

Chapter 9

Field Radios

A radio is one of the most important pieces of equipment you will take into the field. Radio contact with McMurdo Station, Palmer Station, other field parties, and aircraft will help make your field season successful and may also save your life.

Groups staying in the field for more than 24 hours are required to check in daily with the station or vessel supporting their field project. If direct communication is difficult, you can relay with another station or field party. If a field party does not check-in as scheduled, a Search and Rescue (SAR) effort may be initiated.

You will receive training on your radios when you pick them up from the Field Party Shop in McMurdo, the Communications Technician at Palmer, or on a research vessel. Please pay special attention to the instructions you are given, as they will be specific to the radios you will be using in the field. Take the time to do a “shake-down” before you go into the field to make sure you know how to operate the radios, and that they are working.

This chapter covers the types of radios you might be receiving and reiterates the instructions that will be given to you with the radios.

9.1 HF Radios

9.1a PRC-1099 Radio Description

The USAP issues two PRC 1099 HF radios to each field party – the second radio is issued as a back-up. The PRC 1099 is a single sideband radio with peak power output of 20 watts. The radio is capable of both Upper Side Band (USB) and Lower Side Band (LSB) operations. However, USB is the only mode of operations available for use by field parties. The complete field kit weighs about 50 pounds. (See Figure 9-1: PRC-1099 radio controls)

9.1b Batteries and Chargers: PRC-1099

The PRC-1099 is issued with two rechargeable, sealed lead-calcium batteries. In the cold the chemical reaction in these batteries will slow down, so keep them as warm as possible. With proper attention, the two batteries provided should last you several months in the field with solar charging alone.

9.1c PRC-1099 Set-up Instructions

These instructions can be found on the laminated card provided with your radios.

1. Erect the Dipole antenna. The Balun Transformer and both ends of the dipole antenna should be mounted on bamboo poles at least chest high. The antenna should be straight out or slightly folded and the apex (the Balun Transformer) should be pointed toward the station you're contacting to achieve the best communications. (See Figure 9-2: Antenna set up)

