

# **Northern California FM Simplex Operations Guide**

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# Introduction

## Scope

The purpose of this work is to provide information about FM simplex phone operation. It's intended for use in the region extending from California's coast to the Nevada border and from Tehachapi in the south to the Oregon border in the north.

## Content

Commonly used FM simplex frequencies in Northern California are summarized. It outlines use of the Wilderness Protocol. It also provides a suggested outline for conducting ad-hoc emergency operations using FM simplex channels. A quick reference is included to provide a concise reference of techniques and pro-words for radio communications by any means. An additional goal of the guide, is to encourage and popularize the use of simplex as an alternative to repeater operation. With some forethought and discipline, simplex operation can be effectively used for routine and emergency communications. All frequencies are presented in MHz.

## Calling Frequencies

To properly use calling frequencies, make your calls, then move to a working frequency so others can use the calling frequency. It's suggested that you wait until 4 minutes after the hour to make a call. This timing helps prevent interference to those in trouble using the Wilderness Protocol. They are likely to transmit between minute zero and minute four at the top of the hour.

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## References

- NARCC Northern California 6M Band Plan
- NARCC Northern California 2M Band Plan
- NARCC Northern California 1.25M Band Plan
- NARCC Northern California 70 cm Band Plan
- ARRL Public Service Communications Manual
- ARRL ARES Field Resources Manual
- ARRL Repeater Directory 2007/2008
- ARRL Band Plan
- NCS MANUAL 3-3-1, SHARED RESOURCES (SHARES) HIGH FREQUENCY (HF) RADIO PROGRAM USER MANUAL, AUGUST 1, 1995

## 6 Meter

### Calling Frequency

- 52.525

### Working Frequencies

- 51.520
- 51.540
- 51.560
- 51.580
- 52.000
- 52.020
- 52.040
- 53.000
- 53.020
- 53.520
- 53.900

## 2 Meter

### Calling Frequency

- 146.520

### Working Frequencies

- 146.415
- 146.430
- 146.445
- 146.460
- 146.475
- 146.490
- 146.505
- 146.535
- 146.550
- 146.565
- 146.595
- 147.405
- 147.420
- 147.435
- 147.450
- 147.465
- 147.480
- 147.495
- 147.510
- 147.525
- 147.540
- 147.555
- 147.570
- 147.585

## 1.25 Meter

### Calling Frequency

- 223.500

### Working Frequencies

- 223.420
- 223.440
- 223.460
- 223.480

## **70 Centimeter**

### **Calling Frequency**

- 446.000

### **Working Frequencies**

- 441.000
- 446.500



## 23 Centimeter

### Calling Frequency

- 1294.5

### Working Frequencies

1294.025	1294.525
1294.050	1294.550
1294.075	1294.575
1294.100	1294.600
1294.125	1294.625
1294.150	1294.650
1294.175	1294.675
1294.200	1294.700
1294.225	1294.725
1294.250	1294.750
1294.275	1294.775
1294.300	1294.800
1294.325	1294.825
1294.350	1294.850
1294.375	1294.875
1294.400	1294.900
1294.425	1294.925
1294.450	1294.950
1294.475	1294.975

## **Wilderness Protocol**

The Wilderness Protocol suggests radio operators (Amateur service) should monitor standard simplex channels at specific times in case of Emergency or Priority Calls. The idea is to allow communications between hams that are hiking, backpacking or camping in uninhabited areas, outside repeater range. The protocol offers an alternative opportunity to be heard.

The wilderness protocol was inspired by KG4YFE, an avid hiker and camper. It was refined and popularized by William Alsup, N6XMW.

### **Monitoring Frequency**

Monitor the primary frequency - 146.520 MHz and any or all of the secondary frequencies - 52.525 MHz, 223.500 MHz, 446.000 MHz, 1294.500 MHz.

### **Monitoring Times**

Monitor every 3 hours from 7:00 am (0700 Hrs) until 5 (five) minutes past the hour 7:05am (0705 Hrs). Monitoring times: 7:00am - 7:05am, 10:00am - 10:05am, 1:00pm - 1:05pm, 4:00pm - 4:05pm, 7:00pm - 7:05pm, 10:00pm - 10:05pm, 1:00am - 1:05am, 4:00am - 4:05am.

