

CERT Field Communications Handbook

Cupertino Citizens Corps
14 May 2021



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Notes

1 Contact Information

Telephone Numbers

Fire, Ambulance, other Emergency	9-1-1, or 408-299-3233
Cupertino City Office:	408-777-3200
Citizens Corp Coordinator:	408-215-8459
CCC Department	
CARES Emergency Coordinator	408-839-8798
MRC Emergency Coordinator	
Cupertino Public Works Support	
Cupertino Public Works Support (After Hours)	408-299-2507
Union Pacific Railroad, Gate Crossing problems	800-848-8715

2 Channels and Frequencies

Function	Ch/Tone	Notes
Monta Vista ARK	1 / 21	2W, Zone 1 CERT Net
Regnart ARK	2 / 22	2W, Zone 2 CERT Net
Garden Gate ARK	3 / 23	2W, Zone 3 CERT Net
Lawson ARK	4 / 24	2W, Zone 4 CERT Net
DeAnza ARK	5 / 25	2W, Zone 5 CERT Net
Creekside ARK	6 / 26	2W, Zone 6 CERT Net
EOC/Comm 469	7 / 27	2W, Trailer, City Access
CERT TAC 1	8 / 0	0.5W
CERT TAC 2	9 / 0	0.5W
CERT TAC 3	10 / 0	0.5W
CERT TAC 4	11 / 0	0.5W
CERT TAC 5	12 / 0	0.5W
CERT TAC 6	13 / 0	0.5W
CERT TAC 7	14 / 0	0.5W
City-Wide Repeater	20R / 31	50.0W, Tone=192.8Hz

3 Emergency Alert System, stations of interest

KCBS	740 KHz	LP1, National Primary EAS Station
KFBK	1530 KHz	CA State Primary EAS Station
KLIV	1590 KHz	Public AM Station, a CNN affiliate
WQGH344	1670 KHz	Cupertino Community Radio

4 Field Radio Kit

4.1 Introduction

This kit is a self-contained package for deploying communications into the field with Citizen Corps resources.



The Field Radio Kit is made up of the following components:

1. GMRS Radio Pack. This case contains the following:
 - a. Hardened Power Systems (HPS) radio case; a 30 Caliber water-proof enclosure; built-in a 5ah AGM battery.
 - b. GMRS Base Radio; Midland MXT115 GMRS radio
2. Motorola T600 FRS radios, qty 4 or 8
3. Radio kit parts support bag. Contains the (i) GMRS battery charger, (ii) FRS charger, 1 for each pair of radios, (iii) GMRS and FRS radio manuals, (iv) backup radio antenna and auto power adaptor.
4. Antenna.
 - a. For the Monta Vista ARK, an external fixed mount 6dB gain antenna mounted on the Fire Station roof.
 - b. For all other ARKs, a UHF Mag Mount and 6dB gain NMO mount antenna stored in the ARK.

4.2 GMRS Radio Pack

The Midland MXT115 radio, HPS case, and internal 5ah AGM battery, makes this package self-contained.



Radio Enclosure Controls

1. External headphone jack with a switch to turn off the external speaker.
2. Battery charger port for the 12vdc power adaptor or a 12v solar panel up to 59 watts.
3. Main switch that turns off the meters, but allows the radio to work,
4. Power ports:
 - a. To Batt: direct connection to the battery
 - b. Aux: controlled by the center switch
 - c. 3 AMP: USB port for powering or charging peripheral devices

Setup

1. Retrieve the Field Radio Kit from the ARK.
2. Remove the GMRS Radio Pack. Open the lid and set aside.
3. Set up the GMRS Antenna – Monta Vista ARK
 - a. Locate the coax cable just inside the garage door.
4. Set up the GMRS Antenna – all other ARKs
 - a. Retrieve the GMRS mag mount antenna from the ARK. Make sure the antenna is screwed to the mag mount base.
 - b. Using a step ladder, carefully place the mag mount antenna on top of the ARK close to where you will be operating. Make sure the space where you want to put it is clear of debris.
5. Connect the antenna coax to the GMRS radio.
6. Press the “1” side of the rocker switch (between the AMPS and VOLTS display) to check the state of the Radio Kit battery. If it reads less than 12.0 volts, charge the battery.

