CARVER FIRE DEPARTMENT

Standard Operating Guidelines

Section 4.12 – Radio Communications **June 15, 2013**

1.1 PURPOSE

To describe and explain the multi-layered radio system that is used by the Carver Fire Department and provide guidelines for its use.

1.2 SCOPE

The entire radio systems that the Carver Fire Department uses on a daily basis.

1.3 OVERVIEW

Radio communications are a vital component to emergency operations, and for that reason, it is imperative that the radio systems have built-in redundancy or backup systems. The radio system in the Carver Fire Department has multiple back-up features that will allow us to keep working seamlessly when a radio, a console or even an entire system fails.

Our system normally works from a base radio in the dispatch area that can communicate with mobile radios in the various apparatus and with portable radios either in the apparatus or carried by Fire Officers and firefighters. There are several radio frequencies available so the dispatcher has the ability to communicate with different emergency departments. This guideine essentially covers the Carver Fire Department radio frequency.

1.4 COMPONENT PARTS

01. The primary system includes the main Tellex touch-screen console with touchtone features that allows the Dispatcher to transmit and receive radio messages on the Carver Fire radio frequency and on several other frequencies. Those frequencies include Carver Police, Carver DPW, Carver EMS, Plymouth County Control Channel 4, and the 5 Plymouth County Control Fireground frequencies. This console can activate the home receiver tone, siren tones, and the EMS tone. It can read all of the radio identifier codes in plain talk, not numbered code. So Engine 1's radio transmission would be shown as "Engine 1". The dispatcher is always aware of what person, apparatus or portable radio is calling. This console also gives the dispatcher the ability to playback previous radio transmissions, view call lists of previous communications, view the voter status of CFD communications towers, as well as to open and close the overhead apparatus doors.

02. The primary radio system can be manually switched to a back-up repeater system. This would be used if there were a catastrophic failure of the primary repeater system.

03. There is a Motorola Command Star, back-up console in the Fire dispatch center which utilizes radios that are independent of the main console, thus providing our first layer of redundancy. This console is capable of transmitting and receiving on several frequencies, can activate the home receiver tone and the station siren tones, and can receive the radio identifiers codes and the Emergency Man Down signals.

04. There is also a second back-up radio in the dispatch centers (both Fire and Police) that is completely independent of all other radios in the centers. This third backup system is a Motorola CDM1550 mobile radio that is mounted and equipped with a totally independent power supply and antenna, thus providing our third layer of redundancy in the CFD radio system. This radio is capable of activating the home receiver and EMS tones and can also receive the radio identifiers codes and the Emergency Man Down signals.

05. The final layer of redundancy in the dispatch center system is a Motorola HT1250 portable radio which is capable of radio communications on multiple channels and activating the home receiver tone.

06. The other primary component in the system is the mobile and portable radios in the system. Because there are multiple radios, this provides redundancy if there was a complete failure of the main systems, such as a fire in the fire/police station.

1.5 TONES

Our system uses different tone techniques, some audible and some inaudible.

01. Audible tones are the tones that the dispatcher sends out to open the home receiver pagers and set off the station sirens. These tones are on specific frequency and time duration that match tone receiver boards in the Minitors and other radios in the system. Each tone is actually two tones, called "dual tone" to avoid the potential of false activations from other sources.

02. Inaudible tones are tones that are not generally heard but are also sent out by all of our radios during radio transmissions.

A. Channel Guard or Private Line (PL) tone is to assure that our radios do not inadvertently receive unwanted signals or interference from radios in other areas that might also be using Carver's frequency or a frequency very close to ours or from other outside sources. It was very common on the older low band frequencies to HEAR "skip" from other fire departments that

operated on the same radio frequency but was outside of our system. Tolland, Connecticut at one time operated on 33.90 as did most of the Plymouth County Fire Departments and under different environmental conditions, they would sound as clear as our own radios.

B. Identifiers are inaudible signals that are transmitted and received by our radios to let everybody know who is calling. Very helpful when there is excessive background noise or if a firefighter is in trouble and cannot speak. Simply by keying the mike tells everyone who is trying to call. Our radios receive the identifiers in plain talk, not coded numbers, so it is obvious.

