

*The*

# ***Communicator***

*November—December 2021*



# **SARC**



*the Bi-monthly Periodical from Surrey Amateur Radio Communications*



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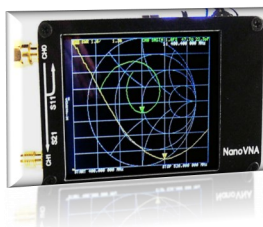
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*A complete Morse project*



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*...and so much more!*



# QRM

---.---.---

...from the Editor's Shack

*Do you have a photo or bit of Ham news to share? An Interesting link?*

*Something to sell or something you are looking for?*

*eMail it to [communicator at ve7sar.net](mailto:communicator@ve7sar.net) for inclusion in this publication.*

Chock full of articles... not ads. That was one of our recent feedback comments, one of many similar ones that we receive. We can do this because we are, or at least started out, as a club newsletter. That newsletter became popular and, here we are with our biggest Communicator ever at 120 pages.

I don't get to do this enough but I would like to express my thanks to my contributing editors, John Brodie VA7XB and Kevin McQuiggin VE7ZD. When my eyes get bleary from looking for typos, they come through with suggestions and interesting content ideas.



Thanks too to the many enthusiasts who contribute articles, pictures and comments.

### ***This Month's Cover...***

*We have cautiously restarted our Antenna Building Workshops as part of our Basic course. Students build their own dual band antenna, trim and tune it, and take it home. Shown are Reg VA7ZEB and Erika, who is one of our current students.*

It is that content that keeps this publication alive and of interest to Amateurs around the globe.

Don't forget that you can access all the back issues of The Communicator on our blog site at: <https://ve7sar.blogspot.com/search/label/SARC%20Communicator> One of my long-postponed projects is to make a comprehensive index of articles over the years, as a handy reference. That will be one of my new year's resolutions.

Heading into the holiday season this is also the time of year to wish all of you and your families a safe and happy time and, from Surrey, BC Canada, all our best wishes for a very happy and prosperous new year?

73,

~ John VE7TI, Editor  
[communicator@ve7sar.net](mailto:communicator@ve7sar.net)

### **On the Web**

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**"Your assumptions are your windows on the world. Scrub them off every once in a while, or the light won't come in." ~ Isaac Asimov**



## The Rest Of The Story...

### *A Canadian propagation researcher*



**John S. Belrose**  
**VE2CV**

John S. (Jack) Belrose was born 24 November 1926 in Warner, Alberta. He attended the University of Cambridge, where he was awarded a PhD in 1958. He worked for the Defence Research Telecommunications Establishment (DRTE) for 33 years. He is a member of the Canadian Amateur Radio Hall of Fame and, along with Walter Cronkite, was awarded the Radio Club of America's Armstrong Medal on 16 November 2007.

Mr. Belrose wrote "Remembrances of a Radio Scientist" excerpts of which are included here. References to 'I' and 'my' in this article are Mr. Belrose himself.

#### ***The Early History of DRTE***

Like nearly all of the Laboratories of the Defence Research Board, DRTE had its origins during WW II. DRTE in the 1950s comprised three laboratories, the Radio Physics Laboratory (RPL), the Communications Laboratory (CL) and the Electronics Laboratory (EL). In 1969 DRTE was transferred to the newly created Department of Communications and renamed Communications Research Centre (CRC). CRC is now under the auspices of Industry Canada.

The Radio Propagation Laboratory evolved from Section 6 of the Operational Intelligence Centre (OIC/6) of the Royal Canadian Navy (RCN) during WW II. It originally occupied small huts on the Prescott Highway, which, in the years 1944-47 housed a naval HF radio station, operating under the call sign CFF. The station received and transmitted messages between Naval Service Headquarters, Allied Authorities, ships at sea, and frequently intercepted enemy transmissions. A name plate now marks the site, which is located south of the Experimental Farm's arboretum, between the Rideau Canal and the Prescott Highway.

During the war, the work of OIC/6 was very directly applied to anti-submarine monitoring and detection problems. Early work was concerned with the application of ionospheric data to communications, detection and direction finding in the HF band. From the outset it was realized that little was known about radio propagation via the ionosphere, and that in the Canadian and North Atlantic latitudes the ionosphere was much more complex and more disturbed than at lower latitudes. Studies of the high latitude ionosphere dominated the research of RPL for more than three decades.

With NRC assistance from C.W. (Bill) McLeish and R.E. Freeman, ionospheric equipment was built and installed in 1942 at the first Canadian ionospheric station at Chelsea, Quebec. It was manned by RCN signalers trained by OIC/6. This station was moved to a small building on the Experimental Farm which was released by the RCN. In 1943, a second RCN ionospheric station was set up at Churchill, Manitoba, in a hut belonging to the Harbour Board. This station was again manned by RCN signalers and directed for two years by R.E. Freeman of NRC. In 1944, the Department of Magnetism of the Carnegie Institution of Washington established an ionospheric station at Clyde River on Baffin Island. This station was taken over by the Department of Transport two years later, and extra stations were established by DOT at Chimo, Quebec, Baker Lake, NWT and Resolute, NWT. The RCAF established ionospheric stations at Torbay, Newfoundland and Portage La Prairie, Manitoba, while the Canadian Army set up similar stations on Signal Hill, Prince Rupert, B.C.

Particularly worth noting in the early history is the story of the RPL Mobile Ionospheric Observatory, mounted in a railroad car, and operated along the railroad between Portage and Churchill for two years (1946/1948). Jack Meek, Del Hansen, Len Hagg, Harold Serson and several others shared in this.

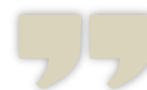
During the latter years of WW II and for a short time afterwards (it came into being in April 1944) a joint committee of the Canadian Armed Services, CBC, NRC and DOT, supervised the policy of ionospheric research in Canada in cooperation with the Central US Committee, on

which there were members from allied countries. This Canadian Committee was named Canadian Radio Wave Propagation Committee (CRWPC). Scientific support for the CRWPC consisted of three scientists, Frank Davies, S/L Jim Scott, and Jack Meek, RCNVR.

Bob Langille was transferred to the growing ionospheric section in 1946 from Army Research and he expanded the activities to continue the Army "Stormy Weather" Radar Project. Both ionospheric and radar research developed to a point at which DRB created the Radio Physics Laboratory in 1948. This grew considerably and was relocated on the present Shirleys Bay Site in completely new and much larger quarters in 1952.

RPL was officially opened on 17 February 1953 by C.M. Drury, Canadian Deputy Minister of National Defence.

Quite separately DRB created the Electronics Laboratory in January 1950. EL began in three small rooms in the then Army's Canadian Signals Research and Development Establishment (CSRDE) in the NRC engineering area east of Ottawa. The unit was later located into an RCAF H-hut in the Rockcliffe RCAF housing area. In 1951 EL moved into a new and much larger building adjoining the Army's CSRDE, and Frank Davies was appointed Superintendent of EL as well as RPL. In 1961, DRB released the EL facilities to NRC, and extended the RPL/CL building at Shirleys Bay to include an EL Wing, naming the considerable laboratory and field area the Defence Research Telecommunications Establishment (DRTE). EL was officially opened on 10 July 1961 by Dr. H.H. Zimmerman, Chairman DRB.



*Particularly worth noting in the early history is the story of the RPL Mobile Ionospheric Observatory, mounted in a railroad car...*

### ***My Formative Years***

These early years had a strong influence on my career-to-be in the field of radio science. Tom Straker a New Zealander and Johanian (a member of St. John's College, Cambridge, and a PhD graduate of Cambridge University), joined RPL in 1950 to become head of the Low Frequency Group. I met him in early spring 1950 on his return trip through Vancouver from Prince George. I was just completing my BAsC degree in Electrical Engineering at the University of BC. The ionosonde at Prince George was recording, during evening and nighttime hours, extra-ordinarily low vertical incidence penetration frequencies, which was of interest to Tom. Very much later we learned that Prince George was located in the "trough region", an evening phenomenon of the nighttime ionosphere at a geomagnetic latitude of 60°.

Tom was instrumental in the research I did at UBC for my MASc degree, since my study program was sponsored by RPL. The title of my thesis was "The Fine Structure of the E-Region." The equipment we used (Peter Niblock and I) was very primitive. virtual height (h') versus frequency recordings were made using a manual ionosonde. But one advantage in taking manual frequency sweeps is that we could make observations between broadcast stations during nighttime hours. Upon completion of my MASc degree I joined Tom Straker's Group, in September 1951, conducting LF antenna and communications research (1951-1953).

Antenna research (study of umbrella top loaded vertical radiators and loop antennas) was carried out in the Bee Hive Area (Area 2). Concerning communications research, trips were made into the north, to Goose Bay, Labrador, and Churchill, Manitoba).

A short story about two amusing incidents follows: The trip to Goose Bay was to assess performance of Canadian Military LF communication systems. The receiving stations employed long wire Beverage antennas, located on the plateau, near to Canadian and US LF transmitters. The problem was to receive LF signals. The Navy Station call sign CFH, located in New Port Corners, NS, had never been received at Goose Bay.

I had a low frequency receiver (an HRO) and a Laboratory constructed loop antenna. I set up my receiving system outside the Receiver Building, and tuned to the frequency of CFH (115 kHz). I told the Military Communication officer: there's the signal, reception is perfectly clear. He said, that sounds exactly like what I hear on my equipment, it is a spurious intermodulation product. I said let us see, it sounds to me like a clear FSK signal. Connect my receiver to your teleprinter. So he connected his teleprinter, which immediately started printing: "CHF Halifax Testing, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 --- CHF Halifax Testing ---". You should have seen the astonishment on his face.

On the Churchill trip we were carrying out communications tests, employing a transportable LF transmitter (built by Del Hansen), for various receive distances between The Pas and Fort Churchill, MB. The LF transmitter was set up at La Pas. Communication back was via HF. Clare McKerrow was at The Pas site. Armour Warrick and I were at the remote sites. Tests between The Pas and Wabowden, and Gillam went well. But while we were in Churchill a polar storm resulted in a black out --- impossibility to communicate on HF between Churchill and The Pas. After 2-days of trying to hear the LF signal, I said to Armour, something is wrong, get on the plane, go to The Pas and find out what the problem is, we should hear the LF signal. When Armour got off the plane, and out to the field site Clare had already started to take down the station. Armour said, put it back on the air. When they made a check on the antenna, Clare found that the alligator clip connecting the antenna to the tuning helix had fallen off!! When connected signals were received at Churchill loud and clear.

Tom was also responsible for my going to Cambridge. I remember one morning Tom telling me: "Belrose (normally he called me Jack, but later I learned that this formality was the method of address that Jack Ratcliffe used), I think you should learn more about the propagation of LF radio waves. I have recommended you for an Athlone Fellowship, and I have written to Jack Ratcliffe, Head of the Radio Group,

Cavendish Laboratories, Cambridge, and The Master of St. John's College, Cambridge, telling them that you are coming." That was the way Tom worked. Concerning writing The Master of St. John's College, one had to be accepted by a college to study at Cambridge. And, of course I had to be accepted by Ratcliffe as a research student in (his) The Radio Group. So it all fell in place, and I left for Cambridge in September 1953, to return in April 1957.

My period of study at Cambridge was fortuitous. On the 30 June 1954 a solar eclipse swept over Norway which was total on a number of the propagation paths I was monitoring. On 23 February 1956, the first ever observed solar proton event occurred. Solar protons were detected at ground level. The effects were marked on the VLF/LF propagation links I was monitoring. My paper in *Nature* (with Kenneth Weeks) was perhaps a first. Solar proton events were studied for more than two solar cycles (22-years) following, by Doris Jelly, Ted Hartz, George Reid, myself and others at DRTE, and by radio scientists all over the world. Solar minimum occurred in the summer of 1954. And (fortuitously) the change from minimum solar activity to maximum activity occurred abruptly within the one year 1956/57. All this provided very interesting observational data for my thesis, the title of which is "Some Investigations of the Propagation of Long and Very Long Radio Waves".

I met my wife Denise (nee Fenal) in 1953 in Cambridge, and we were married (in Paris) in December 1956.

### ***Follow on Research Studies***

For almost two decades my colleagues and I (Ian Bourne, Tim Coyne, Max Burke, Ted Montbriand, Len Bode, Tom Ohno, Lew Hewitt, and Ron Bunker) conducted studies of the D-region of the ionosphere (the ionosphere that lies below a height of about 90 kilometers) by the method of partial reflection of MF waves from the ionosphere; and by LF/VLF propagation (Don Ross, Ben Segal, Tom Ohno, Wilf Lauber, Jean Bertrand and Don Muldrew).

During the latter years of this research we had perhaps the best facilities in the world to conduct such studies. We had 100 kW partial reflection sounders (available power at 2.66 MHz at Ottawa 1000 kW) at Ottawa, Churchill and Resolute Bay. The two sounders at Ottawa employed extensive large antenna arrays, each covering about 12 acres on the ground. The 2.66 MHz 40-dipole array was installed at Area 5 (Ashton transmitter site), supported by twenty 30 metre BC cedar poles. The 6.275 MHz 128-dipole array was installed in Area 2 (the Bee Hive Area).

There were a number of amusing incidents associate with high power transmission, such as finding ones hair standing on end when walking beneath the

transmission line feeding the 40-dipole array when the transmitter power was high (1000 kW). But two amusing stories follow: Len Bode had built the 100 kW transmitters. Tom Ohno built the 1000 kW power amplifier. Terman's *Radio Engineering Handbook* told us that when you construct a tuned grid tuned plate high power amplifier one can anticipate problems, due to parasitic (very high frequency) oscillations. We did have problems, initially. Our transmitter was drive pulsed. When the amplifier went into a parasitic oscillation, it operated in a CW mode. Vividly bright arcs through 30 cm of air could be observed --- and occasionally the main circuit breaker in the building would trip before the circuit breaker in the 20 kV power supply. It would go off with a very loud bang. And besides hearing the bang, Tom and I would be sitting in the dark --- there were no windows in the transmitter building.

On another occasion Chalmers Sechrist, with Sidney Bowhill's (at that time) Group, University of Urbana, Illinois, was visiting us. The Group was attempting to do the partial reflection experiment at their field site. Chalmers was looking at an A-scan (our transmitter power about 350 kW). You certainly have strong E-region echoes Chalmers commented. Chalmers, I said, you are looking at echoes from a height of 50 km, wait, the automatic attenuator will sequentially insert attenuation --- when we have about 50 dB attenuation,



*In the mid-sixties Canadian scientists were in the forefront of those working on high latitude propagation.*

you will see the E-region (110 km) echo. He could not believe it. He had never seen an echo from a height of 50 km.

We had a particular interest in solar eclipses, which for the D-region simulated a sudden transition from day-to-night. Three total eclipses occurred during the course of my studies. For the eclipse of 20 July 1953, I had LF propagation observations only; but we had detailed observational data for the following two eclipses, 7 March 1970 and 10 July 1972. Both of these eclipses were total over East Quoddy, NS. CRC (Len Bode and I) in collaboration with NRC (A.G. (Al) McNamara), and contractual support by Bristol Aerospace, installed a partial reflection sounder, and a rocket launch site at East Quoddy, NS. We launched successfully four rockets into each eclipse, carrying experiments to measure in situ electron density and solar radiation. For the latter eclipse we had, what seems incredible even now, three rockets in the air at the same time, to study the rapid changes that occur right at the time of the total eclipse in the ionosphere.

Our antenna system for the partial reflection experiment was a 4-dipole array, horizontal dipoles phased to provide a circularly polarization signal, directed vertically. But depending on sea state we found we had problems, observed echo signals out to about 70 km range were dominantly sea echoes. We found out years later what the problem was: re-radiated signals by the metal towers supporting our dipole array, which gave a ground wave signal directed

out and over the sea. For an experiment near the ocean, we should have used wooden poles to support our dipole array.

In the mid-sixties Canadian scientists were in the forefront of those working on high latitude propagation. With the launch of the Alouette 1 and 2, and ISIS 1 and 2 satellites, hundreds of scientists all over the world have written hundreds of papers on the ionosphere, on propagation in the ionosphere, and propagation on satellite to ground paths. The total of all Alouette-ISIS papers was almost 700 in 1985.

The VLF receiver which flew on all of these satellites provided a wealth of knowledge about the ionosphere, about ion composition and about high energy particles in the ionosphere. Alouette 1 design engineers were very reluctant at first to even consider the VLF receiver, a receiver which would be connected to the same antenna used by the sounder, the main experiment. But I managed to convince them to fly the experiment by showing (circuit diagram sketched on the back of Keith Brown's cigarette pack) that no switching was required, since the VLF receiver and the sounder could share the same antenna, without interference to the sounder experiment. So finally, almost too late, but in time, Colin Franklin designed the VLF receiver, and it flew.

In latter years I have been concerned with research in the field of computational electromagnetics (antenna problems), and has published several papers on controversial antenna systems:

compact loops (folded dipole or small loop?), and on the crossed field antenna. And (since 1992) researching the history of radio, I have written a number of papers promoting the recognition of the contributions of Canadian born Reginald Aubrey Fessenden (1866-1932) to the development of radio (pointing out that Marconi is not the inventor of the technology).

### ***Closing Remarks***

During the period 1976-1993 I was Canadian Panel Co-ordinator for the AGARD (Advisory Group for Aerospace Research and Development) Electromagnetic Propagation Panel of NATO. I was Deputy and then Chairman of that Panel from 1979-1983. I was Technical Program Chairman/co-chairman of several AGARD/EPP symposiums and specialists meetings, and Lecture Series Director for two AGARD LS on antennas (one on performance of antennas in their operational environments and one on modern antenna design using computers and measurement). My lecture notes entitled "HF Communications and Remote Sensing in the High Latitude Region", AGARD LS Media

Effects on Electronic Systems in the High Latitude Region, is particularly worth noting, since it summarizes three decades of research at CRC by the myself, and particularly by my colleagues.

I am Technical Advisor to the American Radio Relay League in the areas of radio communications technology, antennas and propagation (since 1981), and I have published many articles in QST, QEX, Ham Radio, Communications Quarterly, and in several articles in The ARRL Antenna Compendium series publications (my latest article is to be published in Volume 7) . I am a Fellow of The Radio Club of America, and a Senior Life Member of the IEEE (Antennas and Propagation Society). I have been a licensed radio amateur since 1947 (present call sign VE2CV). The station license for the CRC amateur radio station (such as it is nowadays) VY9CRC is held in my name.

~ <http://www.friendsofcrc.ca/Articles/Belrose-EarlyYears/Belrose%20remembrances.html>

~

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Just scan this QR-code with your cellphone camera or click on <https://ve7sar.blogspot.com/search/label/The%20Communicator>





## The Shack

John Miklor K3NXU

### *Frustrated with that generic programming cable?*



***This \$2 solution might just be your ticket to sanity.***

Let's See...

You purchased a radio and programming cable, loaded the software, and that's as far as you've gotten. You're fighting with error messages:

- Radio did not respond
- Could not open COM port
- Run Time Error

and Windows (TM) 10 keeps changing your drivers.

Now you do what many owners do. Put the radio in the drawer to be worked on later. This is like buying a roll-away treadmill and putting it in the closet until the next time you want to exercise (NOT going to happen).



But wait, yours has the company name and logo right on the cable.

It doesn't matter. Keep reading.

There are a few options available, such as an FTDI cable. It's truly Plug 'n Play, and costs about \$20.

But here's a project that just might solve the issue for around \$2. All you need is a small flat blade screwdriver, a soldering pencil, and a CP2102 board.

### **CP2102**

The CP2102 is a USB to TTL UART chip. What? Long story short... It's the same thing that's in your current cable now, except these work. CP2102 boards can be found on eBay for around \$2 and on Amazon.

### **Here's How**

Let's start with that original cable (*image top left*). Take a small screw driver and pry the open the case from the back where the cable enters (*image middle left*). It should only be snapped together (*image bottom left*).

Unsolder the 3 wires connected to the board. GND is Black, TX is Red, RX is White (*images next page*).

Solder the 3 wires to the corresponding terminals on the new board.

*Note 1:* Some boards may have the TxD and RxD reversed. If it doesn't work the first time, reverse the two wires. No damage has been done.

**Note 2:** Some boards have pins on the back requiring small connectors. You can either remove the pins, solder to them, or use the connectors (Whatever floats your boat.)

### Driver

When you insert the new board into the USB port, give Windows a chance to find and load the new driver. Should take about 30 seconds. When it says 'Driver Found', you're done.

If the driver is labeled CH340 instead of CP210x in Device Manager, that's not a problem. Both chips are designed to do the same thing.

But I don't have a cable...

If you don't have a generic cable, you can use 2.5 and 3.5mm stereo jacks. Here are the pin outs, and what Jim's (KC9HI) cable looks like (*images center right*).

### Cosmetics

If you are adventurous, try retrofitting the new board inside the original plastic housing. This will require a Dremel tool, X-Acto knife, Glue, and some patience, but it can be done.

If the board only has 5 terminals instead of 6, it's not an issue. You only need GND, TX and RX.

Some come protected with a piece of clear heat shrink over the board so you can see the cool blinking lights.

**Note 3:** If you are trying to retrofit the board inside an existing shell, the red board (*below right*) is a bit shorter and easier to fit. For about a dollar or so more, you can find the same boards in a metal case.

What's the Advantage?

- First and Foremost, it works. Take the radio out of the drawer, program it and have some fun.
- Next, it only cost around \$2 to save the generic cable from the trash.
- Very Important... Bragging Rights. Now, when you go to a club meeting and someone says they can't get their cable to work, tell them they can build their own, just as you did.

I hope you had fun with this project. It's super simple and very rewarding. I've made several and never had a failure. Say goodbye to driver issues.

My thanks to Jim KC9HI for his input on this project

More Information: Miklor.com

~ John K3NXU

<http://www.miklor.com>



GND is Black, TX is Red, RX is White



Solder the 3 wires to the corresponding terminals on the new board



Here are the pin outs, and what Jim's (KC9HI) cable looks like



The red board is a bit shorter and easier to fit

## Page 12—News You Can't Lose

### *ARRL, RSGB announce joint events to celebrate centenary*

ARRL and the Radio Society of Great Britain will jointly sponsor events to celebrate the achievement of transatlantic communications by radio amateurs 100 years ago.

In December 1921, ARRL sent Paul F. Godley, 2ZE, as its representative to listen for amateur signals from North America during the Second Transatlantic Tests. Setting up his listening station in Ardrossan, on the west coast of Scotland, Godley received the signals of more than 2 dozen US amateur radio stations, the first on December 12 (UTC) from 1BCG in Connecticut, operated by members of the Radio Club of America. The message read: “Nr 1 NY ck 12 to Paul Godley, Ardrossan, Scotland. Hearty Congratulations. (Signed) Burghard Inman Grinan Armstrong Amy Cronkhite.”

These successful transatlantic tests and the ones that followed would spur technological advances and new global wireless distance records. Several amateur radio operating events this year and next will commemorate the centenary of these significant milestones that heralded the dawn of two-way international amateur radio communication.

ARRL and RSGB will activate special event stations for 6 hours (0200 - 0800 UTC) on December 12 for the 160-Meter Transatlantic Centenary QSO Party. The RSGB will activate GB2ZE from Scotland, with a team of stations from the GMDX Group sharing operating duties. ARRL will activate W1AW. The stations will operate only on CW. If transatlantic

propagation holds up, the stations may continue to operate beyond 0800 UTC.

The GMDX Group of Scotland will award a quaich — a traditional Scottish drinking cup representing friendship — to the first stations in North America and the UK to complete contacts with both W1AW and GB2ZE during the QSO Party. A commemorative certificate will be available for download.

The RSGB and ARRL are also organizing an international amateur radio marathon on the HF bands to commemorate transatlantic tests held between 1921 and 1923. The Transatlantic Centenary Marathon will take place in December 2022.

ARRL and RSGB have assembled a list of stations and groups that are also organizing events and activities to celebrate 100 years of amateur radio transatlantic communication. For more information, visit [arrrl.org/transatlantic](http://arrrl.org/transatlantic) and [rsgb.org/transatlantic-tests](http://rsgb.org/transatlantic-tests). The sites also include links to many previously published articles and presentations covering the historic tests.

#### **Additional events and commemorations**

**Radio Club of America (RCA)** Transatlantic QSO Party, 1200 UTC on November 13 to 0400 UTC November 14, 2021 (16 hours total). The QSO Party commemorates the contribution of members of the Radio Club of America, who constructed and operated the 1BCG

transmitter site in Greenwich, Connecticut, that sent the first message received by Paul Godley, 2ZE, in Scotland.

**W1AW Commemorative Transatlantic QSL Card.** Stations making contact with Hiram Percy Maxim Memorial Station W1AW between December 11, 2021, and December 31, 2022, qualify to receive a commemorative W1AW QSL card. US stations should QSL with a SASE; international stations should QSL via the Bureau.

**The 2021 ARRL 160-Meter Contest,** 2200 UTC on December 3 - 1559 UTC on December 5. This 42-hour CW-only contest is most similar to the original Transatlantic Tests of the early 1920s. Stations in the US and Canada work each other as well as DXCC entities. The RSGB is planning to activate one of the original call signs used in the Transatlantic Tests. Look for G6XX (England); GD6XX (Isle of Man); GI6XX (Northern Ireland); GJ6XX (Jersey); GM6XX (Scotland); GU6XX (Guernsey), and GW6XX (Wales).

**Special Event GB1002ZE,** December 1 - 26, 2021. The Crocodile Rock Amateur Group (CRAG) based near Ardrossan, Scotland, will activate the special event station GB1002ZE. The RSGB encourages stations in the UK and Crown Dependencies to append the suffix “/2ZE” to their station’s normal call sign throughout the period, as authorized by UK regulator Ofcom.

~ ARRL

# Page 13—News You Can Lose

The Lighter Side of Amateur Radio

**Multi-band transceiver tunes both sidebands simultaneously**

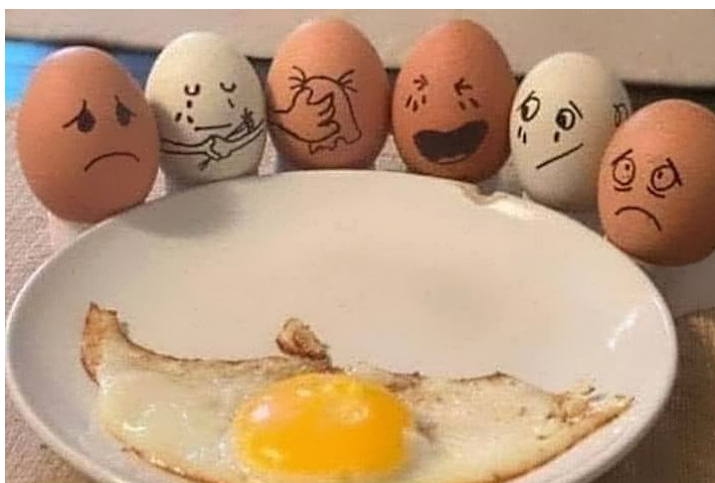


**Upton Snodsbury, UK—A Communicator exclusive.**

October 31, 2021—In a radical new development, Horace Blink MY2EAR has developed a new multi-band transceiver that can tune both upper and lower sidebands simultaneously.

Horace is shown in a local park demonstrating the device and the 360 degree rotatable platform on which it is built.

He told 'The Communicator' that the next step before large scale production is finding a method to use it indoors as he has experienced numbness in his extremities during foul weather use.



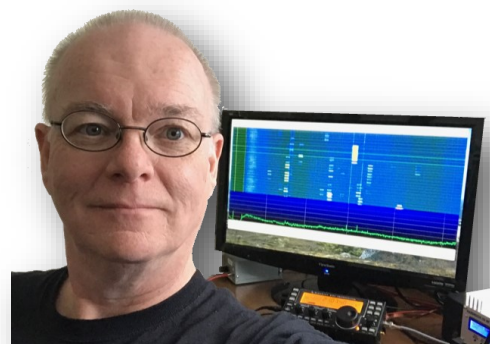
*Millie Henry died last fry day, victim of an unfortunate run-in with an induction stove.*

*Thank God she wasn't beaten. Don't worry, she went over easy, is now on the sunny side, and she resonates in a better plate.*

# Radio Ramblings

## EME update

Kevin McQuiggin VE7ZD/KN7Q



Last issue I described my effort to get a 23cm EME (moonbounce) station set up and operational, and my first contacts on this exciting new mode. I have made about three dozen QSOs with stations in North America and in Europe. As I predicted, my operation on EME over the past few months has driven me towards a decision to improve the antenna system I am using on the band.

Figure 1 – The Loop Yagis



This will be a project that combines both “buy” and “build”, in that I am buying some new equipment, but I will also roll up my sleeves and design some aspects of the new antenna system from scratch. I am partnering with a friend on this, and we both expect to learn a lot.

The project should take about six months to complete, and it’s the subject of this issue’s column.

My two loop Yagi antennas as described in the last issue of The Communicator (see Figure 1) are working quite well, but the fact of the matter is that their low gain, and more importantly their linear polarization has greatly limited my ability to hear (and work) other EME stations. As we know from the basic amateur radio course, polarization mismatches between transmitting and receiving antennas can reduce apparent signal strengths by half (3 dB).

While I have now made a few dozen EME QSOs, my inability to hear smaller stations (and their inability to hear me) means that to achieve consistent performance “off of the moon” I need to improve my antenna system. I decided to upgrade from a linearly polarized Yagi array to a circularly polarized parabolic dish antenna.

This month I will describe the new antenna and rotator unit which will be delivered later this fall and describe the work I am doing with my friend Dennis

AC7FT to develop a new rotator controller which will point the dish to a very high level of accuracy. This project is a nice learning opportunity and will give me a chance to learn all about an advanced operating system which runs on embedded microcontrollers.

My new antenna is shown in Figure 2. It is a 2.4-metre diameter folding parabolic dish that was designed by Paul Andrews, W2HRO. Paul is a very experienced EME operator. The surface of the dish is made of a radio-reflective fabric that is stretched to a parabolic shape by the clever design of the ribs which support the antenna. The feed point is adjustable and incorporates the capability of selecting either linear or circular polarization of the detected and transmitted signals.

The dish weighs under 10 kilograms and can be folded up (kind of like a patio umbrella), removed from its mounting bracket and stored when it is not in use [2]. This aspect had great appeal to me, as I will be able to operate EME (and other microwave work) using a “portable” setup as well as from the backyard at home. It also appealed to my XYL Laura, VE7LPM, who shares my concern about limiting the number of antennas which are permanently deployed in our backyard.

The parabolic dish will replace my two 45-element loop Yagis and offer a practical gain improvement over them of about 8 decibels. This is an improvement of about  $10^{0.8}$  (or 6.3 times) in receiver sensitivity and apparent transmitted signal strength. With this additional gain I will be able to hear and work lots of EME stations that were too faint to copy before.

At UHF and above, parabolic dish antennas have several advantages over Yagi arrays. They offer more gain in relation to physical size of the antenna system, mechanical advantage in terms of ease of mounting and alignment of the antenna, and the capability of selecting and adjusting the polarization of the antenna system. I'll describe each of these factors in a bit more detail.

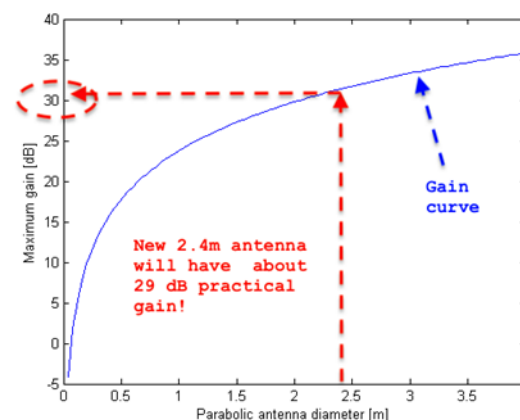
### A) Gain:

Gain increases rapidly with the diameter of a parabolic antenna. Gain of the antenna is related to the ratio of antenna diameter over signal wavelength. At UHF and above, the size of parabolic antennas is small enough to make them of practical use [3]. A 2.4 metre dish at 1296 MHz produces about 29 dB gain. See Figure 3. Achieving 29 dB gain using Yagis is impractical because a single dish can provide better performance in a “smaller package”, with simpler mechanical and feed requirements, and at lower cost.



Figure 2 – New Antenna - Folding Parabolic Dish by W2HRO [1]

Figure 3 – Parabolic Antenna Gain vs Diameter [4]





*I should see additional signal improvement (for both transmit and receive) due to my change from linear to circular polarization.*

## **B) Mechanical Advantage:**

Parabolic antennas are compact units that are easy to mount and keep aligned towards their objective. For a given gain figure, a single dish can provide performance equivalent to an array of 4, 8 or even 16 Yagi antennas. Keeping this many Yagis rigidly mounted and in proper alignment and being able to rotate them in azimuth and elevation accurately is a significant mechanical problem.

For example, my two loop Yagis give me about 21 dB gain. For an 8 dB improvement in performance to the 29 dB gain of a single 2.4m dish, I would need to increase the number of Yagis I am using from 2 to 12. This would be a large, heavy, and unwieldy antenna array! Mounting, aligning, turning, and feeding 12 Yagis is not a simple (or cheap) problem to solve.

## **C) Selectable Polarization:**

An advantage I have only mentioned briefly so far is the capability of parabolic antennas to transmit and receive circularly polarized signals. Circular polarization is the norm on 23cm EME, and linearly polarized antennas such as the Yagis in my current configuration are subject to up to 3 dB of loss due to polarization mismatch. 3 dB is significant: signals are only half as strong as they could be!

In addition to the 8 dB of gain I will achieve by moving to a parabolic antenna, I should see additional signal improvement (for both transmit and receive) due to my change from linear to circular polarization.

## ***Pointing a Dish Antenna***

Parabolic dish antennas are generally used at UHF frequencies and above for terrestrial and satellite/EME work. As such they are usually mounted to be pointable both in azimuth and elevation. The narrow beamwidth of parabolic antennas, however, means that rotators which move the dish need to be much more accurate than those which are normally used at HF, or even for low earth orbiting (LEO) satellite work at UHF/VHF frequencies.

HF rotators and rotator combinations offered by the major manufacturers such as Hy-Gain, Kenwood and Yaesu have a best-case resolution of about plus-or-minus  $\pm 3$  degrees. If you turn your HF rotator to 135 degrees azimuth, for example, the specifications say that the actual direction your antenna will be pointing will be somewhere between 132 and 138 degrees: there is a 6-degree window of error.

This is fine for HF, where big Yagis have half-power beamwidths on the order of 15-20 degrees, and even for small VHF+ Yagi arrays (like my original two loop Yagis) with broader radiation patterns. Pointing an antenna or antenna array with a 15-degree beamwidth  $\pm 3$  degrees at a target (such as a satellite or the moon) will usually put a fair percentage of the antenna radiation on the target. At HF, it'll work just fine.

Larger parabolic dishes, however, can have beamwidths on the order of only a few degrees. All the power (or received signal power) is concentrated in a much narrower beam from the antenna. Pointing

such an antenna with an accuracy of only  $\pm 3$  degrees may mean that the signal actually misses the target (i.e. the moon) completely. Greater accuracy is needed than can be provided with standard HF-style rotators.

The solution to this problem is to use a rotator with higher pointing accuracy. These rotators commonly employ DC-based motors called “slew drives” which can be driven to accuracies of 0.1 degree by suitable electronic control units. See an example in Figure 4.

Dennis AC7FT and I each purchased one of these dual-axis drives to point our new 2.4m parabolic dishes. We hope to be able to point our new parabolic antennas with 0.1-degree accuracy in both azimuth and elevation as part of this project. In addition to accurate lunar pointing for 23cm EME, we hope also to be able to try receiving signals from deep space probes enroute to the planets. We will also be able to point at distant stars for some amateur radio astronomy. There is an amateur radio group called “Amateur-DSN” that does this sort of thing [12].

While we purchased the dual-axis slew drives, what we didn’t purchase was the dual-axis controller unit that will drive these rotators: now to the “new project” part of this column!

### ***A Big Decision on the Control Unit***

The commercial rotator controller units for slew drives are quite expensive. Dennis and I discussed this, and after several “Hamshack Hotline” phone calls [9] we came to a decision that reflects the “learning” philosophy of amateur radio. We decided that rather than buying a control unit, we would undertake a project to design the slew drive controller solution ourselves.

Dennis is an electronic engineer and has spent his career designing radio systems and associated equipment. I have extensive experience in software development, including in the development of embedded systems which interact with hardware at a very low level. We figured that we could learn a lot by taking on this portion of the new antenna project ourselves. We decided on a suitable division of labour: Dennis will be primarily responsible for the interface to the slew drives and motor control, while I will be responsible for the software which will run on our new slew drive controller device.

While this project will delay full deployment of our new antennas by likely several months, the value in the learning opportunity is, in our opinion, worth the delay. We are hoping that we can have a working controller by early 2022.

Neither of us have designed a controller like this before, but we have confidence that we can get the unit designed, built and working. It will be fun, and we will learn a lot! As a backup plan (should we somehow fail to get our controller working) we can always buy one of the commercial controller units.

