FEDERAL SIGNAL
Safety and Security Systems

UltraVoice® Compact Siren/Speaker

Models: RF100U, RF100H, RF100HX, and RF100UX

Setup, Program, and User Manual

25500714
Rev. A3 1023
Printed in U.S.A.

Limited Warranty

This product is subject to and covered by a limited warranty, a copy of which can be found at www.fedsig.com/SSG-Warranty. A copy of this limited warranty can also be obtained by written request to Federal Signal Corporation, 2645 Federal Signal Drive, University Park, IL 60484, email to info@fedsig.com or call +1 708-534-3400.

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Safety Messages

⚠ WARNING

It is important to follow all instructions shipped with this product. This device is to be installed by trained personnel who are thoroughly familiar with the country's electric codes and will follow these guidelines as well as local codes and ordinances, including any state or local noise-control ordinances.

After installation, service, or maintenance, test the system to confirm that it is operating properly. Test the system regularly to confirm that it will be operational in an emergency.

The UltraVoice® Compact Siren/Speaker (model RF100) has its own Installation Manual. See fedsig.com for online manuals.

General Description

Introduction

This manual describes how to set up, configure, program, and use the RF100 Siren/Speaker. See fedsig.com for other related online manuals.

This manual covers the following devices: RF100H, RF100U, RF100HX, and RF100UX; and refers to all models as RF100.

Federal Signal RF100 units can be set up in a wide variety of networks and configurations. This manual provides a standard setup and programming for the RF100. See the Commander® Software Reference Manual or contact Federal Signal for special applications using RF100 devices. "Appendix A Forms" on page 43 contains configuration tables for documenting how your RF100 and Commander® are programmed.

RF100 Overview

The UltraVoice® Compact Siren/Speaker (model RF100) is an outdoor or indoor RF-enabled high-powered speaker with an integral controller and radio. The RF100 is part of Federal Signal's UltraVoice series of products. Use the RF100 as a warning and alerting device with both audible and visual indicators. The audible capabilities include locally stored, high-quality, high-powered tones, pre-recorded voice messages, and live PA. The visual indicators include the use of strobes and lights. Equip the RF100 with up to four local initiation devices (switches) to activate the unit locally.

The RF100 is equipped with either a VHF or UHF two-way radio. The two-way radio allows for configuring the controller, activating the speaker, or polling for supervision. The radio and controller can accept single tone, two-tone, DTMF, EAS, and Federal Signal MSK digital for speaker communications. Using Federal Signal MSK digital provides a secure communications channel.

The RF100 has an internal 100-watt amplifier/driver to deliver tone warnings and intelligible voice messages from RF100 stored memory. The RF100 has software-configurable volume control for optimizing sound levels across your alerting area. The software-configurable volume control also includes an ambient noise monitoring capability to automatically adjust the volume depending on external noise levels.

The RF100 is powered from either 120/240 Vac or 24 Vdc. When the RF100 is powered from AC, there are four solid-state relay outputs to activate AC-powered visual alert

devices. When the RF100 is powered from DC, there is a DC solid-state relay output. The RF100 has a 1/2-inch NPT opening on the top of the speaker for simple installation of pipe mount devices such as strobes. The bottom of the speaker has three 3/4-inch NPT openings to allow access to power, relay outputs, and activation inputs. The rear cover also includes an N-type connection for the external RF antenna. Use the Commander® software system to configure the speaker for specific alerts and use the outputs for strobe or visual devices.

RF100 Setup

The typical setup of an RF100 consists of programming functions for specific actions the speaker performs. These can include voice announcements, siren tones, output activations, and volume adjustments. Once you configure these functions, an activation method is assigned. If the RF100 is being added to an existing system, the functions must be coordinated with the current system design/implementation. For example, live PA announcements are typically assigned to function 1. For new systems, Federal Signal can assist with best practices when designing your specific system. This manual assumes the overall design has been defined.

Programming the RF100

The following is a typical procedure for setting up and programming the RF100. Steps 1 through 3 are usually completed before installing the RF100. The programming of the RF100 requires the use of the Commander® Software System and the Ritron® radio software. This procedure guides you through common configurations. If the speaker is to be activated using DTMF, Duotone, or EAS, many of these steps are not required.

1. Configuring the Radio: Before installing and programming the RF100, configure the radio to operate on your FCC-licensed radio channel. Use the radio software to set the frequencies and the tone or digital squelch.

2. Assigning the site ID: Before installing the RF100, the site ID is assigned. When used with the Commander® software, you must reserve the next sequentially unique numeric site ID numbers for use by the Commander® software to identify each siren device. The site ID will be known as the RTU number in the Commander® software.

3. Programming the microSD Memory Card: Before installing the RF100, the microSD memory card is programmed with digital voice or tone files required for your system. See “Appendix B Standard DV Messages” on page 51.

4. Configuring Commander® to Communicate with the RF100: Before programming the RF100, select your communication channel, interface type, and port. Set your Front Porch time, determine the number of times the CCU will try to contact an RTU, and determine how many seconds to wait between attempts.

5. Configuring the Encryption Key and Security Code (Optional): Before programming the RF100, the Encryption Key and Security Code can be installed. Security is an important part of any networking system. Federal Signal provides two types of security for Commander® and the RF100s: Security Code and Encryption Keys. If using Commander®, you can change Security Codes and Encryption Keys over the air or by using a serial connection to the RF100.

6. Configuring the RF100: Using the RTU Configuration dialog box, select the unit type as RF100, copy configurations from other units, allow Duotone or EAS, and set the tone file used for siren tones. This dialog box also allows Commander® to download the current programming of the RF100. Once the selections are made, Save the selections or Quit to discard changes. If changes are made to the speaker, they must be sent to the speaker using the Configure RTU General Parameters dialog box Send option.

7. Use the Configure RTU General Parameters dialog box to configure general parameters for the RF100. For example, assign the RF100 its Station Name, Station Address, Latitude, and Longitude. Select front porch timing, assign repeater number if being used as a repeater, reporting, security options, and channel selection. If changes are made to the speaker, they must be sent to the speaker using the Configure RTU General Parameters dialog box Send option.

8. Programming Functions: Use the Program dialog box to create program functions, assign inputs to activate functions at the speaker, assign DTMF codes for over-the-air activations, assign Duotone frequencies or EAS Events to specific functions.

The following pages detail the dialog boxes and descriptions of the RF100 options.

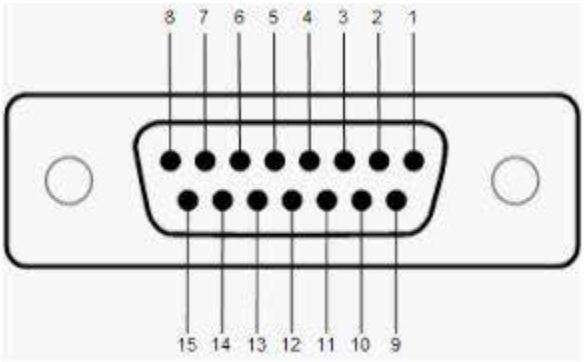
1. Configuring the Radio

Before installing and programming the RF100, configure the radio to operate on your FCC-licensed radio channel. Use the radio software to set the frequencies and the tone or digital squelch. See the “Programming the Ritron® Radio” on page 10 for more information.

Ritron® Radio Interface

The following picture illustrates the Ritron® Radio Interface connector.

Figure 1 Ritron Radio Interface Connector



The following table describes the functions of each pin.

Table 1 Ritron Radio Interface

Pin #	Function
1	Least significant channel select bit (CS0)
2	Channel select 1 (CS1)
3	Most significant channel select (CS2) Binary 4, 2, and 1. All open = channel 8 (7 binary).
4	Microphone input
5	High/low power select (pull low to get low power)
6	+ 9 to 17 Vdc input
7	Auxiliary input, 8-2500 Hz, 1.5/3.0 kHz deviation with 300 mV_{P-P}
8	Auxiliary output, >/= 600 Ω, 12 to 2500 Hz, 1 V_{P-P} for 1.5/3.0 kHz deviation
9	PC programming port, single wire TXD/RXD, 3-5 V, 2400 baud, not inverted, start bit low
10	Volume control (RSSI option)
11	Auxiliary monitor input (pull to ground to open squelch). Can be used for tone detect.
12	Speaker output
13	Carrier detect output (pulls to 3.3 Vdc through internal 390 Ω)
14	PTT (pull to ground to transmit), with time-out-timer
15	Ground

Programming Cable

Figure 2 Transceiver/Programming Cable

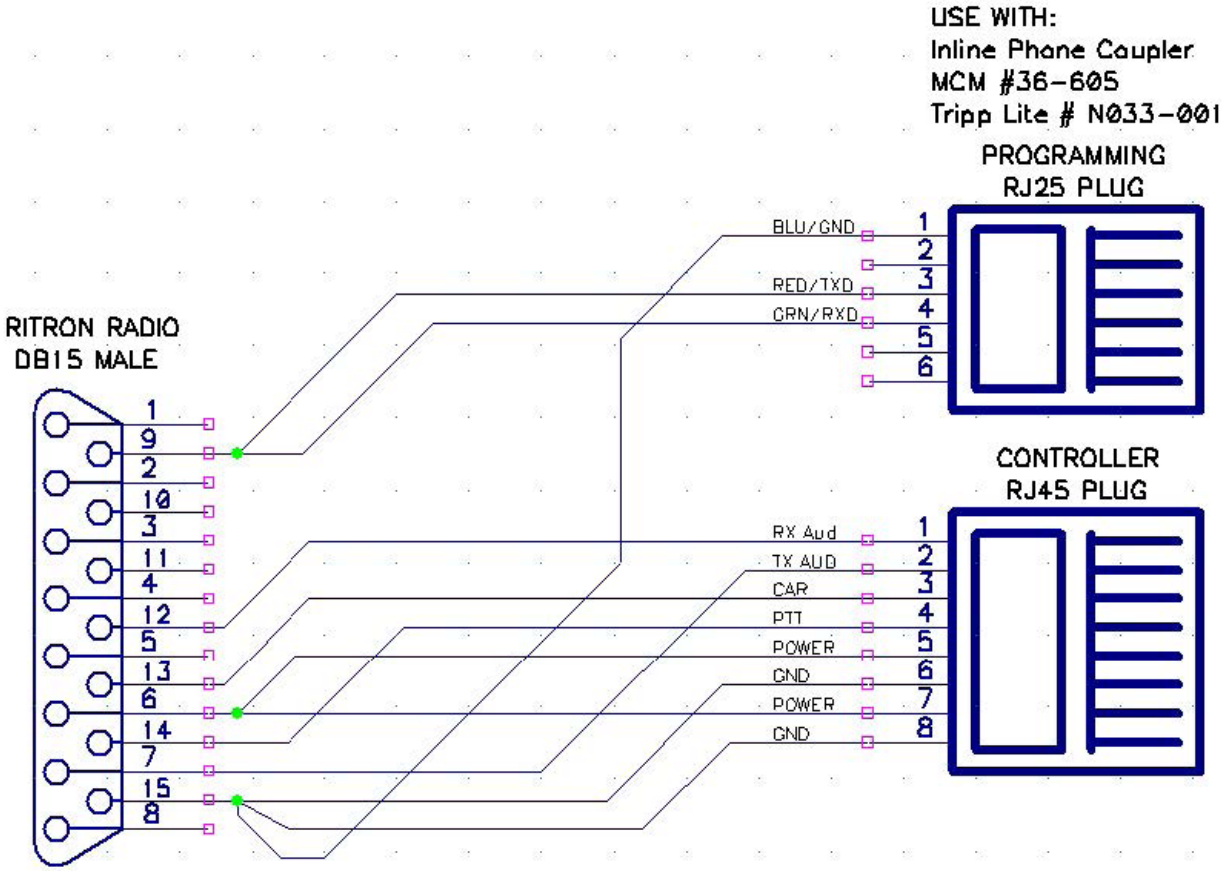


Table 2 Transceiver/Programming Cable

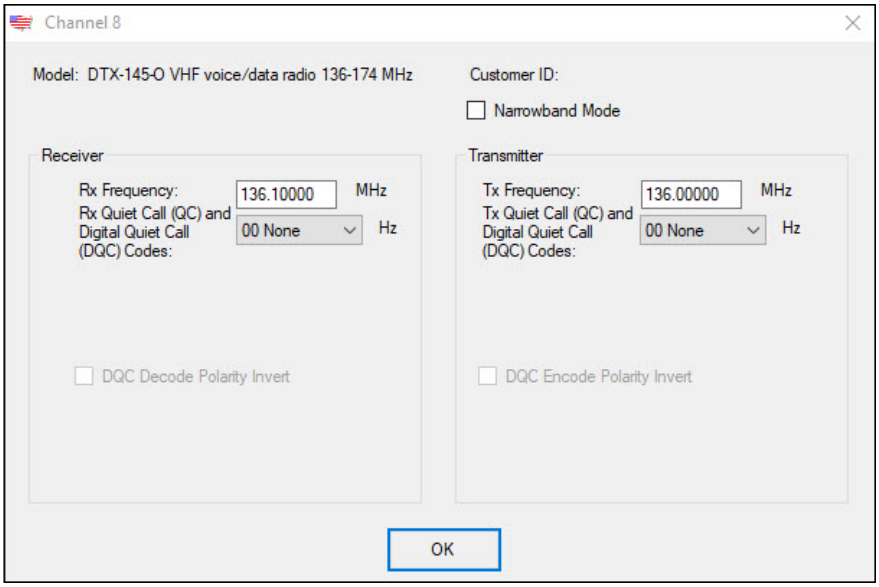
Ritron® DB15	Controller RJ45	Programming RJ25
6, +12 V Power	5 and 7, +12 V power	
7, Auxiliary input	2, TX Audio	
9, Serial Data		3 and 4
12, Speaker Audio	1, RX Audio	
13, Carrier detect	3, Carrier Detect	
14, PTT	4, PTT	
15, GND	6 and 8, GND	1, GND