Charging the GMRS Radio Pack

Refer to the picture on the previous page. If the Radio Kit battery indicates less than 12.0 volts, do the following:

1. Open the green radio kit parts bag and retrieve the radio 12vdc power adaptor.
2. Plug in the power adapter to a power strip connected to the generator.
3. Connect the 12vdc barrel connector to the Radio Kit plug marked SOLAR 50 WATTS MAX.
4. Verify that the VOLTS display now shows a voltage greater than 13 vdc. The Radio Kit battery is now charging.

Shutdown

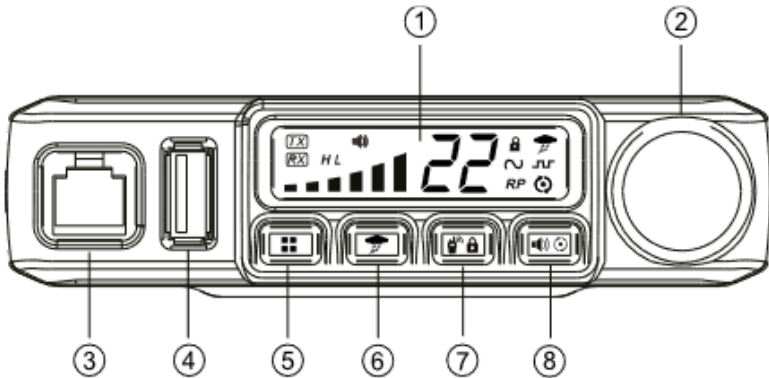
1. Turn off the radio.
2. Unplug the 12vdc power adaptor (if plugged in) and return it to the radio kit parts bag.
3. Disconnect the coax cable from the radio pack.
4. Depending on the ARK,
 - a. Monta Vista ARK: coil and secure the coax; place it inside the garage door.
 - b. All other ARKs: remove the mag mount from the ARK roof. Leave the antenna attached. Stow inside the ARK high on the container wall.
5. Leave the microphone attached. Coil the microphone cable as shown so that the cable is not pinched when you close the lid.



6. Reattach the radio pack top.
7. Close and lock the radio pack lid. Be careful not to pinch the mic cable. Return to the Field Radio Kit.

The MXT115 GMRS 15 channel, 15-watt radio with 8 Repeater channels.

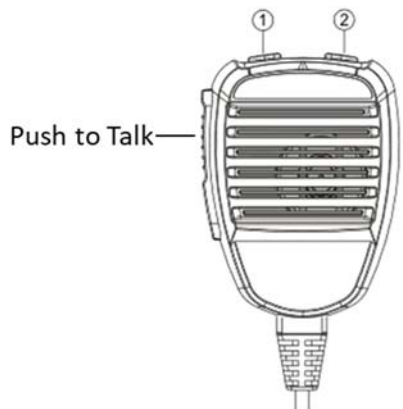
Controls and Indicators



1. LCD Display
2. On/Off Volume
3. Microphone Jack
4. USB Charging Jack
5. Menu - Press to access menu
6. Weather - Press to access weather mode
7. Call / Lock - Press to send a call signal, or long press (2 sec) to lock the keypad
8. Monitor / Scan - Press to enter scan mode, or long press (2 sec) to enter monitor mode

MXT115 Microphone controls

1. Channel Up ▲
2. Channel Down ▼



Power On/Off

1. To turn the radio ON: turn the **On/Off Volume** knob ② clockwise. You will hear a tone when the radio is on.
 - The LCD display will show all icons for one second and then display the most recently selected channel.
2. To turn the radio OFF: turn the knob ② counter clockwise.
 - The LCD display will go blank when the radio turns off.

Selecting the Active Channel

1. Be sure the radio is turned on (See *Power On/Off*).
2. Press and release the microphone **Channel Up ▲** or **Channel Down ▼** button to scroll through the available channels.
3. The Channel icon on the LCD display will show the active channel.