1.6 OPERATING MODES – There are two operating modes to the system also.

01. Repeater mode

In Repeater mode on the Carver frequency, when any radio, (portable, mobile, or base radio) is keyed and transmits a signal, that radio transmission goes out to three cellular towers, one in each part of Carver. At each of these locations, there is a Receiver antenna and a microwave transmitter. There is also what is referred to as a voter in the system. Radio signals from users of the system (low wattage) are received at each of the three receiver sites and are instantly transmitted via microwave to the center Carver repeater site. The signals are compared to each other by the voter. The strongest and clearest signal is chosen and re-transmitted or "repeated" at 100 watts from the center Carver site.

The three tower receiver / voter system was designed to provide excellent radio coverage, especially from low wattage portable radios, in our 40 square mile community. This "repeated", high wattage, radio signal is what is heard by all radios with that radio frequency programmed into it, including mobile and portable radios, Motorola Minitors and home scanners in Carver and beyond.

All radio traffic on the system that is transmitted in "repeater" mode undergoes the same receive, vote, and repeat process that is outlined above. There is a slight delay that is built into the system which causes the chopping of audio or partial loss of a radio transmission when initially keying the microphone. To help mitigate this issue, CFD radios emit an audible tone when the microphone is "keyed", and remains audible until it is ok to begin speaking your verbal radio message.

02. Direct / Simplex Mode

Direct or Simplex mode is essentially radio to radio communications. When a radio is placed in "direct" mode, the signal does not enter the receiver / repeater system and is thus a low wattage, radio to radio transmission. This allows radios to talk directly to each other, avoiding the need to be retransmitted through the repeater tower, but also lessening

the radio signal strength and range dramatically. Direct mode is good for fire scene use where radio traffic might be of a sensitive nature or in training evolutions where it is unnecessary to have dispatch hear all radio traffic. Direct mode is based on line of sight, its range is generally very limited and might be influenced by other factors such as metal siding or concrete walls. Because the radio is on the "receive" frequency, it will hear all radio transmissions that go through the repeater system. That way, if a portable is on the direct mode, it will be able to hear if Fire Alarm or another radio in Repeater mode is calling them. Dispatch generally does not use or hear Direct mode radio traffic.

1.7 BASIC GUIDELINES FOR RADIO COMMUNICATIONS

01. Look at your radio and be sure that you are on the proper channel, repeater, direct, etc.

02. Think about your message before you transmit

03. Take a minute to collect yourself and Speak clearly, in a short concise message

04. **DO NOT** transmit on portable radios while walking. Stand still with as little movement of the radio as possible

05. If your message is reported back to you as unreadable or very scratchy, check your radio for repeater/direct. Use apparatus mobile radios for transmissions in the border areas of town where portable coverage is compromised

06. Only priority messages should contain two-way dialog with Fire Alarm.
Normally – "Fire Alarm, Engine 5 is on.
Priority message – "Fire Alarm from 187, Fire Alarm, 187 is off with a 2 car MVA with entrapment, 187 has command".

07. **DO NOT** use "CARVER" in any transmission within our town borders unless the situation dictates otherwise, such as mutual aid companies working at the same incident, etc. *"Fire Alarm, ~~CARVER~~ Engine 5 is on" or "~~CARVER~~ Fire Alarm, Engine 6 is on"*

08. Be aware of possible feedback situations – close proximity of other radios, minitors, External speakers on apparatus, etc. Distance yourself from feedback sources for clear transmissions.

09. Only report apparatus "going for water", "going for fuel", or "in service" once.
Initial transmission would be "Fire Alarm, Engine 5 is clear of the scene going for water".
It should not be necessary to say you are clear of the water supply and returning to quarters or going for fuel. Try to only report vehicle status if out of service for any reason.

10. **DO NOT** report station manning until the incident commander has given priority messages to the arriving apparatus and/or the incident is stabilized. The IC will request station manning via radio sooner if necessary. Assign one FF to monitor the Station Radio until secured by IC. *"Fire Alarm, Station 1 is manned with 1 and 3"*

11. **DO NOT** generate unnecessary radio traffic during an incident. Utilize face to face communications if practical. Basically, if you can see the person with whom you are trying to communicate, you should initiate a face to face meeting

12. Radios are not telephones and care should be taken to use clear, concise, brief, common radio terminology at all times. Please do not use "Report to Follow"

