

Uniden[®]

UBCD396XT OWNER'S MANUAL

NOTE ON COLOURED TEXT:

- **Sections within this document are numbered to help you navigate the content.**
- **Text within the sections which are coloured blue indicate more information about the indicated text may be available as a section of the same name. Refer to the table of contents to navigate to these sections.**
- **Text within the sections which are underlined and coloured blue (not including the section headers) may be hyperlinked to that specific section or website.**

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1. General Precautions

Before you use this scanner, please read and observe the following:

Earphone Warning

You can use an optional 32Ω stereo headset or earphone with your scanner. Use of an incorrect earphone or headset might be potentially hazardous to your hearing. The output of the phone jack is monaural, but you will hear it in both headphones of a stereo headset.

Set the volume to a comfortable audio level coming from the speaker before plugging in the earphone or headset. Otherwise, you might experience some discomfort or possible hearing damage if the volume suddenly becomes too loud because of the volume control or squelch control setting. This might be particularly true of the type of earphone that is placed in the ear canal.

Liquid Exposure Warning

Uniden does not represent this unit to be waterproof. To reduce the risk of fire or electrical shock, do not expose this unit to rain or moisture!

Power Disconnection Caution

Important: Always turn the scanner off before disconnecting external power. Some settings are saved only as the scanner is powering down.

2. Setting up the hardware

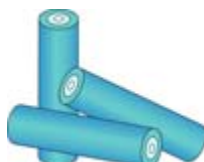
What's included inside the box?



• **UBCD396XT**



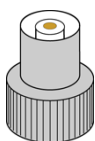
• **SMA antenna**



• **NiMH rechargeable batteries (3)**



• **AC adaptor**



• **SMA-to-BNC adaptor for external antennas**



• **Data transfer cable**



• **Beltclip**



• **Wrist strap**

- **Owner's Manual CD-ROM**
- **Quick Start Guide Sheet**

The cover for the battery compartment might be packed separately, also.

Note! If any of these pieces are missing or damaged, contact your place of purchase immediately. Never use damaged equipment!

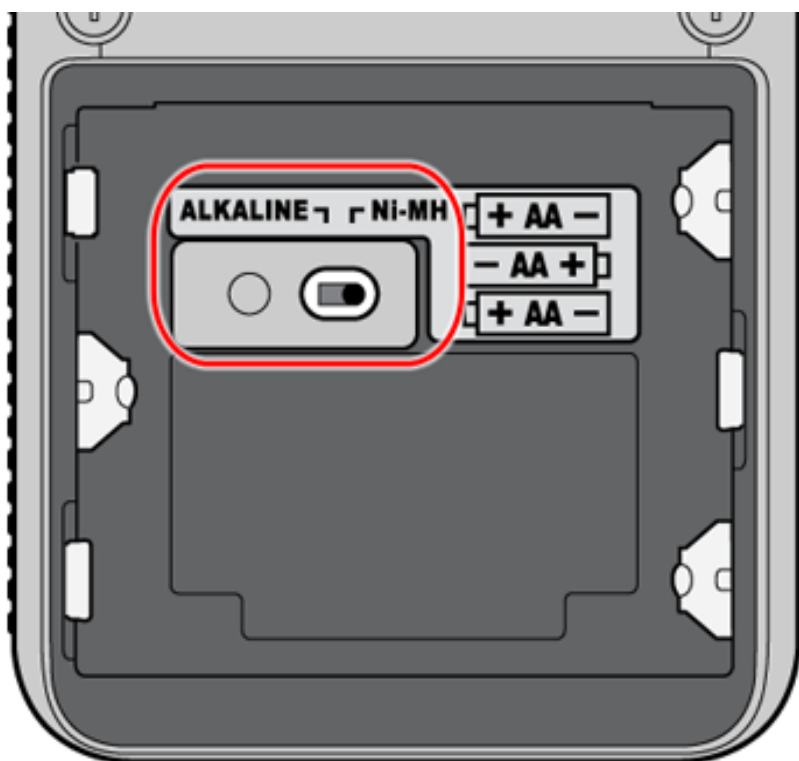
Install the batteries

Your scanner can use either regular alkaline batteries or rechargeable nickel-metal hydride (NiMH) batteries.

The batteries that came with your scanner are rechargeable NiMH.

To install the batteries:

1. Remove the cover from the battery compartment.
2. Make sure that the charge switch is set to the correct battery type:
 - Use the *Alkaline* setting for any regular or nonrechargeable battery
 - Use the *NiMH* setting for any rechargeable battery
3. Make sure the polarity (plus and minus) of each battery matches the diagram inside the compartment.
4. Replace the battery compartment cover.



Connect the antenna



To connect the antenna, just screw it onto the SMA connector at the top of the scanner.

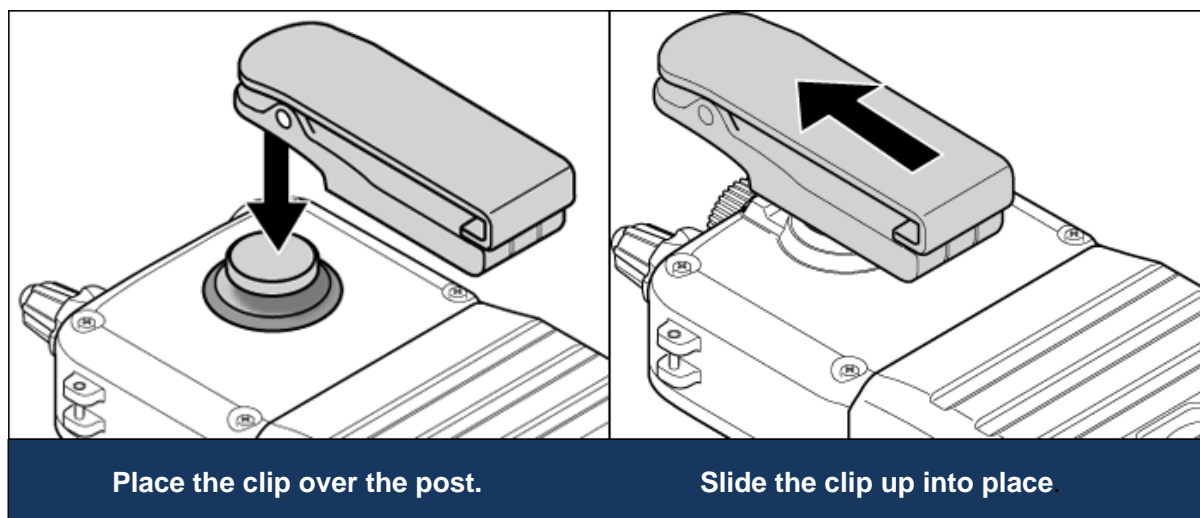
If you want to use an external antenna, attach the included SMA/BNC adapter to the scanner's SMA connector.

Then, connect your external antenna to the BNC connector.

Note! Always use 50- or 75-ohm, RG-58, or RG-8, coaxial cable and the supplied SMA/BNC adapter to connect an outdoor antenna. If the antenna is over 50 feet from the scanner, use RG-8 low-loss dielectric coaxial cable. Cable loss increases with higher frequency.

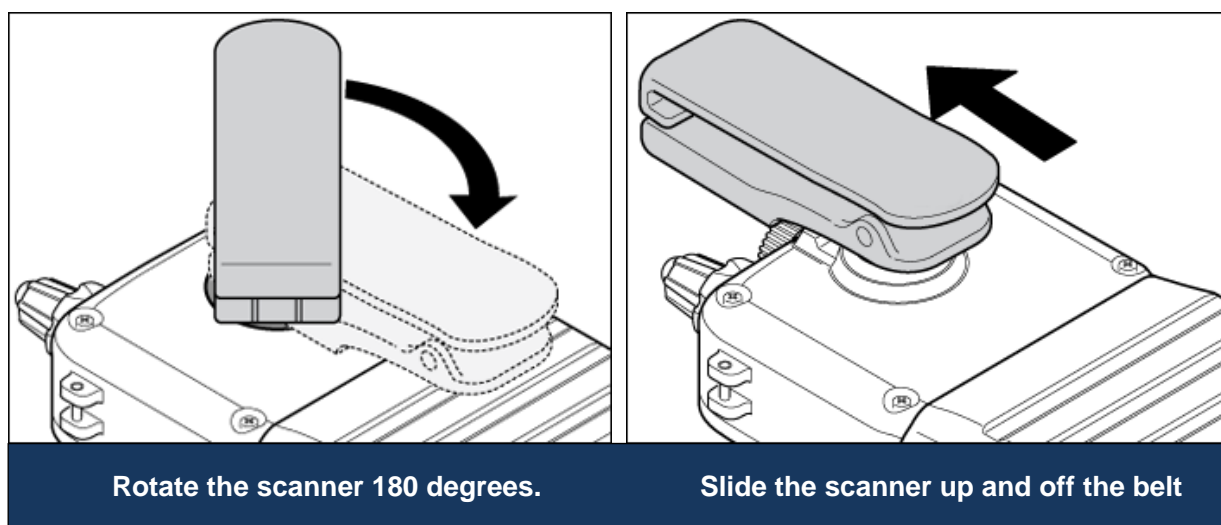
Attach the belt clip

Hold the belt clip with the logo facing you and the hinge facing the top of the scanner. Place the clip over the post, and slide the belt clip straight up until you hear it click into place.



To remove the belt clip

Rotate the scanner so the scanner is bottom-side up. Then slide the scanner straight up until it comes free from the belt clip.



3. Connecting a GPS receiver

A third party GPS receiver is required to utilise the scanner's location based features.

Compatible GPS receivers

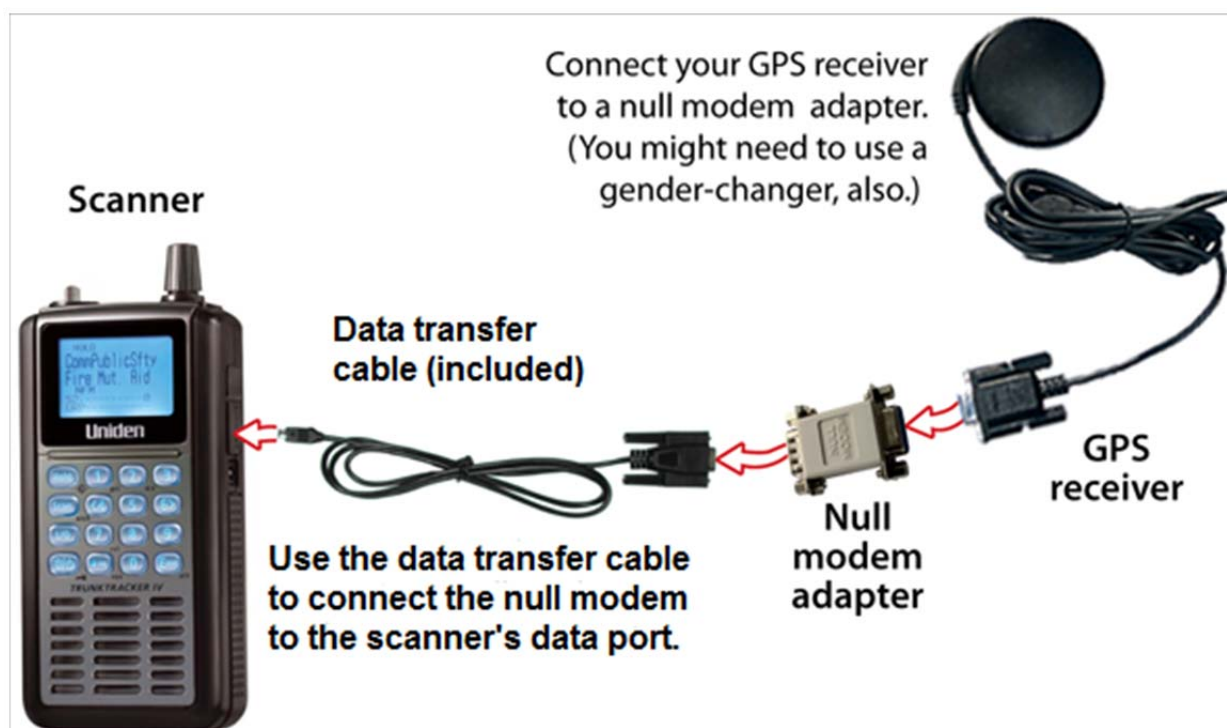
You can connect your scanner to any GPS receiver that meets the following criteria:

- Outputs NMEA-0183 v3.01-compliant location data
- Outputs both the Global Positioning System Fix (*GGA*) and Recommended Minimum Specific GNSS (*RMC*) data sentences
- Provides a serial data (RS-232) connection

Configuring your scanner

1. Go to the [Settings](#) menu and select *Set Serial Port*.
2. Select *4800* bps for the baud rate.

Connecting the receiver



1. Connect your GPS receiver to a *null modem* adapter or cable.
2. Connect the data transfer cable that was supplied with your scanner to the null modem.

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3. *The data transfer cable has a DE-9 socket (female) connector. To connect to the data transfer cable, you need a DE-9 plug (male) connector. (DE-9 connectors are often called *DB-9* connectors.)
4. *Depending on your GPS connection and your null modem, you might need a *gender changer* and/or a DB-25-to-DE-9 adapter.
5. Connect the data transfer cable to the scanner's data port.
6. When the scanner recognizes the GPS input, it displays a confirmation message and shows the GPS icon on the display.
7. *If the GPS receiver does not have a lock on the satellites, the scanner displays *Searching for Satellite*.

Troubleshooting

If you can't get the scanner to recognize the GPS receiver:

- Check the cables. Make sure you have exactly one [null modem](#) (either a cable or an adapter) somewhere in the connection: a *straight-through* connection will not work.
- Check the receiver's baud rate. Most compatible GPS receivers use a baud rate of 4800 bps, but it's possible your receiver is using a non-standard baud rate. Set the scanner's baud rate to match the GPS receiver's.

If the scanner recognizes the GPS receiver but doesn't lockout systems as you expected:

- Make sure the GPS receiver has a lock on the satellites.
- Check the location configuration for the sites and channel groups in the system.
 1. For each site or channel group, go to the [Set LocationInfo](#) menu.
 2. Check the range, latitude, and longitude settings to make sure they are correct.
 3. Make sure the *Set GPS Enable* option is set to *On*.

4. Using Preloaded Systems

Your scanner is factory preloaded with systems by state. The systems contain frequency groups for emergency services, see notes below. If you are fortunate enough to live in an area where one of these systems can be received, then you might have something to listen to right out of the box.

Note!

Preloaded systems are not intended as final programming: You'll need to set the scanner up to suit what you really want to listen to. This is just intended to show that the scanner really works and gives you something to monitor while you get your own programming taken care of.

Note!

System information changes all the time. The preloaded systems were accurately programmed several months prior to first production. It is possible that a system preloaded in the scanner is no longer operational with the preloaded settings.

Preloaded Systems

ACT Public
NSW Public
NSW-GRN MOT
NT Public
NZ Public
QLD Public
SA Public
SA-GRN MOT
TAS Public
VIC Public
WA Public

5. Available Operation Modes

The scanner has several different operation modes; in each mode, the scanner's operation, display, and key functions can be completely different:

Scan mode

The scanner checks each frequency in the user-programmed list of frequencies. For trunked systems, it checks each Talk Group ID in the user-programmed list. When it detects a signal, the scanner stays on the channel and opens squelch. For trunked systems, if the Talk Group ID becomes active, the scanner switches to the audio channel and opens squelch. When the signal stops, the scanner continues the scan.

To enter Scan mode, tap **SCAN**. (This is the default mode when the scanner powers on.)

Search mode

The scanner checks each frequency that falls within a user-programmed range. For trunked systems, it checks each control channel in the user-programmed list. When it detects a signal, the scanner stays on the channel and opens squelch. For trunked systems, when it detects an active Talk Group ID, the scanner switches to the audio channel and opens squelch. When the signal stops, the scanner continues the search.

To enter Search mode, **FUNCTION+** tap **SCAN**. The scanner asks if you want to perform the Quick Search: tap **YES** if this is the search you want.

To start a different search, tap **NO**: the scanner takes you to the [Search for...](#) menu, and you can select your search.

Hold mode

The scanner stays on the current channel and enables save and edit options (options vary depending on the type of system).

Close Call Priority mode

In Close Call Priority, the scanner interrupts its current operation every 2 seconds, searches for signals that are stronger than other signals on the selected band, then returns to the previous operation. When it detects a close call hit, the scanner can switch to the channel and open squelch (depending on the setting). In Close Call

DND (do-notdisturb) mode, the scanner only interrupts if it is not already receiving audio.

To enter Close Call mode, **FUNCTION** + repeatedly tap **HOLD** until Close Call Pri appears.

The Close Call icon appears for Close Call Priority mode and is in reverse colors for Close Call DND mode.

Close Call Only mode

The scanner stops the current operation and only performs Close Call checks as described above.

To enter Close Call only mode, **FUNCTION** + press & hold **HOLD**.

Close Call Do Not Disturb mode

When set in this mode, the scanner will periodically make Close Call checks whenever the scanner is not receiving audio in another mode. This eliminates the annoying breaks in conversation while still allowing for the Close Call functionality. In Close Call Do Not Disturb mode, the Close Call icon appears in reversed color.

To enter Close Call Do Not Disturb mode, **FUNCTION** + repeatedly press **HOLD** until Close Call DND appears.

Priority Scan mode

At a specified interval, the scanner interrupts its current operation, checks the userdesignated conventional priority channels, and then resumes the previous operation. You can set the interval for priority scan checks.

To enter Priority Scan mode:

1. Enter Hold mode.
2. **FUNCTION** + tap **NO**.

If no conventional channels in enabled and unlocked systems are designated as priority, the scanner will display *Priority Scan No Channel*.

For trunked priority channels, you need to enable priority scanning in the system option menu as well as tagging the channel as priority. Trunked priority only

works while scanning that system's control channel or (in the case of Motorola systems) when the scanner is scanning any channel in the system.

Priority Plus Scan mode

The scanner stops the current operation and only performs Priority Scan checks as described above.

To enter Priority Plus Scan mode:

1. Enter Hold mode.
2. **FUNCTION** + repeatedly tap **NO** until the scanner displays *Priority Mode Plus On*.

GPS mode

(Requires a connected GPS receiver.) The scanner displays longitude, latitude, and heading information.

To enter GPS mode, **FUNCTION** + tap **GPS**.

Tone Out mode

The scanner checks up to 10 user-programmed channels for two-tone sequential, single, or group paging tones. When it detects a tone that matches the configuration for that channel, the scanner displays the tone information and opens squelch.

To enter Tone Out mode, tap **MENU**, then scroll down and select *Tone- Out for...*

To exit Tone Out mode, enter Scan mode.

Band Scope mode

The scanner searches a frequency ranges and displays a visual representation of the signal level.

To enter Band Scope Mode:

1. Set one of the 3 search keys to a Band Scope search.
2. Enter Search mode.
3. **FUNCTION** + Tap the designated search key.

6. Keys and their functions

Key Overview

The diagram below shows the keys and what they are called throughout the guide:



Operating the controls

Each button has at least two different actions which you control using the key combinations explained below.

- *Tap* : press the button and release it immediately
- *Double tap* : press the button twice, as quickly as possible (within 1 second)
- *Press & hold* : press the button and keep it pressed for at least 2 seconds before releasing it
- **FUNCTION** + *tap* : press and release **FUNCTION** , then tap the button
- **FUNCTION** + *Double tap* : press and release **FUNCTION** , then double tap the button
- **FUNCTION** + *Press & hold* : press and release **FUNCTION** , then press and hold the button

Using the **FUNCTION** button

When you tap **FUNCTION**, the scanner remembers the **FUNCTION** + key combination for the next 3 seconds; during this time, it displays an *F* icon at the top of the screen.

If you want the scanner to maintain the **FUNCTION** + key combination longer, press & hold **FUNCTION**. The scanner remembers the **FUNCTION** + key combination until the next time you tap **FUNCTION**; during this time, it displays *Function Key Holding* and flashes the *F* icon at the top of the screen.

Key functions in different operation modes

The keys have different functions in each operation mode:

- [Scan and Search mode key functions](#)
- [Hold mode key functions](#)
- [Close Call mode key functions](#)
- [Priority Scan mode information](#)
- [GPS mode key functions](#)
- [Tone Out mode key functions](#)
- [Band Scope mode key functions](#)
- [Available functions in Key Safe mode](#)

Locking the Keypad

You can lock the keypad to prevent accidental interruptions of the scanner's current operation.

- To lock the keypad, press **FUNCTION** + tap **BACKLIGHT**. The scanner display shows *Keypad Lock On* and turns on the keypad lock icon in the upper left corner.
- All keys are disabled except for **HOLD**, **BACKLIGHT**, and **SELECT-VOLUME-SQUELCH** (Volume level only).
- To unlock the keypad, press **FUNCTION** + tap **BACKLIGHT**. The scanner display shows *Keypad Lock Off* and turns off the keypad lock icon.

7. Menu tree

Main menu

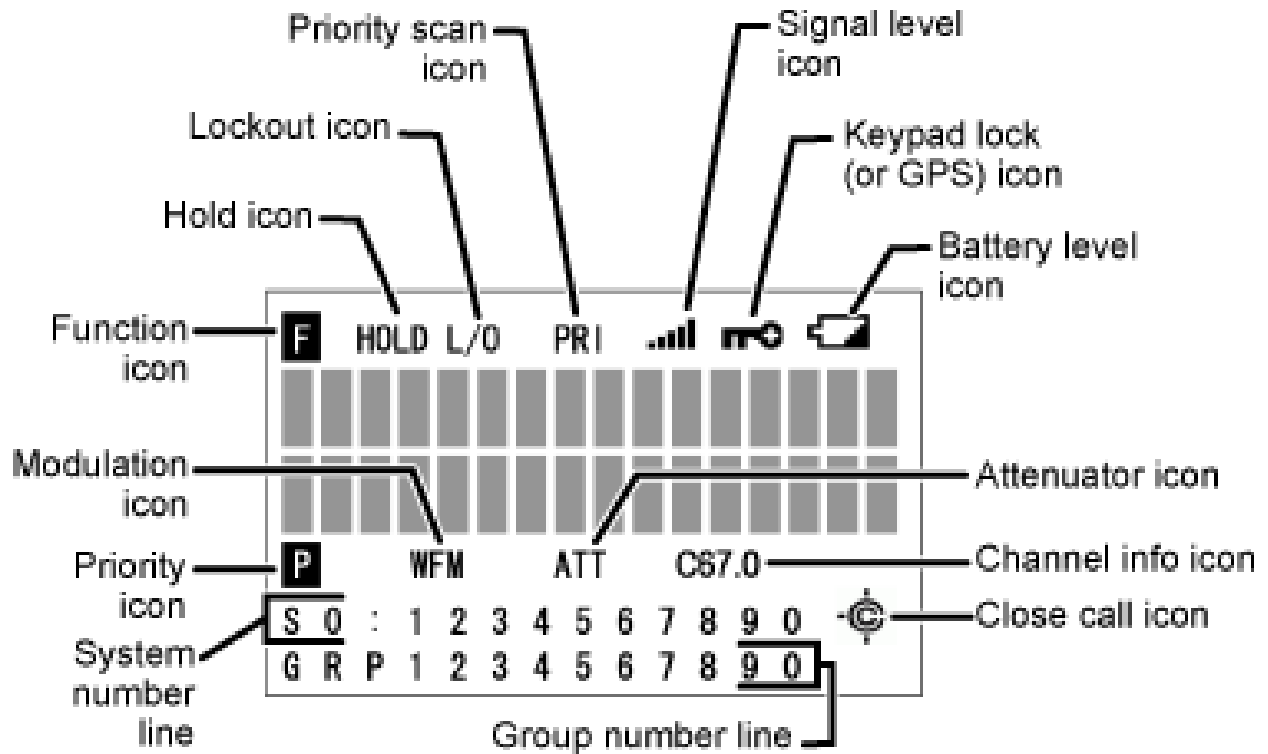
- Program System
- Program Location
- Srch/CloCall Opt
- Search for...
- Close Call
- Priority Scan
- Tone-Out for...
- Wired Clone
- Settings

Using the menu

- To open the menu, tap **MENU**.
- Turn the **SELECT-VOLUME-SQUELCH** knob to move the cursor and highlight menu items. The currently highlighted item appears in reversed-out text.
- To select the highlighted item or confirm an option setting, tap **E-YES** or press down on the **SELECT-VOLUME-SQUELCH** knob.
- To cancel an option setting, press **NO**.
- To go back one level in the menu, tap **MENU**.
- To exit the menu, press **LOCKOUT**. The scanner goes back to the operating mode it was in before you entered the menu.

8. Reading the display


The display icons vary depending on the status of the scanner and what you're doing at any given time. The diagram shows common icon locations, and table below lists the most common icons and their meanings:



Attenuator icon	Steady: The attenuator is turned on for the current channel.
	Blinking: The attenuator is turned on globally (for all channels).
Battery level icon (Handheld models only)	x.xx: The remaining battery voltage is displayed in place of the Xs.
	Blinking icon: The battery is low. (If the AC adapter is connected while the icon is blinking, the battery is incorrectly installed, is the wrong type, or has gone bad.)
Channel info icon	This icon has several available states: <ul style="list-style-type: none"> • P25: The received signal is digitized voice (APCO P25) • LNK: The current channel is configured

	<p>as a voice channel, but the scanner is receiving data on it.</p> <ul style="list-style-type: none"> • DAT: The current channel is configured as a control channel, and the scanner is receiving data on it. • ENC: The received signal is encrypted P25 digitized voice, and the scanner has muted the audio. • Cxx.x: The scanner has detected a CTCSS code; the received code is displayed in place of the Xs. • DCSxxx: The scanner has detected a DCS code; the received code is displayed in place of the Xs. • NAC: xxx: The scanner has detected a P25 network address code (NAC); the received code is displayed in place of the Xs.
<p>Close call icon</p>	<p>Normal (open) icon:</p> <ul style="list-style-type: none"> • Steady: Close call priority mode is on. • Blinking: Close Call Only mode is on, or the scanner has detected a close call signal.
	<p>Reversed (filled) icon:</p> <ul style="list-style-type: none"> • Steady: Close call DND mode is on. • Blinking: Close call DND mode is on, and the scanner has detected a close call signal.
<p>Function icon</p>	<p>Steady: You tapped the FUNCTION key; the scanner will remember the FUNCTION + key combination for the next 3 seconds.</p>
	<p>Blinking: You pressed & held the FUNCTION key; the scanner will remember the FUNCTION + key combination until you tap FUNCTION again.</p>
<p>Group number line (GRP)</p>	<p>In Scan mode: The group Quick Key numbers (GQK) of any unlocked groups in the current system or site are displayed on this line. The GQK number of the group that is currently</p>

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	being scanned blinks.
	In Hold mode: This line displays the GQK number of the current group only.
	In Custom Search mode: The numbers of any programmed search ranges are display on this line. The number of the custom range that is currently being searched blinks.
Hold icon	The scanner is in Hold mode.
IFX icon	You switched to the intermediate frequency (IF exchange).
Keypad lock (or GPS) Icon	 : The keypad is locked. (Available only on handheld models.)
	GPS: The scanner is receiving data from the GPS device.
Lockout icon	The current channel is locked out.
Modulation icon	This icon displays the modulation type of the current channel: AM, FM, NFM, FMB, or WFM.
Priority icon	The current channel is set as a priority channel.
Priority scan icon (PRI)	Steady: Priority scan is turned on.
	Blinking: Priority Plus scan is turned on.
REP icon	The Repeater Find feature is turned on.
Signal level icon	This icon displays the strength of the current signal; the icon ranges from zero bars (no signal) to five bars (strong signal).
System number line (Sx:)	In Scan mode: The system/site Quick Key numbers (SQK) of any unlocked systems or sites are displayed on this line. The SQK number of the system or site that is currently being scanned blinks. For SQK numbers above 9, the tens digit replaces the X in the icon; the ones digits are shown on this line.
	In Hold mode: This line displays the SQK number of the current system or site only. For SQK numbers above 9, the tens digit replaces the X in the icon; the ones digit is displayed on this line.
	In Service Search mode: The icon SCR replaces the System numbers if the broadcast screen feature is turned on.