Transmitting and Receiving

1. Be sure the radio is turned on (see *Power On/Off*)

NOTE: For maximum clarity, hold the microphone 2 to 3 inches from your mouth when speaking.

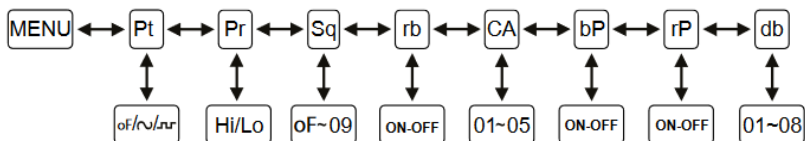
2. To transmit a call, press and hold the Push-to-Talk (PTT) button on the microphone, and speak into the microphone in a normal voice.
 - The **TX** icon will show continuously on the LCD display while transmitting.
3. To receive a call, release the PTT button on the microphone.
 - The **RX** icon will show on the LCD display when your radio is receiving a transmission.
4. If necessary, turn the volume knob clockwise or counter clockwise to increase or decrease the radio volume.

Locking the Keypad

1. Press and hold ⑦ the **Call/Lock**  /  button for three seconds.
 - The Keypad Lock icon  will show on the LCD display when the keypad is “locked.”
2. Repeat to unlock the keypad.








Menu Options

The MXT115 radio has a “Menu” mode that provides access to the features and functions shown in the chart below.



Pt	Privacy Tones - Use this option to set the privacy code.
Pr	Transmit Power Level - Use this option to change the transmit power level to Hi or Lo.
Sq	Squelch Sensitivity - Use this option to adjust squelch sensitivity.
Rb	Roger Beep - Use this option to set the option for the Roger Beep.
CA	Call Alert Tone - Use this option to select the Call Alert tone.
bP	Silent Operation - Use this option to set the option for the keypad audible “beep” tones.
rP	Repeater Channels - Use this option to set the option to allow for Repeater channels.
Db	Display Background - Use this option to select the color of the display background.

Basic Menu Controls

- Press **Menu**  button : Puts the radio in “Menu” mode.
- Microphone **Channel Up**  or **Channel Down**  button: Scroll through the menus or selected options.
- Press **Monitor/Scan**  \  button : Selects a menu or confirms a submenu choice.
- **PTT**: Briefly pushing the Push to Talk button will take the radio out menu mode.















The following is an example of how the menu system works. All other menu choices work identically using the **Menu**, **Channel Up/Down**, and **Monitor/Scan** controls.

To select a Privacy Code





This is a 2-step process:

NOTE: For CCC ARK operations, we will use ~ (for CTCSS) and the tones listed in the front of this guide.

(i) Set the tone type

1. Press and release the Menu  button  to place the radio in “Menu” mode.
2. Use the Microphone **Channel Up**  or **Channel Down**  button to scroll through the menu options until the LCD display shows **Pt**, then press the **Monitor/Scan**  \  button .
3. Use the Channel Up  or Channel Down  button to select the privacy tone type you would like to use:
 - a. **oF** for OFF – no tone is used
 - b. ~ for CTCSS – analog tone is used.
 - c.  for DCS – digital tone is used
4. Press the **Monitor/Scan**  \  button  to confirm your selection.
 - The ~ (for CTCSS) or  (for DCS) icon will show on the LCD display, according to your selection.

