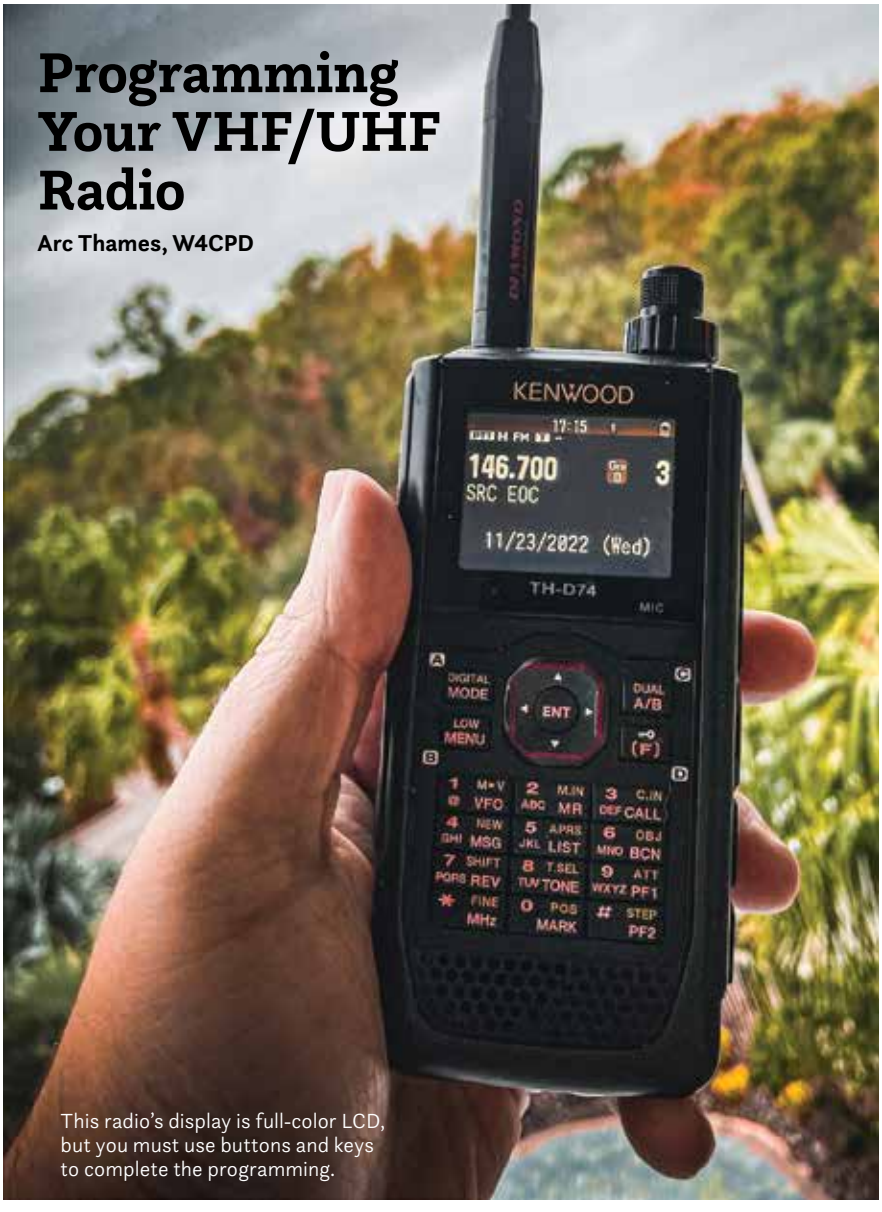
Programming Your VHF/UHF Radio

Arc Thames, W4CPD



This radio's display is full-color LCD, but you must use buttons and keys to complete the programming.

Knowing how to properly program your VHF/UHF radio is an important part of being an amateur radio operator. Here are some basics on picking up this crucial skill.

Handheld and mobile VHF/UHF radios come in a variety of configurations and programming ranges, from easy to difficult. Some radios provide a large LCD or dot matrix-style display, or even a touchscreen, that makes it easier to navigate menus and store settings, while others may rely strictly on pushbuttons and a single- or dual-line display. No matter what kind of interface your radio has, the ability to program new frequencies "on the fly" is essential. While pre-programming your radio before a deployment is best, in an emergency deployment, you may not know the frequencies in use in the impacted area until you arrive. Even if you've previously programmed repeaters for that location, those repeaters may have been damaged, or even been replaced by temporary or mutual aid frequencies. It's important to know your way around your radio well enough that you can program a new frequency on your own.