Special displays

In some operation modes, the display can be very different from the main display. These modes also have 2 or 3 different displays you can cycle through.

- [Band Scope mode display](#)
- [Hold mode displays](#)
- [GPS mode display](#)

9. Conventional Systems

Please note that these pages are meant as general instructions.

Since a conventional system is really a collection of frequencies, the first thing you need to know is the frequency for each channel you want to program.

Programming a Conventional System

To program a conventional system, you'll need to program the required elements in the following order:

Create a system

1. Go to the [Program System](#) menu and choose *New System*.
2. The scanner will prompt you for the System Type. Select *Conventional*.
3. When the scanner prompts you confirm, tap **YES**.
4. The scanner creates the system with a default name. Select [Edit Name](#) if you want to change it.
5. If you need to change any of the system properties, you can do that now. Unless a property is *Required*, you can operate the system without changing the default settings.

System properties

All of these options can be found under your scanner's [Program System](#) menu. If necessary, the sub-menu and option name on each scanner are listed beside the property.

Property	Option name
Required	
None	
Recommended	
Name	Edit Name
Number tag	Set Number Tag
Quick key	Set Quick Key
Optional	
Automatic Gain Control (AGC)	Set Audio AGC
Delay time	Set Delay Time
Hold time	Set Hold Time

Lockout	Set Lockout
P25 wait time	P25 Waiting Time
Startup key	Set Startup Key
Available operations	
Copy a system	Copy System
Delete a system	Delete System

Create at least 1 channel group

Each conventional system can contain up to 20 channel groups, and all systems must contain at least 1 channel group.

1. On the [Program System](#) menu, select the system you just created.
2. Go to the [Edit Group](#) menu and select *New Group*.
3. If you need to change any of the channel group properties, you can do that now. Unless a property is *Required*, you can operate the system without changing the default settings.

Channel group properties

All of these options can be found by selecting the group name under your scanner's [Edit Group](#) menu. If necessary, the sub-menu and option name on each scanner are listed beside the property.

Property	Option name
Required	
None	
Recommended	
Name	Edit Name
Quick key	Set Quick Key
Optional	
Location information	Set Location Info
Lockout	Set Lockout
Available operations	
Delete a group	Delete Group

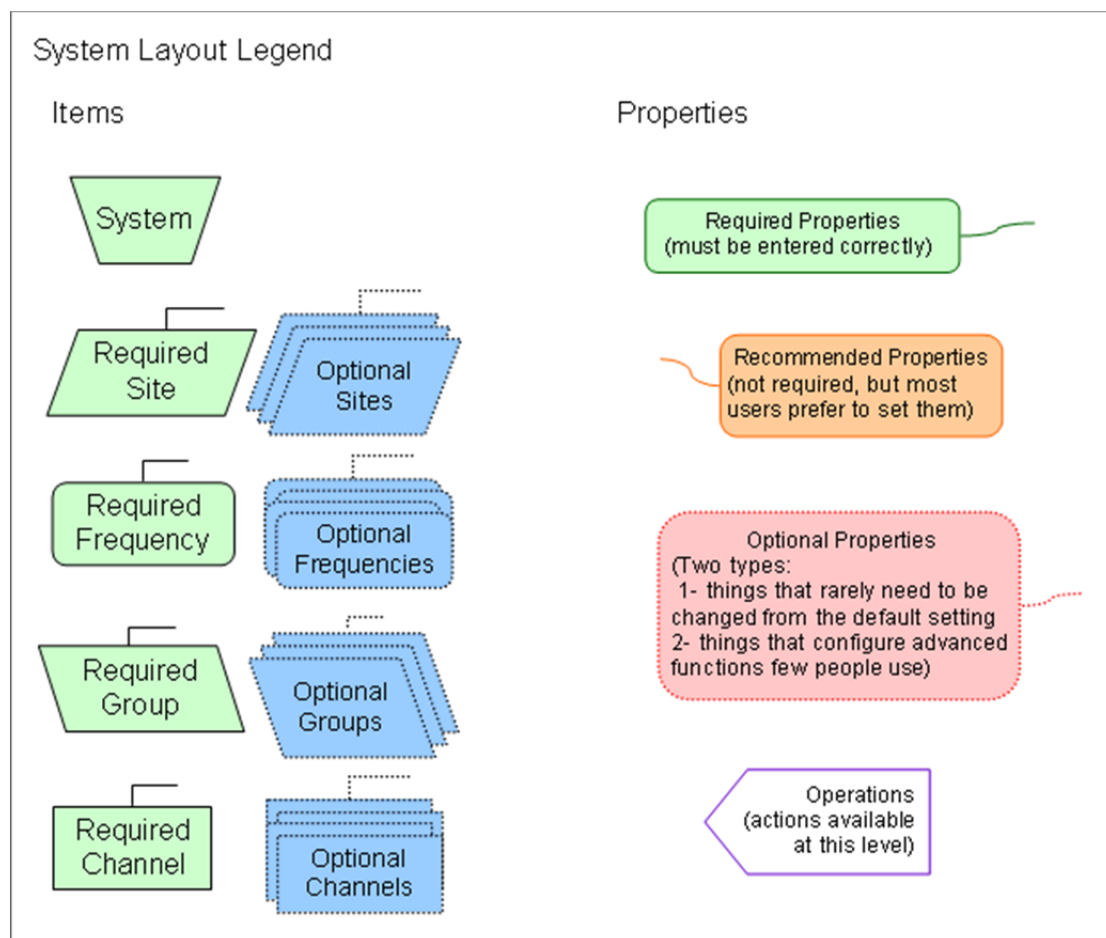
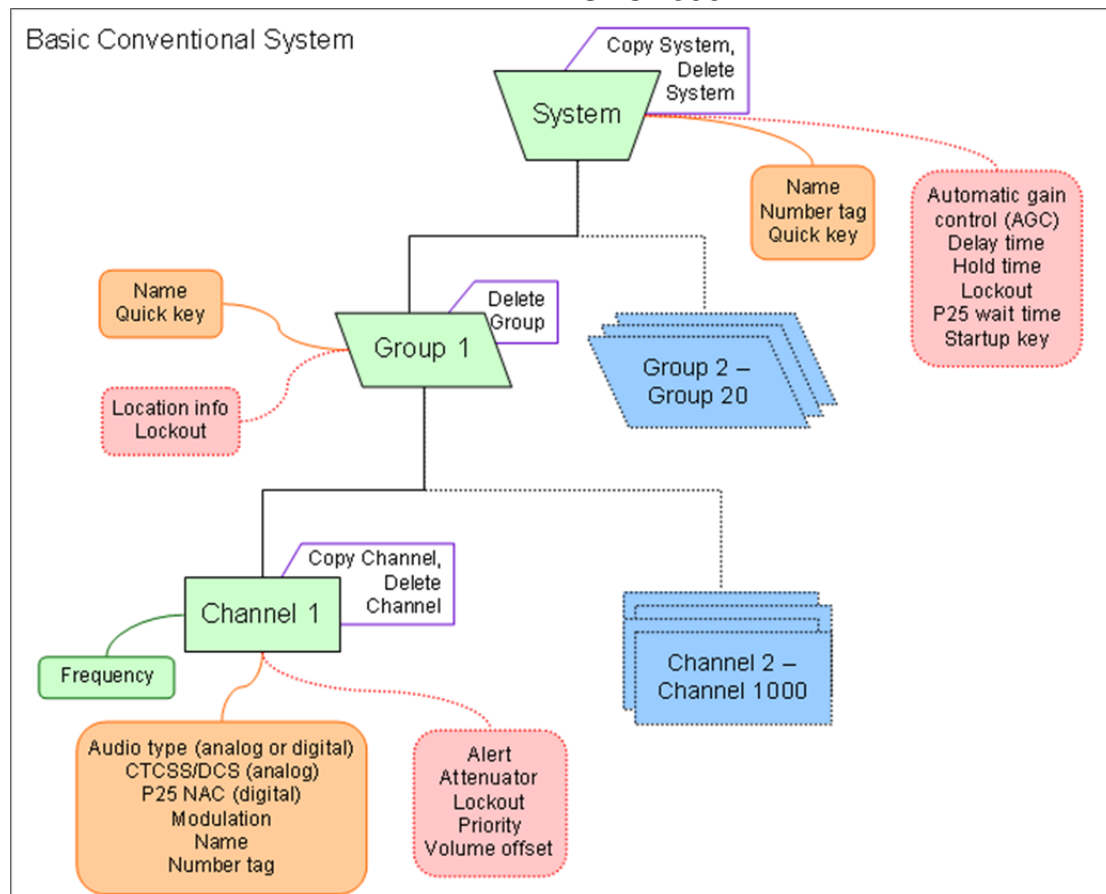
Create at least 1 channel in each group

Each conventional system can contain up to 1000 channels in each group, and all groups must contain at least 1 channel.

1. On the [Edit Group](#) menu, select the channel group you just created.
2. Go to the [Edit Channel](#) menu and select *New Channel*.
3. Input the frequency for this channel in MHz.
4. If you need to change any of the channel properties, you can do that now. Unless a property is *Required*, you can operate the system without changing the default settings.

Property	Option name
Required	
Frequency	Edit Frequency
Recommended	
Analog/digital	Set Audio Type
• CTCSS/DCS	Set CTCSS/DCS (analog channels only)
• P25 Network Address (NAC)	P25 NAC Option (digital channels only)
Modulation	Set Modulation
Name	Edit Name
Number tag	Set Number Tag
Optional	
Alert	Set Alert
Attenuator	Set Attenuator
Lockout	Set Lockout
Priority	Set Priority
Volume Offset	Volume Offset
Available operations	
Copy a channel	Copy Channel
Delete a channel	Delete Channel

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10. EDACS SCAT Systems

Please note that these pages are meant as general instructions. While most of the information here applies to all scanners, some options may not be available on certain scanner models. Model-specific options are indicated in the text.

Programming an EDACS SCAT System

To program an EDACS SCAT system, you'll need to program the required elements in following order:

Create a system

1. Go to the [Program System](#) menu and choose *New System*.
2. The scanner will prompt you for the System Type. Select *EDCS*.
3. The scanner will prompt you for the sub-type. Select *SCAT*.
4. When the scanner prompts you confirm, tap **YES**.
5. The scanner creates the system with a default name. Select [Edit Name](#) if you want to change it.
6. If you need to change any of the system properties, you can do that now. Unless a property is *Required*, you can operate the system without changing the default settings.

System properties

All of these options can be found under your scanner's [Program System](#) menu. If necessary, the sub-menu and option name on each scanner are listed beside the property.

Property	Option name
Required	
None	
Recommended	
Name	Edit Name
Number tag	Set Number Tag
Optional	
Automatic Gain Control (AGC)	Set Audio AGC
Delay time	Set Delay Time
Available operations	
Copy a system	Copy System
Delete a system	Delete System

Create a site

Each EDACS SCAT system must contain exactly 1 site.

1. On the [Program System](#) menu, select the system you just created.
2. Go to the [Edit Site](#) menu.
3. If you need to change any of the site properties, you can do that now. Unless a property is *Required*, you can operate the system without changing the default settings.

Site properties

All of these options can be found under your scanner's [Edit Site](#) menu. If necessary, the sub-menu and option name on each scanner are listed beside the property.

Property	Option name
Required	
None	
Recommended	
Quick key	Set Quick Key
Optional	
Attenuator	Set Attenuator
Hold time	Set Hold Time
Location information	Set Location Info
Lockout	Set Lockout
Modulation	Set Modulation
Startup key	Set Startup Key
Available operations	
None	

Create at least 1 frequency

Each EDACS SCAT system must contain at least 1 frequency in its site.

1. Open the [Edit Site](#) menu.
2. Go to the [Set Frequencies](#) sub-menu and select *New Frequency*.
3. Enter at least 1 frequency for this site.

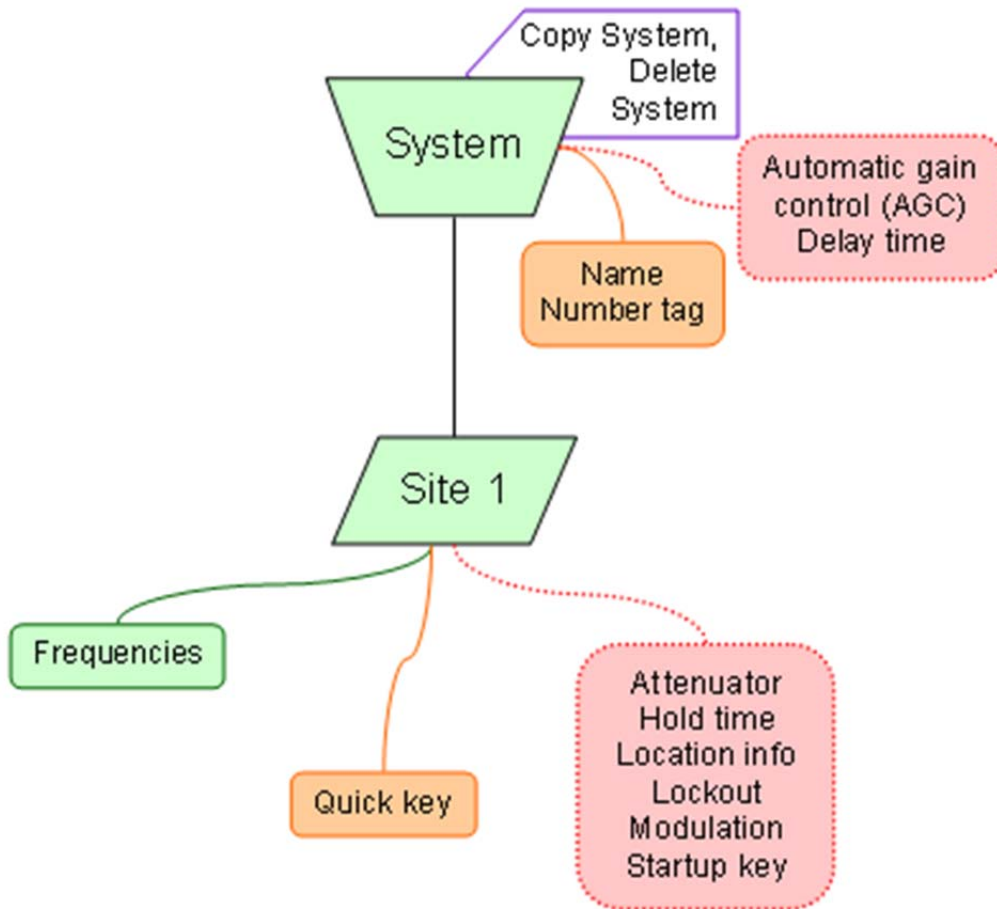
4. If you need to change any of the frequency properties, you can do that now. Unless a property is *Required*, you can operate the system without changing the default settings.

Frequency properties

All of these options can be found by selecting the frequency under the [Set Frequencies](#) sub-menu. If necessary, the sub-menu and option name on each scanner are listed beside the property.

Property	Option name
Required	
None	
Recommended	
Number tag	Set Number Tag
Optional	
Volume Offset	Volume Offset
Lockout	Set Lockout
Available operations	
Delete a frequency	Delete Frequency

EDACS SCAT System



11. EDACS Trunked Systems

Please note that these pages are meant as general instructions.

This section deals with EDACS Wide or standard systems. This includes EDACS systems that use ESK.

No special setting is needed to enable ESK tracking on an EDACS system. Note that the scanner cannot decode EDACS ProVoice.

Programming an EDACS System

To program an EDACS system, you'll need to program the required elements in following order:

Create a system

1. Go to the [Program System](#) menu and choose *New System*.
2. The scanner will prompt you for the System Type. Select *EDCS*.
3. The scanner will prompt you for the sub-type. Select *Wide/Narrow*.
4. When the scanner prompts you confirm, tap **YES**.
5. The scanner creates the system with a default name. Select [Edit Name](#) if you want to change it.
6. If you need to change any of the system properties, you can do that now. Unless a property is *Required*, you can operate the system without changing the default settings.

System properties

All of these options can be found under your scanner's [Program System](#) menu. If necessary, the submenu and option name on each scanner are listed beside the property.

Property	Option name
Required	
None	
Recommended	
Name	Edit Name
Number tag	Set Number Tag
Optional	

Automatic Gain Control (AGC)	Set Audio AGC
Delay time	Set Delay Time
Emergency alert	Emergency Alert
ID format	Set ID Format (AFS) or (DEC)
ID scan/search	ID Scan/Search
Priority ID scan	Priority ID Scan
Available operations	
Copy a system	Copy System
Delete a system	Delete System
Review locked-out IDs	Rvw ID:Srch L/O
Clear all locked-out IDs	Clr All L/O IDs

Create at least 1 site

Each EDACS system can contain up to 256 sites, and all systems must contain at least 1 site.

1. On the [Program System](#) menu, select the system you just created.
2. Go to the [Edit Site](#) menu and select *New Site*.
3. If you need to change any of the site properties, you can do that now. Unless a property is *Required*, you can operate the system without changing the default settings.

Site properties

All of these options can be found under your scanner's [Edit Site](#) menu. If necessary, the sub-menu and option name on each scanner are listed beside the property.

Property	Option name
Required	
Site type	Set Site Type
Recommended	
Name	Edit Name
Quick key	Set Quick Key
Optional	

Attenuator	Set Attenuator
Hold time	Set Hold Time
Location information	Set Location Info
Lockout	Set Lockout
Modulation	Set Modulation
Startup key	Set Startup Key
Available operations	
Delete a site	Delete Site

Create at least 1 frequency in each site

Each trunked system can contain up to 30 frequencies in each site, and all sites must contain at least 1 frequency.

1. On the [Edit Site](#) menu, select the site you just created.
2. Go to the [Set Frequencies](#) sub-menu and select *New Frequency*.
3. Enter at least 1 frequency for this site.
4. When you enter a new frequency, the scanner will prompt you for the **logical channel number or LCN** for that frequency. Enter a number from 1 through 30.
5. If you need to change any of the frequency properties, you can do that now. Unless a property is *Required*, you can operate the system without changing the default settings.

Frequency properties

All of these options can be found by selecting the frequency under the [Set Frequencies](#) sub-menu. If necessary, the sub-menu and option name on each scanner are listed beside the property.

Property	Option name
Required	
Logical channel number	Input LCN
Recommended	
None	
Optional	
Lockout	Set Lockout
Available operations	
Delete a frequency	Delete Frequency

Programming a system for Scanning

Once you create the system and at least 1 site, you can [Search](#) the system with no problems. However, if you want to [Scan](#) the system, you'll need to program the required elements in following order:

Create at least 1 channel group

Each EDACS system can contain up to 20 channel groups, and any system you want to scan must contain at least 1 channel group.

1. On the [Program System](#) menu, select the system you just created.
2. Go to the [Edit Group](#) menu and select *New Group*.
3. If you need to change any of the channel group properties, you can do that now. Unless a property is *Required*, you can operate the system without changing the default settings.

Channel group properties

All of these options can be found by selecting the group name under your scanner's [Edit Group](#) menu. If necessary, the sub-menu and option name on each scanner are listed beside the property.

Property	Option name
Required	
None	
Recommended	
Name	Edit Name
Quick key	Set Quick Key
Optional	
Location information	Set Location Info
Lockout	Set Lockout
Available operations	
Delete a group	Delete Group

Create at least 1 channel in each group

Each trunked system can contain up to 500 channels.

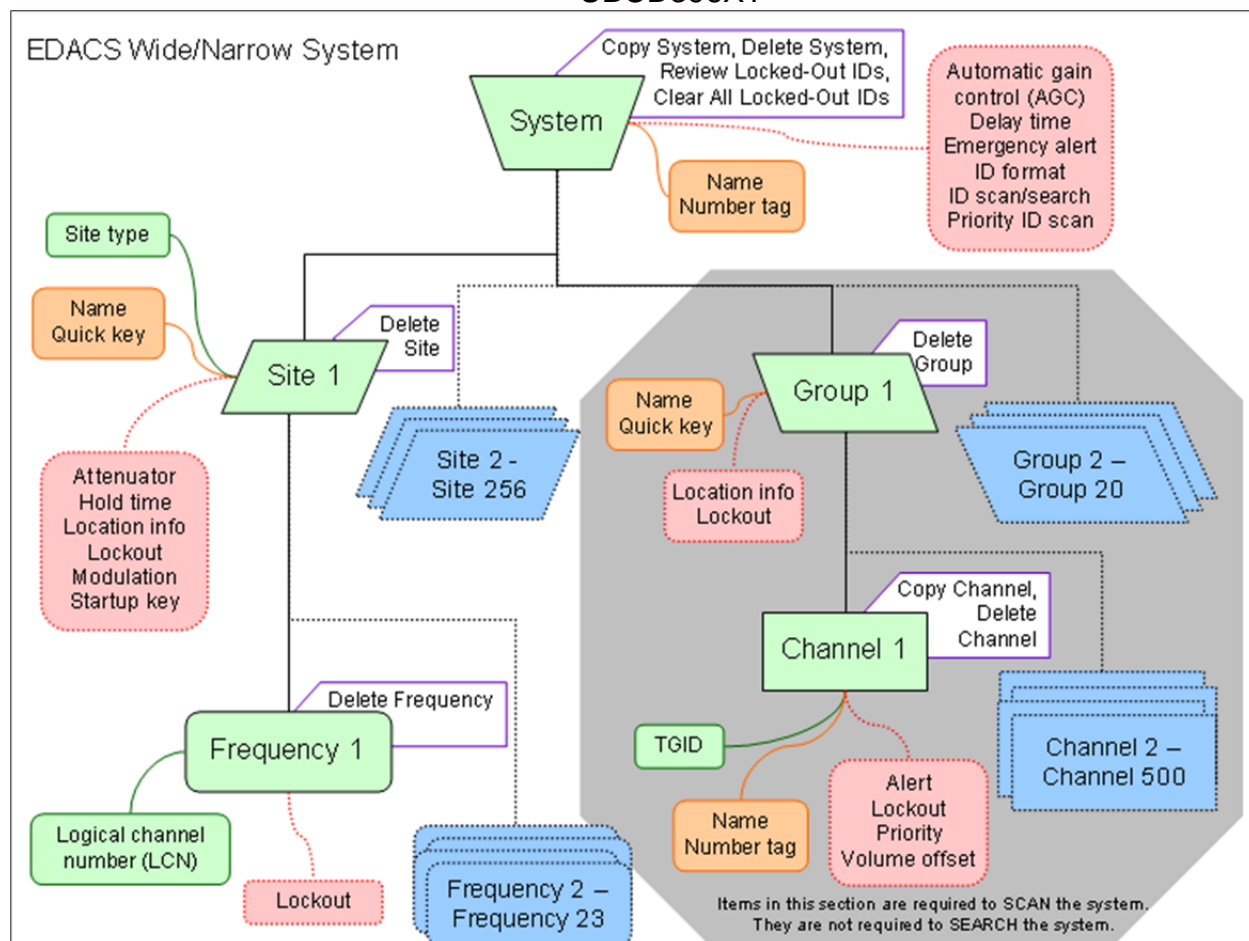
1. On the [Edit Group](#) menu, select the channel group you just created.
2. Go to the [Edit Channel](#) menu and select *New Channel*.
3. Input the [Talk Group ID \(TGID\)](#) for this channel.
4. If you need to change any of the channel properties, you can do that now.
Unless a property is *Required*, you can operate the system without changing the default settings.

Channel properties

All of these options can be found by selecting the channel name your scanner's [Edit Channel](#) menu. If necessary, the sub-menu and option name on each scanner are listed beside the property.

Property	Option name
Required	
TGID	Edit TGID
Recommended	
Name	Edit Name
Number tag	Set Number Tag
Optional	
Alert	Set Alert
Lockout	Set Lockout
Priority	Set Priority
Volume Offset	Volume Offset
Available operations	
Copy a channel	Copy Channel
Delete a channel	Delete Channel

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12.LTR Trunked Systems

Please note that these pages are meant as general instructions.

Programming an LTR System

To program an LTR system, you'll need to program the required elements in following order:

Create a system

1. Go to the [Program System](#) menu and choose *New System*.
2. The scanner will prompt you for the System Type. Select *LT*.
3. When the scanner prompts you confirm, tap **YES**.
4. The scanner creates the system with a default name. Select [Edit Name](#) if you want to change it.
5. If you need to change any of the system properties, you can do that now. Unless a property is *Required*, you can operate the system without changing the default settings.

System properties

All of these options can be found under your scanner's [Program System](#) menu. If necessary, the submenu and option name on each scanner are listed beside the property.