(ii) Set the Privacy Code

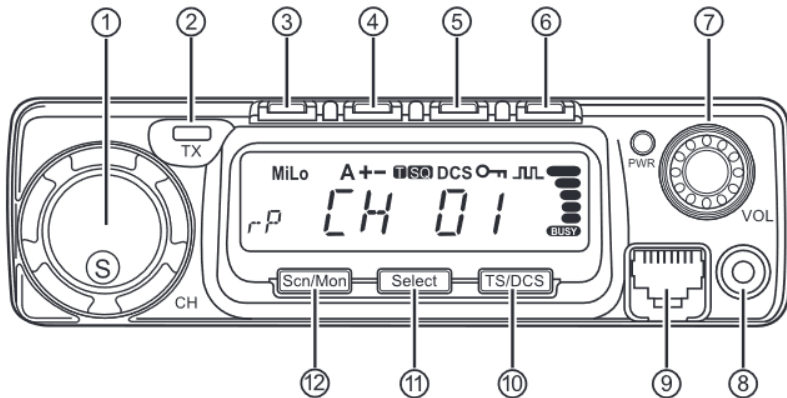
5. Then, use the Channel Up  or Channel Down  button to scroll forward or backward through the available Privacy Codes until the desired Privacy Code is shown on the LCD display.
6. When the desired Privacy Code is shown on the LCD display, press the **Monitor/Scan**  \  to confirm your selection.

NOTE: you must press Monitor/Scan to save your choice.

6 Midland MXT400 GMRS

The MXT400 GMRS 15 channel 40-watt radio with 8 Repeater channels.

Controls and Indicators



1	Channel Selector	7	Volume
2	TX indicator	8	Data Tern, not used
3	Menu	9	Mic connector
4	Call – Call/Lock	10	Privacy Tone
5	Pvl – Power Level	11	Select
6	Pwr – Power On/Off	12	Scan/Monitor

Menu functions

1. Press and hold **[Menu]** button for 3 seconds to enter Menu Mode.
2. Use the **[Call]** and **[Pvl]** buttons to scroll through the menu options.
 - a. **TX**: Transmit (On/Off) – disable the transmitter
 - b. **TALK**: Talk About (On/Off) – directly communicate with other radios when out of repeater range
 - c. **Comp**: Voice Componder (On/Off) – reduces background noise, enhance audio quality
 - d. **Mute**: Silent Operation (On/Off) – all beeps and tones are disabled
 - e. **Call**: Call Alert (1 - 5) – transmit different tones to other stations alerting them of an incoming message
 - f. **TOT**: Time Out Timer (Off, 120, 180, 240, 300 secs) – limits the amount of transmit time the radio has per PTT activation
 - g. **APO**: Auto Power-Off (30, 60, 120 min) – sets time interval to turn off the radio when not in use
 - h. **SQL**: Squelch (Off - 9).
 - i. **LAMP**: Display brightness (Off - 5).

- j. **REP**: Repeater Channels (On/Off) – turn on repeater function.
When enabled, show an additional set of frequency entries.
- k. **RESTORE**: Restore Default settings (Fact)
- ___ 3. Use the **Channel** knob to select the setting.
- ___ 4. Press and release **Select** button to confirm your choice.
- ___ 5. Press **Scn/Mon** to exit Menu Mode

Change Power Level

- ___ 6. Press [**PVI**] to toggle the transmit output power as follows:
High Power → Middle Power → Low Power →...
- NOTE**: Output power is limited to LOW Power.

Select a CTCSS Privacy Tone

- ___ 7. Press the **TS/DCS** button to enter CTCSS Privacy Mode.
NOTE: repeatedly pressing **TS/DCS** twice will cycle through **DCS** mode, *no-Tone* mode, and then **TS/DCS** mode.
- ___ 8. Use the **Channel** knob to scrolls through the tone options.
NOTE: Set the frequency to match the Tone Number used by other FRS/GMRS radios.

Tone	Freq	Tone	Freq	Tone	Freq	Tone	Freq
1	67.0	11	97.4	21	136.5	31	192.8
2	71.9	12	100.0	22	141.3	32	203.5
3	74.4	13	103.5	23	146.2	33	210.7
4	77.0	14	107.2	24	151.4	34	218.1
5	79.7	15	110.9	25	156.7	35	225.7
6	82.5	16	114.8	26	162.2	36	233.6
7	85.4	17	118.8	27	167.9	37	241.8
8	88.5	18	123.0	28	173.8	38	250.3
9	91.5	19	127.3	29	179.9		
10	94.8	20	131.8	30	186.2		

- ___ 9. Press **Select** to confirm your selection. The [**T**][**SQ**] icon will show on the LCD display.
- ___ 10. Press **Scn/Mon** to exit Privacy Code settings.

