

Operator's Guide for New Amateurs



Operators Guide for New Hams

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Operator's Guide For New Amateurs

Amateur radio is a hobby where one person has the means of communicating with others. Many modes are available to use when communicating with other hams such as Morse Code (CW), phone (voice), teletype (RTTY), slow scan TV, and digital (PSK 31 and others).

Many hams talk only to other hams near them or those they know. Some enjoy talking to people all over the world and some enjoy both. Others transmit with low power (QRP).

Some hams enjoy experimenting with electronics. Some may never make a contact with another ham. They simply enjoy building and testing their electronic projects.

There are many, many ways to enjoy our hobby.

1. Elmers

In amateur radio the definition of an *Elmer* is a person who is willing to help somebody else, a guide or mentor.

This help may consists of some or all of the following:

- a demonstration of his ham station
- introducing literature pertaining to amateur radio to an interested person
- helping a fellow ham choose the proper equipment and explain how it works
- helping an interested person learn amateur electronic theory
- helping an interested person apply for a new license
- assisting with antennas and antenna support construction projects
- teaching new hams how to work DX and what Contesting is all about

How does a new ham get this help? Maybe you have a friend or neighbor that is a ham. Ask that person the questions you are thinking about. Or contact the *Western Placer Amateur Radio Club*. There are many hams (Elmers) in the club that are willing to help you out. Club members help each other all the time with many kinds of projects.

2. Operating Techniques

There are many ways to use amateur radio today. All of the modes require a person to be considerate and think about all the people that are either listening to you or waiting to use the frequency. Listening 90 percent of the time and talking 10 percent of the time is a good way to start, whether you intend to transmit on a local 2-meter repeater or HF.

When transmitting on the HF bands, remember, the whole world might be listening to what you say. Listen for some time before transmitting. Conditions on the HF bands are considerably different than on the VHF/UHF bands. You may only be able to hear one side of a conversation. Ask several times if the frequency is busy before calling "CQ" or calling another ham. Remember, you might be on the other side sometime, having a conversation with someone when another ham just barges into your conversation by accident. Be respectful to all others on the bands and treat them the same way you would like to be treated. Listening and adjusting to the established ways in amateur radio will allow a new ham to be accepted sooner.

If you want to join a conversation in progress, transmit your call sign between the other stations transmissions. The station that transmits next should acknowledge you. Don't use the word "Break" as this word usually suggests an emergency. All stations should stand by for those that have emergency traffic. This is true whether on HF, VHF, or UHF.

If you have upgraded from the 11-meter band, leave the CB jargon behind. Most hams find CB lingo distasteful and scowl when it is used. This jargon identifies you as a neophyte and not ready to identify with the ham community. Talk as if you are talking on the telephone.

Messages of a commercial nature are not allowed on amateur radio. You may not call a plumber to fix your plumbing or call a radio station to enter their contest using amateur radio. Do not abuse this rule.

Don't forget to sign your call every ten minutes and when you sign off.

3. Repeaters

Repeaters are radios that enable hams to talk longer distances than they could normally by using two radios directly. A repeater is usually placed on a mountaintop so it can cover more area. This way a person can talk to somebody else on the other side of the mountain. Without the repeater they may not be able to communicate. Many digital modes are available by using a repeater.

Of course, repeaters are not always needed to communicate on 2 meters. Many use simplex (transmit and receive on the same frequency) to talk with each other everyday. This is a preferred method for most hams when possible. Most hams make contact on a repeater and then move to a simplex frequency to finish their conversation.

Many new hams start out with a radio that operates on the 2-meter band. They can use a handheld, mobile, or base station radio to talk to other hams. All of these radios have provisions built in so they will operate on frequencies corresponding with the repeaters. Frequencies used by some of the local repeaters are shown in *Appendix A. Local Repeaters*.

Repeaters are *not* public domain. Repeaters are installed by individuals or a group to support a particular purpose or activity and for the common interests of their owners. When you operate on them, you are actually operating through someone else's duly licensed and coordinated station.

There are other very fine repeaters available in our area on 10 meters, 6 meters, and 220 Mhz. Most 70-cm repeaters in Northern California have been turned off or have reduced power considerably so as not to interfere with the military Pave Paws radar system. Amateur radio is secondary on 70-cm frequencies.

Check out the [Western Placer Amateur Radio Club](#) web-site for more details about the local repeaters.