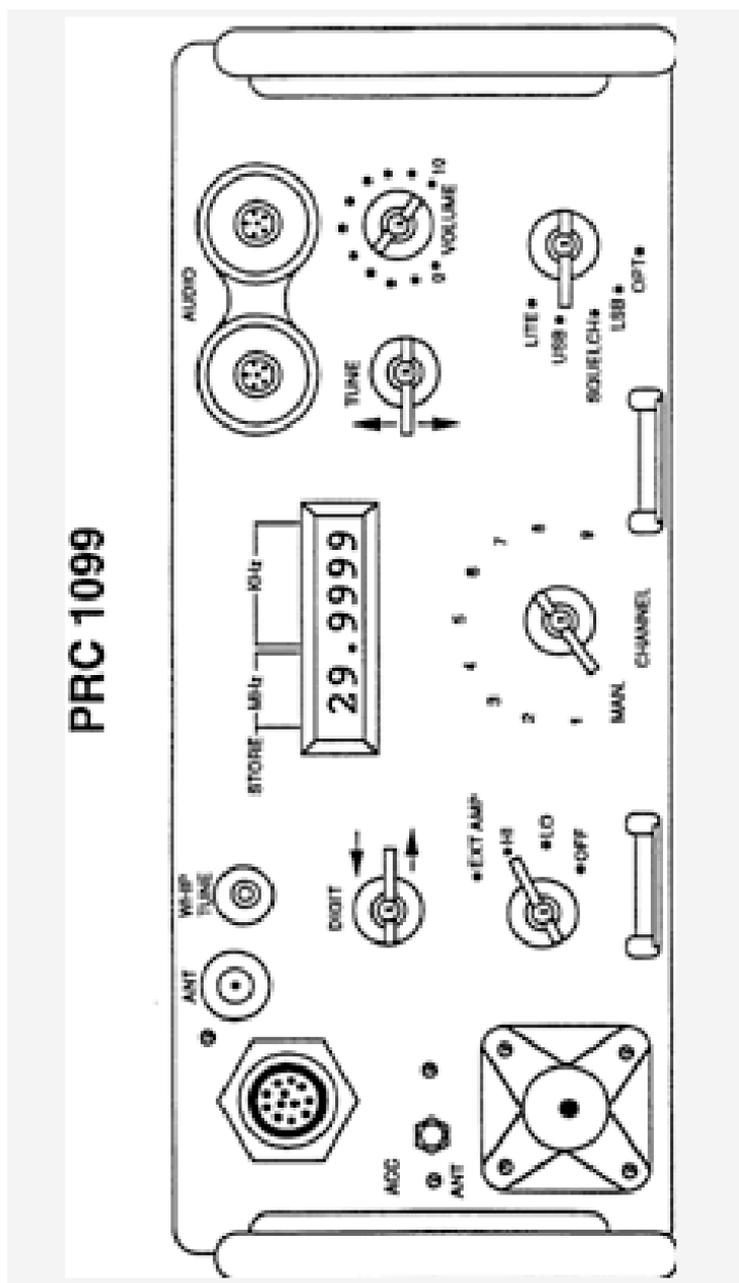


Figure 9-1: PRC-1099 radio controls

Handle the antenna with extreme care to avoid damage to the shorting bar connections. Ensure all shorting bars are connected except the desired frequency. The frequencies are:

McMurdo Station

Frequency	Plug Color	Channel Description
4770 kHz	Blue	Ross Island and Dry Valley Field Parties
5100 kHz	Red	Air-to-Ground
5400 kHz	Green	Scott Base Field Parties
7995 kHz	Orange	Remote/South Pole
9032 kHz	Yellow	Air-to-Ground
11553 kHz	White	Remote Field Parties

Palmer Station

Frequency	Plug Color	Channel Description
4125 kHz	Blue	Secondary USAP Field Parties
11553 kHz	White	Primary USAP Field Parties

- Place the radio in a warm place (e.g. tent, hut, etc.)
- Connect one end of the antenna cable provided to the dipole antenna, connect the other end of the cable to the front panel connector labeled “ANT”.
- Attach the handset to either of the two “Audio” jacks.
- Ensure the batteries are mounted in the rear of the radio.
- Connect the solar panel to the accessories connector. The solar panel can remain connected while the radio is in operation. Position the solar panel for maximum exposure to solar rays.