Auto-Scan

- ___ 11. Quickly press and release the **Scn/Mon** button to enter auto-scan mode

Monitor

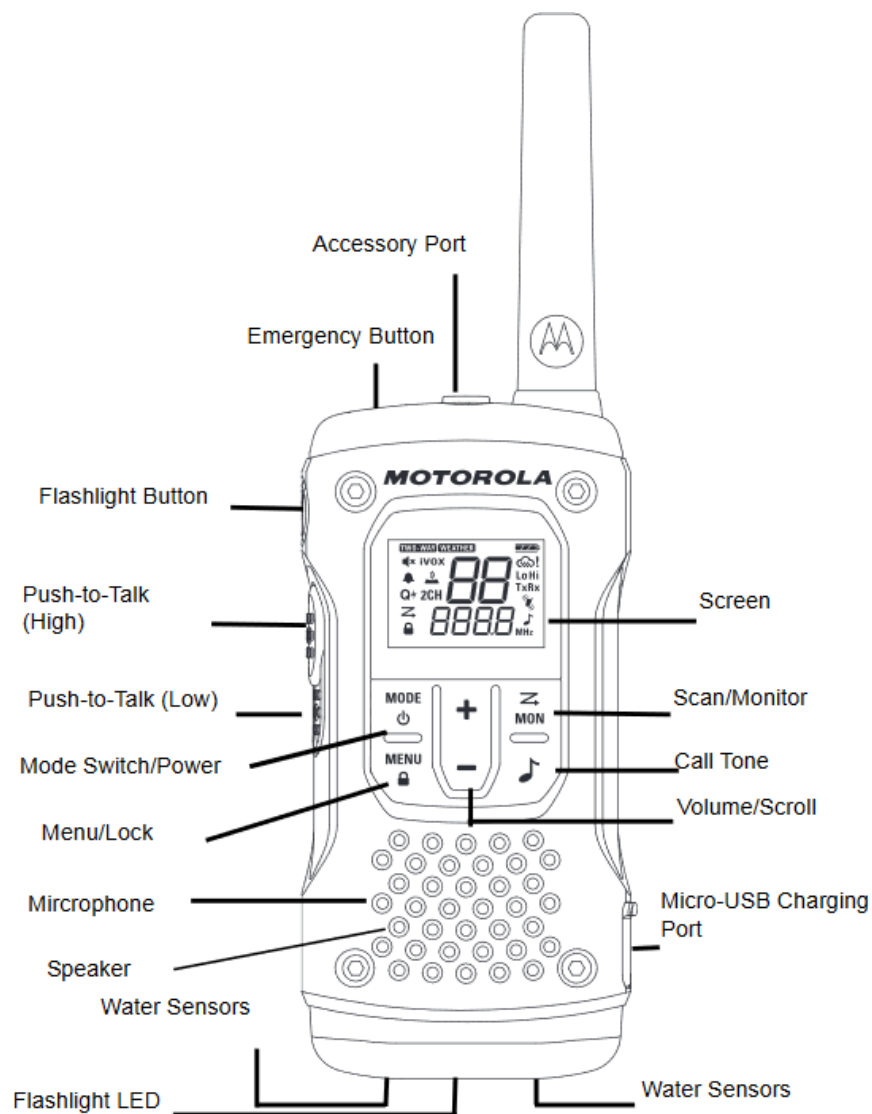
- ___ 12. Press and hold the **Scn/Mon** button to enter monitor mode.
- ___ 13. Press and hold the **Scn/Mon** button again to exit.

Lock Keyboard

- ___ 14. Press and hold the **Call** button. The [Lock] icon will be displayed.
- ___ 15. To unlock, press and hold the **Call** button again.

