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Arizona Repeater Association

Operating Tips

The Arizona Repeater Association offers the availability of 38 repeaters positioned around the state, many of which sit on the top of mountains providing incredible radio coverage as both stand-alone repeaters and linked constellations. Here is a link for you to see all of the repeaters: <https://www.w7ara.org/z/Repeaters.aspx>

With so many new hams joining our ranks, providing information on how to access these wonderful tools and how to use them is critical to their enjoyment and ability to progress into educated and proficient Amateur Radio communicators.

The following information is intended for one and all: inexperienced and experienced hams: Rag Chewers, Club Nets, Educational and Training Nets, Community Service Nets as well as for the transmission of Priority and/or Emergency Traffic.

Here are some simple guidelines to follow when using any of the ARA repeaters:

- ***Please treat others as you would like to be treated***
- ***Avoid conversations about politics, sex or religion***
- ***Avoid the temptation to criticize others***
- ***Enjoy our hobby and our repeaters to the fullest***
- ***Create a welcoming environment and cordial atmosphere on the air***

OPERATING BASICS

You will need three things to successfully operate using an ARA repeater:

1. Repeater Output Frequency
2. Repeater Input Frequency
3. PL tone if applicable
4. Autopatch Procedure

1. Repeater Output Frequency

You must have the correct **receive frequency** in your radio VFO in order to “hear” the repeater. For instance, let’s say you were trying to listen to the Shaw Butte Metrolink Repeater in Phoenix. You would need to enter 147.2400 MHz into your radio VFO.

Virtually all new radios come with the VFO “channel steps” set to 25 kHz frequency steps. However, it would be good to find the menu option for changing the frequency “channel steps” and be certain it is set to 25 kHz steps. It is also recommended that you learn how change the frequency step should you encounter repeaters that have frequencies that do not follow the 25 kHz spacing.

2. Repeater Input Frequency

You must have the correct **transmit frequency** (**“Offset”**.) Since all repeaters use two radios at the repeater site, one to receive on, and one to transmit on. Repeaters receive your signal on one frequency “Input” and simultaneously re-transmit your signal on another frequency, at the same time, “Output.”

In this case, the Shaw Butte repeater is listening on an input frequency of 147.8400 MHz and will retransmit (“repeat”) the traffic it hears on 147.2400, which is the “Output” frequency. The difference between the repeater input frequency and the repeater output frequency is referred to as the “Repeater Offset.” You can refer to a number of resources to obtain information about repeater frequencies and offsets. These will differ based on the band and geographical location.

3. PL Tone/CTCSS

PL tones (Private Line) are encoded sub-audible tones that are transmitted simultaneously with the speech portion of the transmission. It is these tones that the repeater will “hear” and activate the repeater in order to retransmit your signal on the output frequency of the repeater.

In order to use the Shaw Butte repeater, your radio should be programmed to transmit a PL tone of 162.2

NOTE: If a repeater does not “hear” the correct PL Tone with your transmission, your transmission will not activate the repeater.

4. Autopatch Procedure

Once you have successfully accomplished 1, 2 and 3, you may want to take advantage of the Autopatch feature on some of the repeaters in order to make local phone calls through your amateur radio.

Here is the sequence:

Key up, announce your call sign, then, without unkeying, press the * key followed by the 3-digit area code + 7-digit number. Keep the radio keyed for about half a second after entering the last digit, then, unkey. The repeater will announce "autopatch" and place the call.

When finished, key up, announce your call sign, press the # key, and then unkey.

The repeater will respond with "call complete" and the time. There is a 3 minute limit per call. (911 calls have a 15 minute timer.)

That's all there is to it!!!

Well, Sort Of...Read on...

Etiquette, Rules of Road an Protocol

Now that you have access to this wonderful and powerful tool (repeater) and know how to program your radio to us it, you will find that the way different hams, groups, clubs, nets may behave differently when using a repeater.

Some of the practices are dictated by FCC Rules and Regulations; some are modeled in order to meet the needs of the communication type or mission. And other practices may not be very structured at all.

The following is a compilation of operating considerations and may be considered "Best Practice" by some depending on the situation, environment or purpose relating to the type of radio traffic being passed.

1. Is The Repeater Busy

Ensure that the repeater is not busy before you transmit. Make every effort to avoid interrupting an on-going conversation, unless you are requesting to become a participant or you have emergency or priority traffic.

- ***User Tip: When you tune to a repeater or a simplex frequency, listen for at least twenty (20) seconds before transmitting.***

2. Making Your First Contact

Making that first contact can be very nerve racking. So how do go about it? Here are some suggestions once you get the nerve to push the PTT button:

- "This is <callsign> and I just got my license. Is anyone willing to be my first contact?" (Don't be disappointed if nobody responds - even if a conversation has just completed, others may no longer be listening, or might be scanning through frequencies. So if nobody answers right away, wait for a bit and try again.)
- Or you could say "This is <callsign> listening for a call." If you say your call sign followed by "monitoring" "listening", it doesn't clearing state what your intentions are.

