Radio Fundamentals

How to use a hand-held radio effectively in an emergency
This unit is intended to provide a basic introduction to using a radio should circumstance require it during an emergency response.

CERT members interested in radio are encouraged to become licensed Ham or GMRS operators and develop proficiency in operating radios in a robust environment.
Objectives:

After completing this unit you will be able to:

- Understand types of radios and licenses
- Identify typical radio features and controls
- Use correct radio operating procedures
- Know standard procedural words and phonetics
- Know how to operate on a controlled net
Radios enhance operations by:

- Allowing reporting from action teams
- Facilitate quick re-deployment of resources
- Sending weather and other warnings to teams
- Allowing us to work quickly and safely
Alerting Considerations

• **Dallas EOC may:**
  • Notify CERT by email, ham radio, or phone

• **If you self-activate in your neighborhood:**
  • Use any available communications, including land line, cell phone or email to contact the Emergency Operations Center in the Office of Emergency Management.
  • If you have a radio
    • Monitor ham frequency 146.880
TYPES OF RADIO - What is FRS?

• **The Family Radio Service**
• No license is required
• Max. transmit power 500mw
  Short range – “line of sight”
TYPES OF RADIO - What is GMRS?

- **General Mobile Radio Service**
- An FCC Part 95 *Licensed Service* for personal and business use by immediate family members
- FCC license, 5 years w/Fee, no test is required
- More powerful than FRS for longer range.
- FRS channels 1 through 7 are shared with GMRS
- FRS and GMRS may legally talk to each other on the shared simplex channels.
Ham radio is licensed for access to a wide range of radio frequencies.

- FCC licensing is required and is obtained through training, passing exams, and paying fees.
- Licenses are good for 10 years.
- Licensed operators may use substantially more powerful radios that can reach long distances.
- Communications can use repeaters.
- Each licensee has a unique call sign.
If you operate a radio that has been approved exclusively under the rules that apply to FRS, you are not required to have a license.

If you operate a radio under the rules that apply to GMRS, you must have a GMRS license.

GMRS radios generally transmit at higher power levels (1 to 5 watts is typical) and may have detachable antennas.
What are the parts of a radio?

- Typical controls include:
  - On/Off switch, possibly combined with a volume control
  - Channel selector
  - Push-to-talk (PTT) button
  - Channel/Frequency selector
  - Squelch for static suppression

- Other important parts include:
  - Microphone and speaker (sometimes combined)
  - Antenna
  - Battery
Portable Radio “Anatomy”

Power On-Off, Switch

- Is combined with volume control on some models
- Or “push-button” on others

First of all, make sure the radio is “turned on”
More Portable Radio “Anatomy”

Channel Selector

Up-Down arrows

or a rotating knob
The “talk” button

Handheld radios typically have a large button on one side that is the “push-to-talk” button
Repeaters are located on high-rise buildings or towers
- It “Repeats” signals to extend range of portable units
- Receives on one frequency while re-transmitting on another (Duplex)
- Transmit at 50-100 times the power of a hand held radio
- Coverage depends upon “radio horizon,” typically 20 to 60 miles operating radius
- Repeaters are most often available for ham radio; in some locations there are GMRS repeaters
Repeaters send signals beyond “line of sight”
Next – tactical radio protocol or, what to say and when to say it
A two-way radio is not like a cell phone because:

- Only one person can talk at a time
- No one else can speak when YOU have the talk button depressed!
- SO…
When Do You Speak?

Speak ONLY if you **have to**

- **LISTEN** do not “talk over” others
- **WAIT** until others have finished
- **THINK** about what you will say
- **USE PLAIN LANGUAGE**
- **KEEP IT SHORT!**
Push-To-Talk...PAUSE...talk

- Push the “talk” button then wait a couple of seconds before speaking.
- This avoids chopping off the first couple of words as the radio changes over from its receive state to transmit.
Making a call

Name the unit you are calling, then say the words “THIS IS” followed by your unit name

Example: Command this is Team Alpha
When you hear a call to you, start your reply in this manner:

<calling unit> THIS IS <your tactical ID>

Here is an example:

TEAM ALPHA THIS IS COMMAND, GO AHEAD
Here’s a conversation:

*The call:* “SEARCH TEAM CHARLIE, THIS IS COMMAND”

*The answer:* “COMMAND, THIS IS TEAM CHARLIE”

*The response:*

“CONTACT MEDICAL ON CHANNEL ONE FOUR, OVER”

*Confirmation:*

“TEAM CHARLIE CHANGING TO ONE FOUR FOR CONTACT, CHARLIE CLEAR”
When a message is not clear

CLARIFY & GET CONFIRMATION

Example:

Team: “You want me to contact Team 7 on channel 3?”

Command: “Correct!”
There is some etiquette

WAIT to be recognized before speaking — the other party may need to write down your report.

Be CLEAR that you are done so the channel is available for someone else.