Programming the Ritron® Radio

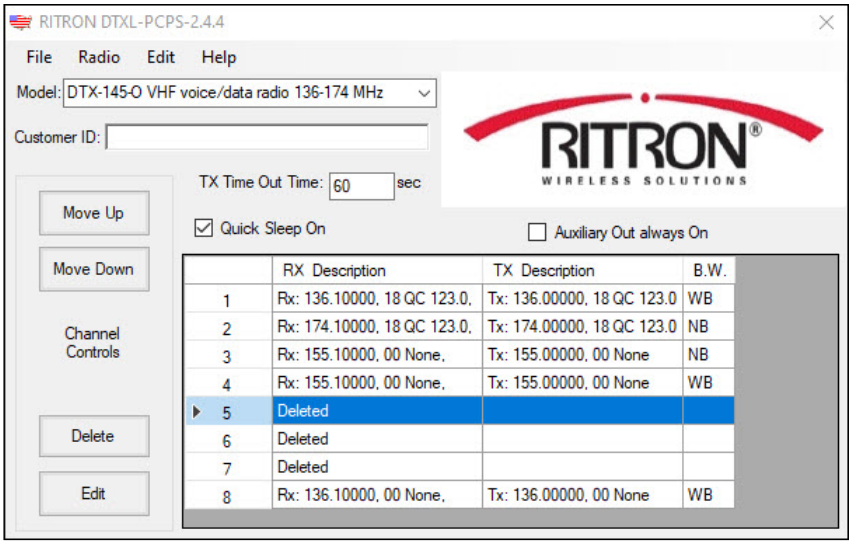
Before installing and programming the RF100, configure the radio to operate on your FCC-licensed radio channel. A programming software kit is required to program the radio (part number Q19902536A). The kit includes programming software and a USB interface cable. Once the software is installed, check for a DTX LS update at https://www.ritron.com/tech. Connect the radio to your computer with the Ritron® 9/USB-PAS USB programming cable. Use the radio software to set the frequencies and the tone or digital squelch.

To program the Ritron® radio:

1. Install the Ritron® radio software.
2. Connect the Ritron® radio with the 9/USB-PAS programming cable.
3. From your computer, start the software and select the proper Com port.
4. Select your model name or read the radio.
5. Type your Customer ID.
6. Select channel 8 and click the Edit button or double-click channel 8. The Channel 8 dialog box appears. Here you can set the frequencies and the tone (QC) or digital (DQC) squelch if used.

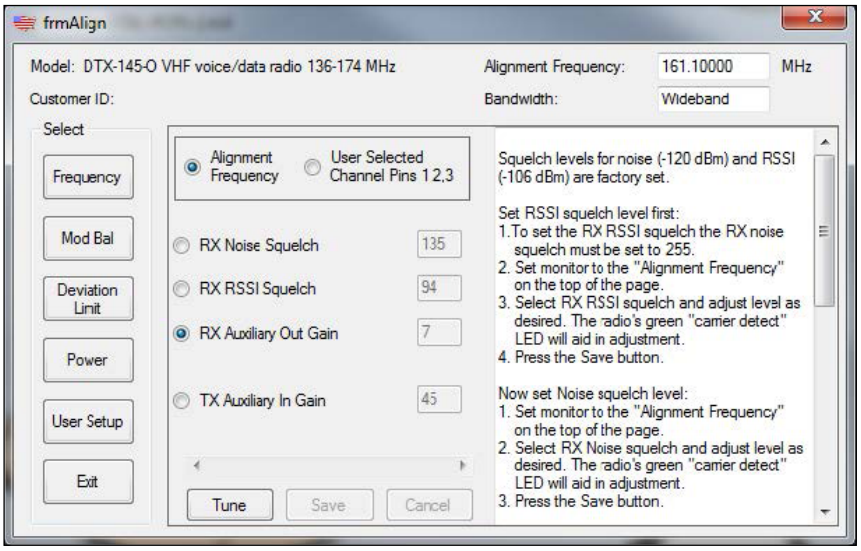


To delete a channel, select the channel and click the Delete button or right-click the channel and select Delete.



7. Click Radio > Program Radio.

8. Click Edit > Tune Radio.



9. Click the User Setup button and select the RX Auxiliary Out Gain option on the Tune button.

10. Use the slider to set the level to 7, and then click the Save button.

2. Assigning the Site ID

When used with the Commander® software, you must reserve the next sequentially unique numeric site ID numbers for use by the Commander® software to identify each siren device. The site ID is the RTU number in the Commander® software.

Do not duplicate IP addresses or site ID numbers on the network at any time, or network errors occur. The Siren Site ID numbers start at number 001 and are numbered sequentially. Commander® Control Station Site ID numbers start at number 900.

Site Address Switch–Located on the control board (S1)

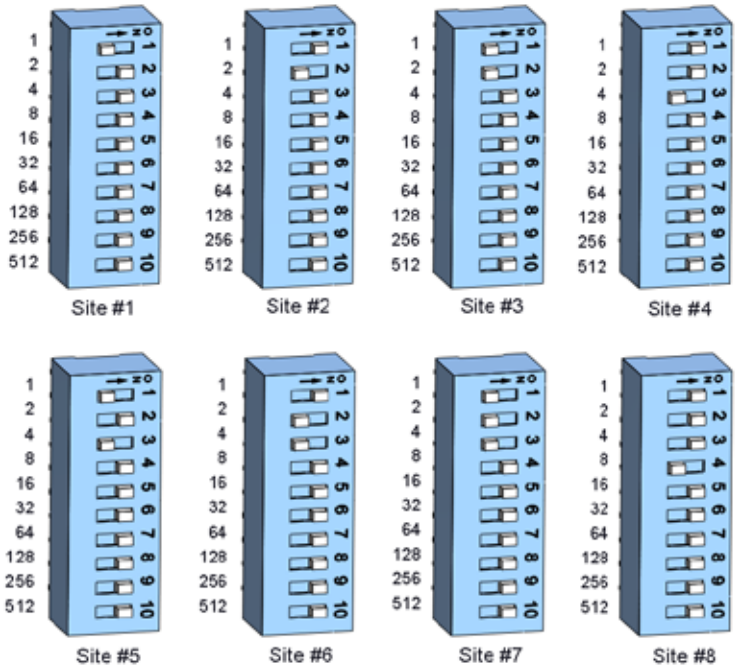
For digital systems only: For the siren to report back with its identity, define the site address by setting DIP switches located on the board. The DIP switches have values of 1, 2, 4, 8, 16, 32, 64, 128 256, 512. Add appropriate DIP switch values to define the site number address.

Example

To define the board for Site #1, toggle the first DIP switch to the left. All other DIP switches are to the right. For Site #2, toggle the second DIP switch to the left. For Site #3, toggle the first and second DIP switch to the left. For Site #4, toggle the third DIP switch to the left. For Site #5, toggle the first and third DIP switch to the left. Continue this method to define other site number addresses.

TIP: Sliding the DIP switch towards the number printed on the circuit board enables that number value.

Figure 3 Setting the Switch Number Example



Switch number	1	2	3	4	5	6	7	8	9	10
Binary number	1	2	4	8	16	32	64	128	256	512

Example: Switch numbers 1, 2, and 3 are binary numbers 1, 2, and 4.

Add 1 + 2 + 4 = 7; 7 is the unit address

NOTE: Programming details are in the software manual. The site address is stored at power up of the controller. If the site address is changed, the power (battery and AC) must be turned off and then on.

3. Programming the microSD Memory Card

The RF100 control board includes a microSD card capable of storing over 4,000 voice or tone messages that total up to 17 hours of total recording time.

The digital voice message file format is 8000 samples per second, 8 bit, mono. Siren sounds, horn sounds, and music should be at no more than 90% of the maximum level (-1 dB) to prevent them from overdriving the amplifier and overpowering the drivers. These can be normalized to set them at the maximum level and then reduced to 90% or -1 dB. This will deliver full nominal output power.

Save these messages with a DV#.wav naming format, or the messages are not recognized. This naming format results in messages DV1.wav through DV4093.wav. Federal Signal recommends using the Digital Voice Wizard.

Changing the files on the microSD card

The RF100 comes from the factory with a standard set of voice and tone files loaded on the microSD card. Federal Signal can provide custom or standard voice messages.

To change the files on the microSD card:

1. Remove the microSD card from JP10.
2. Use a PC to change, add, or delete files.
3. Reinsert the microSD card back into JP10 before closing the RF100.

You need to filter the files to reduce content below 300 Hz. This prevents low-frequency tones in a recording from saturating the output transformer and the speaker drivers.

NOTICE

SPEAKER DAMAGE: The speaker drivers cannot reproduce these frequencies and can be damaged by them.

Digital Voice Wizard

Loading voice or tone files onto the microSD card requires a PC and proper file naming. Use the Digital Voice Wizard to load and name files onto a microSD card correctly.

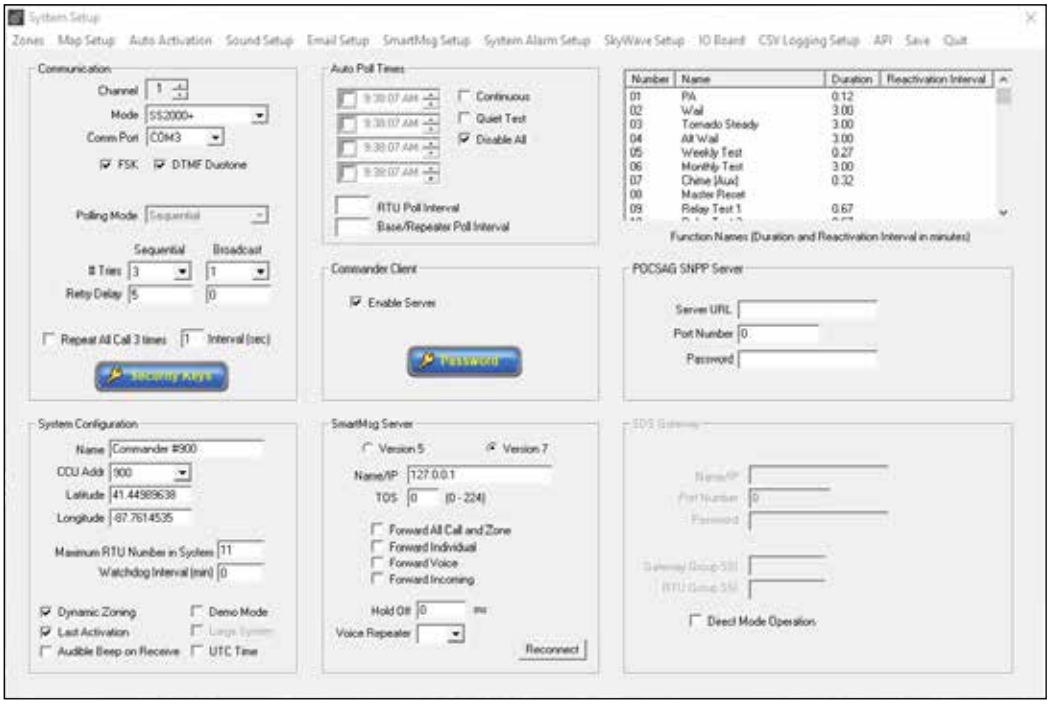
4. Configuring Commander to Communicate with the RF100

Use the following procedure to configure Commander® to communicate with the RF100. Each of these options is detailed in this section with descriptions.

To configure Commander:

1. Start the Commander® application. From the Commander® main window, click System Setup.

The System Setup dialog box appears.



2. In the Channel box, select your communication channel.

3. In the Mode list, select the type of communication interface Commander® uses to communicate with the sirens on the respective channel.

4. In the Comm Port, select your communication port.

5. If you selected the SS2000+ or Modem Modes, the FSK and DTMF Duotone check boxes appear. Select the FSK check box to communicate with siren sites digitally. (Most systems use this option.) Select the DTMF Duotone check box to transmit DTMF or Duotone codes.

NOTE: The DTMF Duotone selection will not allow programming or configuration changes of the RF100; therefore, it should not be selected until all system programming is completed in the FSK mode. Once the configuration is complete, the DTMF Duotone feature can be enabled as needed.

6. If you selected the Serial Mode, the Baud Rate option appears. Select this option to allows direct communication to sirens or other RS-232 devices.

7. In the Front Porch box, type your front porch time. This option is only available with the Modem Mode.

NOTE: Typical radio systems perform optimally with a Front Porch time of 500 ms. Increase or decrease values according to the nature of the radio system being used.

8. In Polling Mode, select Sequential or Broadcast. If this control is unavailable, accept the default value. Most systems will use Sequential Mode. The Broadcast mode is only available with SmartMsg, TCP, UDP, FSModem-Cellbase, SkyWave IDP, AtHoc, Tetra1, and Tetra2.