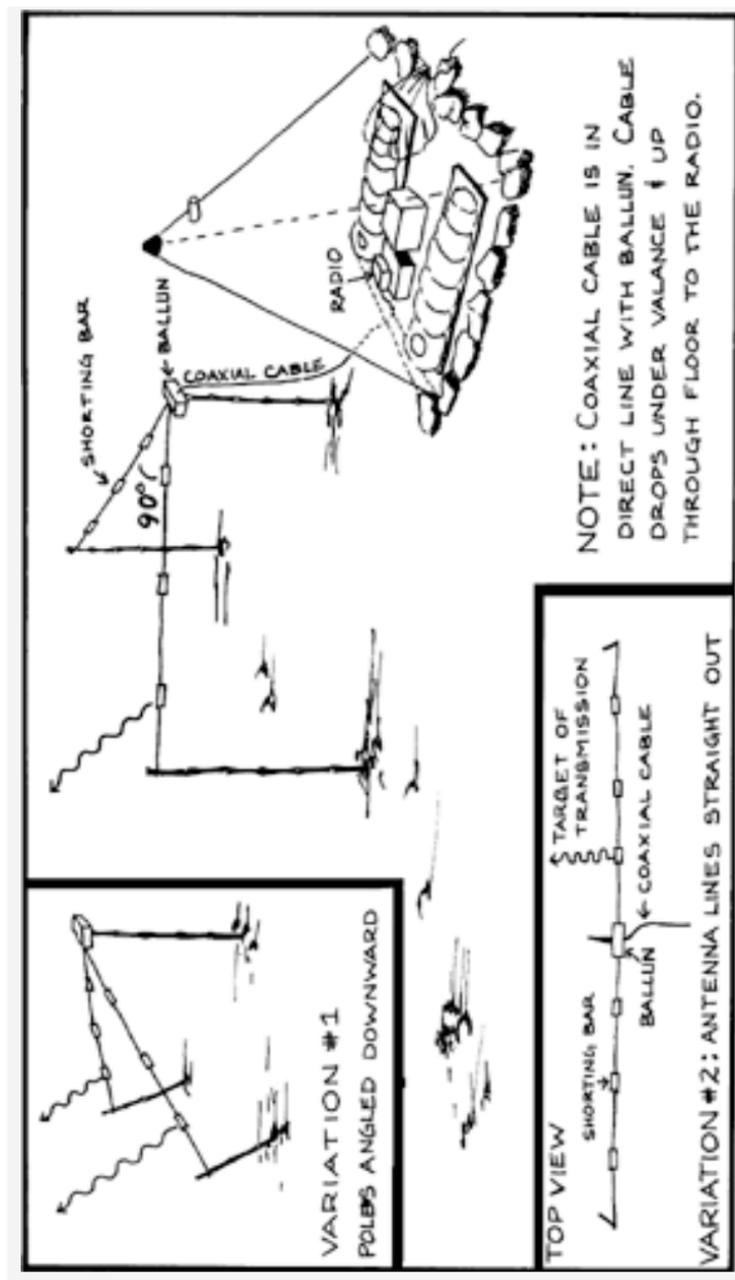


Figure 9-2: Antenna set up

7. Turn the power switch to “HI” (20 Watt) or “LO” (5 Watt) position. The “LO” position should be used if possible to reduce the power drain on the batteries.
8. Select the channel selector to 1 through 6, which correspond respectively to the frequencies, listed above. (McMurdo only).
9. Perform a radio check. For this radio, you need to SPEAK LOUDLY INTO THE MICROPHONE to transmit properly.

9.1d How to Rechannel the Radio

If the memory is inadvertently dumped, rechannel the radio by following the steps below:

1. Set Channel switch to “MAN”.
2. Turn the Digit switch up or down to select the desired digit. The selected digit will flash.
3. Turn the Tune switch up or down to select the correct number.
4. To change frequencies in channel 1-8, set the Channel Control to desired channel number, press/hold the whip tune button and repeat steps 2 through 3.
5. Turn the Function switch to “USB”.
6. Set the power toggle to “HI”.
7. Press the transmit button on the hand-set’s side to transmit.

9.2 VHF Radios

VHF radios are “line-of-sight” radios (i.e., one antenna must be able to “see” the other). They cannot transmit through solid barriers such as land formations. On a flat surface, the horizon and subtle rolls in the terrain limit radio transmissions. VHF communications can also be facilitated between a hand-held radio and an antenna that is channeled on the same frequency at station, or by repeaters. In both of these situations a field-party

member must be operating in line-of-sight of the antenna or repeater for successful radio communications.

VHF hand-held radio batteries do not function well in the cold. Keep your batteries warm by having them inside clothing layers and next to your body when not in use.

The USAP issues five different types of VHF Radios. Specific operating instructions for each type is listed below:

9.2a Operating an MX-300R or Saber VHF Radio (McMurdo Area)

1. Ensure that both the battery and antenna are properly attached.
2. Select the proper channel (see the following table for frequencies).
3. Turn the radio on.
4. Turn the squelch on until a “hash” noise is heard. Set the volume control to a comfortable listening volume, then back off the squelch control until the noise ceases. Inability to get the noise often indicates low or no battery charge.
5. Listen to ensure you won’t be transmitting over other transmissions. “Stepping” on other transmissions will cancel both.
6. Hold the radio in a vertical position. Press the transmit button on the side of the hand-held (or the top of the extension mike). Talk slowly and clearly.