13. The person in the right front seat of the apparatus shall be the primary radio operator.

14. The use of humor and slang is inappropriate and will not be tolerated.

15. The use of profanity on the radio is a violation of federal law and cause for disciplinary action.

16. The use of first names and nicknames should be avoided whenever possible.

Common Terminology

On the Air Responding	Off at the Scene	Nothing Showing	Light Smoke Showing
Heavy Smoke Showing	Fire Showing	Heavy Fire Showing	Out on Arrival
Clear From the Scene	Back in Quarters	Investigating	

Brush Fire Reports

Small Area	Large Area	Off With Smoke in the Area

MVA Reports

Number of vehicles involved *"(Single) Vehicle MVA with Entrapment / No Entrapment"*
Patient Entrapped, Extricated, etc. NOT Victim No Fire Response Needed

Apparatus Signing On

01. Only the first due unit should repeat the address of the incident in their transmission and start the message with the word "Fire Alarm" - *"Fire Alarm, Engine 5 is on responding to 300 Tremont Street, possible structure fire"*

02. All units following should not repeat the address and response info unless they need confirmation or have any doubts as to the response details. *"Fire Alarm, Engine 6 is on"*

03. Use common sense when signing on, especially apparatus that might be non-essential such as a breaker in South responding to a Structure fire in North. Choose your opportunity wisely. Allow for priority messages and incident setup by the Incident Commander before any non-essential radio traffic.

04. Mutual Aid responses Sign on Carver Fire Alarm – *Fire Alarm, Engine 3's on, Mutual Aid Plymouth, Station 2 coverage, switching to Plymouth Channel 1"* – Wait 20 seconds to make sure Fire Alarm doesn't need to give you any priority messages and then switch the towns Channel. Before signing on the Town's channel, listen to their frequency for radio traffic and sign on ASAP but only when you have proper air time. Just like manning the stations – wait! When you key the microphone you tie up their entire channel. Keep a portable on Carver Fire Frequency for "direct" other Carver units.

05. Apparatus on the air with one person on board should sign on as *"Engine 6 is on with one"*, AVOID USING THE TERM SHORTHANDED. Apparatus on with more than one person should sign on normally.

Apparatus Signing Off

01. First unit (including FF with personal P. Radio) off at an incident should take command unless circumstances dictate otherwise. A clear, concise, but **VERY BRIEF** report should be given when off at the scene, even if you are not assuming command.
Example – Fire Alarm, Engine 1 is off, nothing showing, 699 has command.
Off at the scene vs. off at an address –
IF WE HAVE AN ADDRESS **-** use *"Fire Alarm, Engine 6 is off at 140 Main Street, 109 has Command.*
IF WE DO NOT HAVE AN ADDRESS - use *"Fire Alarm, Engine 6 is off, 109 has Command".*

As with apparatus signing on, care must be taken when utilizing air time to sign off. If radio traffic does not permit, it is not the end of the world if you do not get your "off at the scene" message to dispatch as long as the IC knows that you are there.

Apparatus Clearing from an Incident and Back in Quarters

Command should not clear apparatus from scene, or state "Engine 1 will be clearing shortly". Officer on apparatus shall clear their apparatus when leaving the scene. All apparatus should notify dispatch that they are clear of the scene and back in quarters.

Example – "Fire Alarm, Engine 5 is clear of the scene. "Fire Alarm, Engine 5 is back in quarters".

Example – Fire Alarm from Tremont Street Command, overhaul is complete, command is terminated, Engine 5 is clear".

1.8 MOBILE AND PORTABLE RADIOS

As of this afternoon some radio programming changes have been made to all apparatus mounted mobile and portable radios. **These changes were made in an effort to maintain our ability to communicate effectively with our neighboring towns during mutual aid incidents.** The Kingston and Middleboro Fire Departments have each added a second channel to their communications systems and our new programming scheme reflects these changes.

Kingston has added a separate frequency to their radio system and functions as a typical repeater based system. Middleboro's second channel is their main frequency in talk around mode, or what we call "Direct". This is radio to radio communications with no repeater.

Our mobile radio function **has not changed** due to this update, the only difference being the addition of the two new channels as you navigate through the frequency dial. This is not the case with our portable radios as some of the functions have changed.