Property	Option name
Required	
None	
Recommended	
Name	Edit Name
Number tag	Set Number Tag
Optional	
Automatic Gain Control (AGC)	Set Audio AGC
Delay time	Set Delay Time
ID scan/search	ID Scan/Search
Priority ID scan	Priority ID Scan

Available operations	
Copy a system	Copy System
Delete a system	Delete System
Review locked-out IDs	Rvw ID:Srch L/O
Clear all locked-out IDs	Clr All L/O IDs

Create at least 1 site

Each LTR system can contain up to 256 sites, and all systems must contain at least 1 site.

1. On the [Program System](#) menu, select the system you just created.
2. Go to the [Edit Site](#) menu and select *New Site* .
3. If you need to change any of the site properties, you can do that now. Unless a property is *Required*, you can operate the system without changing the default settings.

Site properties

All of these options can be found under your scanner's [Edit Site](#) menu. If necessary, the sub-menu and option name on each scanner are listed beside the property.

Property	Option name
Required	
None	
Recommended	
Name	Edit Name
Quick key	Set Quick Key
Optional	
Attenuator	Set Attenuator
Hold time	Set Hold Time
Location information	Set Location Info
Lockout	Set Lockout
Modulation	Set Modulation
Startup key	Set Startup Key
Available operations	
Delete a site	Delete Site

Create at least 1 frequency in each site

Each LTR system can contain up to 20 frequencies in each site, and all sites must contain at least 1 frequency.

1. On the [Edit Site](#) menu, select the site you just created.
2. Go to the [Set Frequencies](#) sub-menu and select *New Frequency*.
3. Enter at least 1 frequency for this site.
4. When you enter a new frequency, the scanner will prompt you for the [logical channel number or LCN](#) for that frequency. Enter a number from 1 through 20.
5. If you need to change any of the frequency properties, you can do that now. Unless a property is *Required*, you can operate the system without changing the default settings.

Frequency properties

All of these options can be found by selecting the frequency under the [Set Frequencies](#) sub-menu. If necessary, the sub-menu and option name on each scanner are listed beside the property.

Property	Option name
Required	
Logical channel number	Input LCN
Recommended	
None	
Optional	
Lockout	Set Lockout
Available operations	
Delete a frequency	Delete Frequency

Programming a system for Scanning

Once you create the system and at least 1 site, you can [Search](#) the system with no problems. However, if you want to [Scan](#) the system, you'll need to program the required elements in following order.

Create a channel group

Each LTR system can contain up to 20 channel groups.

1. On the [Program System](#) menu, select the system you just created.
2. Go to the [Edit Group](#) menu and select *New Group*.
3. If you need to change any of the channel group properties, you can do that now. Unless a property is *Required*, you can operate the system without changing the default settings.

Channel group properties

All of these options can be found by selecting the group name under your scanner's [Edit Group](#) menu. If necessary, the sub-menu and option name on each scanner are listed beside the property.

Property	Option name
Required	
None	
Recommended	
Name	Edit Name
Quick key	Set Quick Key
Optional	
Location information	Set Location Info
Lockout	Set Lockout
Available operations	
Delete a group	Delete Group

Create a channel in each group

Each trunked system can contain up to 500 channels.

1. On the [Edit Group](#) menu, select the channel group you just created.
2. Go to the [Edit Channel](#) menu and select *New Channel*.
3. Input the [Talk Group ID \(TGID\)](#) for this channel.

4. If you need to change any of the channel properties, you can do that now. Unless a property is *Required*, you can operate the system without changing the default settings.

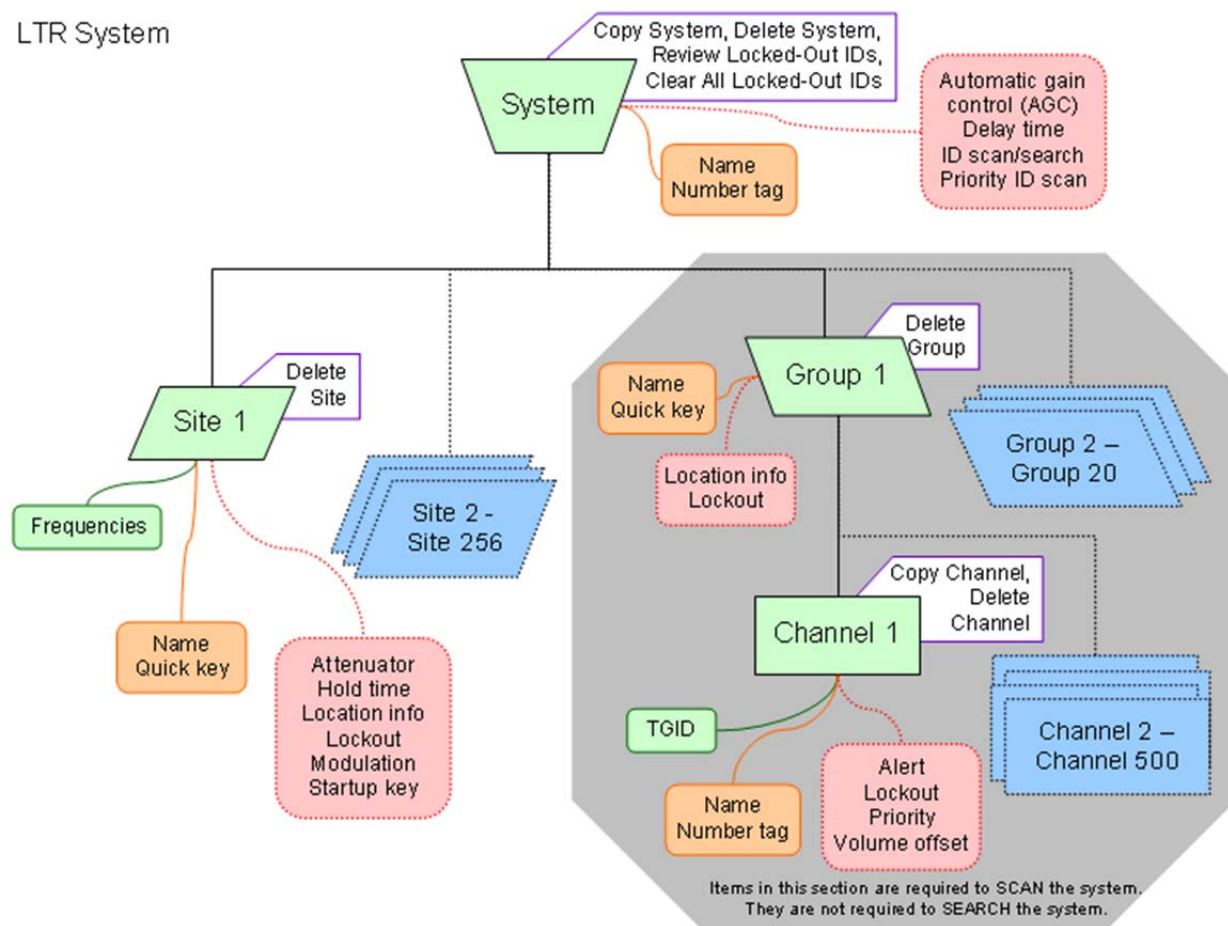
Channel properties

All of these options can be found by selecting the channel name your scanner's [Edit Channel](#) menu. If necessary, the sub-menu and option name on each scanner are listed beside the property.

Property	Option name
Required	
TGID	Edit TGID
Recommended	
Name	Edit Name
Number tag	Set Number Tag
Optional	
Alert	Set Alert
Lockout	Set Lockout
Priority	Set Priority
Volume Offset	Volume Offset
Available operations	
Copy a channel	Copy Channel
Delete a channel	Delete Channel

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LTR System



13. Motorola Trunked Systems

Please note that these pages are meant as general instructions.

A Motorola system can be an 800 MHz, 400 MHz (UHF), or 100-200 MHz (VHF) system.

Programming a Motorola System

To program a Motorola system, you'll need to program the required elements in following order:

Create a system

1. Go to the [Program System](#) menu and choose *New System*.
2. The scanner will prompt you for the System Type. Select *MOT*.
3. When the scanner prompts you confirm, tap **YES**.
4. The scanner creates the system with a default name. Select [Edit Name](#) if you want to change it.
5. If you need to change any of the system properties, you can do that now. Unless a property is *Required*, you can operate the system without changing the default settings.

System properties

All of these options can be found under your scanner's [Program System](#) menu. If necessary, the submenu and option name on each scanner are listed beside the property.

Property	Option name
Required	
Fleet map	Edit Fleet Map (Required for Motorola Type I or Type I/II Hybrid systems only)
Recommended	
Name	Edit Name
Number tag	Set Number Tag
Optional	
Automatic Gain Control (AGC)	Set Audio AGC

Delay time	Set Delay Time
Emergency alert	Emergency Alert
ID format	Set ID Format (DEC/HEX)
ID scan/search	ID Scan/Search
Priority ID scan	Priority ID Scan
Status bit	Set Status Bit
End Code	Set End Code
Available operations	
Copy a system	Copy System
Delete a system	Delete System
Review locked-out IDs	Rvw ID:Srch L/O
Clear all locked-out IDs	Clr All L/O IDs

Create at least 1 site

Each Motorola system can contain up to 256 sites, and all systems must contain at least 1 site.

1. On the [Program System](#) menu, select the system you just created.
2. Go to the [Edit Site](#) menu and select *New Site*.
3. If you need to change any of the site properties, you can do that now. Unless a property is *Required*, you can operate the system without changing the default settings.

Site properties

All of these options can be found under your scanner's [Edit Site](#) menu. If necessary, the sub-menu and option name on each scanner are listed beside the property.

Property	Option name
Required	
Band plan	Edit Band Plan
Recommended	
Name	Edit Name
Quick key	Set Quick Key
Optional	
Attenuator	Set Attenuator

Hold time	Set Hold Time
Location information	Set LocationInfo
Lockout	Set Lockout
Modulation	Set Modulation
P25 wait time	P25 Waiting Time
Startup key	Set Startup Key
Available operations	
Delete a site	Delete Site

Create at least 1 frequency in each site

Each site must contain at least 1 frequency.

1. On the [Edit Site](#) menu, select the site you just created.
2. Go to the [Set Frequencies](#) sub-menu and select *New Frequency*.
3. Enter at least 1 frequency for this site.
4. If you need to change any of the frequency properties, you can do that now. Unless a property is *Required*, you can operate the system without changing the default settings.

Frequency properties

All of these options can be found by selecting the frequency under the [Set Frequencies](#) sub-menu. If necessary, the sub-menu and option name on each scanner are listed beside the property.

Property	Option name
Required	
None	
Recommended	
None	
Optional	
Lockout	Set Lockout
Available operations	
Delete a frequency	Delete Frequency

Programming a system for Scanning

Once you create the system and at least 1 site, you can scan the system in ID Search mode. In this mode, the scanner stops on all system traffic for talk groups you have not locked out. If you want to use ID Scan mode, you'll need to program channels into the system. In ID Scan, the scanner only stops on talk groups you have programmed into a channel.

Create a channel group

Each Motorola system can contain up to 20 channel groups.

1. On the [Program System](#) menu, select the system you just created.
2. Go to the [Edit Group](#) menu and select *New Group*.
3. If you need to change any of the channel group properties, you can do that now. Unless a property is *Required*, you can operate the system without changing the default settings.

Channel group properties

(All of these options can be found by selecting the group name under the [Edit Group](#) menu. If necessary, the sub-menu and the exact option name are listed beside each property.)

Required	None
Recommended	Name (Edit Name)
	Quick key (Set Quick Key)
Optional	Location information (Set LocationInfo)
	Lockout (Set Lockout)
Available operations	Delete Group

Create a channel

Each trunked system can contain up to 500 channels.

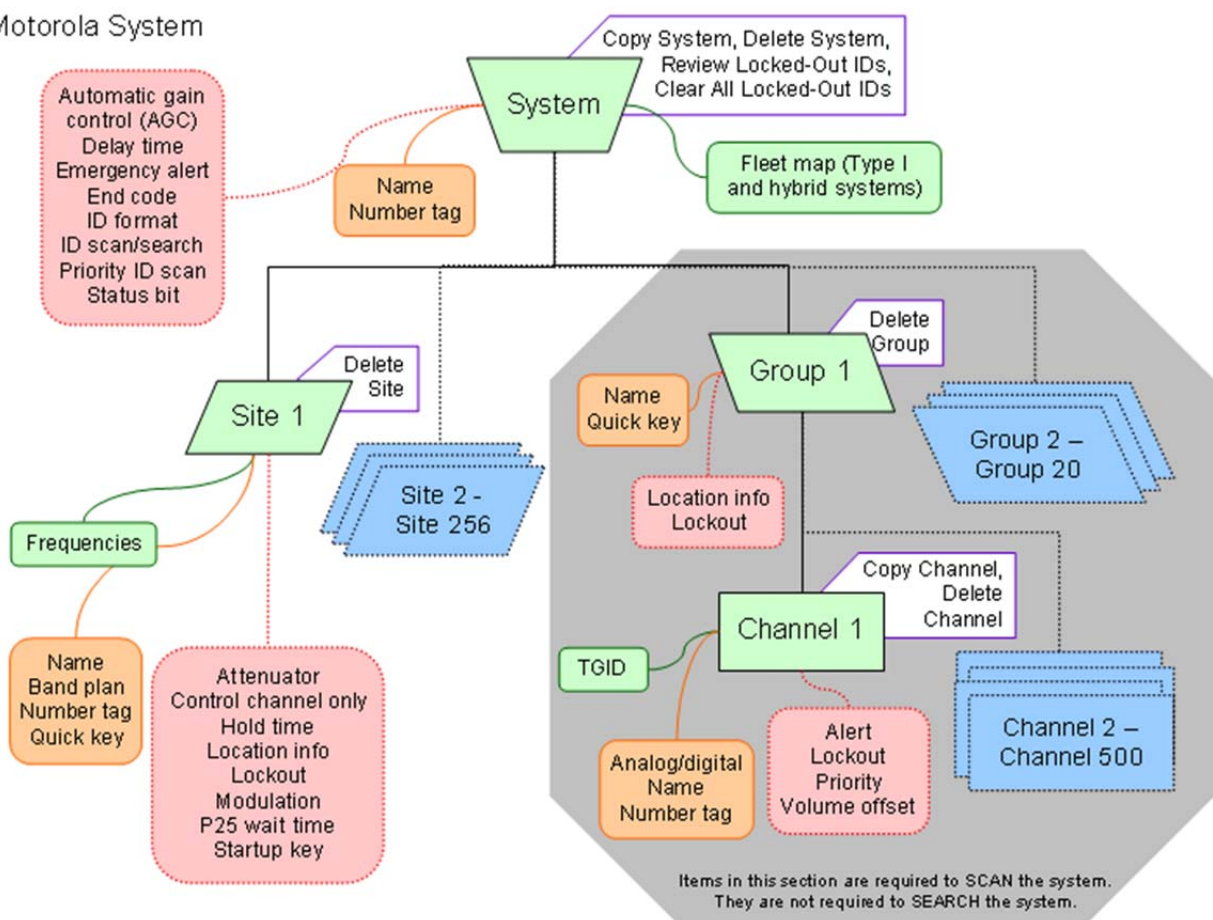
1. On the [Edit Group](#) menu, select the channel group you just created.
2. Go to the [Edit Channel](#) menu and select *New Channel*.
3. Input the Talk Group ID (TGID) for this channel.
4. If you need to change any of the channel properties, you can do that now. Unless a property is *Required*, you can operate the system without changing the default settings.

Channel properties

(All of these options can be found by selecting the channel name under the [Edit Channel](#) menu. If necessary, the sub-menu and the exact option name are listed beside each property.)

Required	TGID (Edit TGID)
Recommended	Audio type (Analog or digital) (Set Audio Type)
	Name (Edit Name)
	Number tag (Set Number Tag)
Optional	Alert (Set Alert)
	Lockout (Set Lockout)
	Priority (Set Priority)
	Volume Offset
Available operations	Copy Channel
	Delete Channel

Motorola System



Motorola System Worksheet B (Fleet Maps)

UBCD396XT

Fleet Map #:	
Block Information:	
Block	Size Code
Block 0	
Block 1	
Block 2	
Block 3	
Block 4	
Block 5	
Block 6	
Block 7	

Fleet Map #:	
Block Information:	
Block	Size Code
Block 0	
Block 1	
Block 2	
Block 3	
Block 4	
Block 5	
Block 6	
Block 7	

Fleet Map #:	
Block Information:	
Block	Size Code
Block 0	
Block 1	
Block 2	
Block 3	
Block 4	
Block 5	
Block 6	
Block 7	

Fleet Map #:	
Block Information:	
Block	Size Code
Block 0	
Block 1	
Block 2	
Block 3	
Block 4	
Block 5	
Block 6	
Block 7	

Fleet Map #:	
Block Information:	
Block	Size Code
Block 0	
Block 1	
Block 2	
Block 3	
Block 4	
Block 5	
Block 6	
Block 7	

Fleet Map #:	
Block Information:	
Block	Size Code
Block 0	
Block 1	
Block 2	
Block 3	
Block 4	
Block 5	
Block 6	
Block 7	

Fleet Map #:	
Block Information:	
Block	Size Code
Block 0	
Block 1	
Block 2	
Block 3	
Block 4	
Block 5	
Block 6	
Block 7	

Fleet Map #:	
Block Information:	
Block	Size Code
Block 0	
Block 1	
Block 2	
Block 3	
Block 4	
Block 5	
Block 6	
Block 7	

14. Motorola fleet maps

Preset Fleet Maps

The scanner contains 16 pre-programmed fleet maps you can select. The table below gives the size code for each block of the preset fleet maps:

Block number	0	1	2	3	4	5	6	7
Preset 1	11	11	11	11	11	11	11	11
Preset 2	4	4	4	4	4	4	4	4
Preset 3	4	4	4	4	4	4	12	
Preset 4	12		4	4	4	4	4	4
Preset 5	4	4	12		4	4	4	4
Preset 6	3	10	4	4	12		12	
Preset 7	10	10	11	4	4	4	4	4
Preset 8	1	1	2	2	3	3	4	4
Preset 9	4	4	0	0	0	0	0	0
Preset 10	0	0	0	0	0	0	4	4
Preset 11	4	0	0	0	0	0	0	0
Preset 12	0	0	0	0	0	0	0	4
Preset 13	3	3	11	4	4	0	0	0
Preset 14	4	3	10	4	4	4	12	
Preset 15	4	4	4	11	11	0	12	
Preset 16	3	10	10	11	0	0	12	

Custom Fleet Maps

To program a custom fleet map, select *Custom* under the *Edit Fleet Map* option. Then, select the appropriate size code for each block. Remember, not all size codes are available for all blocks:

Block	Valid Size Codes
Block 0	0 - 14
Block	0 - 13 (14 not valid)

1	
Block 2	0 - 13 (14 not valid)
Block 3	0 - 13 (14 not valid)
Block 4	0 - 13 (14 not valid)
Block 5	0 - 12 (13, 14 not valid)
Block 6	0 - 12 (13, 14 not valid)
Block 7	0 - 11 (12, 13, 14 not valid)

How Fleet Maps Work

Blocks

Talk Group IDs can range from 0 to 65,535. To make it easier to handle this many IDs, the system divides the TGID range into 8 equal *blocks* :

Block	Starting ID	Ending ID
Block 0	0	8191
Block 1	8192	16383
Block 2	16384	24575
Block 3	24576	32767
Block 4	32768	40959
Block 5	40960	49151
Block 6	49152	57343
Block 7	57344	65535

Size Codes

Each block is assigned a *size code* based on the way the control channel sends the TGID data. Note that codes 12, 13, and 14 take up more than one block:

Size Code	Fleet / SubFleet? / ID	Number of Blocks Needed
0	(as Type II ID)	1
1	128 / 4 / 16	1
2	16 / 8 / 64	1
3	8 / 8 / 128	1
4	1 / 16 / 512	1
5	64 / 4 / 32	1
6	32 / 8 / 32	1
7	32 / 4 / 64	1
8	16 / 4 / 128	1
9	8 / 4 / 256	1
10	4 / 8 / 256	1
11	2 / 16 / 256	1
12	1 / 16 / 1024	2
13	1 / 16 / 2048	4
14	1 / 16 / 4096	8

15. Standard P25 Trunked Systems

This section deals with standard Project 25 or *P25* systems.

Programming a P25 System

To program a P25 system, you'll need to program the required elements in following order:

Create a system

1. Go to the [Program System](#) menu and choose *New System*.
2. The scanner will prompt you for the System Type. Select *P25*.
3. The scanner will prompt you for the sub-type. Select *Standard trunk*.
4. When the scanner prompts you confirm, tap **YES**.
5. The scanner creates the system with a default name. Select [Edit Name](#) if you want to change it.
6. If you need to change any of the system properties, you can do that now. Unless a property is *Required*, you can operate the system without changing the default settings.

System properties

All of these options can be found under your scanner's [Program System](#) menu. If necessary, the submenu and option name on each scanner are listed beside the property.

Property	Option name
Required	
None	
Recommended	
Name	Edit Name
Number tag	Set Number Tag
Optional	
Automatic Gain Control (AGC)	Set Audio AGC
Delay time	Set Delay Time
ID format	Set ID Format (DEC/HEX)
ID scan/search	ID Scan/Search
Priority ID scan	Priority ID Scan
Available operations	
Copy a system	Copy System

Delete a system	Delete System
Review locked-out IDs	Rvw ID:Srch L/O
Clear all locked-out IDs	Clr All L/O IDs

Create at least 1 site

All systems must contain at least 1 site.

1. On the [Program System](#) menu, select the system you just created.
2. Go to the [Edit Site](#) menu and select *New Site*.
3. If you need to change any of the site properties, you can do that now. Unless a property is *Required*, you can operate the system without changing the default settings.

Site properties

All of these options can be found under your scanner's [Edit Site](#) menu. If necessary, the sub-menu and option name on each scanner are listed beside the property.

Property	Option name
Required	
None	
Recommended	
Band plan	Edit Band Plan
Name	Edit Name
Quick key	Set Quick Key
Optional	
Attenuator	Set Attenuator
Hold time	Set Hold Time
Location information	Set LocationInfo
Lockout	Set Lockout
Startup key	Set Startup Key
Available operations	
Delete a site	Delete Site

Create at least 1 frequency in each site

All sites must contain at least 1 frequency.

1. On the [Edit Site](#) menu, select the site you just created.

2. Go to the [Set Frequencies](#) sub-menu and select *New Frequency*.
3. Enter at least 1 frequency for this site.
4. If you need to change any of the frequency properties, you can do that now. Unless a property is *Required*, you can operate the system without changing the default settings.

Frequency properties

All of these options can be found by selecting the frequency under the [Set Frequencies](#) sub-menu. If necessary, the sub-menu and option name on each scanner are listed beside the property.

Property	Option Name
Required	
None	
Recommended	
None	
Optional	
Lockout	Set Lockout
Available operations	
Delete a frequency	Delete Frequency

Programming a system for Scanning

Once you create the system and at least 1 site, you can [Search](#) the system with no problems. However, if you want to [Scan](#) the system, you'll need to program the required elements in following order.

Create a channel group

Each P25 system can contain up to 20 channel groups.

1. On the [Program System](#) menu, select the system you just created.
2. Go to the [Edit Group](#) menu and select *New Group* .
3. If you need to change any of the channel group properties, you can do that now. Unless a property is *Required* , you can operate the system without changing the default settings.

Channel group properties

All of these options can be found by selecting the group name under your scanner's [Edit Group](#) menu. If necessary, the sub-menu and option name on each scanner are listed beside the property.

Property	Option name
Required	
None	
Recommended	
Name	Edit Name
Quick key	Set Quick Key
Optional	
Location information	Set LocationInfo
Lockout	Set Lockout
Available operations	
Delete a group	Delete Group

Create a channel in a group

Each trunked system can contain up to 500 channels.

1. On the [Edit Group](#) menu, select the channel group you just created.
2. Go to the [Edit Channel](#) menu and select *New Channel*.
3. Input the [Talk Group ID \(TGID\)](#) for this channel.
4. If you need to change any of the channel properties, you can do that now.
Unless a property is *Required*, you can operate the system without changing the default settings.

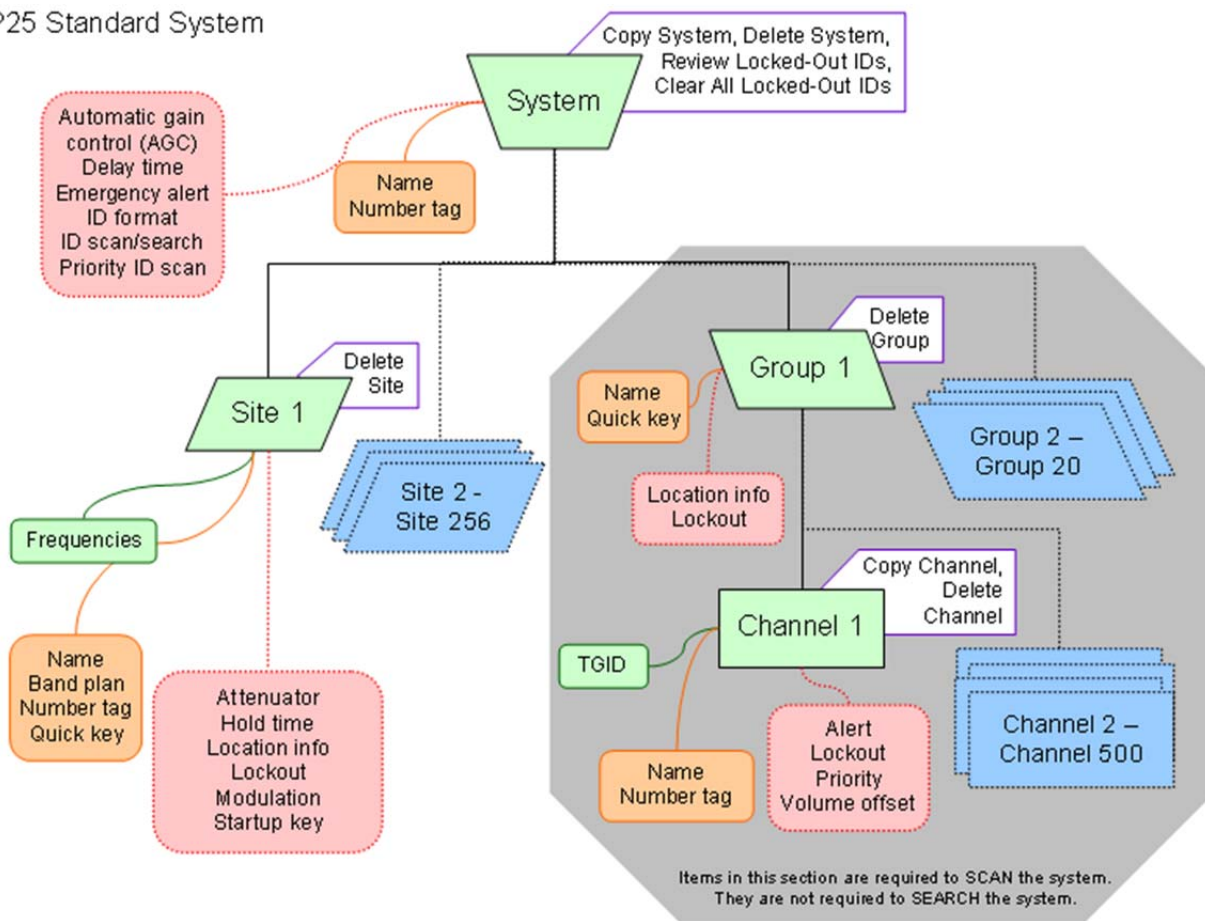
Channel properties

All of these options can be found by selecting the channel name your scanner's [Edit Channel](#) menu. If necessary, the sub-menu and option name on each scanner are listed beside the property.