9.2b VHF Radio Channelization Plans

On the following lists, asterisks (*) denote Scott Base/McMurdo Station coordinated frequencies. Repeated channels appear in bold type.

McMurdo Frequency Plan (For vehicle and handheld radios in the McMurdo vicinity):

CH	Net Name	Transmit freq. (MHz)	Receive freq. (MHz)
1*	I-Net (T-Site)	143.000	143.000
2*	Crash Net (T-Site)	139.600	139.600
3*	NZ Portable	142.800	138.800
4*	NZ Crater Hill	139.300	143.800
5	Public Works (T-Site)	139.000	142.600
6	Airfield Ops	139.200	139.200
7	Science Net	139.500	139.500
8	Field Party Ops (Aurora repeater)	138.600	143.225
9	Fuels Net (T-Site)	143.600	143.600
10	Movement Control Center (U.S. Crater Hill repeater)	139.800	143.725
11	Helo Ops	143.400	143.400
12	Penguin Ops/ANG	143.200	143.200

Field Party Frequency Plan (For portable and handheld VHF radios issued to science groups and support personnel deploying to the Dry Valleys, sea ice camps, and Ross Island camps):

CH	Net Name	Transmit freq. (MHz)	Receive freq. (MHz)
1*	I-Net (T-Site)	143.000	143.000
2*	Crash Net (T-Site)	139.600	139.600
3	Science Net	139.500	139.500
4	Helo Ops	143.400	143.400
5*	NZ Crater Hill	139.300	143.800
6	Helo Flight Following	138.500	143.975
7	Field Party Ops (Taylor repeater)	138.600	143.225
8	Field Party Ops (Wright repeater)	138.600	143.225
9	Field Party Ops (Terror repeater)	138.600	143.225
10	Field Party Ops (Aurora repeater)	138.600	143.225
11	Field Party Ops (Brooke repeater)	138.600	143.225
12	Blank		

9.2c Operating a VHF Radio (Peninsula Area)

The Comms Tech will give detailed instruction on communications procedures and radio usage. General operating instructions are as follows (see Figure 9-3 for the location of controls):

1. Turn on the OFF/VOL volume control. Adjust the volume level.
2. Rotate the squelch control clockwise until background noise just disappears. Further

adjustment will cause incoming radio transmissions to be attenuated.

3. To select a channel, make sure the key lock switch is to the off position , then press the up or down key. The selected channel will be illuminated on the digital display. Lock the channel in place by switching the key lock switch to the on position.
4. Press the CH16 key to go from any channel to Channel 16. Press CLR key to revert to the working channel.
5. Transmission is accomplished as follows:
 - Set the H/L power switch to “L” when within the two mile limit of Palmer Station or whenever it provides sufficient output power.
 - Select and monitor channel 27.
 - Depress the Push-to-talk (PTT) switch and deliver the voice message. The transmit (TX) indicator will illuminate. For best transmission, the microphone should be approximately an inch from the speaker’s mouth.
 - Release the PTT to receive incoming messages.