### **Alternate Times**

Monitor every 3 hours as suggested above, however monitor 5 minutes before the hour till 5 minutes past the hour, in case the calling stations watch is incorrect.

### **Enhanced Monitoring**

Fixed stations or portable stations with enough battery power could listen every hour at the top of the hour. Continuous monitoring is also an effective option, assuming it's practical for the operator.

### **Scanning**

Consider entering 146.520 MHz, 52.525 MHz, 223.500 MHz, 446.000 MHz and 1294.500 MHz in to your scanning radio.

## **Calling**

The wilderness protocol frequencies are national calling frequencies. Make your calls, then move to a working frequency so others can use the calling frequency. It's suggested that you wait until 4 minutes after the hour to make a call. This reduces the chance of interference with emergency or priority traffic from wilderness protocol users.

## **Silence Periods**

Silence should be maintained on wilderness protocol frequencies from the beginning of minute 0 to the end of minute 3 at the top of the hour. Standard calling should only start after the beginning of minute 4, preceded by listening for 30 seconds. Listen first, then call. This is similar in spirit to the silence periods observed on maritime calling and distress frequencies prior to the introduction of the Global Maritime Distress Safety System.

## **Inform Others**

Remind others of this protocol at meetings, on nets and in the field.

## **Use LiTZ to Call for Assistance**

If possible, begin calls for assistance with 10 or more seconds of tone with the LiTZ (Long Tone Zero) signal. If you have a DTMF pad, use it to generate a LiTZ call by pressing the 0 key while transmitting and holding it for at least ten seconds.

# Emergency Phone Operations

## Overview

The purpose of these procedures is to provide a template for conducting Emergency communications on FM simplex frequencies. It's intended to facilitate the creation of ad-hoc local communications teams in areas that don't have repeaters available to conduct emergency operations. These procedures assume some knowledge of the FEMA Incident Command System and local RACES/ARES team structure.

## Tactical Nets

Tactical nets should be created as necessary to support the local Incident Commander. Tactical nets might be created for specific purposes like search and rescue, or other types of real-time coordination of emergency activities. Tactical net frequencies should be on working frequencies as designated by the Emergency Coordinator (EC) or designated alternate.

## Resource Net

A resource net should be established on an as needed basis by the EC or appointed alternate. It is used as a central rallying point for amateur radio operators. During the operation of the resource net, available volunteers should be immediately assigned to matching requirements provided by the command net control. The resource net control should take care in matching volunteer skills and equipment to the existing requirements for communications support. The resource net should primarily operate on a working frequency selected by the EC. The resource net control should monitor calling frequencies for volunteer check-ins when practical.

## Command Net

A command net should be established on a working frequency specified by the EC, or appointed alternate. A primary purpose for a command net will be handling local ARES/RACES calls for volunteers and equipment. A list of volunteer operator and equipment requirements should be maintained as directed by the EC or alternate. The resource net control should be immediately informed of new requirements.

## **Traffic Net**

A traffic net is a controlled net used for passing traffic between local ARES/RACES organizations. It should operate on a working frequency selected by the EC or alternate. It should be used when traffic can not be passed using digital means. A general message form (see appendices) is provided as a recommended form for passing traffic between local ARES/RACES organizations.

## **Interaction Between ARES and NTS**

Traffic routed between local ARES stations and NTS should be routed via ARES Official Emergency Stations and NTS Official Relay stations, except in the case of local organizations that are small or have low traffic volume. These organizations may have operators with dual affiliations in NTS and ARES.

### **Official Emergency Stations**

An Official Emergency Station is an operator in an ARES organization that communicates with a peer NTS Official Relay Station. The ARES Official Relay Station exchanges message traffic with NTS and reformats traffic as necessary.

### **Official Relay Stations**

An Official Relay Station is a amateur radio operator in NTS. In the context of ARES communication, the Official Relay station exchanges traffic with Official Relay Stations at ARES organizations.