7 Motorola Talkabout T600, FRS Radio

7.1 Introduction



7.2 Common T600 FRS Radio Controls

The following describes how to operate the Motorola T600 radio:

Charging the FRS Radio

1. Two radios can be attached to one charger.
2. Open the mini-USB cover on the side of the radio
3. Connect the charger cable. Plug in the charger.
4. The radio battery indicator (upper right) will show solid when completely charged.

Turning the radio on and off

5. Press and hold the ^{MODE} button (top-left) to turn the radio **On** or **Off**.
6. The radio chirps and the display briefly show all icons available on your radio.

Set the Volume

7. In the middle of the radio, find the + and - buttons. Press the + button to raise the volume and the - button to lower the volume.
8. The volume number will show and increment every time you press either of these buttons.

Select a Channel

9. With the radio on, press the ^{MENU} button once. The current channel flashes (larger upper number on the display, 4 in this example).
10. Press the (-) or (+) buttons to select the channel.
11. Press (PTT) to save the channel setting.



Select the Tone Code

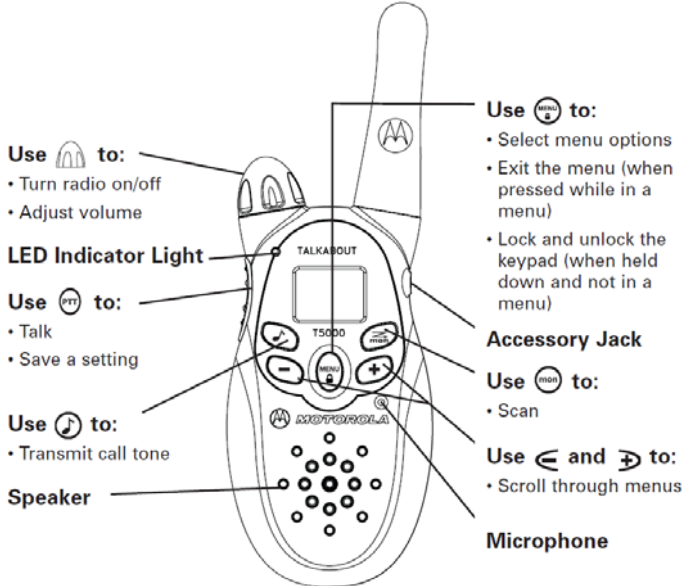
12. With the radio on, press ^{MENU} button twice or until the tone code flashes (smaller lower number on the display, 9 in this example). The current tone code flashes.
13. Press (-) or (+) buttons to select the tone code.
14. Press (PTT) to save the tone code with this channel.

Talking and Listening

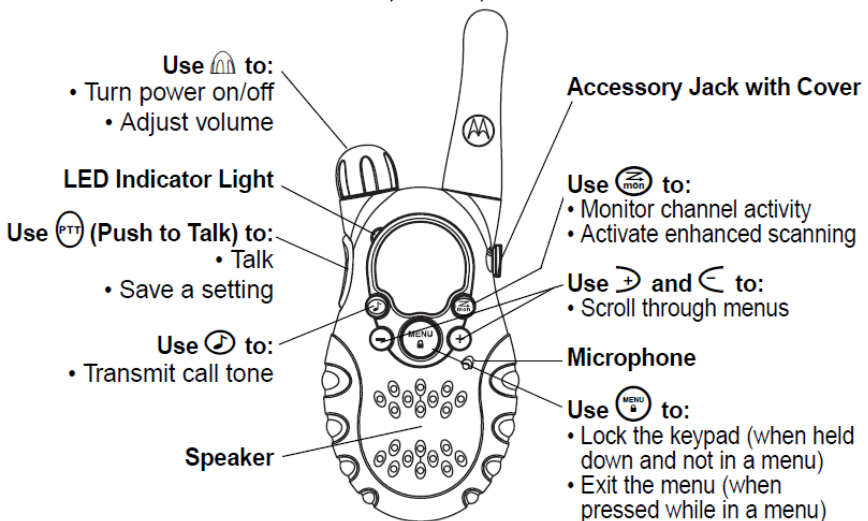
15. To talk, press and hold the Push-to-Talk button. Take a breath. Hold the radio 2 to 3 inches away from your mouth when talking.
16. When you finish talking, release the Push-to-Talk button.