Property	Option name
Required	
TGID	Edit TGID

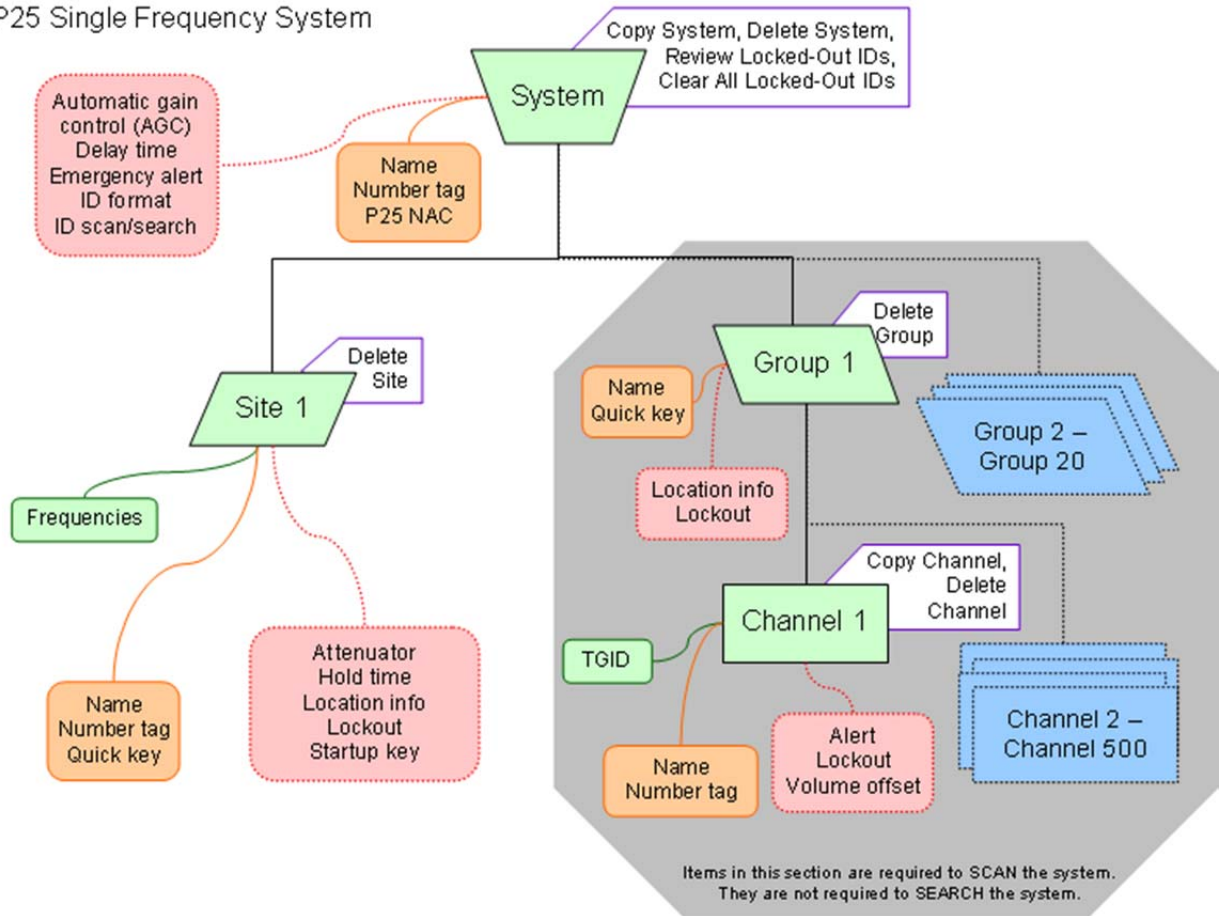
Recommended	
Name	Edit Name
Number tag	Set Number Tag
Optional	
Alert	Set Alert
Priority	Set Priority
Volume Offset	Volume Offset
Lockout	Set Lockout
Available operations	
Copy a channel	Copy Channel
Delete a channel	Delete Channel

P25 Standard System



UBCD396XT

P25 Single Frequency System



16. Single-Frequency P25 Trunked Systems

Single-frequency P25 systems are almost identical to [standard P25 systems](#), except they only have one site per system and the system can use a P25 network address.

Programming a Single-Frequency P25 System

To program a single-frequency P25 system, you'll need to program the required elements in following order:

Create a system

1. Go to the [Program System](#) menu and choose *New System*.
2. The scanner will prompt you for the System Type. Select *P25*.
3. When the scanner prompts you to select *Standard Trunk* or *One-Freq Trunk* select *One-Freq Trunk*, then tap **YES**.
4. The scanner creates the system with a default name. Select [Edit Name](#) if you want to change it.
5. If you need to change any of the system properties, you can do that now. Unless a property is *Required*, you can operate the system without changing the default settings.

System properties

(All of these options can be found under the [Program System](#) menu. If necessary, the submenu and the exact option name are listed beside each property.)

Required	None
Recommended	Name (Edit Name)
	Network address (P25 NAC Option)
	Number tag (Set Number Tag)
Optional	Automatic gain control (AGC) (Set Audio AGC)
	Delay time (Set Delay Time)
	ID format (Set ID Format (DEC/HEX))
	ID scan/search (ID Scan/Search)

Available operations	Copy System
	Delete System
	Review Locked-Out IDs (Rvw ID:Srch L/O)
	Clear All Locked-Out IDs (Clr All L/O IDs)

Create exactly 1 site

Each single-frequency P25 system must contain exactly 1 site.

1. On the [Program System](#) menu, select the system you just created.
2. Go to the [Edit Site](#) menu and select *New Site*.
3. Select the [Set Frequencies](#) menu and enter the frequencies for this site.
4. If you need to change any of the site properties, you can do that now. Unless a property is *Required*, you can operate the system without changing the default settings.

Site properties

(All of these options can be found by selecting the site name under the [Edit Site](#) menu. If necessary, the sub-menu and the exact option name are listed beside each property.)

Required	Frequencies (Set Frequencies)
Recommended	Name (Edit Name)
	Quick key (Set Quick Key)
Optional	Attenuator (Set Attenuator)
	Hold time (Set Hold Time)
	Location information (Set LocationInfo)
	Lockout (Set Lockout)
	Startup key (Set Startup Key)
Available operations	Delete Site

Programming a system for Scanning

Once you create the system and site, you can [Search](#) the system with no problems. However, if you want to [Scan](#) the system, you'll need to program the required elements in following order.

Create a channel group

Each P25 system can contain up to 20 channel groups.

1. On the [Program System](#) menu, select the system you just created.
2. Go to the [Edit Group](#) menu and select *New Group*.
3. If you need to change any of the channel group properties, you can do that now. Unless a property is *Required*, you can operate the system without changing the default settings.

Channel group properties

(All of these options can be found by selecting the group name under the [Edit Group](#) menu. If necessary, the sub-menu and the exact option name are listed beside each property.)

Required	None
Recommended	Name (Edit Name)
	Quick key (Set Quick Key)
Optional	Location information (Set LocationInfo)
	Lockout (Set Lockout)
Available operations	Delete Group

Create a channel

Each trunked system can contain up to 500 channels.

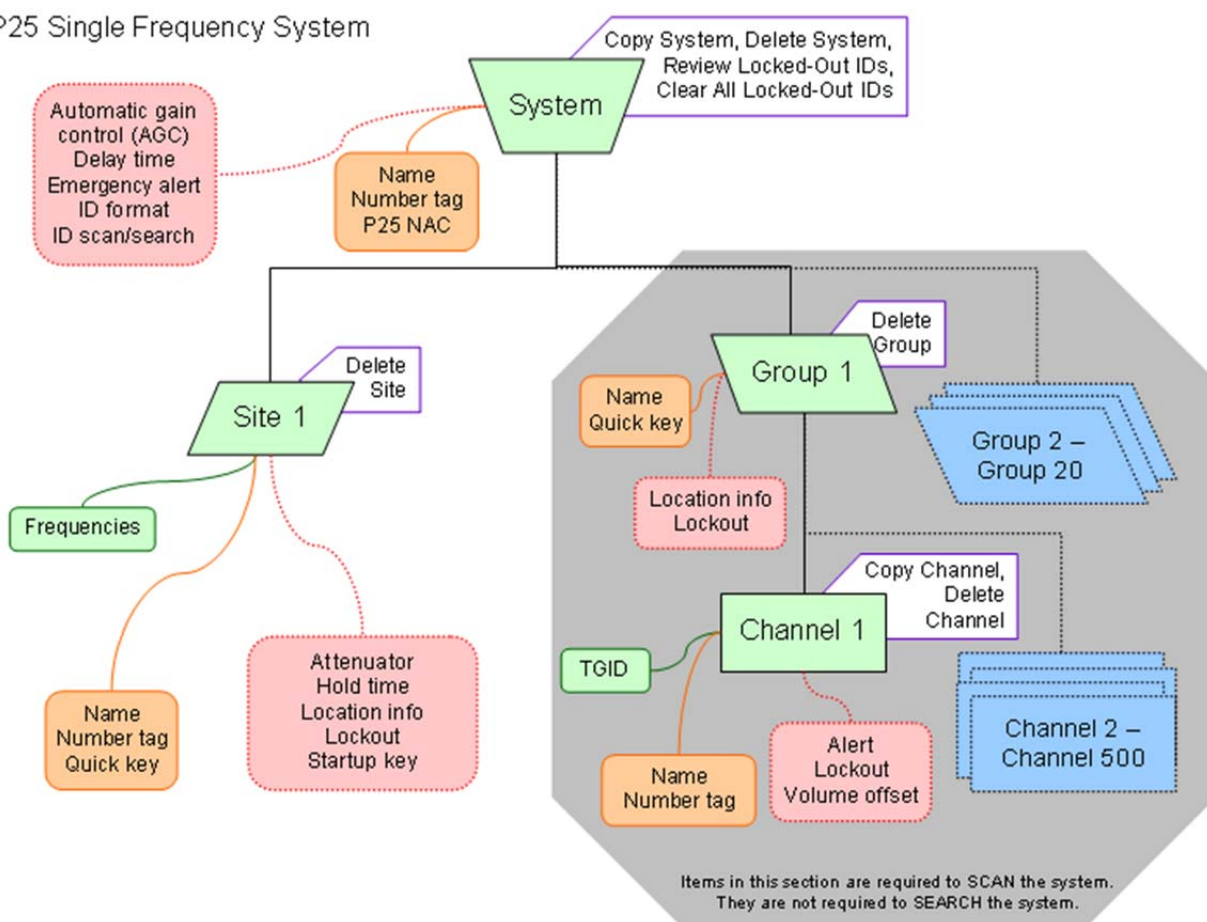
1. On the [Edit Group](#) menu, select the channel group you just created.
2. Go to the [Edit Channel](#) menu and select *New Channel* .
3. Input the [Talk Group ID \(TGID\)](#) for this channel.
4. If you need to change any of the channel properties, you can do that now. Unless a property is *Required* , you can operate the system without changing the default settings.

Channel properties

(All of these options can be found by selecting the channel name under the [Edit Channel](#) menu. If necessary, the sub-menu and the exact option name are listed beside each property.)

Required	TGID (Edit TGID)
Recommended	Name (Edit Name)
	Number tag (Set Number Tag)
Optional	Alert (Set Alert)
	Lockout (Set Lockout)
	Volume Offset
Available operations	Copy Channel
	Delete Channel

P25 Single Frequency System



17. Radio Systems Overview

There are two basic types of radio systems: conventional systems and trunked systems.

Conventional radio systems

In a conventional radio system, each group of users is assigned one (for simplex systems) or two frequencies (for repeater systems). For example, the police in your area might operate on 460.500 MHz, the fire department on 154.445 MHz, the highway department on 37.900 MHz, etc. All transmissions from each group always go out on the on the same frequency--the police won't randomly switch to 500.000 MHz, for instance.

Since each group always stays on the same frequency and frequencies never overlap, it's very easy to follow conversations on conventional systems: when your scanner stops on a frequency, you usually know who it is, and more importantly, you can stop on a channel and listen to an entire conversation.

Up until the late 1980s, this was the primary way that radio systems operated. Some examples of conventional radio systems are

- Aircraft
- Amateur radio
- AM CB/UHF CB users
- Small, private radio systems

Trunked radio systems

Several major trends have converged that have resulted in agencies moving to more efficient *trunked* radio systems:

- Higher levels of radio usage has meant that there aren't enough individual frequencies available to allow every group to have their own frequency.
- Technology advances have brought down the overall cost and complexity of implementing a trunked radio system while increasing the features available to the agency and individual radio users.
- Roll-out of major statewide trunked systems makes it easier for even small agencies to piggy back onto the larger system for less cost than replacing existing systems.

Trunked system basics

There are three major elements common to most trunked systems:

System Controller

The system controller is a special computer that assigns voice channels to users as they key up their radio. The controller is the brains behind the trunking system.

Voice Frequency Pool

The voice frequency pool is a selection of radio frequencies available to the system controller for assigning voice traffic. By assigning voice frequencies to channels only as they are needed, a trunked system can support many more channels than it actually has frequencies.

Talk Group IDs

A Talk Group ID identifies which user or agency has been assigned a particular voice frequency at any particular moment. The Talk Group ID is essentially the user's "channel": since each voice frequency is used over and over by all the agencies on the system, trunked systems rely on the Talk Group ID to identify which particular user or agency is talking.

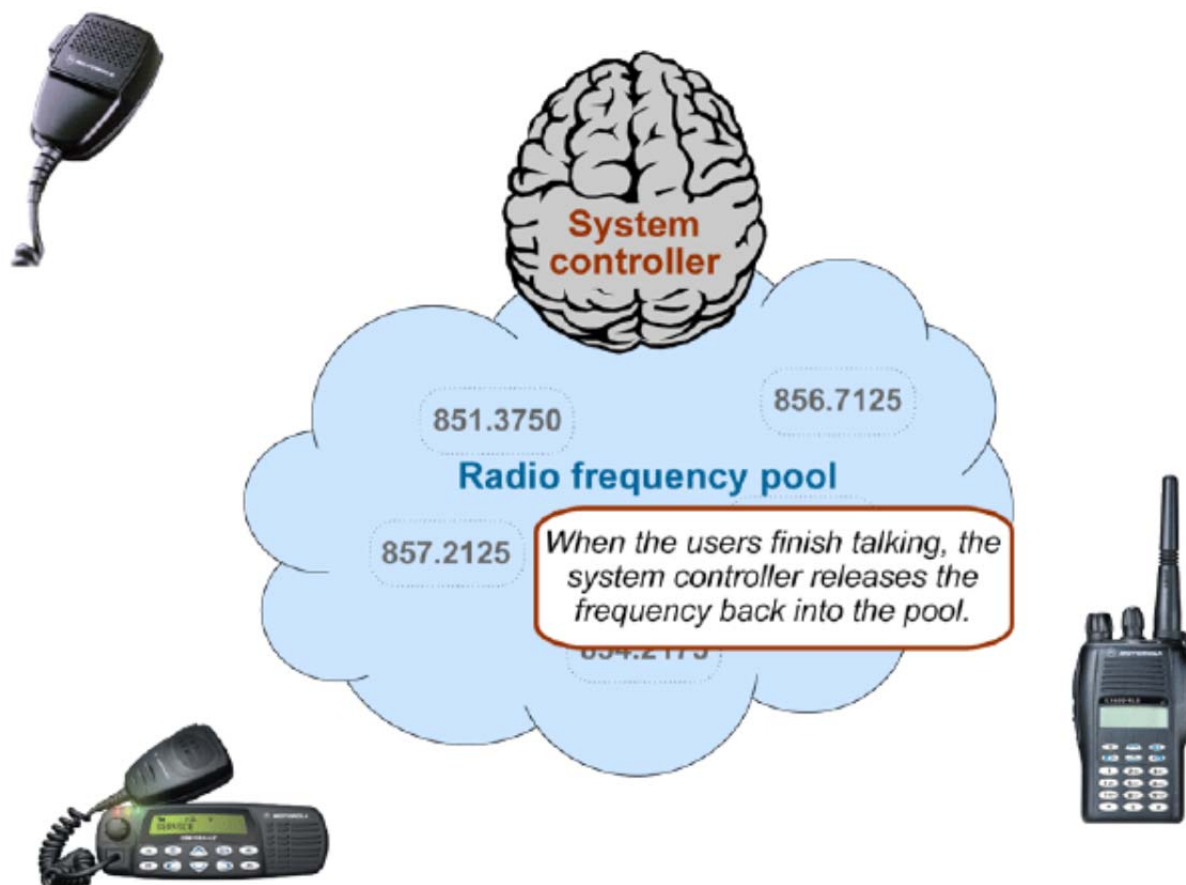
How a trunked system works

A typical communication on a trunked system goes something like this:

1. A user selects the channel they want to communicate on and presses the PTT button on the side of their radio.
2. This sends a channel request message to the controller that the user wants to start a transmission on the Talk Group ID (the channel) that they selected.
3. The controller locates an unused voice frequency and assigns it to that Talk Group ID.
4. The controller then sends out a *channel grant message* to all radios on the system so everyone knows where to find the voice channel for that Talk Group.
5. At this point, the original user's radio beeps, and the user can begin their transmission. While this sounds complicated, in real life this process takes about half a second (sometimes less).

When the user releases the PTT button, the controller releases the voice frequency from its Talk Group ID assignment, leaving the frequency free for the next user that becomes active.

A real life example



A typical 20-frequency trunked system can support hundreds of channels. For example, the Fort Worth system includes over 400 channels providing communication support for Fort Worth agencies (Police, Fire and Ambulance) and agencies in the surrounding cities of Kennedale, North Richland Hills, Forest Hill, Haltom City and Richland Hills. In addition, the same system also supports the Tarrant County Sheriff and Texas Christian University.

Before moving to the trunked system, the Police had only 6 channels (North, South, East, West, Information, and Tactical). Since moving to the trunked system, they are now able to provide 11 channels for North Side PD alone: a main dispatch channel, three talkaround channels, a supervisor channel, a bike patrol channel, and several community patrol channels. Other police districts have similar channel requirements, and now special operations teams such as SWAT, Narcotics, and Traffic each have one or more dedicated channels for their use as well.

18. Deciphering Trunked Systems

Before you program a trunked system

To the average radio user, the complexity of a trunked system is invisible. Their radio is programmed up at the radio shop. They can still easily select who they need to communicate with by selecting a channel on their two-way. They can even directly call other radio users without tying up a dispatch channel — something they could never do before. As a scanner user, on the other hand, you need to know the different types of trunking systems in use, what options are available on each system, and three key pieces of information about any trunking system before you start any actual programming:

- System Type
- System Frequencies
- IDs of the Talk Groups you want to hear

This information is usually available from the online database at www.RadioReference.com.

System Type

There are five major types of scannable systems; some of these also have subtypes. (In the RadioReference database, you can generally determine the radio system type by looking at the line labeled *System Type* at the top of the screen.)

P25 Systems

These are identified in the RadioReference database as *Project 25 Standard*. If the System Type line says anything else, then it is not a P25 system (even though it might have some P25 channels).

LTR Systems

These systems are identified as *LTR Standard* in the system type.

Motorola Systems

There are several subcategories of Motorola systems, but they will all have some form of *Motorola* in the system type: *Motorola Fleetnet*, *Motorola Smartnet*, *Motorola Smartzone*, etc. Once you have identified that it is a Motorola system, you can check the system frequencies to confirm its subtype:

- Motorola 800: all of the frequencies are in the 800 MHz range
- Motorola 900: all of the frequencies are in the 900 MHz range
- Motorola UHF: all of the frequencies are between 400 and 512 MHz

- Motorola VHF: all of the frequencies are between 100 and 200 MHz.

EDACS Systems

There are three subtypes of EDACS systems:

- EDACS Wide: identified as *EDACS Standard* in the system type.
- EDACS Narrow: identified as *EDACS Narrowband* in the system type.
- EDACS SCAT: identified as *EDACS Scat* in the system type (these systems operate on a single frequency).

Conventional Systems

This fifth type of scannable system is a general catchall for all non-trunked systems. See section on [Conventional Systems](#) for more information.

Non-scannable Systems

There are several system types that cannot be monitored with a scanner, either because the systems use proprietary digital formats that are not licensable by scanner manufacturers, or because the systems are not in wide enough use to make it cost-effective for manufacturers to develop a scanner that can monitor them. These non-scannable systems are identified in the system type as:

- LTR Passport
- OpenSky Standard
- MPT1327
- Tetra

System Voice

System Voice summarizes the kinds of voice modulation used on the system. You'll find the following voice types:

- Analog (can be heard with any trunking scanner)
- APCO-25 (can be heard with a digital scanner)
- ProVoice (cannot be heard by any scanner)
- VSELP (cannot be heard by any scanner)

The system voice also tells us when digital channels are mixed in with analog channels on the same system. Unfortunately, this means the system voice line can cause a lot of confusion. Just remember: system *voice* does not define the system *type*.

For example, *APCO-25* can be used as a voice type on a Motorola system that is not actually a *P25 system*. When we're trying to determine whether a system is a P25 system, we need to ignore the System Voice line and focus on the *System Type* line. If there is P25 Voice on a non-P25 system, the scanner can sort this out while scanning.

System Frequencies

The *system frequencies* section in the database lists all the frequencies used by the system. For Motorola and P25 systems, you will need to program only the system control channel frequencies for primary control channels and for alternate control channels in the database.

For EDACS and LTR systems, you will need to program all the listed frequencies and their associated LCN. Some systems have multiple sets of frequencies. These are called *multi-site* systems: each set of frequencies corresponds to a different physical antenna site.

Talk Group IDs (Channels)

The Talk Group information section shows the different channels on the system and which agency uses them. You'll need to go through the list and make a note of the channels you want to hear. Then you can start thinking about how you want to organize those channels.

(One of the great features available to subscribers on RadioReference is the ability to tag channels directly on the site and print out a nicely-formatted hardcopy of each system. It makes this task much, much easier.)

19. Location-based Scanning

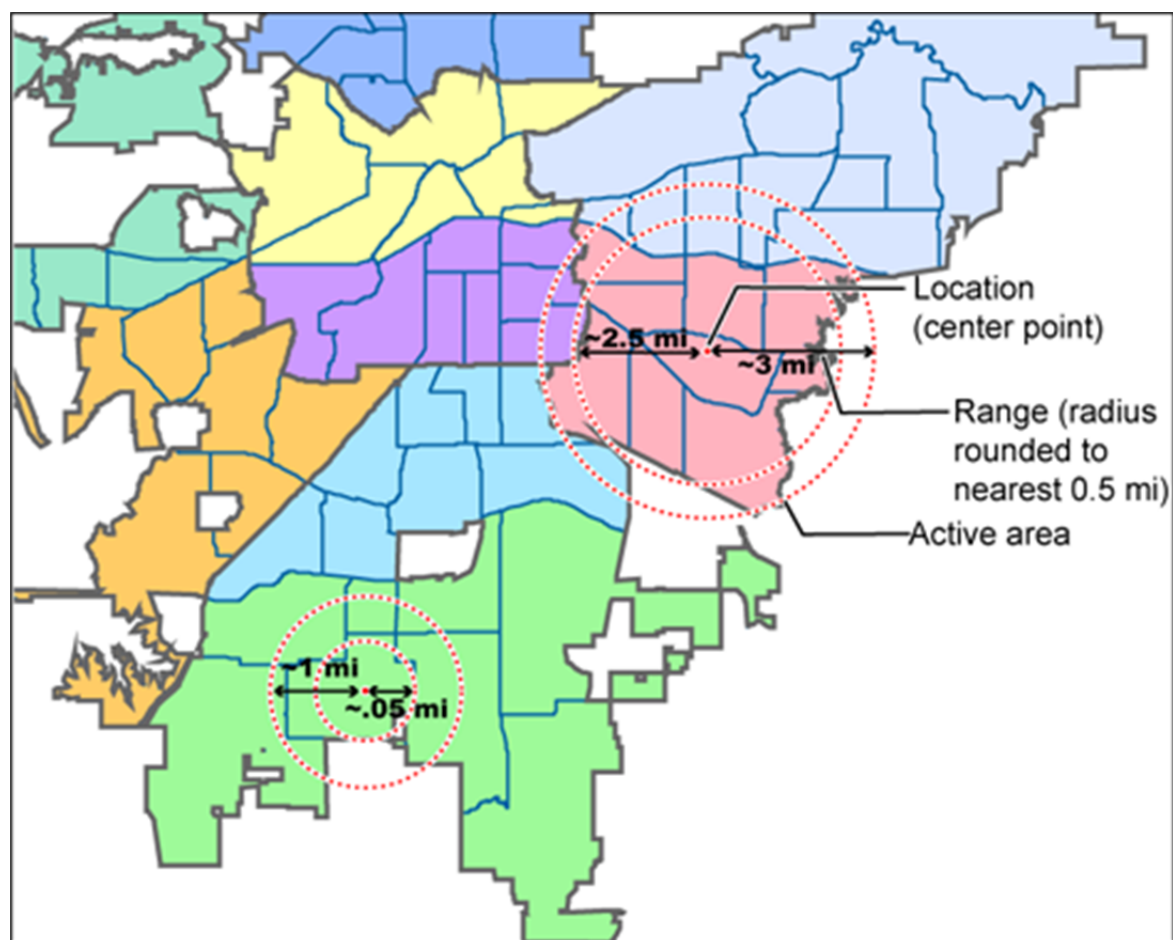
Location-based scanning allows you to control which sites and channel groups are scanned based on your exact location. This frees you from having to manually enable and disable systems or channel groups as you change location.