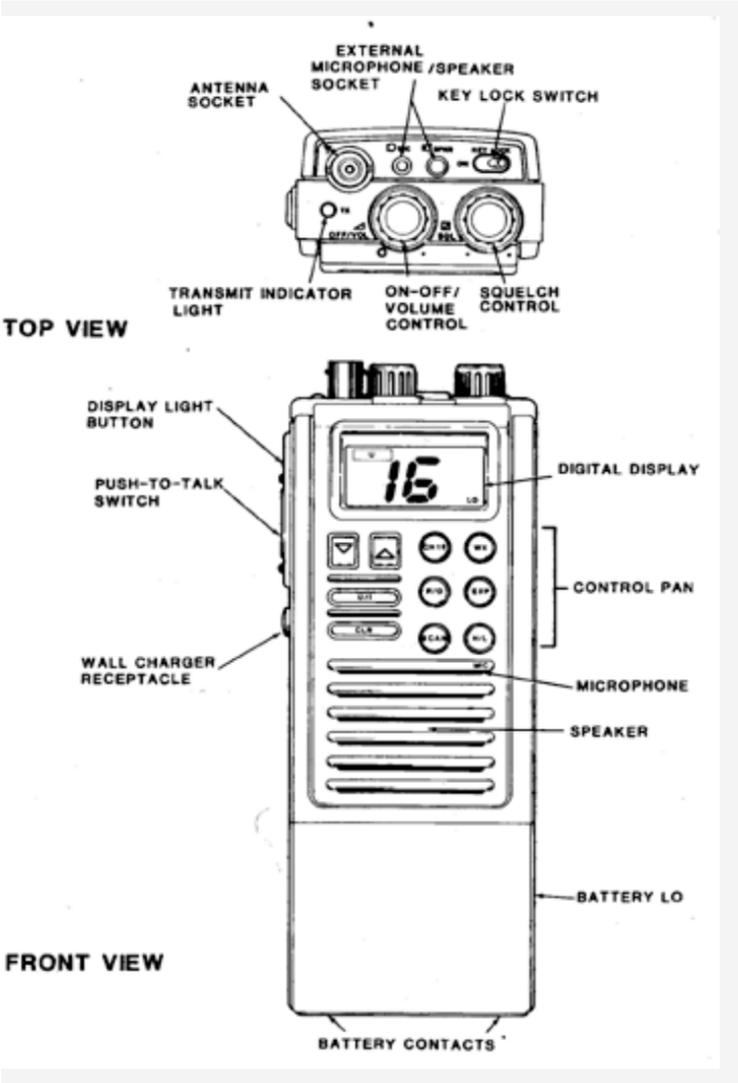


Figure 9-3: Standard VHF radio controls

Palmer Channels for VHF Radios:

Channel 16: Ship Operations (Standard hailing frequency for marine and is used to hail the *R/V Laurence M. Gould* or other vessels when close to the station.)

Channel 27: Boating Operations (This channel transmits and receives with the whip antenna on the tower behind Palmer Station via the repeater near this tower. The hand-held must be in line of sight with the tower to send and receive.) Note: The Motorola Visar hand-held radio uses *channel 02* for this frequency.

9.2d Operating a Visar VHF Radio (Peninsula Area)

(See Figure 9-4 for location of controls)

1. Turn on the radio and make certain it has passed a self-check.
2. To transmit, first check to make sure the radio is set to channel 02 (this is equivalent to channel 27). Listen for a transmission and adjust the volume control to a comfortable listening level. If no transmission is heard, press the PTT button to unsquelch the radio and adjust the background noise to a comfortable level. When the channel is clear, press and hold the PTT switch on the side of the radio and speak slowly and clearly into the microphone area
3. When receiving, if the transmission is poor, press the monitor button to unsquelch the radio and adjust the background noise.

