

## Repeaters use and tips

**Target audience for tonight:** Who is this presentation intended for? Many people obtain their amateur radio license but have trouble getting started being active on the air. Part of that is uncertainty is how to learn how to speak and act on the air, or uncertainty deciding which radio to get, or find using a repeater intimidating.

This is an introduction to repeater use that is not necessarily included in the basic repeater training that you may get from Youtube videos or other sources. So, potential interested people might include:

- You are a new(ish) ham
- AROs or not
- You haven't programmed your radio to talk on a repeater
- You haven't learned Chirp, RT Systems, or a manufacturer's software to program your radio
  - FYI, look for FTDI or Prolific when looking for a compatible cable. Not FTDI clone or similar.
  - Beware of \$10 cables.
- You are listening in but want to start participating with nets or other ham radio use
- Anyone else

## Kinds of repeaters discussed tonight

VHF, UHF, Crossband

Linked repeaters

Winlink Gateways, (not really a repeater) but some repeater tools can be used

Touch on VARA with Winlink

Digital: It is not a Portland NET practice to operate a proprietary digital mode

No DMS, no system fusion, no DStar

Not going there tonight

## Programming your radio for repeater use

You need to be able to set:

- the repeater's transmit frequency,
- set the amount of the offset, to obtain the frequency the repeater listens on, and that you transmit on
- the offset direction +/-
- have the offset mode turned on,
- PL (private line) tone - if used by the repeater. This is a low frequency signal, often 100 Hz, that the repeater responds to. Most repeaters will ignore your transmission unless the proper PL tone is sent in combination with your transmission
- With most radios you **could** check the settings by pressing the PTT and looking at the display and listen to the repeater. This risks "**kerchunking**" the repeater, which is bad practice. You **should** press PTT and say "KJ7DMV testing".

Different radios have very different procedures for programming a transceiver, even with the same manufacturer.

Youtube is a good start for demonstrations for programming a particular model. Quality varies  
Cheat sheets may be available that provide a set of directions.

- Nifty Guides are a commercial source for many radios
- <https://www.niftyaccessories.com/index.php>

Elmers (experienced ham radio people interested in helping others get started in ham radio)

Manufacturer's web site may be helpful, maybe not

Baofeng radios, try mirkit.com. Baofeng radios are considered very hard to manually program, but good cheat sheets and Youtube videos exist.

The Multnomah Counter McARES web site has useful cheat sheets for some common radios.

## Programming via software

With a computer, software, and some way to connect to your radio, you may be able to load a set of repeaters or simplex frequencies into your transceiver. The method varies by manufacturer or model, but there are 3 most common choices:

1- freely available Chirp software. Available for Windows, Mac, or Linux

Chirp has a set of radios predefined that you may use. A single download will have all the predefined radios in 1 download. New radios are frequently being added

<https://chirp.danplanet.com/projects/chirp/wiki/Download>

You need to obtain a data cable that connects between your computer and radio. Beware of counterfeit clones. Cables based on the FTDI USB chip are recommended.

2- Commercially available RT Systems software.

Typically includes a cable and software.

You purchase a different copy of the software for each model of radio that you want to use.

<https://www.rtsystemsinc.com/>

3- Software for your system provided by the radio's manufacturer, at their web site.

4- Baofeng radios are normally programmed with Chirp or RT Systems software.

## Which repeaters can I use?

Any, if open for public use. And if it isn't in use at the time.

You may check the status of who can use with Repeaterbook.com

To determine "who's there" monitoring or using a repeater, state your personal/FCC call sign and wait. If there is no response, try again but not too soon.

If you hear nothing after a few minutes, it is likely nobody is available to speak on that repeater. It also means you are OK to use it.

To talk to a specific person, state "[their call sign] this is [your call sign]. And wait for a response.

Use a phonetic call sign at first contact.

## Repeaterbook.com

A free directory of repeaters.

Does not list every repeater in the area.

Repeaterbook lists callsign, frequency, owner, and whether it is open for general use. It also lists special capabilities (Echolink, etc).

Smartphone apps exist for Apple, Android.

You can list repeaters in a variety of ways. Find info on a single repeater, or all the repeater info for a selected area.

Example:

Search for K7NE from the main page, fill in the callsign field above "repeaterbook" button, press the Repeater Book button.