Sequential Mode polls units one at a time sequentially. Broadcast Mode polls all units at the same time.

When Broadcast mode is used, the Retry Delay must be long enough to ensure all RTUs have time to respond. Typical values are 120 seconds with a Skywave IDP channel and 15 seconds without a Skywave IDP channel. **NOTE**: Broadcast mode may only be used on channels that allow multiple devices to communicate on a channel at the same time, for example, satellite and IP channels.

NOTE: Sequential Mode is required for all systems except the IP/TCP systems and any other communications method that requires Sequential Transmission to be enabled.

9. In the #Tries list, select the number of times the CCU will contact an RTU before considering the communication attempt to be a Comm Fail.

10. In the Retry Delay box, type how many seconds to wait between attempts to contact an RTU.

NOTE: Set the Retry Delay to a value longer than the time required to poll a single RTU. This allows Commander® to wait a sufficient amount of time before attempting a retry. A value between 5 and 7 seconds is optimal for a typical radio system.

11. Select the Repeat All Call 3 times to send All Call and Zone activation transmissions three times.

12. In the CCU Addr, type the unique identifier for the Commander® site.

13. Click Save.

Review the following table for more information about the fields on the System Setup dialog box in the Communication panel.

Fields	Description
Channel	Commander® supports up to four communication channels. Each channel is assigned a Mode and Com Port number (if applicable). Using multiple channels allows Commander® to support multiple communication modes. It is important to remember the following limitations when using multiple channels: • The Com Port setting must be unique for all channels using an RS232 serial port. • All configured channels are used in parallel as opposed to a primary channel with failover implementation.

Fields	Description
Mode	Selects the type of communication interface Commander® uses to communicate with the sirens on the respective channel. See “Mode Options” on page 17 for more details. The following features are dependent on the Mode selection: • PA (VOIP): Only available when Mode is SmartMsg, Modem, or SS2000+ • DTMF and Duotone Encode: Only available for SS2000+ and Modem Click the Mode arrow to see options.
Com Port	The Communication Port is available for modes using a USB or RS232 serial port. Only ports currently available on your system are available for selection.
Front Porch	Front Porch is the amount of time when the PTT is asserted, and the analog or data starts streaming. The time gives the transmitting radio time for the transmitter to come up to full power and the receiving radio time to detect the signal and start receiving before the analog or data starts. To set your front porch: enter a value between 0-10000 milliseconds. Most conventional radio systems will require a front porch between 300-1000 ms depending on the model transceiver employed. For systems using the SS2000+, the front porch is set by the SS2000+, and this parameter is ignored.
Polling Mode	Determines how the units are polled when a Poll All is initiated. Select either Sequential or Broadcast for each channel used. Select Sequential Mode to poll each RTU one at a time in numerical order. Sequential polling is required for conventional radio networks and serial data channels that do not allow more than one device to communicate on the channel at the same time. Select Broadcast Mode to issue a single All Call poll request to all RTUs at the same time. Broadcast polling is faster and more efficient because it reduces the total amount of traffic on the channel. Verify the communication channel can support the amount of traffic generated by simultaneous channel use before enabling Broadcast Mode. If both Sequential and Broadcast channels are enabled, the Broadcast is sent first, followed by sequential transmissions to each site. Sequential and Broadcast each have their own Number of Tries and Retry Delay parameters. For Broadcast mode, the Retry Delay must be long enough for all sites to report in. Dynamic Zoning must be enabled to allow polling retry attempts to occur on a Broadcast channel. When both polling modes are used with an RTU, COM fails will not be logged until all retries and retry delays have ended.
# Tries	Determines how many times the CCU will try to contact an RTU before considering the communication attempt to be a Comm Fail. The CCU will wait between tries the number of seconds indicated by the Retry Delay.

Fields	Description
Relay Delay	Determines how many seconds to wait between attempts to contact an RTU. Set the retry delay to a value longer than the time required to poll a single RTU. This value will vary depending on the communication channel and equipment employed. A value between 5 and 10 seconds is optimal for a typical conventional radio system.
Repeat All Call 3 times	When checked, All Call and Zone activation transmissions are sent three times. When unchecked, All Call and Zone transmissions are sent once. Typically this should be checked to decrease the likelihood of noise on the channel causing a missed activation. If multiple transmissions are causing a problem with live PA, disable this feature. It may also be necessary to disable this feature when all call repeaters are used if there is not enough time between repeats for the repeat sequence to complete. **NOTE**: This setting does not affect programmable HotKeys. HotKeys have their own Repeat All Call 3 Times setting, which may be independently configured for each HotKey.
Interval	Type the repeat Interval in seconds. This field applies even if Repeat All Call 3 times is unavailable because HotKeys can be configured to Repeat as well.
Security Keys	Click the Security Keys button to open the Security Keys dialog box to view or modify the keysets used to encrypt communication.

Mode Options

These types of communication interfaces are available for the Mode option.

Disabled

Select Disabled to disable mode.

SS2000

Select when interfacing to the Federal Signal SS2000 console. The Com Port option becomes available.

SS2000+

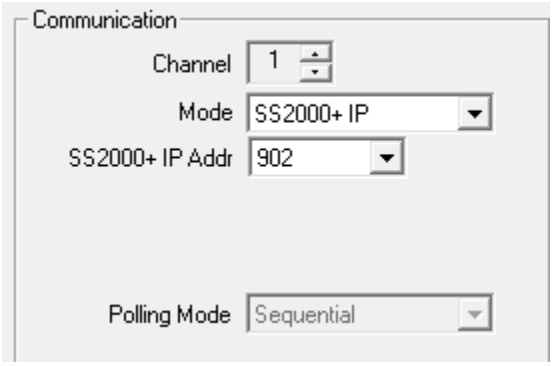
Select when interfacing to the Federal Signal SS2000+ using an RS232 connection. Select an active serial Comm port from the drop-down menu. The connection status of the SS2000+ is monitored on the SS status bar at the bottom of the screen.

The following check boxes appear:

- FSK: Click to communicate with siren sites digitally. (Most systems use this option.)
- DTMF Duotone: Click if the SS2000+ is used to transmit DTMF or Duotone codes.

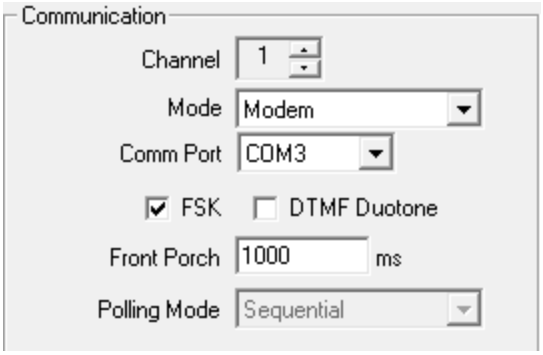
SS2000+ IP

Select the SS2000+ IP mode to connect to the SS2000+ using a LAN connection instead of an RS232 connection. This mode communicates through a SmartMsg communications service using port 16887 and does not support live streaming audio (PA-VOIP/PA-WAV). You must enter the SS2000+ CCU Address to use this mode. The connection status of the SS2000+ is monitored on the SS status bar at the bottom of the screen.



Modem

Select when interfacing to the Federal Signal model MODEM-MSK. The Comm Port and Front Porch options becomes available.



The following check boxes appear:

- FSK: Click to communicate with siren sites digitally. (Most systems use this option.)
- DTMF Duotone: Click if the modem is used to transmit DTMF or Duotone codes.

SmartMsg

Select SmartMsg when communicating to sirens on the Federal Signal SmartMsg platform. When SmartMsg mode is selected, the root SmartMsg server must be specified in the SmartMsg Server panel on the System Setup dialog box.

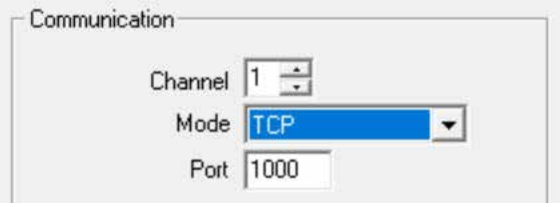
TCP and UDP

Select TCP to communicate with IP-enabled RTUs. This mode requires the RTU to be equipped with a device or module enabling network connectivity such as a Cellular modem. Use UDP mode to interface with Motorola P25 trunked radio networks.

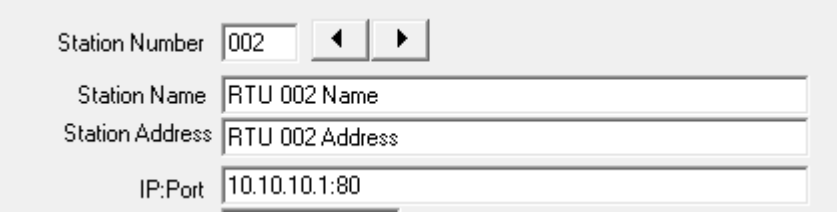
Configure Commander® and the RTU correctly for successful TCP mode communication.

TCP mode requires the configuration of the following parameters:

- TCP Port (System Setup): The TCP Port Commander® will use to listen for incoming connections.



- IP:Port (Configure RTU General Parameters): The IP Address and Port Commander® will use to initiate the connection with the RTU.



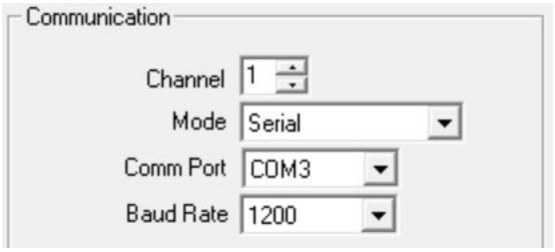
RTU TCP interface

The configuration of the RTU interface unit will vary depending on the device used. Below is a list of general guidelines for configuring a TCP/IP device.

- Configure the device for TCP/IP communication.
- Set the Destination or Auto Connect IP Address to the IP Address of the Commander® computer.
- Set the Destination or Auto Connect Port number to the TCP Port configured on the Commander® System Setup screen channel.
- Set the Device listening port number. This is the port Commander® will use to initiate a connection to the device and must match the Commander® Configure RTU General Parameters setting for the RTU.
- Configure the device RS232 settings: 9600,N,8,1 no handshaking.
- Check network and PC firewall settings. Allow incoming connections on the specified port and any ports used for the configuration of the device.

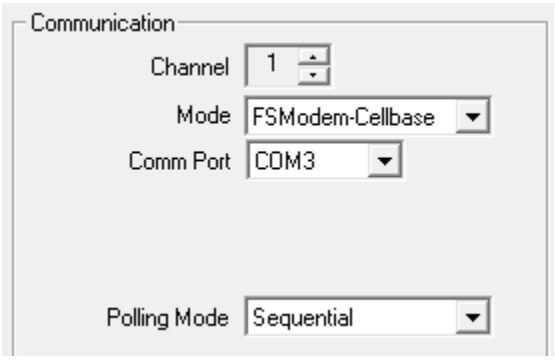
Serial

Select to allow direct communication to sirens or other RS-232 devices such as MOTOTRBO and RF modems. Serial mode requires the selection of a Comm Port and Baud Rate. For direct serial communication to sirens, set the baud rate to 1200 or 9600 depending on Unit Type and configuration.



FSModem-Cellbase

The interface uses a USB or RS232 connection and requires the communications port to be selected from the drop-down menu. The connection status of the FSModem-Cellbase is shown on the status bar at the bottom of the screen.



SkyWave IDP

NOTE: SkyWave is obsolete.

Select SkyWave IDP for interfacing to SkyWave satellite terminals. SkyWave IDP mode requires the configuration of additional parameters on the SkyWave Setup dialog box accessed from the System Setup menu bar. In addition, each RTU must be assigned the associated SkyWave Terminal ID number on the Configure RTU General Parameters dialog box. See the Commander® Software Reference Manual, 25500646, for more details.

AtHoc (optional)

The AtHoc mode enables a custom peripheral serial interface.

Tetra1 and Tetra2 (optional)

The Tetra modes are designed to be used with systems communicating on a Tetra trunked radio infrastructure.

- Tetra1 = TMRI-880i radio
- Tetra2 = Motorola MTM-5400 and Supra

5. Configuring the Encryption Key and Security Code (Optional)

Security is an important part of any networking system. Federal Signal provides two types of security for communications between Commander® and the RTUs (that is, the RF100). All RTUs are required to have the same encryption key and/or security code as defined below:

- Security Code: Security codes are often used with radio-based systems where two separate siren or RF100 networks are adjacent, and there is concern that activation of one system might inadvertently activate the neighboring system.
- Encryption Key: Federal Signal provides 128-bit and 256-bit encryption options for RF100 devices. Older hardware (RTUs) may not be compatible with 256-bit encryption; therefore, 128-bit encryption may be required for backward system compatibility. Contact Federal Signal Technical Support for information regarding which hardware is compatible with 256-bit encryption. See “Getting Service” on page 42.

If you are adding a new RTU (RF100) to an existing secured system, the RTU will require the Encryption Key or Security Code to be installed on the RTU, or the RTU will not communicate with Commander. Security Codes and/or Encryption Keys can be programmed into the RTU (RF100) during installation by using the Federal Signal Universal Programmer and the USB Flasher software package.

If creating a new system, Federal Signal recommends configuring and programming all devices and verifying that all RTUs are properly communicating with Commander®. Then use Commander® to apply the Encryption Key and Security Code to all devices.