### ***The Microcontroller***

We have made some initial design decisions. A microcontroller will serve as the “brain” of our new unit. Our slew drive controller device will be based on an 8-bit microcontroller (CPU) called the



*Figure 4 – DC-based Slew Drive  
High Accuracy Rotator*

ATMEGA1284P from Microchip [5]. This chip contains 128 KB of programmable read-only memory (EPROM) which will be used to store the program that runs on the chip, and 16 KB RAM as working memory to store variables and data structures used to communicate with the user and the rotator controller motors. Microchip CPUs are used in millions of consumer products. They are low cost and very reliable.

What will be different about our implementation is that we will be running a multitasking operating system on the chip. A multitasking operating system allows the CPU to support several tasks in parallel and automatically switch between them as hardware events occur, or when tasks require specific timing.

We will need this capability in our slew drive controller because we will have two independent rotational axes to worry about (azimuth and elevation), plus we will also need to interact with the user and his/her computer concurrently. Multitasking is the logical solution.

dedicated microcontroller such as the ATMEGA1284P and a free multitasking operating system will satisfy our requirements in a smaller footprint, and at much lower cost.

### FreeRTOS

In the larger-systems world, Windows, MacOS and Linux are examples of multitasking operating systems. In the “embedded world” (i.e., systems based on microcontrollers) an open source operating system (OS) called “FreeRTOS” is commonly used in industry and in academia to run multiple tasks on a single microcontroller. FreeRTOS [6] is a mature product; it is well-documented, has a good support infrastructure, and is used by thousands of developers.



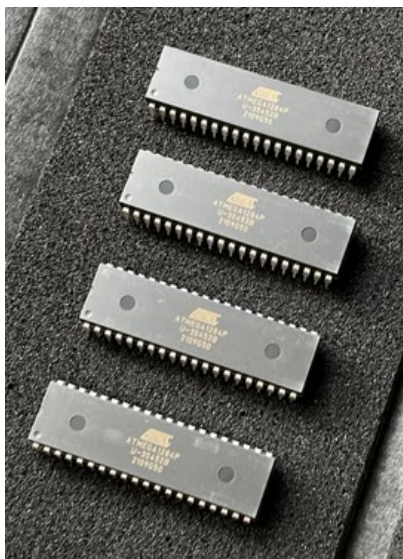
Figure 5 – FreeRTOS Logo

I had never used FreeRTOS, but I thought that I would be able to figure it out. I headed to the web site (<https://www.freertos.org>), downloaded the OS and its documentation, and hit the books.

### First Steps

Dennis has started on the motor controller circuitry, and I bought four 8-bit ATMEGA1284P chips from Digikey for about \$7 each (see Figure 6). Digikey has incredible delivery channels: the chips arrived the very next day. I needed one device to experiment with, but I wanted to have a few spares in

Figure 6 – Four \$7 CPUs



We discussed using a small computer with a multitasking operating system, such as the ubiquitous “Raspberry Pi” (rPi) instead of a microcontroller for this project. After some debate, however, we felt that the overhead and higher cost of the rPi device would make a dedicated microcontroller a better solution. The rPi would be capable of doing what we need to do, but it’d be “overkill”: too advanced for our purpose. The rPi contains a lot of components (both hardware and in its OS) that we will not need. Use of a

case I blew the first device up! I will never doubt my ability to hook stuff up backwards!

The first thing to do with a new computing project like this is to get the CPU running and try something very simple, like attaching some LEDs to the chip and writing a program to blink them. This was my first goal.

Once this first step is complete, further work can then build on the previous step: like climbing a staircase, you take one step at a time, and before you know it (and with lots of perseverance due to inevitable errors) you end up on the roof of the building! I needed to take my first step.

I read the FreeRTOS documentation and learned about its implementation of multitasking, and for a first experiment decided that I would try to blink a single LED that connected to one of the CPU's input/output (I/O) lines.

Setting up a minimal computer system with most small microcontrollers is actually very easy; with Microchip's AVR devices you just need a couple of capacitors and a 3-5 VDC power supply to get the CPU to come up and accept instructions. The datasheet [7] for the chip will always include a schematic for building a basic system using the microcontroller. See Figure 7 for an example from <https://hackaday.io> [10]. What could go wrong?

I put together a minimal system on a reusable "breadboard" (see Figure 8), attached an LED to one of the CPU's I/O lines, and wrote a short program that would blink the LED once per second.

In the microcontroller world, you write your programs in a high-level programming language like "C" on a desktop or laptop computer, compile and link it, and then upload the binary code to the CPU's EPROM via a 6-wire cable that is well described in the manufacturer's documentation.

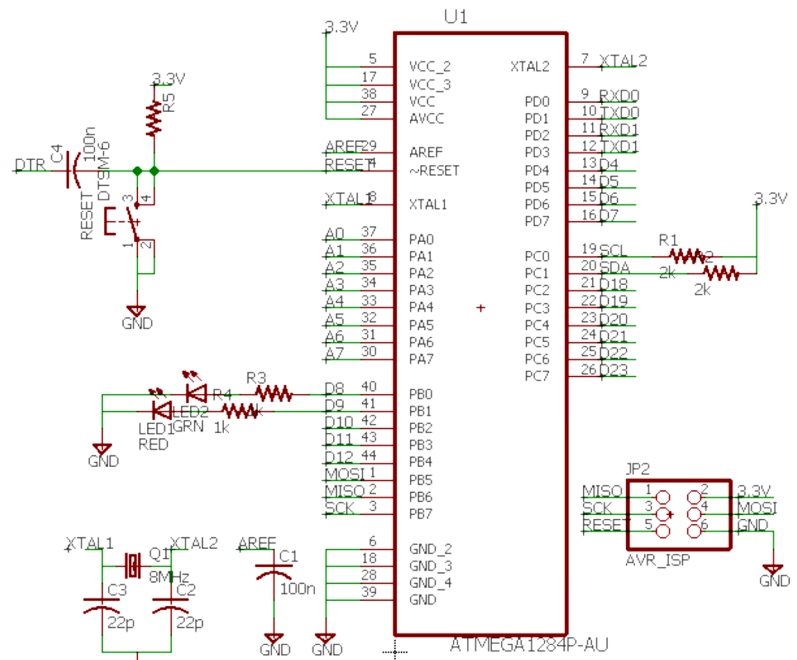


Figure 7 – Schematic of Basic ATMEGA1284P System

Once the code has been loaded onto the chip, it resets and starts running your program.

There are free utilities [8] which run on your desktop/laptop that do this compilation and loading of the chip's EPROM for you. After a bit of reading and some experimentation you will be on your way.

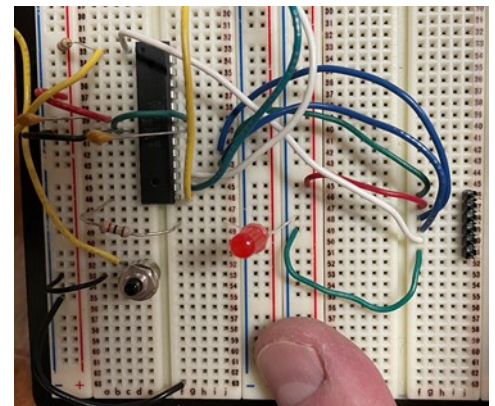


Figure 8 – Initial "Computer System" with Fancy Single LED Output

After some fiddling with the installation processes for avr-gcc and avrdude [8] and getting the bugs out of the compile-link-loading process, I had an operational (if very basic) microcomputer. My "blink" program loaded and ran.

You'll have a real feeling of achievement when that LED starts blinking the first time!

For the next step, I added three more LEDs and set them to run in separate "tasks" (in the larger-computer world we call them "processes" or "threads") so that they all blinked at different rates. I had a bit more reading to do to achieve this. I modified my program from the first step by adding three more tasks. I was new to FreeRTOS: after correcting the inevitable errors, this program worked as well.

So far so good...

### **A Second Step**

The next step was to add the capability for the computer to interact with a user via one of its serial ports while the OS continues to blink the four LEDs. I wanted the computer to generate a command prompt and let the user to be able to enter a command that tells the system to change the blinking rate for each of the LEDs.

This is a "tried and true" way of building high quality software: it is based on an incremental approach, where basic functionality is augmented step by step towards the end goal. It is very efficient because you are continually extending a working program. If a new step doesn't work, then you know exactly where to look (i.e., at the newly-added code) to find the problem.

This incremental approach applies equally well to the design of hardware, or even antenna systems. Start with something very simple, get it working, and then extend it little by little to build a fully capable device, antenna, or computer program. It's a far more successful approach than trying to design and build a complex device or a fully-functional computer program from scratch.

In the larger scope of this project, the basic "blinkerlights" [11] functionality will eventually be extended so that the user can connect to the control unit via their home network, as well as through a serial (and eventually, a USB) port. Ethernet and TCP/IP interfacing will be added to the system via an additional IC once I have the basic serial communications functions working.

Dennis will complete the motor interfacing, we will work to get the microcontroller talking to the motors (the motor control lines will replace the blinking LEDs), and we will eventually have a working controller. We think that we can finish this over the winter and be ready to use the slew drives with our new parabolic antennas next spring.

This is where I am currently at with the project. The LEDs are blinking, and their rates are controllable via serial port commands given by a user. There is much more to do, but so far, so good!

It will be clear sailing once I understand FreeRTOS a bit better. I am having some problems with getting the serial port to interact consistently with user input. The serial port is "hanging" or getting stuck at certain times, and I don't know exactly what is wrong. It is a bit of a puzzle, but I have narrowed down the bug to a couple of OS routines that I don't fully understand yet. More reading and research and I will figure it out!

### **Conclusion**

That's it for this month. I will provide an update on this project next issue - maybe the controller will actually be moving the slew drives by then.

Thanks for reading these "ramblings"; I hope that you find the columns interesting.

Lastly, this issue of The Communicator will span the Christmas holiday season, so I want to wish all the best to you and your families as the end of 2021 approaches. I hope that everyone gets on the air and makes some great QSOs during the holidays!

Feedback on this article can be directed to the [Editor](#), or directly to me at [mcquiggi@sfu.ca](mailto:mcquiggi@sfu.ca).

73,

~ Kevin VE7ZD / KN7Q

## References:

[1] See <https://www.qrz.com/db/w2hro>.

[2] Video of folding dish at <https://www.youtube.com/watch?v=p66s1jF7760>

[3] See [https://en.wikipedia.org/wiki/Parabolic\\_antenna](https://en.wikipedia.org/wiki/Parabolic_antenna)

[4] Base graphic from [https://www.researchgate.net/figure/a-The-offset-parabolic-antenna-b-theoretical-gain-vs-diameter-of-a-parabolic\\_fig3\\_335730140](https://www.researchgate.net/figure/a-The-offset-parabolic-antenna-b-theoretical-gain-vs-diameter-of-a-parabolic_fig3_335730140)

[5] Microchip and the AVR class of microcontrollers are at <https://www.microchip.com/en-us/products/microcontrollers-and-microprocessors/8-bit-mcus/avr-mcus>

[6] See <https://freertos.org>

[7] ATMEGA1284P datasheet at <https://ww1.microchip.com/downloads/DeviceDoc/doc8059.pdf>

[8] Compiler “avr-gcc” at <http://savannah.nongnu.org/projects/avr-libc/>, and firmware loader “avrdude” at <http://savannah.nongnu.org/projects/avrdude>

[9] “Hamshack Hotline” is an excellent, free VOIP service for amateur radio operators run by hams, for hams. I use it daily. While it is an Internet-based service, and therefore not classic “ham radio”, it nonetheless helps you keep in touch with ham friends worldwide in a very convenient way. HH has been described before in The Communicator. See <https://hamshackhotline.com>.

[10] See <https://cdn.hackaday.io/images/1039641408039150849.png>

[11] A term used in computing/hardware design since the 1970s that recognizes that implementing very basic functionality and then building on that incrementally is a good way to start a more complex project!

[12] The “Amateur Deep Space Network” has a web presence at <https://groups.io/g/Amateur-DSN>.





# Emergency Comms

Ham Radio Making A Difference

Tom Cox VE6TOX



## Four uses of the

Tom Cox (VE6TOX) is the Senior ICS Consultant with the Alberta Emergency Management Agency and a Master Instructor with ICS Canada.

He has taught over 400 ICS instructors in Canada, conducts professional development workshops across North America and has written extensively on ICS and ICS instruction.

He received his first ICS training as a volunteer with the City of Vancouver and the Vancouver Emergency Community Telecommunications Organization (VECTOR).

For amateur radio to apply the Incident Command System (ICS) concepts correctly, you must understand “What is the problem?” and “Whose Problem is it?” Not everything is going to be your problem and not every response requires Amateur Radio.

There are four uses of ICS that you can use to understand when ICS is used and how you fit within the ICS organization: Events, support to events, event safety, and Incidents/event Incidents. Each one requires a different understanding of how ICS would be applied.

### ***Applying ICS to Manage Events***

When I teach ICS, it drives me crazy when responders respond to the question “How can ICS be used for public events?” with “Fire, police, ambulance!”

This demonstrates the right attitude of public safety being a priority and an Incident Command Priority. But safety is not the reason we run events, nor is it way we organize an event. In the classroom, I immediately separate safety from

the purpose of the event. The reason we hold a child’s birthday party is not “To be safe!”. Safety is how we will run the party. A child’s birthday party does not require fire, police, and EMS to be on scene. Safety is still a priority, but safety is not the focus, safety does not require the emergency services, and safety is a different concept from “saving”.

Safety exists before, during and after any Incident or event. Safety is a condition; safety is never an absolute. Safety exists when you cross a street, buckle up when driving your car, and is different if you are running on a hot day, a freezing cold day, or if you have pre-existing heart conditions. You don’t need fire/police/EMS every time you go for a run.

You will never run an event if there is a certain threat to the lives of the attendees or if it will destroy the environment. But we always run events knowing there is a level of risk. Car races may hurt drivers or spectators. Bungee jumping sometimes goes wrong, as does sky-diving and scuba diving.

We don't have fire/police/EMS for everyone who jumps out of a plane.

It is best to replace the response concepts of response and Objectives with "Activities". Events are defined by things to see and things to do. For a public emergency preparedness event, you may wish to show capabilities, equipment, and encourage the public to join your organization. For a country music festival, the activities may include stages with music, a beer tent, and camping. For the Olympics, it is specific competitions, opening and closing ceremonies, and the torch relay. And for a marathon, the activities may include fun runs, half-marathons, a wheel-chair marathon as well as the full men's and women's marathons. For Field Day, the activities might be the different modes you intend to use and bonus points for having public officials visit.

When using ICS to manage a pre-planned event, use "Activities" to describe what attendees will see and/or do. ICS can then be used to ensure these activities go ahead as planned.

### **Event Safety**

When the activities have been determined, then the discussion can begin on public safety and the ICS requirements to address the increased risk. But increased risk does not automatically mean you will even have any Incidents. It just increases the potential for an Incident.

The nature of the activities, the location of the event, the time of year, and the number of attendees all must be considered in evaluating the safety aspects of the event and the required mitigation. For a children's birthday party, safety is simply having an adult on scene and having a phone to call 911. No fire, police, EMS required.

But the country music festival means the nearest response might be 30 minutes away. The volume of the music may reduce the effectiveness of any response. A crowd in the open during tornado season is less safe than a crowd outside of tornado season. The security of a beer tent full of drunken cowboys isn't just "phone 911", and finding a tent with no street address in a campground full of partying adults means the response will always be more difficult. You need a box on the organization chart in addition to the activities. This box is labelled "Public Safety" and must be staffed according to the likely hazards, increased risks, challenges of location, and numbers of attendees. But this is NOT an Incident Command box. It is a "public safety" box. If there are no Incidents, no accidents, and no threats to life or property, there never is an Incident, Incident Commander, or response. Safety here is "in case".

Depending on the nature of the event and size of the crowd, the "Public Safety" box under Operations may be small or quite large. When the events is the Olympics or the G20 leaders

meeting, then "Safety/Security" may be a huge beast.

Should an Incident occur, then Incident Command is instituted. Before any Incident, it is simply an event with things people want to see and do.

### **Event Support Activities**

There may be multiple versions of ICS used during an event. At this point, I immediately start to sort out "What is the problem and whose problem is it?" When I worked with the Vancouver or Edmonton Marathon, they could use ICS to organize the activities of the marathon. My role was either to provide first aid to the participants and event volunteers (with St. John Ambulance Brigade) or event communications (with Vector Amateur Radio Communications).

If we were in the box marked "Medical" under Operations, providing medical assistance to the marathon runners and occasionally to the volunteers/organizers, we might use our own ICS organization to support our activities. To the public and organizers, it was simply "Medical". For us, it was transporting volunteers to the course medical tents, obtaining supplies, dispatching bike teams, liaising with EMS/police/event organizers, and scheduling shifts for set-up, during the event, and take-down.

For the event organizers, it appeared there was just one representative in charge of the box. For us, it was an entire ICS



*An emergency plan should identify the likely hazards, pre-determined best response, and role of volunteers to support emergency response efforts.*

structure to support the role the box was there to perform. Boxes labelled “Route Control” or “food” or “communications” for amateur radio might benefit from having an Incident Command structure to “fill the box” and ensure it is efficient.

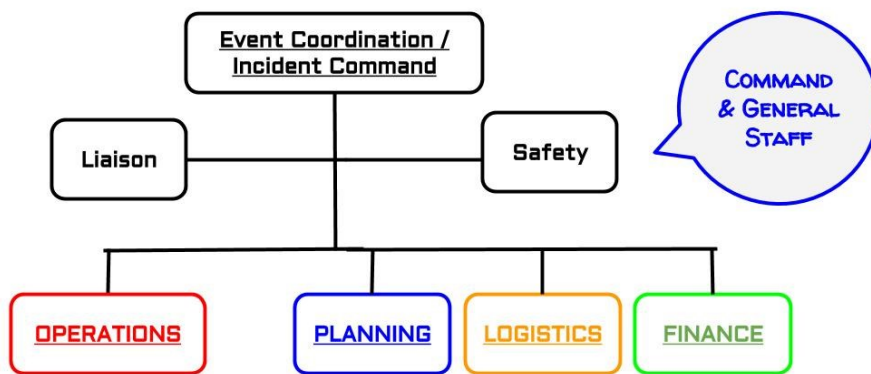
This is perfectly acceptable. With one caveat. For the person in charge of the organization and ensuring the organization fills the designated role required by that box on the organization chart, you are acting with the same authority and responsibilities as an Incident Commander would have. But you are not the Incident Commander. You are only in charge of one box, you are supporting an event rather than an Incident, and you are not in charge of the entire event. Don’t call yourself “Incident Commander”.

All the advantages of ICS can be used to organize not only the event as a whole, but many of the activities within a single box on the event organization chart. If you are extremely competent and capable with ICS, then that box may be the least of the organizer’s worries during an event.

## Event Incidents and Incidents

A fun day can turn bad real fast as a Utah ultramarathon found out on October 9th.<sup>1</sup> From a hail storm during a marathon, severe weather during the music festival, a large fire in the event parking lot, or a terrorist incident like the Boston Marathon bombing, events and Incidents often overlap. This is where a lot of emergency management professionals make a huge error. They assume they will have to do everything themselves. But in recognizing the distinctions between the event, event activities, public safety, and Incident response, all aspects can be addressed more efficiently and effectively.

Organize the event activities and list them under Operations. Add the public safety mitigation box under Operations. Discuss the most likely hazards, incidents, and planned responses. Clarify roles for each. A fight in the beer tent doesn’t require shutting down the whole music festival. A train blocking the marathon route might impact all aspects of the event without having a single risk to life. Severe weather will threaten all lives.



ICS uses a standard system of naming sections and the positions within those sections.

An emergency plan should identify the likely hazards, pre-determined best response, and role of volunteers to support emergency response efforts. A fight in the beer tent may require security and volunteers to stop alcohol service, assist police in separating groups (safely) and stopping new patrons from entering while allowing those inside to escape the threat and reduce the tensions. A heat wave may require emergency water distribution, identify the locations of hoses and water supplies, and reorganizing of event schedules.

A tornado warning may require ending the event or postponing it for a day.

The key is that if all event organizers and volunteers understand the distinction between event and incident, the difference between the event organizers and an event Incident Commander, and have an understanding of the emergency plan, the police/fire/EMS response can be faster and more efficient if all the volunteers are at the direction of the Incident response. The beer sales can be stopped, the music bowl cleared, and those camping warned faster and more efficiently than if the emergency services try to do it by themselves.

The Utah ultramarathon, however, is a great demonstration of how the volunteers become “immediate responders” before the first responders arrived: “That is when Kilgore and Garrison called off the race. The decision was relayed to all the aid stations, and volunteers were told to head to the first station to wait for runners and get them off the mountain.”<sup>2</sup>

Having volunteers understand what the most likely hazards are during an event and providing them with clear direction on what to do if it should

occur means volunteers and responders will both be working with the exact same objectives in mind.

And, if you are good at ICS when managing events or supporting an event using ICS in one box, then you will be trained, experienced, and knowledgeable in the application of ICS whether you are doing an Objective during an Incident, supporting a box on the ICS organization chart during an Incident, or are assisting with the impacts outside-the-tape for an Incident, such as helping in an evacuation centre or volunteering on traffic control around an Incident.

~ Tom VE6TOX

#### UP NEXT:

4. Communications Failures and ICS
5. Supporting emergencies
6. Supporting disasters



#### Footnotes:

1. At the time of writing, an ultramarathon in Utah suddenly had whiteout conditions and 87 participants had to be rescued.  
<https://www.washingtonpost.com/sports/2021/10/10/utah-ultra-marathon-rescue/>
2. Ibid

# TECH TOPICS

David Smith W6DPS

## *A Simple Homebrew Hamstick Dipole*

I have been planning on trying a "Hamstick Dipole" for some time, and finally got all the bits and pieces together when I had time to put it together (due to COVID-19 house arrest). This is definitely not an original design; they have been used for at least a couple of decades.

I like to operate portable from time to time, whether when camping or just to go to a hill top for a day. I had a pair of 15 meter hamsticks, and ordered a pair for 10 meters to use with this dipole mount. They actually worked well enough I added a pair of 20 meter hamsticks.

The "dipole" name indicates that this antenna uses two hamsticks, one forming each side of the dipole. Most often they are used on some type of vertical mount as a quarter-wave Hertz antenna.

"Hamsticks" are designed to be electrically one-quarter wavelength but physically about eight feet long. As an antenna element is shortened with coils it reduces efficiency and bandwidth proportionally for the amount it is physically shortened. (A bit simplified, but a close enough approximation.) There are three foot long "shorty" hamsticks that are much less efficient than the 8 foot version. For the higher HF bands hamsticks are still fairly efficient. In fact on 10

meters the eight foot hamsticks are barely shortened. A full length 15 meter quarter-wave is about 11 feet, so a hamstick is about 8:11 physical to electrical length, which is about 73% efficient. I find hamsticks have acceptable performance on 20 meters and up, but as you go down in frequency they lose so much efficiency that I just don't use them. If you need an HF rubber ducky, hamsticks are okay, but generally do not perform as well and as a full length quarter wave.

The hamsticks are adjusted for frequency by moving the whips in and out, held by setscrews. I got this antenna adjusted for a minimum SWR at 28.4 MHz of 1.16:1. SWR at 28.3 was 1.24:1 and at 28.5 was 1.29:1. The 1.5:1 points were 28.14 and 28.68, for 540 KHz bandwidth. For the Technician sub-band this is very usable without a tuner. During a Sporadic-E opening I worked a station near San Antonio, Texas, with 59 reports in both directions, using my HTX-10 at 25 Watts P-P. With a pair of 15 meter hamsticks the bandwidth was about 360 KHz and with 20 meter about 300, both with a minimum SWR of 1.18:1.

I used a ten foot piece of 1" EMT conduit and an antenna tripod for support during testing. I will normally be using these with fiberglass mast

*Two Hamsticks used as a horizontal dipole*

sections to get the antenna about 32 feet off the ground.

In general I have gotten better results with a balun, but this antenna does not make it easy to use one. I do usually either wind a coax choke, or use 5 or 6 ferrite beads on the coax to minimize RF current on the shield.

This antenna mount also makes experimentation very easy. I have seen variants with the hamsticks arranged vertically. One had a normal 8 foot hamstick on the top (and connected to the center conductor) and a "shorty" three foot hamstick on the bottom. I have also seen variants with the U-bolt in the middle and a hamstick on each side of the mast. Feel free to play, since the angle stock is fairly cheap and you can drill multiple sets of holes. If you don't like one result, flip to the other plane of the angle stock and try again!

On the subject of experimenting, while these are usually referred to as "hamstick" dipoles, you can actually use any 3/8"-24 antennas. So you can use 2 meter, 220, dual band, etc., and get the same kind of results. Using one of these with high gain 2 meter antennas is a very easy way to get on SSB, which is usually horizontally polarized.

There are a variety of popular antennas for portable use, but I like how easy it is to set up and take down this system. Since the hamsticks have standard 3/8"-24 antenna hardware it is easy to find the mounting fitting that goes in a 1/2" hole and has an SO-238 connector on the other end. The side connected to the coax center conductor goes on this fitting and the side connected to the coax shield simply needs a bolt, barrel nut, and some washers. The coax shield is electrically connected to the mount and the center conductor side is isolated from the mount. Hopefully this will be made clear in the photos below.

For the main mounting bracket I used 1" by 1" by 1/16" thick aluminum angle stock. It is quite strong, but very easy to work with and is a great conductor. I use a 6" piece of angle stock, and then drill holes for the mounting U-bolt and antenna hardware.

I space the U-bolt about 5/8" from the end of the angle stock. I mark every thing off before cutting the angle stock so I can test the spacing and make sure things are not too bunched up. You want enough clearance between pieces to be able to tighten the mount on the mast, and connect the PL-259. I put the shield size mounting about an inch and a quarter (1.25") from the U-bolt hole, and the center conductor side another inch and a quarter from that. This leaves about 5/8" to 3/4" inch to the end. For the 5/16" U-bolt I use an 11/32" drill, for the 3/8"-24 bolt a 13/32" drill, and a 1/2" drill for the coax connector. These sizes give a bit of clearance so things go together easily. The coax adapter you use may need a different size, so check the instructions for the one you actually use.

I use a jig saw with a medium metal cutting blade (24 TPI) to cut the angle stock. You could also use a hack saw, since the aluminum cuts easily. The holes are also easy to drill, and I use a 1/8" pilot drill to verify the spacing.

All in all, the fabrication is pretty easy with fairly modest tools. No need for a full machine shop, or machinist.

*For the main mounting bracket I used 1" by 1" by 1/16" thick aluminum angle stock.*





Figure 1



Figure 2

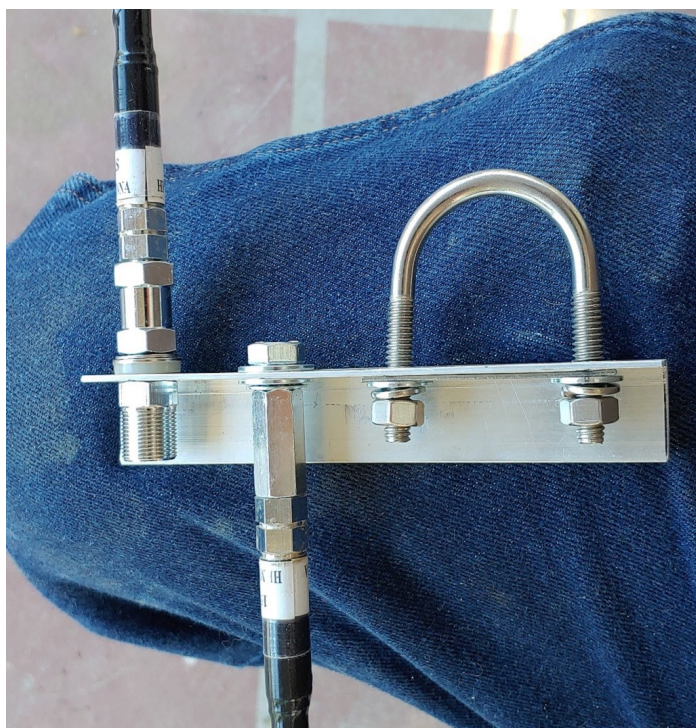


Figure 3

Once the holes are drilled it is quite easy to assemble the bits and pieces. The regular bolt doesn't require a lot of torque. Basically tightening down on the lock washer is plenty. The coax adapter has a plastic washer that electrically isolates the hamstick and center conductor from the mounting bracket and rest of the antenna. It is very important that this plastic washer be installed correctly and not over-tightened. I put the adapter in just finger tight and do continuity checks. The center conductor on the SO-238 should have continuity to the hamstick connector on the other side, but not to any other part of the antenna. The shield threads of the SO-238 should have continuity to the mounting bracket, but not to the center conductor. After the initial check I tighten the adapter and then repeat the continuity check.

The hamstick that connects to the coax adapter should be pointed out the side of the mounting bracket that does not have the other plane of aluminum. This prevents any capacitive couple to the bracket. I doubt you would lose much power, but I have seen some wonky SWR readings. The other side is electrically connected to the bracket, and shield side of the coax (*figure 1*).

I put the coax adapter at the outside, but it would probably work just as well if the other hamstick was on the outside. I prefer to use flat washers to spread the load a bit better on the aluminum, and lock washers to hold things together without a lot of torque. The steel bar that comes with the U-bolt keeps the angle stock from bending if you do torque it onto the mast, but it really doesn't take much torque to hold (*figure 2*).

It is much easier to visualize with the hamsticks installed. I have seen people use a lock washer at this connection, but for a portable antenna that will be taken down for transport it never seemed needed. Just a got finger-tight connection and the weight of the elements keep them locked in place pretty well (*figure 3*).

The size of mast that this antenna works with is determined by the size of the U-bolt. With this 5/16" by 1-1/2" U-bolt it will mount easily on 1" to 1-1/4" masts. This includes segments of 1-1/2" mast with a swaged end. If you want to use a larger mast, simply use a larger U-bolt and lengthen the bracket to fit.

One of the big advantages to a hamstick dipole is how easily it takes down for transport and storage. The hamsticks have a four foot long coil section and a four foot long whip. By taking one hamstick out of the socket and separating both whips from the coils the whole antenna is just over four feet long and can be zip-tied or velcroed together. When used with four-foot sections of fiberglass mast, the whole antenna system fits easily in the truck of most cars and can be set up by one person.

Some of the parts can be found at your local home center, but some are a bit harder to find. 3/8"-24 is common for antennas, but most hardware you find is 3/8"-16. Of course for washers it doesn't matter.

The coax adapter can usually be found at your better ham supply companies and many truck stops. I got some at Amazon. I also got the barrel nut at Amazon.

The total cost was about \$22, but with some of the parts there was enough left over to make several antennas.

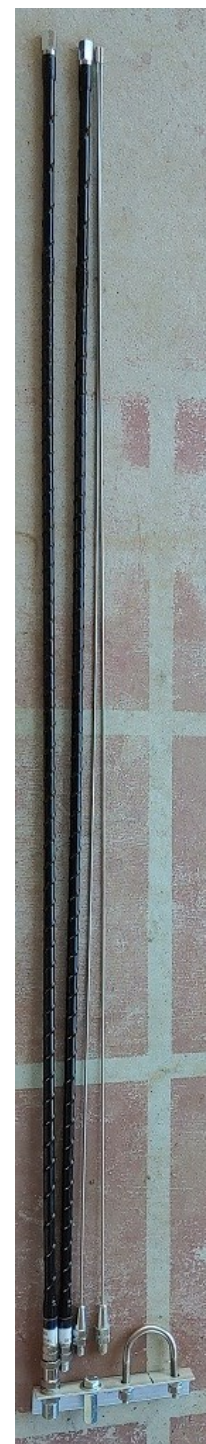
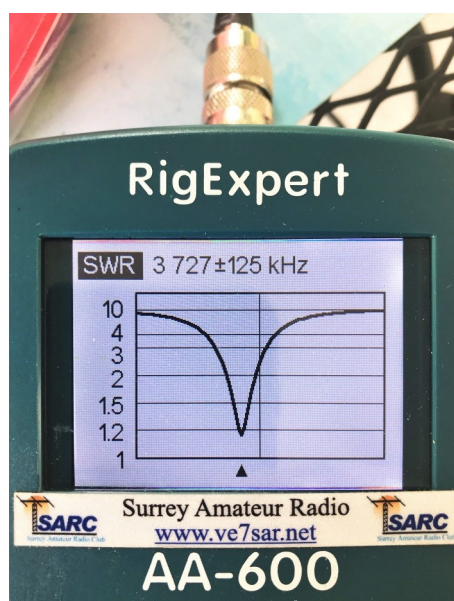
~ David W6DPS

<https://www.qsl.net/w6dps>



Above: Some of the parts from the hardware store.

Below: A similar commercially made bracket and the resulting SWR reading on 80m.



...more

# TECH TOPICS

Loet van Sermondt PJ2LS

## DIY 5:1 Broadband RF Balun

*It is always fun, useful and above all educational to experiment with antennas, power lines and baluns. Loet also shows us that with his self-built balun. Take advantage of it!*

### Intro

I've been building and experimenting a lot lately with baluns and wire antennas. Nowadays you can buy whatever you want in the way of antennas, but how nice is it to make something yourself that is cheap and also exhibits superb performance? What were the prerequisites? Actually, my requirements were not very stringent: preferably no antenna tuner needed, a low SWR and affordable. That must be doable, right?

My thoughts went out to a broadband [balun](#), and a wire antenna with a length of around 10 meters, which could be combined with my extendable mast (about 9 meters). I could then use the antenna as a vertical or as a sloper. On the website of a commercial company, I found a PDF file with wire lengths that they use for their commercial balun. That turned out to be 9.14 meters or a multiple: 18.28 meters.

I myself have used a wire of 10 meters and started testing with it. I shortened it to 9.30 meters, which later, after having made all the measurements, turned out to have a very acceptable SWR ratio.

After some searching on the internet I found a DIY 5:1 balun, with copper tubes, printed circuit boards and the toroid cores for a very acceptable price on eBay.

I placed an order for two pieces. These were sent from France. To make a long story short, it took 4 weeks before I finally received the package here in Curacao, but it was worth the wait!

### Get started

The manual that came with it was very clear. However, pay attention to the circuit boards: for soldering the circuit boards to the copper tubing, you have to use a soldering iron that can produce a lot of heat, otherwise it does not work well to allow adequate solder flow.



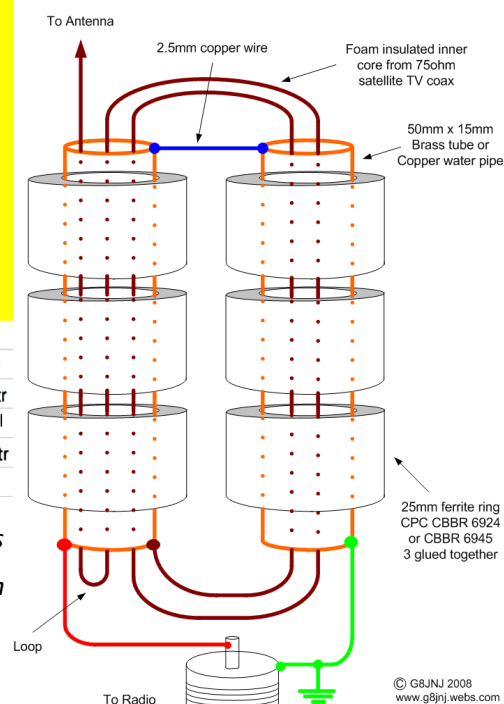
Enclosure crafted by DL1CM

Band										
6	1.0	1.0		1.2	1.2		1.0	1.0		1.2
10	1.3	1.1		1.4	1.4		1.1	1.3		1.5
12	1.4	1.4		1.2	1.4		1.5	1.4		1.6
15	1.1	1.2		1.2	1.1		1.3	1.2		1.3
17	1.1	1.2		1.5	1.2		1.2	1.1		1.2
20	1.6	2.0		2.0	2.0		2.1	1.6		2.1
30	1.6	1.6		1.8	1.7		1.7	1.5		1.4
40	1.7	1.9		1.9	1.8		2.0	1.6		2.1
60	1.2	1.9		2.3	1.6		1.9	1.1		1.6
80	2.0	2.1		2.0	1.7		2.0	1.7		1.7
160	8.2	5.8		6.6	8.1		5.6	7.6		7.2
Sheath Current Filter	SET	Balun		Balun	Set		Balun	Set		Set
Coax	19.9 mtr	19.9 mtr		10.6mtr	10.6mtr		19.9 mtr	19.9mtr		10.6mtr
Setup	sloper	sloper		sloper	sloper		Vertical	Vertical		Vertical
Wire length	9.30 mtr	9.30 mtr		9.30 mtr	9.30 mtr		9.30 mtr	9.30 mtr		9.30 mtr
Best result										

Above: The table of SWR results from different combinations

Right: Construction of the balun

### 5:1 Broadband RF Transformer Construction



After everything was ready, I did a check on the SWR analyzer with a resistance of 250 Ohms between the antenna and ground to verify that everything was done correctly. The SWR seemed good on all tries.