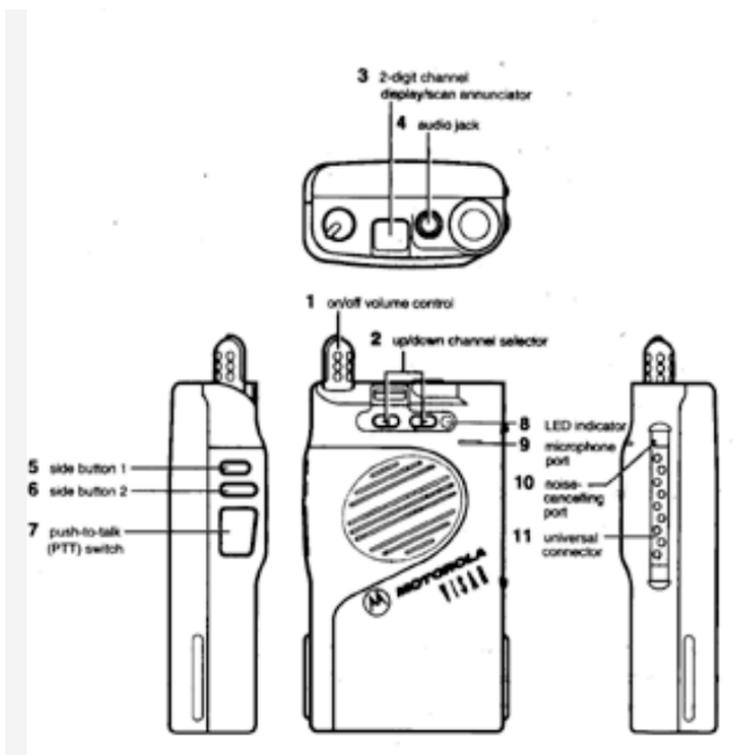


Figure 9-4: Visar VHF radio controls, switches, indicators, and connectors.

4. To change the channel, you must first disable the channel-locking feature. To do this, hold down the channel-selector buttons for two seconds to disable the feature. The two channel-selector buttons can then be used to scroll up or down through the list of available channels programmed into the radio. To enable the channel-lock feature, hold down the channel selector buttons at the same time for two seconds, and the present channel will be locked (preventing accidental channel changes).

9.2e Troubleshooting a VHF Hand-Held Radio

Problem: **Possible Reasons**

No power: Dead battery, or poor battery connection.

No audio: Low or dead battery, or mode select switch is on the wrong position.

No transmission: Out of “line of sight” with receiving party or repeater. Try climbing to higher ground - even holding the radio as high as possible with a remote clip-on mike will sometimes help. Moving away from a vehicle may enhance transmission.

Low battery. Weak light or non light indicates no power. Check battery.

Repeater may be down. Trigger the mike/transmit switch and release. If you are operating through a repeater, a noise burst should be heard for approximately one second. If there is no noise, you are either not transmitting or receiving, or the repeater is down. Try another channel.

No reception: Weak battery. Check both the squelch and mode select switches.

Party transmitting may have a weak radio or poor vantage point for transmitting. Get to a better site for reception or ask for a relay from another station or party.

If party transmitting is coming across poorly, try breaking squelch to receive weak incoming signal.

9.3 McMurdo Area Radio Information

After you have attended your science meeting, stop by the Field Operations Communications Center (FOCC) (radio call sign “MAC Ops”) to establish your radio communications plan. This plan will establish your radio call sign, radio-frequency assignments, and your daily health and safety check-in schedule from the field to MAC Ops.

Any time that you will be at a field location at which a helicopter or fixed-wing aircraft leaves your site (for a short period of time), you must have a minimum of two radios, one as a back up unit.

Before going into the field, you must test your radio equipment. This can be accomplished during your Field Safety Training Course.

After arriving at your field site and before the aircraft departs the site, establish communications with MAC Ops (FOCC) at McMurdo. If you are unable to communicate put-in information (at a minimum your call sign, number of field-team members, your location, and that you are being put in at your field site) with McMurdo, attempt communications with the South Pole and ask communications operators there to relay for you to MAC Ops. If you cannot establish communications with either of these two stations, the aircraft will return your field party to McMurdo. Radio relay to MAC Ops via an aircraft does not constitute established put-in communications as this does not provide confidence

that your field-radio equipment is sufficiently operable. At the end of your field season return your radios and accessories to the Field Party Communications Shop.

9.3a HF Communications Procedures Between Field Parties and Fixed Wing Aircraft

LC-130 aircraft (HerCs) are capable of communicating on any of the frequencies with which the PRC-1099 radio is programmed. Communications between field parties and fixed-wing aircraft normally occur on 9032 kHz. If a fixed-wing aircraft cannot be reached on that frequency, try 4770 kHz or 11553 kHz to contact MAC Ops at McMurdo.

Air National Guard LC-130 aircraft are identified by the call sign “Skier,” followed by a specific aircraft number. For example, the call sign for a particular aircraft might be “Skier Nine Five.”