To use Location-Based scanning, you need to have the following:

- the location for the center point for each site or channel group you want to control
- the radius or distance from the center point you want to set as the range for each site or channel group
- if you are scanning while traveling, you may want to include the heading (direction) of travel
- some type of mapping method. If you don't want to use paper maps, you might try a mapping software (such as Microsoft® Streets and Trips or Delorme® Street Atlas) that allows you to draw markings and overlays on maps.
- a GPS receiver with a serial data output (NMEA)

There are many different approaches you can use to determine where to place a center point for a system/ site or channel group. The two most common are the geopolitical approach and the antenna-centric approach. For large trunked systems, you may find that a combination of these two approaches works best.

The Geopolitical Approach



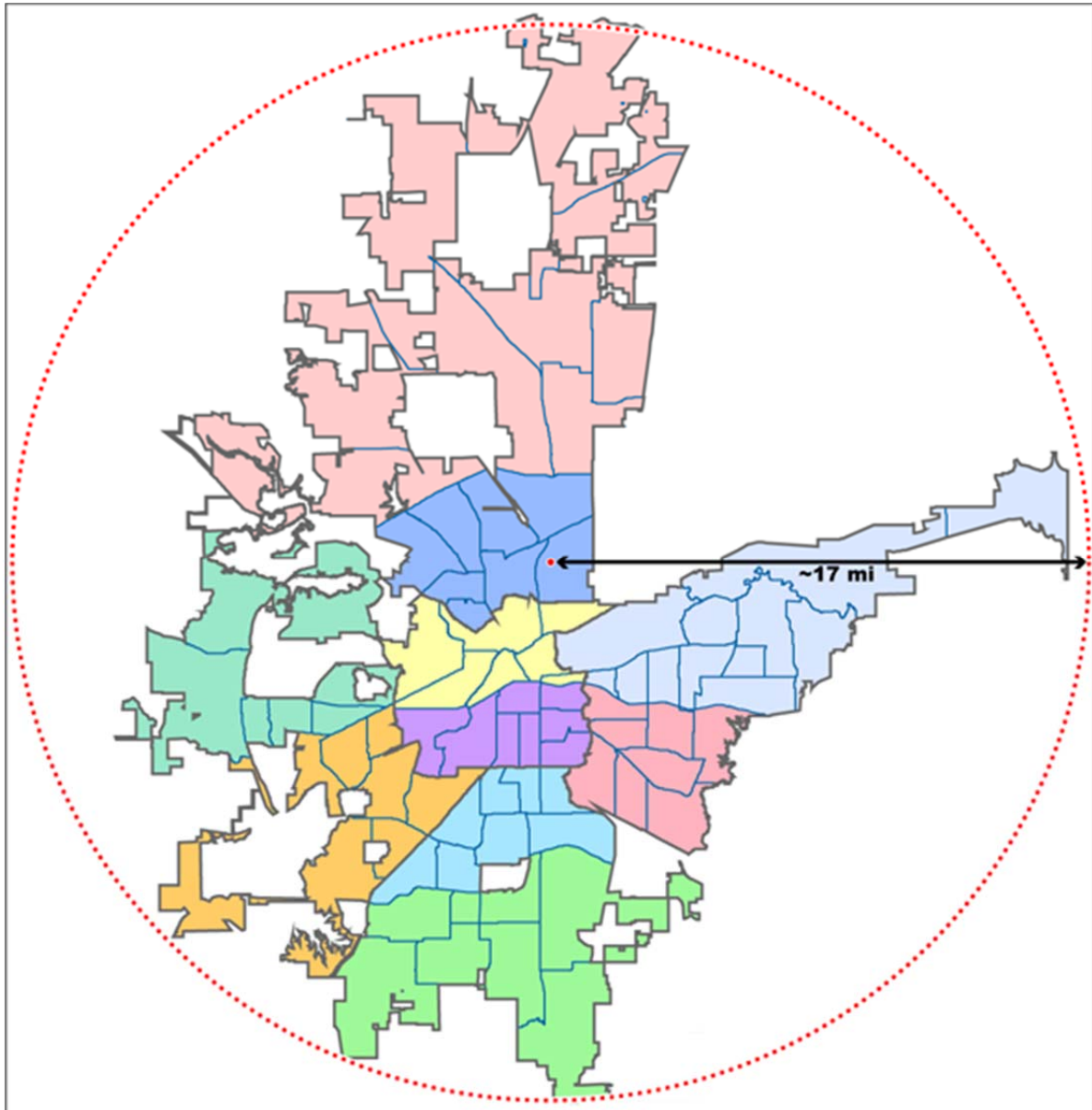
With the geopolitical approach, you want the scanner to turn on the site or channel group at the limit of relevance rather than reception. This approach is useful for scanning targets that have a welldefined jurisdiction and their transmission are only relevant when you are within that jurisdiction.

To use the geopolitical approach, find the geographical center of the scanning target's territory (whether city, county, district, precinct, or other agency jurisdiction), and set these coordinates as your center point location. Then, adjust the range or radius to cover the boundaries of that target.

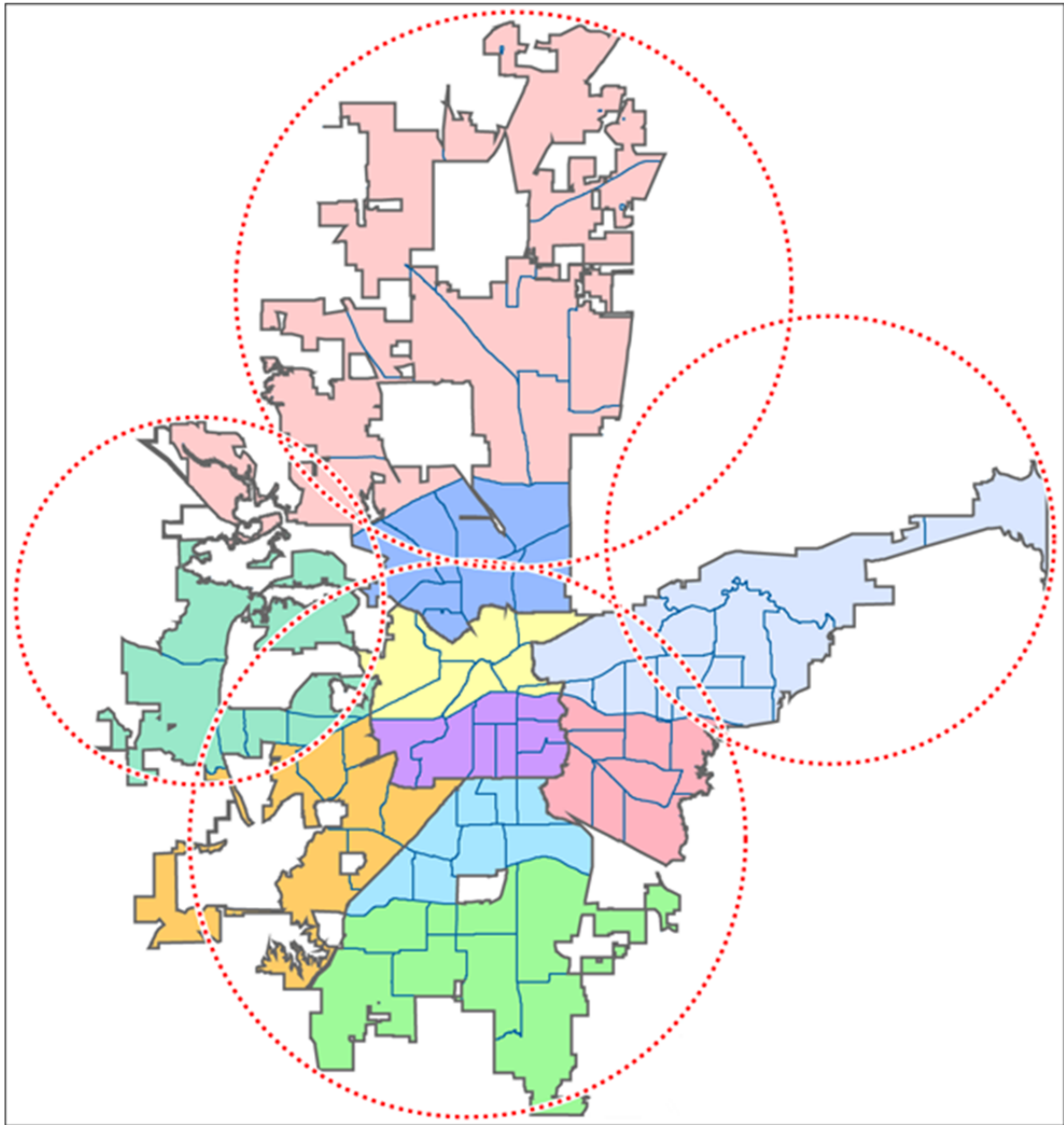
To use this method, use your chosen mapping application to zoom out so that the entire target is visible, then, draw a circle that just covers the targets boundaries. Adjust the size of the circle to the nearest $\frac{1}{2}$ mile increment.

Depending on the shape of the territory, you may have to choose between a lot of overlap or not covering the entire area: jurisdiction, you might end up with a large amount of overlap. You'll have to decide which radius that best suits your application.

For example, if your territory is a city, you'll have a lot of "extra" area if you use one single location:

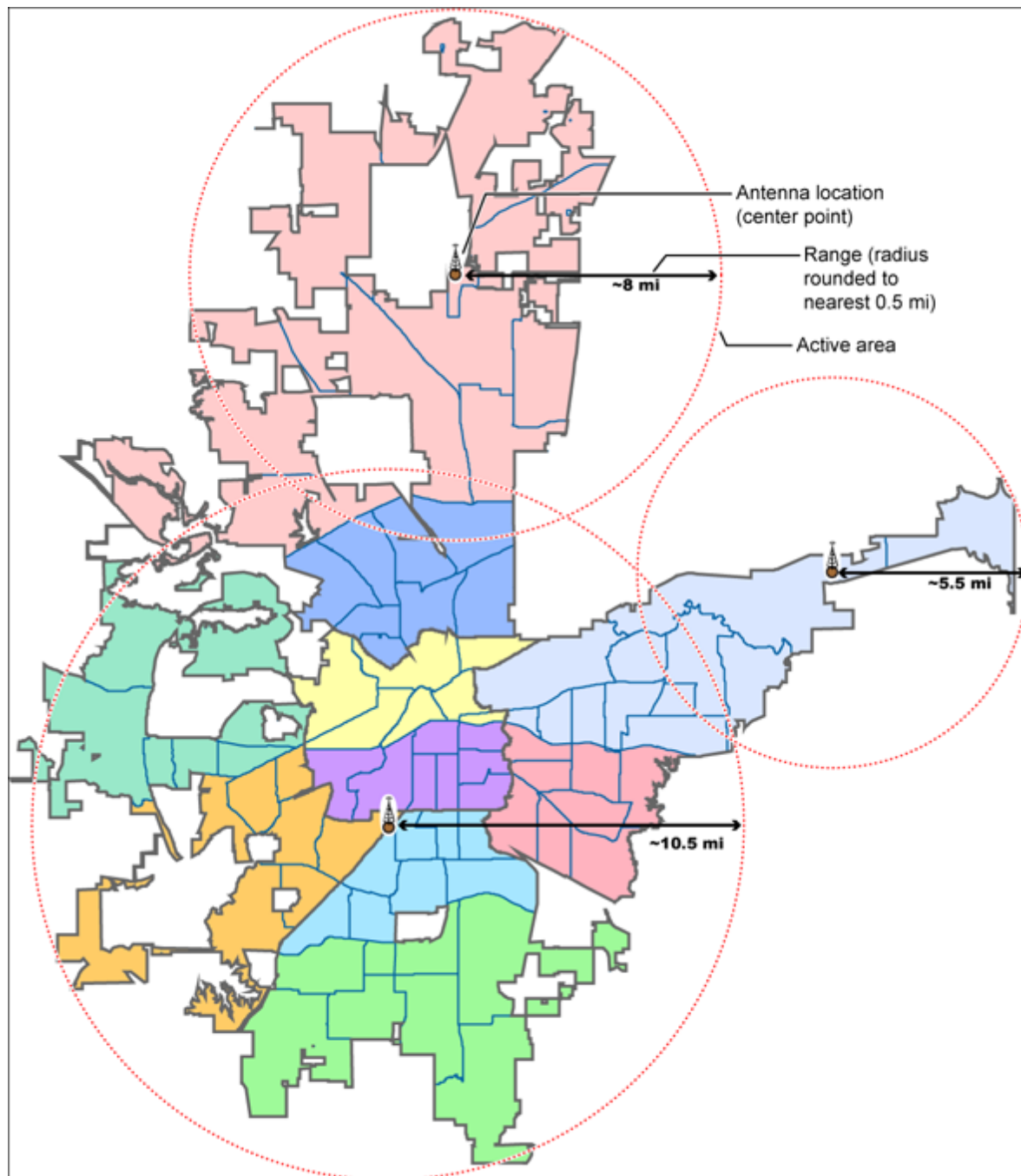


On the other hand, if you sub-divide the area, you may end up with areas that are not covered:

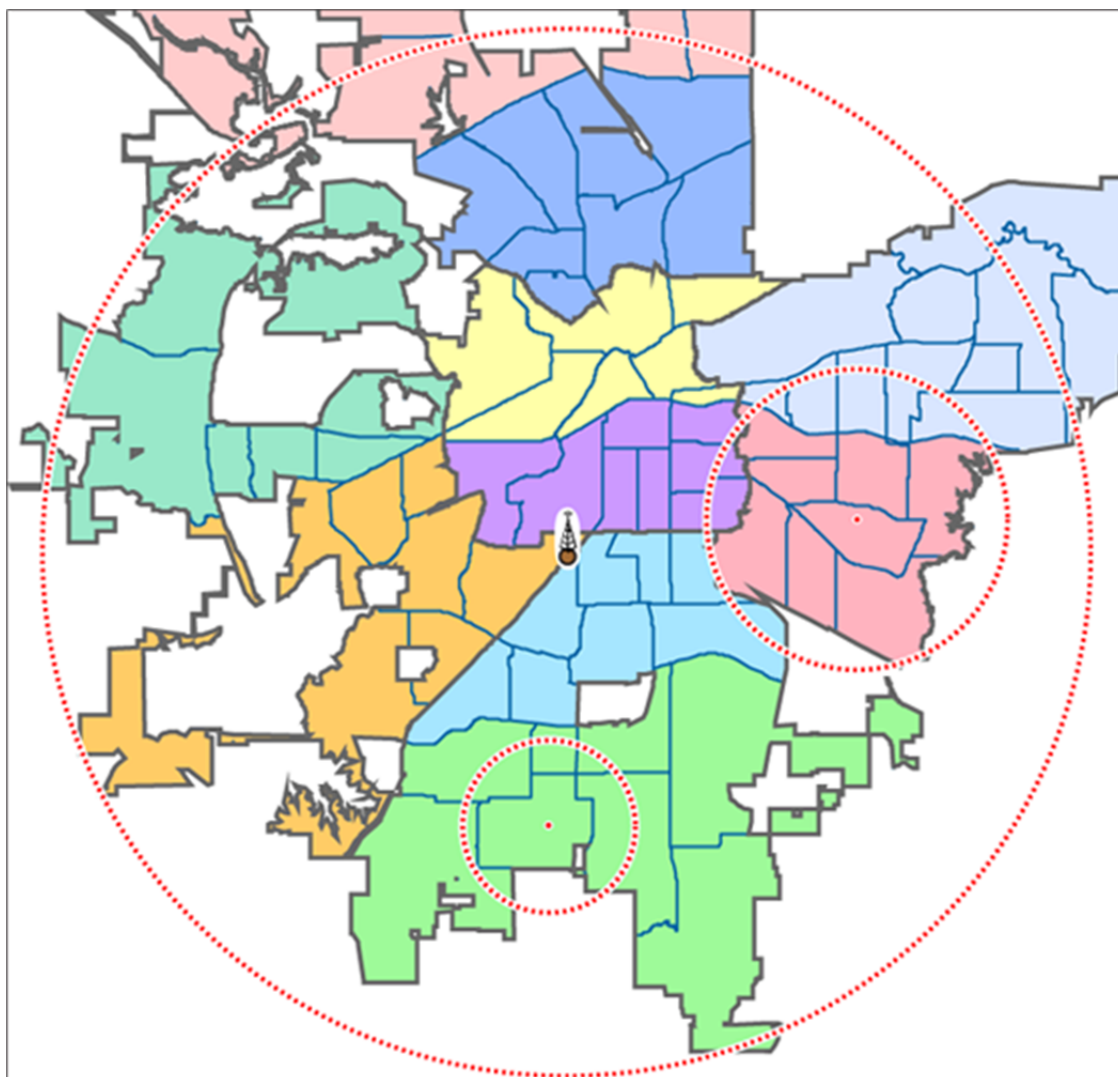


The Antenna-Centric Approach

Using an antenna-centric approach, you set the physical antenna location as the system/sites center point and the antenna's actual reach as the range.



Combining for Efficiency



Because many trunked systems have both multiple antenna sites and multiple agencies with differing geographic boundaries, you may want to combine the approaches:

1. Use the antenna centric approach at the site level: set the geographic coordinates of the antenna as the central location for each site.
2. Use the geopolitical approach at the channel group level. Within the same system, set up a channel group for each agency, and set the central point of the agency territory as the group location.

With both approaches combined into a single system, the scanner will now seamlessly switch between antenna sites as needed to keep the scanner tuning only to those sites you can receive well, and will also turn channel groups on and off as you relocate to different jurisdictions.

See Also

Section on [Connecting a GPS receiver](#)

Section on [Programming locations](#)

20. Number Tags

- Number Tags let you quickly navigate to a specific system or channel.
- You can assign Number Tags at the system level (*System Number Tag*, or *SNT*), at the channel level (*Channel Number Tag*, or *CHNT*), or at both levels.
- You can assign an SNT to the temporary system *Close Call Hits* that is created during [Close Call](#) searches. This system and its SNT operate like any other system.
- You can assign Number Tags to service searches and custom search ranges. These search Number Tags operate like regular SNTs.

Programming Number Tags

Assigning an SNT

- SNTs can range from 0 to 999.
- Systems can have the same SNT, but you will get a warning when you create multiples. (This includes SNTs assigned to the Close Call Hits system or any search ranges.)

To a system:

1. Open the [Program System](#) menu.
2. Select the system you want to assign the number tag to.
3. Select [Edit Sys Option](#), then select [Set Number Tag](#).
4. Enter the number tag you want to use for this system.

To the Close Call Hits system :

1. Open the [Close Call](#) menu.
2. Select [Hits with Scan](#), then select [Set Number Tag](#).
3. Enter the number tag you want to use for the Close Call Hits system.

To a service search range:

1. Open the [Search for...](#) menu.
2. Select [Edit Service](#), then select the service search range you want to assign the number tag to.

3. Select [Search with Scan](#), then select [Set Number Tag](#).
4. Enter the number tag you want to use for this search range.

To a custom search range:

1. Open the [Search for...](#) menu.
2. Select [Edit Custom](#), then select the custom search range you want to assign the number tag to.
3. Select [Search with Scan](#), then select [Set Number Tag](#).
4. Enter the number tag you want to use for this custom search range.

Assigning a CHNT

- You can assign CHNTs to channels even if the system does not have an assigned SNT. However, without an SNT, you can only navigate to these channels from within that system itself.
 - CHNTs can be duplicated within their own system, but you will see a warning when you create multiples.
 - CHNTs can range from 0 to 999.
1. Open the [Program System](#) menu.
 2. Select the system containing the channel you want to assign the number tag to.
 3. Select [Edit Group](#), then select the channel group you want.
 4. Select [Edit Channel](#), then select the channel you want to assign the number tag to.
 5. Select [Set Number Tag](#).
 6. Enter the number tag you want to use for this channel.

Using Number Tags

To navigate directly to:	Key Sequence	Example
A system or search range	<ol style="list-style-type: none"> 1. Tap HOLD. 2. Enter the SNT + •. 3. Tap MENU. 	If the SNT is 4, enter HOLD / 4 / • / MENU .
A channel in the current system	<ol style="list-style-type: none"> 1. Tap HOLD. 2. Enter the CHNT. 3. Tap MENU. 	If the CHNT is 27, enter HOLD / 27 / MENU .
A channel in a different system	<ol style="list-style-type: none"> 1. Tap HOLD. 2. Enter the SNT followed by the decimal point. 3. Enter the CHNT. 4. Tap MENU. 	If the SNT is 4 and the CHNT is 27, enter HOLD / 4 / • / 27 / MENU .

Notes:

- If two systems have the same SNT, they will be selected in sequence (i.e. the first time you select the SNT, the scanner will go to the first system assigned with that SNT; if you select the same SNT again, it will go to the 2nd system assigned with that SNT, and so on).
- If two channels in the same system have the same CHNT, they will be selected in sequence (i.e. the first time you select the CHNT, the scanner will go to the first channel in that system assigned with that CHNT; if you select the same CHNT again, it will go to the 2nd channel assigned with that CHNT, and so on).

21. Quick Keys

- Quick Keys let you enable or disable systems and channel groups during a scan. Disabled systems and channel groups are ignored during scans.
- You can assign Quick Keys at the system/site level (*System/site Quick Key* or *SQK*), at the channel group level (*Group Quick Key*, or *GQK*), or at both levels.
- You can assign an SQK to the temporary system *Close Call Hits* that is created during [Close Call](#) searches. This system and its SQK operate like any other system.
- You can assign Quick Keys to service searches and custom search ranges. These search Quick Keys operate like regular SQKs.

Programming Quick Keys

Assigning an SQK

- Multiple systems, sites, and search ranges can share the same SQK.
- All systems and sites assigned to the same SQK will be enabled (or disabled) when you enter the Quick Key.
- SQKs range from 0 to 99.

To a conventional system:

1. Open the [Program System](#) menu.
2. Select the system you want to assign the Quick Key to.
3. Select [Edit Sys Option](#), then select [Set Quick Key](#).
4. Enter the Quick Key you want to use for this system.

To a trunked system:

1. Open the [Program System](#) menu.
2. Select the system you want to assign the Quick Key to.
3. Select [Edit Site](#), then select the site you want.
4. Select [Set Quick Key](#), then enter the Quick Key you want to use for this site.

To the Close Call Hits system :

1. Open the [Close Call](#) menu.
2. Select [Hits with Scan](#), then select Set Quick Key to.
3. Enter the Quick Key you want to use for the Close Call Hits system.

To a service search range :

1. Open the [Search for...](#) menu.
2. Select [Edit Service](#), then select the service search range you want to assign the Quick Key to.
3. Select [Search with Scan](#), then select [Set Quick Key](#).
4. Enter the Quick Key you want to use for this search range.

To a custom search range :

1. Open the [Search for...](#) menu.
2. Select [Edit Custom](#), then select the custom search range you want to assign the Quick Key to.
3. Select [Search with Scan](#), then select [Set Quick Key](#).
4. Enter the Quick Key you want to use for this custom search range.

Assigning a GQK

- All channels in the channel group will be enabled (or disabled) when you enter the GQK.
- Multiple channel groups in the same system can share the same GQK. However, all of these channel groups will be enabled (or disabled) when you enter the GQK from within that system.
- You can assign GQKs to channel groups even if their system does not have an assigned SQK.
- You can only use GQKs within the current system: the GQK will not affect a channel group in another system.
- GQKs range from 0 to 9.

1. Open the [Program System](#) menu.
2. Select the system containing the channel group you want to assign the Quick Key to.
3. Select [Edit Group](#), then select the channel group you want.
4. Select [Set Quick Key](#), then enter the Quick Key you want to use for this channel group.

Using Quick Keys

- Quick Keys only work in Scan mode.

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- Entering the Quick Key toggles the enabled/disabled state of the system/site/search range or channel group (i.e., if the system is currently enabled, entering the Quick Key will disable it, and vice-versa).

To use SQK 0 through 9

- Enter Scan mode.
- Tap the number key that matches the SQK. (For example, if the SQK is 4, just enter **4**.)
- Any systems, sites, or search ranges assigned to this SQK become disabled. (If they were already disabled, they become enabled.)

To use SQK 10 through 99

- Enter Scan mode.
- Tap the decimal point (**./NO**), then enter the SQK. (For example, if the SQK is 32, enter **./NO / 32**.)
- Any systems, sites, or search ranges assigned to this SQK become disabled. (If they were already disabled, they become enabled.)

To use a GQK

- Enter Scan mode.
- Go to the system that contains the channel group you want to enable or disable.
- Tap **FUNCTION**, then tap the number key that matches the GQK. (For example, if the GQK is 7, enter **FUNCTION / 7**.)
- Any channel groups assigned to this GQK *within the current system only* become disabled. (If they were already disabled, they become enabled.)

22. Search Keys

The scanner has three Search Keys that you can assign to a special search range; the Search Keys are set to number keys **1**, **2**, and **3**:



Search Key 1



Search Key 2



Search Key 3

Programming Search Keys

1. Open the [Search for...](#) menu.
2. Select [Set Search Key](#), then select the search key you want to program.
3. Select the search range you want to assign to this Search Key. Choose one of the pre-programmed service search ranges, one of the 10 custom search ranges, a Tone-Out search, or a Band Scope search.

Using Search Keys

To start the search assigned to a Search Key, **FUNCTION** + tap that Search Key. For example, to start the search assigned to Search Key 2, **FUNCTION** + tap **2**.

(You can't use the Search Keys when the scanner is in Scan mode or GPS mode.)

If the Search Key you select starts a Tone-Out search, the scanner switches to Tone-Out mode and searches the most-recently-used Tone-Out channel (out of the 10 available). If you want to search a different Tone-Out channel, use the **SELECT-VOLUME-SQUELCH** knob on handheld models to select the Tone-Out channel you want to use.

23. Programming locations

To use [Location-based Scanning](#) with a particular system, you will need to program your scanner with the geographic coordinates you want to use for each site or channel group. You can also program your scanner to alert you when you approach particular locations.

Programming a location for a site

Each system site can have separate location information.

1. Open the [Program System](#) menu.
2. Select the system you want to program for location based scanning.
3. Select [Edit Site](#), then select the first site you want to assign a location to.
4. Select the [Set LocationInfo](#) menu and enter the latitude, longitude, and range for this site.
5. Change the *Set GPS Enable* field to *On*.
6. Go back to the [Edit Site](#) menu and repeat these steps with any other sites you want to program for this system.