Okay, now the practical test, with a wire and a mast. After a lot of back and forth between balun and analyzer, and the [sheath current filter](#) switched from close to the balun and transmitter, I finally came to a nice SWR result. See the table of the measurement results above.

I made several nice (FT8) contacts from the garden with the G90 and an Icom 705. The largest distance was from Curaçao to Finland.

### Finishing

You can put the balun in a PCV tube and make it completely waterproof. Or you choose a nice box like Dick ([DL1CLM](#)) made for me. A bit of eye candy, hi. Do use a strain relief for the wire.

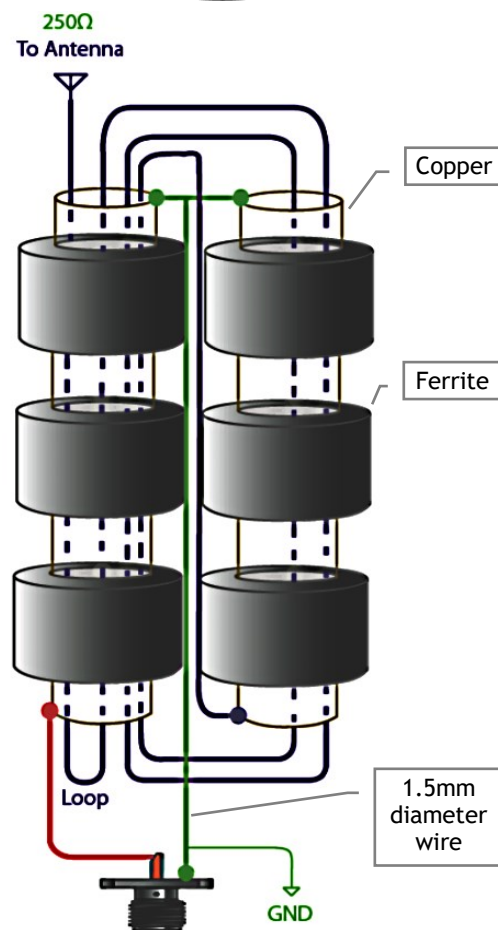
All in all, I am very satisfied with the result!

I now have an antenna plus balun, suitable for home and for portable use, with a wire of 9.30 meters that can be used between the 6 and 40 meters bands and without a tuner. For 40 and 80 meters you will have to use a longer wire (about 18.50 meters).

~ Loet PJ2LS

This article appeared in the journal of the Dutch Amateur Radio Union (DARU), September 2021 <https://www.daru.nu>

Our thanks for permitting us to translate and publish this article.



VOARROR is a graphical representation

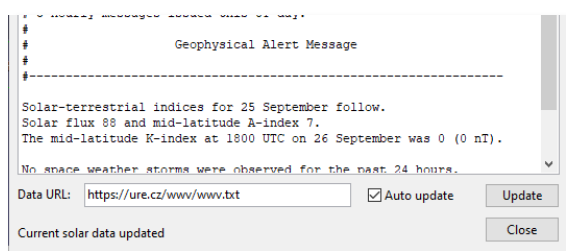
The first problem encountered the

**NOTE:** Because of a change in the

<http://ok1dub.cz/wwv/wwv.txt>)

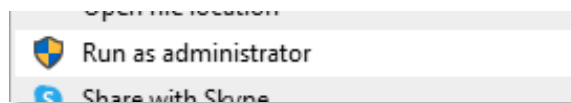
But the server still continues to work, and it's new link which URL I eventually found, must be pasted into the program Solar Data window is: <https://ure.cz/www/www.txt>

Second problem encountered with Windows 10. When I pasted the new URL into the software, still produced an error and wasn't updating voaprop.config file? Again another few hours of late night head banging and scratching Grrr! I found the reason why?



This is down to a configuration setting against the program itself, and Windows 10. What you must do, is right click on the VOAPROP icon on the Windows desktop, and click Run as administrator then add the URL again to the Solar data window, and this time it will

update the file, and everything will then start to work, and you will see the Solardata update.



If you also pop down to Mirak's site <http://ok1dub.cz/www/> you will also be able to find updated ssndata.txt and beacons.txt files which you can download and update in the root of the program.

Once you have all this updated, the program will perform flawless without any problem.

My thanks must be to the late G4ILO for writing such a superb piece of software, and his family that still keep his website open <https://www.g4ilo.com/>

~Steve G1KQH  
[g1kqh@arrl.net](mailto:g1kqh@arrl.net)



## Southgate Vibes Podcasts

*"Is this frequency in use?"*

Steve Richards G4HPE presents the Southgate Vibes, a podcast about Amateur Radio

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# 2 meters

Bob Witte K0NR

***One radio to rule them all (Ham, GMRS, FRS, MURS)?***

Bob maintains a great blog site at <https://www.k0nr.com/wordpress/>.

Contact Bob at [bob@k0nr.com](mailto:bob@k0nr.com).

You can also check out his book [\*VHF, Summits and More: Having Fun With Ham Radio\*](#).



The common Baofeng UV-5R can transmit and receive on a wide range of frequencies... but not necessarily within the rules.

The common Baofeng UV-5R can transmit and receive on a wide range of frequencies...but not necessarily within FCC rules.

From time to time, the question is raised about using radio equipment in multiple radio services. One common example is a licensed radio amateur that wants one radio to cover the Family Radio Service (FRS), General Mobile Radio Service (GMRS), and the 2m/70cm ham bands. Some people also want the Multi-Use Radio Service (MURS)...or maybe even marine VHF or aircraft VHF. The thinking goes that if one radio can transmit and receive on all these frequencies and that person is authorized to use those frequencies, then one radio can do it all.

This seems like a reasonable objective but the problem is that the FCC has a few rules and regulations that come into play. This leads to an important note: I am writing about the FCC rules and regs here...you may choose to ignore them but that's on you.

## ***US Part 97: Amateur Radio Service***

First, the good news. The Amateur Radio Service, governed by FCC Part

97, has very few restrictions on the type of equipment you can use. Heck, you can build a transceiver from parts and put it on the air. So the ham rules are not going to be a major limitation.

## ***US Part 95: FRS, GMRS and MURS***

FRS, GMRS, and MURS radios are governed by FCC Part 95. Section 95.591 says this about FRS radios:

§ 95.591 Sales of FRS combination radios prohibited.

Effective September 30, 2019, no person shall sell or offer for sale hand-held portable radio equipment capable of operating under this subpart (FRS) and under any other licensed or licensed-by-rule radio services in this chapter (devices may be authorized under this subpart with part 15 unlicensed equipment authorizations).

Section 95.1761 says this about GMRS transmitters:

(c) No GMRS transmitter will be certified for use in the GMRS if it is equipped with a frequency capability not listed in § 95.1763, unless such transmitter is also certified for use in another radio service for which the

frequency is authorized and for which certification is also required. No GMRS transmitter will be certified for use in the GMRS if it is equipped with the capabilities to operate in services that do not require equipment certification, such as the Amateur Radio Service. All frequency determining circuitry (including crystals) and programming controls in each GMRS transmitter must be internal to the transmitter and must not be accessible from the exterior of the transmitter operating panel or from the exterior of the transmitter enclosure.

(d) Effective December 27, 2017, the Commission will no longer issue a grant of equipment authorization for hand-held portable unit transmitter types under both this subpart (GMRS) and subpart B of this part (FRS).

Similarly, MURS radios have this restriction (Part 95.2761):

(c) A grant of equipment certification will not be issued for MURS transmitters capable of operating under both this subpart (MURS) and under any other subparts of this chapter (except part 15).

The FCC is saying (requiring) that FRS, GMRS and MURS radios must work on their designated frequencies and nothing else. At one time, it was legal to sell a combination FRS/GMRS radio but the FCC has specifically removed that option. Part 95.1761 seems to leave an opening for a GMRS radio that is also certified for use in another radio service, but that is a very thin opening and it specifically excludes the Amateur Radio Service.

Now, why would the FCC put these restrictions in the regulations? The answer is pretty simple: these radio services are intended to be used by everyday, non-technical folks. The radios need to be simple to use and not include the capability to wander off onto any old frequency. Hence, the rules lock down the frequencies that the radios can use.

(As a side note, this regulatory approach is good for amateur radio. Imagine if FRS radios had Channel 30 set up to transmit on 146.52 MHz, with a note in the manual that says “only use this channel if you have an amateur radio license.” We would have a crapton of unlicensed operating on 2 meters.)

### **US Part 90: Private Land Mobile Radio Services**

Part 90 regulates a broad range of land mobile radio, including public service, police/fire, search and rescue, forestry, utilities, and businesses. Licensing is very specific under Part 90. A radio license will specify a particular set of frequencies allowed, specific power levels and emission types, and even the allowed operating location of the radios.

Radios designed for Part 90 are usually programmed by a radio tech to operate only those specific frequencies that a licensee is authorized to use. This results in a relatively simple operating set up



*This book is an easy-to-understand introduction to VHF/UHF ham radio, including practical tips for getting on the air and having fun messing around with radios.*

*Learn about FM, SSB, repeaters, equipment, band plans, phonetics, portable operating, Summits On The Air (SOTA) activations and more.*



*The Midland MXT400 is a typical GMRS mobile transceiver.*



The Anytone TERMN-8R handheld transceiver.

with the user just selecting from the preset channels on the radio. Part 90 radios normally cover a wide range of frequencies so that the manufacturer and the radio shop can sell one radio model to any licensed user.

In many cases, these Part 90 radios cover the adjacent amateur bands, such as 2m and 70cm. (For example, the [Anytone AT-D878UV](#) is Part 90 certified and covers 140-174 MHz and 400-480 MHz.) So this does open up the possibility of using a Part 90 radio under a Part 90 license and using it on the ham bands. A typical scenario is when a Search and Rescue member has a Part 90 radio set up to use the S&R frequency as well as the 2m/70cm amateur bands. The key to this is starting with a radio that is Part 90 certified and then programming it for the amateur band. Of course, you need to be authorized to use the Part 90 frequency and have an amateur radio license.

### ***Getting Creative on Radio Configuration***

A few years ago, Anytone Tech tried to market the TERMN-8R VHF/UHF radio as legal for the ham bands, GMRS, MURS and Part 90 use. An early review of this radio is [here on the PD0AC blog](#). Basically, the radio had three distinct operating modes: GMRS, MURS, and Commercial/Normal. Initially, the FCC approved the radio but later took a closer look and canceled the authorization. The [TERMN-8R](#) is still available but without the three modes. It is marketed as a Part 90 radio that also does the amateur bands.

I recently became aware of the [Anytone AT-779UV](#) which is sold in the USA as a Part 95 GMRS radio. However, using the programming software, the radio can be configured to cover the 2m and 70cm amateur bands or a much broader range of frequencies (136-174 & 400-470 MHz). If you change the radio configuration to operate on the ham bands (or wider), the radio is no longer Part 95 certified. The configuration via software takes some knowledge and effort so it is not a mode that you can easily switch back and forth. It is really no different than other software-programmable radios.

### ***Wrap It Up***

So there you go, your dream of One Radio To Rule Them All (FRS, GMRS, MURS, and the 2m/70cm ham bands) is not going to happen. At least not legally. You can configure a radio to do this...but it will not meet FCC regulations. However, you can configure a Part 90 radio to operate legally on Part 90 frequencies and on the amateur bands.

~ Bob KØNR

...more

## 2meters

Bob Witte KONR

**Tips and Tools for Managing Logs**

Lately, the majority of my radio activity has been [SOTA](#) and [POTA](#) activations, sometimes simultaneously. The logging requirements for the two programs are different so I often need to adjust the log file before submitting it. Even more common, I need to double-check and fix errors in my SOTA and POTA logs. Some of this comes from the idiosyncrasies of the logging software but often the errors are introduced by the operator. (That would be me.)

Here are a few tools and tips to assist with your portable logging.

**SOTA and POTA Logging Tools**

For SOTA, Joyce/K0JJW and I normally just use a paper log. If the number of QSOs is small, the paper [method is easy and reliable](#). Later, I use the [SOTA CSV Log Editor by G0LGS](#) to enter the information into a CSV (Comma Separated Variable) file. This program is reliable and easy to use. This Windows program uses CSV for the log files but it can also export the log in [ADIF](#) (Amateur Data Interchange Format).

For POTA activations, we tend to have a larger number of QSOs so I try to log them in real-time on a computing device. The [HAMRS](#) logger is a relatively new logging program by Jarrett/KB0ICT. It runs on multiple platforms, including Windows, Linux, Mac, iOS and Android. I've been using it on Windows, an iPad, and my iPhone. The user interface is tuned for portable operating

with just enough features and not a lot of fluff. There are some bugs here and there but Jarrett continues to release bug fixes and new features at a steady rate. I have not encountered any serious issues and I really like the implementation. HAMRS exports files in [ADIF format](#).

**CSV Files**

A CSV file just has the variables of interest separated by commas, usually one QSO on each line. These files are a bit cryptic but can be read by humans with just a little effort. Below is a CSV file generated for a SOTA activation. Note that the first line contains the header information that defines the variables in the subsequent lines.

The SOTA CSV Log Editor

SOTA CSV Log Editor

File Options Help

Contact Details:

Date: 05-Sep-21 Time: 21:06

Callsign: WGOAT Summit: WOC/FR-063 Mount Herman [DM79MB] (16.9mi, 021)

Band: 144MHz Mode: FM ☐ SWL

Notes: My Ref: WOC/FR-004 Pikes Peak [DM78LU]

Log Contact Clear Entry My Call: KONR

Line	Date	Time	Callsign	Band	Mode	Summit	Notes	My Call	My Summit
1	10-Aug-21	15:49	K0MGL	144MHz	FM			KONR	WOC/FR-222
2	10-Aug-21	15:50	N0KRM	144MHz	FM			KONR	WOC/FR-222
3	10-Aug-21	15:52	K7ASB	144MHz	FM			KONR	WOC/FR-222
4	10-Aug-21	15:53	KL7GLK	144MHz	FM			KONR	WOC/FR-222
5	10-Aug-21	15:55	K0FYR	144MHz	FM			KONR	WOC/FR-222
6	10-Aug-21	15:57	KNOMAP	144MHz	FM			KONR	WOC/FR-222
7	10-Aug-21	16:15	K0MGL	432MHz	FM			KONR	WOC/FR-222

Delete selected

27 entries KONR - Aug 10 - 3 summits 07-Aug-21 (157431) 06-Sep-21 3:08:00 UTC

**CDT K-4558 KONR**

THEIR CALLSIGN: W9YB RST SENT: 59 RST RCVD: 59

THEIR PARK: Comma separated COMMENTS:

TIME: 03:09 DATE: 06-Sep-2021

FREQUENCY: 14.061 MHz BAND: 20m

POWER (W): MODE: CW

MY PARK: K-4558 MY CALLSIGN: KONR

TIME ON	CALLSIGN	RST	STATE	FREQUENCY	BAND	MODE	THEIR PARK
18:03	W9YB	59	59	14.293	20m	SSB	
18:02	KSRAR	59	59	14.293	20m	SSB	
18:02	NBSCD	59	59	14.293	20m	SSB	

KONR@K-4404-20210810.adi - Notepad

File Edit Format View Help

Exported by SOTA CSV Log Editor Copyright (c)

<ADIF\_VER:5>3.0.4

<PROGRAMID:19>SOTA CSV Log Editor

<PROGRAMVERSION:7>1.5.8.0

<EOH>

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<OPERATOR:5>KONR

<QSO\_DATE:8>20210810

<TIME\_ON:4>1549

<CALL:5>K0MGL

<MODE:2>FM

<BAND:2>2m

<RST\_RCVD:2>59

<RST\_SENT:2>59

<MY\_SOTA\_REF:10>W0C/FR-222

<MY\_GRID SQUARE:6>DM78DR

<EOH>

<STATION\_CALLSIGN:4>KONR

<OPERATOR:5>KONR

<QSO\_DATE:8>20210810

<TIME\_ON:4>1550

<CALL:5>N0KIM

<MODE:2>FM

<BAND:2>2m

<RST\_RCVD:2>59

<RST\_SENT:2>59

<MY\_SOTA\_REF:10>W0C/FR-222

<MY\_GRID SQUARE:6>DM78DR

<EOH>

<STATION\_CALLSIGN:4>KONR

<OPERATOR:5>KONR

<QSO\_DATE:8>20210810

<TIME\_ON:4>1552

<CALL:5>K7ASB

<MODE:2>FM

<BAND:2>2m

<RST\_RCVD:2>59

<RST\_SENT:2>59

<MY\_SOTA\_REF:10>W0C/FR-222

<MY\_GRID SQUARE:6>DM78DR

<EOH>

KONR - Aug 10 - 3 summits.csv - Notepad

File Edit Format View Help

Signature,Call (my call),Full Reference (my summit),Date,Time,Band

V2,KONR,W0C/FR-222,10/08/2021,15:49,144MHZ,FM,K0MGL,,

V2,KONR,W0C/FR-222,10/08/2021,15:50,144MHZ,FM,N0KIM,,

V2,KONR,W0C/FR-222,10/08/2021,15:52,144MHZ,FM,K7ASB,,

V2,KONR,W0C/FR-222,10/08/2021,15:53,144MHZ,FM,KL7GLK,,

V2,KONR,W0C/FR-222,10/08/2021,15:55,144MHZ,FM,K0FYR,,

V2,KONR,W0C/FR-222,10/08/2021,15:57,144MHZ,FM,K0MAP,,

V2,KONR,W0C/FR-222,10/08/2021,16:15,432MHZ,FM,K0MGL,,

V2,KONR,W0C/FR-222,10/08/2021,16:19,144MHZ,FM,KX0R,W0C/PR-018,

V2,KONR,W0C/FR-222,10/08/2021,16:26,144MHZ,FM,W0BV,,

V2,KONR,W0C/FR-222,10/08/2021,16:28,144MHZ,FM,K0MOS,,

V2,KONR,W0C/FR-222,10/08/2021,16:29,144MHZ,FM,WZ0N,,

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V2,KONR,W0C/FR-041,10/08/2021,18:19,144MHZ,FM,K0MOS,W0C/SR-029,

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V2,KONR,W0C/FR-041,10/08/2021,18:35,144MHZ,FM,K0DMRC,,

V2,KONR,W0C/FR-041,10/08/2021,18:36,144MHZ,FM,K1KGH,,

V2,KONR,W0C/FR-041,10/08/2021,18:36,144MHZ,FM,KL7GLK,,

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V2,KONR,W0C/SP-101,10/08/2021,20:47,144MHZ,FM,K1KGH,,

V2,KONR,W0C/SP-101,10/08/2021,20:48,144MHZ,FM,KL7GLK,,

ADIFMaster - C:\Users\bob\OneDrive\Documents\Radio Logs\POTA\KONR@K-4404-20210810.adi

File Edit Search View Tools Settings Help

Line	STATION...	OPERATOR	QSO_DATE	TIME_ON	CALL	MODE	BAND	RST_RCVD	RST_SENT	MY_SOTA_REF	MY_GRID SQUARE	SOTA_REF	GRID SQUARE
1	KONR	KONR	20210810	1549	K0MGL	FM	2m	59	59	W0C/FR-222	DM78DR		
2	KONR	KONR	20210810	1550	N0KIM	FM	2m	59	59	W0C/FR-222	DM78DR		
3	KONR	KONR	20210810	1552	K7ASB	FM	2m	59	59	W0C/FR-222	DM78DR		
4	KONR	KONR	20210810	1553	KL7GLK	FM	2m	59	59	W0C/FR-222	DM78DR		
5	KONR	KONR	20210810	1555	K0FYR	FM	2m	59	59	W0C/FR-222	DM78DR		
6	KONR	KONR	20210810	1557	K0MAP	FM	2m	59	59	W0C/FR-222	DM78DR		
7	KONR	KONR	20210810	1615	K0MGL	FM	70cm	59	59	W0C/FR-222	DM78DR		
8	KONR	KONR	20210810	1619	KX0R	FM	2m	59	59	W0C/FR-222	DM78DR	W0C/PR-018	DM79CO
9	KONR	KONR	20210810	1626	W0BV	FM	2m	59	59	W0C/FR-222	DM78DR		
10	KONR	KONR	20210810	1628	K0MOS	FM	2m	59	59	W0C/FR-222	DM78DR		
11	KONR	KONR	20210810	1629	WZ0N	FM	2m	59	59	W0C/FR-222	DM78DR		
12	KONR	KONR	20210810	1816	N0DET	FM	2m	59	59	W0C/FR-041	DM78ET	W0C/SR-046	DM79CS
13	KONR	KONR	20210810	1819	K0MOS	FM	2m	59	59	W0C/FR-041	DM78ET	W0C/SR-029	DM79DU
14	KONR	KONR	20210810	1820	KX0R	FM	2m	59	59	W0C/FR-041	DM78ET	W0C/PR-018	DM79CO
15	KONR	KONR	20210810	1824	K0MGL	FM	2m	59	59	W0C/FR-041	DM78ET		
16	KONR	KONR	20210810	1826	WZ0N	FM	2m	59	59	W0C/FR-041	DM78ET		
17	KONR	KONR	20210810	1829	K0AVU	FM	2m	59	59	W0C/FR-041	DM78ET		
18	KONR	KONR	20210810	1830	W0BV	FM	2m	59	59	W0C/FR-041	DM78ET		
19	KONR	KONR	20210810	1835	K0DMRC	FM	2m	59	59	W0C/FR-041	DM78ET		
20	KONR	KONR	20210810	1836	KL7GLK	FM	2m	59	59	W0C/FR-041	DM78ET		

Sometimes it is very helpful to just be able to edit a CSV file directly. For example, if Joyce/K0JJW and I worked the same set of chasers from a summit, I can create a new log file by doing a find/replace of my callsign with her callsign. For this, I use a simple text editor such as Windows Notepad. Its native file format is plain text so it won't inadvertently add in additional formatting or characters. Excel (or another spreadsheet) will handle this format but make sure you output a clean CSV file.

## ADIF Files

ADIF is the most flexible and portable file format for ham radio logging. It can be uploaded to Logbook of The World and imported into most comprehensive logging programs. ADIF files are a bit more complex, using Data Types, Enumerations, and Fields to produce a flexible file format that is also human-readable.

Again, a simple text editor (Notepad) is useful for making edits to an ADIF file. The particular file shown above was exported from the SOTA CSV Editor with each field on its own line. This makes each QSO easier to read but the file has a lot more lines in it.

Above left Editor, for a SOTA activation

Above right: An example of a CSV file from a SOTA activation.

Left: ADIF Master is very useful for viewing ADIF files from SOTA, POTA or other events.

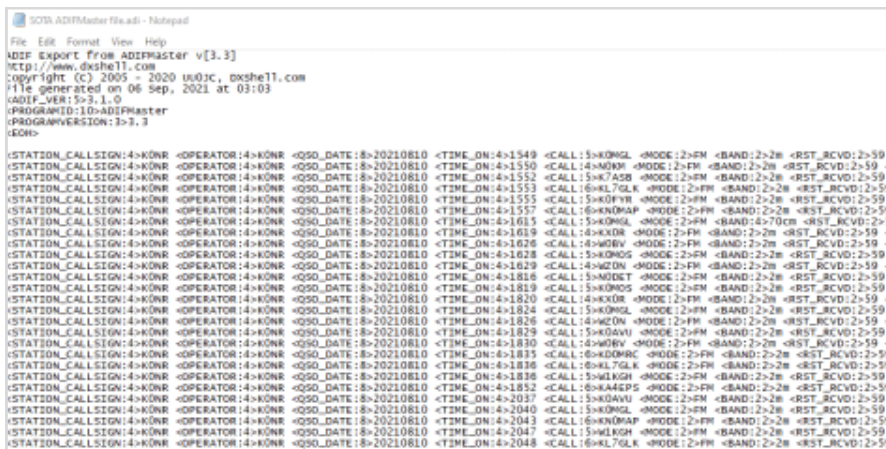
The program [ADIF Master](#) is very good at viewing ADIF files and making changes to them. I often use it to do a final check of the log before submitting it.

When ADIF Master saves an ADIF file, it puts each QSO on one line. The fields and variables remain the same, but the spacing changes. This reduces the overall length of the file (number of lines) but it can be more difficult to read.

ADIF Master flattens the ADIF file by putting one QSO on a line.

Sometimes you might need to convert between CSV and ADIF file formats. There are online tools to do this but I have not used them enough to comment.

I am not going to try to explain the various fields and labels used in these file formats. For the ADIF format, take a look at the detailed specification here: <https://adif.org/>. A few times, I have needed to find a specific field that was missing and add it to an ADIF file. ADIF Master can do this for you, but you must know the exact name of the field.



ADIF Master flattens the ADIF file by putting one QSO on a line.

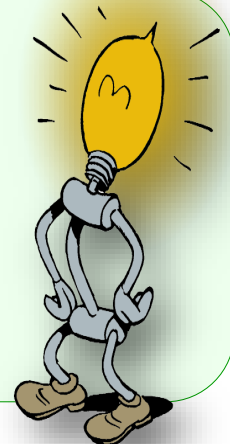
These are a few things I've learned along the way playing around with SOTA and POTA logs. I hope this is helpful.

~ Bob K0NR

### Here's an item from Jim K9YC on RFI Digest users group.

*Most hams confuse Grounding and Bonding, which are VERY different. An earth connection matters ONLY for lighting protection and electrical safety. Bonding matters for those issues, and also minimizes hum, buzz, and RFI. Bonding consists of tying together ALL earth electrodes, all station equipment, the station common point, including antenna entry panels and arrestors, towers that are adjacent to the house, etc.*

~ 73, Jim K9YC





## More Ham News

Stephen G7VFX

### *What's a long length of LAN cable? A transmitter, of course*



*"From an engineering perspective, these cables can be used as antennas and used for RF transmission to attack the air-gap."*

LAN cables can be sniffed to reveal network traffic with a \$30 setup, says researcher. What's a long length of electrical wire? A transmitter, of course.

An Israeli researcher has demonstrated that LAN cables' radio frequency emissions can be read by using a \$30 off-the-shelf setup, potentially opening the door to fully developed cable-sniffing attacks.

Mordechai Guri of Israel's Ben Gurion University of the Negev described the disarmingly simple technique to The Register, which consists of putting an ordinary radio antenna up to four metres from a category 6A Ethernet cable and using an off-the-shelf software defined radio (SDR) to listen around 250MHz.

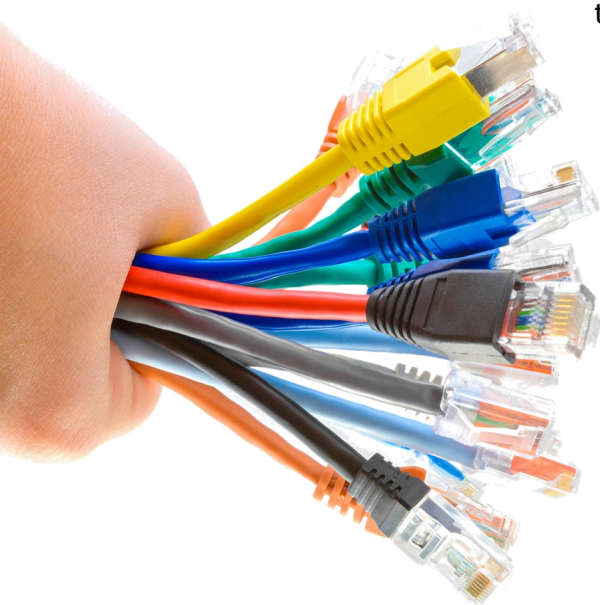
"From an engineering perspective, these cables can be used as antennas and used for RF transmission to attack the air-gap," said Guri.

His experimental technique consisted of slowing UDP packet transmissions over the target cable to a very low speed and then transmitting single letters of the alphabet. The cable's radiations could then be picked up by the SDR (in Guri's case, both an R820T2-based tuner and a HackRF unit) and, via a simple algorithm, be turned back into human-readable characters

Nicknamed LANtenna, Guri's technique is an academic proof of concept and not a fully fledged attack that could be deployed today. Nonetheless, the research shows that poorly shielded cables have the potential to leak information which sysadmins may have believed were secure or otherwise air-gapped from the outside world.

He added that his setup's \$1 antenna was a big limiting factor and that specialised antennas could well reach "tens of metres" of range.

"We could transmit both text and binary, and also achieve faster bit-rates," acknowledged Guri when EL Reg asked about the obvious



limitations described in his paper [PDF]. "However, due to environmental noises (e.g. from other cables) higher bit-rate are rather theoretical and not practical in all scenarios."

One obvious further research technique would be to look at sniffing information over network cables at their full operational speeds, Guri having acknowledged that slowing live network traffic down to levels used in his experiment would be impractical. His full paper, however, noted: "Transmitting UDP packets doesn't require higher privileges or interfering with the OS routing table. In addition, it is possible to evade detection at the network level by sending the raw UDP traffic within other legitimate UDP traffic."

The academic's previous research included a technique for turning DRAM into a form of wireless transmitter, as part of his work looking at ways of pwn'ing air-gapped networks.

Professor Alan Woodward of the University of Surrey observed: "What this shows is that even an unplugged Ethernet cable can radiate energy which is detectable."

He added: "The paper is a nice piece of work and reminds us that whilst you might think something is air-gapped, it might be chattering away over the airwaves. People used to laugh at the great clunky terminals used in secure environments but they arose for a reason: TEMPEST."

TEMPEST, as we reported 20 years ago, was originally a US government scheme for reducing

the amount of RF emissions generated by computer equipment. Today it's been adopted as a NATO standard, with the UK's National Cyber Security Centre having a public webpage about it.

"Often," observed Woodward, "modern security systems look for data leaving the network to know that they have an intruder. But if it's leaving on some unmonitored channel (over the air) then it has a low probability of intercept by the security measures."

[https://www.theregister.com/2021/10/14/lantenna\\_ethernet\\_cable\\_rf\\_emissions/](https://www.theregister.com/2021/10/14/lantenna_ethernet_cable_rf_emissions/)

*~ Our thanks to Stephen G7VFX and Southgate Radio for the above information*

### **New helps with the old**

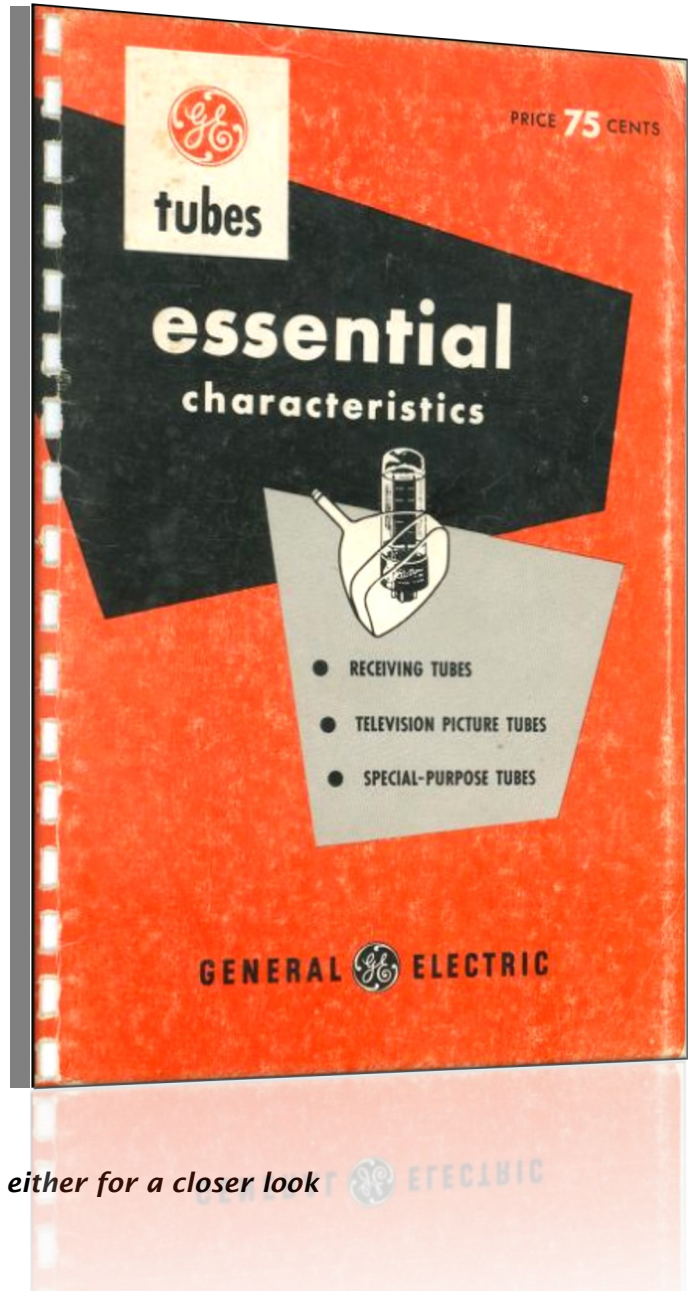
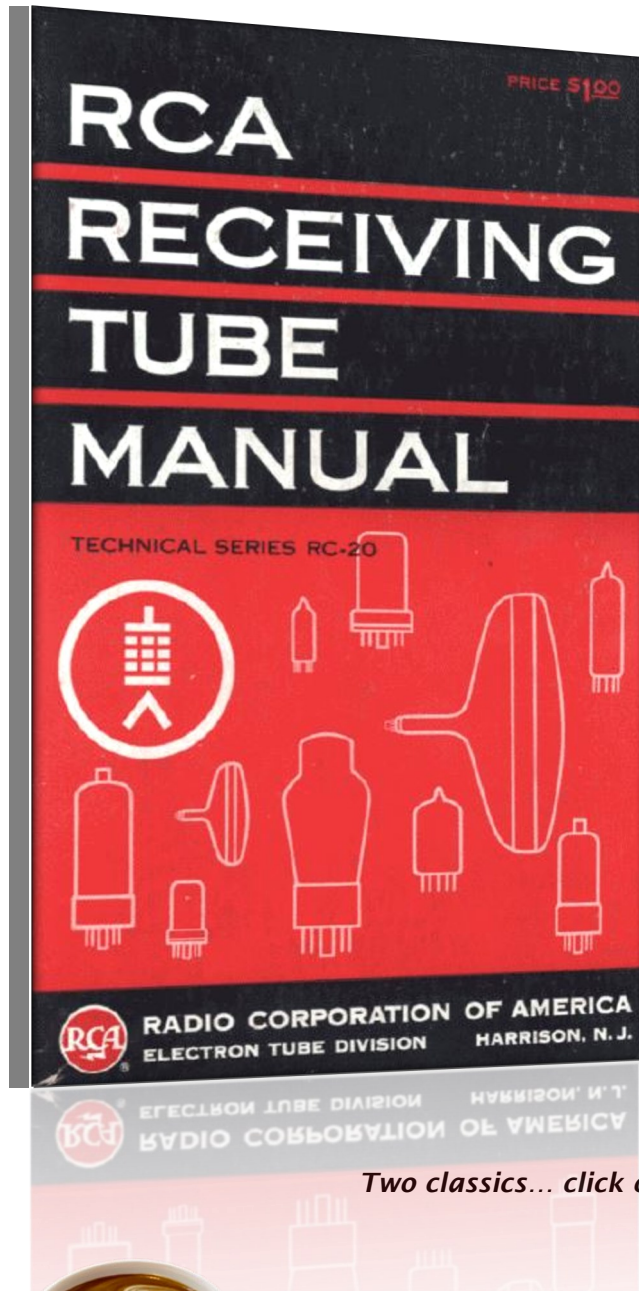
'Morse code' encodes a simple text into a sequence of dots, dashes/dits, and spaces. It is one of the earliest methods used to transmit messages in the form of audible or visual signals. The Morse code method is primarily used in telecommunication and is famous amongst amateur radio operators. Now, if you want to translate Morse code on your Windows 11 PC, this article on "thewindowsclub.com" (all one word is surely going to help you.)

In this post, from the windowsclub.com they list some methods using which you can translate Morse code. Using the mentioned solutions, you can translate a plain text message to the respective Morse code. Also, you can convert a Morse code back to plain text. If you want, you can also play the sound of the Morse code as well as download the audio.

Just a "dash" of retro fun from [thewindowsclub.com](https://thewindowsclub.com)

*~ WIA*

*A look back into the web's time machine...*



*Two classics... click on either for a closer look*



### **Social Reminder**

Subject to COVID prevention policy in effect at the time, the Saturday weekly social gathering is once again 'on' at the Denny's Restaurant, 6850 King George Blvd., Surrey BC from 07:30—09:30. All are invited. Afterwards, we will host workshops and will be available to invigilate Amateur Radio exams at the OTC, 5752—142 Street, Surrey from 10-noon. Bring your ham issues, our Elmers will try to help you sort them out.