Assuming you are Event II-171, proper communications would proceed as follows:

You: ”Skier Nine Five, this is India India One Seven One, over.”

LC-130: ”India India One Seven One, this is Skier Nine Five, copy you loud and clear, over.”

You: ”Skier Nine Five, this is India India One Seven One...(Proceed with your message.)”

9.3b VHF Communications Procedures Between Field Parties and Helicopters

Remember, any time that you will be at a field location at which a helicopter or fixed-wing aircraft leaves your site, even for a short period of time, you must have two radios. Field groups doing day trips in an area serviced by repeaters can use VHF radios. Anyone doing an over-night trip must take a PRC-1099 into the field.

A helicopters primary means of communication with field parties will normally be on Helo Ops (Helo Ops: TX-143.400, RX-143.400). Secondary communications by PRC-1099 (HF) is normally on 9032 kHz. HF communications should be prearranged with the helicopter pilots prior to departure.

Helicopters are identified by the last three digits on the helicopter tail. The digits are always two numbers and a letter.

Assuming a helicopter is too far away for you to see its call sign, and your call sign is GO-052, proper communications would be as follows:

You: "Helicopter, this is Golf Oscar Zero Five Two."

Helo: "Golf Oscar Zero Five Two, this is Three Four Quebec, copy you loud and clear, over."

You: "Three Four Quebec, this is Golf Oscar Zero Five Two...(proceed with your message)"

9.4 Peninsula Area Radio Information

Hand-held radios are checked out from the Communications Technician (Comms Tech) shop. A base station is located in the Communications Center where channels 27 and 16 are monitored. The base station is set to scan the two main frequencies.

9.4a Traveling Away from Palmer Station

When going away from the station, whether on foot or in a Zodiac, take two hand-held radios from the Communications shop. The radios that are charged and ready for use are hanging on the wall just inside the door to the shop.

Ensure that the backup battery is wrapped in plastic. Batteries will last a few hours if set on high and used for constant communications. They will last all day if set on low (recommended) and only used for check-in and check-out.

All radios taken away from station should be in a harness and worn next to the body, beneath your coat. Keep the radio warm and dry. Another option, if boating is to place the radio in a waterproof plastic pouch for protection against immersion, these are available in the Communications shop.

Keep the radio power switch set to ON all the time. However, if it is necessary to turn your radio off for a short period of time, contact the Comms Tech to inform

him how long you plan on being off the air.

Radios are maintained by the Palmer Communications Technician. When done using the radio, return it to the Radio Shop and place it in the used radio box. The Comms Tech will charge the batteries and check the radio before replacing it on the hook for reissue.

9.5 Phonetic Alphabet

HF communications are easily affected by magnetic disturbances and sunspot activity, which will sometimes make communications broken and difficult to understand. On these occasions it helps to spell out words that are not being understood by the station you're contacting. Use the following phonetic Alphabet to ensure that when you say "F" they don't misunderstand you as saying "S":

A	Alpha	N	November
B	Bravo	O	Oscar
C	Charlie	P	Papa
D	Delta	Q	Quebec
E	Echo	R	Romeo
F	Foxtrot	S	Sierra
G	Golf	T	Tango
H	Hotel	U	Uniform
I	India	V	Victor
J	Julia	W	Whiskey
K	Kilo	X	X-ray
L	Lima	Y	Yankee
M	Mike	Z	Zulu

9.6 Ground to Air Emergency Signals

The following two pages (figures 9-5 and 9-6) contain diagrams of ground to air emergency signals. If radio communications with aircraft are not available, you can communicate with the pilots using these signals.

