

# Ham Radio.. my personal voyage in the hobby

Jeff Smith VE1ZAC, VA1GE revised Feb, 2017

Ham radio is a big subject to cover. Ostensibly, it would be nice to say the right things to attract other folks to join the ranks of radio amateurs, but there is no way to really cover the whole subject from one person's viewpoint. I am particularly interested in HF modes, especially CW (Morse code), DXing, building almost anything, vintage tube radio, contesting and experimenting with directional receive antennas. HF to me means less than 30 MHz, and really, for all practical purposes, less than 21 MHz. There is a whole world of ham radio involved with emergency service, VHF, UHF, extra-terrestrial radio, digital radio, software defined radios and advanced networking. I don't participate in those areas much, but am always interested to see what's going on.

With that as a cover, the following is a narrative about my own interests and participation in the world of ham radio.

Aside: Ham radio to me is defined by those with a government issued license allowing them to utilize ITU governed segments of the RF radio spectrum for personal communications and experimenting. It does not include CB radio, or the latest craze of talking to other folks via an internet chat mode, and calling it "Radio". It isn't RF radio, it's the internet. The government radio license is obtained by passing basic tests provided by host country government radio control agencies which then issues an ITU recognized call sign and authorizes use of the recognized ham radio spectrum for the defined purposes of the ham license. The license is just that.. a license to operate an RF transmitter within a set of prescribed guidelines. It can be taken away, and occasionally this does happen. Ham radio is quite unique in that it largely regulates and polices itself. In return, ham radio provides host governments with access to a cost free civilian network of radio operators that can be tapped in emergencies. Governments also see the benefits of the commercial activities of the ham radio equipment market and the general technical beneficence associated with hobby oriented radio persons in a nation's population and industries..

## The Beginnings

Ham radio, and radio in general, has been a lifelong interest of mine. As a kid, I spent hours doing things that contributed to my radio interest. Things such as tearing apart any old radio that was unfortunate enough to fall in my clutches, reading every radio or electronics magazine I could get my hands on, and pestering the heck out of a neighbour ham. (VE3PT, Lloyd Marsh, SK, may he rest in peace). Lloyd may not have meant to have such a peer effect on a kid, as he had lots on his own plate, but he did make a little time for me. And pester him I did! I visited his basement shack many times and was always amazed at what was going on. Lloyd was fairly typical of hams in the late 50's and early 60's in that he had a groaning desk full of equipment, a homemade amplifier built into an old filing cabinet and, to my mind, a really cool antenna which was strung up between two surplus power poles planted in his back yard. Lloyd was an electrical

engineer with Ontario Hydro. Lloyd also donated lots of "Junk" to my own projects and had a few special tools that were way beyond my limited resources. Tools such as a GreenLee chassis punch.. this thing was akin to something from the space program, as far as I was concerned !

In the 50's and 60's tubes were king of course. Transistors were just getting going. This was also a golden age for radio of all sorts. Shortwave broadcasting, commercial and industrial use of HF radio and ham radio were all very much at the forefront of the technological environment in which we lived in North America. The cold war was in full swing, early space craft projects used HF radio and all you needed was a receiver of some sort to tune in and find amazement at every turn of a knob. I didn't have the fortune required at the time for a decent communication receiver, but did have several well worn 5 tube Superhet "Table" radios with their lethal live AC line chassis, all with homemade "Improvements" patiently applied by myself... mostly with little idea of what I was doing. Information came from hobby magazines and other folks interested in the subject. I had one childhood friend who was also bitten by the bug, and we spent many busy hours dismantling old radios and storing the parts, even though we were not sure what a lot of them were.

I finally saved enough money to buy the most basic of shortwave receivers from Heathkit.. a GR81 regenerative receiver. This actually worked pretty well, despite its simplicity, and I spent endless hours listening to that receiver ! Here is a YouTube clip of a restored GR-81: [http://www.youtube.com/watch?v=IGN\\_ajMdVc0](http://www.youtube.com/watch?v=IGN_ajMdVc0)

(I was definitely the original radio 'geek' as a kid.)