# Measurements With The NanoVNA

Arie Kleingeld PA3A

## Part 7: Measuring the Q of a coil

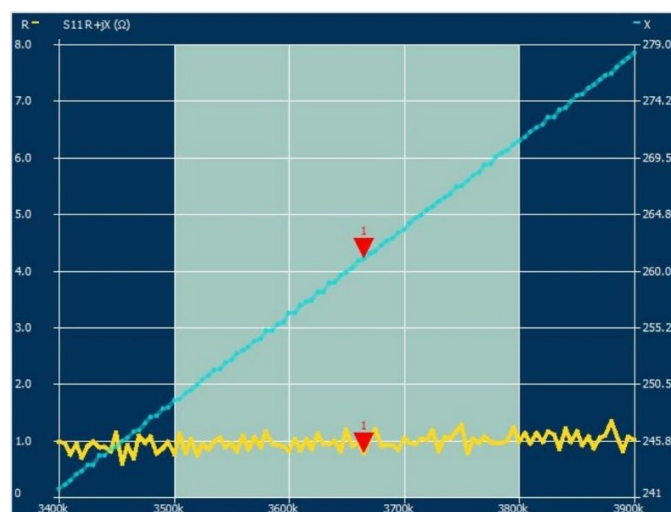
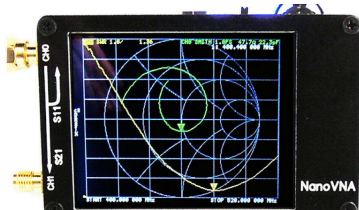
### Introduction

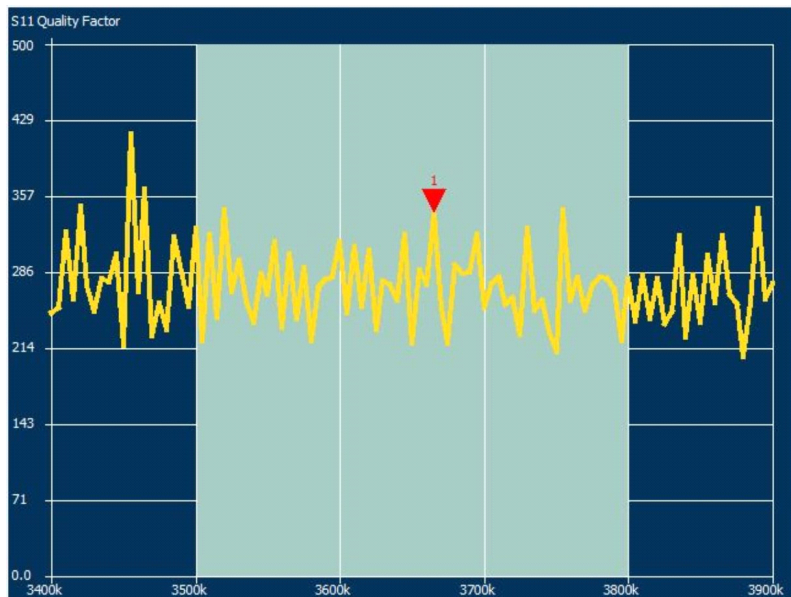
Recently, a radio amateur friend asked me how he could measure the quality factor  $Q$  of a coil. After discussing it, of course I said with conviction: “You do that with a nanoVNA in combination with the PC program nanoSAVER”. NanoSAVER contains this function, namely ‘S11 Quality Factor’. Hang the coil on the S11 port (CH0), measure and read it. Because I’m working on a small project to design and build a good preselector for my receivers, it is good to know the  $Q$  of the coils that you use. We can measure that quickly. But... sometimes you underestimate a task; and turned out to be a bit more difficult than first proposed. Enough reason to share that in this story.

### The S11 R+jX measurement and translation to the Q

As a test object in this article, I use a purple 4C65 core, approx. 23mm diameter. A nice workable size with relatively few windings valued at about 11  $\mu\text{H}$ . For comparison, next to it a red T200-2 core that also works out to about 11  $\mu\text{H}$ . The difference in windings is clear and can be explained immediately by the relative permeability  $\mu_r$  of the two materials. For the 4C65 material that is approx. 125 and for the 2-material it is approx. 10.

Before taking a measurement, the nanoVNA is first calibrated for the desired frequency range where I plan to use the core: 3.4-3.9 MHz. Then the core is measured. The result is shown in the figure next to it that shows S11 R+jX. From this nanoSAVER calculates, among other things, the L-value. That comes out at 11.3  $\mu\text{H}$ .





The graph on the next page (S11 Quality Factor) shows the calculated quality factor Q based on the same data. This is calculated by dividing XL by R

It's not as straightforward as I had hoped. The Q sometimes goes from 211 to 345 within 5 kHz and of course that is not the case. The reason for this is that we measure a value of XL that is around 260 ohms and a resistance value R near 1 ohm. The XL runs nicely in a tight line according to  $XL = 2\pi fL$ . The value of R jumps up and down at 0.5 ohms and as a result you can't really read the Q. In this combination, the nanoVNA is apparently not able to measure the resistance component noise-free. In short, this is not the correct method.

In addition to the noise on the measurement, another complication arises, evident from the following. Of course, you never do only one measurement if you get a diverse result such as this. You connect everything again, tighten the connectors, and then measure again. The results (especially the R-values) varied from around 1 ohm to around 1.3 ohms with the same amount of noise.

With that variation we obtained different values of the calculated quality factor Q.

The shifting of the average R-value arises from variations in the nanoVNA itself. If my nanoVNA (type H3.2) has just been turned on and is calibrated, you can measure something perfectly. An hour later with the same calibration you get very different values in the Q-measurement. Apparently, the nano heats up when it is on, with an undesirable side effect. Now it doesn't matter so much for a simple SWR measurement, but it does matter in the Q measurement. Therefore, for the next measurements we will turn the nanoVNA on for an hour before calibrating and measuring. We'll also move away from measuring only the coil.

### Measurement using an LC circuit

To get a better ratio between measured X and R we are going to measure with an LC series circuit using a good quality capacitor of just over 150 pF. This value was chosen because I want to measure the Q in the 80m band.

With a series resonance there will be a small resistance and hardly any reactance to measure. Previous measurement tests showed that a resistance of 1 ohm could still be measured fairly well with the S11 R+jX method and with the S21 shunt method. Measuring a 0.2 ohm resistance was also feasible (see part 5 of this series on measuring low impedances). Therefore, I used both methods side by side to somewhat verify the results obtained.

For the new measurements, the nanoVNA was first turned on for an hour, and then calibrated for the two methods: the S11 R+jX measurement (circuit to CH0) and the S21 shunt measurement (CH0 directly connected to CH1 in parallel). To clarify, both connection methods are shown next to each other in the boxes [next page].

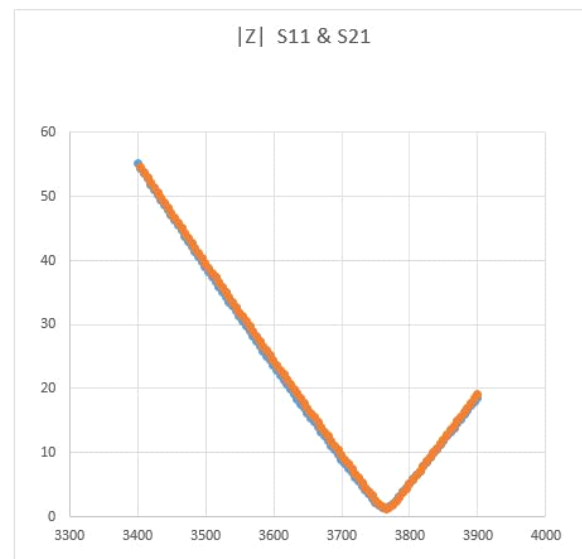
The results were astonishingly good. The two measurements S11 and S21 were exported in S1P and S2P files respectively and then calculated with Excel to  $Z = R + jX$ . (For the formulas used see the two boxes below).

A resonance frequency of  $3763 \pm 1$  kHz was found for both setups (where  $X \approx 0$ ) and the value for R also corresponded:  $1.27 \pm 0.005$  ohms. The two calculated  $|Z|$ -graphs therefore correspond in the adjacent figure. It seems almost too good to be true, but apparently, I did something right. With the XL value of 267 ohms measured at the same frequency, and found  $R = 1.27$  ohms, you end up with  $Q = XL/R$  at a Q of 210. A great toroid coil!

### Conclusion

It is quite possible to measure the Q of a coil using the nanoVNA. The series resistance of the coil appears to be easily measurable with series resonance of the coil in a series circuit. It's as if it comes right out of a schoolbook, and the nanoVNA makes it measurable. If the measured resistance is below 1 ohm, choose the S21 method as described in box 2 because measurement with S11 then becomes too inaccurate.

~ Arie PA3A



### Online groups for NanoVNA:

<https://groups.io/g/nanovna-users>

<https://groups.io/g/NanoVNAV2>

<https://groups.io/g/nanovna-f>

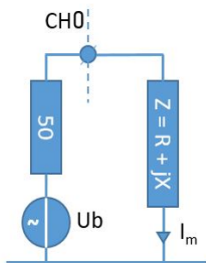
<https://groups.io/g/nanovna-f-v2>

#### Box 1.

$$S11 = S_r + j S_i$$

$D_r$  and  $D_i$  values are directly exported by nanoSAVER by means of an **S1P** file.  $R + jX$  can be calculated using below formulas. The principle of this is explained in part 2 of this series.

$$R = 50 \frac{1 - (S_i^2 + S_r^2)}{(1 - S_r)^2 + S_i^2} \quad X = \frac{100 S_i}{(1 - S_r)^2 + S_i^2}$$

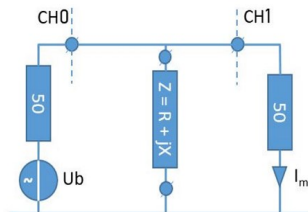


#### Box 2.

$$S21 = D_r + j D_i$$

$D_r$  and  $D_i$  values are exported directly from nanoSAVER by means of an **S2P** file.  $R + jX$  can be calculated using the formulas below.

$$R = 25 * \frac{D_r(1 - D_r) - D_i^2}{(1 - D_r)^2 + D_i^2} \quad X = 25 * \frac{D_i}{(1 - D_r)^2 + D_i^2}$$



*This was Arie's seventh and final installment of his series on the NanoVNA. We hope it has inspired you to try these measurements.*

*Our thanks to Arie for permitting us to translate and reprint these articles.*



# Ham Hardware

Jan van der Meij, PA0JMY

## *Rechargeable batteries in radio equipment*

In recent years, a lot has changed in the field of rechargeable batteries. The power density per content and weight has become much better and, in particular, due to the need for batteries for mobile consumer apps. and, not to mention, electric vehicles, the time between charges has been greatly improved. There are new techniques and new raw materials to achieve the desired parameters. In this article, the batteries are described that are currently in use in mobile professional equipment, and I will describe the vision for the future.

### *History and future*

We all know the regular alkaline battery. This one-time battery can be found in every household as in the clock on the wall or the remote control of the TV. In the mid-60s of the last century, the need arose for batteries that could be charged and used several times. Although the generation of zinc batteries had a reasonable capacity, the price was high. There was a battery developed with nickel and cadmium as important raw materials. Cadmium is a heavy metal and therefore environmentally unfriendly. There were no alternatives so the development of NiCd batteries was continued. The penlight version of the battery had an available capacity of about 200 mAh. Development did not stand still, and the capacity became larger, and is currently about 2000 mAh for a battery with equal dimensions. The charging of the battery was also constantly improved.

In the beginning it was necessary to charge a battery for 14 hours; in later versions, a charging time of about one hour became sufficient.

In recent years, the development of rechargeable batteries has not stagnated. This is mainly due to the availability of mobile phones for the ordinary consumer. It is expected that the cost of formulating new types of batteries will be recovered quickly and developing new types of batteries will continue for the time being.

### *Definitions*

C = Capacity of the battery. This is used to indicate the level of the charging current. If a battery has a capacity of 1,000 mAh then the charging current at 1C is 1,000 mA. A charging current of 0.5C means 500 mA.

Cycle = Indicates the complete discharge and full charging of the battery

### *Different types of batteries*

Below I describe the different types of batteries: Nickel Cadmium, Nickel Metal Hydride, Lithium Ion and Lithium Polymer.

And in addition to those, there are also (of course) two other types of rechargeable batteries, which I use in this article, however, will not describe in detail: the lead battery and the rechargeable alkaline batteries.

A lead battery is generally used in applications where weight does not play an important role. The capacity of a lead battery is high, and it is possible to discharge the battery with very high discharge currents. A lead battery not suitable for portable apparatus due to the presence of an acid (liquid) and the high weight.

There is a category of alkaline batteries that can be charged. The advantage of such a rechargeable battery is that it is a one-on-one replacement for dry batteries. The rated voltage is 1.5 Volts. However, there is a big disadvantage with the capacity of the battery. In practice, the capacity of a new battery will be equal to that of a charged NiMH battery. After discharging and recharging, the remaining nominal capacity is only 60% of the capacity of a new battery. After about ten charging times, the capacity has become so low that the battery is no longer usable in practice.

### 1. The Nickel Cadmium (NiCd) Battery

*Popular in the 80's*

A Nickel Cadmium battery has, as mentioned, very environmentally unfriendly properties. However, until the mid-80s this type of battery was the only kind of rechargeable battery that could be produced relatively cheaply. However, the battery has another nasty characteristic: the memory effect. That occurs when the battery is not fully discharged before charging. In practice, the battery of a walkie-talkie is placed in the charger after a shift, independent of the number of hours of use. This will slowly reduce the capacity of the battery and will eventually make the capability of a 'charged' battery to deliver a useable current very short (half an hour or less). The only way to prevent this effect is to fully discharge the battery and then charge as indicated by the manufacturer of the battery. Also overcharging (by leaving the battery in the

charger for a long time) is not allowed. If the proper procedures are followed, it is possible to charge a NiCd battery about 1,000 times with the the nominal capacity of the battery dropping to about 80% of the indicated capacity. A new battery, by the way, has a capacity of 105 - 110% of the indicated capacity. The self-discharge of a NiCd battery is approximately 10% in the first 24 hours after charging and then about 10% per month.

### Charging NiCd batteries

A Nickel Cadmium battery is easy to charge. There is a preference for fast charging where the charging current used is equal to the capacity of the battery (1C). The battery is then charged in just over an hour. Charging creates gas. If the pressure in the battery becomes too high, a safety valve will open and some gas will escape. The valve will not close completely again and a white powder will form at the top of the battery. The temperature in the battery will have to be monitored during charging. If the temperature becomes too high, the charging cycle must be terminated.

During the first 70% of the charging cycle, an efficiency of almost 100% is achieved. That means that all energy is absorbed and the temperature in the battery remains the same. Above 70%, the yield decreases, and the battery gets warm. The temperature rises to approximately 40 degrees Celsius at 100% charge. Above that the temperature quickly rises.

Because the internal resistance of batteries with a very high capacity is greater than that with a lower capacity, batteries with a high capacity will be heated earlier during charging. To prevent overheating, it is necessary to charge the battery quickly first and at approximately 70% of the nominal capacity, to switch to trickle charge. Of



course, in that case there will no longer be any question of fast charging.

The advantages and disadvantages of NiCd batteries

**Advantages:**

- easy and fast charging;
- more than 1,000 cycles are possible;
- good discharge properties;
- good properties at low temperatures;
- cheap

**Disadvantages:**

- relatively small power density, especially when compared to more modern types of batteries;
- memory effect;
- high self-discharge;
- environmentally unfriendly.

## 2. The Nickel Metal Hydride (NiMH) Battery

*Building on the NiCd, NiMH is not usable for large-scale commercial applications*

A NiMH battery is an improvement on the NiCd battery. In the beginning of the the seventies of the last century, a way was sought to store hydrogen for a nickel-

hydrogen battery. To do so, high pressure is created in the battery, and therefore it is not useable for commercial applications. They are only used in satellite applications. Due to its chemical properties the battery exhibits the

infamous memory effect to a much lesser extent than with NiCd batteries. The power density is also better than with NiCd.

The battery is sensitive to high discharge currents. It has been found that discharge currents of more than 0.5C shortens battery life. Additionally, the pulse-shaped discharge of the battery, as in use for GSM and TETRA applications, shortens the life- duration further. Self-discharge of a NiMH battery is approximately 20% in the first 24 hours and then 15% per month. In practice, this means that it is not possible to store charged batteries for a longer period of time. Because overcharging is not healthy for the battery, stored equipment equipped with NiMH batteries is not rapidly deployable.

### Charging NiMH batteries

Charging NiMH batteries is largely the same as NiCd batteries.

The battery is considered charged by the charger if there is a sudden reduction in the clamping voltage that occurs at 16 mV. Then fast charging must be terminated immediately and must be transferred to trickle charge. Furthermore, in an appropriate charger, the temperature of the battery is monitored, and a timer will set the maximum time for fast charging. Fast charging of a NiMH battery has a disadvantage: the lifespan becomes seriously reduced. When charging a NiMH battery with 1C, the battery can be charged up to 300 times.

The maximum temperature during fast charging should never exceed 60 degrees Celsius! The battery charger will switch to trickle charging if the temperature of the battery rises by 0.1 degree Celsius per minute. As indicated before, the NiMH battery is very sensitive to overcharging. As a maintenance charge, it is recommended to use a charging current of up to 0.05C. The charging current for a NiCd battery charger is normally 0.1C and therefore a battery charger



for NiCd batteries cannot be used to charge NiMH batteries. The other way around, this can be done well.

The advantages and disadvantages of NiMH batteries:

#### Advantages:

- 35% better power density than NiCd;
- Less sensitive to memory effect;
- Environmentally friendly.

#### Disadvantages:

- Limited service life;
- Prone to overcharging;
- High self-discharge. This is even 50% higher than with NiCd batteries;
- Maintenance.

### 3. The Lithium Ion battery

*The battery with the highest power density per unit weight.*

Lithium Ion (Li-Ion) batteries are a more recent development. Since the mid-90's of the last century, Li-Ion batteries were sufficiently stable to be used in consumer goods and in Personal Mobile Radio (PMR) equipment. Prior to this, there were occurrences, that due to changes in the Lithium electrode the battery became so hot that the melting point of Lithium was reached (180 degrees Celsius). That was then accompanied by explosions and the emission of hot or even burning gases...

Lithium is the lightest metal available. The electrochemical properties are also good, and therefore lithium can be used to manufacture the lightest battery or the battery with the greatest power density per unit of weight. The energy density of the battery is twice as high as that of NiCd batteries. The discharge

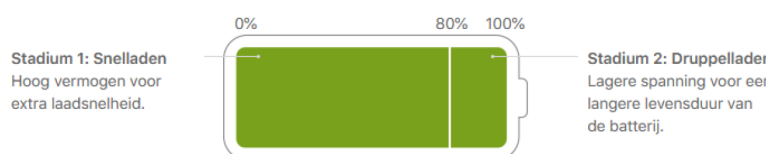
profile is about the same as that of NiCd batteries and therefore a Li-Ion battery is promising for future developments.

The negative electrode of a Li-Ion battery is made of graphite, the positive electrode is made of manganese or cobalt. Cobalt is more expensive but has a longer service life, has better properties above 40 degrees Celsius, and a higher energy density than manganese. The nominal clamping voltage of a Li-Ion battery amounts to 3.6 Volts. In practice, it will be possible to feed devices with only one cell (there are Li-Ion batteries available in a penlite housing).

Li-Ion batteries are fragile. Precautions are needed to prevent both overcharging and too deep a discharge. In addition, it is necessary to use specially designed charging equipment for this purpose. At the moment, there is a problem with aging. Regardless of whether the battery is in use or not, aging occurs. Capacity reduction is noticeable after a year, and after about three years the battery will regularly fail. It is unclear why this occurs. Li-Ion batteries should be checked periodically and, when checked, replaced if required. Keeping them cool (15 degrees Celsius) and only partially charging the battery slows down the ageing process.

#### Charging a Li-Ion battery

Battery chargers for Li-Ion batteries are characterized by highly accurate voltage settings and a maintenance charge is unnecessary for a fully charged battery. A cell can be charged to a voltage of 4.20 Volts with a tolerance of 0.05 Volts. With an initial charging current of 1C, the charging time of a Li-Ion battery is 3 hours and the battery stays cool during charging.



The battery is considered charged if the clamping voltage has reached the tipping point and the charging current has been reduced to approximately 0.03C. With a high charging current, the battery is charged to approximately 80% of the specified capacity. Then the charging current decreases and the battery is slowly charged to the nominal capacity. It makes little sense to increase the initial charging current, as the time saved is then required to fully charge the battery. Overcharging the battery, as with the other types of batteries, causes an increase in the battery temperature. In the case of Li-Ion batteries this should be prevented, hence the use of intelligent chargers.

#### **The advantages and disadvantages of a Li-Ion battery:**

##### **Advantages:**

- High energy density;
- Low self-discharge;
- No maintenance required;
- In full development with the expectation that higher capacity can be achieved for the same volume.

##### **Cons:**

- Protection circuits are necessary to prevent overcharging and undervoltage;
- Aging;
- Discharge current cannot be too high;
- Expensive to produce;
- Not yet fully developed.

##### **Format**

You can find lithium batteries or cells in different forms. You probably know the button cells that are in a hearing aid or watch. Those are lithium batteries. There are also lithium batteries in the form of a regular penlights. These can often be found in electronic toys, shavers and, for example, GPS equipment.

Lithium batteries can often be found in electric bicycles, cars and mobile phones. The demand for lithium batteries continues to grow and, for example, many governments have a plan to only produce electric cars from 2030 onwards. You can imagine how many lithium batteries will be needed!

#### **4. The Lithium Polymer battery**

##### *A recent development*

The Lithium Polymer (LiPo) battery is the latest addition to the rechargeable battery family.

The most significant difference between a Li-Ion battery and a Li-Polymer battery is the use of a dry polymer instead of a porous cloth soaked in electrolyte. The advantage of this is that the battery can be manufactured in all kinds of shapes and, for example, can be made as an integrated cover of a walkie-talkie or even rolled up or produced as a thin plate. The battery has a thickness of only one millimeter.

Unfortunately, there is another problem at the moment: conductivity is low, and therefore there is a high internal resistance. It is true that the conductivity can be improved by heating it up (to 60 degrees Celsius) but for a commercial application that is undesirable. The capacity per unit volume is greater than that of Li-Ion batteries and the batteries can be charged at least 1,000 times.

##### **Charging Li-Po batteries**

Charging a Li-Polymer battery is the same as that of a standard Li-Ion battery. The charger can therefore (for the time being) be equivalent to that of the Li-Ion battery. Here, too, an accurate voltage setting applies. The nominal charging time is approximately 4 hours for a full charge.

**Advantages:**

- Very small size. A battery can even be produced in credit card format;
- Flexible in shape;
- Very light in weight;
- Safer than Li-Ion batteries due to lack of liquid electrolyte.

**Disadvantages:**

- Relatively expensive to manufacture

***The next generations of batteries***

We have seen that the power density of batteries has hardly increased in recent years. In our mobile phones and walkie-talkies, the capacity is enough to last a day and we are used to charging the phone every day. But yes, charging every day and about 1000 charge cycles means that the phone has to be written off after less than 3 years. In the current generation of many phones and tablets, the battery can no longer be replaced.

***Comparison table***

*Below is a comparison of the different battery characteristics*

Characteristic	NiCd	NiMH	Li-Ion	LiPo
Trickle charge (14 hours)	Yes	Yes	Yes	Yes
Quick charge	1 hour	1 hour	3-4 hours	3-4 hours
1-Hr quick charge (capacity)	90	90	70-80	60-70
Number of charge cycles	1,000	750	500	1,000
Price	Low	Mid	High	high
Voltage per cel	1.2	1.2	3.6	3.6
Capacity (max in penlight form)	1 Ah	3 Ah	4 Ah	4 Ah
Weight	high	high	Low	low
Power density (Wh per Kg)	45-80	60-120	110-160	100-130
Temperature limit—negative	-40	-20	-20	0
Temperature limit—positive	+60	+60	+60	+60
Self discharge at room temperature per month	10%	15%	5%	5%
Tolerance to overcharge	reasonable	poor	very poor	poor
Peak discharge rate	20C	5C	>2C	>2C
Nominal discharge rate	1C	≤0.5C	≤2C	≤2C

*This article appeared in the journal of the Dutch Amateur Radio Union (DARU), September 2021.*

*Our thanks for permitting us to translate and publish this article.*



<https://daru.nu>

In the case of electric vehicles, we are looking at new possibilities where capacity per weight is important. The batteries in electric vehicles must be able to continue to operate under strenuous conditions: from very cold to very hot. In addition, a fast charging time and a high discharge current are required. Universities are busy developing new types of batteries: I see silicon, air, seawater and sodium mentioned on the various websites. We will have to wait and see what is ultimately commercially viable. In addition to electric vehicles, batteries for portable equipment is also being examined. Think not only of your walkie-talkie but also of your smartwatch or wireless sensors. Slowly but surely, more and more techniques are being developed in which no scarce raw materials are used, but everyday materials such as sand. After all, that's what our IC's and transistors are made of, aren't they?

The ideal battery does not exist (yet). High in power density yet small in dimensions; very fast charging, no self-discharge are properties that contradict each other. It is clear that a lot is going to change; we will have to abandon environmentally unfriendly batteries and production methods. The rare earths are running out or becoming unaffordable due to export restrictions.

And, once gone it's gone... All in all, a particularly good reason to continue to do research in the pursuit of making batteries from common elements on our earth.

**More information about batteries can be read or viewed via the links below:**

Battery basics :

<https://www.youtube.com/watch?v=DBLHaLhyo2w>

Lithium-ion battery, How does it work? :

<https://www.youtube.com/watch?v=VxMM4g2Sk8U>

How The Next Batteries Will Change the World :

<https://www.youtube.com/watch?v=oh5ULFMsQHU>

Lithium-ion battery: this is what the ingredients look like:

<https://zerauto.nl/lithium-ion-batterij-zo-zien-de-ingredients-look-like/>

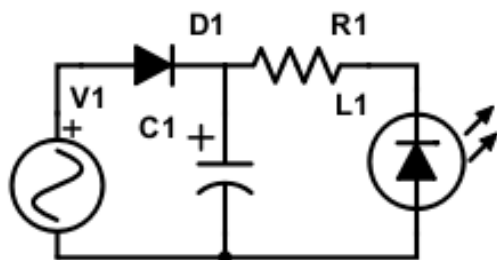
The Truth About Tesla Model 3 Batteries, part 1 :

<https://insideevs.com/news/338743/everything-you-ever-wanted-to-know-about-tesla-batteries/>

The Truth About Tesla Model 3 Batteries, part 2 :

<https://www.youtube.com/watch?v=TdUqQZC2dcE>

~ Jan PA0JMY



**Need an easy LED replacement for a burned out #47 pilot bulb?**

Make it yourself! C1 is 100 uF 25v, D1 is a general purpose diode and R1 is 100 ohms. The LED can be any color you like. Be sure to observe polarity of the electrolytic capacitor and diodes.

...more

# TECH TOPICS

John Schouten VE7TI

## Breathing new life into a tired Baofeng UV-5R



Oh, the Baofeng UV-5R... it is revered or reviled but, in any event, there are lots of them about, and many in use today that have quite a few miles on them. Sometimes errant programming has resulted in some unpredictable anomalies or have resulted in them appearing to be defective.

Based on some experience and feedback, here are some methods that may revive yours. Performing a reset is extremely easy, however if you speak only English and the voice prompts are in Chinese, performing a simple reset or recovering from one may require a little more attention.

### To set the language from Chinese to English

1. Press MENU.
2. Press the UP and DOWN arrow key to select VOICE (Menu Item 14).
3. Press MENU to choose VOICE.
4. Press the DOWN arrow key to choose ENG.
5. Press MENU to choose ENG.

NOTE: a VFO RESET only resets the frequency values in VFO mode. To reset the radio back to factory defaults, choose RESET/ALL. A reset should resolve most issues, but may not resolve them all.

Follow the steps below to reset a Baofeng UV-5R, BF-F9, BF-F8+, UV-B6 or UV-82 transceiver.

### To perform a VFO reset

1. Turn on the radio and press the MENU button.
2. Press the UP and DOWN arrow key to select RESET (Menu Item 40).
3. Press MENU to choose RESET.
4. Press the DOWN arrow key to choose VFO.
5. Press MENU. The radio will display SOURCE?
6. Press MENU to confirm. The radio will display WAIT... for a few seconds, then beep twice to confirm reset is complete. The radio will revert to Chinese language mode. Reset is complete.

And, at last resort...

### To perform a FULL factory reset

1. Complete steps 1 to 3 above.
2. Press the DOWN arrow key to choose ALL.
3. Press MENU. The radio will display SOURCE?
4. Press MENU to confirm. The radio will display WAIT... for a few seconds, then beep twice to confirm reset is complete.
5. The radio will revert to Chinese language mode. Reset is complete.

Some scenarios, such as inoperability due to an incorrect or corrupt image file may not be resolved with a reset and require another resolution. A reset is usually a standard first step when troubleshooting the radio.

A few years ago, someone did a torture test to try to break one. Have a look, you may be surprised:

<https://youtu.be/SyuhllNz8RA>

~ John VE7TI

# SOLDER SPLATTER

Luc Decroos ON7DQ

## Building the OST Morse Box DG

### Summary

ON7DQ rebuilt the prototype into a new case, this time including all the Bells & Whistles this project has to offer.

The basic instruction manual is available in Dutch and English and now also in Spanish, thanks to SOTA friend Ignacio, EA2BD. ¡Gracias amigo!

All files and full documentation for the basic version is on this github page:

<https://github.com/on7dq/OST-Morse-Box>, you have to build this first.

The extended version with two different decoder boards is here

<https://github.com/on7dq/OST-Morse-Box-DG>, building the decoder hardware is optional, but it is strongly advised to use the newer firmware.

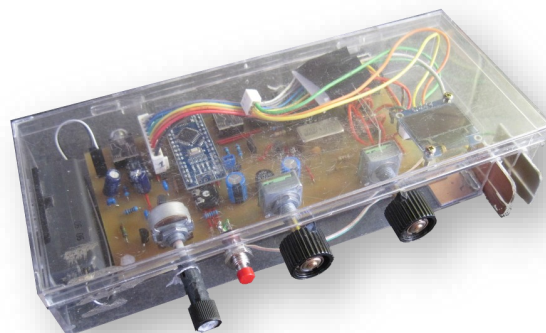
I built the first prototype in 2020, on a **single sided** PCB, where Gil had made the "top plane" with wires... a bit primitive but it worked (of course !). In a hurry I put it into a plastic cigar box... not very appealing to potential builders.



OST Morse Box DG with key

### Introduction

In a previous article (see *The Communicator* May-June 2021, page 26), I presented you the **OST Morse Box** project. A versatile and modular system to practice CW over the air on VHF/UHF, but offering many more useful functions.



Recently I was looking for a new project, and thought, why not rebuild the Morse Box, but this time add all the possible “Bells & Whistles”, so as to have a nice looking “presentation model”.

So I’m proud to present you the result of my work, see the picture at the start of this article.

My box still has the very first prototype PCB, its controls occupy the left side of the front panel. I added BOTH decoder boards, those controls are on the right side of the panel.

### Added features

I added several switches and pushbuttons, most of which are optional, but I just wanted “to have it all”.

SO I added **switches** for Power, PTT disable, Decoder selection (PLL or BPF), Input signal selection: internal (from the VHF/UHF transceiver) or external (e.g. from an HF transceiver).

An extra **LED** serves as a tuning aid for the PLL decoder, or for setting the input level for both decoders.

Internally I added two small slide switches, one to disable the power bank “keep alive” feature, which generated a ticking noise. And one to short out resistor R7, to increase the MIC level for Yaesu transceivers.

Two **pushbuttons** were also added, one for switching the decoder ON or OFF, and a RESET button on the back panel.

As I was looking at the decoder ON/OFF button, I thought it would be nice if I could also start the built-in sine wave generator with that button, so I asked Gil if that would be possible?

Of course it was, after a few days Gil came up with **version 2.12 of the Arduino firmware**, Now the decoder button works as

follows (supposing the decoder was ON):

> Decoder OFF > Generator ON > Generator OFF and Decoder back ON.

Those that don’t want any decoders, can touch the key or paddle to switch OFF the generator, this will also leave the decoder in the OFF state.

The frequency of the generator is adjusted with the WPM potentiometer, and is limited to the range of 450–1450 Hz. If you want the full range and more precise frequency setting, you have to use the Windows Control program.

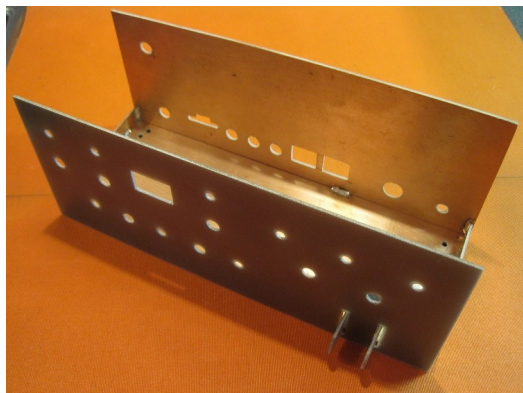
Even if you’re not building the fully equipped Morse Box, you’re advised to update your firmware to this newer version.

Here follow some more construction details of the cabinet. Nothing really difficult, it was all made with home tools, although I do have some nice cutting and bending tools which make life easier.

I started by cutting a few pieces of single sided PCB. The dimensions of the box were inspired by the size of the front panel of an IC-9700, so that the box will fit nicely on top of it : it’s 23 cm wide, 9 cm deep and 9 cm high (approx. 9” x 3.5” x 3.5”).



I soldered the back panel to the bottom panel, and added two side strips, where I could fix the cover using small Parker screws. The width of the bottom plate is 4 mm less than the front and back panels, to accommodate for the side strips. Also, the bottom panel is not fully at the bottom, it was raised about 3 mm to leave space for four rubber feet. The front panel was soldered after most of the insides were mounted. Drilling and filing all the holes was a lot of work, especially measuring the correct position!



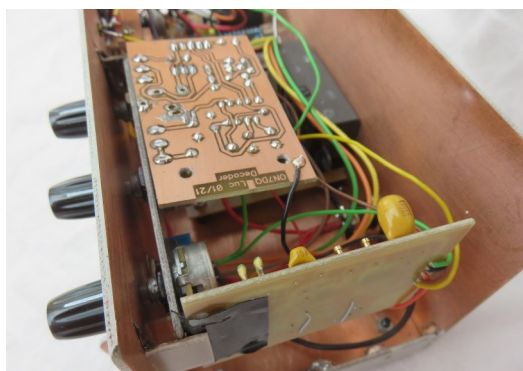
But after a while, it started looking like this. There are **19 holes** in the front, and **10** in the back!

The front panel was again removed and all sides were spray painted with two layers of a light gray matte finish.

Then all the labels were put on, just using Scotch tape, nothing fancy. I know there are better solutions, like professionally laser-etched aluminium panels, but those may cost more than the electronics inside the box ! So I used what I had and works for me, and I'm very happy with it.

### Hints and kinks

Two things which you may find interesting, is how I mounted the decoders and the OLED display.

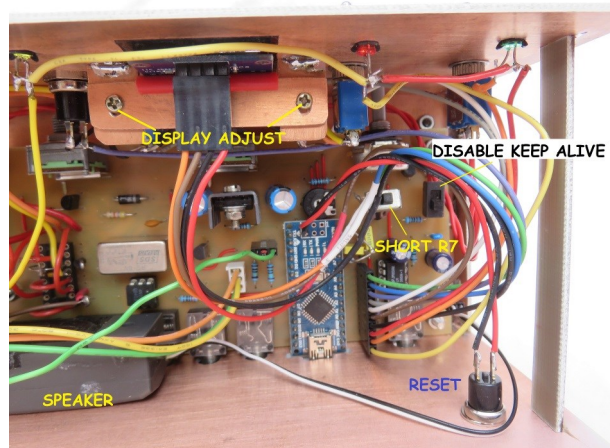


The two decoder boards were mounted just hanging from their potentiometers. I made a kind of "bridge" with three holes for the potentiometers. The bridge is then soldered to the front panel, so you don't see any nuts

on the front panel, and I had only to drill three small holes for the 4mm shafts.

The same principle was used for the OLED display. Two supports left and right of the display support a "bridge", which has small slots, so that I can adjust the pressure on the display.

A piece of soft rubber insulation from a test lead makes sure I don't crack the display or the board, or short any components it may touch.



On the picture above you can also see the two small slide switches (near the top right), an internal speaker (bottom left) and the RESET button (bottom right).

This is a view of the front panel when all was finished.



The two switches for RANDOM and BEACON are of the special ON-OFF-(ON) type as suggested in the basic manual. This means they function as a pushbutton when pushed down (non locking), and as a toggle switch (locking) when pushed upward.

It also contains the built-in **Touch Paddle** option (bottom right). The paddle was made following the example in the basic manual.

The ground strips were soldered to the bottom plate of the case.

And this is the back panel.