The two significant changes to our portables are as follows:

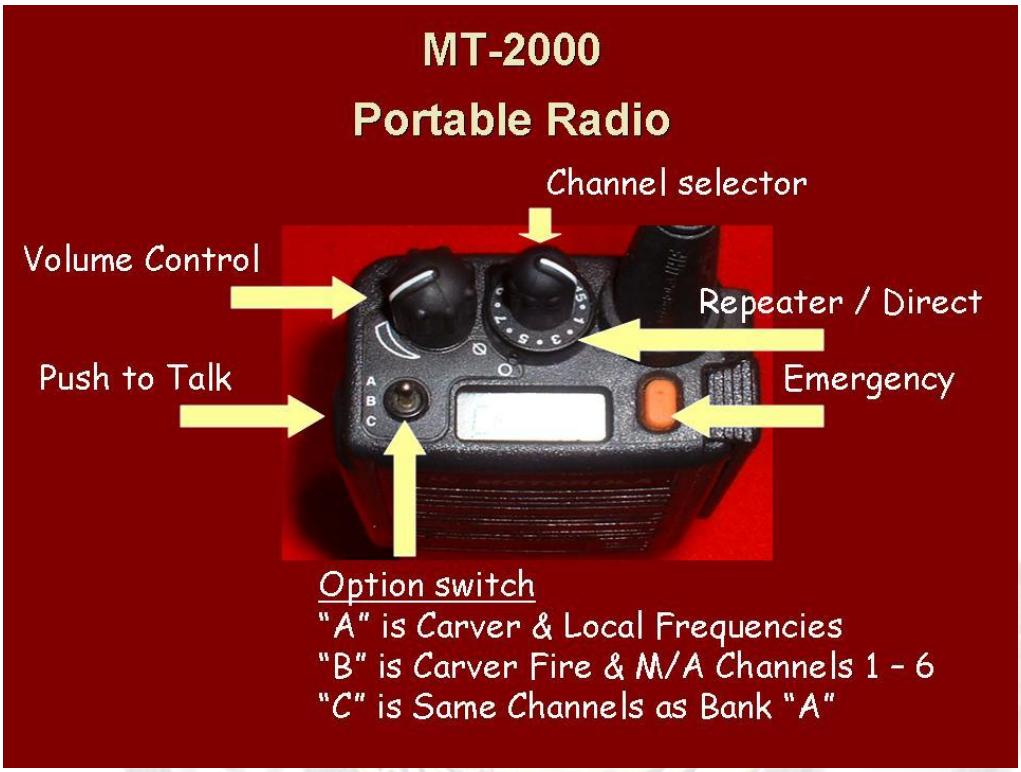
A - B - C SWITCH - The small silver switch on the top of the portable radio functions slightly different than it has in the past.

In the "A" position – The portable is in "repeater" mode and transmitting on the frequency that has been selected on the rotary dial. The frequency list ***has changed in this mode***. Mutual Aid frequencies 1 – 6 have been deleted from this mode to accommodate the addition of Kingston and Middleboro's new channels.

In the "B" position – The portable is again in "repeater" mode and transmitting on the frequency that has been selected on the rotary dial. The frequency list ***has changed in this mode***. Mutual Aid frequencies 1 – 6 reside here in addition to Carver Fire frequency.

In the "C" position – SAME AS POSITION "A"

TOP MOUNTED TWO POSITION ROTARY TOGGLE SWITCH – This two position rotary toggle switch is located under the rotary channel selector knob and is utilize to switch between "repeater" and "direct" modes (see pictures below)



When the rotary switch points to the white printed circle with a line through it, the radio is in "direct" mode.

When the rotary switch points to the white printed circle, the radio is in

"repeater" mode.

NOTE - the only visual indicator as to which mode the radio is in is the position of this switch. The only other indicator is scratchy or unreadable transmissions to your intended receiver.

1.8 RADIO FREQUENCIES

The channel bank frequencies are as follows:

BANK "A"	BANK "B"	BANK "C"
Carver Fire	Carver Fire	Carver Fire
Carver Fire Backup	Mutual Aid Ch1	Carver Fire Backup
Plympton Fire	Mutual Aid Ch2	Plympton Fire
Middleboro Fire Ch1	Mutual Aid Ch3	Middleboro Fire Ch1
Middleboro FireCh2	Mutual Aid Ch4	Middleboro Fire Ch2
Wareham Fire	Mutual Aid Ch5	Wareham Fire
Onset Fire	Mutual Aid Ch6	Onset Fire
Kingston Fire Ch1	Carver Fire	Kingston Fire Ch1
Kingston Fire Ch2	Carver Fire	Kingston Fire Ch2
Plymouth Fire Ch1	Carver Fire	Plymouth Fire Ch1
Plymouth Fire Ch2	Carver Fire	Plymouth Fire Ch2
Carver DPW	Carver Fire	Carver DPW
Carver Police	Carver Fire	Carver Police
Carver Fire	Carver Fire	Carver Fire
Carver Fire	Carver Fire	Carver Fire
Carver Fire	Carver Fire	Carver Fire