If the Encryption Key and Security Code do not match between Commander® and the RTU, a communication error is reported.

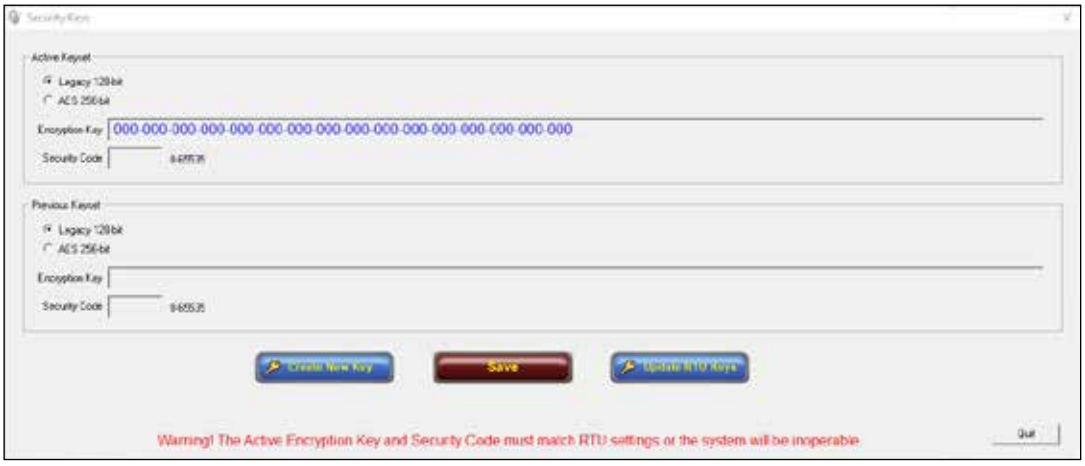
To change the Security Code and Encryption Key:

1. From the Commander® main window, click System Setup.

The System Setup dialog box appears.

2. Click Security Key.

The Security Keys dialog box appears.



Fields	Description
Active Keyset	Keyset used to send and receive all messages except Update RTU Keys.
Previous Keyset	Keyset used to send the Update RTU Keys message. The purpose of this keyset is to facilitate sending the Update RTU Keys command to RTUs currently running on the previous keyset. The previous keyset is automatically populated when clicking the Create New Key button and must always reflect your system's previous keyset when performing remote updates.
Legacy 128-bit	Set Encryption key cipher for legacy 128 bit.
AES 256-bit	Set Encryption Key cipher for AES256 (FIPS PUB197).
Encryption Key	The Encryption Key performs scrambling of the data transmission. Like the Security Code, the Encryption Key is assigned to each RF100 in the system and must be the same for successful communication. There is no open setting for the Encryption Key. The key values must match.
Security Code	A 16-bit code (0-65535) that is programmed into each RTU, SS2000+, and Commander® control system. The RTU, SS2000+, and Commander® security codes must match for successful communication. The RF100 security code is programmed during initial programming and into RTUs by using the Universal Programmer. If the RTU, SS2000+, and Commander® security codes do not match, a communication fail error occurs. This feature helps prevent unauthorized system access and activation. A key value of 65535 is defined as an open system. Base stations and sirens programmed with this value communicate with any other siren or base station regardless of its key value.
Create New Key	This operation will copy the Active keyset into the Previous keyset and auto-create a new Active Encryption Key. The Previous keyset is used for sending the Update RTU Keys message to RTUs. Only one control station in your system may auto-create a key. The remaining control stations must be updated manually to match the auto-created station's Encryption Key and System key values. After clicking the Create New Key button, you can manually edit the active Encryption Key and/or Security Code. **IMPORTANT**: Never manually edit the Active Keyset before clicking Create New Key, as the previous key would not contain the correct previous value. When performing remote key updates, the previous key must reflect the keyset of the RTUs.
Save	Saves your changes.
Update RTU Keys	Sends the Active Keyset to all RTUs and eavesdropping control stations. **IMPORTANT**: Not all RTU types and firmware versions support remote key updates. RTUs that do not support remote key updates must be updated locally using the Universal Programmer. The Update RTU Keys is sent using the previous keyset. The previous keyset must match the RTU's current setting.
Quit	Exits the dialog box without saving.

Usually the Security and Encryption keys are set at system commissioning and are not changed again. If it becomes necessary to change either the Security Code or Encryption Key, you must flash or program all RF100s in the system with the new settings. Only trained personal should perform this procedure.

Commander® systems support two modes of encryption:

- Legacy (128 bit): Supported with all RF100s.
- AES (256 bit) AES conforms to the Advanced Encryption Standard (FIPS PUB 197): Supported with all Series C RF100s.

6. Configuring the RF100

Using the RTU Configuration dialog box, select the unit type as RF100, select if the speaker will use Duotone or EAS for activation, and select the different tone tables. If you need to configure multiple speakers, use the Copy from another RTU section to push programming across similar units. You can also use this dialog box to download the configuration of the speaker.

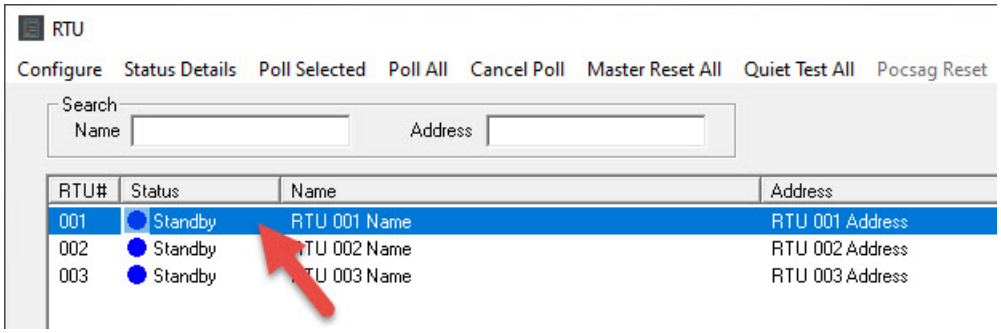
Commander® Software version 15.8.0.36 or greater is required for configuring all RF100 models. Software upgrades are available at no additional cost to all customers subscribed to a software maintenance plan. Contact Technical Support for upgrade assistance. See “Getting Service” on page 42.

To configure the RTU in Commander®:

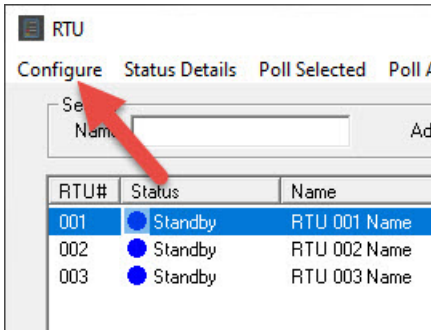
1. If you are adding an RF100 to an existing system, verify that the number of RTUs is set properly.
2. From the Commander® main window, click System Setup.

   The System Setup dialog box appears.
3. Under the System Configuration section, update the number of RTUs to the total number on your system in the Maximum RTU Number in System box, and then click Save.
4. From the Commander® main window, click RTU.

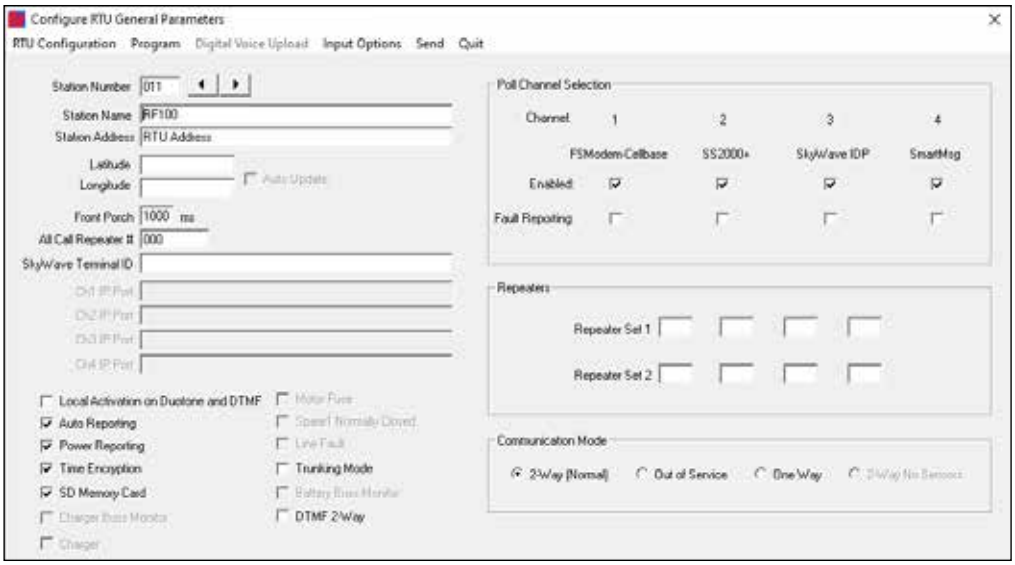
   The RTU dialog box appears.
5. Select the unit to configure.



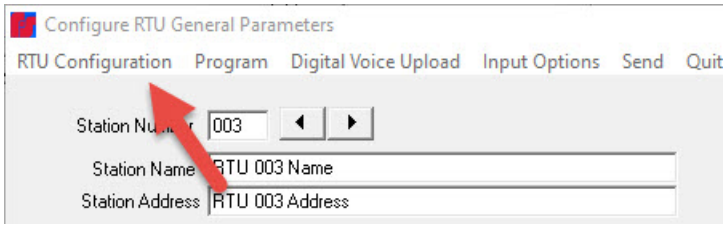
6. Click Configure.



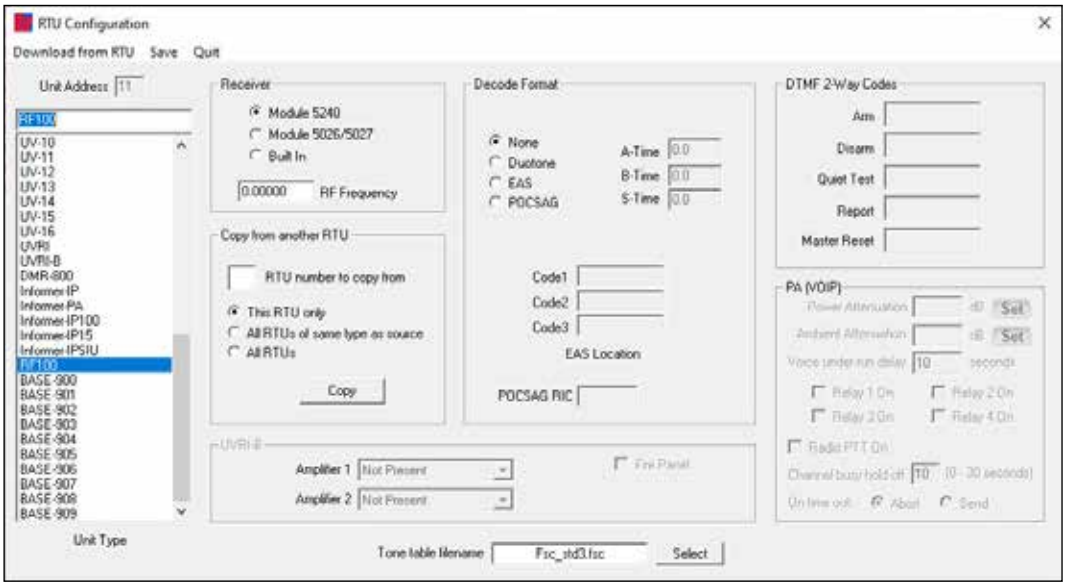
The Configure RTU General Parameters dialog box appears.



7. Click RTU Configuration.



The following dialog box appears.



Fields	Description
Unit Address	Displays the RTU site number of the selected RTU.
Unit Type	RF100. Use for all RF100 series products.

Copying Functions from another RTU

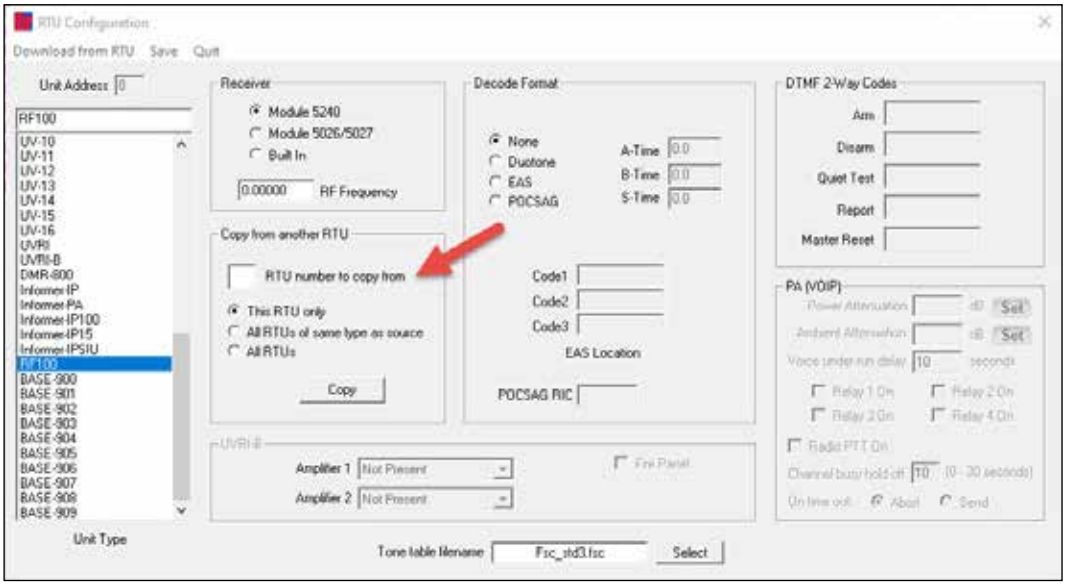
To shorten the time to configure an RTU, you can copy the programming from a source RTU into another RTU. All parameters and program functions are copied except site name, address, and any stored messages.