- And a third option is to make arrangements to directly call a fellow ham that you know: <Their call sign> from <Your call sign>. This is referred to as the “To/From” calling sequence and is considered best practice.

3. How to Make a Contact after that First One...

One of the most enjoyable aspects of the Amateur Radio hobby is meeting new people. But how do you do that on a ham radio repeater.

Consider using some of these techniques:

- When other stations finish a conversation, and you would like to chat with one of them, call them directly followed by your callsign. i.e. WB4xxx from W7xxx
- Announce your callsign followed by a pleasant “Good Morning” or “Good Afternoon” or your location
- Announce your callsign followed by “Listening for a Call”
- Announce your callsign followed by “Any stations on frequency in “location and available for a call?”
- Announce your callsign followed by “Requesting information regarding...”

User Tips:

- Calling CQ on an FM repeater will likely not generate a response
- Repeated requests for a “Radio Check” or “Signal Report” will also likely receive little response
- Bouncing around to different repeaters and announcing your call sign will likely be met with limited success and be viewed negatively.
- Asking “Is Anybody Around” without announcing your call sign typically is not productive.

4. Quick Key Got You!!!

One of the most important things about using repeaters, especially linked repeaters, is to learn to push the microphone button, pause for 1-2 seconds, and then begin speaking. The reason for this is that the repeater(s) need time to open and be ready to receive your voice traffic.

If you push the PTT button and simultaneously start speaking, the first word or the first part of a word (or your callsign) may be cut off. This does not facilitate effective communications and can be frustrating to others.

Once you learn this technique, it will become second nature and you will do it automatically. You will also earn the respect of your fellow hams for your repeater use proficiency.

5. Then The Alligator Got You!!!

Another important practice is to let the repeater “drop” before it has reached its 3 minute time-out timer. So if you think you are going way long on your current transmission, announce “reset”, unkey, let the repeater squelch tail drop, and listen for the repeater courtesy beep. This lets you know that the repeater has reset its timer. Then wait for 3-5 seconds before transmitting. This gap allows you to hear someone who may be trying to break in with emergency or priority traffic or someone trying to transmit on the repeater output frequency. (Most hams, even experienced ones, are not very good at this. It is something you need to train yourself to do).

6. Private or Closed Repeaters

It is suggested that you become familiar with the usage, protocol and/or policies of repeaters you might like to use. Just because a repeater is “*there*” does not mean that you are welcome to use it. For example, extended rag-chews may not be welcome by some repeater owners.

Even though your license allows you to operate on any frequency within the bounds of your license class, a wise amateur will avoid “closed or private” repeaters until you have done some research about the repeater. **NOTE: All of the ARA repeaters are completely “OPEN.”**

- ***User Tip #1: Listen to a repeater for a while before you make a decision to use it. You might even ask someone on the repeater if you are welcome to use it for occasional conversations or to make a call.***
- **User Tip #2 You can research repeater information by going to a website www.qrz.com or repeaterbook.com and look up the repeater owner or sysop and contact them to get more information about using their repeater.**

7. Q Codes

Although Q-Codes have a very valuable place in Amateur Radio, they are not to be used on FM voice channels. Plain language is used to help ensure that those listening fully understand what is being said.

- ***User Tip: Q-Codes are traditionally used in CW Operations, not FM voice.***
- **When participating in an Emcomm environment, plain language is expected in order to avoid confusion over the meaning of Q-Codes, 10 Codes or any other codes.**
- **The use of “Hi Hi” on an FM voice repeater is not the opposite of “Low Low.” Note: It is okay to laugh on the radio.**

8. “Clear and Monitoring” or “Clear On Your Final” ????????

At the end of conversation, you might hear a station say: “<Call Sign> Clear and Monitoring.” This can cause confusion. Does “Clear” mean that you are clear of the frequency and moving on? And what is really meant by “Monitoring?” What or who is it that you are monitoring for and will you advise when you stop “monitoring?”

Closely related to this pattern is “Clear On Your Final.” Again, just what does this mean? Are you closing your station after the other station closes? What if the other station has another thought or question for you?

