

Ham Radio Basic Operations

According to the ARRL Operating manual, Ham Radio is all about **operating**. The purpose of which is to hear and be heard. An unused radio is just an expensive dust catcher. Disclaimer - the following was taken from the ARRL Operating Manual and is not necessarily from my personal experiences. So let's ask ourselves a few questions -

1. WHY did you get your license? Is there something specific you want to do with it? (For example - Ragchew, DX, Emergency Communications (RACES, ARES & CERT), Contesting, Fox Hunts, Public Service, MARS, RTTY and Digital, Echolink, Winlink, APRS, QRP, SSTV or even contact outer space?)

2. WHAT mode are you mainly going to operate in? (VHF/UHF, HF, CW, Digital)
WHAT frequency are you going to use in that mode?

Have a copy of the ARRL Band Plan to make sure you stay within your license's parameters and if using HF, also see the Considerate Operator's Frequency Guide which gives you generally recognized frequencies for certain modes and activities.

3. WHEN - is there a better time (propagation) to use that mode? Or a scheduled NET time?

4. WHERE are you mainly going to operate? [Walking around (HT), at home (base station), mobile in a vehicle or out in the field (ie Field Day)] Each location requires specific and usually different equipment.

Always ask yourself these questions **first** because the answers determine what kind of equipment you will need. All stations require a licensed operator, a radio, an antenna and a power source.

5. HOW to operate

A. Know the Rules

The United States Federal Communications Commission (FCC) is the authority on ham radio regulations. All ham radio regulations are listed in the Code of Federal Regulations (CFR), specifically Part 97 of Title 47.

Your license entitles you to operate your radio equipment within the privileges that your license class allows. Hams can only use the amateur radio bands for the purpose of communicating with other hams, training in amateur radio science, emergency communications, technical studies and testing equipment.

The #1 Rule - ALWAYS BE COURTEOUS!

Some No-No's to be aware of:

No broadcasting to a general audience - you must be communicating with another ham

No musical transmissions

No foul language

No impersonating another amateur for malicious intent

No intentionally causing interference with another ham's transmissions or reception

B. Know how to operate your equipment - get out your manual and learn:

1. How to go to reverse (listen to the input frequency of a repeater) - it is important to know this because if you or someone else is not making the repeater, going to the input frequency (simplex) may put you in a better position to hear or be heard

2. How to program your radio:

a. Manually - VFO with offset and CTCSS (especially important when on the road or in the field); How to then save/add to memory if desired

b. Via computer - It is a good idea to have preprogrammed as many frequencies (simplex, local and out of area - intertie) as you think you might need into memory. This is where you can also go online and google the area you want to visit to find their local frequencies to add to your radio's memory before you travel (there are hams who have the software and who can help you do this)

3. How to scan - how to start, stop and choose which frequencies in memory you want to scan

4. What all those buttons on your radio mean and do (just in case you press the wrong thing, you know how to get back to where you want to be)

5. How to access menus to initially configure/set up your radio

Note: when using an HT - be sure your antenna is kept *vertical* when transmitting

C. Know the protocols of being on the air

FCC Rule - you must identify yourself by call sign every 10 minutes and when you are finished speaking.

Always use just the minimum amount of power needed to make a contact

You don't always have to go thru a repeater - a lot of time you are close enough to go simplex

Types of Calls -

Simplex - line of sight direct (radio to radio) communications

Mobile local (around town monitor local repeater frequencies) or traveling (preprogrammed frequencies including simplex - national simplex calling frequency is 146.52 MHz)

Repeater - both RCARC websites list local and intertie repeaters that are good resources to

go to, to find which frequencies you might want to add to your preprogrammed list
www.rainbowcanyons.com and www.rcarc.info

Interie - give location and what repeater you are going thru ie “This is KG7PBX (say phonetically also) in Mesquite NV on Utah Hill

Try to limit your conversations to 10 minutes or less - take a breath before pushing PTT when responding to let Break stations in. Share the airwaves and be courteous to others

On a Net with a HT - if your signal thru the repeater or if you are told your signal is noisy or has lots of static, try moving a few feet to a slightly different location.