NOTE: Federal Signal recommends copying from the same RTU type, for example, an RF100. Take special care to review all parameters copied to ensure program commands have been copied over from the source RTU as expected and ensure unexpected alterations have not occurred to the program copied from the source RTU.

If not copying from another RTU, see “Configuring Individual RTUs” on page 27.

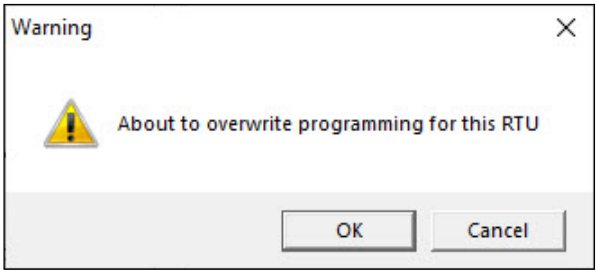
To copy the programming from another RTU:

1. From the RTU Configuration dialog box, enter the number of the desired source RTU in the RTU number to copy from text box.



2. Click Copy.

   The following message box appears.



3. Click OK.
4. Click Save to save the current settings and exit this screen. If there are any errors in your data, an error message box appears.

   The Configure RTU General Parameters dialog box is now active.

   NOTE: It is necessary to send the Program block command to the RTU before changes will take effect at the respective RTU.

5. Click Send.

   See “Programming Functions” on page 36 for the complete steps on programming RF100 serially over the air.

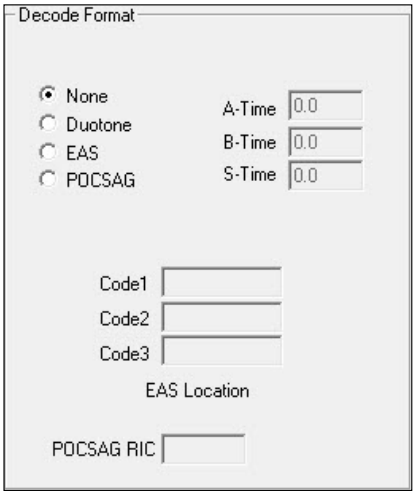
6. Click Quit to quit the RTU Configuration screen without saving. Configuration parameters remain as they were when the Configuration screen was opened.

Configuring Individual RTUs

To configure individual RTUs:

1. For each RF100, select RF100 from the Unit Type list on the left.
2. Select if the unit uses Duotone or ESA for activation.
   - If using Duotone, type the A-Time, B-Time, and S-Time intervals.
   - If using EAS, type the EAS codes.

   The following is the Decode Format section.



All units decode FSK (digital) and DTMF signaling; however, Duotone and EAS decoding are mutually exclusive. Select the desired decode format by clicking the option button.

Fields	Description
Duotone Timing	Enter the Duotone timing for the A-Tone, B-Tone, and S-Tone (single) in the fields provided. S-Tone must be set to zero if single tone decoding is not employed.
EAS Location	For units using EAS decoding, enter one to three location codes. For EAS activation, the following conditions must be valid: • The location code of the transmitted EAS message matches one of the three programmed location codes. • The EVENT code of the transmitted EAS message matches an event code assigned to an activation function. **NOTE**: EAS and Duotone activations are mutually exclusive. For EAS activation to be functional, EAS must be selected as the Decode Format.

Fields	Description
POCSAG RIC	POCSAG RIC (Receiver Identity Code) is not used with the RF100.

3. If a different tone file is to be used for the standard siren tones, select it using the Select button.

4. Click Save to save the current settings and exit this screen. If there are any errors in your data, an error message box appears.

The Configure RTU General Parameters dialog box is now active.

NOTE: It is necessary to send the Program block command to the RTU before changes will take effect at the respective RTU.

5. Click Send.

See steps 10, 11, 12 on page 33.

7. Using the Configure RTU General Parameters dialog box

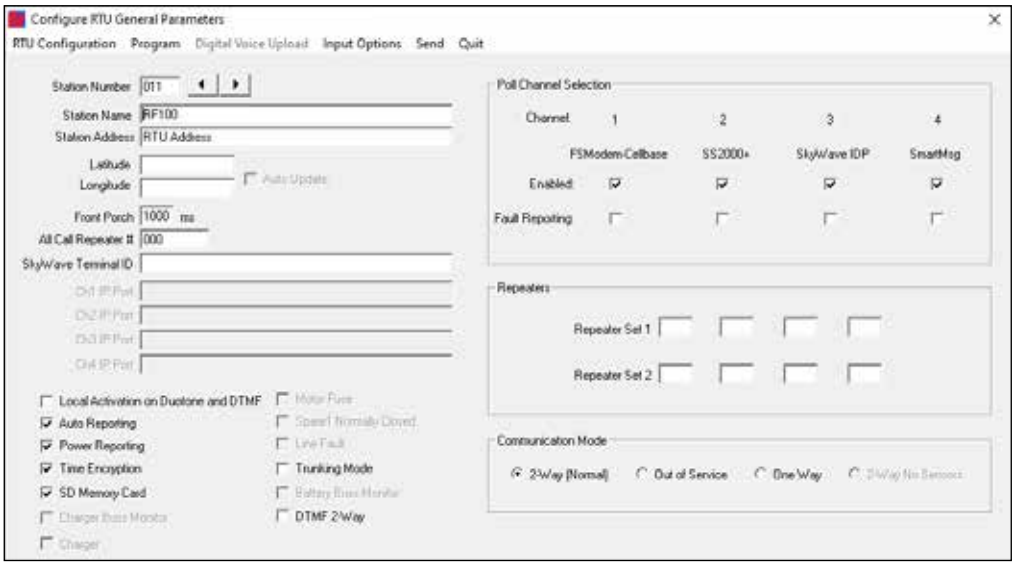
The Configure RTU General Parameters dialog box allows further selections of the RF100 options. Each of the selections is detailed below with descriptions. If changes are made to the speaker, they must be sent to the speaker using the Configure RTU General Parameters dialog box Send option.

Initial RF100 Setup

To configure the RTU in Commander®:

1. From the RTU dialog box, select the unit to configure and click Configure.

   The Configure RTU General Parameters dialog box appears.



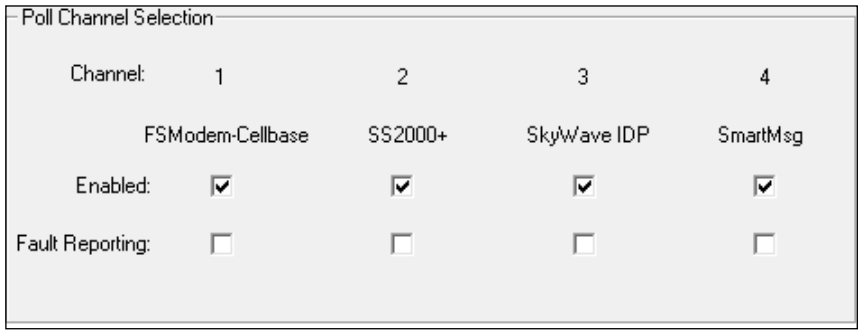
2. Enter the Station Name of the RF100, the Station Address, and the Latitude and Longitude. This information is used for mapping devices and for naming throughout the Commander® system.

   NOTE: Use the table in ”Appendix A Forms” to record RF100’s information.

Fields	Description
 Spin box	Selects the next or previous RTU.
Station Number	Displays the RTU number currently selected.
Station Name	Type a name for the RTU. This field is for display purposes and does not affect the behavior or the RTU.
Station Address	Enter the station address. This field is for display purposes and does not affect the behavior or the RTU.
Latitude and Longitude	The geographical coordinates of the RTU in decimal degrees. These values are conveyed to the CommanderOne® cloud service and can be left blank if your system does not use this optional system. Systems using SkyWave® Satellite can be configured to populate the Latitude and Longitude values automatically. When enabled, the geographical coordinates are reported by the RTU during a Satellite Poll and will be automatically updated.
Front Porch	Controls the transmitter's front porch. (Front Porch is the amount of time when the PTT is asserted, and the analog or data starts streaming. The time gives the transmitting radio time for the transmitter to come up to full power and the receiving radio time to detect the signal and start receiving before the analog or data starts.) A typical conventional radio system uses a value between 300-1000 ms depending on the radio model used.

Fields	Description
All Call Repeater #	Enter the All Call Repeater number for the site if it is used as an All Call Repeater. Enter zero if this RTU is not used as an All Call Repeater. All Call Repeaters will digipeat all call and zone activation commands in sequence, starting with all call repeater number one and propagating through the system to the highest-numbered all call repeater. Using all call repeaters allows reaching sites that are too distant to hear the base without the need for expensive, dedicated repeater systems. Any site in the system may be assigned an all call repeater number. When selecting all call repeaters, use the following guidelines: • Repeater number one must be able to hear the base. Select repeaters that can hear the base as lower-numbered repeaters. It is advantageous if repeater two and three are also able to hear the base. (See Limitations.) • Higher-order repeaters must be able to hear at least one lower-numbered repeater or the base. If possible, select repeater numbers such that adjacent repeater numbers can hear each other. • The front porch on all repeaters must be set to the same value. • Assign all call repeater numbers in sequential order, starting with number one. Do not skip numbers. **Limitations** Higher numbered repeaters have built-in redundancy, as they have an opportunity to hear all lower number repeaters that come before them. However, if repeater number one fails to hear the base or is out of commission, the chain is broken, and no repeater will transmit unless it can hear the base directly. Therefore, for redundancy, make sure two or more of the lowest-numbered repeaters can hear the base. When using all call repeaters, it may be necessary to turn off All Call Retries as the time required for the digipeats to take place may exceed the retry delay.
SkyWave Terminal ID	For systems using SkyWave IDP communication mode, specify the Terminal ID of the SkyWave terminal.
Ch1 IP:Port- Ch4 IP:Port	For channels using the TCP or UDP communication mode, specify the IP and Port number of the RTU for the respective channel. The format must be the IP address in dotted-decimal format followed by a colon and the port number (Example: “10.12.1.154:32565”).
SmartMsg ID	The SmartMsg ID applies only for UVRI-B type units running dual network interfaces. If your UVRI-B unit is configured for dual interfaces, enter the SmartMsg ID of the SE2000 IP board in this field.

Fields	Description
Local Activation of Duotone or DTMF	When enabled, the RTU will auto report Local Activation when Duotone or DTMF activates the siren and current is detected. This option requires fcm v5.2 or uvh v7.2 or later and does not affect earlier versions of RTU firmware.
Auto Reporting	Allows the RTU to initiate a report when a status point changes state.
Power Reporting	Allows the RTU to initiate a report when the Power status changes state.
Time Encryption	Adds extra security against a malicious operation. This is accomplished by comparing the base station's time and date encoded into the activation message with that of the RTU's time clock. If they differ by a predetermined amount, the siren will not sound, and a sync fail error will occur. This option is recommended if a malicious operation is a concern; however, its use could cause the sirens to fail to operate if the time clocks become out of synchronization.
SD Memory Card	Enable SD Memory Card if the RTU is equipped with an SD card for voice storage. If the RTU does not have an SD memory card installed, this box must be unchecked. When checked, the RTU performs a health check of the SD Memory card during a Quiet Test. The result of the health check is reported on the Status Detail “SD Memory Card” field.
Trunking Mode	This feature is not supported.
DTMF 2-Way	To configure an RTU for a DTMF two-way system, check this option and send General Parameters. DTMF two-way uses DTMF for communication over a radio channel and is used when digital is not possible. DTMF two-way has limitations. Dynamic Zoning is not supported. Some RTU status parameters are not available, including analog values and RTU time. For UV-type sirens, activation is limited to the first 50 functions. Functions 51-200 are not supported. DTMF two-way units cannot be configured over the air; only activation and polling are supported. DTMF two-way units must be configured locally over a direct serial connection.

Fields	Description
Channel Selection	 The Channel Selection Enabled row controls which communication channel(s) are used for individual communication to the RTU. All Call and Zone communication are always transmitted on all channels. Enable only the channels supported by the RTU. The Fault Reporting row controls if the respective channel will report a fault condition if communication is not received on the respective channel. Only channels configured for fault reporting will be displayed on the RTU Status Details dialog box.
Repeaters (also referred to as a digipeater)	A repeater is a standard RTU that is used as a communication link between the CCU and a target RTU using store and forward technology. Ideally, the CCU is capable of communicating directly with all RTUs in the system without repeaters. If there are RTUs, the CCU cannot communicate directly because the distance is too great or there is an object between the CCU and RTU. You can use up to four repeaters to reach the destination RTU. Repeaters fire sequentially, one, then the next, so collisions do not occur on the channel. Two repeater sets can be configured. The first attempt will occur on Set #1. If the first attempt is not successful, another attempt will occur on Set #2.
RTU Repeater Set #1	Enter the RTU number of each repeater in sequential order, the first one being the first repeater to forward the message. First, try the direct path and retry using repeaters only if the direct path fails, put the destination site address as the first repeater in Repeater Set #1.
RTU Repeater Set #2	Repeater Set #2 is used if the first attempt on Set #1 fails. If Set #2 is blank, no retries will occur if #1 fails. Retry a direct path if Set #1 fails, and put the destination site address as the first repeater in Repeater Site #2.
Communication Mode	The Communication Mode contains the following options: • 2-Way (Normal) • Out of Service • One Way • 2-Way No Sensors
2-Way (Normal)	The 2-Way (Normal) option is the default. Select when the other options do not apply.