These programming changes in addition to the six Mutual Aid frequencies will help ensure communications interoperability with our neighboring communities, resulting in a safer work environment while operating at mutual incidents.

Please contact either Chief Weston or me with any questions.

1.9 SCAN FEATURE

Effective immediately the following policy is in effect for department portable radio's issued to Officers, the Divemaster and Assistant Divemaster;

01. Officers wishing to have their department issued portable radio's programmed to scan may do so.

02. The methodology to activate and deactivate the scan function shall be the button beneath the green button on the side of the radio.

03. The channel list in the portables will remain the same after our reprogramming on 6/29/06. No additional frequency's shall be added.

04. Scan should not be used at any official fire department incident or training exercise.

05. The Officer in Command at an incident may utilize the scan feature, or authorize others to use it, if he/she deems that circumstances warrant it.

06. Portables assigned to apparatus shall not be modified to scan.

07. Department members who have received permission to purchase and operate portable radio's on the Carver Fire Department frequency are subject to the same standards as outlined in items 4 and 5.

1.10 PURCHASE OF PERSONAL PORTABLE RADIOS

01. Members may purchase and use personal UHF portable radio's provided they obtain the proper authorization from the Chief of Department and conform to departmental standards at all times. This authorization may be revoked by the Chief at any time for failure to follow Carver Fire Department radio policy.

02. The permission will be subject to the following conditions;

A. The radio must be a hand held portable.

B. The radio must be narrow band.

C. The radio must transmit an MDC ID assigned by the Fire Chief at the start of every transmission.

D. The radio may only be used for appropriate fire department use.

E. Unless using an assigned incident command ID, the operator shall use his/her accountability number as an identifier.

F. The owner of the radio is responsible for maintenance of the radio.

G. The authorization is only for the UHF frequency licensed to the Carver Fire Department by the FCC. It does not authorize operation on any county or neighboring fire department frequency's.

H. If the radio was purchased 2nd hand, evidence must be shown that the radio has been checked out by a factory authorized technician. (8-05)

I. Any scan function in the radio should not be used at any official fire department incident or training exercise. (8-05)

J. The Officer in Command at an incident may utilize the scan feature, or authorize others to use it, if he/she deems that circumstances warrant it (8-05)

03. The permission process will be done in two steps.

A. The Firefighter should obtain written permission to purchase from the Fire Chief.

B. Once purchased, the Firefighter should bring the radio to the Fire Chief for verification that it transmits the proper ID code. Written authorization for use will be given at that time.

1.11 BACKUP RADIO (Dispatch)

There is a back-up radio in the dispatch that is completely stand-alone. It has its own antenna system and power supply, and it should work when all other radios or systems are not working.

01. Operation of this radio is very simple, however some important steps need to be done to assure there is no feedback to other radios.

A. Mute the primary Fire Channel on the primary console or you will get extreme feedback. BAD MOVE!

B. Turn up the volume on the back-up radio

C. Use the up and down arrows to make sure you are on the Fire frequency.

D. Key the microphone and make your **preliminary announcement**

E. Push the **red Fire Tone button** to cue the fire tone

F. Then key the microphone and the fire tone will go out.

G. Once the tone goes out, YOU HAVE TO WAIT A COUPLE OF SECONDS for the "HOME RXER TONE" ID to clear from the screen. If you do not wait until it clears you will put the Fire Tone out again when you key the microphone. BAD MOVE!
You can also press the home button or any button, right after putting out the town, to clear the queue, setting the radio back to Carver Fire.

H. Once clear, immediately make your announcement or the Fire minitors will not stay open and no one will hear your announcement.

I. Once your announcement is complete. Please un-mute the Fire Channel on the primary console

J. Turn down the volume on the back-up radio

<u>Please make a preliminary announcement before toning</u>