4. National Traffic System

The NTS is a field organization of the ARRL (American Radio Relay League) which was formed to pass formal written messages (traffic) from any point in the United States to any other point. The NTS has its origins in the earliest days of radio as indicated by the name, “American Radio **Relay** League”. These messages, which are put in a standard format called a “radiogram”, are relayed from one ham to another, using a variety of modes, including voice, Morse code, radio teletype, or packet. The message is ultimately delivered to the addressee by an NTS operator who lives fairly close to the recipient, either by telephone, mail, or hand delivery (uncommon).

During disasters or other emergencies, radiograms are used to communicate information critical to saving lives or property, or to inquire about the health or welfare of a disaster victim. During these times, the NTS works in concert with the Amateur Radio Emergency Service (ARES) and other emergency and disaster relief organizations, such as the American Red Cross and The Salvation Army.

But even when there is no emergency, the NTS operates every day and is used by thousands of people – hams and non-hams – to send and receive brief messages of a personal, non-commercial nature, such as birthday greetings, congratulations on a special event, or wishes for a speedy recovery. Subject to international treaties governing “third party” messages, many foreign countries also allow their hams to exchange radiograms with US hams.

4.1 How are NTS Messages Handled?

Messages can originate from either hams or non-hams. Non-hams who would like to send a radiogram should contact a ham friend or neighbor. There is no charge for a radiogram. Radiograms are one way hams serve the public, and they are welcomed as a way to train new traffic handlers and keep the experienced handlers in practice.

The National Traffic System (NTS) plan is a means for systematizing amateur traffic handling facilities by making a structure available for an integrated traffic facility designed to achieve the utmost in two principal objectives: rapid movement of traffic from origin to destination, and training amateur operators to handle written traffic and participate in directed nets. These two objectives, which sometimes conflict with each other, are the underlying foundations of the National Traffic System.

4.2 NTS Nets

Messages are usually relayed using a system of “nets”. Nets are on-the-air meetings of message handlers at an appointed time and a designated frequency. There are four levels of nets, each covering broader territory – local, section, regional, and area. Local nets relay messages to and from the Section nets; Section nets to the Region nets; Region nets to the Area nets. These nets are held throughout the day in order to move messages around the country. (Only designated operators participate in the Region and Area nets. These nets are not open for general participation.)

See *Appendix B. Local Nets* for NTS nets.

5. Digital Radio

Computers can be used in many ways with your amateur radio station. There are other digital modes besides those listed here, including Olivia and RTTY. The original digital mode used by hams is CW.

5.1 PSK 31

Translated literally, it's an acronym for “Phase Shift Keying, 31 Baud”. PSK31 is a form of modulation (or “mode”) that offers a higher level of performance in conversational communications (keyboard-to-keyboard) that we can enjoy. It's been made instantly usable by all of hams, due in part to the proliferation of the personal computer, and in part to the superb and generous efforts of some very talented ham/programmers. For information, see <http://www.psk31.com/> or <http://www.arrl.org/tis/info/HTML/psk31/>.

The Western Placer Amateur Radio Club sponsors a certificate for PSK users who gather a million miles. For information, see <http://www.wparc.org/certificates.shtml>.

5.2 Voice Over Internet Protocol

There are several Internet based amateur radio applications using Voice Over Internet Protocol (VoIP). Two of these are the Internet Radio Linking Project (IRLP) and Echolink.

Internet Radio Linking Project

The Internet Radio Linking Project (IRLP) allows the linking of amateur radio repeaters to the internet on a worldwide basis. Utilizing a series of control tones, an Amateur can “bring-up” any one (or more) of the hundreds of other IRLP enabled repeaters throughout the world. In addition, “reflectors” exist which may be thought of as full-time party lines. International participants can be included at any particular moment. For more information, see <http://www.irlp.net/>.

Echolink

EchoLink[®] software allows licensed amateur radio stations to communicate with one another over the Internet, using voice-over-IP (VoIP) technology. The program allows worldwide connections to be made between stations, or from computer to station, greatly enhancing amateur radio's communications capabilities. There are more than 200,000 validated users worldwide — in 162 of the world's 193 nations — with about 3,800 online at any given time. For information see: <http://www.echolink.org/>.

5.3 Automatic Position Reporting System

APRS[™] is a specialized subset of the packet radio concept which was first introduced by Bob Bruninga, WB4APR, in 1990. It has been developed as a tactical tool to allow the tracking and display of position and status information of both fixed and moving assets. For example, in a civic parade, it can show the position (and speed) of the lead car, the mayor's vehicle, aid and fire units, the last vehicle, etc. In a Search & Rescue situation, it can show the incident command location, individual search team positions and the areas that they have covered, containment points, etc. These locations and status information then can be transmitted and superimposed on city, street, or topographic maps and displayed on multiple computer screens.