8 Other FRS Radios

8.1 Motorola Talkabout T5000, T5500, T5550




8.2 Motorola Talkabout T5900, T5920, T5950



8.3 Common T5000 FRS Radio Controls

Almost all FRS/GMRS hand-held radios have the same basic operating controls. The following describe how to operate these radios:

Turning the radio on and off

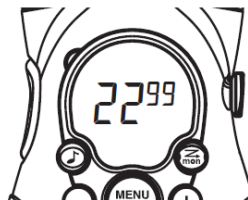
1. Turn top-left knob clockwise to turn the radio on and counter-clockwise to turn the radio off.
2. The radio chirps and the display will briefly show all feature icons available on your radio.
3. **For T600 FRS radios:** Press and hold the ^{MODE}  button (top-left) to turn the radio On and Off.

Set the Volume

4. Press and hold (MON) (monitor button) while rotating top-left volume control until you reach a comfortable listening level.

Selecting the Channel

5. With the radio on, press the (MENU) button. The current channel flashes (larger number on the display, 22 in this example).
6. Press the (-) or (+) buttons to select the channel.
7. Press (PTT) to save the channel setting.



Selecting the Tone Code

8. With the radio on, press (MENU) button until the tone code flashes (smaller number on the display, 99 in this example). The current tone code flashes.
9. Press (-) or (+) buttons to select the tone code.
10. Press (PTT) to save the tone code with this channel.

Talking and Listening

11. To talk, press and hold (PTT). Take a breath. Hold the radio 2 to 3 inches away from your mouth when talking.
12. When you finish talking, release (PTT) (press to talk, release to listen).

9 Radio Operations Basics

9.1 In General

1. Operating a radio is about 90% listening and 10% talking.
 2. If you are too busy to pay attention to what is happening on the radio, then assign this task to someone else.
 3. When transmitting:
 - i. Press and hold the radio's PTT button
 - ii. Take a breath. This ensures your radio transmitter is on and receiving stations detect your signal.
 - iii. Speak slowly and clearly.
 - iv. Keep your messages as short and succinct as possible.
-

9.2 Operating on the CERT Radio Net

4. We always want to know who is on the channel, where you are, what you are doing, and if you are OK. We do this by choosing a radio channel for this ARK on which we all will operate. See the channel assignments earlier in this guide.
5. Every station on the channel will use a name. Some names are usually assigned by the ARK and you could have a name like **TEAM 3, FIRST AID, SEARCH 4**, etc. If you or your team was not assigned a name, then use your own name.
6. **CHECK IN** to the local ARK Radio Net if you are at home and have a radio, or if you are assigned a task at the ARK. This does a few things:
 - i. let's the ARK's Net Control know who is on the Net
 - ii. confirms you have your radio set correctly with the correct Channel and Tone for your ARK. Make sure this is correct before leaving for your assignment.

CHECKING IN

If you are... Bob	You would say... Creekside ARK, this is Bob at Stelling and Rainbow, checking in.
Creekside ARK:	OK Bob, acknowledged.

Angie Creekside ARK, this is Angie at Bubb and Regnart, checking in

Creekside ARK: Hi Angie, acknowledged.

7. **CHECK OUT** of the local ARK Radio Net when you are done with your assignment and back at the ARK. This does a few things:
- i. let's the ARK's Net Control know you are leaving the Net
 - ii. We won't worry about you anymore!
 - iii. Checking out does not mean that you may be done with your participation, just that Net Control will no longer look for you on the Net.

CHECKING OUT

If you are...	You would say...
Bob	Creekside ARK, this is Bob, I am back home. Checking out.
Creekside ARK:	OK Bob, acknowledged.
Angie	Creekside ARK, this is Angie back at the ARK. I am checking out.
Creekside ARK:	Hi Angie, acknowledged.
TEAM 3	Creekside ARK, this is TEAM 3. We are back at the ARK.
Creekside ARK:	TEAM 3, acknowledged. Are you checking out of the Net?