How to make a call - Whether you are operating HF, VHF/ UHF with or without a repeater, the procedure is essentially the same. First be sure you are on a frequency that is approved for your license class.

For VHF/UHF - choose a simplex or repeater frequency

HF - depending on your radio and antenna it may be necessary to tune the antenna before beginning.

Learn the phonetic alphabet; at least be able to give your call sign and spell your name phonetically when needed for clearer communication

To Initiate a Call

VHF/UHF - Simplex or Repeater - You normally don't call CQ here

1. Press the mike button on the HT , take a breath and say “This is KG7PBX” or “KG7PBX” or "KG7PBX monitoring” or "KG7PBX is monitoring and listening." Of course you would use your own call sign.

2. You get a response something like "KG7PBX, this is WA7GTU. At this point you want to wait and listen for the repeater to drop when you hear the squelch tail end to indicate it is okay to proceed. This gives the repeater a chance to catch up to you and/or give someone else a chance to break in.

3. Press your mike button, take a breath and answer his call. Repeat their call sign, and at this point the discussion can be whatever you make it. If a first time contact, give your name and location and any other information you wish. When you are done speaking say "Over" or "Back to you."

The use of the terms "over" or "back to you" are a courtesy that lets the other operator know that you are finished talking and are turning the operation back to him or her. This helps prevent doubling (two hams talking at the same time)

4. At the end of the contact you would sign off by saying "WA7GTU this is KG7PBX clear and monitoring." - if you wish to continue to monitor *or* “WA7GTU this is KG7PBX clear” if you do not wish to continue.. (their call sign first then yours)

To Respond to a Call

To respond to a call over the repeater you would take on the role of the opposite person in the above discussion. You hear WA7GTU calling on the repeater so answer as follows after the repeater drops and the squelch tail ends:

1. "WA7GTU this is KG7PBX. Begin conversation, when done say - "Over" or "back to you."
2. Basically the exchange would proceed as discussed above. Be sure to identify your station every 10 minutes and identify yourself at the end of the contact as explained above.

Initiate a Call on HF

Calling CQ to Make a Contact (again this is not my experience but I understand HF can be very noisy so it is a good idea to use call signs phonetically to improve understanding and communication)

1. Begin by finding a clear frequency (always listen FIRST) such as 28.460. Speak clearly into the mike and ask "Is this frequency in use? This is KG7PBX." If you get no response you might ask a second time just to be sure. Again if there is no response then proceed to step 2. If someone says that the frequency is in use then just move to another clear frequency and try again.

2. Now call "CQ CQ CQ. This is Kilo Golf 7 Papa Bravo Xray, KG7PBX calling CQ CQ CQ. This is Kilo Golf 7 Papa Bravo Xray, KG7PBX calling CQ and waiting for a call." Now you listen for the return call. Being on an HF band it is possible to get a call ranging from very strong to very weak.

3. You might hear "KG7PBX this is Papa Yankee 1 Alpha November Foxtrot PY1ANF calling."

4. You respond by saying "PY1ANF (using phonetics is best - their call sign first) this is KG7PBX. Thanks for the call, your signal is 59*. My name is Linda and my QTH (location) is Cedar City, Utah. So how do you copy? PY1ANF this is KG7PBX over."

You have made your first HF contact. At this point you can make the contact as long or short as you like depending on the band conditions and what you find to discuss with your new friend in Brazil.

In a contest, you would keep the contact very short with just the minimal information exchanged as required by the contest rules.

5. You end an HF contact by giving both call signs and signing off. For example: "... thanks Luis for the contact and 73 to you and your family. PY1ANF this is KG7PBX signing off *or* I am clear"

What do you do if more than one station responds to your call? If you hear one call more clearly then simply respond to that station. If you hear only parts of a call sign, maybe "Alpha November" then begin by saying "the station with Alpha November in your call, please say again". Once you have heard the complete call sign you repeat their call sign and proceed with the contact.

Responding to a CQ

Begin by tuning within the range of frequencies that you are permitted to operate in and find a station calling CQ. To respond to the station you take on the role of the other station in the above exchange. The one difference is that after you call you may find out that other stations are also calling and that your call is not immediately recognized. If so wait until the stations complete their contact and then try again. If you don't want to wait, then tune to another frequency, listen for another station calling CQ and answer that call.