One of the greatest features of this radio, in my opinion, was its ability to receive the 160,80,40, and 20 M ham bands. With careful fiddling of the "regen" control, I could tune in AM and SSB broadcasts, and even the mysterious Morse code that hams used. This radio let me peak into a whole universe of interesting goings on. I feel sorry for that radio, as I eventually decided it needed "modifying" as well. It didn't survive some of those experiments very well, but I had moved on to bigger and better equipment. Still, I often think back about the fun I had with that receiver, as limited as it was. It was sold as a "beginner" radio, and it was not very fancy. I remember it cost about \$40 to get that radio shipped to my PO Box in the little village where I grew up. It seemed like a fortune in 1961.

My friend and I spent many hours drooling over the equipment in the glossy Heathkit catalogues that were mailed out twice a year. Both of us were not blessed with ham friendly families, so drooling was all we could do with those catalogues.

Other ham related projects included building my own homebrew (not kits) volt ohm multimeter, a basic signal generator and signal tracer, a couple of power supplies, including one with 800 volts and 500 mA DC output.. a nicely lethal power supply. Imagine, for a few minutes, letting your kids build and play with that now! I also built and experimented with all kinds of tube and transistor oscillators, low power transmitters and receiver accessories, such as a 'Q' multiplier and a transverter. Some of this stuff worked well, some did not. It was all great fun. This was not my only interest in life, but it was the beginning of a long lasting fascination with radio and electronics. Before anyone asks, yes, I did really start out with a crystal radio, which was pretty common among my age group. I knew maybe 6 neighbourhood kids who had these things.

My interest started at 10 years old, but soon after this I was busy with my teenage years, and high school. University and getting on with my lot in life took precedence and ham radio took a back seat for a lot of years.

Brief Intermission (30 years !)... I did have some receivers in the 70's and 80's and spent some time listening, but no ham radio activity. Receivers consisted of a Yaesu FRG-7 (still have it), a really beat Collins R-390 cold war era receiver and an Allied SX-190. These radios had some modifications including Collins mechanical filters, digital frequency displays, modifications to AGC rates, and others. All were acquired as dumpster rescues or swaps.

## Ham Radio.. it's back !

OK, I had said I would get back to ham radio later in life when I had time. Come to think of it, I said the same thing about golf , diving, and fishing. In 1993, it was time to revisit ham radio and get involved again. This time, my interest list was a bit refined. The short list of interest/goals:

- Polish up CW skills
- Build an HF station with interesting antennas on an urban lot
- Try not upset too many neighbours
- Indulge my fondness for "Fingers in radios" and acquire as much equipment by build or repair as possible.
- Start listening again and find out what's happened to the HF spectrum in 30 years
- Develop skills with NEC based RF modelling
- Get into HF contesting
- Get semi-serious about DXing, notably the ARRL DXCC program, CW
- Add some decent RF tools and test equipment to my shop ( nothing new.. EBay has arrived !)
- Indulge in some vintage radio, notably tube Heathkits. (All that stuff I drooled over as a kid was now surplus or junk in many cases.)

It's now 2017. Here is where I am now.

### Polish up those CW skills

I love CW ! Why ? Mostly because I am not a 'natural' at it. I had to work to get proficiency and then have to keep working to maintain proficiency. But there is a huge reward for those who put a little effort into this interesting and simple communication method. Did somebody tell you CW was dead? Not true. Up till recently, most governments required all radio licensees' to pass a Morse Code test to gain operating privileges. Some still do, in fact. An interesting ham radio fact is the existence of a large number of CW knowledgeable hams in the world. There are over a million hams, at least half of which learned some CW to get a license. Most CW taught in non-English speaking countries includes the universal list of 'Q' codes and their meanings, and a very limited amount of CW shortcuts which are all in basic radio English. That means that CW allows a very rudimentary form of communication with hams that are not fluent in English. And this is a factor in why CW has not died out in the ham radio community. In fact, there is some evidence to indicate that it is more popular than ever. CW transmissions are inherently narrow band and have far more chance of

completing a contact with another ham by using basic transceivers and antennas. It dominates the DX world and contesting for this same reason. Thus, you can make contacts around the world much easier with CW and a basic transceiver than you can with voice modes, like SSB.