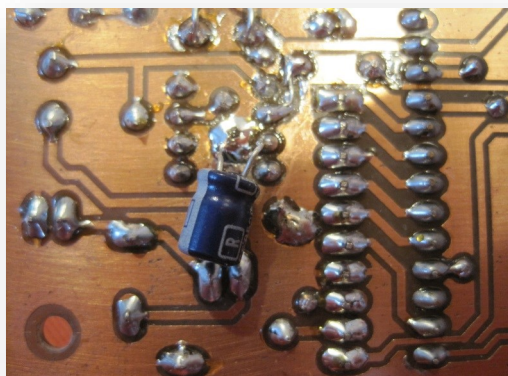
Most of the connections are on the PCB of the basic version. The extra stuff is: EXT IN, to connect a signal from an external receiver to the decoders. A DC 12V power input, feeding the 7808 voltage regulator on the PCB. The RESET pushbutton.

Finally, a cover was made from an old cover from a server. It was cut and bent into shape, and spray painted with two layers of red paint.

### Change notes

While rebuilding the OST Morse Box, I also made a few small changes.

When using headphones, one may notice the computer noise (rumble) from the Arduino and/or the connected PC. Adding a 47 $\mu$ F/10V electrolytic capacitor between pins 7 and pin 4 (GND) on the LM386 solves this problem (any value between 10 $\mu$ F–100 $\mu$ F will do).



Adding a switch to disconnect R12 from +5V, to disable the “keep alive” circuit.

Adding a switch to short out R7 to increase the modulation level for Yaesu transceivers.

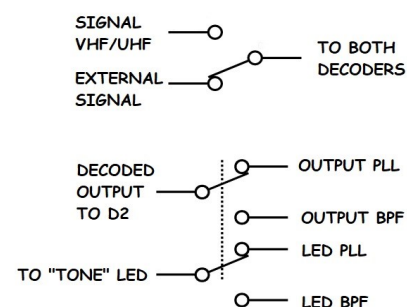
Replacing the fuse I put in earlier, by an LM7808 voltage regulator. A heatsink was not necessary, but I put one in anyway.

At the jumper block, I added test points (stiff wires) to connect **GND**, **+5V**, and **RX AUDIO** for the decoder(s). I could solder to these points even after the PCB was mounted in the case.

The **12V DC** input is connected to pin 17 on the jumper block, named **+9V** in the manual.

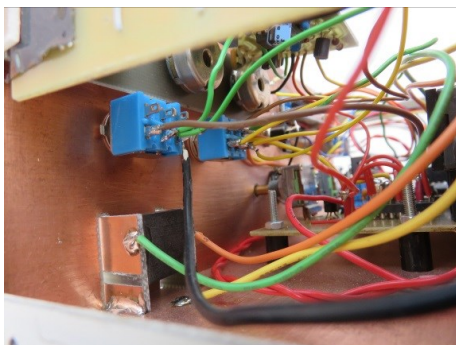
Pin 19 on the jumper block, the PTT signal, is routed over a switch on the front panel, and then back to the transceiver PTT line. This is handy if you want to do some local code practice without transmitting, but still want to be standby on the local channel for a voice QSO. The PTT from the microphone will remain functional.

Finally the decoder switching was done according to this diagram.



Decoder wiring diagram

The **SIGNAL** switch selects between the internal audio from the VHF/UHF transceiver or an external source, and feeds both decoders at the same time. Both decoders are also supplied with +5V all the time.



The **DECODER** switch selects which decoder will be used. Only one of the decoders' outputs is connected to the Arduino input D2 (on the paddle test jumper). The LED output is also selected by this switch.

It may all seem a rats nest in the end, but when the lid is on, it looks really nice ... what do you think ?

I hope my article has given you some ideas, and a new motivation to build your own version of the OST Morse Box !

73,

~ Luc ON7DQ / KF0CR

(Luc's e-mail address is on QRZ.com )

## VY0ERC Update...

*You may recall a story (The Communicator, January–February 2020) about Eureka VY0ERC on Ellesmere Island, an atmospheric research station in Canada's far north. At the time the crew was fund-raising for a new antenna. Here is an update...*

VY0ERC is scheduled to get back on the air from Eureka, Ellesmere Island (IOTA NA-008), Nunavut this Fall.

The team (VE1RUS and VE3KTB) is now in preparation to depart to Eureka on October 11, 2021. As soon as the first antenna is erected, VY0ERC will get on the air.

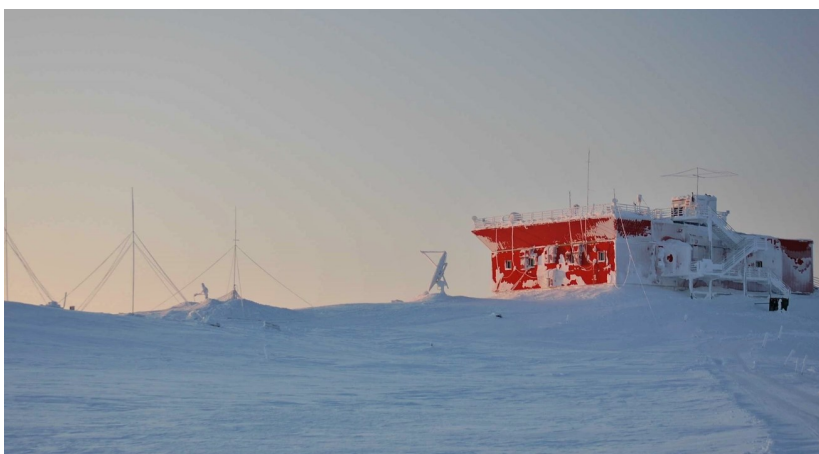
The station will be active on HF bands in CW, SSB and digital modes till November 22, 2021 (time permitting).

Participation in CQ WW SSB and the ARRL Sweepstakes is scheduled, and operations via FM and SSB satellites are also planned.

Video: <https://youtu.be/unGQBgnn46E>

### Background

Eureka is a research station located at 80°N, 86°W on Ellesmere Island, Nunavut, Canada. It was founded in 1947 as the first out of five weather stations established under Canada-U.S. Joint Arctic Weather Station program. Since the establishment, the station has become an important hub supporting variety of activities in the surrounding area and in the High Arctic in general.



Currently it consists of three main areas: the Eureka Aerodrome, the Environment and Climate Change Canada (ECCC) Weather Station (WS) and the Polar Environment Atmospheric Research Laboratory (PEARL).

Eureka is the third-northernmost permanent research community in the world. The only two further north are Alert, which is also on Ellesmere Island, and Nord, in Greenland.

Eureka is known as the “Garden spot of the Arctic”, with abundant flora and fauna and unique animal life, i.e., jaegers, snow owls, lemmings, Arctic hares, muskoxen, Arctic foxes, Arctic wolves, caribou, and polar bears. The region around Eureka is a polar desert with mean annual surface air temperature about  $-19^{\circ}\text{C}$  and annual water equivalent precipitation of 70 mm. The winter temperatures in Eureka can drop below  $-50^{\circ}\text{C}$ .

The PEARL Ridge Laboratory (Ridge Lab) is located on a hill 610 m above sea level, ~15 km away by road from the ECCC WS. The laboratory was originally built by the Meteorological Service of Canada (currently ECCC) in 1992 to conduct research specifically related to stratospheric ozone in the High Arctic and was named as Arctic Stratospheric Ozone Observatory (AStrO).

In 2005, when PEARL was established, AStrO became its main facility under the name Ridge Lab. Later, two more PEARL facilities were built: Zero Altitude PEARL Auxiliary

Laboratory (OPAL) - near the ECCC WS and Surface and Atmospheric Flux, Irradiance and Radiation Extension (SAFIRE) - near the Eureka Aerodrome.

Since the establishment, PEARL has been operated by the Canadian Network for the Detection of Atmospheric Change (CANDAC), a network of university and government researchers dedicated to studying the changing atmosphere over Canada. It has evolved into a state-of-the-art research institution with a large complement of instrumentation for measuring atmospheric properties from the ground to over 100 km altitude 24/7 year-round.

73,

~ Alex VE1RUS/VE8

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More details about PEARL and CANDAC can be found at:

<https://www.candac.ca>

<https://eureka.physics.utoronto.ca/>

<https://twitter.com/candacpearl>

***You know you're a ham if:***

*You ID every ten minutes during a regular conversation*



# 'Hamming' on the Computer

Matt Johannessen and Ben West

*Amateur radio meets edge computing to keep disaster response teams connected*

In the immediate aftermath of a natural disaster, local infrastructure such as cell towers, power lines, and telephone and internet cable are often damaged or destroyed, limiting the ability for responders to share data and access the internet. With more organizations moving to a cloud-first IT strategy, the ability to bridge applications running in the cloud and tools operating at the edge is a key requirement for creating solutions that allow responders to operate effectively in these challenging environments.

Recently, the **Amazon Web Services (AWS)** Disaster Response team conducted a field testing operation designed to replicate a common disaster response scenario. Held in Northern Virginia, it included forward-deployed field locations (at/near the disaster site) and a

headquarters location (HQ) that was more than 25 miles away. The field sites had minimal working infrastructure and no cellular or internet connectivity, and the HQ was an office building with standard internet access and stable infrastructure. The goal of the exercise was to establish an ad-hoc network at the field sites that allowed team members to collect and process data at the edge, as well as create a link between the field site and HQ using the Amateur Radio Emergency Data Network (AREDN) to provide access to cloud-based resources in the field.

## What is AREDN?

Amateur radio operators, widely referred to as 'hams,' have a long history of providing communications support to communities during disaster response efforts. The field testing operation was no different: four licensed AWS amateur radio operators demonstrated how inexpensive and readily available radio hardware can be configured to use AREDN to provide connectivity between the edge site and the HQ location. By using commercial off-the-shelf hardware, the AWS team

## Field Test Architecture

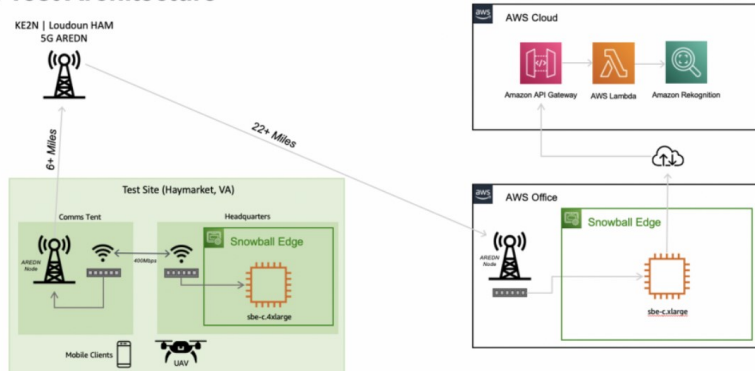


Figure 1: Conceptual architecture of the Disaster Response team's field testing operation. [\[click to enlarge\]](#).

simulated real world response conditions, where hams bring equipment into the field to re-establish connectivity for disaster response teams.

AREDN is an ad-hoc radio frequency (RF) mesh networking application that allows amateur radio operators to share applications and data via long distance RF communications over miles. A mesh network is a local network topology in which multiple nodes and devices connect together directly, dynamically, and without hierarchy to as many other nodes as possible to build a reliable, self-configuring communications network. The AREDN mesh is self-healing, meaning that if a node is removed from the network, the remaining nodes automatically reconfigure themselves to maintain connectivity across the network—this is a key feature driving the increasing popularity of AREDN for emergency response connectivity. AREDN uses widely available, low cost commodity hardware to establish 2.4 and 5ghz point to point links between stations. Each node on the mesh provides network connectivity to share compute resources with remote users. In the case of the test exercise, the goal was to set up one AREDN node at the HQ office building and another node at the field location, both of which could connect to other existing AREDN nodes in the Northern Virginia area and ultimately enable the transfer of data between the two sites.

### How we built it

Like real world scenarios, the team had to operate within physical limitations of the test location, a rural 25 acre site with mixed terrain. The AWS Snowball Edge<sup>1</sup> device [<https://youtu.be/bxSD1Nha2k8>] requires a commercial power source, but the location that had power was not viable to establish RF communications via AREDN.

To run the Snowball Edge Compute Optimized, which served as the main data storage and processing hub in the field, the team split the field command center into two sites: one near the power source to run the Snowball Edge, and a second “communications hub” that was powered by a solar generator (eg. solar panel combined with a battery). The communications hub had line of sight to an existing AREDN node that was part of the Northern Virginia AREDN network, as well as line of sight back to the primary command center site with the Snowball Edge. The two sites were bridged together wirelessly using commercial long range outdoor WiFi access points, which also provided local area network connectivity to users and devices operating at the field site.

A second AREDN node was set up at the office HQ location, which also had line of site to the existing northern Virginia AREDN nodes, enabling the relay of data between the headquarters and field locations over the AREDN mesh. A second Snowball Edge Compute Optimized device was deployed at HQ and connected to both the AREDN mesh network and the internet. This allowed us to serve applications to users on the AREDN mesh, including endpoints that could proxy data and requests from the field that came in over AREDN up to cloud-based resources over the internet. Results were returned to users in the field over AREDN.

Once the necessary equipment was set up and configured at each location, the team collected a variety of diagnostic metrics to evaluate the network performance of both the local WiFi and AREDN links. At the field site, the wireless link

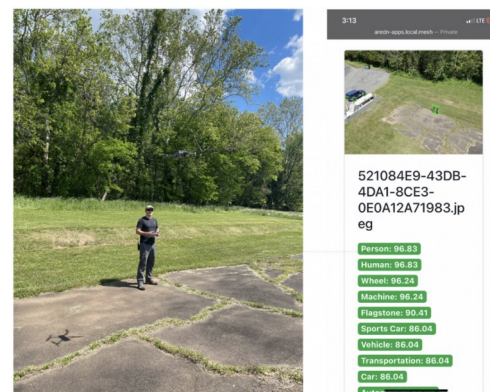


Figure 2: Unmanned aerial vehicle (UAV) operator transmitting images from the edge to the cloud via AREDN and receiving Amazon Rekognition results.

between the command center and communications hub delivered up to 400 mbps of bandwidth, and team members were able to connect to the local wifi from nearly 0.6 miles away from the access point. The AREDN link between the field site and the headquarters office building provided over 15 mbps of throughput, which was sufficient to transfer images, voice, and text data in near real time.

### **Testing disaster response scenarios**

With the network established and tested, the team began exercising several scenarios common during disaster response operations. The first scenario focused on establishing a text-based chat capability, called Rocket.Chat, that team members in the field could use to communicate with each other, as well as remote members located at the HQ building. A Rocket.Chat server was deployed to the Snowball Edge at the HQ location and configured as a discoverable application on the AREDN mesh network. Users were able to successfully access Rocket.Chat, create accounts, and chat with each other in real time while connected to the local WiFi at the field site. Using the same pattern, the team also deployed Etherpad, an open source note taking and document writing app that allows users to edit documents collaboratively in real time.

The team also developed a custom containerized web application to perform computer vision tasks using Amazon Rekognition, a machine learning (ML) service that detects and labels objects in images and video. The app was hosted on the Snowball Edge at the HQ location, which successfully connected to send images to Amazon Rekognition for object detection (see Figure 2). Users at the field site were able to upload photos from a variety of devices including mobile phones, UAV platforms, and laptops.

Over the course of the operation, the team collected feedback from users and tuned the application architecture continuously at the edge. For example, the team reduced the total end-to-end response time by using the Snowball Edge device in the field to pre-process, or downsize, images, to minimize upload times over the bandwidth-limited AREDN links.

By the end of the two day exercise, users experienced about 1.5 second end-to-end response times for large raw images (10Mb+), which included images taken during live UAV flight operations. The ability to connect workloads in the field running on AWS Snowball Edge, with pre-trained artificial intelligence (AI)/ML services in the cloud via ad-hoc networks like AREDN gives response organizations new options when connectivity is limited.

### **Learn more and get started**

To get started, learn more about the AWS Disaster Response Program and the Snow family of edge devices. AWS offers multiple programs for nonprofits to get started on the cloud, including the AWS Nonprofit Credit Program, which helps organizations offset the costs of implementing cloud-based solutions. Apply for the AWS Nonprofit Credit Program to start your journey with AWS.

~

[Amateur radio meets edge computing to keep disaster response teams connected | AWS Public Sector Blog \(amazon.com\)](#)

[Subscribe to the AWS Public Sector Blog newsletter to get the latest in AWS tools, solutions, and innovations from the public sector delivered to your inbox, or contact us.](#)

<sup>1</sup> AWS Snowball, a part of the AWS Snow Family, is an edge computing, data migration, and edge storage device that comes in two options. Snowball Edge Storage Optimized devices provide both block storage and Amazon S3-compatible object storage, and 40 vCPUs. They are well suited for local storage and large scale-data transfer.



# VE7SL's Radio Notebook

Steve McDonald VE7SL

## The *green glow*

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Recent emails from two friends brought new insight into a blog that I had been intending to do for some time.

As has been mentioned on more than one occasion, I discovered radio in the late 50s at the age of 10, after reading an article about shortwave-listening in a drugstore magazine. My father was able to rescue an old GE cathedral from grandpa's downtown barbershop, where it sat gathering dust for several years in the back room storage space. Fortunately, it immediately came to life when plugged in, and soon after dad spent an afternoon scurrying about on the roof of our 3-story house in central Vancouver, my radio-adventures began. Life would never be the same!

As I recall, the first couple of weeks were spent listening to radiotelephone traffic between various tugboats

and their dispatchers, in the 2 megacycle marine band. Initially it took me awhile to figure out what I was listening to but found it fascinating to hear the tugboats up and down the coast getting their daily marching orders.

It wasn't too much later that I discovered the international shortwave bands and I was soon keeping detailed logs of my catches and mailing for a coveted QSL. Friday nights were always special as it meant I could DX well into the night and not worry about having to get out of bed for school early the next morning. My 3rd floor bedroom shack was the true definition of 'warm and cozy' and a memory I will always cherish.





Courtesy Paul's Tube Radio Restorations

Up to this point I had yet to discover ham radio. I must have tuned across a few conversations on phone but evidently hadn't been too awe-struck at what I had heard... perhaps I didn't know what I was hearing or was unable to comprehend some

of the expressions they were using or what they were talking about when describing their gear. For whatever reason, the ham radio 'trigger-event' had not yet transpired... but it soon would.

By this time, I had moved upward, from the Boy Cubs to the Boy Scouts. I must explain that these activities were forced upon me by my parents and not something I particularly enjoyed, especially the midwinter camping trips that were always pouring rain or freezing. Again, from grandfather, I had been provided with an old, virtually uninsulated, WW1 sleeping bag, that wouldn't have kept anyone alive at the western front for longer than a week. These all too regular winter excursions to the rain

forest were pure misery and if I wasn't freezing to death then my sleeping bag was usually getting soaked from the river of rain running through the tent... most of these weekend outings were sleepless and left me feeling like

a zombie for the next few days. But... not every scouting experience was bad and in fact, it was a scouting event that would soon provide the ham-radio 'trigger'!

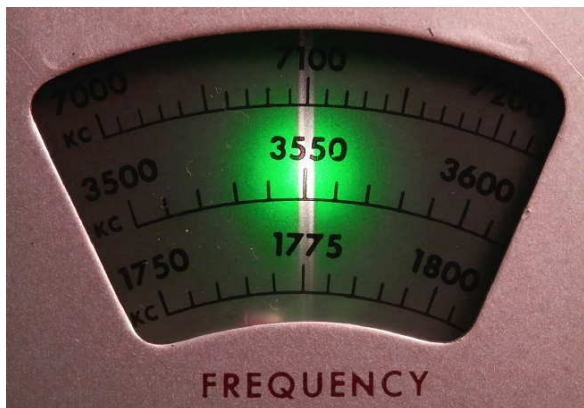
The opportunity arrived for those that wished, to visit a local 'ham station' to partake in some sort of 'on-the-air experience'. This would have been in 1958 and having been already familiar with shortwave radio, I immediately signed-on.

A few weeks later, about six of us found ourselves in the basement shack of Ernie Savage, VE7FB. Although a stranger to me, Ernie was a well known 75m phone traffic man and an ardent 75m mobile operator. Although he was only about five-foot two, Ernie was a powerhouse of a personality and most of us cowered quietly as Ernie tweaked the dials and with a tight grip on his large microphone, barked louder than his small stature might suggest... all of us quietly prayed that Ernie wouldn't pass the microphone to any of us.

**And then I saw it!** Although I didn't know it at the time, it was a pivotal moment in my development and would shape all aspects of my life from that point forward.

As Ernie reached up to change the frequency of his mammoth Heathkit DX-100 my eyes gazed upon and then became fixed on the big Heathkit's green dial... the magical green dial that could take him anywhere he wanted to go, with just a twist of the wrist. There was something about its semi-transparent, alluring green shade that just grabbed hold of me. It was one of the coolest things I had seen in my first experience with amateur radio and I knew, from that moment

Heathkit's magical green VF-1 VFO dial



on, that I wanted to get involved in this amazing hobby. Instead of just listening to signals, I could be making my own!

Like so many memories from my youth, this moment is still fresh in my mind... I can still visualize everything in that room as if I had just left Ernie's shack. Although the warm orange glow emitted by the dials of the equally mammoth **Hallicrafters SX-28 'Skyrider'** were stunning, it was the inviting glow of the little green Heathkit dial that I found myself focused upon ... how odd this all seems to me now, thinking about it over sixty years later.

Perhaps the Heathkit engineers had learned of the 'power of green' from those earlier genius Hallicrafter's draftsmen... can anyone deny the alluring appeal of a Hallicrafter's front panel or dial?

Whatever the reason, Heathkit engineers were no slouches either when it came to luring young radio-crazed boys as well as full-grown men with their eye-appealing ads and clever designs.

As a young teen, I could never afford to buy a DX-100 but I was able to buy a VF-1 and added one to my Heathkit DX-20 workhorse. With the lights turned off in the high attic bedroom shack, the orange dials of the Super Pro and its backlit S-meter combined with the seductive green glow of the VF-1. It just couldn't get any better!

Until recently, I had no real idea of why I had found the green dials so enchanting but an email from Mark, VA7MM, finally made it all perfectly clear. Mark offered the most plausible explanation... the diabolical Heathkit and Hallicrafters engineers had been putting Kryptonite in their dials... the stuff that even Superman found overpowering and unable to resist!

It was now so obvious why countless thousands of young boys and grown men had found these products so difficult to resist... seems we never had a chance.

~ Steve VE7SL



Hallicrafters SX-42 Dial



Powerless

## My ham radio adventure continues...

Mike Weir VE9KK

Around this time last year, I registered for the CWops intermediate CW course. The CWops is a worldwide group of radio ops that support the operation of CW. On top of this, they want to help up-and-coming CW ops as well as those (like me) who want to improve their speed. As for me, I wanted to improve my speed and learn how to head copy morse code. For me, I found when receiving around 20wpm and up it's very hard to write things down and keep up with the conversation.

So as I was saying last year around this time I applied to join the CWops intermediate CW class. With joining they ask for a commitment to 1 hour a day of practice time and once a week taking part in an online zoom style class time. I was accepted and as the time came near to begin the class COVID had my wife working from home. This meant our hobby room was also doubling as her office. This was a huge problem as she is always doing video conferencing as well as Webex phone calls. Her office hours were all over the map as she works with counterparts in many world time zones. I ended up cancelling my

placement in the CWops class as I wanted to leave it open for someone who was sure they could dedicate the time needed.

Well here we are a year later and my wife is now basically retired and I have lots around the

house on the go but I still wanted to get my CW speed up and nail down this head copy biz. I ended up going to the CWops website and downloading the study material and I made a commitment to set aside time each day and go through the drills, studies and practice... but on my own. I am happy to say that I have been going full tilt for the last 18 days and things are coming along.

I am now starting to get the head copy gig, not a hundred percent yet but I am on my way. My other goal is to get to the point that in a CW contest I can start calling CQ contest and not have to search and pounce for contacts. My issue with not calling CQ contest at this point is I feel my CW speed is not up to par. I feel that I will just be a frustration to other operators in the contest who are trying to complete a contact with me.

Here is a link to the CWops website. Pay them a visit and look around at the links even if your not interested in moving up the CW speed ladder. You can learn CW with them or pick up some great links to other CW-related information.

Well, I press on in my continual CW adventure!

~ Mike VE9KK

Mike Weir, VE9KK, writes from New Brunswick, Canada. Contact him at [ve9kk@hotmail.com](mailto:ve9kk@hotmail.com).





## Ham Hardware

Cory KD0QEA

### *Use of a small mixer to improve intelligibility*

First, why would you want to connect your radio to an audio mixer? Wouldn't that just be a possible failure point, noise source, etc.? It could be, but I had a broken hand microphone and no way to use my radio. Since I've been playing music and collecting audio gear for way too long I had a few things laying around. Not only would I hook up a performance quality microphone to my HF radio, but I would get a few bonuses in the process.

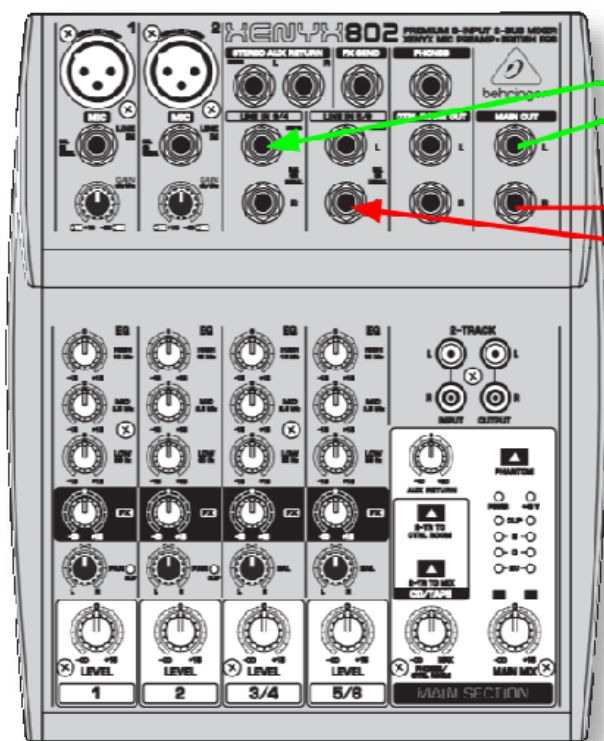
When connecting a non-radio microphone to a radio it is missing a key feature, the PTT switch. So as part of my plan I needed to devise a way to add that switch back in. The choice was between a button on the desk or a footswitch. I actually chose both. My HF radio has a foot switch and my VHF/UHF radio has a desk button.

The biggest bonus of a mixer is being about to use the 3 band equalizer on RX and TX. I've got the input channel of my HF radio set up to boost the midrange and cut the highs to help the human voice punch through the noise. I have a similar setting on my microphone audio so I can transmit within the passband of my transceiver and have good quality audio.

An interesting little bonus to the mixer I own is the "Tape In" and "Tape Out" RCA connectors. I've connected these to the line in and out of my computer's sound card. This way the mixer also acts as my sound card interface for digital modes. You can use VOX for PTT but I tend to just use the foot switch so I don't accidentally leave VOX turned on.

The final thing I've been able to do with my radios since hooking up the mixer may be a little less popular, but it can be useful. With two radios connected one can be transmitting while the other is receiving. This means that the transmitting radio will retransmit the RX audio on a different band. I haven't used this for VHF to HF crossbanding but I did connect a club member to our weekly net when he was connected to me via EchoLink from the other side of the country.

So how do I do this? I've heard Bob Heil say this is one of the most common questions he gets after he went through it on an episode of HamNation. The first step is to hook your microphone up to your mixer. I use channel 1 because it's the one farthest to the left and my mic is on the left side of my desk. I've omitted this step in the diagram as it's not that complicated.



HF Radio



VHF/UHF Radio



The next step is to get the RX audio from the radios into the mixer so you can hear it through headphones or amplified speakers. You should probably use a 1:1 audio transformer to avoid ground loops, but I didn't have any so I just hooked up a shielded audio cable with ¼" ends from the headphone port

of my HF radio to the line input on channel 3-4. The VHF/UHF radio output is connected to channel 5-6 in the same way.

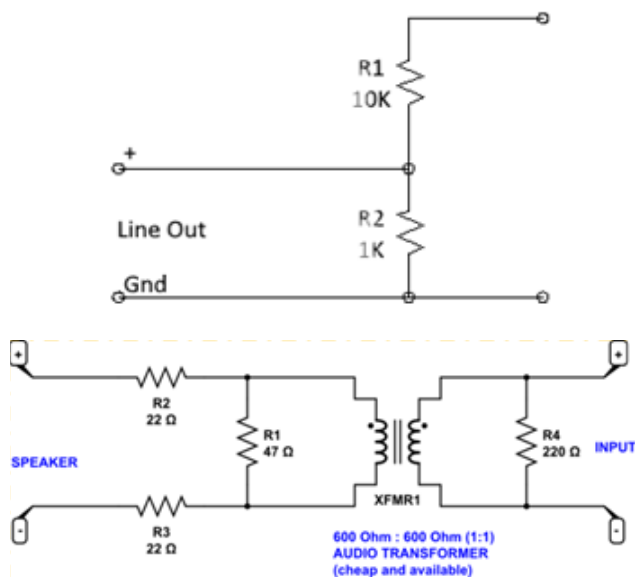
You might be saying "What about feedback?". Since our radios are all half duplex, we don't have to worry about it. When the radio is in RX only I can hear myself talking into my microphone, when it is in TX the other parties are muted.

The most complicated step of this whole project is getting the audio from the mixer into the radio for transmission. The line level audio output of the mixer may be way too high for some radios, but I have an Icom 718 without a mic preamp so I didn't have to worry too much. The pinout for your mic plug or accessory port should be in your radio's manual. Use a 1:1 audio transformer for isolation and a audio potentiometer to bring the level down to what the radio expects. This is also where you tap off a pair of wires so you can short the PTT to ground with a foot switch or desktop momentary switch. A circuit diagram would be rough at best because every radio is different, so I'll skip it.

Overall I would say this was a great solution for me. Having a mixer connected to your radio makes a comfortable operating station with flexibility and improved audio quality.

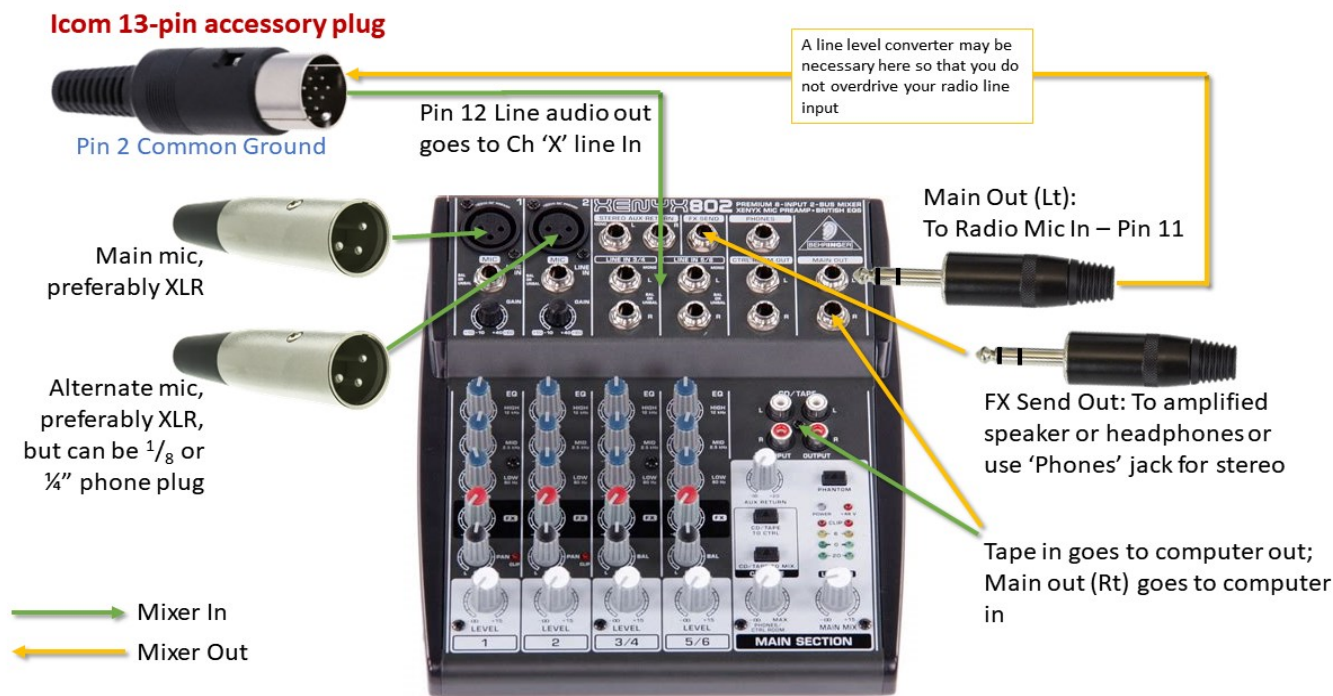
~ Cory KD0QEA

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Two circuits that can be used to lower the line level input, to prevent overdriving your radio. The bottom circuit provides DC isolation.

/continued

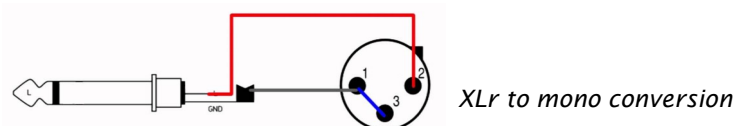


Having subscribed to the idea of having a mixer to control audio in and out of my station as a result of a HamNation podcast from about 10 years ago, I came up with the above as a method to interface with my Icom transceivers, my two mics and my computer. I can route the audio anywhere in and out of my devices and, more importantly, control the equalization by raising or lowering the audio frequencies. This can really cut through the interference or muffle in a hard to copy HF signal.

I use XLR plugs where possible. XLR stands for X connector, Locking connector, and rubber boot. It is claimed that XLR will offer considerably less noise, no ground loops, no hum, a better audio dynamic, and sharper focus. It sounds more 'precise'.

The reason for the above is that XLR is what you depend on for balanced signals. The hot pin is the signal carrier. The cold pin carries an inverted signal or mirror image of the audio information. The third pin is responsible for ground (also known as the earth pin). Any noise produced by the cold and hot pins is canceled out as they go through the equipment thanks to how XLR is designed. A balanced XLR signal or connection is ideal for very long runs of cable and for carrying the small voltage signal created in a microphone. Better quality mics use XLR for this purpose. Watch the demo on YouTube: <https://youtu.be/6qE5zd7rYw8?t=2627>

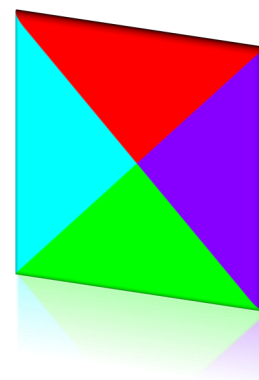
~ John VE7TI



# Foundations Of Amateur Radio

Onno Benschop  
VK6FLAB

*We need more glue in our hobby ...*



*To listen to the  
podcast, visit the  
website:  
<http://podcasts.vk6flab.com/>. You can also use  
your podcast tool of  
choice and search for  
my callsign, VK6FLAB.*

*Full instructions on  
how to listen are here:  
<https://podcasts.vk6flab.com/about/help>*

Since December 2010 I've been licensed as a radio amateur. For some this seems like a long time ago, for others, it's just the beginning. In my time thus far I've attempted to document and describe my journey and in doing so, I've had the unbeatable pleasure of hearing stories from others who were inspired by my efforts to join, or rejoin the hobby.

It occurred to me that it's hard to tell when you look at any one amateur if the ink on their licence is still wet, or if the whole certificate is faded and yellowed with time.

You also cannot tell by looking if one amateur turns on their gear in the car during the daily commute, or if they go out on expeditions to remote locations twice a year.

The callsign a person holds tells you even less, let alone the class of their license.

In our community we talk about mentoring and we call such people Elmers, but do we really use this as a way to glue together our hobby as its namesake might suggest?

As a result of my profile, there's a steady stream of commentary about what I do and how I do it. As you might expect, there's both good and bad, sometimes describing the same thing from opposite sides in equally heated terms.

I'd like to take this opportunity to point out that playing the man and not the ball will get you completely ignored. If however you have a specific grievance with any technical aspect of what I'm contributing, by all means let me know, but be prepared to provide references because it might come as a surprise, I do research before I open my mouth. That's not to say that I don't make mistakes, I'm sure I do and have.

Before this turns into a self congratulatory oration, I'd like to point out that all the negative feedback I see all around me does nothing to grow our hobby, does nothing to encourage learning, does nothing to reward trial and error and it doesn't contribute to society at large in any way.

I'm mentioning this because I also receive emails from amateurs who have left the community, not because of lack of interest, but because of the bullying that they've experienced.

I know that there are several local activities that I avoid because it's just not fun to bump into people who are friendly to your face whilst being vicious online.

It continues to amaze me that this topic keeps recurring and that it keeps needing to be called out. One thing I can tell you is that ignoring it doesn't work. I've described previously what you should do instead when you're the subject of such petulant behaviour, but it bears repeating. Say it out loud.