Key Settings

While each radio manufacturer differs in the way you access settings, most settings are stored when you save the memory channel. The common settings you need to be able to modify are:

- Frequency
- Repeater offset
- Tone (CTCSS)
- Tone squelch
- Power level

Frequency

The frequency you wish to listen on is set by adjusting your *VFO* (*variable frequency oscillator*), also known as your channel display. I said, "the frequency you wish to listen on," because if you're using a repeater, the transmit frequency will be different from the listening/receiving frequency. If you're going to be transmitting on a simplex frequency — meaning radio to radio, with no repeater — you'll only need the one frequency.

Repeater Offset

A repeater receives an incoming signal from a particular frequency and then retransmits that signal on a separate frequency. The difference between a repeater's transmitting and receiving frequencies is called its *offset*. Some radios know the generally assigned frequencies of repeaters and will automatically set the offset frequency. If your radio is equipped with the automatic repeater offset feature, it's important to know how to disable it. In the event that a repeater is out of order, you may need to transmit on the repeater's output frequency in simplex mode.

Tone

If you're using a repeater, you'll also need to properly set the CTCSS tone of the repeater, as well as know if the repeater uses a tone only on the input or the output as well. CTCSS tones signal the repeater that the incoming signal is actually meant for that repeater, and allow it to open its squelch and retransmit the signal. This is done to prevent spurious emissions that may be destined for another repeater in an adjacent area when band conditions cause VHF/UHF ducting across a region.

Tone Squelch

In addition to knowing the proper tone for the repeater, you can also set your radio for what is known as *tone squelch*, which signals your radio to open the squelch only if the proper tone code is heard. This is

useful for the same situation described above, but is also necessary when using repeaters that are dual-mode analog and digital, such as those that use C4FM. Without turning on your tone squelch, you will hear the digital noise transmitted by those digital signals. This can be annoying, but it's easily resolved by enabling the tone squelch for that memory channel. (See "Tones: The Keys that Unlock Repeaters" in the March/April 2020 issue of *On the Air* for more about CTCSS tones and tone squelch.)

Touchscreens are a great way to quickly access your radio's settings, as well as quickly save memory channels

Power Level

Lastly, the power transmit level can be set on many radios and stored in the memory channel. Remember — when operating, you should only use the minimum amount of power required to make the contact. Storing the proper power level in the radio memory prevents you from having to adjust later, but many radios allow quick access to increase your transmit power if needed.

Remembering How to Store Memories

One of the reasons many hams struggle with programming is that typically, once we've programmed our radios with the initial channels we want, we don't modify them often, or add new ones. It's difficult for many of us to remember the steps for tasks we don't do on a regular basis. The settings for repeater offset and tone can be buried in a radio's menus, if you haven't taught yourself where to find them, it can be frustrating when trying to add a new frequency in the field.

I recommend printing out the relevant programming sections of your radio's manual and keeping them in your car or go-kit. Some companies also offer quick reference guides that are a shortened version of the radio's manual; these tend to be small and easy to carry. Many of us rely on the internet to look up this information, but keep in mind that, in a disaster area, we might not have access to the internet.

Technology can still help us in those situations. Long before you're deployed to an event, you can take smartphone pictures of the relevant pages from the radio's manual, or download the manual directly to your phone. Applications such as iBooks on an iOS device, or even Amazon's Kindle app, allow you to store PDFs directly on your device for reference. Those apps are helpful not only for your radio's manuals but also for any other documentation you might need during a deployment. You can pick up an inexpensive tablet online, load it with the PDF files of your radio manuals, common ICS forms, and other documents such as the AUXFOG (Auxiliary Communications Field Operations Guide), and keep it in your go-kit.

No matter your skill level, practice makes perfect. For practice, look up a repeater in a place you're planning to vacation and add that repeater to your radio. Before you know it, you'll be helping your friends program their radios too!

Arc Thames, W4CPD, serves as the Section Emergency Coordinator of ARRL's Northern Florida Section and Emergency Coordinator of Santa Rosa County, Florida. He has been a licensed ham since 2016.