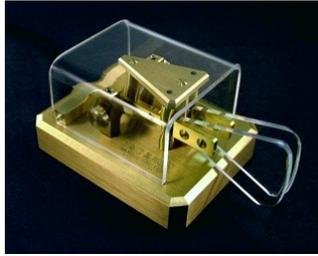
Learning CW (Morse code) is not as hard as it was in days gone by. In the old days, the idea was to memorize, start slow, keep working to build up speed, etc. This was a very brutal way to learn code and every time you got to a certain speed level, you would have to relearn it all over again to increase speed. It's no wonder people found it hard. The Germans employed a psychologist named Koch during WW2 to figure out a better way to learn code. He recognized that it was much easier to learn it at the fast speed spacing the first time.. and put many thousands of German armed forces through training in a really short time. Koch has been rediscovered now and is widely accepted as the only sensible way to learn code. It's known as the "Koch" method. You can find out about it here: <http://www.justlearnmorsecode.com/koch.html> and a very good trainer can be found here: <http://www.g4fon.net/CW%20Trainer.htm>

Some tips, if you decide to get into CW:

- DO NOT send with paddles until you are good at receiving. This will just hold you back. Sending is very easy, when you are ready.
- Follow the Koch method, exactly. It makes it so easy.
- If you are writing on a pad or a keyboard while listening, try looking away from your hands while listening...this frees up brain concentration. (A very good tip !)

Sending is seldom (almost never) done with the old manual hand key anymore. The idea is that if you send good properly spaced code, the person on the other end will have a much easier time of it, and your communication will be more effective. Sending is now done with an iambic keyer and paddles or even a keyboard. It's easy to send perfectly spaced code with a paddle and keyer, and fun too. Keyers are generally built into most modern transceivers, or you can build or buy one of your own.

Paddles: ( these are the three Morse iambic paddles I own and enjoy using)



Chatting or 'rag chewing' as it is known, on CW is an art form and is the highest level of CW use. DXing and contesting is a very basic and rapid fire exchange. There is no lengthy chatting going on.. just passing very basic information such as call sign, a location and maybe a serial number.

There are PC apps that copy CW, reasonably well. None of them work as well as your brain. But if you want to play with one or use it as a check while your learning this is a decent one: <http://cwget-morse-decoder.soft32.com/>

So, why do I love CW so much? The answer lies in the fact that I am not really that good at it, and it takes my concentration to use. I find it hard to think about anything else at the same time, and thus find it relaxing. A second reason is the fact this it is the easy doorway into DXing and contesting. A third reason is that this is the defacto popular mode to utilize if you want to build and experiment with transmitters and receivers. You can build a very effective CW rig which will hold its own for CW use.

### A note on licensing

In Canada, there are two ham radio licenses. These are basic and advanced. Further, the Industry Canada folks will issue a CW proficiency test if you want it stamped on your license. In some other countries they want to see CW proficiency to issue a local or temporary license. (It is not a requirement for Canadian amateur licensing.) The basic licence allows you to use commercial radio equipment at basic transceiver power levels. You may not build or adjust transmitters, or own or operate linear amplifiers. The advanced license allows building and experimenting with transmitters, owning, building or operating linear amplifiers and doing some other things such as owning and sponsoring VHF repeaters. Neither test is particularly challenging and it is entirely reasonable for the technically inclined to do both at the same sitting. You must do the basic license while the advanced license is optional. Information on testing and

licensing is available from RAC (Radio Amateurs of Canada) here: <https://www.rac.ca/> and Industry Canada Spectrum Management, here: [www.ic.gc.ca/eic/site/smt-gst.nsf/eng/h\\_sf01709.html](http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/h_sf01709.html)