## Appendix 1 - Glossary

- Automatic Packet Reporting System (APRS) - An amateur radio based system for real time tactical digital communications of information of immediate value in the local area.
- ARES - The Amateur Radio Emergency Service (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.
- ARRL - The American Radio Relay League (ARRL) is the largest membership association of amateur radio enthusiasts in the USA. ARRL is a non-profit organization, and was founded in May, 1914 by Hiram Percy Maxim of Hartford, Connecticut. The ARRL represents the interests of amateur radio operators before federal regulatory bodies, provides technical advice and assistance to amateur radio enthusiasts, and supports a number of educational programs throughout the country.
- Command Net - As the size of an incident increases and more jurisdictions become involved in the incident, a command net may become necessary. This net allows the incident commanders to communicate with each other to resolve interagency or intra-agency problems, particularly between cities, or within larger jurisdictional areas. It is conceivable that this net could become cluttered with a high volume of traffic. It may also be necessary to create multiple command nets to promote efficiency.
- DEC - The ARRL District Emergency Coordinator (DEC) is appointed by the SEC to supervise the efforts of local Emergency Coordinators in the defined district.
- Emergency Operations Center (EOC) - A central command and control facility responsible for carrying out the principles of emergency preparedness and emergency management, or disaster management functions at a strategic level in an emergency situation, and ensuring the continuity of operation of a company, political subdivision or other organization.
- FEMA - Federal Emergency Management Agency
- ICS - Incident Command System. The Incident Command System (ICS) is a standardized, on-scene, all-hazard incident management concept in the United States. It is a management protocol originally designed for emergency management agencies and later federalized. ICS is based upon a flexible, scalable response organization providing a common framework within which people can work together effectively. These people may be drawn from multiple agencies that do not routinely work together, and ICS is designed to give standard response and operation procedures to reduce the problems and potential for miscommunication on such incidents.

- NARCC - The Northern Amateur Relay Council of California, Inc. (NARCC) is the Amateur Radio coordinating organization for the 10 meter band and higher in northern California. NARCC performs the repeater coordination function for the region in cooperation with the FCC, ARRL, and the support of the hams in northern California. NARCC's region extends from California's coast to the Nevada border and from Tehachapi in the south to the Oregon border in the north.
- NTS - The National Traffic System (NTS) 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.
- Official Emergency Station - Amateur operators may be appointed as an Official Emergency Station (OES) by their Section Emergency Coordinator (SEC) or Section Manager (SM) at the recommendation of the EC, or DEC (if no EC) holding jurisdiction. The OES appointee must be an ARRL member and set high standards of emergency preparedness and operating. The OES appointee makes a deeper commitment to the ARES program in terms of functionality than does the rank-and-file ARES registrant.
- Official Relay Station - An Official Relay Station is a traffic-handling appointment that is open to all classes of license. This appointment applies equally to all modes and all parts of the spectrum. It is for traffic-handlers, regardless of mode employed or part of the spectrum used. The potential value of the skilled operator with traffic know-how to his country and community is enhanced by his ability and the readiness of his station to function in the community interest in case of emergency. Traffic awareness and experience are often the signs by which mature amateurs may be distinguished.
- Packet radio - A form of digital data transmission used to link computers. Its name is a reference to the use of packet switching between network nodes, which allows multiple virtual circuits to coexist on a single radio channel. Packet radio networks use the AX.25 data link layer protocol, derived from the X.25 protocol suite and adapted for amateur radio use.
- RACES - The Radio Amateur Civil Emergency Service (RACES) was established under the Federal Communications Commission Rules and Regulations, as part of the amateur radio service. The mission of RACES is to establish and maintain the leadership and organizational infrastructure necessary to provide amateur radio communications in support of emergency management entities throughout the United States and its territories.
- Resource Net - For larger-scale incidents, a resource net is used to recruit operators and equipment in support of operations on the tactical nets. As an incident requires more operators or equipment, the resource net evolves as a check-in place for volunteers to register and receive assignments.
- SEC - The Section Emergency Coordinator is the assistant to the Section Manager (SM) for emergency preparedness. The SEC is appointed by the SM to take care of all matters pertaining to emergency communications and the Amateur Radio Emergency Service (ARES) on a sectionwide basis.





