Why I Think That Ham Radio is Such a Great Hobby

Jim Edmondson, N5JGE

My interest in radio started when my Dad bought a Knight Kit Star Roamer general coverage receiver. We built that kit on an old picnic table in the basement when I was about 10 years old. I put a long-wire antenna from my second-story bedroom window to a tree out back and enjoyed shortwave listening for many years. When I finally got my novice license, the Star Roamer was my receiver and I built the HealthKit HW-16 crystal-controlled CW transmitter to complete my station. The long-wire was replaced with a trap dipole to better fit our small townhouse lot. Next, I built a VFO to replace the HW-16 crystals. Unfortunately, college and starting a family and a career interfered with upgrading my novice license and I let it lapse. Over the next four-plus decades, I was an off and on again shortwave and scanner listener at my home station and portable on my many business trips. When PCs first came out, my sons and I built several and learned a lot about the hardware and software aspects of MS-DOS and then Windows computing.

Getting back into ham radio was on my "To Do List" for retirement, but I did not pursue it immediately. When Covid started, I found myself with time on my hands and my Wife encouraged me to get back into ham radio. I passed the Technician and General exams in the same session and I picked up where I left off 40+ years ago. Two big differences were that I no longer knew Morse code well enough to operate CW and that PCs were pretty much integrated into many aspects of ham radio. At first, I was happy to operate on the HF and explore all of the old and new operating modes. However, there are so many facets to this hobby and I soon found myself drawn back to kit-building. Today, that usually means QRP operation. Those two activities also work very well with the current popularity of Parks on the Air (POTA) operating.

There are several good quality QRP kits available today and the capabilities in small packages is pretty amazing. QRP Guys, QRP Labs, and the (tr)uSDX are all fabulous kit makers. In the case of QRP Labs and (tr)uSDX, you can purchase assembled units if desired. Kits today are nothing like those of the Knight kits. Gone are the terminal strips, the use of tube sockets to connect components and chassis punches to mount controls. Instead, we now have PCBs (Printed Circuit Boards) with SMDs (Surface Mount Components), through-hole components, microprocessor control of SDRs (software defined radios) and 3D printed cases. Some SMD components are smaller than a grain of rice – quite a challenge to solder onto PCB pads! Fortunately, many QRP kit PCBs are supplied with the SMDs already mounted. In those cases, kit-building consists mainly of assembling the BPF (Band Pass Filter) and LPF (Low Pass Filter) sections and connections to the power supply and PC. This includes mounting several through-hole components, jacks, switches, pushbuttons, etc. as well as winding and mounting the toroids.

Kit-building has provided a great way to learn more about modern radio operation. I built a QRP Labs QDX and promptly fried the final RF amplifier (four BS170 MOSFETs). There is a very active groups.io email list for QRP Labs products (QRP-Labs email list). Several members were very helpful in helping me troubleshoot and localize the problem. One gentleman even mailed eight BS170s to me as there were

out of stock at the usual electronics suppliers! It turns out that a cold solder joint at one of the toroids in the transmitter LPF presented an open circuit to the RF amplifier and caused the failure.

Because the QDX is very sensitive to poor SWR, especially if the impedance of the antenna is <50 ohms, I bought and built a "QRPoMeter" kit. I also learned about this ingenious device on the QRP Labs email list. It is a resistive SWR bridge, so even if the antenna connection is open (infinite resistance), the parallel resistive network presents a 2:1 (100 ohm resistive) SWR to the radio. This greatly reduces the chance of burning out the RF amplifier. In addition to measuring SWR, the QRPoMeter also makes accurate measurements of the output power of rigs up to 15W. Along with a current-limiting DC power supply to measure rig receive and transmit current draw, you can head off many problems. (You can also use most DMMs (Digital Multi-Meters) to check QRP rig current draw.)

The second area from kit-building that caught my interest was LPF design. The LPF is critical to reducing the transmitted power of harmonics leaving the final RF amplifier. For radios installed after January 1, 2003 and operating below 30MHz, FCC regulations require the spurious emission to be 43dB below the fundamental (operating) frequency signal strength. There are many types of filter designs, but most of the QRP rigs use a multi-stage pi-design with a trap at the second harmonic. I used filter modeling software (ELSIE) to see how the QRP Guys LPF should work and then used a NanoVNA to sweep the filters from rig and found much different behavior. This led to buying some capacitors and inductors to model and assemble alternate filters. I found some combinations that work much better and will try them out soon. I am waiting for delivery of a Tiny SA, a spectrum analyzer in a NanoVNA type form factor. This will allow me to measure the output power over a wide frequency range, evaluate filter designs and verify compliance with the FCC regulations.

In doing these investigations, I found a website (MegawattKS) that described how you can assemble a decent electronic lab for a minimal investment. A NanoVNA, tinySA and a current limiting 30V / 5A DC power supply each cost about $60. A decent DMM might run <$50. According to MegawattKS, a small oscilloscope (up to 40MHz) and signal generator (up to 20MHz) are available for about $70 each. Test boards, cables, attenuators / DC blocks and components would round out a decent electronics hobby lab.

While this has been a rather rambling and personal article, I want to summarize why I think that ham radio is such a great hobby based on my experiences over the last 3-years since re-entering the hobby.

- First are ham radio operators: your local club and VE team, on-line forums, You-Tube community and many others.
- The huge number of different activities that you can participate in: many kinds of operating, EmComm, contesting, DX'ing, QRP, QRO, POTA, SOTA, IOTA, YOTA, antenna design / building, radio and accessory design / building and on and on.
- The huge number of educational on-line resources to learn about the above activities, electronic theory and practice and much more.
- Active software development for weak signal modes, N1MM, GridTracker, POTA.app, QRZ.com, ClubLog and many others.
- The advocacy by and resources from the ARRL.

With the above support, I was able to get tested in the middle of Covid and pick up where I left off 40+ years before – now that is amazing! My biggest regret is waiting so long to become a ham operator again.