Fields	Description
Out of Service	When enabled, RTUs activate if online but do not cause faults and are not included in fault reports. This is useful for sites that have not been installed or are down for service. The following applies when Out of Service is enabled: • The site status displays “Out of Service” and is indicated by a black dot. • RTU is not included in All or Auto polls. • RTU is not included in System Alarm faults. • RTU is not included in statistical reporting. • RTU activates if online. • RTU responds to individual polls; however, the site status and color remain Out of Service and black regardless of fault conditions or com fail. **NOTE**: The Out of Service feature replaces the "NOT USED" feature used in previous versions of Commander®. For reverse compatibility, all sirens named NOT USED (all capital letters) are automatically renamed “Not Used” and configured as Out of Service. You can put the RTU in or out of service by clicking the check box, and you can change the Station Name without affecting the Out of Service state.
One Way	Select One Way if the RTU is not capable of returning status. For example, the RTU is equipped with a receiver and not a transceiver or transmitter. One Way sites are displayed as gray dots on the RTU dialog box and do not show status points on the Status Detail dialog box.
2-Way No Sensors	Select this option when the RTU is a two-way unit but does not contain sensors for monitoring site conditions.

8. Programming Functions

Use the Program dialog box to create program functions, assign inputs to activate functions at the speaker, assign DTMF codes for over-the-air activations, assign Duotone frequencies or EAS Events to specific functions.

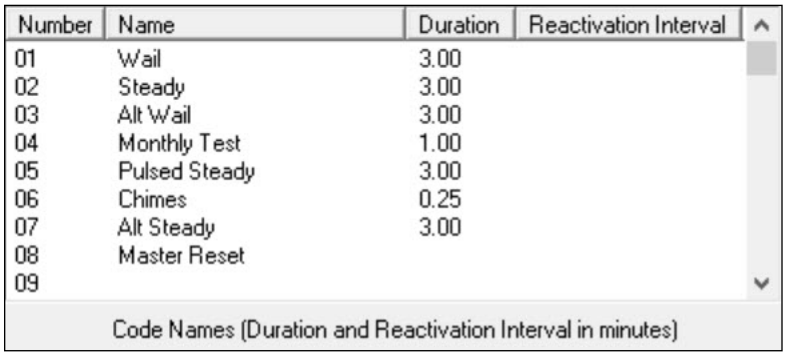
Functions

Functions are a set of specific instructions for an RF100 device. A function can be as simple as turning on a relay for 5 seconds or broadcasting a WAV file. Functions typically use a WAV file; therefore, it is important to have the WAV files defined and loaded before defining functions. Functions can also be more elaborate with relay activations, volume level, multiple voice messages, ambient noise level, and so forth. Functions are stored on each RF100, and Commander® allows for copying functions across RF100s. The RF100 supports 50 total functions.

Functions are Named in the System Setup dialog box. Functions are then programmed at each individual RTU. While each RTU will have the same-named functions, the function programming within each RTU may be different. For example, on an outdoor siren RTU, a Wail function may activate a mechanical siren for 3 minutes, while the indoor RTU may play a digital voice message and activate a relay for a visual indicator. If changes are made, Save the selections or Quit to discard changes. If changes are made to the speaker, they must be Sent to the speaker using the Configure RTU General Parameters dialog box Send option.

Naming Functions and Setting Duration and Reactivation Intervals

Functions are named for use across all RTUs. Using the System Setup dialog box, you can name Functions, set a total duration, and add a reactivation interval. These names and times are used system wide. For example, if a specific function requires repeating, the function within each RTU can be programmed for repeat. If the repeating is uniform across all RTUs, then the System Setup will allow a specific function to repeat.



Number	Name	Duration	Reactivation Interval
01	Wail	3.00	
02	Steady	3.00	
03	Alt Wail	3.00	
04	Monthly Test	1.00	
05	Pulsed Steady	3.00	
06	Chimes	0.25	
07	Alt Steady	3.00	
08	Master Reset		
09			

Code Names (Duration and Reactivation Interval in minutes)

The Function Names panel is used to assign names, durations, and reactivation intervals to functions. The Name is for visual display purposes only and does not affect the function being executed. The function being performed at each RTU is controlled by its respective RTU configuration. Duration specifies how long the siren icon will animate on the Hot Key dialog box and likewise does not necessarily indicate how long the sirens are sounding as each siren is controlled by its respective configuration.

Functions can be assigned a system-wide Reactivation Interval if it is desired to have the function automatically reactivate at a specified time interval. Reactivation will continue until the Duration expires. For example, if Duration is 10 and Reactivation Interval 3, the activation will be resent every three minutes for a total duration of 10 minutes. This will result in four activations at the following times:

0 minutes (original activation)
3 minutes
6 minutes
9 minutes

Reactivation is terminated whenever a new function is activated, including scheduled auto activations. Polls and a quiet test configured to occur in conjunction with a scheduled poll will not terminate a reactivation in progress.

IMPORTANT: Most systems do not use reactivation, and the Reactivation Interval should be zero or left blank. If a non-zero value is specified, the system will reactivate at the specified interval.

To modify the Name, Duration, or Reactivation Interval of a function, double-click the entry in the Function Names panel. The Enter Code Name dialog box appears.

NOTE: Both Duration and Reactivation Interval maximum are 999999 minutes (694 days). Duration must be greater than Reactivation Interval.

Activating Functions

When the RF100 is activated, it performs one of its preconfigured functions (that is, play live streaming audio, play stored WAV file, play built-in siren tones, control relay outputs). You can program one or more actions into a single function.

Digital Voice WAV files are recorded and stored in memory at each RTU. The Digital Voice recordings can be any language and can include tones. From the factory, seven siren tones are preconfigured in a tone file and are not recorded.

The RF100 automatically stops sounding and returns to standby mode when the Control Point sends a Cancel or Reset command. In addition to canceling the active function, the Reset command resets the RF100 status clearing local RTU historical data stored.

Federal Signal recommends using the Cancel command as the primary means to cause an RTU to stop sounding. The Master Reset command is reserved for maintenance and trouble shooting activities.

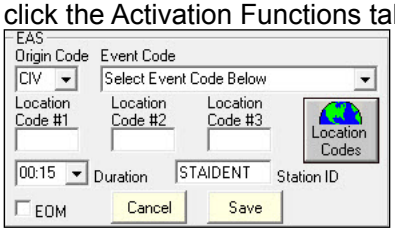
Programming Functions

To program functions:

1. From the Commander® main window, click RTU.
2. Select the RTU to configure.
3. Click Configure.
4. Click Program.

The Program dialog box appears.

Fields	Description
Unit Type	The unit type assigned to the RTU.
Unit Address	The unit address defined for the RTU.
Function Number	The program entry number.
Program Entries	The total number of programs configured for this device.
Input 1-4	Each Input can be assigned to one function. Go to the Input, and then select Mode and Polarity. Mode: Select either Momentary or Continuous. Momentary means the programmed action only activates once. Continuous means the programmed action continuously executes. Polarity: Select either Normally Open or Normally Closed. A contact closure across a Normally Open activates the function. A contact open across a Normally Closed activates the function.
DTMF (optional)	Enter the DTMF string for this function. Acceptable DTMF digits are 0-9, A, B, C, D, *, #. For wildcard digits, precede the digit with an apostrophe. (A wild card digit is valid for the pound sign as well as the specified digit.) **NOTE**: The DTMF selection is only applicable to systems that use DTMF signaling. If DTMF signaling is not used, leave this field blank.

Fields	Description
Duotone (optional)	Enter the A Tone and B Tone frequencies for this function. The acceptable frequency range is 300-3000 Hz.
EAS Event (optional)	For units employing EAS decoding, enter an EAS Event (EEE) code to be associated with this function. For EAS activation, the following two conditions must be valid: • The transmitted EAS message's location code matches one of the three programmed location codes. • The EVENT code of the transmitted EAS message matches an event code assigned to an activation code. **NOTE**: EAS and Duotone activation is mutually exclusive. For EAS activation to be functional, set the Duotone Timing parameters (A-Time, B-Time, S-Time) to zero. To configure EAS events, use the SSLoader+ application. To view EAS, click the Activation Functions tab and select the EAS Activation Codes.  **NOTE**: Typically, an SS2000+ is used to activate EAS Events.
Function Select	Contains the list of available functions. Use the Add, Remove, and Remove All buttons to populate your Function List. Functions will be executed in sequence, starting with the first (top) and proceeding to the bottom. **NOTE**: Functions can be added or removed by double-clicking on the selection.
Arm and Disarm	All sounding functions will automatically turn off when the RTU becomes disarmed. Upon execution of the Arm function, the RTU will remain armed for 255 seconds. The arm timer is halted during sounding functions and resumes during the Delay function or at the end of the function sequence. It is good practice to start each function sequence with Arm and end with Disarm.

5. Select the desired function from the Function Select list. If the desired function is not displayed, use the Add button to add additional functions for programming.

6. Continue to add functions to the Function List until completed. Click Save.

   Each function requires a set of commands to be configured, saved, and sent to the RF100. Use "Table 3 Command Definitions" on page 38 to assist in programming the RF100. Typically you start with the ARM command to activate the RF100, then activate a relay, play a digital voice file, deactivate the relay, and then disarm the unit. Use the Command List to move specific Commands to the Selected Commands box.

The following table list the Functions with their descriptions.

Table 3 Command Definitions

Fields	Description
Arm	The Arm function activates the amplifier in an RF100. The RF100 must be armed, or activation functions will not operate. Once armed, the RF100 remains armed for approximately 4-1/2 minutes.
Disarm	Disarms the RF100.
Wail	Sounds wail siren tone.
Pulsed Wail	Sounds pulsed wail siren tone.
Alternate Wail	Sounds alternate wail siren tone.
Steady	Sounds steady siren tone.
Pulsed Steady	Sounds pulsed steady siren tone
Alternate Steady	Sounds alternate steady siren tone.
Auxiliary	Sounds auxiliary siren tone. The auxiliary tone is normally set for Westminster Chimes.
Digital Voice -n	Enter the desired digital voice number to run, and then click OK. For RF100 devices, enter between 1-4093.
Dynamic Voice	Plays a sequence of digital voice messages specified at the time of activation.
Public Address	Broadcasts live audio messages.
Quiet Test	Performs a self-test of the RF100 unit, amplifier, and speakers by sounding an inaudible tone.
Cancel (Use instead of Master Reset)	Terminates active function. Assign a Hotkey to the Cancel Function if performing a master reset is not desired. A Cancel will not reset a Latched relay; a Master Reset will.
Master Reset	Terminates active function and clears latched status.
Phase Off	Not used.
Low Power	Reduces unit power to approximately 20 dB below maximum volume. This selection overrides front panel controls.
High Power	Increases unit to full output. This selection overrides front panel controls.
Power Attenuation	Set the number of dB SPL to reduce the speaker volume during functions. 0 dB (of attenuation) produces full volume. For example, the RF100 produces approximately 114 dB SPL at 10 feet with no Power Attenuation. Using Power Attenuation allows a maximum adjustment of 20 dB. If all 20 dB of Power Attenuation is used, the RF100 produces 94 dB of SPL at 10 feet.
Ambient Attenuation	Automatically adjusts the volume level to compensate for background noise. The setting defines the ambient noise level for full volume output. Ambient levels below this level will result in a reduction of volume output. If both Power and Ambient attenuation are used, the values are added together. Ambient attenuation is reset (disabled) when the Arm function is executed.

Fields	Description
Delay	Delays for a fixed number of seconds. Enter the desired delay time, and then click OK. This function inserts a delay into the function. For example: Activate a relay to turn on a strobe, delay 10 seconds, and then sound voice message alert. Enter between 2-500 seconds.
Relay 1-4 Cycle	Pulse selected relay on and off. This function will automatically terminate when the unit becomes disarmed.
Relay On/Off	Relay #1 On: Close relay #1. Relay will automatically open when the unit becomes disarmed Relay #1 Off: Open relay #1 Relay #2 On: Close relay #2. Relay will automatically open when the unit becomes disarmed Relay #2 Off: Open relay #2 Relay #3 On: Close relay #3. Relay will automatically open when the unit becomes disarmed Relay #3 Off: Open relay #3 Relay #4 On: Close relay #4. Relay will automatically open when the unit becomes disarmed Relay #4 Off: Open relay #4.
Relay 1-4 Latch	Relay #1 Latch: Close relay #1 until Master Reset or until a Relay #1 Off is sent. Relay #2 Latch: Close relay #2 until Master Reset or until a Relay #2 Off is sent. Relay #3 Latch: Close relay #3 until Master Reset or until a Relay #3 Off is sent. Relay #4 Latch: Close relay #4 until Master Reset or until a Relay #4 Off is sent.
Repeat Start –n Repeat End	Enter the desired number of times to repeat, and then click OK. All functions between Repeat Start and Repeat End will repeat n times. Enter between 0-255. **WARNING**: Do not attempt to use the repeat functions on legacy RTUs.