Programming a location for a channel group

Each channel group in a system can have separate location information.

1. Open the [Program System](#) menu.
2. Select the system you want to program for location based scanning.
3. Select [Edit Group](#), then select the first channel group you want to assign a location to.
4. Select the [Set LocationInfo](#) menu and enter the latitude, longitude, and range for this site.
5. Change the *Set GPS Enable* field to *On*.
6. Go back to the [Edit Group](#) menu and repeat these steps with any other groups you want to program for this system.

Remember: You have to turn on *Set GPS Enable* before the location information can affect that site or channel group.

Programming general locations

You can program general locations (i.e., locations that are not associated with a site or channel group). There are three types of general locations:

- points of interest (*POI*)

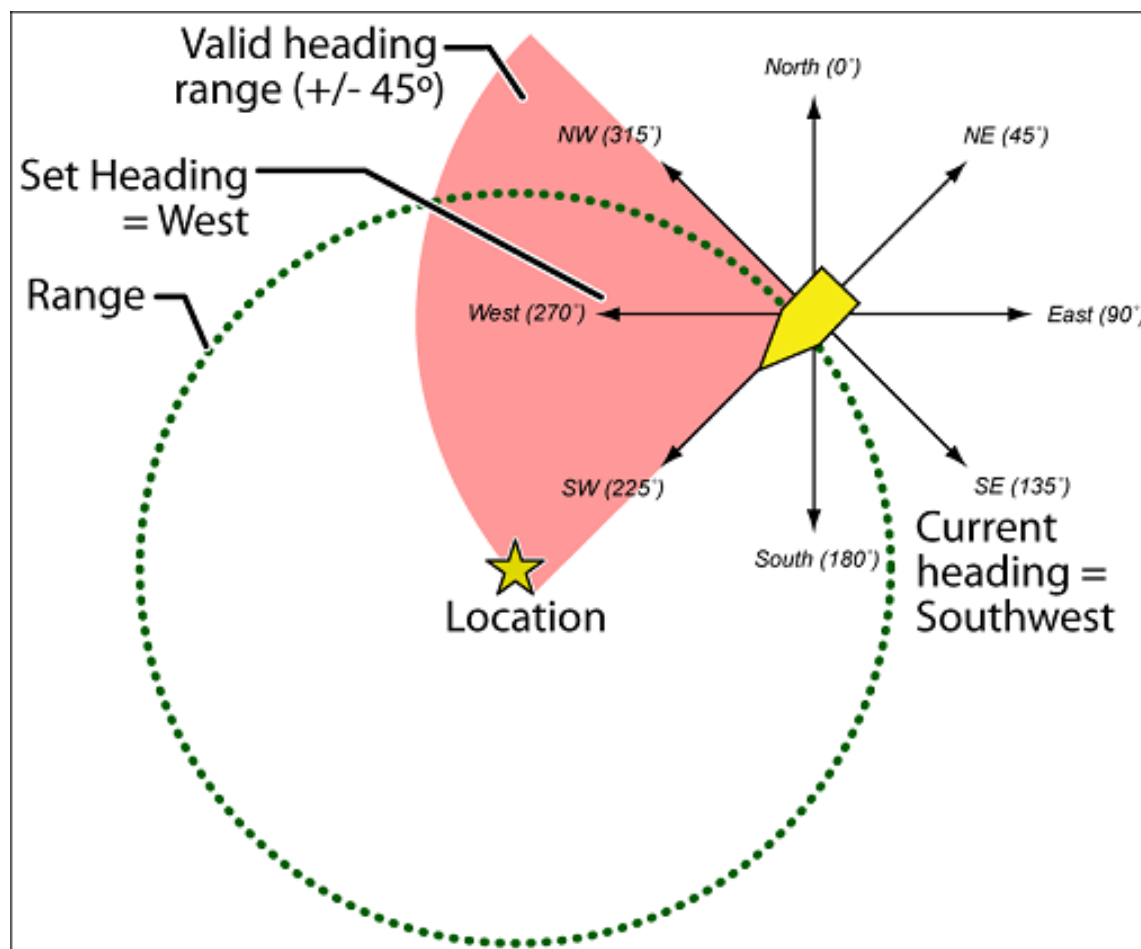
- intersections (*Dangerous Xing*)
- roads (*Dangerous Road*)

You can program the scanner to alert you when you come within a designated distance of that location.

To create a new location

1. Open the [Program Location](#) menu.
2. Select the type of location you want to create.
3. Select *New Location* to create a new location of this type.
4. If you want to create a different type of location, go back to the [Program Location](#) menu and select that location type.
5. If you want to change the default location name, select Edit Name and enter a new name.
6. Select *Set LocationInfo* and enter the latitude and longitude for this location.
7. Select *Set Range* and enter the distance from this location you want the scanner to alert you.
8. Choose the *Alert Tone* and *Alert Light* you want the scanner to use when you come within range of this location.

For Dangerous Xing and Dangerous Roads only



In addition to range, you can specify a heading and a speed limit for these types of locations:

- If you set a speed limit, the scanner will only trigger an alert when you are within the location's range *and* your current speed is over the programmed speed limit.
- If you set a heading, the scanner will only trigger an alert when you are within the location's range *and* your current heading is +/- 45 degrees from the programmed heading. (For example, if you set the heading as *North*, the scanner will trigger an alert if your current heading is *North-east* but not if your current heading is due *East*.)

Edit an existing location

1. Open the [Program Location](#) menu.
2. Select the type of location you want to edit; the scanner lists the existing locations of that type in alphabetical order.
3. Select the location you want to edit, then change any of the location settings you want.

24. Setting alerts

Your scanner can trigger alerts for several different events. The table below shows the different alerts and how to program them:

To sound an alert when	Follow these steps
A channel becomes active	Edit the channel properties (Edit Channel#Set Alert): <ol style="list-style-type: none"> 1. Go to the <i>Program System</i> menu and select the system that contains the channel you want set the alert for. 2. Select <i>Edit Group</i>, then select the group you want. 3. Select Edit Channel, then select the channel you want to set the alert for. 4. Select <i>Set Alert</i>. 5. Choose the <i>Alert Tone</i> and <i>Alert Light</i> you want the scanner to use.
An active Talk Group on a system contains an emergency flag	Edit the system properties (Edit Sys Option#Emergency Alert): <ol style="list-style-type: none"> 1. Go to the <i>Program System</i> menu and select the system you want set the alert for. 2. Select Edit Sys Option, then select <i>Emergency Alert</i>. 3. Choose the <i>Alert Tone</i> and <i>Alert Light</i> you want the scanner to use.
The scanner detects a Close Call hit	Edit the Close Call properties: <ol style="list-style-type: none"> 1. Go to the <i>Close Call</i> menu. 2. Select <i>Set CC Alert</i>. 3. Choose the <i>Alert Tone</i> and <i>Alert Light</i> you want the scanner to use. 4. For Close Call Alerts, you can also have the scanner pause before it resumes searching. Select <i>Set CC Pause</i> to activate this feature.
The scanner gets a hit on a Tone-Out channel	Edit the Tone-Out channel properties: <ol style="list-style-type: none"> 1. Go to the Tone-Out for... menu. 2. Select <i>Tone-Out Setup</i>, then select the

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	<p>Tone-Out channel you want to set the alert for.</p> <ol style="list-style-type: none"> 3. Select <i>Set Alert</i>. 4. Choose the <i>Alert Tone</i> and <i>Alert Light</i> you want the scanner to use.
<p>You approach a particular location</p> <ul style="list-style-type: none"> • Point of Interest (<i>POI</i>) • Dangerous Road • Dangerous Intersection (<i>Dangerous Xing</i>) 	<p>Edit the location properties:</p> <ol style="list-style-type: none"> 1. Go to the Program Location menu and select the type of location you want set the alert for. 2. Select the particular location. 3. For a POI, select <i>Set Alert</i> , then choose the Alert Tone and the Alert Light you want to use. 4. For a Dangerous Road or Xing, the alert tone is preset. Select the Alert Volume and the Alert Light you want to use.

25.Using Quick Keys, Startup Keys, and Search Keys

The different shortcut keys have different functions:

Quick Keys

- Quick keys let you enable and disable systems and channel groups (disabled systems and channel groups are ignored during scans).
- You must be in Scan mode to use Quick Keys.
- System Quick Keys (SQKs) let you enable or disable systems, sites or search ranges: just enter the SQK from the number pad.
- Group Quick Keys (GQKs) let you enable or disable channel groups inside the current system: Tap **FUNCTION**, then enter the GQK from the number pad.

Startup Keys

- Startup Keys let you lock and unlock several systems, sites, and search ranges all at the same time.
- When you activate a Startup Key, the scanner unlocks all systems, sites, and search ranges that are assigned to that same Startup Key; the scanner also locks all systems, sites, and search ranges that are assigned to a different Startup Key.
- To activate a Startup Key, press & hold the number key while you power the scanner on.

Search Keys

- Search Keys let you quickly start one of 3 programmed searches.
- To start the search assigned to a Search Key, **FUNCTION** + tap that Search Key.

26. Tone Out mode

With the tone out feature, the scanner monitors up to 10 different channels for paging tones (two-tone sequential, single tone, and group tone). Normally, the scanner monitors each of the 10 channels in turn. However, if any tone-out channels share the same frequency, modulator, and attenuator settings, the scanner checks these channels simultaneously.

Configuring Tone Out channels

To configure Tone-Out channels:

1. Go to the [Tone-Out for...](#) menu.
2. Select *Tone-Out Setup*.
3. Select the Tone-Out channel (*Tone-Out 1* through *Tone-Out 10*) you want to configure.
4. Select *Set Frequencies* and choose the frequencies for this channel
5. Select *Set Tone* and program Tone A and Tone B.
6. Set any of the other properties as you prefer (they aren't required).

Required	Frequencies (Set Frequencies)
	Tone A and Tone B (Set Tones)
Recommended	Name (Edit Name)
Optional	Automatic Gain Control (Set Audio AGC)
	Delay Time (Set Delay Time)
	Alert (Set Alert)

Using Tone-Out Mode


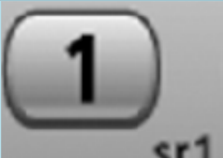
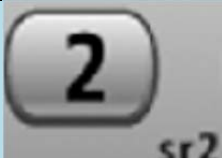

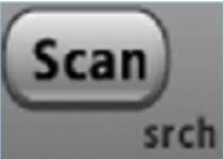



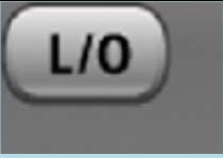
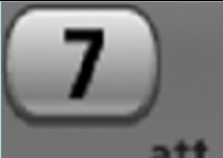
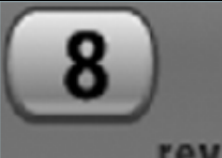

To start a Tone-Out search:

1. Tap **MENU**.
 2. Scroll down and select *Tone-Out for...*
 3. Select *Tone-Out Standby* to start the search.
- The scanner starts searching the most recently-used Tone-Out channel (and any other Tone-Out Channels that have the same frequency).
 - If you want to search a different channel, just turn the **SELECT-VOLUME-SCROLL** knob until you find the channel you want.





- To exit Tone-Out mode, tap **SCAN**.

Key operation in Tone Out Mode

- Turn the **SELECT-VOLUME-SCROLL** knob to change the channel.
- **FUNCTION** + tap **MENU** to go to the *Tone-Out for...* menu.

Key Name (2nd operation) Action On:	 HOLD (Close Call)	 1 (Search 1)	 2 (Search 2)	 3 (Search 3)
Tap	Enter Hold mode (the scanner opens squelch).	Enter the number on the key.		
FUNCTION + Tap	Toggle Close Call modes.	Start the search range assigned to this Search Key.		
FUNCTION + Press & hold	Enter Close Call Only mode.	NA	NA	NA
Key Name (2nd operation) Action on:	 Scan (Search)	 4 (IF exchange)	 5 (Volume offset)	 6 (Display mode)
Tap	Enter Scan mode.	Enter the number on the key		
FUNCTION + Tap	Display the Quick Search screen (enter Search mode).	Switch to the intermediate frequency (IF).	NA	NA
Key Name (2nd operation) Action on:	 Lockout	 7 (Attenuation)	 8 (Reverse freq.)	 9 (Modulation)
Tap	NA	Enter the number on the key.		

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FUNCTION + Tap	NA	Toggle the attenuator state for this channel.	NA	Change the modulation.
FUNCTION + Press & hold	NA	Toggle the attenuator state for all signals.	NA	NA
Key Name (2nd operation) Action on:	 Backlight (Power, Lock)	 No (Decimal, Priority)	 0	 Yes (Enter, GPS)
Tap	Turn on the LCD backlight.	During a system message: Cancel the message and exit that screen.	Enter the number on the key.	Edit the current Tone-Out channel.
Press & hold	Turn the scanner on or off.	NA	NA	NA
FUNCTION + Tap	Lock or unlock the keypad.	NA	NA.	Enter GPS mode.
FUNCTION + Press & hold	NA	NA	NA	NA

27. Close Call mode



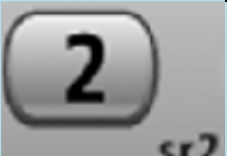



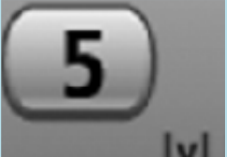

When the scanner is in Close Call mode, it performs a close call check every 2 seconds. The scanner switches to the selected bands and searches for unusually strong signals (indicating the transmitter is probably somewhere close by). After the close call check, the scanner returns to its previous function.

In *Close Call Do Not Disturb* mode, the scanner does not perform a Close Call check if it is already receiving an audio transmission. This prevents the audio from cutting out every 2 seconds.


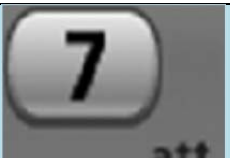
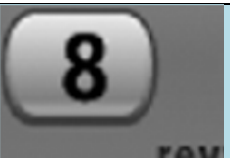
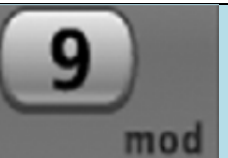
In *Close Call Only* mode, the scanner only performs Close Call checks. The [Close Call](#) menu lets you change the operation settings of the Close Call feature. You can change the overall Close Call options through the [Srch/CloCall Opt](#) menu.

Key operation in Close Call Only mode


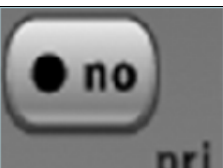

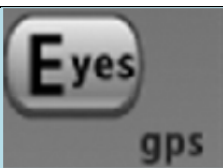
- Turn the **SELECT-VOLUME-SCROLL** knob to resume searching.
- **FUNCTION** + tap **MENU** to go to the *Close Call* menu.

Key Name (2nd operation) Action on:	 Hold (Close Call)	 1 (Search 1)	 2 (Search 2)	 3 (Search 3)
Tap	When the scanner detects a Close Call hit: Enter Hold mode.	Disable the Close Call band associated with this key. Tap again to enable.		
FUNCTION + Tap	Toggle Close Call mode.	Start the search assigned to this Search Key.		
Key Name (2nd operation) Action on:	 Scan (Search)	 4 (IF exchange)	 5 (Volume offset)	 6 (Display mode)
Tap	Enter Scan mode.	Disable the Close Call band associated with this key. Tap again to enable.		

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FUNCTION + Tap	Display the Quick Search screen (enter Search mode).	Switch to the intermediate frequency (IF).	NA	NA
Key Name (2nd operation) Action on:	 Lockout	 7 (Attenuation)	 8 (Reverse freq.)	 9 (Modulation)
Tap	Temporarily lock out the current Close Call frequency (until you turn the scanner off).	Disable the Close Call band associated with this key. Tap again to enable.	NA	NA
Double tap	Permanently lock out the current Close Call frequency.	NA	NA	NA
Press & hold	Unlock all Close Call and Search frequencies.	NA	NA	NA
FUNCTION + Tap	Review the list of locked out frequencies.	Toggle the attenuator state for this channel.	NA	Change the modulation.
FUNCTION + Press & hold	NA	Toggle the attenuator state for all signals.	Show the reverse frequency for the current frequency. (The scanner returns to the current	NA

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			frequency when you release the key.)	
Key Name (2nd operation) Action on:	 Backlight (Power, Lock)	 No (Decimal, Priority)	 NA	 Yes (Enter, GPS)
Tap	Turn on the LCD backlight.	During a system message: Cancel the message and exit that screen.	NA	When monitoring a Close Call frequency: store the current frequency.
Press & hold	Turn the scanner on or off.	NA	NA	NA
FUNCTION + Tap	Lock or unlock the keypad.	NA	NA	Enter GPS mode.
FUNCTION + Press & hold	NA	NA	NA	NA

28. Band Scope mode

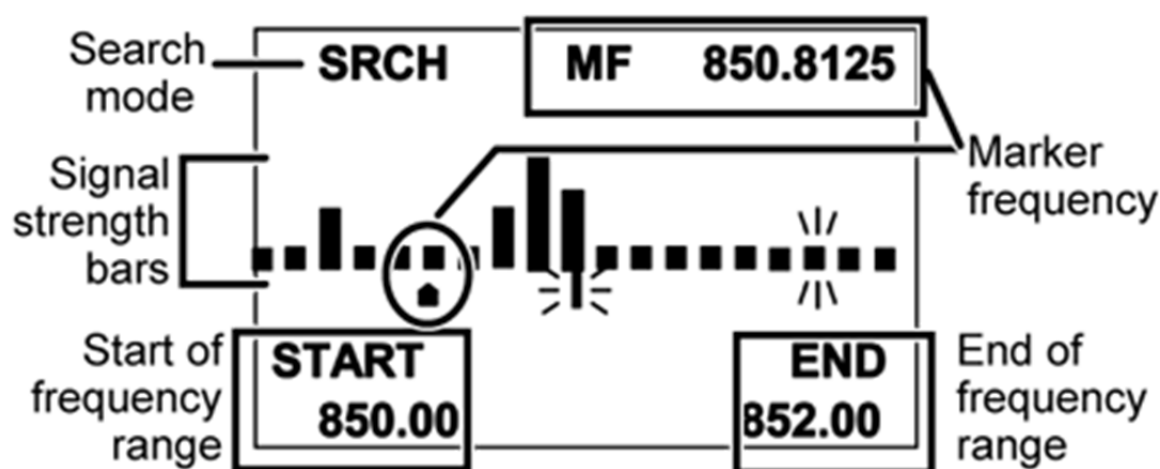
Band Scope mode is a special type of Search mode where the scanner displays the strength of any signal it finds.

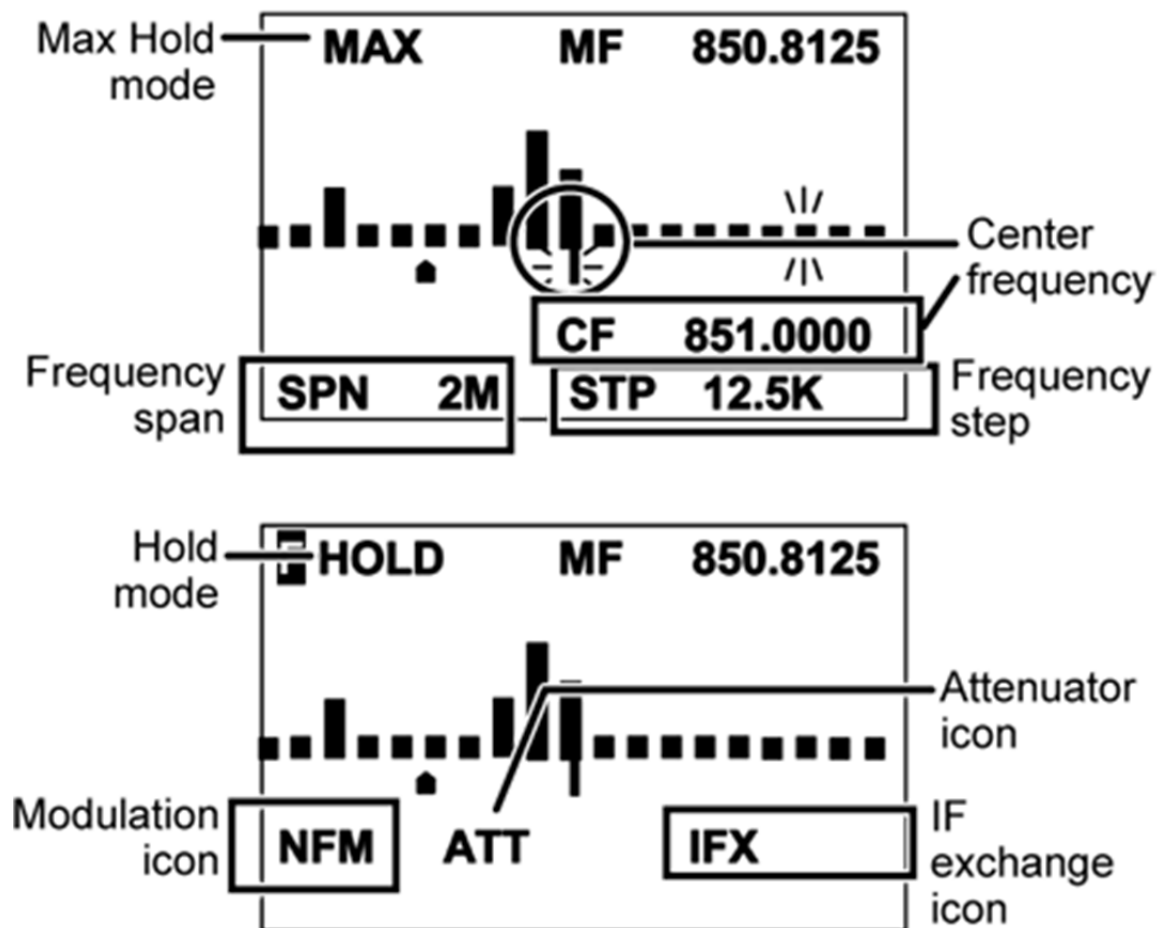
- In a band scope search, the scanner starts at the lowest frequency in the range and moves up the search range.
- In *Max Hold* Search mode, the scanner displays the strongest signal that it found.
- If you manually set the mode to NFM or FM, the scanner will not reliably detect signals that are modulated in either FMB or WFM.

To turn on Band Scope mode:



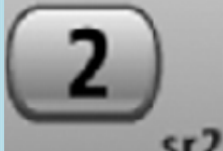

Band Scope mode is the default setting for Search Key 3. To turn on Band Scope mode, enter Search mode, then tap **FUNCTION + 3 (SR3)**. (To change the Search Key assignment, see [Search Keys#Programming Search Keys.](#))

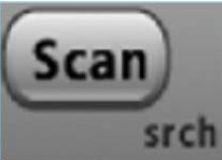

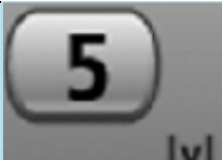




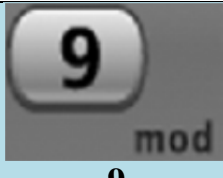

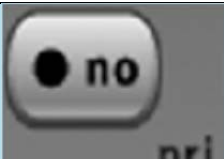

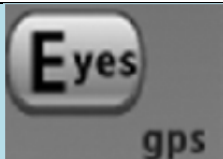
Reading the display in Band Scope mode





Key operation in Band Scope mode

Key Name (2nd operation) Action on:				
	Hold (Close call)	1(Search 1)	2 (Search 2)	3 (Search 3)
Tap	Enter Hold mode.	NA	NA	NA
FUNCTION + Tap	Toggle Close Call modes.	Start the search assigned to this Search key.		
FUNCTION + Press & hold	Enter Close Call Only mode.	NA	NA	NA

<p>Key Name (2nd operation) Action on:</p>	 Scan (Search)	 4 (IF exchange)	 5 (Volume offset)	 6 (Display mode)
<p>Tap</p>	<p>Enter Scan mode.</p>	<p>NA</p>	<p>NA</p>	<p>NA</p>
<p>FUNCTION + Tap</p>	<p>Change the band scope search type.</p>	<p>Switch the Intermediate Frequency used on this Frequency.</p>	<p>NA</p>	<p>NA</p>
<p>Key Name (2nd operation) Action on:</p>	 Lockout	 7 (Attenuation)	 8 (Reverse freq.)	 9 (Modulation)
<p>Tap</p>	<p>Press this key to close the setting screen and return to the Normal Screen.</p>	<p>NA</p>	<p>NA</p>	<p>NA</p>
<p>FUNCTION + Tap</p>	<p>Press this key to restart searching.</p>	<p>Toggle the attenuator state for the current signal.</p>	<p>NA</p>	<p>Change the modulation.</p>
<p>FUNCTION + Press & hold</p>	<p>NA</p>	<p>Toggle the attenuator state for all signals.</p>	<p>NA</p>	<p>NA</p>
<p>Key Name (2nd operation) Action on:</p>	 Backlight (Power, Lock)	 No (Decimal, Priority)	 NA	 Yes (Enter, GPS)

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Tap	Turn on the LCD backlight.	Press this key to select the next setting item.	NA	NA
Press & hold	Turn the scanner on or off.	NA	NA	NA
FUNCTION + Tap	Lock or unlock the keypad.	NA	NA	Enter GPS mode.
FUNCTION + Press & hold	NA	NA	NA	NA

29. GPS mode

You must have a [compatible GPS receiver](#) connected!