What is a Net? - An amateur radio net, or "network", is simply an "on-the-air" gathering of amateur radio operators. Most nets convene on a regular schedule and specific frequency, and are organized for a particular purpose. Nets may be formal (directed with a Net control station) or informal (lack some of the formalities and protocols of a formal net).

Net control Station Operator - manages the nets operation for a given session. The NCS operator calls the net to order at its designated start time, periodically calls for participants to join, listens for them to answer (or check in), keeps track of the roster of stations for that particular net session and generally orchestrates the operation of the net. Most informal nets use a NCS simply to control the order in which participants transmit their comments to the group in round-table style.

Types of nets

Traffic - Traffic nets operate primarily to relay formal written messages. In Utah, the National Traffic System (NTS) Net is the Beehive Net which meets daily at 12:30 pm on 7.272 MHz.

ECOMM - emergency communication nets are directed nets that practice necessary skills for emergency communications

Special Events or Public Service - Tactile Nets that cover Races, Parades, etc

DX - DX nets are organized to help amateur radio operators make contact with stations in distant locations or regions where amateur radio operators are scarce.

Club - Amateur radio clubs often organize nets to foster communication between members on a regular basis.

Weather - SKYWARN Amateur Radio Network - The National Weather Service (NWS) uses amateur radio to serve as a collection point where local spotter networks (using local repeaters and frequencies) can collect and relay reports and information to the NWS for their local area

Talking on a Net

Most nets are "directed nets" meaning there are certain "conventions" that should be followed. One operator, acting as Net Control, is responsible for moderating the conversations and keeping order on the air. When calling roll call, net control should pause 3-4 seconds between names to allow for break-ins. Having a net control helps prevent doubling.

When on a directed net, you should not speak unless/until you are called on by Net Control. When Net Control calls on you, you can give your call sign again, address the group and then close with your call sign and return the frequency by saying "back to Net Control" or "back to the net".

If you wish to add/say something or talk to another ham, wait for Net control to ask for comments from the group, then give your call sign and wait to be acknowledged by Net control because several stations may answer at once. When acknowledged, give your comment or have your conversation, then indicate you are done by giving your call sign and saying "back to Net Control" or "back to the Net"

*RST Reports - Amateurs use the RST system for reporting signal strength and readability. T/Tone is used with CW only) In actual operation the signal strength is often taken from a reading on your radio's S-meter.

Readability

- 1--Unreadable
- 2--Barely readable, occasional words distinguishable.
- 3--Readable with considerable difficulty.
- 4--Readable with practically no difficulty.
- 5--Perfectly readable.

Signal Strength

- 1--Faint signals, barely perceptible.
- 2--Very weak signals.
- 3--Weak signals.
- 4--Fair signals.
- 5--Fairly good signals.
- 6--Good signals.
- 7--Moderately strong signals.
- 8--Strong signals.
- 9--Extremely strong signals.

Equipment Examples

Equipment	Walking/Hiking	Mobile	Base Station	Field Station
Radio	HT popular - dual band 2m - 70 cm 5 watt ex: Baofeng, Yaesu FT-60R Kenwood TH-D72A for GPS/APRS	higher wattage, dual or all band, can mount in vehicle ex: Yaesu 7900, Kenwood 710GA (GPS/APRS),	highest wattage, usually all band dependent on budget and features ex: Icom 7100 Kenwood 71A	usually a mobile/portable all band ex: Yaesu 857d
Antenna	rubber duckie or whip at home ex: 1/4 λ mag mount on pizza pan w/pigtail	VHF/UHF - mag mount, lip mount - 1/4 λ , 5/8 λ HF - ex: screwdriver type	VHF/UHF ex: J-pole is common HF - only limited by size for frequency desired	Portable - but the higher the better ex:
power source	battery pack or AAA	car battery - can use cigarette lighter adapter or connect direct separate battery box	Switching power supply plugged into wall receptacle	generator, solar, battery
Extras	external microphone		antenna tuner amplifier computer to do digital	laptop to do digital

Always trying to improve reception and transmission - usually means better antenna with sometimes a little more power
So what do you use?