APRS differs from tradition packet in several important ways:

- uses an unconnected (no handshaking) protocol; it is not error-free
- activities are primarily local in nature
- sometimes uses digipeaters to augment local coverage
- can use the Internet to allow remote viewing of local conditions
- traffic is limited to position (GPS), status, and very short messages
- has a special category for weather reporting stations
- (in the USA) shares one National frequency (144.39 MHz simplex)

While the APRS concepts are beautifully simple, the application of APRS concepts to local situations can be beautifully complex. That complexity can be fascinating and any licensed Amateur can participate.

5.4 Packet Radio

A system that uses a computer to send out packets of information via amateur radio

Amateur radio, through packet radio, offers about the same capability as the Internet. The Amateur Packet Radio system utilizes a network of amateur radio stations, connected using free radio waves, to transmit and receive digital information.

This radio network provides:

- RACES/ARES/NTS and Emergency Communications for life and safety messages
- DX Packet Cluster systems to announce band openings and DX stations heard on HF bands
- Satellite Communications for worldwide station-to-station links
- Packet Bulletin Board Systems (BBS) to store and relay personal messages and bulletins
- Keyboard-to-keyboard connection for direct chat between amateur stations
- Networking and computer file transfer

6. Reciprocal Agreements

The United States has a reciprocal agreement with Canada. This agreement allows us to use our radios in Canada and Canadians can use their radios in the U.S. For example, when we identify our radio transmissions when visiting British Columbia, we must sign our call followed by "Portable VE7".

7. Tuning Your Radio

One thing that is very irritating to hams is someone tuning or testing their radio on the air. Using a dummy load is the proper way to tune up or test your radio or amplifier equipment. When tuning up on the air, your transmitter emits a tone that can cause interference on the band.

8. DXing and Contesting

8.1 Working DX

The DX bug often bites the new ham quickly while operating on 10 meter CW. Lots of rare and exciting contacts can be made on this band as well as all the other HF bands. Many contacts can be made with modest power and humble antennas. Be mindful of changes in propagation and sunspot activity. One day you might not be able to communicate with fellow hams in the U.S. The next day you will be able to communicate with hams all over the world.

When learned, patience and operating skills are huge advantages and required when working DX successfully. Spending most of your time listening makes you a successful DXer. When listening for a DX station, start at one end of the listening range and slowly tune through the range looking for a DX station. Depending on conditions, this may take a considerable amount of time. Listen for a signal hiding behind a stronger signal. Many DX stations are not able to afford the expensive equipment we use. They may be using very low power and small wire antennas. Their reduced signals are often hard to find.

To make it easier for us to hear the DX station, the DX station may work split. This means this person will transmit on one frequency and listen on several different frequencies. His listen frequencies are those of his choosing and usually 5-10 KHz above his transmit frequency. Listening carefully to what the DX station says will help you to determine where he is listening. If

you call on his frequency and he is working split, you will cause interference on his transmit frequency. This in turn makes others irritated and then results in 'on the air' conflicts.

Most DXers collect cards from the stations they work. This is called QSLing and the cards received from a DX station will confirm that you have worked that station. Awards are given for working over 100 different countries. Many other awards are available for those that are interested. DX web-sites are shown below:

- <http://www.eqsl.cc/>
- <http://www.arrl.org/lotw/>
- <http://www.qrz.com/>
- <http://www.dxc.ve7cc.net/>

8.2 Rag Chewing

Rag chewing is the art of carrying on an interesting conversation with other hams. This aspect of our hobby has been honed into a fine art by hams. Many of them probably assemble on 75-meter phone, but they can be found on most bands. Subjects are limitless, but traditionally hams avoid politics and religion, except those that are interested in starting conflicts. Many rag-chewers gather in groups (nets), taking turns with their assertions and opinions. Much can be learned from listening to and taking part in these chats. Opinions on the quality of various amateur products, methods of antenna construction and performance, new electronic data, weather info, and DX opportunities can be very useful information. Even DXers can be found rag chewing now and then. Many hams set schedules with each other to rag chew.

Try to resist the temptation to editorialize. Nothing sounds worse than some blowhard that has all the answers, regardless of the question.

8.3 Contesting

Contesting is the act of making as many contacts with other amateurs as possible during a given period of time via amateur radio. Contesting is the challenge of competing against other amateurs, whether here or all over the world. There are many kinds of contests from Field Day to the ARRL International DX contest.

Field Day is a competition among amateurs of the U.S. and Canada. It is aimed at sharpening our skills for operating and setting up equipment in times of need.