See Also

GPS mode is only one small part of location-based scanning. For more information on using your scanner with a GPS receiver, see the following links:

[Location-based Scanning](#) contains

- an overview of why you might want to use a GPS receiver with your scanner
- an explanation of two different approaches to location-based scanning
- some information on finding antenna locations

[Programming locations](#) contains

- details on how to program locations for systems, sites, and channels
- details on how to program Points of Interest (*POI*), Dangerous Roads, and Dangerous Intersections (*Dangerous Xing*)
- information on reviewing and editing locations

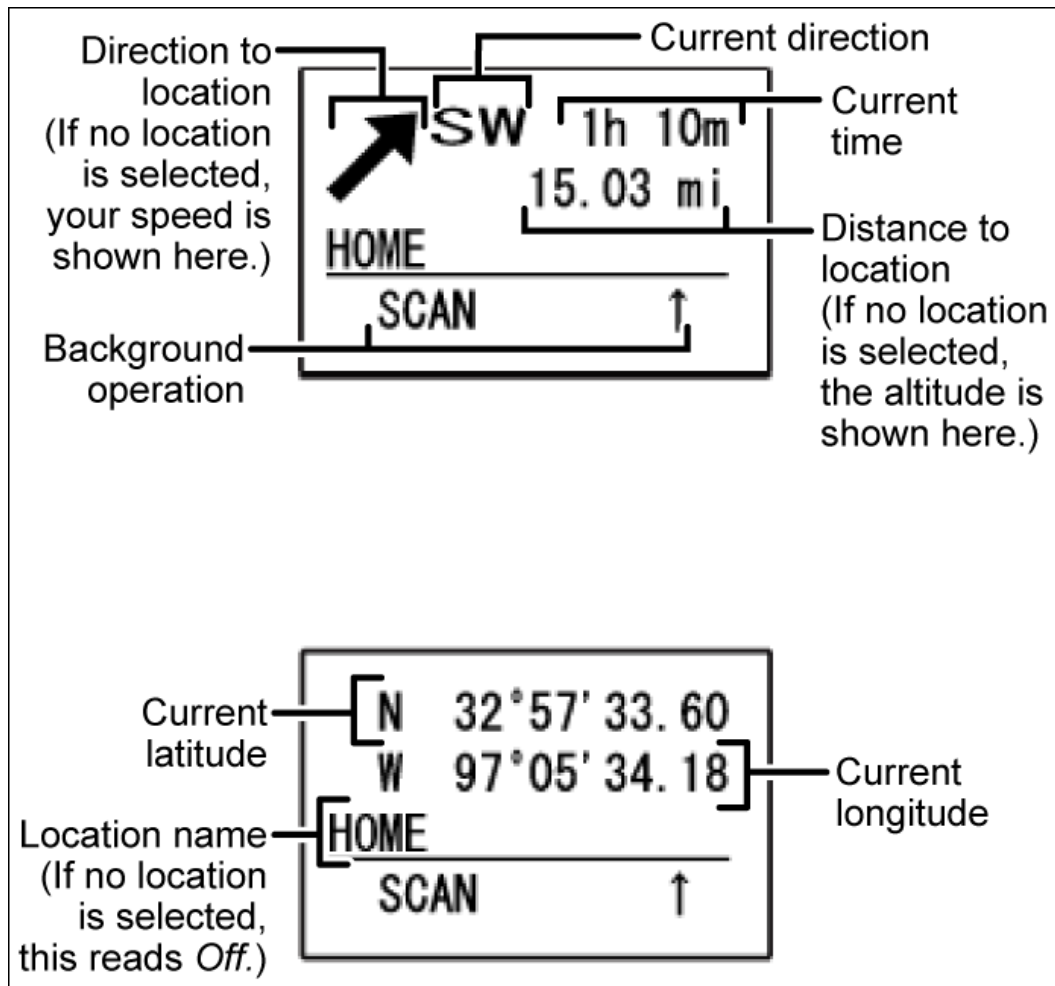
[Connecting a GPS receiver](#) contains

- details on which GPS receivers are compatible
- instructions on connecting a GPS receiver
- troubleshooting tips if you can't the receiver working with the scanner

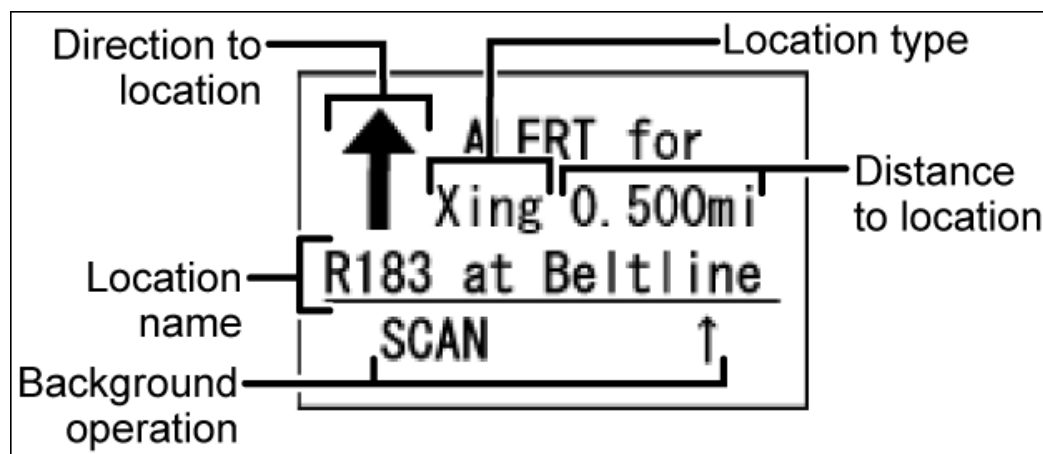
Reading the display in GPS mode

There are several displays available in GPS mode.

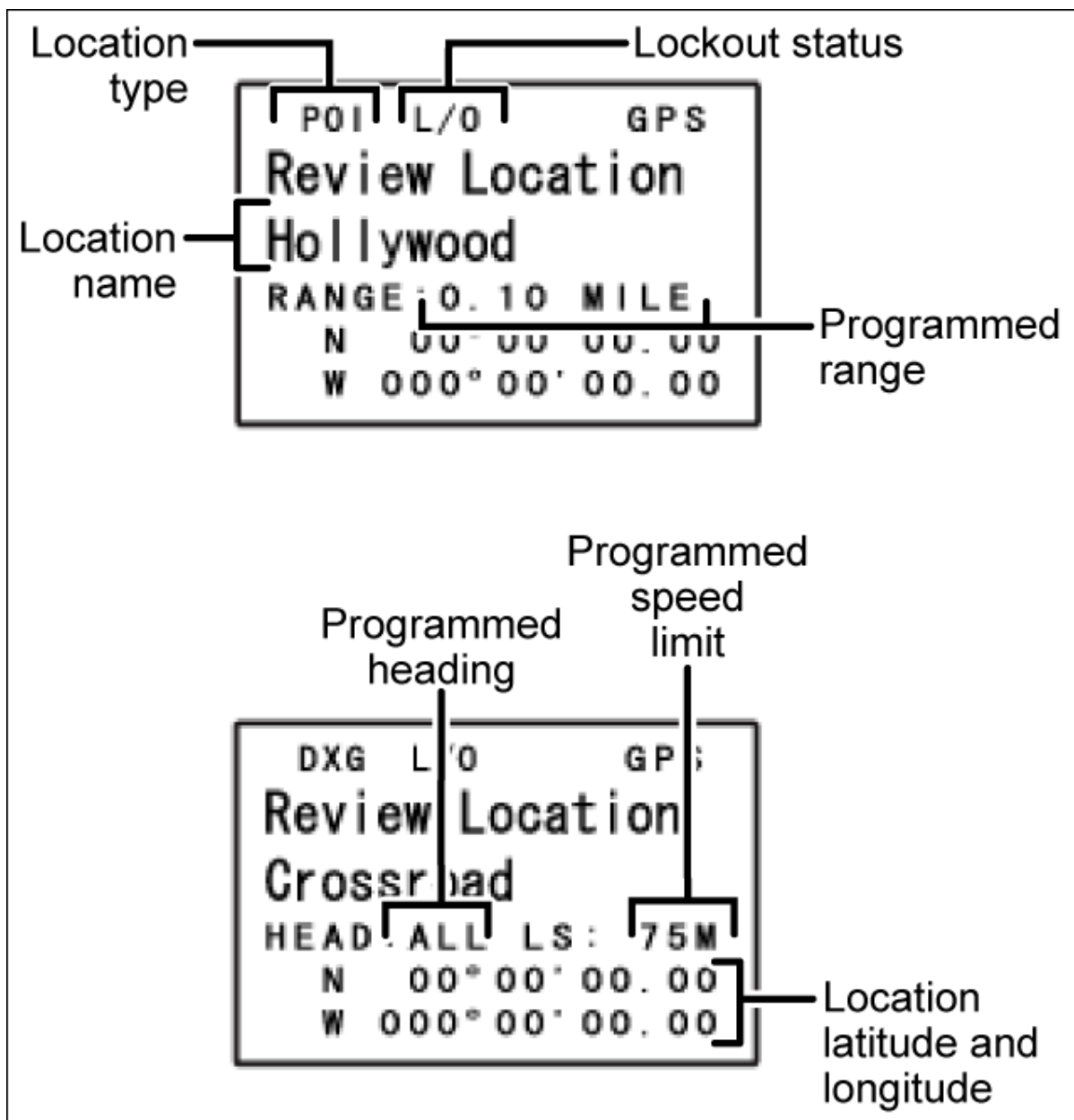
Main GPS display







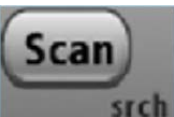

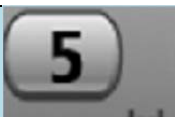
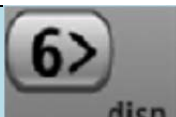
Location alert display










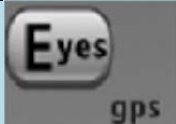
Location review display



Key operation in GPS mode

Key Name (2nd operation) Action on:	 Hold (Close call)	 1 (Search 1)	 2 (Search 2)	 3 (Search 3)
Tap	Toggle Hold mode on the scan or search running in the background. When reviewing locations: Enter Scan Hold mode.	NA	NA	NA
Key Name (2nd operation) Action on:	 Scan (Search)	 4 (IF exchange)	 5 (Volume offset)	 6 (Display mode)
Tap	Return to previous operation. When reviewing locations: Enter Scan mode.	NA	NA	NA
FUNCTION + Tap	Return to previous operation. When reviewing locations: Enter Scan mode.	NA	NA	Cycle through the available displays.

Key Name (2nd operation) Action on:	 Lockout	 7 (Attenuation)	 8 (Reverse freq.)	 9 (Modulation)
Tap	Temporarily lockout the current Location Alert. When reviewing locations: Toggle the Lockout status of the current location.	NA	NA	NA
Double Tap	Permanently lockout the current Location Alert.	NA	NA	NA
Press & hold	When reviewing locations: Unlock all locations of the current type (POI, Dangerous Road or Crossing).	NA	NA	NA
FUNCTION + Press & hold	When reviewing locations: Unlock all locations regardless of type.	NA	NA	NA

Key Name (2nd operation) Action on:	 Backlight (Power, Lock)	 No (Decimal, Priority)	 0	 Yes (Enter, GPS)
Tap	Turn on the LCD backlight.	During a system message: Cancel the message and exit that screen. When reviewing locations: Close the location review list.	NA	Open the location review location list. When reviewing locations: Edit the selected location.
Press & hold	Turn the scanner on or off.	NA	NA	NA
FUNCTION + Tap	Lock or unlock the keypad.	NA	NA	NA
FUNCTION + Press & hold	Turn the scanner on or off.	NA	NA	When reviewing locations: Replace the select location's coordinates with the coordinates of your current position.

30. Program System

The *Program System* menu lets you create systems and edit existing systems. All existing systems are listed in the order they were created: select the system you want to edit, or select *New System* to create a new one.

When you create a new system, the scanner prompts you to select a system type; the system type you select controls what options are available for the system setup. You can't change a system type once the system is created: if you need to change the system type, delete the system and create it all over again as a new system.

The *System Type* options are:

- *P25* : Use for any P25 system. When you select this system type, the scanner prompts you to choose *Standard Trunk* or *One-Freq* .
- *MOT* : Use for any Motorola system.
- *EDCS* : Use for any EDACs system. When you select this system type, the scanner prompts you to choose *WIDE/NARROW* or *SCAT* .
- *LT* : Use for any LTR system.
- *Conventional* : Use for any non-trunked system.

REMEMBER: Once you select a system type, you can't change it!

Edit Name

Enter a name or edit the existing one. Names can be 16 characters long, and they can contain upper and lower case letters, punctuation, and spaces. Turn the **SELECTVOLUME-SQUELCH** knob on the handheld scanners or the **SCROLL / FUNCTION** knob on mobile scanners to choose the character you want, then press **6** (right cursor) to move the cursor to the next character.

Edit Sys Option

This menu lets you set the options for each system.

Edit Site

(trunked systems only) This menu lets you create sites and edit existing sites. All existing sites are listed in the order they were created: select the site you want to edit, or select *New Site* to create a new one.

Edit Group

This menu lets you create groups and edit existing groups. All existing groups are listed in Group Quick Key order: select the group you want to edit, or select New Group to create a new one. You can have up to 20 groups in each system.

Copy System

Make a copy of this system and all its settings including all sites, groups, channels, and frequencies. The scanner prompts you to enter a new system name.

Delete System

Delete this system and all its settings; this includes sites, groups, channels, and frequencies.

New System

Create a new system.

31. Edit Sys Option

System options vary depending on the system type.

Global system options

The following options are available for all types of systems.

Set Number Tag

Assign a number to this system or channel that you can use to tune directly to a specific channel. Choose a number from 0 to 999. (For more information, see [Number Tags.](#))

Set Delay Time

Set the number of seconds the scanner should wait after a transmission stops before moving on to the next channel. Select 0, 1, 2 (default), 5, 10, or 30 *seconds*.

To have scanner leave the channel after a designated number of seconds whether the transmission stops or not, select one of the negative values. Choose -10 seconds to have the scanner leave the channel after 10 seconds even if the transmission is still going on; choose -5 *seconds* or -2 *seconds* to have the scanner leave after 5 seconds or 2 seconds, respectively.

Set Audio AGC

Turn on Automatic Gain Control (AGC) for this system. When you activate this feature, the scanner automatically adjusts the volume for each channel based on the signal strength. You can turn on the gain control for *Analog* and *Digital* signals separately.

To change the settings for the audio AGC, see [Adjust Audio AGC](#)

Conventional system options

The following options are available when you're editing a conventional system:

Set Quick Key

Assign this system or site to a Quick Key so you can easily enable or disable it during scanning. Enter a number from 0 to 99; tap NO (the decimal point) if you

don't want to assign this system or site to a Quick Key. (For more information, see [Quick Keys](#).)

Set Startup Key

Assign this system or site to a Startup Key so you can lock or unlock it during power up. Enter a number from 0 to 9; tap NO (the decimal point) if you don't want to assign this system or site to a Startup Key. (For more information, see [Startup Keys](#).)

Set Lockout

Decide whether you want to lock out the system so the scanner will ignore it during Scan and Search modes. If you lock out a system, all channels within that system are locked out. Choose one of the following options:

- Unlocked: The system is not locked out.
- Temporary L/O: The system is locked out until you turn the scanner off and back on.
- Lockout: The system is permanently locked out.

Set Hold Time

Set the minimum number of seconds the scanner should spend checking this system or site even if there is no traffic on any channel. (The scanner always checks each channel in a system or site once even if the hold time is set to 0 seconds.) Select the number of seconds from 0 through 255 (0 is the default).

P25 Waiting Time

On channels that contain a mix of analog and digital signals (i.e., where the *Audio Mode* is set to *All*), it is possible to have *false decode* problems caused by digital noise at the beginning of transmissions. To prevent this, a user-configurable P25 wait time (from 0 to 1000 ms) has been added.

During the wait time, the scanner evaluates the received signal; if it detects P25 data, the scanner opens squelch immediately. If it does not detect any P25 data, the scanner opens squelch as soon as the wait time expires.

Note: Any analog transmissions on this channel will lose the first part of the transmission, up to the wait time you set here.

Select the number of milliseconds (after the start of a transmission) the scanner should wait while checking for P25 data. Choose a number from 0 through 1000 ms in 100 ms increments. The scanner only applies the wait time setting to Conventional or Motorola (non P25) systems, and only when the channel's *Audio Mode* setting is *All*.

Trunked system options

The following options are available when you're editing a trunked system:

ID Scan/Search

Choose whether the scanner only checks the Talk Group IDs that you program (*ID Scan*) or checks all the Talk Group IDs it can find (*ID Search*) when scanning this site.

Priority ID Scan

Choose *On* to have the scanner check any priority-labeled channels in this system during Priority ID Scan mode. Choose *Off* if you want the scanner to ignore this system when scanning priority channels.

Emergency Alert

This menu lets you configure whether the scanner triggers an alert tone and light when it detects an emergency flag within an active Talk Group. (Compare this to the channel setting [Set Alert](#), which can trigger an alert tone and light whenever a channel becomes active.) The settings for [Set Alert Tone](#) and [Set Alert Light](#) are common to both types of alerts.

Set ID Format (DEC/HEX) or (AFS/DEC)

Trunked systems have three different formats for the Talk Group ID, but not all formats are used by each system type. Choose the Talk Group ID format used by this system:

- *Dec* : The system uses a decimal (base 10) format for the Talk Group IDs (available for all trunked systems)
- *Hex* : The system uses a hexadecimal (base 16) format for the Talk Group IDs (available for P25 and Motorola systems only)
- *AFS* : The system uses the Agency-Fleet-Subfleet format for the Talk Group IDs (available for EDACS wide or narrow systems only)

Rvw ID:Srch L/O

This feature displays a list of all locked out Talk Group IDs. If you want to unlock a Talk Group ID, just select it from the list and press **YES** .

Clr All L/O IDs

Choose yes to unlock all the Talk Group IDs in this system or site. (Choose no to cancel and go back to the previous screen.)

Motorola system options

The following options are available when only when you're editing a Motorola system:

Edit Fleet Map

(Motorola Type I or Hybrid systems only) This menu lets you choose one of the 16 preprogrammed fleet maps; select *Custom* to manually program your own fleet map information. (See [Motorola fleet maps](#) for more information.)

Set Status Bit

Choose *Yes* to have the scanner check the status bit in each TalkGroup ID, or choose *Ignore* to ignore all status bits in this system.

Set End Code

Choose whether the scanner recognizes any end transmission codes when deciding to leave a channel. You have the following options:

- *Analog*: The scanner recognizes only analog end transmission codes.
- *Analog-Digital*: The scanner recognizes both analog and digital end codes.
- *Ignore*: The scanner waits for the carrier to drop before leaving a channel.

P25 System options

The following options are available when only when you're editing a P25 system:

P25 NAC Option

(P25 single frequency systems only) Choose whether the scanner limits reception to transmissions that include a specific Network Access Code (NAC) for this system or frequency.

- *Search*: The scanner opens squelch for any digital signal, but displays the NAC being used.
- *Set P25 NAC*: The scanner opens squelch only for signals that include the NAC you enter here. Enter a hexadecimal number between *0* and *FFF*.

32. Edit Group

When you create a new channel group, the scanner automatically assigns a default name of Group XX, where XX is a 2-digit sequential number (1 through 20).

Options available for all groups:

You have the following options for channel groups:

Edit Name

Enter a name or edit the existing one. Names can be 16 characters long, and they can contain upper and lower case letters, punctuation, and spaces. Turn the **SELECTVOLUME-SQUELCH** knob on the handheld scanners or the **SCROLL / FUNCTION** knob on mobile scanners to choose the character you want, then press **6** (right cursor) to move the cursor to the next character.

Set Quick Key

Assign this group to a Quick Key so you can easily enable or disable it during scanning. Enter a number from 0 to 9; tap NO (the decimal point) if you don't want to assign this group to a Quick Key. (For more information, see [Quick Keys](#).)

Edit Channel

Use this menu to program channel information for this group (see [Edit Channel](#)).

Set LocationInfo

Use this menu to program location information for this group (see [Set LocationInfo](#)).

Set Lockout

Decide whether you want to lock out the channel group so the scanner will ignore it during Scan and Search modes. If you lock out the channel group, all channels in the group are also ignored during Scan and Search. Choose one of the following options:

- Unlocked: The channel group is not locked out.
- Temporary L/O: The channel group is locked out until you turn the scanner off and back on.

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- Lockout: The channel group is permanently locked out.

Delete Group

Delete this group and all its settings, including any channels and frequencies.

New Group

Create a new group.

33. Set Location Info

Use this menu to configure geographic information for each system or site. With this information and a standard NMEA GPS input, the scanner can automatically change which systems, sites and channel groups it scans as you change location. You must set the location information if you want to use Location-based Scanning.

Set Latitude and Set Longitude

Enter the latitude and longitude of the center of this system or site. You can use any geographical coordinates as the center, but most often it will be the physical location of the antenna, the center of a city, county, or other geopolitical territory, or some combination of the two.

Geographical coordinates can be represented in a few different ways. The two most common representations are DMS and Deg.

DMS breaks the coordinate into Degrees, Minutes, and Seconds. This is typically represented like: 44° 58' 12.79" N. Your scanner uses this format.

Decimal degrees simply use the degrees expressed as a decimal number. 44° 59' 12" equates to 44.97381 Degrees. Mathematically, you can change DMS to Deg using the formula $DDD + MM/60 + SS.ss/3600$. You would perform the reverse calculation to convert Deg to DMS.

To more easily convert Decimal Degrees to the DDD° MM' SS.sss" format or vice versa, see the converter at this url;

<http://transition.fcc.gov/mb/audio/bickel/DDDMMSS-decimal.html>

Set Range

Enter the maximum distance from the center that this site or channel will be active. As long as your position is within the radius you enter here, the scanner monitors this site or channel; when you leave the channel range, the scanner locks out this site or channel.

The scanner treats the number you enter here as miles or kilometers depending on the value you selected in the Set Unit field in the Set GPS Format menu (under the main Settings menu). Enter a range from 0.5 through 125.0 mi/km, in 0.5 mi/km steps.

Set GPS Enable

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(A GPS unit must be connected)

Turn this feature on if you want the scanner to lock out this site or channel group when you leave the range and enable the site or channel group when you are within the range.

34. Edit Channel

This menu lets you create channels and edit existing channels. All existing channels are listed in alphabetical order: select the channel you want to edit, or select New Channel to create a new one. You can have up to 1000 channels in a conventional system and 500 channels in a trunked system.

When you create a new channel, the scanner prompts you to enter the frequency (in a conventional system) or the Talk Group ID (in a trunked system) for the channel: you can edit these at any time through this menu.

Edit Frequency (conventional systems)

Enter a valid frequency for this band. If the frequency is invalid or if it already exists, the scanner sounds an error tone and prompts you enter the frequency again.

Edit Talk Group ID (trunked systems)

Options available for all channels:

You have the following options for channels:

Edit Name

Enter a name or edit the existing one. Names can be 16 characters long, and they can contain upper and lower case letters, punctuation, and spaces. Turn the **SELECTVOLUME-SQUELCH** knob on the handheld scanners to choose the character you want, then press **6** (right cursor) to move the cursor to the next character.

Set Audio Type

Select the type of audio signal contained on this channel. Choose *Digital Only* or *Analog Only* according to the signal type; select *All* if this channel might contain both digital and analog signals.

Set Number Tag

Assign a number to this system or channel that you can use to tune directly to a specific channel. Choose a number from 0 to 999. (For more information, see [Number Tags](#).)

Set Modulation

Select what type of modulation the scanner should use for this frequency or channel.

Auto	The scanner uses the default modulation type for this frequency's band.
AM	The scanner treats the frequency as an AM band.
NFM	The scanner treats the frequency as a Narrowband FM band.
FM	The scanner treats the frequency as an FM band.
WFM	The scanner treats the frequency as a Wideband FM band.
FMB	The scanner treats the frequency as an FM broadcast band.

Set Attenuator

Turn on attenuation to reduce the signal strength by 20 dB. You can turn on attenuation for individual frequencies and channels or for entire sites. If you turn on attenuation for a site, all frequencies within that site will be attenuated.

Set Priority

Choose whether this channel should be flagged as a priority channel so the scanner checks it during priority scans and searches.

Set Alert

This menu lets you configure whether the scanner triggers an alert tone and light whenever this channel or frequency becomes active. (Compare this to the system setting [Emergency Alert](#), which triggers a tone and light when a Talk Group contains an emergency flag.) The available options for [Set Alert Tone](#) and [Set Alert Light](#) are common to both types of alerts.

Set Lockout

Decide whether you want to lock out the channel so the scanner will ignore it during Scan and Search modes. Choose one of the following options:

- Unlocked: The channel is not locked out.
- Temporary L/O: The channel is locked out until you turn the scanner off and back on.
- Lockout: The channel is permanently locked out.

Volume Offset

The scanner can automatically adjust the volume when it tunes to this channel or frequency. Enter one of the following options:

Softer	No Change	Louder
-3, -2, -1	0 (default)	+1, +2, +3

Copy Channel

Copy this channel and all its settings into the buffer. When a channel is stored in the buffer, the scanner adds *Paste Channel* to the bottom of the *Program Channel* menu whenever you are editing a compatible system (that is, a system that is the same type as the one you copied the channel from).

Delete Channel

Delete this frequency or channel and all associated settings.

New Channel

Create a new channel.

Analog channel options

The following options are available only when the Audio Type is set to *Analog* .

Set CTCSS/DCS

(Conventional systems only) Choose one of the following CTCSS/DCS options for this channel:

Off	The scanner ignores all CTCSS and DCS tones and opens squelch on any signal.
Search	The scanner displays any received CTCSS and DCS tones, but it opens squelch on any signal.
CTCSS	The scanner prompts you to enter a CTCSS code; it will only open squelch if the received signal contains a CTCSS tone that matches the one you enter here.
DCS	The scanner prompts you to enter a DCS code; it will only open

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	sqelch if the received signal contains a DCS tone that matches the one you enter here.
Set Lockout	The scanner prompts you to enter a CTCSS or DCS code that you want to lockout for this channel. The scanner will not open sqelch if the received signal contains a matching CTCSS or DCS tone.

Digital channel options

The following options are available only when the Audio Type is set to *Digital* .

P25 NAC Option

Choose whether the scanner limits reception to transmissions that include a specific Network Access Code (NAC) for this system or frequency.

- *Search*: The scanner opens sqelch for any digital signal, but displays the NAC being used.
- *Set P25 NAC*: The scanner opens sqelch only for signals that include the NAC you enter here. Enter a hexadecimal number between *0* and *FFF*.

35. Edit Site

When you create a new site, the scanner automatically assigns a default site name using the following pattern

Site XXX-YYY TTT

where *XXX* is a 3-digit system index number, *YYY* is a sequential site number (1 through 256), and *TTT* is one of the following 3-letter type codes:

- *EDC* (any EDACS system)
- *LTR* (any LTR system)
- *MOT* (any Motorola system)
- *P25* (a standard P25 system)
- *1FQ* (a single-frequency P25 system)

Options available for all sites:

You have the following options for sites:

Edit Name

Enter a name or edit the existing one. Names can be 16 characters long, and they can contain upper and lower case letters, punctuation, and spaces. Turn the **SELECTVOLUME-SQUELCH** knob on the handheld scanners or the **SCROLL / FUNCTION** knob on mobile scanners to choose the character you want, then press **6** (right cursor) to move the cursor to the next character.