Do the same kind of search for K7RPT. Do you see 19 matches? These are linked together in a network. For NET NET, the local repeater is unlinked from the group. Note that a linked group of repeaters need more hands on repeater maintenance and support. Who to call? Check with NET NET managers group ([pdxnet.net@gmail.com](mailto:pdxnet.net@gmail.com)) for the NET NET repeater, let them make the contacts.

Once a search shows a set of matching repeaters, select the Map Results option in the top header bar to see a map of the repeater locations.

**Search North American repeaters.** Drill down to Oregon by clicking on Oregon on the map.

Repeaters are listed in categories. I.e. ARES. Or select by city: select Portland, and be prepared to wait for the system to compile that list.

The repeaterbook listing should show the repeater's owner. You may be shown a website address. You can browse to that address for more information.

## Repeater Etiquette

Taken from <https://www.onallbands.com/repeater-etiquette-best-practices-dos-and-donts/>

### Before Transmitting

As with other aspects of Ham Radio, always listen before transmitting. If somebody else is using the repeater, and you don't have an emergency, wait until the repeater is free before making your call. When you do, ask if the repeater is in use first.

### Soliciting a Call

The best way to make a call is simply call the station you're trying to reach—"N0AX, this is KX9X calling." If you're just looking for a conversation, simply announce you are available for a call. Some examples are "KX9X monitoring 146.760" or "KX9X monitoring... anybody free to chat?" Or simply state "KX9X listening".

**One thing to not do is call CQ;** it is generally frowned upon to call CQ on a repeater. Except under circumstances where you know who you are talking to, it's a good practice to use phonetics on a repeater, especially during a net.

Many repeaters have what is called a "courtesy tone" or "courtesy beep." You'll also notice that many repeaters stay active for a few seconds after somebody stops talking. Be sure to **leave some space in the conversation to let the repeater stop transmitting.** This helps prevent the repeater from "timing out" due to too long of a transmission. It also leaves room for another person to jump in if they have an emergency.

**Try not to interrupt an ongoing conversation.** It's not pleasant to be interrupted in real life, so please avoid it on the repeater as well.

Lastly, remember that there are people of all backgrounds that could be listening to your conversation. Just as when you are in public, use conversational, polite language. You never know when you may speak with a Ham who doesn't care for bad language or has small children who are listening.

In general, be polite and use common sense and common courtesy.

### Jumping into an Ongoing Conversation

You may encounter a situation when you either want to jump into a conversation or need to use the repeater while it is already in use. In those circumstances, wait until there is a pause in the conversation, then send your call with a short explanation of why you are chiming in. Some examples are, "This is KX9X, may I join this conversation?" or "KX9X here, may I make a quick call?" Wait for a response. If you need to make a call to another user, make the connection and relay your traffic as quickly as possible. If you are going to need more time, tell the person you're speaking with to wait until the current conversation is over, or make arrangements to move to a different repeater or another frequency where you can keep talking.

### Emergency Traffic

If you have a genuine emergency and a repeater is your only means of communication, use the word EMERGENCY. If the repeater is free, keep it simple: "KX9X EMERGENCY" or "KX9X with emergency traffic";

somebody please respond.” If the repeater is in use, wait until there is a pause in the conversation and then jump in using your call and the word “emergency.”

### **Nets - on air group conversations**

Whether it is for a health and welfare event—such as an ARES activation or severe weather—or merely a weekly on-air gathering of club members, nets are more structured and follow a protocol. Every net will have a Net Control Operator who takes the primary role of coordinating stations participating in the net. Nets have a format; most nets will read the format over the air at the beginning of the net, outlining how to check in and when you will be called on to speak to the net. Other nets will post their format on a website. If you’re still unsure how your local net functions, ask Hams in your area who participate in nets for guidance before checking in. Listening to the net and how people are checked in can provide answers, as well.

**If a net radio meeting is for severe weather or some other emergency**, do not check in or transmit to net control unless you have valuable information for the net or net control has asked you for something. Seconds count in emergencies and unnecessary traffic ties up the net. Feel free to listen, but don’t check in if you don’t genuinely have something to offer the net. Always listen to net control’s instructions during an emergency net.

### **Other Good Practices**

Sometimes Hams simply hold down their mic for a second and let go, just to see if they are able to access the repeater. This is known as **kerchunking**. It’s **bad practice** to kerchunk a repeater. If you want to see if you’re hitting the repeater, simply say your call: “KX9X testing.” If you hear the courtesy tone when you let off your mic, you’re making it into the repeater. And by giving your call, you may spark a conversation with another Ham!