Other contests such as CQ Worldwide, ARRL International DX, and CQ WPX are competitions between the world and U.S. hams. Some hams build contest stations where they have many hams operating during the contest. Some enjoy just contesting from their own station and by themselves. Some testers are very serious about their hobby and others just contest to have fun. Points are

made, scores are given, and trophies are won after the contest is over. There are many DXers and contesters in Placer County that are active and available to help those that may be interested.

Table 8.1: DX & Contesting Terms

Term	Definition
Dupe	A duplicate contact on the same band
DX	long distance
DXCC	ARRL DX Century Club awards program
Dxpedition	a temporary operation from a location that seldom sees amateur radio activity
EME	Earth-Moon-Earth or moonbounce
Meteor scatter	communicating by bouncing signals off the ionized trails of meteors
OM	“old man”, referring to a male
pileup	a chaotic situation that occurs when many stations are calling the same station simultaneously
shack	a room where amateur operators keep their radio equipment
vertical antenna	an antenna that is vertical polarized
WAS	Worked All States award
XYL	Ex Young Lady, a married female
Yagi	a beam or directional antenna, usually rotatable and has several elements
YL	Young Lady, a single female
73	best regards

8.4 Conflicts

If you ever become involved in or hear an “on the air” conflict or argument, keep your comments to yourself. Making comments, even if you are correct, just drags you into the conflict. There are a few hams that get into a conflict on purpose and want nothing more than to involve you. This is a game with them, something like those people that create viruses to be placed on the Internet. Do not insert your opinion about somebody’s bad conduct. It only adds to the problem. Ignoring them is the best policy. If they don’t have someone to argue with, the argument is over!

Some new hams slip into their old, comfortable terminology from the CB radio. I have heard other hams berate someone for using terms such as “standing by on the side” or “10-4”. Hams do not use the 10-code, but no one is served by making somebody feel foolish on the air. Hams should lead by example and not by “dragging others over the coals” on the air.

Listen to other hams on the radio and don't be afraid to ask questions. By listening you can avoid conflicts. Most hams remember all too well what it was like to press that PTT switch for the first time. We are all human.

9. Emergency Services

Helping others in time of need is one of the most important goals we as amateurs take upon ourselves. The Radio Amateur Communication Emergency Services (RACES) group and the Amateur Radio Emergency Service (ARES) group are part of and supported by the *Western Placer Amateur Radio Club*. Both groups are utilized during times of natural disaster, search and rescue operations, and public activities (such as parades and bike-a-thons). They provide communications in case of emergencies or when needed.

9.1 ARES

ARES[®] consists of licensed amateurs who have voluntarily registered their qualifications and equipment for communications duty in the public service when disaster strikes. Every licensed amateur, regardless of membership in ARRL or any other local or national organization, is eligible for membership in the ARES. The only qualification, other than possession of an Amateur Radio license, is a sincere desire to serve. Because ARES is an amateur service, only amateurs are eligible for membership. The possession of emergency-powered equipment is desirable, but is not a requirement for membership.

For more information, see <http://www.arrl.org/FandES/field/pscm/sec1-ch4.html>.

9.2 RACES

RACES, administered by local, county and state emergency management agencies, and supported by the Federal Emergency Management Agency (FEMA) of the United States government, is a part of the Amateur Radio Service that provides radio communications for civil-preparedness purposes only, during periods of local, regional or national civil emergencies. These emergencies are not limited to war-related activities, but can include natural disasters such as fires, floods and earthquakes.

For more information, see <http://www.arrl.org/FandES/field/pscm/sec1-ch1.html#1>.

10. Direction Finding

Direction finding: the art of locating a radio signal. Different uses for this art are fox hunting (for fun) and transmitter finding (serious when needed). It has been used to find an errant transmitting device, people purposely causing interference, searching for downed aircraft and just fun. Interested hams can contact the WPARC to participate. You will need a special antenna. Ask to ride along with participants during the next fox hunt.

11. Other Kinds of Amateur Radio Modes

There are many other ways to participate in amateur radio. Radio teletype (RTTY), slow-scan TV, satellite, and moon bounce (EME) are some that comes to mind.

12. In Closing

If you have just received an amateur radio license, you have made a wonderful choice for a hobby in which you can participate in all the rest of your life.

An organization that represents all hams is the American Radio Relay League (ARRL). Members from all over the United States support the ARRL. The ARRL helps members with technical information; they represent all hams in matters brought before the Federal Communication Commission concerning amateur radio and help in many other ways. For more information on the ARRL, check out their web-site at: www.arrl.org/.