"Thank you for your comment. I don't believe that it's in the spirit of amateur radio. Please stop."

Feel free to use that phrase anytime someone in this hobby makes you feel uncomfortable.

One final observation. If you've not personally experienced this behaviour that's great, but it doesn't mean that it doesn't happen or that it's not endemic. Consider for a moment how you'd feel if you were attacked whilst being active in a hobby you love, for no other reason than that the person attacking you didn't like the wire you were using to construct a dipole or some other equally outrageous reason like your gender, sexual orientation, license class, choice of radio or preferred on-air activity.

Say it with me:

"Thank you for your comment. I don't believe that it's in the spirit of amateur radio. Please stop."

~ I'm Onno VK6FLAB

## ***You in the community ...***

The other day a member of our community proudly showed off their plaque for first place as a Short Wave Listener or SWL in the Poland SP DX Contest. Together with their dad they listened on 80m using a WebSDR and logged all the contacts they were able to hear. Their participation didn't include transmitters, since neither have got their callsigns, yet.

To me this illustrates exactly what it's like to dip your toes into the world of amateur radio and it's a path that many amateurs have taken to become licensed and transmitting.

I'm mentioning this because that same short wave listener also won a platinum diploma from the anniversary of Stanislaw Lem's 100th birthday amateur contest.

All podcast transcripts are collated and edited in an annual volume which you can find by searching for my callsign on your local Amazon store, or visit my author page: <http://amazon.com/author/owh>. Volume 7 is out now.

Feel free to get in touch directly via email: [cq@vk6flab.com](mailto:cq@vk6flab.com), follow on twitter: [@vk6flab](https://twitter.com/vk6flab) or check the website for more: <http://vk6flab.com/>

If you'd like to join a weekly net for new and returning amateurs, check out the details at <http://ftroop.vk6flab.com/>, the net runs every week on Saturday, from 00:00 to 01:00 UTC on Echolink, IRLP, ALLStar Link, IRN and 2m/70cm FM via various repeaters.

If you'd like to participate in discussion about the podcast or about amateur radio, you can visit the Facebook group:

<https://www.facebook.com/groups/foundations.itmaze>

This podcast episode was produced by Onno (VK6FLAB). You can find more at <http://vk6flab.com/>

If that name sends tingles of excitement down your spine, you're familiar with his work. If not, you might be interested to know that Stanislaw Lem was a world acclaimed Polish writer of science fiction who died in 2006.

This random discovery, in addition to giving me ideas about opportunities for contests and awards, reminded me of other times when in one setting I've been surprised by information relating to another setting. In this case, science fiction. In previous workplaces I've come across software developers, technicians and managers who outside their roles in computing were active as volunteer fire-fighters, paramedics, writers, stage performers, singers, foster parents and more.

It occurred to me that we in the amateur radio community spend most, if not all, of our time discussing amateur radio, but that we likely share other interests with our community. I recently discovered other science fiction nerds, a cos-player, there's some volunteer fire-fighters and the like, no doubt there's more.

My point being that in addition to finding more common ground between us as a community, we also have the opportunity to share our hobby with other people who share our interests. It's hard to imagine that science fiction fans and fire-fighters for example are unable to relate to amateur radio.

Don't get me wrong. I'm not advocating that you hit the members of your other communities over the back of the head with amateur radio. Instead, think of it as another way to connect to that group.

The thing that strikes me about our amateur community is the diversity that it encompasses. It means that there's likely plenty of other interests that you will find that bind you to other amateurs and it likely means that your other hobbies and interests might share some of your amateur interests.

Truth be told, as all consuming as amateur radio is, it's not the only thing that defines you and it's not the only thing of interest to the people around you.

What those interests are is up to you.

Only one way to find out.

Talk with your friends.

~ I'm Onno VK6FLAB



# No-Ham Recipes

Heather VE3HQB



## *A winter stew*

Many of us who work, come home at night feeling like we would not like to cook. If you prepare the stew on Sunday, cooking it to the end of the first stage, then refrigerating it, you can put it back into the slow cooker on Monday morning and it will cook all day and stay warm, greeting your worn-out scowl with a welcoming aroma! This is an especially welcoming aroma on late fall and winter evenings in countries where it gets dark at 1630 hours. Try it with a freshly warmed loaf of artisan (hand-made) bread.

- 1½ pounds (680 g) potatoes, peeled and cubed
- 6 medium carrots cut into 1 inch (2.5 cm) slices
- 3 tablespoons (45 ml) all-purpose flour
- 1½ pounds (680g) stewing beef, cut into 1 inch (2.5 cm) cubes
- 14½ ounce (435 ml) diced tomatoes plus juice
- ½ teaspoon (2.5 ml) salt
- ½ teaspoon (2.5 ml) dried thyme
- Mushrooms, optional
- 1 medium onion, coarsely chopped
- 3 celery ribs, coarsely chopped
- 3 tablespoons (45 ml) vegetable oil
- 1 cup (250 ml) beef broth
- 1 teaspoon (5 ml) ground mustard
- ½ teaspoon (2.5 ml) pepper
- ½ teaspoon (2.5 ml) browning sauce

Layer the potatoes, carrots, onion and celery in a 5 quart (5 litre) slow cooker. Place flour in a large re-sealable plastic bag. Add stewing beef, seal bag, and toss to coat evenly.

In batches, in a large skillet, brown beef cubes in oil. Place browned beef over vegetables in the slow cooker. In a large bowl, combine tomatoes, beef broth, mustard, salt, pepper, thyme and browning sauce. Pour over beef. Cover and cook on high heat for 1½ hours. Reduce heat to low and cook 7 to 8 hours longer or until meat and vegetables are tender. Makes 8 servings.



## KB6NU's Column

Dan Romanchik, KB6NU

### Getting hooked up to Reverse Beacon



I love the Reverse Beacon Network (RBN) and have often thought about becoming one of the spotters in order to give something back. One of the things holding me back was that I needed to install CW Skimmer. Last December, I tried to get CW Skimmer working with my Flex 6400. Unfortunately, I wasn't successful, and being both impatient and ambivalent about paying \$75 for the program, I gave up on it after a little while.

A couple of weeks ago, I decided to try it again. This time, after consulting the Flex Radio Community Forum, I was successful.

*When he's not trying to figure out which way current flows, Dan blogs about amateur radio at [KB6NU.com](http://KB6NU.com), teaches ham radio classes, and operates CW on the HF bands. Look for him on 30m, 40m, and 80m. You can email him at [cwgeek@kb6nu.com](mailto:cwgeek@kb6nu.com).*

The trick getting a program called Slice Master 6000, which configures and launches third party applications, such as CW Skimmer, GRITTY, WSJT-X, and fIDigi, automatically. (By the way, it's called Slice Master because Flex refers to their receivers as "slices.")

With that program up and running, the next step—and it turned out to be a bigggg step—was to connect CW Skimmer to RBN. The first thing that you have to do is to

find the right version of a program called Aggregator. Unfortunately, there are links on the RBN website to version 4.4, and that's the version I first downloaded and installed. So, of course, that didn't work.

The version that you want is version 6.3. Honestly, I've forgotten how I found the right version, but you can find it at <http://www.reversebeacon.net/pages/Aggregator+34>.

After installing version 6.3, I was able to get Aggregator to connect to and collect spots from CW Skimmer, but it still wasn't connecting to RBN for some reason. Googling around, I found the RBN-OPS groups.io mailing list. I asked for some help there, and after checking some of the obvious things, one of the fellows volunteered to actually log in remotely to my computer and get it all sorted out.

We spent nearly two hours debugging the problem, and honestly, I'm not sure what all he did, but it's now up and running. At this point, I'm only spotting on one band at a time, and only when I'm not operating, but at least I'm giving something back to RBN.

It's been quite interesting to watch the spots. Here's a screen shot from a couple of mornings ago [graphic below right].

I'm not sure the ZM1A spot is for real. I just didn't have enough time to run down there and try to work him. It is very interesting, though, to see how propagation changes throughout the day.

One thing that I found out is that many, if not most of the spotters are using Red Pitaya SDRs and not regular amateur radio transceivers. The Red Pitayas have an incredible bandwidth, and that's why you see so many of the spotters providing spots on so many bands.

When my helper found out that I was using a Flex to provide the spots, he made it sound as though my single-band or dual-band spots weren't going to be all that useful. It may not be as useful to the network as all the other spotters, but it certainly is interesting to me.

He also bristled when I suggested that the Aggregator documentation could be improved and that there might be more RBN spotters if the documentation was better. His position was that

the really serious folks would persist and get it up and running. I'm not so sure about that. I think a lot of people give up when they encounter poor documentation.

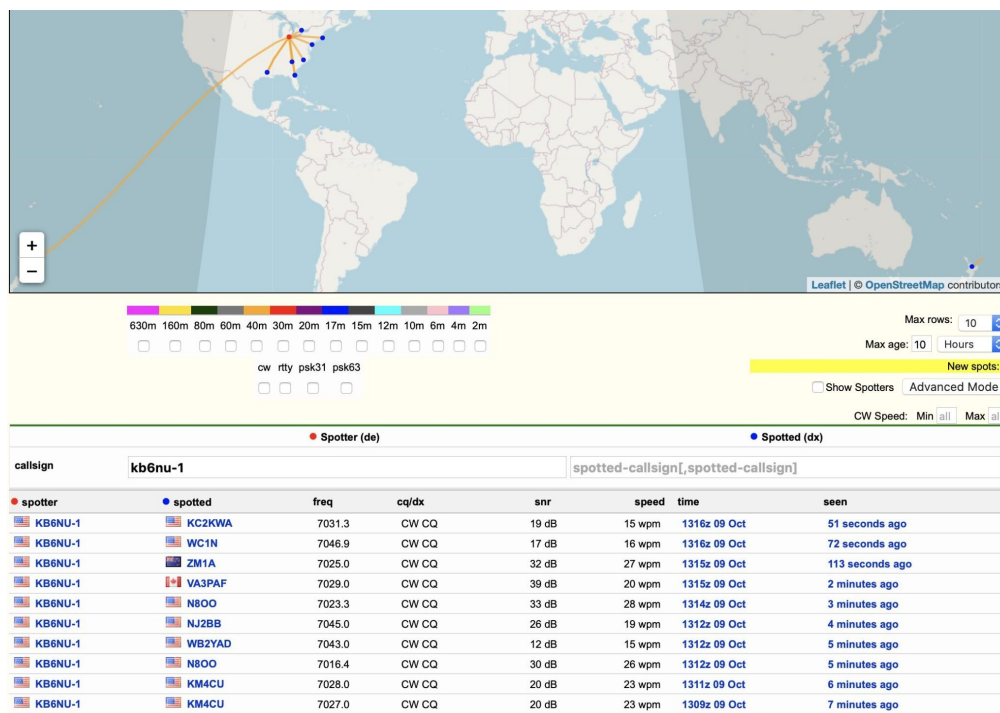
Anyway, looking to the future, I think my next step is to be setting up my Flex 6400 to listen on two bands and send those spots in. After that, I may think about getting a Red Pitaya to become a more comprehensive spotter. The Red Pitayas cost \$500, though, so it's not an insignificant investment.

You can see my spots by searching for KB6NU-1 into the spotter callsign box on <http://beta.reversebeacon.net/main.php>.

~ Dan KB6NU



*When my helper found out that I was using a Flex to provide the spots, he made it sound as though my single-band or dual-band spots weren't going to be all that useful.*



# Ham Crossword

## Antennas

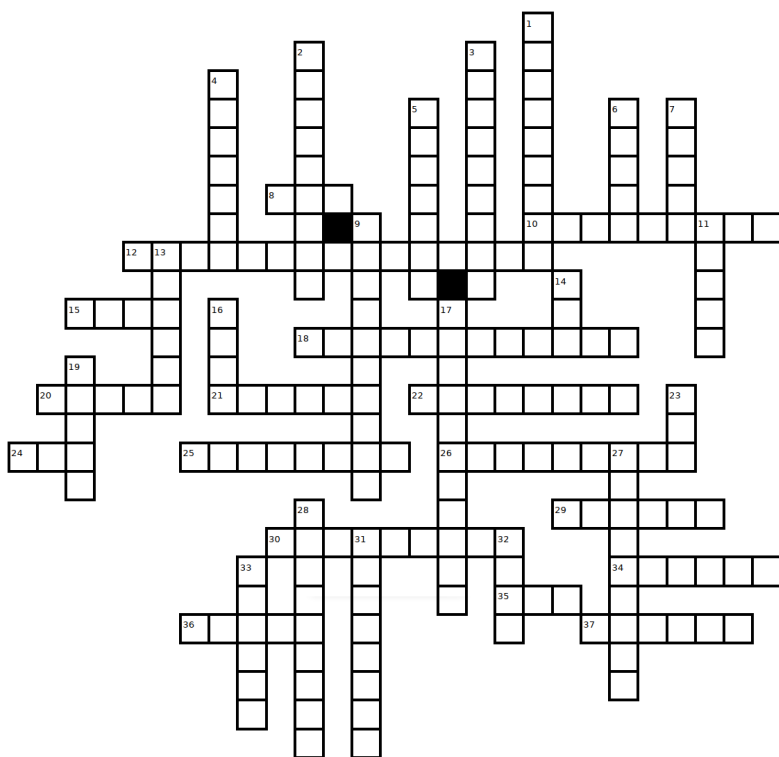
### Down:

1. Yagi elements other than the driven
2. longest element in a Yagi antenna
3. defines the range of frequencies
4. antenna of two conductors each forming a pair of adjacent sides of a rhombus
5. radials bent 45 degrees downward
6. a 5/8-wave vertical antenna has more gain and \_\_\_\_\_ radiation angle
7. loop antenna with three sides
9. 286 or 300 divided by frequency
11. chart used to display antenna characteristics
13. Greek symbol for wavelength
14. decibel gain compared to isotropic
16. loop antenna with four sides
17. ability of an antenna to transmit in a specific direction
19. country of origin of the Yagi antenna
23. how many driven elements in a Yagi antenna?
27. a hypothetical point source
28. the state of being resonant
31. elements forward of elements connected to the feedline
32. a coil and capacitor in parallel
33. a type of dipole antenna of 300-ohm impedance

### Across:

8. a dipole fed off-center
10. if an antenna is made shorter, the resonant frequency \_\_\_\_\_.
12. with both electric and magnetic components
15. supports the elements of a Yagi
18. determining direction of radiation
20. a type of matching circuit
21. the Yagi element connected to the feed line
22. polarization perpendicular to Earth's surface
24. the co-inventor with Yagi
25. 300,000 km/sec is the \_\_\_\_\_ of propagation
26. another name for a bat-wing antenna
29. plane of a vertical car-mounted whip antenna
30. location where the feedline is connected to the antenna
34. a type of single wire antenna of unspecified length
35. abbreviation for a type of antenna tuner
36. used to match impedances
37. radiation pattern of an isotropic antenna

*Solution on page 115*



## Ham Leftovers...

### A simple antenna for weather images from an umbrella?

In order to optimally receive NOAA weather satellite images a special satellite antenna tuned for 137 MHz should be built. Generally either a QFH or turnstile antenna is recommended as these receive signals coming from the sky very well. If you are interested in receiving weather satellite images from NOAA satellites with an RTL-SDR dongle then we have a tutorial [available here](#), and a video at <https://youtu.be/1OYUD7dji2g>

### History of the Ham Radio Callsign

In this video Mike Ritz W7VO looks at the history of amateur radio call signs in the United States. Every legal amateur radio operator in the world has a unique callsign assigned to them by their government, and many of us are better known by our callsign than our given name. But what world event was it that caused these monikers to be? Why are they constructed the way they are?

Watch this video I put together as presented at the QSO Today Expo in March 2021, and discover for yourself the storied history of the ham radio callsign!

Watch [The Storied History of the Ham Radio Callsign](#)

### The History of Single Sideband

Single sideband modulation revolutionized electronic communication, but where did the idea come from?

Antique Wireless Association Curator Emeritus Ed Gable, K2MP, tells the surprising story of single sideband, its origins, the developers, companies and the hardware that brought it to the forefront of wireless communication. [This presentation is the first of the AWA's monthly "AWA Shares" series.](#)

### Problems winding up your long lengths of co-ax?

You've Been Doing This Wrong Your Whole Life!! This YouTube video will show you how to win your feedlines properly and without twists or tangles... <https://youtu.be/t8PvNMCo3T8>

### How your phone, laptop, or watch can be tracked by their Bluetooth transmissions

Mobile devices have become increasingly chatty over the Bluetooth Low Energy (BLE) protocol and this turns out to be a somewhat significant privacy risk.

[https://www.theregister.com/2021/10/22/bluetooth\\_tracking\\_device/](https://www.theregister.com/2021/10/22/bluetooth_tracking_device/)

# Back to Basics

John Schouten VE7TI

From The Canadian Basic Question Bank

## *Superfluous communication*



The subject for this issue is bound to be a controversial one. Here in the Vancouver area, as I'm sure elsewhere, we have a few Amateurs who do not follow the traditional ethical standards of Amateur Radio. Most hams are very driven to keep the hobby from sliding into the abyss that CB radio became, however there are always exceptions.

The Canadian Amateur Radio Basic Question Bank has these two entries on this subject:

**B-1-6-4** Which of the following statements is not correct?

- A. An amateur radio operator transmitting unnecessary or offensive signals does not violate accepted practice
- B. Except for a certified radio amateur operating within authorized amateur radio allocations, no person shall possess or operate any device for the purpose of amplifying the output power of a licence-exempt radio apparatus
- C. A person may operate or permit the operation of radio apparatus only where

the apparatus is maintained to the Radiocommunication Regulations tolerances

- D. A person may operate an amateur radio station when the person complies with the Standards for the Operation of Radio Stations in the Amateur Radio Service

There is a ploy here in that the question looks for the incorrect answer. Article 32 of the Canadian Radiocommunication Regulations, which said "A person may operate radio apparatus only to transmit a non-superfluous signal or a signal containing non-profane or non-obscene radiocommunications" was repealed in 2011 as inconsistent with the terms of the Canadian Charter of Rights and Freedoms.

That said, in the spirit of keeping the service from going down the "slippery slope", hopefully amateurs will continue to abide by that now unenforceable rule.

The second question that applies to Canadian Amateurs, and other licensed Amateurs operating in Canada is:



**B-1-20-1** What type of messages may be transmitted to an amateur station in a foreign country?

A. Messages of a technical nature or personal remarks of relative unimportance

B. Messages of any type, if the foreign country allows third-party communications with Canada

C. Messages that are not religious, political, or patriotic in nature

D. Messages of any type

Regulations do not permit just "any type" of message.

Messages to a foreign country need be "of a technical nature or remarks of a personal character of relative unimportance", but what about messages within your own country? Radio waves do not respect political boundaries.

There is very subjective language in both questions, and leaves it open to interpretation of what "personal remarks" are, what are "offensive signals", and "what is of relative unimportance". Without question, community standards have relaxed greatly in the past generation. What was once taboo is now commonly read, heard and seen in the media and other platforms. What is offensive or unimportant to me may not be to you, and vice-versa.

In the United States, a higher standard (with substantial penalties) is still enforced by the FCC. And, in a country that prides itself on free speech based on First Amendment rights, it seems odd that they set a different standard. For example, in the US Technician question pool (equivalent to the Basic qualification here in Canada), there are these two questions:

Hello. I would like to know if it is permitted to discuss politics, religion and other controversial topics on Amateur Radio frequencies. I am aware that profanity is forbidden, but I am speaking about non-profane discussion that doesn't involve threats or incitement or any other illegal speech. I see nothing in the regulations that forbids this but I want to be certain.

spectrum\_victoria / victoria\_spectre (IC) <spectrumvictoria-victoria... Wed, Sep 8, 3:20 PM (9 days ago) ☆ ↶ ⋮  
to spectrum\_victoria, [redacted]

Good day [redacted] Yes you are correct that the Amateur Radio bands are pretty much wide open to any type of conversations that you could probably expect. I would like to make note that if a conversation involves illegal activities that these should be forwarded to your local police authority for follow up. You may be asked to collect as much information regarding the persons speaking and the activity as possible as part of any investigation.

I hope this helps.

Operations Manager, STS-Western Region  
Innovation, Science and Economic Development Canada / Government of Canada

I hope you don't mind a follow up to my recent inquiry about regulations on controversial speech. Some hams in our group have now raised the topic of profanity. I can't find anything in the regs about profanity. I know that it is banned in the Marine service and Aeronautical service, but I can't find anything in the amateur regs. Can you please clarify?

Not a problem with the reply [redacted]. The rules around profanity were removed from our regulations many years ago, so this would explain why you cannot find any reference to them in our documents. We would hope that Amateur Radio Operators would act respectfully during their communications, but I am sure not everyone does. If this does escalates to threats, etc, then we recommend advising the local police authorities especially if you know the location of the offenders.

*Here is the email thread from a SARC-SEPAR member that prompted this edition's Back to Ba-*

**T1D06 [97.113(a)(4)]** What, if any, are the restrictions concerning transmission of language that may be considered indecent or obscene?

A. The FCC maintains a list of words that are not permitted to be used on amateur frequencies

B. Any such language is prohibited

C. The ITU maintains a list of words that are not permitted to be used on amateur frequencies

D. There is no such prohibition

And, the second question:

**T1C03 [97.117]** What types of international communications is an FCC-licensed amateur radio station permitted to make?

A. Communications incidental to the purposes of the Amateur Radio Service and remarks of a personal character

B. Communications incidental to conducting business or remarks of a personal nature

- C. Only communications incidental to contest exchanges, all other communications are prohibited
- D. Any communications that would be permitted by an international broadcast station

The language in **T1D06** is certainly clear and concise in its intent to ban profanity and other undesirable language however, **T1C03** is equally subjective as the Canadian regulations.

Why is this so? Well, the answer probably originates from the regulations of the International Telecommunications Union (ITU) of which Canada and almost all nations are members.

The ITU is a specialized agency of the United Nations responsible for all matters related to information and communication technologies. It was established on May 17, 1865 as the International Telegraph Union, making it among the oldest international organizations still in operation.

The ITU was initially aimed at helping connect telegraphic networks between countries, with its mandate consistently broadening with the advent of new communications technologies; it adopted its current name in 1934 to reflect its expanded responsibilities over radio and the telephone. On November 15, 1947 the ITU entered into an agreement with the newly created United Nations to become a specialized agency within the UN system, which formally entered into force on January 1, 1949.

The ITU promotes the shared global use of the radio spectrum, facilitates international cooperation in assigning satellite orbits, assists in developing and coordinating worldwide technical standards, and works to improve telecommunication infrastructure in the developing world. It is also active in the areas of broadband Internet, wireless technologies, aeronautical and maritime navigation, radio astronomy, satellite-based

meteorology, TV broadcasting, and next-generation networks.

Based in Geneva, Switzerland, the ITU's global membership includes 193 countries and around 900 business, academic institutions, and international and regional organizations.

The ITU definition of Amateur Radio:

*Section 1.56 amateur service:* A radiocommunication service for the purpose of self-training, intercommunication and technical investigations carried out by amateurs, that is, by duly authorized persons interested in radio technique solely with a personal aim and without pecuniary interest.

And it goes on to restrict the permitted content of Amateur Radio transmissions:

#### **ARTICLE 25 Amateur services**

##### *Section 1 – Amateur service*

**25.2 § 2 1)** Transmissions between amateur stations of **different countries** shall be limited to communications **incidental to the purposes of the amateur service**, as defined in No. 1.56 and to **remarks of a personal character**. (WRC 03)

We can interpret incidental as commonly defined, that is, related to the Amateur service. So, discussions about propagation, equipment and so on.

Here again, it refers to “transmissions between amateur stations of different countries”. On ‘remarks of a personal character’, this again strays into the grey area. If I call you an idiot (or worse) on the air, or question your religious beliefs or politics, is that not a remark of a personal character? In the United States, that is clear. In Canada, and possibly elsewhere, it appears we may have strayed into an area of unenforceable rules, particularly if the discussion involves two or more hams within Canada.

Continuing with ITU definitions, number 1.56 referred to above states:

The ITU Radiocommunication Assembly, considering

a) that No. 1.56 of the Radio Regulations (RR) defines the amateur service as:

“A radiocommunication service for the purpose of self-training, intercommunication and technical investigations carried out by amateurs, that is, by duly authorized persons interested in radio technique solely with a personal aim and without pecuniary interest.”;

b) that RR No. 1.57 defines the amateur-satellite service as: “A radiocommunication service using space stations on earth satellites for the same purposes as those of the amateur service.”;

c) that certain minimum operator operational and technical qualifications are necessary for proper operation of an amateur or amateur satellite station, recommends

1. that administrations take such measures as they judge necessary to verify the operational and technical qualifications of any person wishing to operate an amateur station;

2. that any person seeking a licence to operate an amateur station should demonstrate theoretical knowledge of:

#### Radio regulations

- international
- domestic

#### Methods of radiocommunication

- radiotelephony
- radiotelegraphy
- data and image

#### Radio system theory

- transmitters
- receivers
- antennas and propagation
- measurements

#### Radio emission safety

- Electromagnetic compatibility
- Avoidance and resolution of radio frequency interference.

These international requirements are why even our Basic exam is as complex as it is.

In conclusion, it appears that the two questions in the Canadian Basic Question Bank are vague, based on the email exchange with ISED, and that both questions could be amended to provide clarity.

Hopefully Amateurs worldwide will continue to respect the history and intent of the Amateur Radio Service. As I stated at the start of this article, I fear we are on the slippery slope. It is probably time to put on some cleats to slow or stop the slide!

~ John VE7TI

#### Calling all New Amateurs: Get your Name in Lights!

Did you get your Amateur Radio certificate within the past year or two and want to introduce yourself through TCA to the Amateur Radio community? If so we would love to hear from you.

Drop a line to [tcamag@yahoo.ca](mailto:tcamag@yahoo.ca) and tell us how you were introduced to the magic of Amateur Radio.

Do you credit any particular Amateur (“Elmer”) with getting you started? Which aspect of the hobby do you enjoy so far?

Please be sure to include your name, call sign, date and level of certificate – and don’t forget to include a photo or two. We hope to hear from you soon!



## *Do you need more information about our courses?*

<https://bit.ly/SARCCourses> or scan the QR-code with your smart-device camera

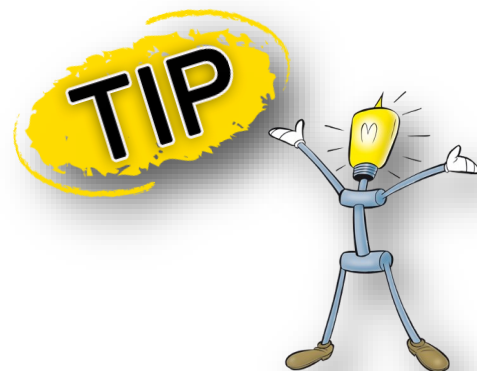
### *Study Links for more information*

Whether you are new to the hobby or brushing up on skills, you should find these study links helpful:

1. RIC-7 is the entire up-to-date Industry Canada (IC) Basic Question Bank.  
<http://tinyurl.com/CanadaBasicQB>
2. Industry Canada (ISED) on-line practice page:  
[https://apc-cap.ic.gc.ca/pls/apc\\_anon/apeg\\_practice.practice\\_form](https://apc-cap.ic.gc.ca/pls/apc_anon/apeg_practice.practice_form)
3. The Amateur Radio Exam Generator is at:  
[https://www.ic.gc.ca/eic/site/025.nsf/eng/h\\_00040.html](https://www.ic.gc.ca/eic/site/025.nsf/eng/h_00040.html)
4. The ExHaminer Study software for Windows is at: <https://wp.rac.ca/exhaminer-v2-5/>
5. VE3YT has an excellent question-based guide available at [ve3yt.com](http://ve3yt.com)

Contact SARC if you wish to write the Basic or Advanced Exam. If you pass we'll even give you a year free as a SARC prospective member!

**Newly Licensed?** When you receive your paper license in the mail, it will come with a form that can be filled out and mailed to the Radio Amateurs of Canada office, at which point an introductory RAC one-year membership will be set up. Introductory memberships are identical to our existing basic memberships and you will receive The Canadian Amateur magazine for one year.



## *HAMpuzzle V1.2*

Our new students are often confused by the block diagrams for receivers and transmitters. A freeware program to practice assembling block diagrams for the Canadian Amateur Radio Basic certification exam runs under Microsoft Windows (but also works flawlessly on Ubuntu 10.04 + Wine 1.2.2)

HAMpuzzle V1.2 (2014 04) <https://www.rac.ca/wp-content/uploads/2014/04/HAMpuzzle/HAMpuzzle12.zip>

Be sure to download at least one set of Diagrams from the web page and deposit the bank(s) in the same folder as the program. For Basic:

[https://www.rac.ca/wp-content/uploads/2014/04/HAMpuzzle/HAMpuzzle\\_Diag\\_Basic.zip](https://www.rac.ca/wp-content/uploads/2014/04/HAMpuzzle/HAMpuzzle_Diag_Basic.zip)

Radio Amateurs of Canada is pleased to make the HAMpuzzle© program available and extends sincere thanks and congratulations to François Daigneault, VE2AAY, for writing and providing it as freeware to anyone wishing to download it.

~ RAC

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<https://separ.ca/>

**SARC**  
Surrey Amateur Radio Communications  
<http://ve7sar.net>

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- CW is still around and is the lowest bandwidth mode. It's simple, reliable and allows signals to be received, even when propagation conditions are poor
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## Radio Amateurs of Canada

### *RAC's new Auxiliary Communications Service*

As part of the transition to the new Auxiliary Communications Service (ACS) program, RAC Community Officer (CSO), Jason Tremblay, VE3JXT, has been following a video series presented by the Radio Amateur Training Planning and Activities Committee (RATPAC) on Thursday evenings.

This series of weekly disaster communications presentations provided via the Zoom videoconferencing platform is called “Emergency Management’s Expectations of Amateur Radio” and focuses on government, non-government agencies and organizations served by Amateur Radio in one way or another during a disaster. Although the presentations are currently based in America, they cover many similar issues and concerns found here in Canada.

The role of the Auxiliary Communications Service in Canada will also be to supplement, or augment communications for local, provincial or national emergency management groups and non-government organizations when required.

Jason will be joining a group of presenters in the RATPAC series to offer a look at the differences in emergency management in Canada and the United States, and to discuss why Radio Amateurs of Canada is developing an Auxiliary Communications program. For more information about the

presentation and the video series please visit:

[RATPAC Video Presentations Lists - Google Drive](#)

Although not affiliated with the American Radio Relay League, RATPAC is made up of ARRL Section Managers, appointed ARRL field leaders, and other members of the Amateur Radio community.

It hosts Zoom presentations twice weekly for Amateur Radio operators worldwide: Wednesdays on general radio topics; and Thursdays on Amateur Radio emergency communications. The presentation audience participates directly in the Zoom sessions and/or indirectly with video links and related documentation sent out after each session.

RAC will also be hosting a coast to coast Zoom session in January 2022 to cover the new direction in detail. Stay tuned to the RAC website and the pages of The Canadian Amateur magazine for more information. <https://www.rac.ca/auxiliary-communications-service-presentation/>

~ Jason Tremblay, VE3JXT  
RAC Community Services Officer

## Videos of Presentations at RAC Canada Conference and AGM are now available

Thank You for Attending and Participating!

The RAC Canada Conference and [RAC Annual General Meeting](#) is now complete. We would like to thank all of the participants and the presenters for taking part in this year's event.

Videos are now available on the RAC YouTube Channel

Our volunteers have posted the videos on the [RAC YouTube Channel](#) at the link provided below.











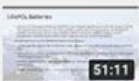


We are still working on editing some of the videos but they can be viewed in their raw form and we will replace them when they are ready. Unfortunately, there were technical problems with the "Reception of Non-Amateur Satellites" presentation and it is not available.

If you visit the YouTube channel you will also find some excellent presentations from last year's inaugural conference as well as some other videos.

We would love to post other videos about Amateur Radio on our YouTube channel so if you have some or know of anyone who does, please contact Alan Griffin, RAC MarCom Director at [marcom@rac.ca](mailto:marcom@rac.ca).




[September-October 2021 eTCA is now available for download](#)

	<b>Keynote Presentation: "A Fireside Chat" with the Leaders of the IARU, ARRL, RSGB and RAC"</b> Radio Amateurs of Canada
	<b>"VLF Experiments on 8 kHz"</b> Radio Amateurs of Canada
	<b>60 metre Propagation in the Canadian Auroral Zone</b> Radio Amateurs of Canada
	<b>3D Printing for Amateur Radio</b> Radio Amateurs of Canada
	<b>Leading Canadians at the World Radiosport Team Championship (WRTC 2023)</b> Radio Amateurs of Canada
	<b>The RAC Challenge: RAC Canadian Portable Operations Challenge</b> Radio Amateurs of Canada
	<b>VHF+ Contest Roving and Microwave Hilltopping</b> Radio Amateurs of Canada
	<b>Canadian Forces Affiliate Radio System (CFARS)</b> Radio Amateurs of Canada
	<b>Royal Canadian Sea Cadet Corps and Amateur Radio</b> Radio Amateurs of Canada
	<b>Canadian University CubeSats: VIOLET and ALEASAT</b> Radio Amateurs of Canada
	<b>LiFePO4 Batteries – Comparisons and Applications</b> Radio Amateurs of Canada
	<b>"The Road to Protecting Canadian Amateur Radio Spectrum?"</b> Radio Amateurs of Canada
	<b>RAC Annual General Meeting 2021: Part of the RAC Canada Conference</b> Radio Amateurs of Canada



# November 2021

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1 On-line Basic Course 19:00 hrs	2	3	4	5	6 Coffee: 730-930 AM @ Denny's 6850 King George Blvd., Surrey OTC Open: 10-Noon Antenna Workshop
7	8 On-line Basic Review 19:00 hrs	9 1930 SEPAR Net 2000 SARC Net Basic Course Exam 1—TBA 19:00 hrs	10 SARC General Meeting (Zoom) 1900-2100	11 Remembrance Day 	12	13 Coffee: 0730-0930 @ Denny's OTC Open—10-Noon Basic Course Exam 10:00 hrs CONTEST: WAE DX Contest (RTTY)
14 CONTEST: WAE DX Contest (RTTY)	15	16 1930 SEPAR Net 2000 SARC Net	17	18	19	20 Coffee: 0730-0930 @ Denny's OTC Open: 10-Noon Antenna Workshop
21	22	23 1930 SEPAR Net 2000 SARC Net	24 1900 SARC Exec Meeting	25	26	27 Coffee: 0730-0930 @ Denny's OTC Open—10-Noon CONTEST: CQ WW DX Contest (CW) Richmond ARC swap meet
28 CONTEST: CQ WW DX Contest (CW)	29	30 1930 SEPAR Net 2000 SARC Net				

For details on all SARC events,  
go to [ve7sar.net](http://ve7sar.net)

Contest Details: <http://hornucopia.com/contestcal/contestcal.html>

# December 2021

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1	2	3	4 Coffee: 730-930 AM @ Denny's 6850 King George Blvd., Surrey  OTC Open: 10-Noon Antenna Workshop
	For details on all SARC events, go to <a href="http://ve7sar.net">ve7sar.net</a>					
5	6	7 1930 SEPAR Net 2000 SARC Net	8	9	10	11 Coffee: 730-930 AM @ Denny's  <b>SARC Christmas Social at the OTC</b> <b>11:00</b>
12	13	14 1930 SEPAR Net 2000 SARC Net	15	16	17	18 Coffee: 0730-0930 @ Denny's OTC Open—10-Noon CONTEST: RAC Winter Contest
19 CONTEST: RAC Winter Contest	20	21 1930 SEPAR Net 2000 SARC Net	22	23	24 	25 
26	27	28 1930 SEPAR Net 2000 SARC Net	29 1900 SARC Exec Meeting	30	31 	

Contest Details: <http://hornucopia.com/contestcal/contestcal.html>



# ARDF: Foxes & Bunnies

Jeremy Morse VE7TMY

## *The first SARC Fox-O-Ring event*

SARC's first Fox-o-ring event at Surrey's Watershed Park on September 11, 2021. I found 7 of the 10 transmitters in 1 hour 47mins and returned to the starting point.

I placed approx locations of the transmitters as waypoints on GaiaGPS map and this helped me to get close enough to hearing the transmitters. I could tell almost exactly where I was at all times using my smartphone and the GaiaGPS mapping overlays. GaiaGPS maps once subscribed approx \$45/year allow you to use an Internet browser to determine which layers work for your needs. Hiking, biking, driving, snowmobiling, hunting etc. You can also cache the map layers so you do not need to use your data plan for the images/map layers.

After I found the first transmitter F-T2 I remembered to turn on the tracking feature which leaves breadcrumbs. (a trail of where you've been) This is useful so you can more easily tell your direction of travel. When you are not moving fast the direction of travel icon (arrow) is difficult to confirm until you've taken several steps forward.