- ***User Tip #1: Under normal circumstances, when you are finished with a contact but will continue listening, it is sufficient to simply say your call sign at the end of your conversation. You could also indicate your intentions prior to closing with your call sign. Example: “Thank you for the call. I have arrived at my destination. See you later.” Then close with just your call sign only. The other station will also need to perform the proper close. You cannot do it.***
- ***User Tip #2: If you attempt to contact someone and there is no response, you can notify others that you are finished by saying, “No Contact” or “Nothing Heard”, this is W7....” This allows anyone who may have been standing by to go ahead and make his or her call. And be prepared. Someone may call you after you close.***

9. “For ID”

There really is no reason to transmit your call sign other than for the purpose of identifying your station. The FCC requires that a station identify every 10 minutes during a conversation, and at the end of a conversation or series of communications. Conversations need **not** come to a halt while you identify. “Stand by, everyone, while I say my call sign for ID.” Simply say your call sign once within the 10 minute window and at the conclusion of your traffic or conversation. You can simply insert your callsign as part of your traffic, whether it be a statement or a question for the other station(s).

§ 97.119 Station identification.

(a) Each amateur station, except a space station or telecommand station, must transmit its assigned call sign on its transmitting channel at the end of each communication, and at least every 10 minutes during a communication, for the purpose of clearly making the source of the transmissions from the station known to those receiving the transmissions. No station may transmit unidentified communications or signals, or transmit as the station call sign, any call sign not authorized to the station.

(2) By a phone emission in the English language. Use of a phonetic alphabet as an aid for correct station identification is encouraged;

- **User Tip: While talking, simply say your call sign once every ten minutes. It is considered “amateurish to say “This is W7xxx for ID”, or “This is W7xxx for identification.”**
- **On virtually all “directed nets” when a station closes with their call sign, it is clear in the context of their communication they are finished with their traffic.**

10. Emergency Traffic – ALWAYS Yield!!!

Different repeater groups handle emergency communications in different ways. A general guideline is this: if you have emergency traffic, **Say So!**

For Example: “This is W7xxx with priority/emergency traffic, can someone help me contact DPS?” or “I need help contacting the Fire Department.”

Asking “is anybody monitoring?” may sound like an attempt to start a casual conversation. On many repeaters, you might simply be ignored. However, if you state that you have emergency or priority traffic, people on many repeaters will drop what they are doing to help you.

If the repeater is in use, simply announce “BREAK” in between the other stations transmissions.

When a calling or breaking station interrupts, **ALWAYS** yield quickly since you never know if they have emergency or priority traffic.

Note: if you are listening on a repeater frequency and someone asks for emergency assistance and you **cannot** help, **BE SILENT!**

User Tips:

- **If you have emergency traffic, Say So**
- **Immediately acknowledge a “Breaking” station**
- **If you can help, please do.**
- **If you cannot help, do not transmit.**

11. Calling another station. “To-From”

When you are calling another station, the generally accepted calling sequence is in the “**To-From**” sequence. Simply say the station call sign that you are attempting to make contact with, immediately followed by your call sign. If no immediate response is received, a second call is certainly acceptable.

- **User Tip #1: Call twice. Making numerous calls is considered excessive.**

- ***User Tip #2: Calling “CQ” on an FM repeater is considered poor form and should be avoided. (Would a new Ham know what “CQ” means?)***

12. Use of Phonetics.

The Amateur Radio Service uses ITU/NATO Phonetics

User Tips:

- If attempting to make contact with a station that is not familiar with you, it would be helpful to use Phonetics
- You may be asked to use Phonetics by Net Control Stations upon initial contact.
- The use of homemade/made up Phonetics is confusing and is not considered good operating technique or best practice. For example, when you hear a station say Kilowatt7xxx, is the call sign KW7xxx or K7xxx. The correct phonetic for “K” is “Kilo.”

13. Directed Nets (LISTEN, LISTEN, LISTEN)

- The Net Control Station is responsible for the flow of traffic on a directed net
- Follow the directions given to you by the Net Control Station
- When the Net Control Station asks you for information, provide **only** the specific information that was requested. Nothing more unless it is Emergency or Priority Traffic.

User Tips:

- If you have traffic for the Net, simply state your FCC call sign or your “Tactical” call sign and wait for the Net Control Station to acknowledge you and give you instructions
- If the Net Control Station calls you by either your FCC Call Sign or your “Tactical” Call Sign, simply responded with the call sign used by the Net Control Station and wait for instructions on how to proceed.
- Be Clear, Concise, Brief
- Use ITU/NATO Phonetics
- When you are finished with your traffic, simply close your transmission with just your Call Sign. There is no need or value in saying things like “Back to Net” or “Back to Net Control”, “Back to You” or “Over.” While using these “add-ons” on a “Social” Net may be common and acceptable, using them on an Emergency, Tactical, Resource, Community Service or Training Net is **not acceptable**.