7. Use the arrow buttons to move to the next function to program. Create the selected commands for each function.

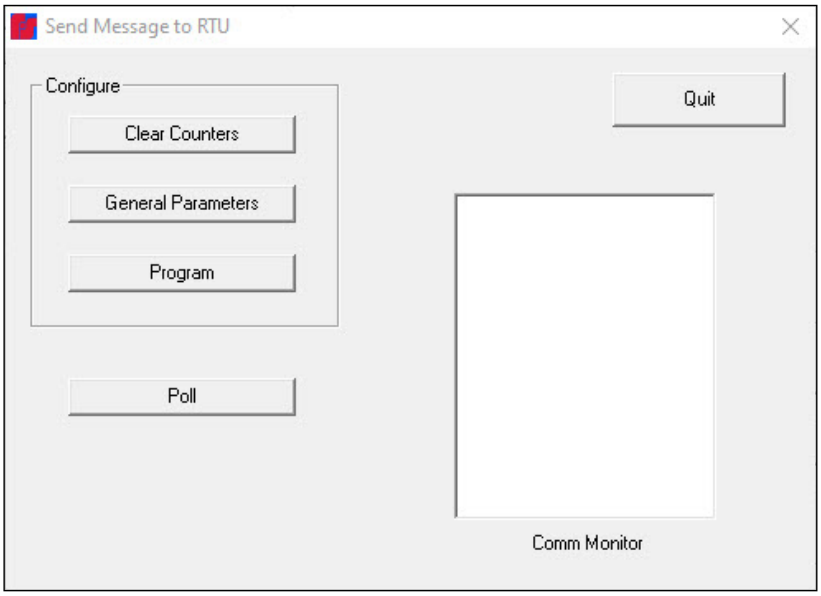
8. When all Functions have been programmed, click Save to store Function programming in Commander®.

The Configure RTU General Parameters dialog box is now active.

NOTE: Use the table in ”Appendix A Forms” to record programming information.

9. Click Send to send the program information to the RF100.

The Send Message to RTU dialog box appears.



Fields	Description
Clear Counters	Clears the activation and cancel counters for this RTU.
General Parameters	Sends the following items from the General Parameters screen: • Alarms: Enabled/Disabled. • Power Fail Detect: Enabled/Disabled. • Trunking Mode: Enabled/Disabled. • Front Porch: Dead carrier time before data transmission. • Commander® revision information.
Program	Sends the RF100 its personality data, including the following information: • Configuration data from the Configure RTU window of Configure RTU Parameters. • Program data from the Program RTU window of Configure RTU Parameters. • Zone configuration information from the Zone window of Base Status. • Security Code.
Poll	Sends a poll message to the currently selected RF100, and then Commander® waits for poll acknowledgment.
Quit	Terminate the Send Message to the RTU window without sending any message.

10. Click General Parameters. View the Comm Monitor to confirm that an acknowledgment is received from the RTU. An Ack'd response signifies success.

11. Click Program to store Function programming in the RF100.

12. When programming is completed, click Quit.

Function programming for that RF100 is complete.

Using the RF100

Using the RF100 requires you to program functions. Create a function from a set of commands. Each function has a specific use. For example, you can make a test announcement using low volume and a message stating, “A test is in progress.” Another function can be for a 3-minute siren tone with visual activation. The RF100 can store up to fifty unique functions. Each function contains up to twenty stacked commands. Assigning more than one command (for example, relay on, digital message 1, 2, and 3, relay off) to each activation code or function allows you to run a sequence of commands without sending additional activations. A function typically consists of arming the speaker, activating a relay for visual indications, providing an attention tone, activating a specific voice announcement, repeating, and then ending the function.

Once you configure functions, an activation method is assigned. You can configure the RF100 to operate the function through local operation (inputs) and radio via Federal Signal (MSK), DTMF, Duotone, or EAS.

Local Operation

You can program the RF100 to allow up to four local buttons or contact closures to activate functions. Functions can include broadcast of voice, tone, siren files, outputs for external device activation (strobes), and speaker volume adjustments. Consider assigning one input as a cancel to stop inadvertent activations.

Radio Activation

The RF100 decodes Federal Signal MSK (digital) and DTMF signaling; however, Duotone and EAS/SAME decoding can be selected but are mutually exclusive. For example, you can configure an RF100 to operate using Federal Signal digital communications (Commander and SS2000+) and activate using Duotone from a dispatch panel. Federal Signal recommends the use of FSK for two-way operation and speaker supervision. Use of Federal Signal MSK communications provides secure communications not provided by other communication methods.

EAS Activation

You can configure the RF100 to decode EAS/SAME events with up to three PSSCCC location codes. You can assign the EAS events to specific functions. This flexibility allows EAS alerts to provide detailed voice alerts, visual indication, or general siren warning tones.

DTMF and Duotone Activation

DTMF and Duotone are typically used from dispatch panels or portable radios. You can assign each function a DTMF or Duotone for activation.

See the Commander® Software Reference Manual for additional programming information.

Quiet Test

The Quiet Test allows testing of the speaker control board, power supply, and amplifier. The Quiet Test uses a 20 kHz tone (inaudible) to test the tone generator, amplifiers, and speaker drivers.

Typically, the Quiet Test is activated from Commander® with results reported for speaker verification. You can also use an SS2000+ to activate and provide quiet test results.

Getting Service

If you are experiencing any difficulties, contact Federal Signal Customer Support at 800-548-7229 or 708-534-3400 extension 7511 or Technical Support at 800-524-3021 or 708-534-3400 extension 7329 or e-mail at techsupport@fedsig.com. For instruction manuals and information on related products, visit http://www.fedsig.com.

Appendix A Forms

Table 4 WAV File Messages (DV Messages)

WAV File Number	Name	Message and Description	Length

Table 5 Programed Functions

Function Number	Selected Commands	Definition
Function Name		
DTMF		
Duotone		
A Tone		
B Tone		
EAS Event		
Input		
Mode	☐ **Momentary** ☐ **Continuous**	
Polarity	☐ **Normally Open** ☐ **Normally Closed**	

Function Number	Selected Commands	Definition
Function Name		
DTMF		
Duotone		
A Tone		
B Tone		
EAS Event		
Input		
Mode	☐ **Momentary** ☐ **Continuous**	
Polarity	☐ **Normally Open** ☐ **Normally Closed**	

Function Number	Selected Commands	Definition
Function Name		
DTMF		
Duotone		
A Tone		
B Tone		
EAS Event		
Input		
Mode	☐ **Momentary** ☐ **Continuous**	
Polarity	☐ **Normally Open** ☐ **Normally Closed**	

Function Number	Selected Commands	Definition
Function Name		
DTMF		
Duotone		
A Tone		
B Tone		
EAS Event		
Input		
Mode	☐ **Momentary** ☐ **Continuous**	
Polarity	☐ **Normally Open** ☐ **Normally Closed**	

Table 6 Programed Zones

Zone Number A/B	Zone Name	Sites in this Zone

Table 7 Programed Activation Templates

Template Number	Template Name	Action

Table 8 Hotkeys

Hotkey Number	Name	Action
1		
2		
3		
4		
5		
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14		
15		
16		
17		

Hotkey Number	Name	Action
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		
31		
32		
33		
34		

Hotkey Number	Name	Action
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Appendix B Standard DV Messages

Table 9 Standard DV Messages

#	FWS Name	Customer Name for DV	Description	Notes
1	FWS-13955	TM1	(5 sec) Wail-Conventional Siren 560-1055 Hz	
2	FWS-13956	TM2	(5 sec) Yelp-Rapid Siren 560-1055 Hz	
3	FWS-13957	TM3	(5 sec) High-Low-Alternating High and Low 561 Hz and 760 Hz	
4	FWS-13958	TM4	(5 sec) Bell-Bell, Struck Rapidly-801 Hz	
5	FWS-13959	TM5	(5 sec) Yeow-Descending High to Low, Repeated 545 Hz and 1296 Hz	
6	FWS-13960	TM6	(5 sec) Horn-Steady Horn	470 Hz
7	FWS-13961	TM7	(5 sec) Beep-Slow Intermittent Horn 470 Hz	
8	FWS-13962	TM8	(5 sec) Stutter-Rapid Intermittent Horn 470 Hz	
9	FWS-13963	TM9	(5 sec) Slow Whoop-Slow Ascending Low to High, Repeated 424 Hz and 1163 Hz	
10	FWS-13964	TM10	(5 sec) Gradual Horn-Steady Horn, Gradually Increasing in Volume 514 Hz	
11	FWS-13965	TM11	(5 sec) Temporal Slow Whoop-NFPA Coded Slow Whoop 424 Hz and 774 Hz	
12	FWS-13966	TM12	(9 sec) Westminster Chime-Westminster Chime-Musical Tone	
13	FWS-13967	TM13	(5 sec) Evac-Amplitude Modulated Siren 479 Hz	
14	FWS-13968	TM14	(5 sec) Air Horn-Steady Horn 400 Hz and 800 Hz	
15	FWS-13969	TM15	(5 sec) Chime-Single Strike Chime-Musical Tone	
16	FWS-13970	TM16	(5 sec) Phaser-Rapid Siren	600-1200 Hz
17	FWS-13971	TM17	(5 sec) Alternating High and Low 363 Hz and 518 Hz	
18	FWS-13972	TM18	(5 sec) Warble-Extremely Rapid Siren 560-1055 Hz	
19	FWS-13973	TM19	(5 sec) Alert-Slow Sweep Tone 400-1560 Hz	
20	FWS-13974	TM20	(5 sec) Euro-Police-Alternating High and Low 969 Hz and 800 Hz	
21	FWS-13975	TM21	(5 sec) Euro-Fire Sweep Tone 900-800 Hz	
22	FWS-13976	TM22	(5 sec) Euro-Slow Whoop-Slow Sweep Tone 650-1290 Hz	
23.	FWS-13977	TM23	(5 sec) Euro-General-Intermittent Horn 969 Hz	
24	FWS-13978	TM24	(5 sec) Euro-Toxic-Steady Horn 969 Hz	
25	FWS-13979	TM25	(5 sec) Euro-Police II-Slow Alternating High and Low 554 Hz and 440 Hz	
26	FWS-13980	TM26	(5 sec) Euro-Stutter-Intermittent Beep 2840 Hz	
27	FWS-13981	TM27	(5 sec) Euro-Sweep-Sweep Tone 1163-397 Hz	

#	FWS Name	Customer Name for DV	Description	Notes
28	FWS-13982	TM28	(5 sec) Ringer-Continuous Ringing Tone 560 Hz and 326 Hz	
29	FWS-13983	TM29	(5 sec) Buzzer-Buzzer Tone 1318 Hz and 760 Hz	
30	FWS-13984	TM30	(5 sec) Attention-Extremely Rapid Siren-Multiple Frequency	
31	FWS-13985	TM31	(5 sec) Multi-Tone-Extremely Rapid Siren-Multiple Frequency	
32	FWS-13986	TM32	(5 sec) Caution-Extremely Rapid Siren-Multiple Frequency	
33	FWS-13987	Three 1 kHz tones Pre-Announcement	Three 1 kHz tones Pre-Announcement	
34	FWS-13988	Wobbulator-3 times Pre-Announcement	Wobbulator-3 times Pre-Announcement	
35	FWS-13989	FWS-10274-DSP2 M1 - Chime - Pre-Announcement	DSP2 M1 - Chime - Pre-Announcement	
36	FWS-13990	3 blasts-5 sec- Pre-Announcement	3 blasts-5 sec- Pre-Announcement	
37	FWS-13991	TM4-3 times Pre-Announcement	TM4-3 times Pre-Announcement	
38	FWS-13992	M15-3 times Pre-Announcement	M15-3 times Pre-Announcement	
39	FWS-13993	52 horn 5 sec	52 horn 5 sec	
40	FWS-13994	52 horn 10 sec	52 horn 10 sec	
41	FWS-13995	52 horn 15 sec	52 horn 15 sec	
42	FWS-13996	52 horn 1 sec pulses 10 times	52 horn 1 sec pulses 10 times	
43	FWS-13997	1 kHz_30 sec	1 kHz_30 sec	
44	FWS-13998	(5 sec) Alt Steady	(5 sec) Alt Steady	
45	FWS-13999	(5 sec) Alt Wail	(5 sec) Alt Wail	
46	FWS-14000	(5 sec) Pulsed Steady	(5 sec) Pulsed Steady	
47	FWS-14001	(5 sec) Pulsed Wail	(5 sec) Pulsed Wail	
48	FWS-14002	(5 sec) Steady	(5 sec) Steady	
49	FWS-14003	(5 sec) Wail	(5 sec) Wail	
50	FWS-14004	Westminster Chime	Westminster Chime	
51	FWS-14005	Attention	Attention	
Severe Weather				
52	FWS-14006	Severe Weather Warning-Seek Shelter	“The National Weather Service has issued a severe weather warning. Take shelter immediately. Repeat, the National Weather Service has issued a severe weather warning. Take shelter immediately.”	