9.3 Passing Messages

Preparing the Message

1. Before transmitting, think of the message you want to send.
 - v. Organize your thoughts.
 - vi. If necessary, write down the message you want to send.

- vii. Keep your message brief; there could be others on the channel with messages as well.
2. Do not pass victim or patient names over the radio unless asked for the name; these are public airwaves.
NOTE: There may be exceptions to this policy, such as matching up lost children with parents. Make sure the CERT Coordinator or Incident Commander approves any exceptions before starting.
3. If necessary, use the ICS 213 Message Short Form, phone message pad, or something similar when creating your message.

Passing a Message

2. Listen: Make sure the frequency is clear or Net Control is not talking to someone else who you might not hear.
3. Notify the ARK Net Control Operator that you have a message to pass. The Net Control Operator will tell when to pass the message.
4. To pass very short, simple messages, you send the entire text, and the receiving station may simply say "copied" or they may say the text back to you.
5. For longer messages, say the message in logical phrases of about 4 to 7 words, without repetitions. Talk slowly.
6. Say Break when pausing and release the PTT key while you wait for the receiving station to write down your message and acknowledge you. Always release the PTT key if you stop talking.
7. Do not resume transmitting until the receiving station acknowledges the last transmission with something like "OK" or "continue" or something similar.
8. Speak clearly and slowly. As a pacing guide, *ghost write* the message as you say it (not necessary to actually write it down again).
9. Use the message passing prowords and the phonetic alphabet to spell items that cannot be understood reliably by pronouncing them.

10. End the message with "End of Message".

If you are...	You would say...
Team 3	Creekside ARK, this is TEAM 3 with a message for you.
Creekside ARK	Team 3, what is your message?
Team 3	Creekside ARK, this is Team 3. Large tree blocking the road in front of 1236 Bubb Road, just south of Rainbow Drive. Traffic is blocked both directions. End of Message.
Creekside ARK	Team 3, Acknowledge.

10 Phonetic Alphabet & Numbers

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	Juliet	W	Whiskey
K	Kilo	X	X-Ray
L	Lima	Y	Yankee
M	Mike	Z	Zulu

0	zero (ZEE-row)	5	five (Fife)
1	one (Wun)	6	six (Sicks)
2	two (Too)	7	seven (SEV-vin)
3	three (Tree)	8	eight (Ate)

11 Modified Mercalli Intensity Scale (MMI)
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I	Not felt	Not felt except by a very few under especially favorable conditions.
II	Weak	Felt only by a few persons at rest, especially on upper floors of buildings.
III	Weak	Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.
IV	Light	Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.
V	Moderate	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
VI	Strong	Felt by all, many frightened. Some heavy furniture moved or overturned. Dishes, glassware, knickknacks, and books fall off shelves. Weak plaster, adobe buildings, and some poorly built masonry buildings cracked. Damage slight.
VII	Very Strong	Negligible damage in buildings of good design and construction. Slight to moderate damage in well-built ordinary structures. Considerable damage in poorly built or badly designed structures. Some chimneys broken. Fall of plaster, loose bricks, stones, tiles, cornices, unbraced parapets and

	porches. Some cracks in better masonry buildings.
VIII Severe	Considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned. Wood-frame houses moved on foundations if not bolted; loose partition walls thrown out. Tree branches broken.
IX Violent	General panic. Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations. Wood-frame structures rack, and, if not bolted, shifted off foundations. Underground pipes broken.
X Extreme	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rail bent. Water thrown on banks of canals, rivers, lakes, etc.
XI Extreme	Few, if any, (masonry) structures remain standing. Bridges destroyed. Broad fissures in ground. Underground pipe lines completely out of service. Earth slumps and land slips in soft ground. Rails bent greatly.
XII Extreme	Damage total. Lines of sight and level are distorted. Objects thrown into the air.

Ref: <https://pubs.usgs.gov/gip/earthq4/severitygip.html>

