



## Second Century

# Time for Shack Automation?

*With the long, dark months of winter upon us, most of us can't do much outside with regard to our stations. However, now is the ideal time to look at the operating position and ask: What else can I do to enhance my amateur radio operating capabilities? One answer that springs to mind is computing and automation.*

Long ago, personal computers were vastly more expensive than the ones today, with little or no software available, and certainly no internet access to amateur radio resources. Today, there is a huge array of hardware and software solutions available, not to mention a myriad of amateur radio data sources online. It has become routine to see pictures of shacks with four or more monitors fanned out around the operating position to provide access to logging, awards tracking, real-time spotting tools, digital modes, satellite tracking, and so on. Having all of this on a screen and at your fingertips has rewritten the game of amateur radio.

At ARRL Headquarters in 2021, we undertook an initiative to redefine our club station, W1HQ. Gone are the old desks and walls covered with maps, certificates, and paper QSL cards. Today, the shack appears to be wireless. Two racks house the equipment; a cable management system hides the wiring; there are Bluetooth-based accessories including wireless connection to our Bencher paddles using a solution from Glen Popiel, KW5GP, and Green Heron products control the two rotators and assortment of antennas. With the help of Dave de Coons, WO2X; Kyle Krieg, AA0Z, and our Lab's Digital RF Engineer John McAuliffe, W1DRF, we've fully automated the shack using a Raspberry Pi-hosted Node-RED environment. To us, this looks like the shack of the future, which is already here!

Most hams today use PC computers running Windows. There is an ocean of software to perform all sorts of amateur radio-related functions, and the innovation continues every year. Two of the most popular programs are *N1MM* and *WSJT-X*. Tom Wagner, N1MM, has built a strong team for the development, documentation, and support of his namesake contest logging program. I use it in DXpedition mode for everyday logging, along with the contests I participate in throughout the year. If you are not logging by computer, consider using *N1MM*. *WSJT-X* is designed by a team led by Dr. Joe Taylor, K1JT. They have been developing various weak-signal digital modes, including FT8, FT4, and now SuperFox FT8, to help everyone make contacts irrespective of how modest their station is or how poor propagation might be.

Another computing platform you may want to leverage in your shack is the Raspberry Pi (RPI). The single-board computer costs well below \$100 and uses a version of the Linux operating system configured for the RPi. The RPi comes in a few different models, with the most powerful being the latest version, the RPi 5. There are many add-on HATs ("Hardware Attached on Top" — boards that attach to the RPi) specifically developed for amateur radio, including the MMDVM HAT for digital VHF/UHF radio, DRAWS HAT for supporting digital modes like FT8, and other HATs that can control relays, Voice over IP, and even CW. Getting started isn't as difficult as you might think with resources like Jason Oleham, KM4ACK, and his 73 Linux, among other builds especially for hams.

If you have a latest-generation radio with a single USB interface port, you're in luck when it comes to shack computing. Usually with just the addition of a simple software driver, not only can you control the radio's settings from popular logging and contest programs, but you can also use the digital modes without additional interfaces or radio-specific cables. Even more, you can use apps like *AnyDesk* or *RealVNC* to remote into your computer and run FT8 from anywhere! This is a simple gateway to remotely controlling your entire shack and experimenting with your own Node-RED control panel.

Over the next few months, spend some computing time in the shack. Take on projects in line with your level of experience, and use YouTube and website-based tutorials for shortcuts or suggestions on completing them. Be radio active by building your computing skills. Be a connector by taking on a club project, like HamClock. And look for ways to make your amateur radio experience more fun and fulfilling!

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