#	FWS Name	Customer Name for DV	Description	Notes
53	FWS-14007	Severe Weather Warning-Seek Shelter	“This is a severe weather warning. Take shelter immediately. Repeat, severe weather warning. Take shelter immediately.”	
54	FWS-14008	Severe Weather Alert-Seek Shelter	“Please take shelter immediately. This is a severe weather alert.”	
55	FWS-14009	Severe weather Approaching-Seek Shelter	“Attention. Attention. This is an emergency. Severe weather approaching. Seek shelter immediately.”	
56	FWS-14010	Severe Weather-Stay away from Windows	“Attention. A severe weather warning has been issued; proceed immediately to the interior of the building, away from windows and entrances.”	
Tornado				
57	FWS-14011	Tornado Warning-Seek Shelter	“This is a tornado warning. Seek shelter immediately. This is a tornado warning. Seek shelter immediately.”	
58	FWS-14012	Tornado Sighted-Seek Shelter	“Attention! Life-threatening situation. A tornado has been sighted in the area. Seek shelter inside or take cover immediately. Stay away from windows and doors.”	
59	FWS-14013	Tornado Sighted-Seek Shelter	“Attention, a tornado has been sighted in the area. Take shelter immediately. Repeat, a tornado has been sighted in the area, take shelter immediately.”	
60	FWS-14014	Tornado Warning-Seek Shelter	“This is a tornado warning. Seek shelter immediately. This is a tornado warning. Seek shelter immediately.”	
61	FWS-14015	Tornado Warning-Designated Area	“Tornado Alert, report to your designated area.”	
62	FWS-14016	Tornado Warning-Seek Shelter	“Attention! Attention! Tornado warning. Seek shelter immediately. Attention! Attention! Tornado warning. Seek shelter immediately.”	
High Winds				
63	FWS-14017	High Wind	“Attention: The National Weather Service has issued a high wind warning. High winds are approaching. Take shelter immediately. Repeat, the National Weather Service has issued a high wind warning. High winds are approaching. Take shelter immediately.”	
Flood/Water/Tsunami				
64	FWS-14018	River Level Warning	“Danger. River level rising.”	
65	FWS-14019	Flood Warning	“Attention: A Flood Warning has been issued for this area. Tune to your local radio station for details.”	
66	FWS-14020	Tsunami Warning	“Attention: A Tsunami Warning has been issued for this area. Tune to your local radio station for details.”	

#	FWS Name	Customer Name for DV	Description	Notes
Lightning				
67	FWS-14021	Lightning-Take shelter	“Dangerous lightning in the area. Take shelter immediately. Repeat, dangerous lightning in the area. Take shelter immediately.”	
Armed Person/ Intruder/ Dangerous Situation/Security Alert				
68	FWS-14022	Dangerous Situation on Campus	“Attention. Dangerous situation reported on campus. Take cover and stay in place until further information is provided. Repeat. Take cover and stay in place until further notice.”	
69	FWS-14023	Lockdown	“Warning, this is a lockdown alert, please proceed to a secure area.”	
70	FWS-14024	Armed Intruder on Campus	“Attention: An armed intruder has been seen on campus. Shelter in place immediately.”	
71	FWS-14025	Gunshots Reported on Campus	“Attention: Gunshots reported on campus. Shelter in place until further notice. Repeat.”	
Shelter in place until further notice				
72	FWS-14026	Armed and Dangerous Person	“Attention! Armed and dangerous person alert. Seek a secure location.”	
73	FWS-14027	Lock Down	“Warning, this is an order to lock down. Proceed to a secure location. Repeat, this is an order to lock down. Proceed to a secure location and wait for further instructions.”	
Seek Shelter-Generic				
74	FWS-14028	Remain Sheltered	“Attention…Attention… Please remain in a sheltered area until further notice. Attention… Attention…Please remain in a sheltered area until further notice.”	
75	FWS-14029	Seek Shelter	“Attention! Seek shelter immediately. Stay indoors”	
Chemical Release/Hazardous Material				
76	FWS-14030	Hazardous Material Release-Go inside	“Attention. Life threatening situation. A hazardous material release has occurred. Go inside. Close all windows and doors. Stay until further notice.”	
77	FWS-14031	Hazardous Materials-Stay Inside	“Hazardous materials incident. Stay inside; close all doors and windows. Remain calm and wait for further instructions.”	
78	FWS-14032	Chemical Release-Seek Shelter	“Warning. Chemical release, take shelter indoors. Repeat. Chemical release, take shelter indoors.”	
79	FWS-14033	Chemical Release-Seek Shelter	“Attention! There has been a chemical release in the area. Go inside, close all windows and doors, turn off all heating and air conditioning. There has been a chemical release. Seek shelter now.”	

#	FWS Name	Customer Name for DV	Description	Notes
80	FWS-14034	Shelter In Place	“Attention: Authorities have issued an alert to Shelter in Place due to a chemical release in the area. Tune to your local radio station for details.”	
81	FWS-14035	Hazmat-Seek Shelter	“Attention. Attention. Hazardous condition. Seek shelter immediately and wait for the all clear.”	
Evacuate				
82	FWS-14036	Evacuate To Safe Area	“Attention! Evacuate to a safe area.”	
83	FWS-14037	Emergency Evacuate All Buildings	“Warning, this is an emergency evacuation order. Remain calm and evacuate all buildings; follow posted evacuation routes.”	
84	FWS-14038	Emergency Evacuate All Buildings-Designated Gathering Area	“Attention. Attention. An emergency has been declared. Please evacuate all buildings immediately. Proceed to the nearest exit and go to your designated gathering area.”	
85	FWS-14039	Evacuate Campus	“Warning, this is a campus evacuation order. All non-emergency personnel must leave campus immediately. Repeat, this is a campus evacuation order. Leave campus immediately.”	
86	FWS-14040	Evacuate-Higher Ground	“Attention: Evacuate, Evacuate, Evacuate, Move to high ground immediately. Tune to your local radio station for details.”	
87	FWS-14041	Mandatory Evacuation	“Warning, a mandatory evacuation has been issued effective immediately. Follow all emergency evacuation plans and evacuate at once. Personnel without transportation, stand by for additional information.”	
88	FWS-14042	Evacuate-Do not use Elevator	“Attention! An emergency has been reported. Please evacuate the building immediately. Do not use the elevator.”	
General Emergency/Other				
89	FWS-14043	Public Safety Emergency	"Public Safety Emergency. Please take shelter immediately and seek additional information from the campus emergency information network."	
90	FWS-14044	Emergency Pre-announcement	“Stand by for an important announcement from your local emergency agency.”	
91	FWS-14045	General Emergency	“Emergency. Please stand by for further instructions.”	
92	FWS-14046	Unsound Structures	“Warning. Warning. Do not attempt to enter unsound structures. Check your area for damage and avoid risk.”	
93	FWS-14047	Power Outage	“There is a building-wide power outage. Avoid using open flames or candles during this outage.”	

#	FWS Name	Customer Name for DV	Description	Notes
Public Address				
94	FWS-14048	Pre-Announcement for Live Broadcast-PA	“Attention! Attention! Stand by for an emergency announcement. Stand by for emergency information. Attention! Attention! Stand by for an emergency announcement. Stand by for emergency information.”	
Fire				
95	FWS-14049	Fire-Wild Land Fire	“Wild land fire approaching. Remain calm and evacuate campus.”	
96	FWS-14050	Fire Drill	“Attention this is a fire drill, report to your designated area.”	
97	FWS-14051	Fire Alert	“Attention this a fire alert, report to your designated area.”	
98	FWS-14052	Fire on Campus	“Fire on Campus-Please stand by for further instructions.”	
99	FWS-14053	Fire Alarm Test Start	“Fire alarms are currently being tested. No evacuation of the building is necessary.”	
100	FWS-14054	Fire Alarm Test Complete	“Fire alarm testing is complete. All alarms from this point forward should be treated as a real fire alarm and the building should be evacuated.”	
Test				
101	FWS-14055	Test	“This is a test of the emergency warning system. This is only a test.”	
102	FWS-14056	Test	"This is a test of the Campus Emergency Alert System. This is only a test. "	
103	FWS-14057	Test	“This is a test of the public warning system. This is only a test. If this had been an actual emergency, additional instructions would be broadcast. This is only a test.”	
104	FWS-14058	Test	“Your attention please: This is a test. This is a test of the emergency warning system. This is a test and only a test. There are no emergency situations in our area. Thank you.”	
105	FWS-14059	Test	“Attention: This is a test of the emergency warning system. This is only a test. If this were an actual emergency, you would be instructed to tune to your local radio station. This is only a test.”	
All Clear				
106	FWS-14060	All Clear	“Attention this is an all clear, repeat all clear.”	
107	FWS-14061	All Clear	“Attention! All clear. All clear. Resume normal activities.”	
Closed				
108	FWS-14062	University Closed	“Attention: The University is now closed. Tune to local media for further information.”	

#	FWS Name	Customer Name for DV	Description	Notes
Armed Forces Songs				
109	FWS-14063	Army Song	“Army Song Band and Chorus”	
110	FWS-14064	Navy Song	“Anchors Aweigh”	
111	FWS-14065	Air Force	“The Air Force Song”	
112	FWS-14066	Marine Corp	“The Marines’ Hymn”	
113	FWS-14067	Coast Guard	“Semper Paratus”	
114	FWS-14068	Army Song	“The Army Goes Rolling Along”	
115	FWS-14069	National Anthem	“National Anthem” 80 sec.	
Armed Forces Sounds-Bugle Call				
116	FWS-14070	Adjutant’s Call	“Adjutant’s Call”	
117	FWS-14071	Assembly	“Assembly”	
118	FWS-14072	Attention	“Attention”	
119	FWS-14073	Army Song	“Call to Quarters”	
120	FWS-14074	Church Call	“Church Call”	
121	FWS-14075	Drill Call	“Drill Call”	
122	FWS-14076	First Call	“First Call”	
123	FWS-14077	First Sergeants Call	“First Sergeants Call”	
124	FWS-14078	Fix Bayonets	“First Bayonets”	
125	FWS-14079	Taps	“Taps”	
126	FWS-14080	Carry On	“Carry On”	
127	FWS-14081	Retreat	“Retreat”	
128	FWS-14082	Ground Attack Charge	“Ground Attack Charge”	
129	FWS-14083	Guard Mounting	“Guard Mounting”	
130	FWS-14084	Mail Call	“Mail Call”	
131	FWS-14085	Mess Call	“Mess Call”	
132	FWS-14086	Morning Colors	“Morning Colors”	
133	FWS-14087	Officer’s Call	“Officers Call”	
134	FWS-14088	Recall	“Recall”	
135	FWS-14089	Reveille	“Reveille”	
136	FWS-14090	Slow Retreat Bugle Call	“Slow Retreat Bugle Call”	
137	FWS-14091	Tatoo	“Tatoo”	
138	FWS-14092	To the Colors	“To the Colors”	
139	FWS-14093	Evening Slow Colors	“Evening Slow Colors”	
PAGASYS GEN II FILES				
140	FWS-14094	800Hz 1 sec on 1 sec off	800 Hz 1 sec on 1 sec off	
141	FWS-14095	Alt Tone Hi Low	Alt Tone Hi Low	
142	FWS-14096	Alternating Tone	Alternating Tone	

#	FWS Name	Customer Name for DV	Description	Notes
143	FWS-14097	Bell Continuous IMO General Alarm	Bell Continuous IMO General Alarm	
144	FWS-14098	Bell IMO PAPA BELL 7x SHORT	Bell IMO PAPA BELL 7x SHORT 1x Long	
145	FWS-14099	Bell Intermittent IMO Gas 1 sec ON 1 sec OFF	Bell Intermittent IMO Gas 1 sec ON 1 sec OFF	
146	FWS-14100	Chime Test Tone	Chime Test Tone	
147	FWS-14101	Continuous Tone PFEER Toxic Gas Alarm 1 kHz signal	Continuous Tone PFEER Toxic Gas Alarm 1 kHz signal	
148	FWS-14102	Duck and Cover	Duck and Cover	
149	FWS-14103	Emergency Shutdown	Emergency Shutdown	
150	FWS-14104	Gas Detected	Gas Detected	
151	FWS-14105	General Alarm 7 short 1 long 30 sec 1 khz	General Alarm 7 short 1 long 30 sec 1 khz	
152	FWS-14106	Intermittent Tone PFEER General Alarm 1 kHz signal 1 sec ON 1 sec OFF	Intermittent Tone PFEER General Alarm 1 kHz signal 1 sec ON 1 sec OFF	
153	FWS-14107	Low Freq 2 Tone	Low Freq 2 Tone	
154	FWS-14108	“Abandon Platform”	“Abandon Platform”	
155	FWS-14109	“All Clear”	“All Clear”	
156	FWS-14110	“Man, Over Board”	“Man, Over Board”	
157	FWS-14111	“This is a test of the Alarm System”	“This is a test of the Alarm System”	
158	FWS-14112	“This is a test of the General Alarm”	“This is a test of the General Alarm”	
159	FWS-14113	Pfeer PAPA	Pfeer PAPA	
160	FWS-14114	Pre-Announce Chime ASC Tri Tone Routine ALT1	Pre-Announce Chime ASC Tri Tone Routine ALT1	
161	FWS-14115	Process Alarm	Process Alarm	
162	FWS-14116	Process Shutdown	Process Shutdown	
163	FWS-14117	Process Classified	Process Classified	
Additions				
164	FWS-2599	Test End	“This has been a test of the emergency warning system. This was only a test.”	