The first fox I found was F-T2 and I probably circled the area 3-4 times before I found it. I had forgotten to ask how much bushwhacking we would be required to do in order to find the foxes.

You can view my track below in BLUE, but remember that the actual transmitters were not the red icons. Those red icons are my estimation of the circles drawn on the map provided. S-T3 was next, then backtracking a bit to S-T2. Then back over my footsteps to look for F-T1.

I was finding some transmitters on the opposite side of the trail from where they had been planted. I chose to go through the bushes on a few of them and wished I had worn long pants instead of shorts. I'll know better next time. F-T1 gave me quite a bit of trouble and the area was near a wide canyon. I was using a receiver I had assembled a few years ago and was hearing a bunch of QRM at this point.

I was looking at the clock for the first fox taking me approx 30mins to find, and then I was on a roll after that until F-T1 slowed me down again. I had approx 30mins until noon after finding F-T4 so decided to go for F-T5 and S-T5 on my way back to the cars. These two didn't give me much trouble and I had 13 mins to spare.

At the end of the event the clouds were starting to roll in and also some rain was starting to fall.

Amel/Les asked for some help recovering the transmitters from the group. I volunteered to go grab the last 3 that I didn't find during the hunt. I drove around 64th ave to the parking lot opposite the

park and went in to find the last 3. You can view my track in Green. They didn't give me much trouble now that I knew how to find them.

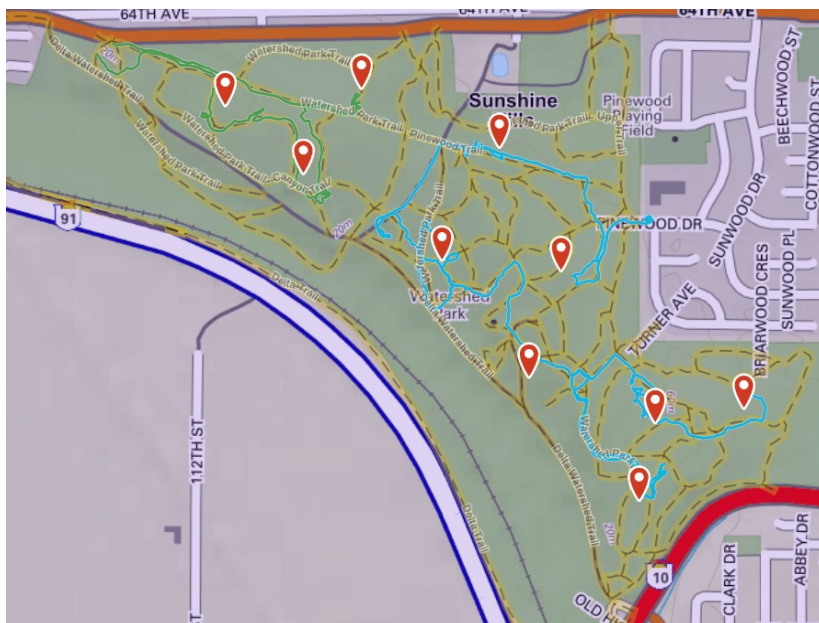
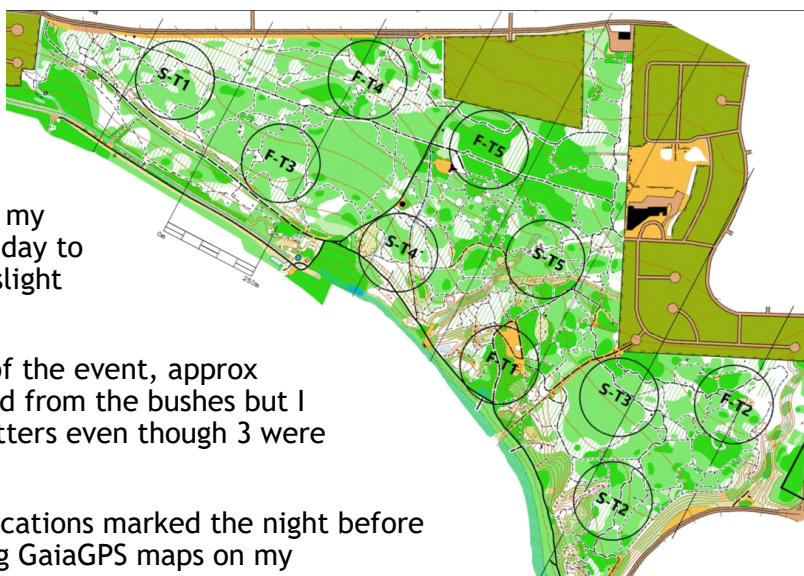
When I did find F-T3 though I did need to use my receiver's attenuator for the first time in the day to find the actual transmitter. It was located a slight distance from the flag and well disguised.

So I actually got tons of exercise on the day of the event, approx 10.3 km total. My feet hurt, legs were scraped from the bushes but I had lots of fun actually finding all 10 transmitters even though 3 were after the event ended..

I'm sure having access to the map with the locations marked the night before gave me an advantage, as did previously using GaiaGPS maps on my phone/tablet. I also had some strategy planned ahead of time like going for F-T2 first. I had also planted 5 foxes in Watershed park earlier this year so knew some of the park layout. If the ARDF events ever do become much more popular or competitive, announcing the location of the event an hour before may put everyone on an equal footing. Some travelling by public transit may have issues with that and be less interested in attending.

Shown is a map of Watershed Park provided for the event. It is turned sideways and cropped, and includes:

- Map of GaiaGPS
- Backroad Mapbooks Canada layer.
- BRMB Canada Trails layer.
- BLUE is my main path for the event but only enabled when I found F-T2.
- GREEN is the recovery of S-T1, F-T3, and F-T4 after the event



~ Jeremy VE7TMY

# Local Ham Gear For Sale

More listings at [hamshack.ca](http://hamshack.ca)

For sale are **Four 8' long tower sections** = 32' free standing. The bottom anchors are missing as they were left in the concrete after it was taken down. **\$75.00 or best offer.**

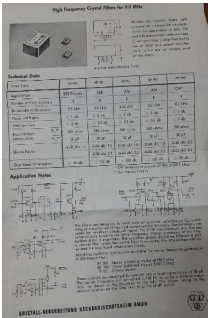
Kjeld also has a rather large Marine Radio (HF boat anchor?) sitting at his home and he'd like to find a new home for it. If you're interested contact him.

Contact: Kjeld VE7GP 604-531-6396 or [VE7GP@telus.net](mailto:VE7GP@telus.net)

## 70 cm Fast Scan TV Transmitter

For sale is an analog fast scan (NTSC standard) ATV transmitter in a hardened and waterproof metal case. Suitable for mounting outdoors. Last used by hams at Simon Fraser University on an emergency communications project in the early 1990s. Runs on 12 VDC. Approximately 100 feet of power/antenna/control cables included. As is, but if it doesn't work to your satisfaction you can return it. **\$100 OBO.**

Contact: Kevin McQuiggin VE7ZD/KN7Q [mcquiggi@sfu.ca](mailto:mcquiggi@sfu.ca)



## Crystal Filters

\$60 each or both for \$100, plus shipping.

I have both the XF-9A for SSB TX and the XF-9B for SSB RX plus matching crystals, sockets and spec sheet. These are high quality crystal filters made in Germany. The TX is unused and the RX is like new.

I can also supply crystals to heterodyne 10-15-20-40-80 m to a 9 MHz IF using a 5 -5.5 MHz VFO. And, if you are building a receiver, I can provide 9 MHz IF transformers to match.

**WANTED: Old National Geographic and Reader's Digest Magazines.**

Contact: John VA7XB [va7xb@rac.ca](mailto:va7xb@rac.ca) or 604-591-1825

**A REAL SDR Transceiver! Flex-3000 fully SDR 100W Transceiver C\$800 with FireWire card and headset/mic adapter (laptop not included)**

Great condition but rarely used now. Details at <https://www.flexradio.com/documentation/flex-3000-owners-manual/>

**8-foot stainless steel whip \$25**

Contact: John VE7TI [ve7ti@rac.ca](mailto:ve7ti@rac.ca)



## SURREY AMATEUR RADIO COMMUNICATIONS

# Radio-Active

## Profiles Of SARC Members

Licensed in 1988 as VE7GRK my involvement began many years earlier in my teen years. My dad (Norm VE7FKN -SK) was part of the Burnaby Amateur Radio Club, and as he joined and began to attend the Friday night meetings he would bring us kids that want to come along with him. We would come as the caretaker for the Bonsor Community Center would let us run around, and hang out, as long as we didn't create more work for him. Some nights we would head over to the Sears store next door and look around, but then would head back when the store closed to have some more fun.

I remember a packed room (often full of smoke) with people learning about radio. They would be drawing electronic circuits and block diagrams, and practicing Morse code. The code was the fun part. I think it would frustrate the adults that were working so hard to learn code and we as kids just learned it so easily.

Then there was field day. Often held in a park near the high school. We would ride our bikes up and be treated to hot dogs and soft drinks. Everyone was so friendly and I think enjoyed having kids around, except when we might interrupt as they were operating in the contest. Some of the men who were friends of my dad still remember and talk about us kids as we grew up.

As it was, my younger brother was first to be licensed, even before my dad. My dad followed, finally getting his license and a station set up at home. I remember going to help take down the tower from a Ham that was moving, and that became the tower we had at home. That was my first tower climb. Lou VE7CGE was up top and I got to climb up and help him. What a thrill that was.

Well it was a few years later, about a year after I was married that I decided it was time to actually write the exam. I attended the class offered by BARC and passed the exam. During the Morse code section the examiner started with a practice session and asked everyone to have the person next to them check the work. He then asked for those tests that people passed to be brought to the front, as we had passed. It was something he did to help with those who might be nervous. At the time Wally VE7CJT, made practice cassette tapes which we used to practice at home. So I was finally licensed, and the call sign VE7GRK was available in the Victoria office of Industry Canada, and they transferred it over to the Surrey Office so I could have it.

At the time I was working for a print shop which made calendars, they asked me to take the company van to deliver these calendars to the various



Gord Kirk  
VA7GK

## SURREY AMATEUR RADIO COMMUNICATIONS

tourist shops from Banff to Jasper. So I borrowed a mobile radio and installed it in the van. It was mounted on the seat base and used a mag mount antenna on the roof. I would enjoy the conversations with local hams throughout the route. Each area repeater would often have a different ham or two, and just about every time I travelled through they would enjoy a conversation with me.

A few years later I had been hired by the BC Ambulance Service and was stationed at Logan Lake BC. While delivering calendars, one of the hams I talked with as I passed through, I got to meet face to face. Fred Houghton VE7FFK lived in Logan Lake and would often have a Saturday morning breakfast with a group of us there. Another one of my dad's friends, John Wright from the Burnaby Club, also moved and retired in Logan Lake. I spent many evenings at his home with him and his wife Louise enjoying a meal and good conversation.

As I was always interested in radios, I had taken the time to understand the radio programming profile in the Ambulance Radios and how the provincial

communications system worked for the ambulance service. This would serve me well as several years later I took a full time position in the Ambulance Dispatch in Vancouver. I did not have "mic fright" and being familiar with how the radios worked, I passed my training and became a full time dispatcher, still working as a Paramedic on a part time basis on my days off from dispatch.

As my career progressed I became a Supervisor then one of the Superintendents for BCAS. During this time the planning for the 2010 Winter Olympics began and I was assigned to communications and dispatch planning for the Olympics. Working with the BCAS Emergency Manager, we developed a concept of operations and communications plan to manage the changes to the system that would need to occur for the Olympics, in which the world would be watching.

One interesting thing that happened prior to the Olympics was that our Regional Dispatch Center in Kamloops had to move to their backup site due to a sewer problem in the main building. The repairs would have left them in the back up site for some time and as a result there would not be a backup place to move to while the repairs were done. This was concerning as we did not want this to occur during the Olympics. As we were thinking about how to resolve this, I thought of an IRLP demo that Fred Orsetti VE7IO had given to my son at his QTH. I suggested that we do something similar to create a link to allow Metro Vancouver Ambulance Dispatch Center to dispatch Kamloops should another incident occur while they were in their backup center. This plan was enacted and the BCAS dispatch again had full backup and still to this day the various centers not only have local back up facilities but also the ability to fail over to each other giving further redundancy.

As things moved along I was again promoted and ultimately left the Ambulance Service as the Interim Executive Director for the all three Provincial Dispatch Centers.

After some time off I was approached by E-Comm 911 to join them. E-Comm is the primary 911 answering point for most of British Columbia. It provides dispatch



## SURREY AMATEUR RADIO COMMUNICATIONS

services to many Municipal Police and RCMP, as well as many Fire Departments throughout BC. E-Comm also runs a wide area trunked radio system for the Police, Fire, and Ambulance services. I was asked to join the team to help with radio transitions as the system was upgraded to a state of the art Motorola P25 network. I worked with Police, Fire and Ambulance to help plan, train and ultimately transition the departments to their new radio system. Today I serve them as the Senior Manager for Wireless Service Delivery for the radio system.

The love for radio has not only been with me throughout my career but also my family. One day, kidding my oldest son, I joked with him that he needed to get his radio license before his drivers license. For a 13 year old that was looking forward to being able to drive he asked how to to get his radio license. We had an upcoming training class scheduled with Surrey Amateur Radio Club so I asked him if he wanted to go. He did, and much to my surprise his younger sister (11 years old) also wanted to go. So we signed them up. As it happened, when the day class started, I was held up at work so called my wife and asked her to drive them over. As I knew all the SARC guys, I said she could just drop them off as they would be safe with the group. As I was on my way my wife said she would stay and I didn't have to come that night. When they returned home it turned out she had also signed up for the class. So at the end of the class we had three additional licensed hams at home. A few years later my youngest son also signed up for a class and was licensed at 10 years old.

During this time my two brothers, that were yet to be licensed, also became licensed. One of my brother's wife and their two children are now also licensed. When they are over we sometimes get questions about all of the special license plates on the cars.

For me personally, I have been involved in Surrey with both the radio club and Emergency program since 1995. Today I find



myself supporting SARC as a director and I am the Emergency Radio Coordinator for the Surrey Emergency Program (SEPAR) for the city.

I enjoy portable comms using my Elecraft KX3 radio and have made many contacts while camping throughout North America. I also have a Yaesu 857D all band radio in my truck and one of the most memorable contacts was made on the Interstate highway from northern Montana talking to the Netherlands.

At home my station is currently being moved into a new room. While all of the kids were at home the radio station was located in a large walk-in closet. From the roof of my house there is an end-fed wire across the backyard that serves as my HF antenna, and there are also the VHF and UHF antennas for local communications.

From my childhood to today amateur radio has been a very important part of my life, playing a part in my career and my family. After all of these years I still find something new to learn and I find enjoyment in making that contact to some far away place in the world.

~ Gord VA7GK

## SURREY AMATEUR RADIO COMMUNICATIONS

### The OTC Report

John Brodie VA7XB



#### *Our amplifier failure*

After the power transistor on our SPE Expert Linear 1.5 failed recently, we contemplated a big repair bill plus long delay with shipping to the distributor in Texas. Repairing expensive solid state equipment is not for the faint-of-heart.

Luckily, SARC member, Slawa VE7LWW, stepped up and offered to undertake the repair as he has extensive experience with the LDMOS power transistors in similar linear amplifiers and he repairs them routinely in his work.

After confirming the source of the fault, Slawa was able to remove the transistor and replace it with a new chip obtained from Mouser at a cost of about \$400 CAD. Delivery from Mouser Electronics was overnight and the installation took another day, ready just in time for the RTTY contest on the weekend. Slawa advises that the most common cause of such failures is over-driving the device.

We are grateful to Slawa for his expertise and willingness to undertake the repair, not to mention the cost and time savings in not having to ship the amp to Texas. Thankyou Slawa, you saved the day!

~ John VA7XB

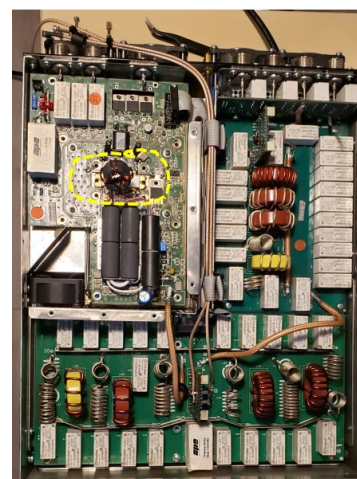


Figure 1 the chip is soldered to a copper plate just below the circled torroidal inductor



The faulty transistor



ing Centre

## SURREY AMATEUR RADIO COMMUNICATIONS

### *Also at the OTC: Antenna workshops resume*

After a lengthy break due to COVID, we have now resumed our Antenna Workshops, a component of our Basic Amateur Radio course. In the workshop, the students have a hands-on opportunity to learn about, build, tune and take home a 'Roll-up J-pole' gain antenna, suitable for VHF-UHF use. Previous students have commented very favourably on this exercise as an aid in grasping the concepts of standing wave ratio (SWR), impedance matching, and how antennas work, in a far more understandable manner than through a classroom presentation.

There is some good-natured competition as students, many of whom have never soldered before, let alone built an antenna, try to reach the best SWR. Results close to the perfect 1:1 are not unusual.

We have several classes of students to catch-up, and at this time, the workshop is open to those who are fully vaccinated, to a maximum of 8 participants per session. We keep the number of students low enough for proper spacing and we encourage proper COVID protocols.

Any provincial COVID restrictions in effect at that time apply.

Although we do have a supply of our own available for shared use, if they have them students are asked to bring:

- A soldering pencil or gun and solder;
- Needle nose pliers;
- Sidecutters;
- A sharp knife or retractable cutter;
- Electrical tape; and a
- Measuring tape

Workshops dates will be announced beforehand and any prior SARC Basic course students who have not participated may contact us at: [course@ve7sar.net](mailto:course@ve7sar.net) to register,

~ John VE7TI



*There is some good-natured competition to see who has built and tuned their workshop antenna for the best SWR.*

## SURREY AMATEUR RADIO COMMUNICATIONS

# The Contest Contender



## WW DX (RTTY) Contest

John Brodie VA7XB



The contest group hadn't done an RTTY event for a couple of years, given our move-out of the OTC and subsequent COVID restrictions. So there was an appetite amongst the group to sharpen our competitive skills and to get back into the fray. The station had been mostly set up in advance of Field Day in June, but several refinements completed over the summer have made it more comfortable, more professional-looking and less vulnerable to interference.

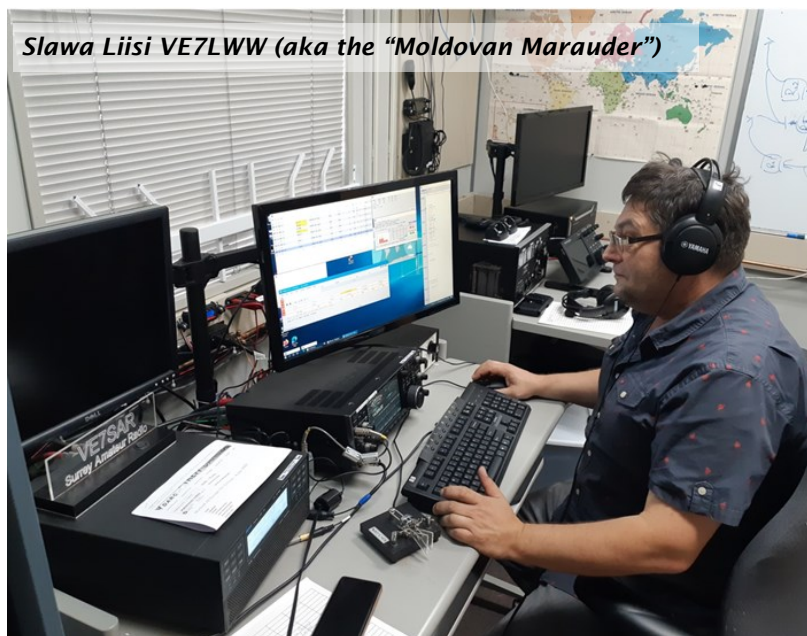
One major problem was that the amp was not working so that had to be repaired just days before the contest started (see Amp report for more). Once N1MM+ Logger, the

IC-7610 and Expert Linear 1.5 machines were programmed and tested, they operated without problems for the entire contest. Our Green Heron controller and Alfa Spid rotator for the TH7 beam on the tower also performed flawlessly. No sudden computer crashes and no equipment malfunctions compromised the effort (it's surprising how seldom we can say this).

Since RTTY operates at a high duty cycle, we found that the amp tended to run hot even at 750 w, so power was reduced to 500 w for the entire contest, which kept the temperature within bounds during extended CQs.

The team included Slawa VE7LWW, Anton VE7SSD, Sheldon VA7XH and John VA7XB. Eduardo VE7EJR also came to observe but jumped in to make a few contacts in the final hours. Most of the action was on 20m, as expected, and at night 40m and 80m were somewhat productive. An estimated 200+ of the 812 contacts made by the team were in Central/Eastern Europe and Asia. The surprise was that 15m was open on Sunday for approximately 6 hours even to Europe where we worked Turkey, Italy, Spain and Portugal. Several Middle East stations were heard but we could not break the pileups of strong US stations calling them. Claimed score was 544,698 points, not too shabby!

RTTY is a popular mode for DX contests because it is entirely visual, i.e. done via the software, computer screen and mouse



Slawa Liisi VE7LWW (aka the "Moldovan Marauder")

## SURREY AMATEUR RADIO COMMUNICATIONS

so those with poor hearing are on a level playing field with all others. Beginners quickly pick up the routine. The East Coast enjoys an advantage because of the population density and proximity across the pond to Europe, so West Coast stations are unlikely to ever come out on top.

Nevertheless, it was fun to get involved with RTTY once again, and we have demonstrated that at least one of our HF stations is SET UP, FULLY TESTED AND READY TO GO. A few operators, like-wise, are more fully prepared to meet the challenge. Here are the statistics:

Band	QSOs	Pts	ZN	Cty	SP	Pt/Q
3.5	103	198	7	6	31	1.9
7	134	272	14	17	35	2.0
14	512	1225	27	66	45	2.4
21	63	139	11	20	18	2.2
<b>Total</b>	<b>812</b>	<b>1834</b>	<b>59</b>	<b>109</b>	<b>129</b>	<b>2.3</b>

Score: 544,698  
1 Mult = 2.7 Q's

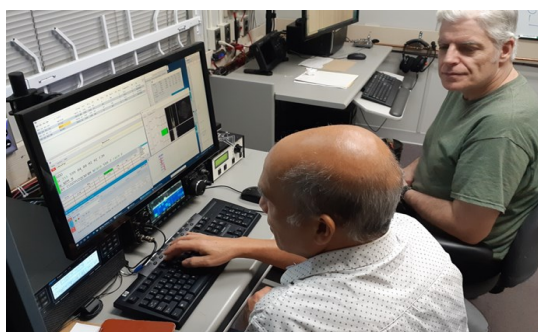
Pwr	Rank	Score	Call	QSO	Mult
H	1	7 040 574	IQ4FC	3805	723
H	2	5 500 410	OK5Z	3017	705
H	3	4 859 060	SO4M	2723	673
H	4	4 320 804	SP8R	2582	652
H	5	4 242 296	YU5R	2486	664
L	6	4 015 620	NP4DX	2623	630
H	7	3 904 047	DQ2C	2351	651
L	8	3 795 138	ED7B	2436	618
H	9	3 783 920	OG66X	2792	560
H	10	3 008 320	ED1R	2236	553
H	11	2 419 984	AD4ES	2288	476
H	12	2 346 102	DQ9Y	1702	561
H	13	2 175 536	JT5DX	2056	376
H	14	2 123 486	NA7TB	2041	538
H	15	2 104 440	K3AJ	1782	494
H	16	2 081 160	NA5NN	1848	540
H	17	2 054 128	K5RZA	1998	551
H	18	1 922 544	LZ7A	1708	474
L	19	1 807 056	9A7T	1263	564
H	20	1 655 416	OE9R	1618	412
H	21	1 528 455	K9YY	1473	465
H	22	1 285 625	K7BTW	1607	425
H	23	1 143 326	VK5ARG	1053	382
L	24	1 065 960	K9NR	1152	405
L	25	919 454	ED3M	1011	379
H	26	840 622	KT7E	1104	379
L	27	732 296	LY5W	771	383
H	28	627 157	DP6K	815	337
H	29	544 698	VE7SAR	812	297
H	30	393 120	SB7A	905	208



John Brodie VA7XB contest organizer



Eduardo VA7EJR a new contester



Sheldon VA7XH assisting Anton VE7SSD

## Periodic Table of Radio Contests 2021

Nov Dec

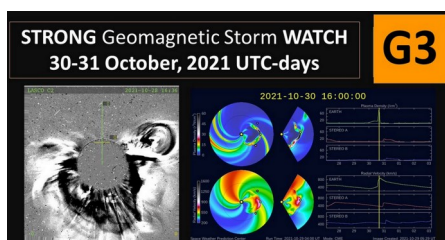
6 2190Z	8 3 0000Z 2230Z	5 1900Z	Multimode
ARRL SS CW	ARRL 160		off-the-air
13 0000Z	14 11 2358Z 0000Z	12 2359Z	CW
WAE RTTY	ARRL 10		SSB
20 2190Z	22 18 0500Z 0000Z	18 2340Z	Digital
ARRL SS SSB	RAC Winter		VHF/UHF
27 0000Z	28 24 2400Z	25	
CQWW CW	HAPPY HOLIDAYS		

Start Day (UTC) → 1 3 → End Day (UTC)  
Start Time (UTC) → 0000Z 2359Z → End Time (UTC)  
Contest Name → Major Contest of weekend



## WW DX Contest—October 29-31, 2021

Things looked auspicious with all station equipment tested and working, and sunspot count up considerably from previous weeks, as reported by ARRL:



*“Sunspot activity was up this week, with the average daily sunspot number increasing by nearly five-fold from 11.3 to 54.9. Average daily solar flux rose from 78.6 to 95.7. Currently our Sun is peppered with spots.”*

But... the omens seemed less favourable after hearing reports of solar MCE (mass coronal ejections) during the two days of the contest with poor propagation predictions.



### [Spaceweather.com](https://spaceweather.com)

Thursday, “A strong G3-class geomagnetic storm is possible on October 30 when the CME from yesterday’s X-flare is expected to hit Earth’s magnetic field.” This is why the predicted planetary A index on October 30-31 is 40 and 35.

Despite the prediction of poor propagation, there was a surprising amount of activity on the bands,

and good openings to Europe on both days on 80 through 15m. We noted a lot of East Coast spots on 10m on Sunday afternoon also but could only work a few, so 10m was a dud for us.

Thirteen 13 members participated, about half of which had no prior experience with contesting. So it was billed as a learning exercise rather than a competitive effort, with considerable time taken to explain the workings of the equipment, how an exchange is made and other matters of protocol. The objective was to expose new members to contesting and give them some experience with use of our station. If a rare DX contact was made in the process, that was considered a bonus. The highlights were Jan’s successful exchange with A47RS in Oman (Persian Gulf), first-timer Paul’s exchange with A73A in Qatar and other contacts with Cape Verde and Canary Islands off west Africa. We heard Namibia but couldn’t break the pileup.

Then about 4 hours into Jan’s shift late on Friday, it happened. The computer crashed and took all the N1MM config settings with it, so the contest was abandoned for the night. Early in the morning,

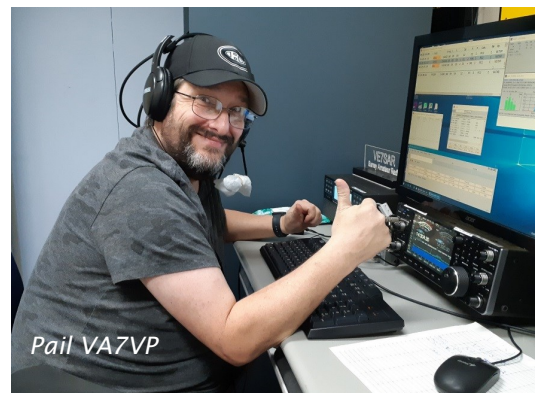


*We probably all remember our first HF contact. Reg VE7ZEB and his wife Erika (from our current Basic class) both made their first contact, to Eastern Europe, when 20m was ‘hot’ on Saturday morning. We’re not sure about Reg yet, but Erika looks like she will be back contesting soon.*

considerable time was lost getting things running again, including re-configuring N1MM+ logger but wav files would not send. It was eventually resolved by Thomas VE7TXL, who noticed that the internal radio codec box must be checked in audio settings/playback. Thereafter things settled down and the computer behaved to the end of the contest.

Thanks to the following members for making this a worthwhile event: Paul VE7VP, Jan VA7VJ, Steve VE7SXM, John VE7TI, John VA7VGC, Kapila VE7KGK, Eduardo VA7EJR, Anton VE7SSD, Sheldon VA7XH, Erika and Reg VA7ZEB and Thomas VE7TXL; thanks also to John VA7XB for organizing and several of the more experienced testers for mentoring the new guys. A total of 674 contacts... not bad overall.

~ John VA7XB



Band	QSOs	Pts	ZN	Cty	Pt/Q
3.5	96	181	8	8	1.9
7	154	315	14	19	2.0
14	132	354	24	48	2.7
21	286	630	16	34	2.2
28	6	18	2	3	3.0
Total	674	1498	64	112	2.2
Score: 263,648					
1 Mult = 3.8 Q's					



## SURREY AMATEUR RADIO COMMUNICATIONS

### Your SARC Membership



If you have not already renewed, your membership in SARC expired as of last June 1st.

But... you're not too late.

Payment may be made in one of several ways:

1. Use PayPal on the SARC website: [www.ve7sar.net](http://www.ve7sar.net)
2. If we meet, bring a cheque or cash to the AGM on September 9th.
3. Mail a cheque to our Treasurer Scott Hawrelak  
13935 80A Avenue, Surrey V3W 6P5

Thankyou for taking care of this as soon as possible.

~ John Brodie VA7XB  
Membership

Dues are as follows:

- Individual \$31
- Individual (if RAC member) \$26
- Family \$41
- Family (if RAC member) \$36



### Hamshack. ca

- Receives 12,000 or so visits per week
- Has over 500 registered users
- Usually sits at about 250 active listings as items seem to move very quickly

Most importantly, I have continued with the amateur radio club listing initiative and recently added a self-enrolment form for clubs to add their own listings on the site. In addition, living through a pandemic made me realize the importance of emergency planning, and the importance that amateur radio plays in the emergency management field, by providing emergency communications services to public agencies and other organizations. Group representatives adding their organization to the site now have the ability to list the emergency communications services provided by their group.

It is anticipated that this emergency communications inventory will be accessed by public and other organizations to augment existing communications capacity for inclusion in emergency management planning.

~ Don Rosberg, VE7DXE

## SURREY AMATEUR RADIO COMMUNICATIONS



### General Meeting Minutes

September 8, 2021

SARC 2021 Annual General Meeting

#### **SARC Annual General Meeting Minutes Sept 8, 2021**

Attendees: In attendance (26 members present, plus proxies and 2 non-members)

Start Time: 7:02pm

Location: Surrey Fire Training Centre

#### **Welcome**

John Brodie welcomed everyone to the meeting and thanked them for attending under these unusual conditions.

#### **2021 AGM Agenda**

##### **Call to Order & Introductions (John XB)**

The 2020/2021 Annual General Meeting of the Surrey Amateur Radio Communications Society (held at the Surrey Fire Training Centre) was called to order at 7:08pm on Sept 8/2021 by President John Brodie VA7XB

Ralf Stewart VE7IHE introduced himself to the group.

##### **Approval of Agenda (John XB)**

Jinty moved to approve the 2021 AGM agenda presented on screen. Seconded by Steve McLean. Motion carried

##### **Confirmation of Quorum (John XB)**

John S. We have 26 of 79 paid members so we have a quorum tonight.

##### **Approval of Minutes from 2020 AGM (Jeremy)**

John S. moved that we accept the 2020 AGM minutes as presented in the SARC Communicator. Seconded by Steve McLean. Carried

##### **Presentation & Approval of 2020/21 Financial Statement (Scott)**

- The SARC balance statement was presented on the overhead TV screen by Scott H. Our current auditor of our financial statements is stepping down. We are looking for anyone with bookkeeping/auditing experience to help review the books next year. Thanks to Pam Hamilton, who is retiring, for her assistance in past years.
- Kevin McQuiggin moved to approve the annual financial report as presented by Scott. Seconded by Jinty. Carried.

##### **Announcements (John XB)**

- John B. Received an email from Worksafe BC looking for an administrative assistant with an interest in radios and logging road frequency coordination. It is perhaps 90% administrative and 10% serves as back up radio frequency coordination. Assigning frequency/tones for cranes, grapple yarders, fielding reports of radio interference. If you or anyone you know is interested please contact John B. and information will be forwarded. The job posting was made public today at Worksafe BC.

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- Les Tocko: Sept 11/2021 is another Fox-O-Ring (Fox Orienteering). This format is different and will be 10 hidden transmitters with very low power (micro watts) You will be able to receive them from maybe 100 meters away max. You will not be able to hear them from the starting location. The transmitter locations will be circled on the park map. You will then need to visit the location on the map and find the transmitter. They will transmit continuously on the same frequency (low power) It will be at Surrey's Watershed park starting at 10am.
- John B Future meetings will be on Zoom until further notice of the way things are going. Most of our presenters are not local. We will let everyone know in advance.

### General Meeting Oct 13 2021

- Chris Anton VE7TOP on the AREDN network. This is an emergency data amateur radio network. Similar to BC-WARN but more accessible to the general public. <https://www.arednmesh.org/>

### General Meeting Nov 10 2021

- Doug Pattengale VE7CQT will present on Digital Voice

### December 2021 Christmas Party (Jinty R)

- We usually have the Christmas party on the first Saturday of December and we had to cancel it last year. We left our deposit and re-booked for this year 2021. It is planned for Dec 4th (subject to change) at 11:30-2:30pm at the Guildford Golf and Country Club 7929 152nd St. Surrey BC. Jinty is conferring with the restaurant about COVID protocols. The restaurant will require COVID Vaccine passports to enter. Masks are not required but recommended upon entering and while not at the table. We have requested

4 people per table. The buffet will have plexiglass and their staff will serve.

- Jinty took a quick survey from the room for their choices in food for the party. This is to help prepare the menu with the restaurant. Options are roast beef, turkey and ham. Turkey seems to be the most popular with those in attendance.
- A discussion about having entertainment or not. We may be space limited.

### Mobile Cruise-In (John S)

- John S. While scanning other clubs' newsletters I learned about a mobile cruise-in at a local A&W restaurant in the U.S. This was setup to encourage their members to bring their mobile radio systems together for a bit of show and tell and to provide others with ideas. Cars, backpacks, bicycles what you choose to bring. They had a small contest like most bands covered, neatest installation etc...
- I am trying to contact our local A&W. (73rd and King George). Likely Spring or Summer 2022 but no dates set as yet, but will keep everyone informed.

### Committee/Other Reports

#### President's Report (John XB)

I am stepping down as president and a new president will be elected from the group of directors.

#### Repeater (Steve)

- The two repeaters are functioning well, but the north repeater still has some occasional intermod. We went through the north repeater and replaced IRLP nodes, power supplies, standby battery, amp and the repeater was taken out and cleaned.
- We still may want to do some work on the antenna. The south repeater received a

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NEW battery and is operating well on the same frequency (it is not an IRLP node).

- John S. Questioned about multiple people not able to connect at the same time.
- Gord K to follow up with Dave Cameron about the EchoLink limitation.

### CW Class (Kevin)

- We had a class last year but didn't quite finish the class due to COVID restrictions. We were planning to start up another class and let those that didn't finish last time join. We had too small of an interest in the upcoming class and will try again in January.

### Field Day (Jason absent)

- This year we participated in Field Day in a way that allowed for safe operations and the re-establishment of key infrastructure. Last year our event was cancelled due to provincial health orders and safety concerns. This year was one to learn and adapt to the situation to reach our goals. Adaptation is a key skill to continue operations which SARC/SEPAR soundly demonstrated. To make this happen, it was decided to focus on our Operations Training Center (OTC) and SEPAR Trailer as both assets required significant effort to activate.
- Having a fixed date like Field Day provides ample motivation to make the required changes. Many SARC and SEPAR members showed up for several Saturdays to work on these items which included designing the layout, moving equipment, erecting antennas, pulley wires, pulling weeds/stumps, etc. There are a few notable members worth mentioning - John XB, John TI, Gork GK, Stan NF, David DRS - who are frequent contributors.

- For next year, please sign up to participate in the Field Day planning! This is an excellent way to be exposed to several facets of amateur radio including: contesting, emergency operations, and community support. In the meantime, make use of the OTC and get involved. Field day contest results will be available around December.