14. Stand By...

Sometimes, while talking to another station, it is necessary to ask the other person to **“Stand By.”** This request may be made for any number of reasons. Regardless, the proper response, when requested to *“stand by,”* is **silence.**

Generally it will only take a moment and the other station will be back. If you really feel it is necessary to say something, then say, “[Call Sign] standing by.” If you respond to *“stand by”* with a long, drawn-out acknowledgement, it serves **no purpose** and the person asking you to *“stand by”* is probably not listening anyway.

15. No Obscene, Indecent or Profane Language at any time

It is vitally important to keep your language and conversation polite for any number of reasons. Profanity is strictly forbidden and other off-color comments should be off limits as well because it is the right thing to do. Other hams and their family members do not want to hear conversations that are not appropriate for the whole family to hear.

Have you ever noticed how you enjoy listening to the traffic on some repeaters/nets while others cause you to quickly change to a different frequency? We can keep or lose good hams because of what they hear on our repeaters and nets.

16. Noisy Environments

Keep in mind that when you are operating in a noisy environment, you do **not** have to be able to hear yourself talking. There will be those instances where you are helping with emergency communications for a disaster, or communications support for a parade, a marathon or you are at an airport or other noisy place.

If you shout into the microphone loud enough to hear yourself, you are distorting the signal so badly that the person on the other end may not be able to understand you. Instead, practice speaking into the microphone in a normal tone. It can be very difficult to operate under these conditions (loud background noise), but it is a skill that we would all do well to learn.

17. Interference

The ARA policy/procedure for handling intentional interference is:

If you hear a “jammer”, IGNORE HIM. Resist the temptation to “set the jammer straight.” Simply do not acknowledge his presence. If the jammer has no audience, he will soon be gone.

CONTACT THE INTERFERENCE COMMITTEE by filling out and submitting an interference report.
(See the “Dealing with Interference” Tab in the Repeater section.)

18. Signal Reports/Radio Checks/Kerchunking

We hams are focused on producing a good quality signal on our transmissions. There are times when we have made changes to our equipment, completed new installations, or find ourselves in locations that may present a communication challenge. All perfect opportunities to ask for feedback regarding our signal quality.

There are two components that make up the effectiveness of your transmission:

- Signal Quality (Strength) How good your signal is reaching the repeater or other simplex station.
- Audio Quality which is how clear your voice is and how easy is it to understand you.

It is certainly appropriate to ask for help when you have made changes to your operating platform. You can do this by making a call: “This is <Call Sign>, I have some changes to my (radio, antenna, or coax), would someone be able to give me a report on my signal?”

You may not receive a response. It happens. But when you do, you can expect to hear a variety of responses that you can use to evaluate your signal quality and identify the need to make any adjustments.

Examples:

- “You are loud and clear”
 - “You are full quieting into the repeater”
 - “Your signal is communications grade”
 - “You are “not holding the repeater”
 - “Your audio is very low”
 - “You have a lot of noise with your signal
- Note:** Providing a report of 50% Full Quieting is NOT useful.

If you receive a good report on your signal, that is wonderful.

If you do not, here are some standard suggestions that may help you to improve your signal:

- Increase your power
- Change your location
- Use a better antenna or higher mounting position
- Try accessing a different repeater if on a linked system
- Test your antenna for proper resonance
- Look for faults, breaks, issues with your coax and connectors

- Increase the gain on your microphone

User Tip:

- **It is NOT considered good practice to repeatedly ask for “radio checks” or “signal reports” in an attempt to make contacts.**
- **It is also NOT considered good practice to key the repeater and not say anything (Kerchunk the repeater). Remember, it is an FCC requirement that you identify your station appropriately when you transmit. If you are testing your radio, just say so and ask for help if you want it.**

19. Avoid Lengthy Conversations

- Please limit conversations to *15 or 20 minutes*.
- Then take a good long break, or move to another frequency.

User Tip:

- ***It’s not enough to pause now and then to invite others to join in. Others just may not be interested in the topic. Be polite, and please to not monopolize the repeater or especially a linked system.***

20. CB to Ham Radio

Certain types of jargon are easily recognizable as being “CB” terms.

While there is nothing “wrong” with CB, using slang jargon may cause others to view you as a CB’er and not a Licensed Amateur Radio Operator with good communication skills and knowledge

User Tips:

- “What is your first personal?” when you mean “what is your name?”
- “What is your handle?” Could mean your real name or your “radio” name.
- “I’m on the side,” when you mean you are “listening.”
- “Thank you for the ‘come back’” when you mean “thank you for the call or thank you for answering my call.”

Besides, using plain language will make you a better communicator and earn the respect of those who are listening.

21. Selling items OTHER than ham related equipment

Selling any ham equipment is allowed as long as it’s not done on a regular basis or as a business. Conversations, advertising, or selling vehicles, toys, other non-ham related equipment and discussing prices is NOT permitted on any of the ARA repeaters.