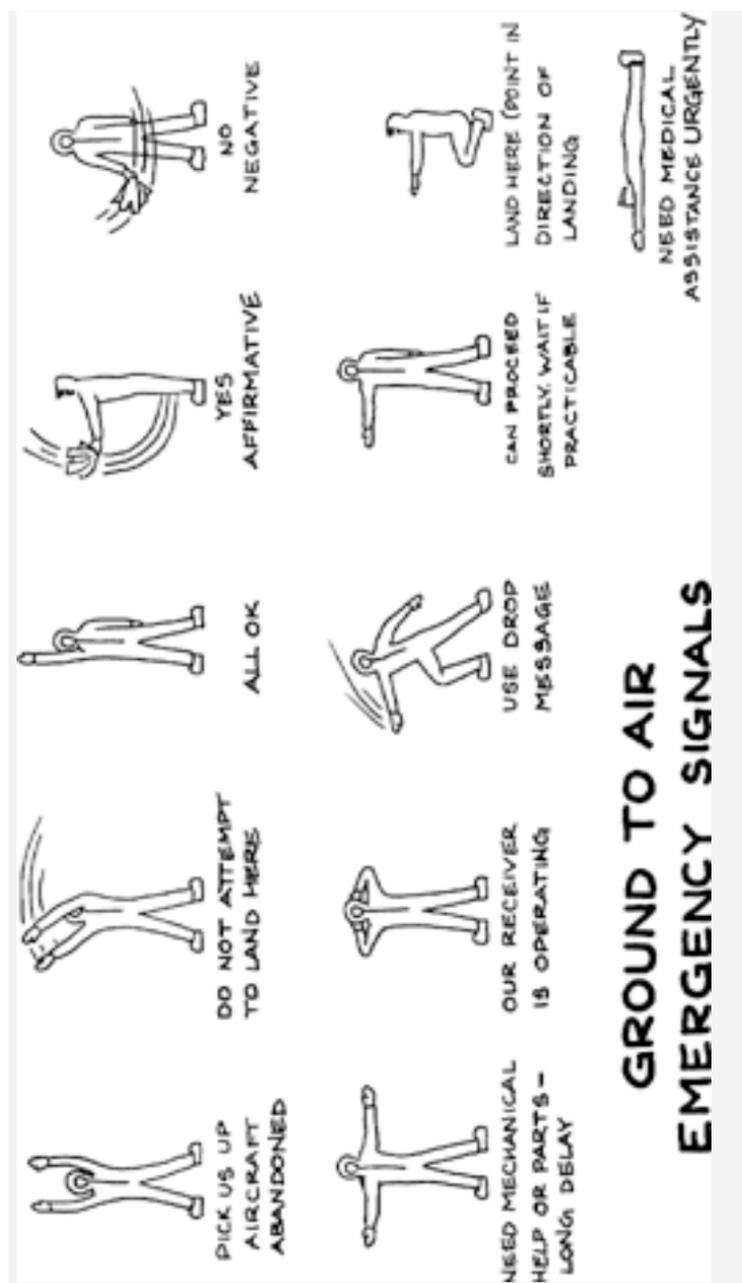


Figure 9-5: Ground to air hand signals

I	REQUIRE DOCTOR SERIOUS INJURIES	II	REQUIRE MEDICAL SUPPLIES	X	UNABLE TO PROCEED	F	REQUIRE FOOD AND WATER	K	INDICATE DIRECTION TO PROCEED	←	AM GOING IN THIS DIRECTION
D	WILL ATTEMPT TO TAKE OFF	5	AIRCRAFT BADLY DAMAGED	△	PROBABLY SAFE TO LAND HERE	LL	ALL WELL	L	REQUIRE FOOD AND OIL	N	NO - NEGATIVE
Y	YES - AFFIRMATIVE	JL	NOT UNDERSTOOD	W	REQUIRE ENGINEER	O	REQUIRE COMPASS & MAP	!	REQUIRE SIGNAL LAMP		

LETTER HEIGHT: 5 FT. WIDE x 15 FT. HIGH
LETTER WIDTH: 12 FT. WIDE x 3 FT. HIGH

GROUND TO AIR EMERGENCY SIGNALS

Figure 9-6: Ground to air letter signals