### Foxhunt (Anton & Les)

- The annual SARC "Fox Hunt" has long been a well established event on the calendar and was recently held on Aug 28th in the now usual location of Crescent Park in South Surrey. SARC members, guests and friends supported the event; and such continues to grow in popularity as this year, there were 31 Hams participating in the actual "Hunt" along with 5 unlicensed 'friends' and 7 kids.
- It was a dry sunny day, upon arrival at the site, it was noted that our usual covered site of benches and easy access to the BBQ facilities was "taken" by another group.
- All quickly pitched in and we had to pivot and locate other benches where we could set up.
- Participants were divided up into teams of "Expert" and "Novice" classes. And this year for the first time we had an under 12 class. The objective this year was to make it more a family event and to stimulate interest in the hobby the under 12 class was added.
- Where there were not enough receivers, participants "buddy up" to share equipment and the club also had loaners. After a brief intro and training session by Amel VA7KBA and Jeremy VE7TMY, and with adrenaline going, the groups were enthusiastically dispatched at 10.00am

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with a 2 hour time limit, five 80m foxes hidden throughout the park. Much fun was had by all.

- The social half of the event was the informal BBQ, providing opportunity to engage in adventure stories, exchange of lessons learnt and challenges overcome; all with warm camaraderie and calorie replacement over a burger and hot dog, and a cool drink.
- In any planned event, such as this, there are many moving parts and I extend recognition and greatest of thanks to Jan Voslenik VA7VJ, Jeremy VE7TMY and Thomas VE7TXL who handled all the set up and the technical aspects of the “foxes”. Much appreciation to Brenda (XYL of Anton VE7SSD) for food shopping, John VA7XB for ice/ice cooler and BBQ, Jeremy VE7TMY for ice and the able chefs of Brenda, Anitha and Stan VA7NF, for expertly manning the BBQ. Heather B XYL of John B, for table set up and cleaning up. John VE7TI for sourcing the prized fox trophy and guidance, leaving the best for last, special mention is made of our two fav guys Les Tocko VA7OM, and Amel VA7KBA, whose technical support throughout the year and donation of punches is gratefully acknowledged.
- The results/Bragging rights were awarded to Expert class 1st place, Amel VA7KBA 5 foxes 24mins

Novice class 1st place, Linda and Jens Schwarz 5 foxes 73 mins

- The main object of the event is fun, and thus we are all winners. Mark your calendars tentatively next year May 14th or 21, 2022 as we look forward to another annual SARC FoxHunt

### SEPAR (Gord)

- SEPARS (Surrey Emergency Program Amateur Radio Society) directors are considering the dissolution of the SEPAR Society.
- The SEPAR Emergency Communications program will continue to function under the direction of the City of Surrey.
- It must be clearly noted that the SEPAR program is administered on behalf of the City of Surrey Emergency Program through the Fire Service by licensed volunteer amateur radio operators, and will continue. It should be clarified, because there is occasional confusion, that the roles of SEPAR and SEPARS are distinct:
- SEPAR was formed in 1994 because of the BC government’s mandate for each municipality to develop an emergency program. SEPAR became the communications component of the Surrey Emergency Program (SEP) and is administered through the Surrey Fire Service. SEPAR is not an Amateur Radio club, but a roster of individual volunteers holding at least a Basic Amateur Radio license, locally screened and willing to be deployed when needed, under the direction of the Surrey Emergency Program. Screening is done through a record check with the Surrey RCMP and, when successfully completed, applicants are issued an Emergency Management BC (EMBC) identification card.
- SEPAR is the program that maintains the list of approved communications volunteers and maintains city owned assets including the grab-n-go kits, two generators, the radio room at Fire Hall One and its associated antennas.
- Most SEPAR volunteers are SARC members.

## SURREY AMATEUR RADIO COMMUNICATIONS

- In consultation with the Surrey Fire Service, SEPARS was conceived primarily to recruit and train Amateur Radio operators and as a means of soliciting funds through grant opportunities and sponsorship. The Directors of the Society consist of elected members who hold an Amateur Radio license and two non-elected directors appointed by the City of Surrey. The non-elected positions have been held by the Deputy Fire Chief responsible for Emergency Planning and his assistant.
- In 2015 the Community Gaming Grant program rules for obtaining funding for volunteer programs were amended. Of primary importance in these changes, funding was no longer available for any program directly associated to a level of government. Given that SEPARS had two appointed City directors, the program was disqualified from further grants.
- In 2018 to support the SEPAR society the two City Directors stepped down from the society. While this is part of the solution to correct the ability to request gaming grants, the existence of both SARC and SEPARS creates confusion and may impact the ability of both organizations to apply for grants going forward.
- In recognition of this, SEPARS members gave the executive permission to explore merging the two societies with SARC at the 2020 AGM.
- SEPARS, the Society, functionally administrative, has purchased assets including radios at Fire Hall One, the trailer, its radios and associated equipment, laptop computers and an overhead projector to support the City SEPAR program. SEPARS itself is not a club or a provider of operators.
- In 2009 SARC and SEPARS entered into a Letter of Understanding. The letter

recognized the purposes of each society and included the following principles of cooperation:

- “4. PRINCIPLES OF COOPERATION In order that the parties may cooperate and utilize their resources from time to time with optimum mutual benefit, the following principles are agreed upon:
- 4.1 The parties may correspond with each other, exchange information and engage in appropriate supporting activities in order to encourage and broaden interest, understanding and appreciation of each other’s activities and their value to the public in emergency situations.
- 4.2 SARC will maintain to the best of its ability, its amateur radio repeater systems in a fully -functioning state for use by SEPARS during training exercises and during emergencies or disasters so that SEPARS can fulfill its obligations to the City of Surrey, and
- 4.3 SEPARS will to the extent possible make available to SARC its communications resources including “grab and go kits”, to facilitate the improvement of technical skills, messaging capability and operating experience by persons who have membership in both organizations”

### Society Resolution Requirements

- The following are the requirements for “winding up” or “dissolution of the society” from the SEPARS constitution:

Upon the winding up or dissolution of the Society, assets of the Society remaining after the satisfaction of its debts and liabilities (other than all property (including documents) of the City of Surrey, including, without limiting the generality of the foregoing, all data, and/or information which has been

## SURREY AMATEUR RADIO COMMUNICATIONS

recorded in any manner or which has been transcribed or transferred by any means from the City of Surrey's documents to any documents held by the Society ("City Data"), shall be given or transferred to such organization or organizations that are:

(a) concerned with promoting the same purposes of this Society; and

(b) recognized by the Canada Revenue Agency as being either a charitable corporation, not for profit organization or a charitable trust, pursuant to the Income Tax Act of Canada from time to time in effect. The members of the Society may identify such organization or organizations at the time of the Society's winding up or dissolution.

- From (a) above the purposes of the SEPAR Society are:

As described in the SEPARS Constitution and Bylaws (April 29, 2009), the purposes of the Society are: (a) to assist the City of Surrey, emergency service providers, community groups and neighborhood committees in the rapid deployment of amateur radio communications and a messaging network in case of a civil emergency;

(b) to assist and enhance the capabilities of the Emergency Operations and Communications Centre;

(c) to promote and foster amateur radio across the Lower Mainland and especially to improve the quality of emergency preparedness within the City of Surrey through the development and enhancement of amateur and other public service communications;

(d) to promote inter-agency cooperation on matters dealing with amateur radio;

(e) to enhance the relationship between the amateur radio community and emergency service providers;

(f) to improve amateur radio capabilities and effectiveness within the City of Surrey;

(g) to encourage area coordination of resources relative to amateur radio;

(h) to promote a sense of community safety, to increase community knowledge of amateur radio, and to develop a network of public communications volunteers to assist in times of emergency through education, training and public-awareness initiatives relative to amateur communications;

(i) to solicit and raise funds and to apply for grants to carry out the objectives of the Society and to accept donations for such purposes;

(j) to cooperate with community groups and all other associations or organizations in such things as are necessary and conducive to the attainment of the objectives of the Society;

(k) to conduct or facilitate research which furthers the purposes of the Society; and

(l) to affiliate with other associations of local, national or international jurisdiction, if, in the opinion of this Society, such affiliation would be of mutual benefit.

- The Surrey Emergency Program Society is considering the dissolution of the SEPAR Society and is inquiring from Surrey Amateur Radio Communications Society if they would be willing to accept the assets of the SEPAR Society,

## SURREY AMATEUR RADIO COMMUNICATIONS

Gord moved that:

- “The Executive Board of Surrey Amateur Radio Communications Society is authorized by the membership to accept the assets of the SEPAR Society should the SEPAR Society be dissolved, and that prior to doing so will ensure all liabilities of the SEPAR Society have been satisfied and other than annual Emergency Trailer Insurance will not be accepting outstanding liabilities for SEPARS and that SARC would confirm the purposes of the SEPAR Society and SEPAR Emergency Program do not conflict with the purposes of SARC Society, and that SARC acknowledges they will continue to support the City of Surrey Emergency Program “SEPAR Emergency Program” consistent with the Principles of Cooperation agreed to the the Letter of Understanding agreed to by the two Societies created in June/July 2009.”

Seconded by Robert Fishwick. Carried.

### OTC (Gord)

- Surrey Fire met with the SFSAR to merge the use of the building for shared use. We cleaned out the brush and stumps in front of the container. We emptied out the bicycle area and held a parking lot sale.
- Once we received access to the radio room, increased security and repairs to the washrooms and AC just in time for Field Day and the hottest day of the year.
- We erected the grey tower and performed radio grounding with an auger, installing copper strips and bentonite clay.
- The generator was fixed and serviced by the fire department. Internet is in the building but we have been working to improve the Internet.

- John B. We still meet every Saturday morning at the Denny’s on King George and invite people to join us at the OTC 10-11am for work parties and social activities.
- John S Would like to recognize Gord for his efforts to improve the relationship between SARC/SEPAR and SFS/CoS.

### Membership (John XB)

- Current paid membership is 79. We are still catching up with a few that have not yet paid. We have 204 ham class graduates that are considered prospective members.

### Contests (John XB)

- We only participated in 2 contests except for Field Day. We participated in the BC QSO Contest (Feb) and RAC Canada Day Contest (July) Would like to participate in more contests in the future.

### Ham Class (John TI)

- We start a new course every 10-11 weeks. There is still a high demand and have had students from almost every province. All positive feedback and high success rate with most graduates receiving honours.
- Still would like to get back to the antenna workshops when we can meet in person.
- I’d like to acknowledge the help from John Brodie assisting with the administrative actions required to make the course possible. I’d also like to thank my co-instructors Stan Williams and Kevin McQuiggin.

### SARC Communicator (John TI)

- The SARC Communicator consists of 6 issues a year filled with over 100 pages per edition and is read in 130 countries per month. Roughly 5,000 downloads per

## SURREY AMATEUR RADIO COMMUNICATIONS

month that we know of and likely many more issues passed on. We get requests to reprint our articles very often.

### Net Control (John XB)

- We have a full list of operators now and want to say thank you to those that help out. Anyone interested in participating as net control for a night or two please let me know.

### New Business

#### Use of Amateur frequencies by unlicensed

- Robert Fishwick: A friend of mine contacted me about a radio programmed with a Resource Road (commercial) frequency. There was some misunderstanding that he could use it for amateur radio by writing a letter to the Four Wheel Drive Assoc of BC. Upon further review the 4WDABC does recommend members acquire their amateur radio license for amateur radio frequency use. They (4WDABC) have a commercially licensed frequency (non-amateur band). A letter is required to show permission prior to that frequency being programmed into a commercial radio.

#### Purchase of second amplifier

- Stan Williams. Raised the topic of extending the second OTC station with a Flex Radio Power Genius (power amplifier). A motion was made and after discussion it was withdrawn for further discussion at the director's meeting.

### Election of Directors for 2021-2022

(John TI)

- Call for nominations for director of Surrey Amateur Radio Communications
- Call for nominations for director of Surrey Amateur Radio Communications for the second time.
- Call for nominations for director of Surrey Amateur Radio Communications for the third time.
- Hearing no further nominations from the floor the incumbent directors were asked to continue.
- Scott, Gord, Kevin, Steven all confirmed they would stand again as directors.
- John S. Moved that these candidates be acclaimed. Seconded by Stan. Approved by acclamation.

### Adjournment

- Robert Fishwick moved that we adjourn the meeting at 9:18pm Seconded by Jinty. Carried

Minutes recorded by

~ Jeremy Morse VE7TMY

**Your 2021-2022 SARC Board of Directors** (Left to right: John VA7XB, Stan VA7NF, John VE7TI, Steve VE7SXM, Kevin VE7ZD, Gord VA7GK and Jeremy VE7TMY. Missing Scott VE7HA)



## SURREY AMATEUR RADIO COMMUNICATIONS



# SARC Meeting Minutes

October 13, 2021

### SARC General Meeting Minutes Oct 13, 2021

Attendees: 41  
Start Time: 7:00pm  
Location: Online Zoom Meeting

**Welcome and Call to Order**  
- (Steve VE7SXM)

**Review and Approval of Agenda**  
- (Steve VE7SXM)

John Brodie moved to approve the agenda as presented. Seconded by Stan Williams

### **Announcements (ALL)**

**Report on new Officers elected** (Steve VE7SXM)

Treasurer - Scott Hawrelak - VA7HA will agree to continue as Treasurer

Secretary - Jeremy Morse - VE7TMY will agree to continue as secretary

Vice President - John Brodie - VA7XB becomes the VP (from president)

President - Steve Mclean - VE7SXM becomes the president (from VP)

### **Directors**

John Schouten - VE7TI

Gord Kirk - VA7GK

Kevin McQuiggin - VE7ZD

Stan Williams - VA7NF

### **Future presentations:**

- Nov 10th, 2021 - General Meeting  
Presentation is Doug Patengale VE7CQT on digital modes - Confirmed

### **Christmas Party:**

- Currently set for Dec 4th, 2021 (Steve/All)

Jinty/John B. will prepare an email to go out to the membership to gauge interest. We need to know the minimum number of participants.

**Richmond ARC Swap meet:** Nov 27th  
(Steve/All)

- We may opt to have a table at this swap meet, looking for members support and help

John B. A few members have asked for a table to sell their personal items.

Gord will book a table for SARC use.

### **Amplifier Repair**

- Special Thanks to Slawa VE7LWW for repairing our high power HF Amplifier

This effort saved the club considerable expense and time, as we were preparing to send it to the USA for repair when Slawa heard of the issue and offered to repair it.

## SURREY AMATEUR RADIO COMMUNICATIONS

### Financial Audit:

- Special Thanks to Pam Hamilton VA7PFH for all her support over the years in auditing the club books. Pam has decided to retire, so we are looking for someone to fill that role, if anyone is able to assist, please let Scott know.

### Financial Report

- (Scott VA7HA)

- As Pam has retired, we are in need of another volunteer for doing the books in 2022
- The financial report was presented. We are in good shape.
- Scott will order name tags in the New Year. If you ordered a name tag previously it's at the OTC and a director can assist getting it to you.

### Committee/Other Reports

SEPAR - (Gord VA7GK)

- Still in discussions to consider collapsing the SEPARS (Society).
- If you want to be involved with the emergency program contact [va7gk@shaw.ca](mailto:va7gk@shaw.ca).

OTC - (Gord VA7GK)

- Two working stations and tower setup. Lots of work has been completed including grounding improvements. In discussions about a shared lease, maintenance, cleaning.

- Would like to begin the OTC Committee again to help make recommendations on next steps to the facility.
- Almost every Sat 10am-12pm there is a work party or small group after breakfast that gathers at the OTC.
- Power Amp has been repaired by Slawa VE7LWW. Cost ~\$436. Big thanks to Slawa who saved us more extensive repair costs.

Membership - (John VA7XB)

- Membership is currently at 102, a final notice was sent to those that have not paid yet.
- Contests - (John VA7XB)
- We did the RTTY DX contest in late September at the OTC using the repaired amp (over 800 contacts around the world) Participants were Anton VE7SSD, Slawa VE7LWW, John VA7XB, Eduardo VE7EJR, Sheldon VA7XH
- Next contest is CQ WW DX (SSB) Oct 30-31.

- Coaching available. Who wants to participate?

Nets - (John - VA7XB)

- We have a full schedule of operators but could use more people as a backup.
- Gord: Reminder about the SEPAR @7:30pm just net ahead of the SARC at 8:00pm and there is also a Winlink Net

if you'd like to participate send an email to [lon ve7nl@winlink.org](mailto:ve7nl@winlink.org)

Communicator - (John VE7TI)

- Still working on the Nov/Dec issue. Always looking for stories and articles from our local area.
- Some new articles from a ham in the UK that we look forward to publishing.

Ham Class - (John VE7TI)

- About 50% through the latest course and continuing again next week. Expecting exam in early November. Next class will be in the second week of January.
- Still trying to get the Antenna workshop opened up for a limited number of people.

Repeater Update/Status

- (Steve - VE7SXM)

- We are monitoring the intermod noise issue. Please let the directors know if you hear the intermod.
- The Echolink participant number has increased since the last meeting. If you're still experiencing a busy notice let us know.

## SURREY AMATEUR RADIO COMMUNICATIONS

### **New Business**

- (Steve VE7SXM)

### **New Projects List (Steve)**

- Discuss the development of new projects, and the funding that be required
- The board is working on this list and will share with membership along the way
- The purpose of this process is to engage the membership early in the project process in order to gain greater input from the membership, and to provide transparency in project spending

### **OTC committee (Gord VA7GK)**

- Would like to create a new OTC committee, that will consist of a group of members that would be engaged in the OTC management and maintenance

- Input from the committee will be used by the board to make (better) decisions regarding the OTC

### **Repeater Manager/Committee (Steve)**

- We are looking to the club membership for volunteers for these committees
- Please let us know that you are interested

### **Purchase request to membership**

- John S. Purchase of TWO new small form factor PCs for the OTC (one per station) - Value \$1500 Seconded by Stan Williams. Carried. 23 for, 1 against, 3 abstain. 11 did not vote.

### **Other New Business**

- Next General Meeting (Nov 10th) over ZOOM, invitations will go out shortly before the meeting

- Doug Patengale VE7CQT on digital modes - Confirmed

### **Motion to Adjourn - Steve**

- John S moved that we adjourn the meeting. Seconded by Stan W. Carried.

~ Minutes prepared by  
Jeremy Morse VE7TMY

### **Presentation - Speaker**

Chris Anton - VE7TOP - joins us from Vancouver Island to discuss "AREDN"

<https://www.arednmesh.org/>

Coming up at SARC...

## **Intro to Amateur Radio DMR and Digital Voice**

The November General Meeting on Zoom is a presentation by Doug Pattengale VE7CQ, including:

- |  |                          |
|--|--------------------------|
| • Digital vs Analog voice compared                                 | • What is Digital Voice? |
| • Audio Clarity: Analog vs DMR                                     | • What is a 'code plug'? |
| • Repeater networking / topology                                   | • What are Talk Groups   |
| • Comparison of DMR, D-Star, System Fusion (C4FM), NXDN, P25 modes | • Repeaters vs Hot Spots |



Out of town guests are invited to ask for the presentation link via email [communicator@ve7sar.net](mailto:communicator@ve7sar.net)

# Meeting Presentation

## The Amateur Radio Emergency Data Network

Our presenter for the October joint SARC—SEPAR meeting was Chris Anton VE7TOP who joined us via Zoom from Vancouver Island to discuss "AREDN"

<https://www.arednmesh.org/>

The AREDN® Development Team was formed February of 2015 by former members of the BBHNDev team interested in making mesh software work for the needs of Amateur Radio Operators and emergency networks. The AREDN work is based on the experiences and skills gained working on the BBHNDev team.

### Group Responsibilities

The AREDN® team strives to create quality software releases for use on commercial-off-the-shelf (COTS) devices with a primary focus on meeting the needs of emergency communications data networks. Many members of the AREDN® dev team were members of the BBHN Dev Team which was responsible for producing and testing versions of BBHN from version 1.0.1 thru version 3.0.1, including the tunneling solution. Users have obtained the work-products of this team from <http://www.broadband-hamnet.org/> and from various distribution sites.

### Organizational Structure

The AREDN® team consists of community volunteers who believe in the goals of the project and wish to contribute to the advancement of Amateur Radio. The volunteers take on tasks that they feel they are capable of performing in order to better the solution.

Overall the three main aspects of structure exists inside the team. The volunteers may be contributing to multiples categories over the course of their involvement

### Project Manager

- Assists in coordinating efforts of volunteers
- Provides insight and planning
- Programming
- Writes code and scripts or builds images in order to implement features and fixes into the solution(s)

### Beta Testers

- Provide diverse skill and information real world knowledge about the solution(s)
- Provide networks that are upgraded to experimental releases to check



*AREDN Goes Mobile Too...*

*They are working on an AREDN system in Toronto. Theirs is also an interesting*

*concept: The Mobile AREDN Mesh Network.*

<http://va3qr.ca/aredn/mobile/>



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that the programmers creations functions as expected and to help in located any possible areas for improvement before a stable release is published.

### Mid-Island AREDN Data Net

#### Bringing High Speed Amateur Radio Data Networking To Mid Vancouver Island.

We have started a project to establish an amateur radio high speed data mesh network using RF for the Ladysmith, Nanaimo, Gabriola Island, Parksville, Qualicum Beach and Sunshine Coast areas.

AREDN uses off the shelf, readily available components that can be re-purposed for the network.

It is generally inexpensive and a lot of used gear is available.

Amateurs have privileges in the RF spectrum used and can use greater power levels than domestic routers, switches and other gear.

The 'mesh' happens when these amateur stations link and provide a wide area of non-commercial coverage.

Why do we want to do this? Here's just a partial list of what we can use this for:

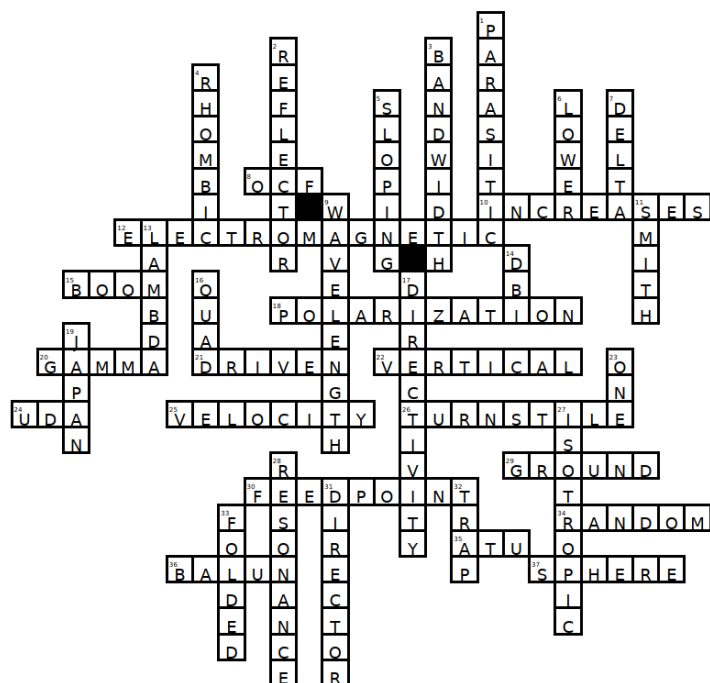
- Multiple Voice Channels (Digital)
- Texting and Email Applications
- Winlink Packet Radio

- Remote Station Control and Monitoring
- Repeater Site Control and Monitoring
- Video
- Radio Hotspots

And that's just a partial list, all using RF links.

We now have the opportunity to take this project to the next level by setting up a series of data relay stations at some of the very best communication sites in mid Vancouver Island and beyond.

<http://www.ve7na.ca/aredn/>



### Crossword answer key

From page 76

## SURREY EMERGENCY PROGRAM AMATEUR RADIO



### SEPAR Report

Gord Kirk VA7GK  
SEPAR Coordinator

### *An end-of-the-year update*



SEPAR continues to be active working to improve the program and building our ability to provide an emergency communications service through amateur radio. As a direct result of the ongoing licensing classes taught by Surrey Amateur Radio Communications (SARC) we have been the beneficiary of several new SEPAR members. Most of the SEPAR members are active in both the Emergency Program and the amateur radio community locally. These new members have been assisting in the weekly work at the new Operations and Training Center (OTC).

The OTC has been beneficial as a gathering place to meet in small groups to help practical education in getting on the air. We have built out the room with SARC to have two powerful HF stations and VHF/UHF capabilities. The SARC small antenna trailer tower is set up at the site with an HF beam and VHF/UHF antennas mounted on it. We also have a wire antenna (dipole) between the building and some nearby trees.

One of the unplanned benefits of having a space to meet has been the indoor common space shared with South Fraser Search and Rescue. On Saturday mornings we have had individuals come and write licensing exams while other work is being done.

In the parking lot we have spent time adjusting and tuning antennas both portable and vehicle mounted. It has become a place that we can say: "if you are having trouble with your radio, bring it by as we have a group of "elmers" who can help you get it working".

Recently SARC held a parking lot sale, free to anyone, to sell off extra equipment that has been donated or just no longer used. Hams were invited to bring their own equipment to sell from the car trunk. This tailgate sale saw many of our new members acquire radios or things needed to get on the air. It has been really rewarding to hear these newly licensed (and many new to SEPAR) get on the air. On the weekly nets hearing many with improved signals is encouraging to listen to.

## SURREY EMERGENCY PROGRAM AMATEUR RADIO

Our weekly nets have continued to be well attended. We start on the repeater and move to simplex to help everyone have an understanding of who they can usually hear and talk to, should we ever need to communicate without the repeater in an emergency. Recently I attended the OTC and ran the directed net from there. The site being centrally located with good height allows for excellent communication throughout the city on simplex.



*Ray VA7ASU and Ashley VA7OAM took our course, built a kit, and got the large Chelsea Gardens complex on the air for emergency communications.*

One of the other emergency programs run by the City of Surrey is the Neighborhood Emergency Preparedness Program or NEPP. SEPAR has been working with the sprawling Chelsea Gardens complex, helping them to get an amateur radio station established. This began after a couple of their NEPP members attended our Basic course and were licensed. One of our members attended on a Tuesday evening to help them test out their kit and location for participation in our weekly net.

A second NEPP group in the Panorama Ridge area has been working with another SEPAR member to understand how we might build a tie in with Amateur radio, while the smaller neighborhoods connect via FRS/GMRS radios. We hope to be helping develop training for this over the fall to help bring a low barrier to entering a communications component into the NEPP program.

Name	Frequency	Offset	CTCSS
VE7RSC (Primary Repeater)	147.360	+0.600	110.9
VE7RSC (Secondary Repeater)	443.775	+5.0	110.9
VE7RPT (Primary Regional Repeater)	146.940	-0.600	
Optional 136.5 Rcv			
Simplex 1	(VHF)	146.550	
Simplex 2	(VHF)	147.420	
Simplex 3	(UHF)	446.550	
Simplex 4	(UHF)	447.425	

### Other frequencies in the Greater Vancouver area:

Primary: Coquitlam/Abbotsford	146.430
Primary: Inter-Municipal Group 3	146.445
Primary: Vancouver; Mission; Sec. Coquitlam	146.460
Primary: Kent-Mission; Sec. Richmond	146.475
Primary: Inter-Municipal Group 2	146.490
Primary: New West; Sec. Richmond	146.505
National Calling / FM Simplex Group I	146.520
Primary: North Shore; Port Coquitlam	146.535
Primary: Bowen Island; Surrey	146.550
Intermunicipal Group 1 Coordination	146.565
Primary: Lions Bay/Vancouver/Delta/Langley	146.580
Primary: Port Moody; Sec. Burnaby	146.595
Secondary: Vancouver/Surrey	147.420
Secondary: Vancouver (UBC) / Maple Ridge	147.450
Primary: White Rock/Chilliwack; Sec. No. Shore	147.480
Secondary: Burnaby/Pitt Meadows	147.510
Primary: Delta; Sec. Abbotsford	147.540
Primary: Hope; Sec. Delta; ALSO EMBC	147.570



Surrey Emergency Program Amateur Radio



## SURREY EMERGENCY PROGRAM AMATEUR RADIO



*Our weekly nets are every Tuesday night on the SARC repeater on 147.360 + T110.9 at 07:30 pm PST. All are welcome to check in.*

We are continuing to explore a MESH network for Surrey to help with messages digitally as a much more efficient method to get information passed throughout the city. This month's combined SEPAR/SARC meeting was a presentation of the AREDN (Amateur Radio Emergency Data Network) presented by Chris Anton VE7TOP from the mid-island amateur group building a network there.

Over the fall we still have some projects to complete, one of which is the rewiring of our emergency communications trailer. We started this to make sure we were ready for field day and, with that behind us, we will be updating the wiring and replacing weather worn coax to the antennas etc. Further information about this will be coming in an email to the SEPAR Group.

Our last item to report on was the SEPAR Participation in the Great BC Shakeout, our annual earthquake drill in BC. On the 3rd Thursday morning of October at 10:21. After people practice their drop, cover, and hold actions during a quake, they should do a quick check of their current location, and if they are able, turn on their radio to the repeater to check in. We asked Paul VE7VP to run the "adhoc" net as the net control station. Just like the real thing, the first amateur who is able can start the net. Paul, who is not a regular net controller, agreed to run this net. We asked amateurs to check in and provide an update of their current state, did they have communications, power, any damage etc.?

Some amateurs reported through the use of exercise, exercise, exercise (so everyone knew it was a part of the exercise and not real) damage to their locations or visible damage to transit systems, trees down power out etc.

The idea is to have the net control simply list the location of radio stations working, damage reports etc. This short "windshield damage assessment" would then be relayed to the City Fire Hall 1 (EOC) to help them with their initial response to the earthquake event. We had 23 stations involved in this emergency net within 30 minutes of the "earthquake" occurring. This was from within Surrey itself and neighbouring municipalities. I want to thank everyone who participated in this exercise

If you are interested in the SEPAR program, and wish to become more involved, please let us know. Our website is [www.separ.ca](http://www.separ.ca) and there is a contact form to get in touch with us.

~ Gord Kirk VA7GK  
SEPAR Coordinator



# We're QRT

## Let me introduce myself

Steve McLean VE7SXM

As the new President of Surrey Amateur Radio Communications, this is my first QRT, so I will provide a little background on myself. I have lived in Surrey for over 30 years, am married with three adult children, unfortunately, none have picked up the hobby (yet). Although, I have been interested in radio most of my life with CB radio as a teen, and I did start the process of gaining my licenses as a teen, other interests got in the way. It wasn't until just a few years ago, that I again became interested in Amateur radio, received my honours certificate in 2015, and then upgraded to Advanced in 2020, and I am now also a certified examiner.

I became a SARC member shortly after obtaining my certificate, and have been actively involved in the club since. I had previously been elected to the SARC board, and as of the September SARC Annual General Meeting and subsequent director's meeting, I became the current President of SARC, taking over from John Brodie (VA7XB). Those are some pretty big shoes to fill, but I am looking forward to doing so.

This will be an interesting year for SARC as we now have a fully functional Operations and Training Center (OTC), with two high end HF radios, a tri-band beam, and wire line antenna covering all HF bands, along with a VHF/UHF station.

There is still work to be done at the OTC, and we are looking for member involvement to assist.

One of my goals for this fiscal year is to form a number of committees and/or working groups to help manage and advance both the OTC, our two repeater sites and any other projects that come along. There are lots of things we can do, from getting our Yaesu repeater on to the Fusion network to setting up and extending the local APRS networks to name a few.

I am looking forward to this new year and what we can do with the many tools that we have available to us as we continue the momentum that has been created at SARC over the last few years.

~ Steve VE7SXM



*Steve at a recent OTC work party; and no, he actually works, and does not just supervise leaning on a shovel 😊*

## SARC SOCIETY DIRECTORS 2020-2021

### PRESIDENT

John Brodie VA7XB  
[president at ve7sar.net](mailto:president@ve7sar.net)

### VICE PRESIDENT

Steve McLean VE7SXM  
vice [president at ve7sar.net](mailto:president@ve7sar.net)

### SECRETARY / WEBMASTER

Jeremy Morse VE7TMY  
[secretary at ve7sar.net](mailto:secretary@ve7sar.net)

### TREASURER

Scott Hawrelak VE7HA  
[treasurer at ve7sar.net](mailto:treasurer@ve7sar.net)

### DIRECTORS

Gord Kirk VE7GK  
(SEPAR Liaison)

Kevin McQuiggin VE7ZD / KN7Q

John Schouten VE7TI  
(SARC Publications/Blog/Social  
Media & Courses)  
[communicator at ve7sar.net](mailto:communicator@ve7sar.net)  
[course at ve7sar.net](mailto:course@ve7sar.net)

Stan Williams VA7NF

### SARC MEMBERSHIP, NET & CONTEST MANAGER

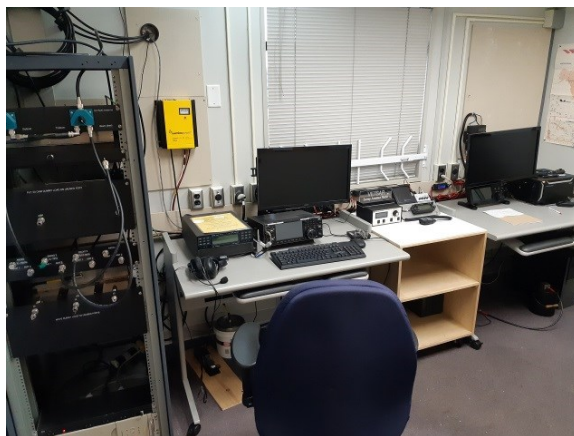
John Brodie VA7XB  
[membership at ve7sar.net](mailto:membership@ve7sar.net)

### SARC QSL MANAGER

(pro tem) John Brodie VA7XB

### SARC REPEATER MANAGER

VACANT  
[repeater at ve7sar.net](mailto:repeater@ve7sar.net)



*More pictures around the OTC.*

*The radio room is almost fully completed now except for a few tweaks, and the facility is also being used for workshops, such as the Basic Course Antenna Workshop.*

*Also shown is the September 'trunk' sale where we, and a few of our members, disposed of some of our treasures.*

## November—December

*heading into winter and  
a new ham year*



That's it for another issue, our biggest ever. Thank you for your continued support.

On Wednesday, November 10 at 7pm, we have a Zoom presentation and introduction to Amateur Radio DMR and Digital Voice by Doug Pattengale VE7CQ.

In December there is no General Meeting nor our usual Christmas lunch, but we will have an open house social at the OTC on Saturday, December 11 starting at 11am.

**SARC** hosts an Amateur Radio net each Tuesday evening at 8 PM. Please tune in to the VE7RSC repeater at 147.360 MHz (+600 KHz) Tone=110.9, also accessible on IRLP node 1736 and Echolink node 496228.

On UHF we operate a repeater on 443.775MHz (+5Mhz) Tone=110.9 or IRLP Node 1737.

*We are looking for a SARC Net Manager. Its not a difficult job and, if you have some time to spare, we'd like to hear from you. Basically it involves scheduling someone to do the Tuesday evening weekly net.*

	SARC Net 20:00 Hrs
1 <sup>st</sup> Tuesday Standby	Jean-Luc VA7JLU Reg VA7ZEB
2 <sup>nd</sup> Tuesday Standby	Jinty VA7JMR Sheldon VA7XNL
3 <sup>rd</sup> Tuesday Standby	Rob VE7CZV REG VA7ZEB
4 <sup>th</sup> Tuesday Standby	Kapila VE7KGK John VA7XB
5 <sup>th</sup> Tuesday Standby	Jinty VA7JMR John VE7TI
Want a turn at Net Control? Contact the SARC Net Manager	

## Down The Log...

### SARC Monthly Meetings

2<sup>nd</sup> Wed. (Sept-Jun)  
1900 hrs at the [Surrey Fire Service Training Centre](#),  
14923 - 64 Avenue,  
Surrey, BC. Here is a  
what3words link and map:  
[https://what3words.com/  
markers.addiction.ozone](https://what3words.com/markers.addiction.ozone)

### Weekly SARC Social

Saturday between 0730  
and 0930 hrs at the  
Denny's Restaurant, 6850  
King George Blvd., Surrey  
BC

### Workshops

Saturday between 1000  
and Noon at the OTC  
5752 142 Street, Surrey  
BC

### SEPAR Net

Tuesday at 1930 hrs local  
on 147.360 MHz (+)  
Tone=110.9

### SARC Net

Tuesday at 2000 hrs local  
on 147.360 MHz (+)  
Tone=110.9

### VE7RSC Repeaters

2m North: 147.360MHz+  
Tone=110.9Hz  
IRLP node 1736  
Echolink node 496228  
  
2m South: 147.360MHz+  
Tone=103.5Hz Fusion  
capable; No IRLP/EchoLink  
  
1.2m: 223.960 Mhz -1.6  
Tone=110.9  
  
70cm: 443.775MHz+  
Tone= 110.9Hz  
IRLP node 1737



## We Have A SARC Patch!

These are suitable for sewing on a jacket, cap or your jammies, so you can proudly display your support for SARC.

The price is \$4 each or three for \$10 and they can be picked up at a meeting or the weekly Koffee Klatch.

*We thank our sponsors for their support of SARC*

*Please support them.*



Successful Guide to the Basic Exam for the Canadian Amateur Radio Operator Certificate

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[www.ve3yt.com](http://www.ve3yt.com) for the guide, my intro book and cw course

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