## Appendix 3 - Quick Reference

### Microphone Techniques

It is important to use prescribed microphone techniques when operating a radio. Most microphones used today are extremely sensitive and should be held or placed about one-half inch from your lips and spoken into at a normal level without raising your voice. The use of correct procedures shortens transmission time and releases the frequency to other users. Experience shows that the four most important factors in voice communications are the degree of loudness, rate of speech, pronunciation, and pattern of speech used. A brief summary of these factors follows:

**LOUDNESS:** The degree of loudness (volume) to use depends on a number of factors such as propagation quality, type of emission, and type of microphone being used. Speaking too loudly on a single sideband circuit may over modulate the signal to a point where it becomes unintelligible. As a general rule of thumb, speak clearly, distinctly, and in a normal tone.

**RATE OF SPEECH:** There is no fixed rate of speech that is best for all occasions. Generally, words are spoken at approximately 100 words per minute. If the message is to be written down, the transmission speed should be slowed accordingly. Speak at a rate which sounds natural, and allows the message to be written down by the receiving operator.

**PRONUNCIATION:** The third factor for good readability is the clear and distinct pronunciation of all sounds, syllables, and words. Words not pronounced distinctly may be misunderstood. Give all words a commonly accepted pronunciation.

**PATTERN:** Good readability in voice communications requires a not too fast, not too slow rate of speech and strict attention to pronunciation. A radio message should not be transmitted word-by-word. It should be transmitted idea by idea, with adequate spacing between the words that make up the separate ideas. To ensure understandability, radio transmissions should be similar to conversational speech.

## Common Pro-words

Most Commonly Used Pro-words. Pro-words are pronounceable words or groups which are assigned definite meanings, and whose purpose is to shorten and to facilitate voice communications. Pro-words are never used in the text of a message. Commonly used pro-words for general voice communications include:

**ACKNOWLEDGE:** Let us know that you have received and understand this message.

**AFFIRMATIVE:** Yes, or permission granted

**BREAK:** Indicates separation of text from other portions of the message

**CORRECTION:** A transmitting error has been made. Continue with the last word correctly transmitted.

**DISREGARD THIS TRANSMISSION:** This transmission is in error. Disregard it. Should not be used to cancel a message that has been completely transmitted and for which receipt of acknowledgment has been received.

**FIGURES:** Numerals or numbers follow

**FOR:** Transmit this message to all addressees or to the address designations immediately following

**I READ BACK:** The following is my response to your request to read back.

**I SAY AGAIN:** I am repeating transmission or portion of transmission indicated.

**I SPELL:** I shall spell the next word phonetically.

**I VERIFY:** That which follows has been verified at your request and is repeated. Used only as a reply to VERIFY.

**MESSAGE FOLLOWS:** Indicates information to follow.

**NEGATIVE:** No, or that is not correct.

**OUT:** This is the end of my transmission to you, and no answer is required or expected.

**OVER:** This is the end of my transmission to you and a reply is required. Go ahead, transmit.

**READ BACK:** Repeat all, or the specified part, of this message exactly as received.

RELAY (TO): Transmit this message to all addresses or to the address designations immediately following.

ROGER: I have received your last transmission. This pro-word is not to be used in the sense of OK, will do, or affirmative.

SAY AGAIN: Repeat all or part of your last transmission.

SPEAK SLOWER: Your transmission is too fast. Reduce speed of transmission.

STAND BY: Self-explanatory.

THAT IS CORRECT: You (or the transmission) are correct.

THIS IS: This transmission is from the station whose designation immediately follows.

VERIFY: Verify entire message (or portion indicated) with the originator and send correct version.

WAIT: I must pause for a few seconds.

WAIT OUT: I must pause longer than a few seconds.

WORD AFTER: The word of the message to which I have reference is that which follows.

WORD BEFORE: The word of the message to which I have reference is that which precedes.

WORDS TWICE: Communication difficult. Transmit each phrase twice. This pro-word may be used as an order, request, or as information.

WRONG: Your last transmission was incorrect. The correct version is.

## Phonetic Alphabet

A - ALFA  
B - BRAVO  
C - CHARLIE  
D - DELTA  
E - ECHO  
F - FOXTROT  
G - GOLF  
H - HOTEL  
I - INDIA  
J - JULIETT  
K - KILO  
L - LIMA  
M - MIKE  
N - NOVEMBER  
O - OSCAR  
P - PAPA  
Q - QUEBEC  
R - ROMEO  
S - SIERRA  
T - TANGO  
U - UNIFORM  
V - VICTOR  
W - WHISKEY  
X - XRAY  
Y - YANKEE  
Z - ZULU