Example:

“Blue Team, KF5CMV, clear”
Keep it simple

- Answer questions directly; do not over explain
- Add details, but be brief
- Let ‘Control’ or the requestor ask for details
- ASK who a message is for if you don't know
- Let third parties speak directly to each other
Talking into the radio

- Use earphone or headset *(if you have one)*
- Turn down volume - *don’t add to noise level!*
- Shield microphone from the wind

- Speak ACROSS the microphone
- Use a normal speaking voice
Using proper key words helps expedite radio messages.

The most common are:

- "THIS IS" - Used to identify who is calling
- "OVER" - Means "I have finished and it’s now your turn"
- "GO AHEAD" - Means "I’m ready to copy"
- "CLEAR" - Means "I am finished and expect no reply"
Voice radio is easy to intercept
CERT teams may encounter situations with mass casualties, crimes, or security concerns
  - Need to comply with HIPAA
  - Need to not invite onlookers
We must protect the privacy of individuals and the security of operations

... so what things should we think about?
Communication Security

- Keep names of victims private
- Hold or pocket the radio in manner that keeps the push-to-talk button safe to prevent others accidentally overhearing
- Keep casualty numbers or incident locations confidential
Setting Up Communications

- Assign channels to teams and key services as the number of radios allow:
  - Team Lead / Incident Command
  - Search, rescue, fire and other action teams
  - Medical
  - Logistics
CERT communications with first responders may be assigned on a separate channel or frequency.

A CERT team member may be assigned to incident command, which may be a fire or police leader, to communicate with CERT teams in the field.
Identify who needs to communicate:

- Within teams doing field work
- Between Team lead and field teams
- Between Team Lead and the Emergency Operations Center (EOC)
First - Tactical Call Signs

- Tactical call signs are used in emergencies and during special events such as marathons, parades, or ceremonies.
- Tactical call signs reflect the activity that is being supported and a location, for example:
  - Water Stop One
  - Northeast Triage
  - Driver Fourteen
  - Search Team Bravo
  - Rescue Team Three
Using a controlled net

- Team Lead designates a team member proficient in radio operation to manage communication
  - The command post is addressed as “Command”
  - All conversations are either started by Command or by units calling Command
- Use a Controlled Net when more than four people are using one channel at the same time.
In communication between a portable or mobile unit and a fixed location (such as a command post) the FIXED station controls communication in all matters relating to:

- Priority and timing of radio transmission
- Choice of working radio channel
- Duration and suspension of work

*Except* in case of distress, life-safety or urgent communications.
Why have a controlled net?

It enables the Team Lead to:

- PRIORITIZE resource requests
- QUICKLY handle multiple situations
- Have a radio operator at command who LOGS what happens
Participating in a controlled net

- Respond ONLY to “Command”
  - Get permission before contacting anyone
- Answer PROMPTLY
  - Monitor the radio continuously
  - Answer immediately if you are called
- Don’t leave the “air” without checking out!
  - Otherwise, Command wastes time trying to call or locate you when you are not there.
• WAIT a few seconds before pushing “talk” and between phrases so others can break in
• It’s OK to interrupt, IF you have urgent info
  ▪ That's why you leave gaps between transmissions
• When necessary to interrupt, speak only long enough to “IDENTIFY AND SAY WHY”

Example: “Stairwell Ten URGENT!”
Radio operating practices

- Use PLAIN LANGUAGE ONLY
  - NO 10-CODES OR JARGON!
  - AVOID TECHNICAL TERMINOLOGY UNLESS IT IS OPERATIONALLY NECESSARY!

- Use SHORT SIMPLE phrases
  - Short transmissions help the listener
When you can’t reach another unit

- Go to a backup frequency
- See if you can contact another unit to relay a message to the folks you are trying to contact
- Send a runner
The Command radio operator’s role

**MAINTAIN** radio discipline by:
- Setting the example
- Prioritizing messages and requests
- Handling all radio traffic efficiently

**TRACK** what’s going on…
- Write down everything that happens…

**REPORT** to the Team Leader or Incident Commander
Good records are important

- Because memory is limited
- We all get *busy*!
- Information must be summarized or shared later on
- Records help us plan on improving
• Record these things:
  • Problems that arise
  • Status of tasks
  • Resources needed, available, assigned
  • Personnel accountability reports (PAR) from teams in the field
Keep a Communications Log

Example CERT Radio Operator’s Log ICS Form 309 (Modified)
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<th>Letter</th>
<th>Phonetic</th>
<th>Letter</th>
<th>Phonetic</th>
<th>Letter</th>
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<td>India</td>
<td>R</td>
<td>Romeo</td>
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</table>
For more information

- Amateur Radio Relay League Emergency Communications
  http://www.emergency-radio.org/

- FCC General Mobile Radio Service Licensing Information
  https://www.fcc.gov/wireless/bureau-divisions/mobility-division/amateur-radio-service

- Fees
Almost done,
Now, Please take the quiz at this link:
RadioQuiz