There may come a time when you need to know if your radio sounds good into a repeater; perhaps you’re having a technical issue, or you’ve made an adjustment to your radio. It’s perfectly fine to get on your repeater and ask for assistance. For example, “KX9X testing; can anybody give me a signal report?” will do nicely. Be mindful of the time and don’t tie up the repeater too long trying to diagnose a problem. If there’s a lingering issue, move to a simplex frequency to continue diagnostics.

Earlier I noted that repeaters have a “**time out**” **feature**. The repeater will stop transmitting after a certain amount of time if it has been engaged without a pause. Three minutes is a standard timeout setting. Ensure that your transmissions aren’t so long that you risk timing out the repeater. Enjoy your conversation, but keep an eye on the clock, too.

Finally, repeaters are a social hub of your local Ham community. Be courteous and friendly. If you hear a new Ham on the repeater, welcome them and help make them feel at home.

### **Local Nets**

Radio on air group discussions

Chat NET

NET NET

McARES

PARC - Portland Amateur Radio Club

**Local Nets continued:** A list of nets in the area is available at <https://kc7nyr.com/local-nets/>. It includes the acronym OTVRC which is Tualatin Valley Radio Club

## **Crossband Repeaters**

Handheld radios and mobile radios are available that include crossband repeater capability. For example: a VHF/UHF handheld radio operator could transmit to a nearby mobile crossband repeater on UHF, the mobile cross band repeater would retransmit on a VHF frequency.

Current crossband capable list: <https://www.hamtronics.com/best-cross-band-repeater-radios/>

## **CROSS Band Radio Legal Considerations**

Before setting up a cross-band repeater capability, **make sure you are familiar with the FCC regulations** which govern repeaters and "remote bases." To make these operations fully compliant with FCC regulations, there are a few points which need to be considered. Two of the major requirements are discussed below..

### **Station Control**

The FCC requires that a repeater be under the control of an operator who controls the repeater and can intervene in the event of a problem. Control can either be local (i.e., "the use of a control operator who directly manipulates the operating adjustments in the station to achieve compliance with the FCC rules") or remote ("the use of a control operator who indirectly manipulates the operating adjustments in the station through a control link to achieve compliance with the FCC Rules").

### **Station Identification**

An unattended station needs to be identified on all frequencies on which it transmits. When the user identifies on the UHF uplink, the cross band repeater is also identifying itself on the VHF side. However, many radios do not have the capability in cross band repeater mode to identify on the UHF downlink (transmit) side, or the VHF side, for that matter. Additionally, when another operator transmits on the UHF uplink, the cross band repeater won't be correctly identified on the VHF side, either. So, depending on your radio, some sort of add-on device for automatic identification may be required for full FCC compliance.

**EchoLink:** EchoLink allows licensed Amateur Radio stations to communicate with one another over the Internet, using streaming-audio technology. The program allows worldwide connections to be made between stations, or from computer to station, greatly enhancing Amateur Radio's communications capabilities.

Repeaterbook will list EchoLink repeaters if that information was provided to the database.

### **Proprietary digital modes (DMR, D-Start, System Fusion)**

Repeaterbook lists separate sections for these. Portland Emergency Neighborhood Teams program does not support using proprietary digital modes, which require the use of specific manufacturer radios.

### **Winlink**

Winlink is a digital mode that works with a wide variety of amateur radios. It consists of a global network using amateur radio and Internet transports. Targeted primarily at Microsoft Windows users, there are also clients for MacOS and Linux and Android.

Winlink software allows you to search for gateways and sort by distance and direction.

Check with local knowledge of which gateways are recommended.

Just because a gateway exists and is online, doesn't mean it is working. And it may be in use and the gateway generally handles 1 connection at a time.

How to tell if a Winlink gateway is busy? Listen in on the gateways's transmit frequency.

VARA - a high speed network protocol over amateur radio, HF, VHF. Winlink can be set up to use VARA. Use it if you can. Free to start but high speed mode requires you to purchase a license. \$69 for a single license, quantity discount is available.

If you are planning to use a Winlink gateway, it is a good idea to test it in advance. If it is free, send a short message to yourself.

Winlink can also transmit over the Internet by using the Telnet protocol.

Be as concise as possible when sending a Winlink message, over radio frequencies. Long messages tie up the gateway and others have to wait until your message is finished. In normal circumstances, a "telnet" mode will route the message over your Internet connection and not use your radio at all.