License testing is performed by volunteer examiners, normally associated with clubs. Locally, HARC (Halifax Amateur Radio Club) has at least one current examiner. HARC can be found here: <http://halifax-arc.org/>

## Antennas

An endlessly interesting subject! The release of NEC-2 into the public domain at the same time as the PC was hitting its stride has spawned a whole raft of very good modelling programs that allow advanced antenna design and performance modelling. This in turn has created a whole generation of quite knowledgeable radio amateurs who understand and practice antenna modelling. You can learn more about antennas with a modelling program in a few weeks, than you might have attained from a life time of cut and try antenna experimenting. In my case, I have spent countless hours involved with like minded hams around the continent and indeed around the world that are pushing the envelope on limited space receive arrays. (My main antenna interest). I have some notes on receive antennas, and other antenna subjects in various articles on my radio website, here: [www.VE1ZAC.com](http://www.VE1ZAC.com)

My favourite NEC-2 modelling program is EZNEC by Roy Lewellan, W7EL. You can find out about it here: <http://eznec.com/>

## My operating setup



Above is a kind of funky panoramic shot of my current operating setup (the center of the picture has some straight line distortion, but I like the picture). Like most radio setups, it's always in some state of flux. Currently, the right holds an

Icom 7700, an Elecraft K3, a solid state 1 KW power amplifier and a bunch of transmit and receive antenna selection and adjustment devices. I particularly like CW operating for DX hunting and contesting along with an element of receive antenna experimenting for urban small lot locations. Computers play a very significant role in contesting and DX hunting these days, and my setup is typical. I use a free and very full featured logging and control program call DXLab Suite, found here: <http://dxlabsuite.com/> and N1MM contest software, found here: <http://n1mm.hamdocs.com/tiki-index.php> . Both of these applications are free, state of the art, and supported by excellent user groups and contributors.

Note, that while I say I am interested in contesting, this is a very basic contest setup. Contesting in ham radio is popular and very competitive, and there are some really big contest operating efforts geared to this hobby. The great thing about it.. there is something in contesting to challenge every level of operator. Lots of fun !

On the left in the picture above are a couple of my vintage radios. The far left is a classic Collins Radio designed R390A analog HF receiver designed for the US military in the early 1950's and still considered one of the finest analog radios every built. It has 27 tubes (!). I also have a selection of vintage Heathkit amateur radio's that have been rescued and rebuilt, all with tubes, and all operating and still useable on the air.

### The Internet

The internet is really an amateur radio operator friend these days. You can find out everything through Google searches ( or DuckDuckGo, if you don't want Google to know everything). There is a 24/7 database of user contributed loggings, known as "Spots" kept on a volunteer many server network known as the "DC Cluster". Most logging and contest programs plot into this system and it has changed the entire nature of HF amateur communications. Most of the really good ham applications are free. Many folks, like myself, maintain a small website/blog on radio subjects. Some of my best radio friends collaborate on technical projects for antennas and ham radio and have found each other through websites like this. Mine is [www.ve1zac.com](http://www.ve1zac.com) It is not a very fancy site, but I keep my musings and ramblings posted here for the interest and enjoyment of other hams. I am constantly surprised to find this site getting several hundred hits a month from around the world. If you wander around in the articles I post on this site, you can find out all kinds of things about my antenna "Farm" and some

of the other little projects I tackle to make my station work better or to research a particular interest I have.

This note describes my particular interest in ham radio, and doesn't even graze so many other aspects of it. While it has changed a lot over the years, it is still a great hobby and still has a large subset of technical folks who participate and enjoy it in many ways.

Jeff VE1ZAC