If you still have questions regarding this hobby or would like to join our club, please contact the WPARC for help at www.wparc.org or write:

Western Placer Amateur Radio Club
PO Box 1173
Lincoln, CA 95648

Special thanks

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A.

Local Repeaters

Output	Input	Call	Location	Sponsor	Notes
29.620	-	N6JSL	Auburn	PARK	o 156.7 x
52.600	-	WD6AXM	Grass Valley	YSARC	o 151.4 rs
52.760	-	KF6GLZ	Grass Valley	N6ZN	o 131.8 ex
145.190	-	K6IS	Sacramento	NHRC	o 162.2 ae
145.230	-	KC6MHT	Sacramento	KC6MHT	o 162.2 ae
145.250	-	N6NA	Sacramento	RCARCS	o 162.2 x
145.270	-	W6SAR	Auburn	PCSAR	o 156.7
145.430	-	K6ARR	Auburn	SFARC	o 162.2 aes
146.085	+	WD6AXM	Sutter Buttes	YSARC	o 127.3 esx
146.115	+	N6KOD	Grass Valley	WMARG	o 151.4l
146.355	+	KI6TE	Auburn	GSARG	o 94.8 e
146.625	-	WB4YJT	Grass Valley	NCAA	o 151.4 ex
146.640	-	W6SAR	Roseville	PCSAR	o 156.7 er
146.760	-	N6JSL	Auburn	N6NMZ	o 136.5
146.820	-	KG6TXA	Sacramento	SALAC	o 127.3 elx
146.910	-	W6AK	Sacramento	SARC	o 100.0 aelr
146.985	-	AB6OP	Sacramento	AB6OP	o 94.8 erx
147.000	-	K6MVR	Vacaville	MVRC	o 136.5 ex
147.015	+	W6DD	Grass Valley	NCARC	o 151.4 esx
147.030	+	N6RDE	Cameron Park	N6RDE	o 77.0 aelrsx I:7330 E:92518
147.120	+	KF6SQL	Sacramento	ERRS	o 162.2 a
147.285	+	W6DD	Grass Valley	NCARC	o 151.4 ersx

Output	Input	Call	Location	Sponsor	Notes
147.300	+	K6NP	Sacramento	GBTPRC	o 136.5 elx
223.820	-	WB6ALS	Auburn	N6NMZ	o 131.8 elx
223.900	-	N6NMZ	Auburn	N6NMZ	o 100.0
224.220	-	KC6MHT	Sacramento	KC6MHT	o 123.0 ae
224.320	-	AB6LI	Grass Valley	AB6LI	o 151.4 sx
224.400	-	K6IS	Sacramento	NHRC	o el
224.560	-	WA6ZZK	Lincoln	WA6ZZK	o 94.8 esx
224.580	-	W4WIL	Auburn	W4WIL	o 167.9 e
224.700	-	AA6IP	Sacramento	AA6IP	o 107.2 el
224.900	-	KD6GVO	Grass Valley	KD6GVO	o 151.4 aelrsx

- Bold Face:** Repeaters used by WPARC for various activities
- Input:** The + or - standard repeater offset for that band and frequency
- Location:** The city or town where the station is located.
- Notes:** Special attributes of the station are as follows:
- o** = Open repeater
 - nnn.n** = repeater PL tone code
 - a** = Autopatch capable
 - e** = Emergency power operation capable
 - l** = Linked (to other repeaters)
 - r** = Affiliated with RACES
 - s** = Affiliated with ARES
 - x** = wide-area coverage (large footprint)
 - I** = IRLP node
 - E** = Echolink node

B.

Local Nets

Table B.1: National Traffic System (NTS) Nets

Net Name		Frequencies	Local Day	Local Time
PAN	Pacific Area Net	14.345	Dy	2:30 PM PT
PAN	Pacific Area Net	3.652	Winter Dy	8:30 PM PT
PAN	Pacific Area Net	7.052	Summer Dy	8:30 PM PT
6RN	Sixth Region Net	7.275, 3.916	Dy	3:30 PM PT
6RN	Sixth Region Net	3.655	Dy	7:45 PM PT
6RN	Sixth Region Net	3.655	Dy	9:30 PM PT
RN7	Seventh Region Net	7.238	Dy	9:45 AM PT
RN7	Seventh Region Net	7.238	Dy	3:15 PM PT
RN7	Seventh Region Net	7.042, 3.560	Dy	7:30 PM PT
RN7	Seventh Region Net	3.560, 7.048	Dy	9:30 PM PT