Set Quick Key

Assign this system or site to a Quick Key so you can easily enable or disable it during scanning. Enter a number from 0 to 99; tap **NO** (the decimal point) if you don't want to assign this system or site to a Quick Key. (For more information, see [Quick Keys](#).)

Set Startup Key

Assign this system or site to a Startup Key so you can lock or unlock it during power up. Enter a number from 0 to 9; tap **NO** (the decimal point) if you don't want to assign this system or site to a Startup Key. (For more information, see [Startup Keys](#).)

Set Frequencies

Use this menu to program frequencies for this site.

Set Modulation

Select what type of modulation the scanner should use for this frequency or channel. (Only the modulation types available for this frequency or channel are displayed.)

Auto	The scanner uses the default modulation type for this frequency's band.
NFM	The scanner treats the frequency as a Narrowband FM band.
FM	The scanner treats the frequency as an FM band.

Set Attenuator

Turn on attenuation to reduce the signal strength by 20 dB. You can turn on attenuation for individual frequencies and channels or for entire sites. If you turn on attenuation for a site, all frequencies within that site will be attenuated.

Set Lockout

Decide whether you want to lock out the site so the scanner will ignore it during Scan and Search modes. Choose one of the following options:

- Unlocked: The site is not locked out.
- Temporary L/O: The site is locked out until you turn the scanner off and back on.
- Lockout: The site is permanently locked out.

Set Hold Time

Set the minimum number of seconds the scanner should spend checking this system or site even if there is no traffic on any channel. (The scanner always checks each channel in a system or site once even if the hold time is set to 0 seconds.) Select the number of seconds from 0 through 255 (0 is the default).

Set LocationInfo

Use this menu to program location information for this site.

Delete Site

Delete this site and all its settings; this includes any frequencies.

New Site

Create a new site.

Options available for Motorola systems

See [Edit Band Plan](#)

See [P25 Waiting Time](#)

Options available for P25 systems

Edit Band Plan (P25)

Most P25 systems include the band plan information in the control channel data. However, if a system does not include this information, you can program it manually.

The scanner will prompt you for the following information:

Band plan number	Select one of the 16 available band plan slots.
Input Base Freq	Enter the lower limit of the band frequency. Valid frequencies are between 25.00000 MHz and 1300.00000 MHz at each 5.0 Hz step (25.000000 MHz, 25.000005 MHz, 25.000010 MHz, etc.).
Input Spacing	Enter the number of kHz between each channel. Valid spacings range between 125 kHz and 128 kHz at each 125 Hz step (125.000 kHz, 125.125 kHz, 125.250 kHz, etc.)

When you're finished, the scanner renames the band plan in the following pattern:

{band plan number} :{base frequency} / {spacing}

So a band plan label of 6:534.02585/127.750 means this is band plan number 6, with a base frequency of 534.02585 MHz and 127.750 kHz between each channel.

Options available for EDACS systems

Set Site Type

Select *Wide (standard)* or *Narrow* according to the EDACS site type.

Volume Offset (EDACS SCAT Only)

The scanner can automatically adjust the volume when it tunes to this channel or frequency. Enter one of the following options:

Softer	No Change	Louder
-3, -2, -1	0 (default)	+1, +2, +3

36. Set Frequencies

This menu lets you create frequencies and edit existing ones. All existing frequencies are listed in the order they were created: select the frequency you want to edit, or select New Frequency to create a new one. When creating frequencies, keep the following rules in mind:

- You can't duplicate frequencies within a site.
- You can store at least 500 frequencies per site.
- You can store up to 1000 frequencies per site, depending on the number of TGID in the entire system.

Edit Frequency

Enter a valid frequency for this band. If the frequency is invalid or if it already exists, the scanner sounds an error tone and prompts you to re-enter the frequency.

Set Lockout

Determines whether the frequency will be scanned. If you lock out the frequency and the frequency is used as the control channel, the system will not be scanned.

- Temporary Lockout - The lockout will be cleared when you cycle power.
- Lockout - The lockout must be manually cleared.
- Unlocked - The scanner will use the frequency when monitoring the system.

Delete Frequency

Delete this frequency or channel and all associated settings.

New Frequency

Create a new frequency.

LTR and EDACS system options

When you're editing site frequencies within an LTR or EDACS wide or narrow system, you have the following additional options:

LCN (Logical Channel Number)

When you enter a new frequency or edit an existing frequency, the scanner prompts you enter a logical channel number (LCN). Enter a number from 1 through 20 for an LTR system or a number from 1 through 30 for an EDACS wide or narrow system.

EDACS SCAT system options

When you're editing site frequencies within an EDACS SCAT system, you have the following additional options:

Set Number Tag

Assign a number to this system or channel that you can use to tune directly to a specific channel. Choose a number from 0 to 999. (For more information, see [Number Tags](#).)

Volume Offset

The scanner can automatically adjust the volume when it tunes to this channel or frequency. Enter one of the following options:

Softer	No Change	Louder
-3, -2, -1	0 (default)	+1, +2, +3

37. Scan mode

Scanning vs. Searching

Scan and Search mode have very similar operations. In both Scan and Search modes, the scanner steps through a set of frequencies and checks for activity. For Scan mode, you program each individual frequency or Talk Group ID you want the scanner to check; for Search mode, you designate a range of frequencies and the scanner will check each individual frequency that falls within that range.

With trunked systems, Scan mode and Search mode are very similar, so the scanner can combine the two in a single operation, switching from one to the other depending on the settings of each individual system:

Scanning trunked systems

- The scanner *scans* a system if the *ID Scan Search* option is set to *ID Scan*
- The scanner only checks for activity on unlocked Talk Group IDs *that are programmed for this system*.
- If any programmed Talk Group ID becomes active, the scanner switches to the voice channel and monitors the transmission until it ends or until the *Delay Time* expires.
- The scanner checks each unlocked Talk Group ID at least once; if the hold time has expired, it moves on to the next system.

Searching trunked systems

- The scanner *searches* a system if the *ID Scan Search* option is set to *ID Search*.
- When any Talk Group ID becomes active, the scanner checks to see if that ID is locked out.
- If the ID is unlocked, the scanner switches to the voice channel and monitors the transmission until it ends or until the *Delay Time* expires.
- The scanner monitors the system until the hold time expires, then moves on to the next system.

Default Scan Mode

In the default Scan mode, the scanner checks frequencies in the following order:

1. Scans or searches any unlocked systems programmed to system Quick Keys (SQKs) in ascending order starting with the system or site assigned to SQK #1.
 - In the system, the scanner first checks any unlocked groups assigned to group Quick Keys (GQKs) in ascending order starting with the system or site assigned to SQK #1 (through GQK #0).
 - The scanner then checks any remaining unlocked groups in that system in the order in which you created them. If none of the groups in the system have been assigned to GQKs, the scanner checks all unlocked groups in the order in which you created them.
 - The scanner does not check systems if the SQK is disabled off.
 - The scanner does not check groups if the GQK is turned off.
2. Scans any remaining unlocked conventional systems (not assigned to an SQK). (The scanner checks groups within each system as described in step 1.)
3. Checks all unlocked trunked systems (not assigned to an SQK). (The scanner checks groups within each system as described in step 1.)
4. Searches through the designated general service frequencies (Public safety, Air, etc.).
5. Searches through any unlocked frequencies saved in the Custom Search list.
6. Checks any frequencies saved in the Close Call Hits list.

Locked Items

The scanner does not check locked out items in either scanning or searching:

- A *system* or *site* is considered locked if
 - its SQK is turned off
 - its **Set Lockout** field is set to *Locked Out* or *Temporary L/O*
- A *group* is considered locked if
 - the system or site containing it is locked
 - its GQK is turned off
 - its **Set Lockout** field is set to *Locked Out* or *Temporary L/O*
- A *channel* or *frequency* is considered locked if
 - the group containing it is locked
 - its **Set Lockout** field is set to *Locked Out* or *Temporary L/O*




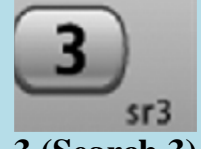
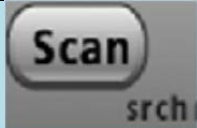
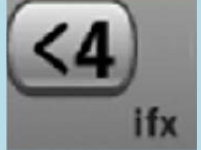
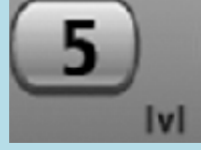
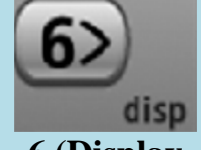
Key operation in Scan mode



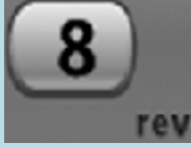

Special keys

- Turn the **SELECT-VOLUME-SCROLL** knob to change the direction of the scan.





- While monitoring a channel, turn the **SELECT-VOLUME-SCROLL** knob to resume scanning.
- **FUNCTION** + turn the **SELECT-VOLUME-SCROLL** knob to select a system.
- The scanner starts scanning at the system you select here.
- **FUNCTION** + tap **MENU** to edit the current system.

Keypad controls

Key Name (2nd operation) Action On	 HOLD (Close Call)	 1 (Search 1)	 2 (Search 2)	 3 (Search 3)
Tap	Enter Hold mode (the scanner opens squelch).	Disable the systems or sites assigned to this System/Site Quick Key (SQK). Tap again to enable.		
Press & Hold	Scan the current system only. Press & hold again to return to normal scan.	NA	NA	NA
FUNCTION + Tap	Toggle Close Call Modes	Disable the channel groups assigned to this Group Quick Key (GQK). Tap again to enable.		
FUNCTION + Press & hold	Enter Close Call Only mode.	NA	NA	NA
Key Name (2nd operation) Action on:	 Scan (Search)	 4 (IF exchange)	 5 (Volume offset)	 6 (Display mode)
Tap	Resume scanning.	Disable the systems or sites assigned to this System/Site Quick Key (SQK). Tap again to enable.		
FUNCTION + Tap	When scanning a conventional system, display the Quick Search prompt (enter Search mode). When	Disable the channel groups assigned to this Group Quick Key (GQK). Tap again to enable.		

	scanning a trunked system, switch between ID Scan and ID Search.			
Key Name (2nd operation) Action on:	 Lockout	 7 (Attenuation)	 8 (Reverse freq.)	 9 (Modulation)
Tap	Temporarily lock out the current channel, frequency, or location (until you turn off the scanner).	Disable the systems or sites assigned to this System/Site Quick Key (SQK). Tap again to enable.		
Double Tap	Permanently lock out the current channel, frequency, or location.	NA	NA	NA
Press & hold	Unlock all channels, groups, and frequencies in the current system.	NA	NA	NA
FUNCTION + Tap	Temporarily lock out the current system or site (until you turn off the scanner).	Disable the channel groups assigned to this Group Quick Key (GQK). Tap again to enable.		
FUNCTION + Double Tap	Permanently lock out the current system or site.	NA	NA	NA
FUNCTION + Press & hold	Unlock all items regardless of	NA	NA	NA

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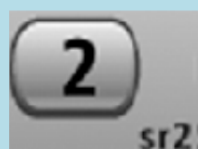
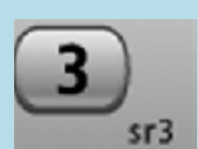

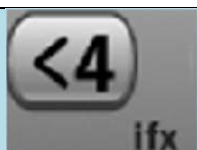
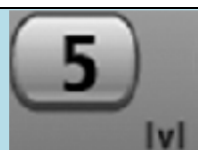
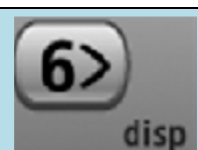
	type.			
Key Name (2nd operation) Action on:	 Backlight (Power, Lock)	 No (Decimal, Priority)	 0	 Yes (Enter, GPS)
Tap	Turn on the LCD backlight.	Start a 2-digit SQK entry. The next two digits will be treated as the SQK. During a system message: Cancel the message and exit that screen.	Disable the systems or sites assigned to System/Site Quick Key 0. Tap again to enable.	Edit the current channel.
Press & hold	Turn the scanner on or off.	NA	NA	NA
FUNCTION + Tap	Lock or unlock the keypad.	Toggle Priority mode	NA	Enter GPS mode.
FUNCTION + Press & hold	NA	NA	NA	Store the current Location information.






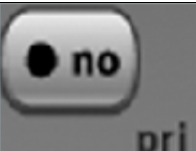

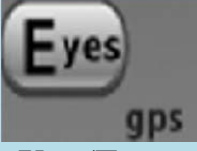
Key operation in Search mode

Special keys

- Turn the **SELECT-VOLUME-SCROLL** knob to change the direction of the search.
- While monitoring a channel, turn the **SELECT-VOLUME-SCROLL** knob to resume searching.
- In Custom Search mode, **FUNCTION** + turn the **SELECT-VOLUME SCROLL** knob to select a custom search range. The scanner starts at the custom search range you select here.
- **FUNCTION**+ tap **MENU** to go to the *Search for...* menu.
- During a Quick Search, **FUNCTION**+ tap **MENU** to go to the *Srch/CloCall Opt* menu.

Keypad controls

Key Name (2nd operation) Action On	 HOLD (Close Call)	 1 (Search 1)	 2 (Search 2)	 3 (Search 3)
Tap	Enter Hold mode.	Disable the custom search range assigned to this key. Tap again to enable.		
FUNCTION + Tap	Toggle Close Call modes.	Start the search range assigned to this Search Key.		
FUNCTION + Press & hold	Enter Close Call Only mode.	NA	NA	NA
Key Name (2nd operation) Action on:	 Scan (Search)	 4 (IF exchange)	 5 (Volume offset)	 6 (Display mode)
Tap	Switch to Scan mode.	Disable the custom search range assigned to this key. Tap again to enable.		
FUNCTION + Tap	Resume searching.	When monitoring a frequency, toggle the IF for that frequency.	NA	Switch the display mode.

Key Name (2nd operation) Action on:	 Lockout	 7 (Attenuation)	 8 (Reverse freq.)	 9 (Modulation)
Tap	Temporarily lock out the current frequency (until you turn off the scanner).	Disable the custom search range assigned to this key. Tap again to enable.		
Double Tap	Permanently lock out the current frequency.	NA	NA	NA
Press & hold	Unlock all frequencies from search and Close Call modes.	NA	NA	NA
FUNCTION + Tap	Review the list of locked out frequencies.	Toggle the attenuator state for this channel.	NA	Change the modulation.
FUNCTION + Press & hold	NA	Toggle the attenuator state for all signals.	Show the repeater reverse frequency for the current frequency (the scanner returns to the original frequency when you release the key).	NA
Key Name (2nd operation) Action on:	 Backlight (Power, Lock)	 No (Decimal, Priority)	 0	 Yes (Enter, GPS)
Tap	Turn on the LCD backlight.	During a system	Disable the search range	Store the current













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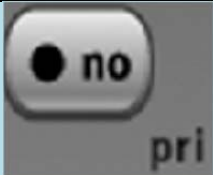


		message: Cancel the message and exit that screen.	assigned to this key. Tap again to enable.	frequency.
Press & hold	Turn the scanner on or off.	NA	NA	NA
FUNCTION + Tap	Lock or unlock the keypad.	NA	NA	Enter GPS mode.
FUNCTION + Press & hold	NA	NA	NA	NA

38. Hold mode

Hold stops the scanner on the current channel or frequency. You can access these functions by using the different key operations:

Key operation in Hold mode

Key Name (2 nd operation)				
Action on:	Hold (Close call)	1 (Search 1)	2 (Search 2)	3 (Search 3)
Tap	Resume scan or search.	Enter the number on the key		
FUNCTION + Tap	Enter Close Call mode.	Start the Quick Search assigned to this key		
FUNCTION + Press & hold	Enter Close Call Only mode.	NA		
Key Name (2 nd operation)				
Action on:	Scan (Search)	4 (IF exchange)	5 (Volume offset)	6 (Display mode)
Tap	Enter Scan mode.	Enter the number on the key		
FUNCTION + Tap	Enter Search mode.	Switch to an alternate intermediate frequency to avoid interference.	Change the volume offset for the current signal.	Rotate through the three available display modes.
Key Name (2 nd operation)				
Action on:	Lockout	7 (Attenuation)	8 (Reverse freq.)	9 (Modulation)
Tap	Unlock the current channel or frequency if	Enter the number on the key		

	<p>locked.</p> <p>If unlocked, single-tap to temporarily lock or double-tap to permanently lock the current channel or frequency.</p>			
<p>FUNCTION + Tap</p>	<p>Unlock the current System, Site, or Search if locked.</p> <p>If unloced, single-tap to temporarily lock or double-tap to permanently lock the current system, site, or search.</p>	<p>Toggle the attenuator state for the current signal.</p>	<p>NA</p>	<p>Change the modulation type.</p>
<p>FUNCTION + Press & hold</p>	<p>Unlock all systems, sites and searches.</p>	<p>Toggle the attenuator state for all signals.</p>	<p>Switch to the reverse repeater frequency of the current signal.</p>	<p>NA</p>
<p>Key Name (2nd operation) Action on:</p>	 <p>Backlight (Power, Lock)</p>	 <p>No (Decimal, Priority)</p>	 <p>0</p>	 <p>Yes (Enter, GPS)</p>
<p>Tap</p>	<p>Turn on the LCD backlight.</p>	<p>Enter a decimal point or "i" for direct entry.</p>	<p>Enter "0".</p>	<p>In Search Hold, save the current frequency into memory.</p> <p>In Scan Hold, go</p>

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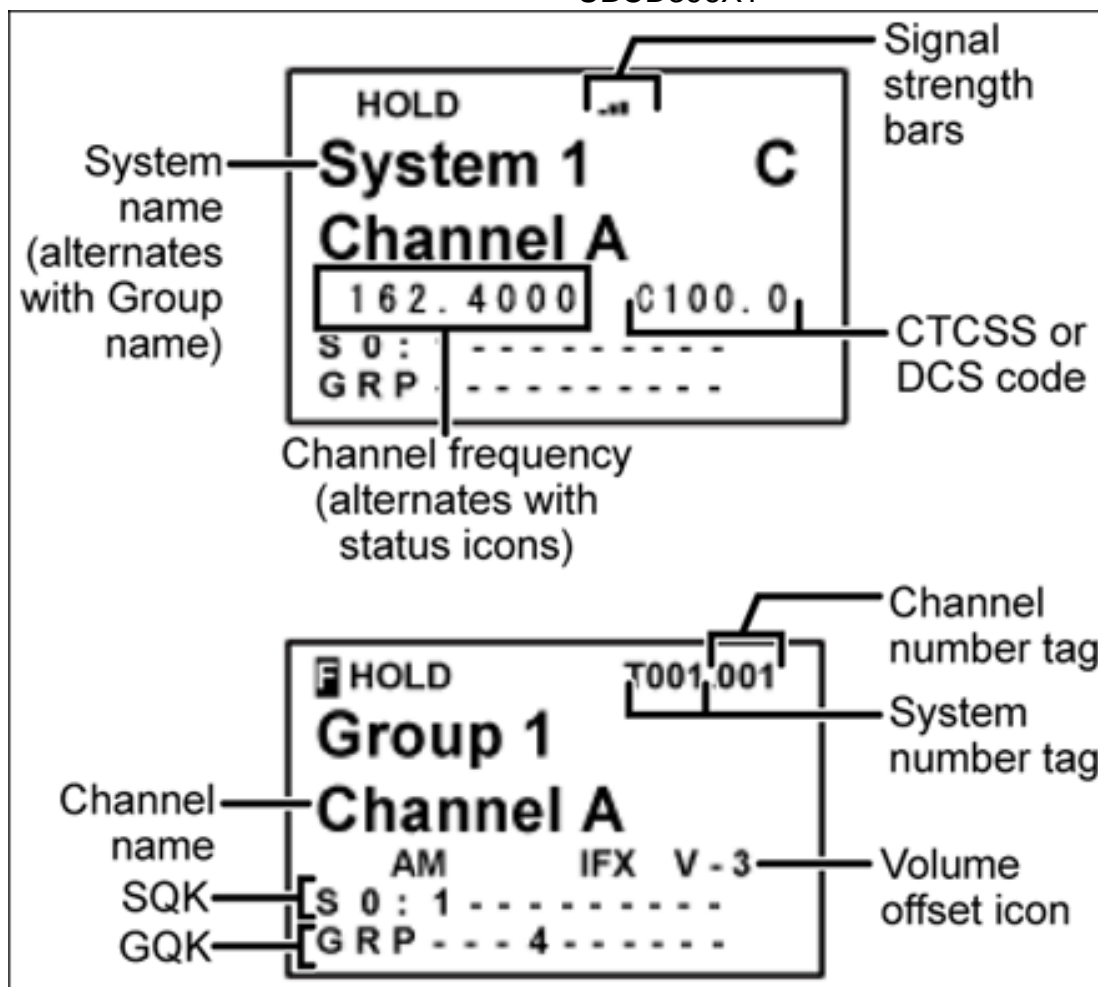
				to menu mode for the current channel or, if held on a Trunked System frequency, go to menu mode for the system.
Press & hold	Turn the scanner on or off.	NA	NA	NA
FUNCTION + Tap	Lock or unlock the keypad. Turn Priority scan on or off.	NA	Enter GPS mode.	
FUNCTION + Press & hold	Turn the scanner on or off.	NA	NA	NA

Reading the displays in Hold mode

The display information in Hold mode varies depending on the type of system the scanner is Holding on.

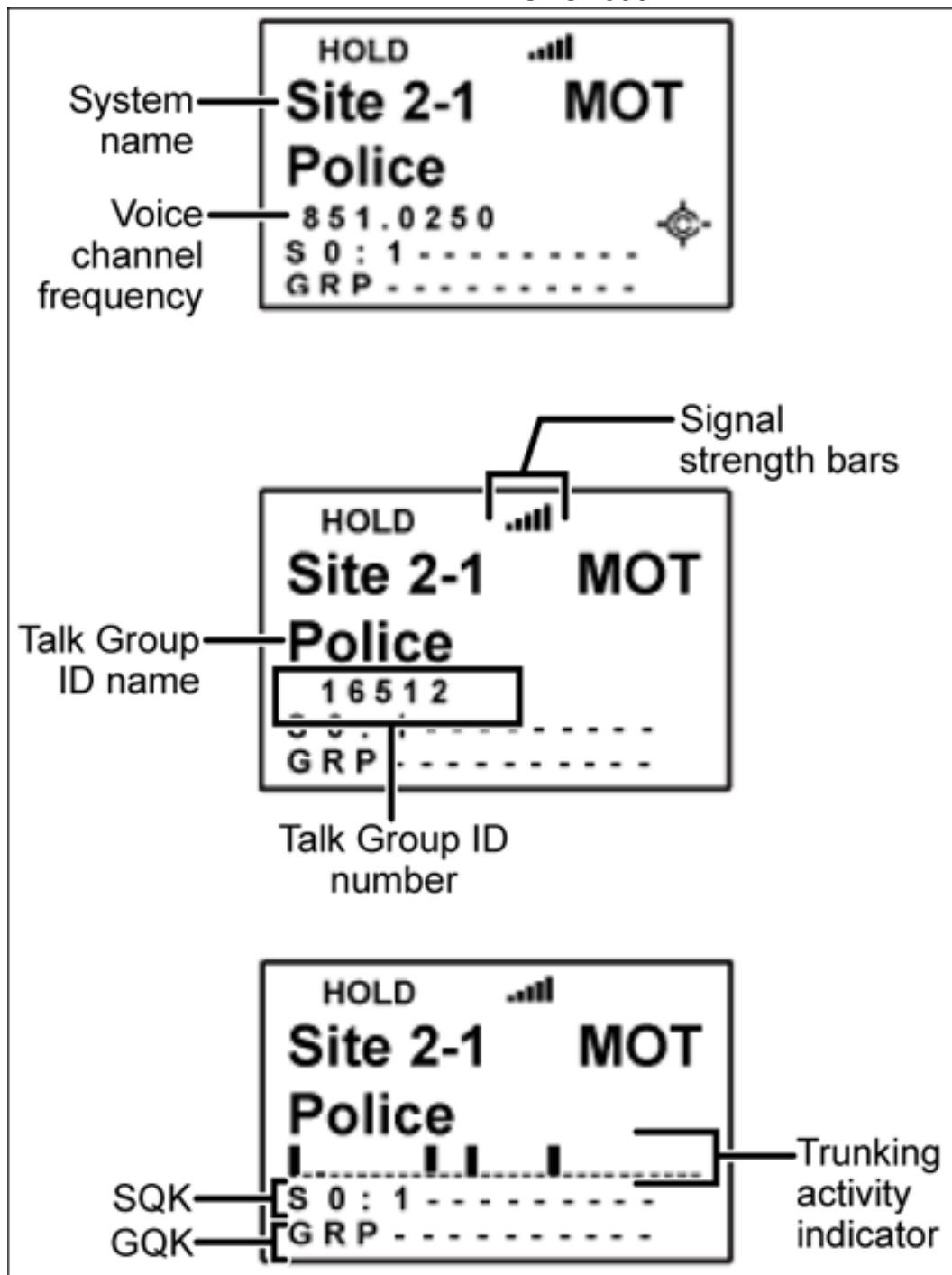
Conventional system display

When the scanner is holding on a conventional system, it displays the following screens:

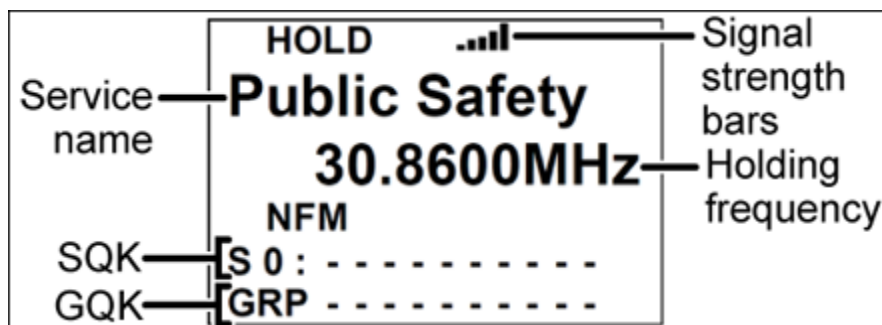


- To see the alternate information on the display at the top, cycle through the display modes.
- To see the display at the bottom of the diagram, tap **FUNCTION**.
- For an explanation of System and Channel Number Tags, see [Number Tags](#).
- For an explanation of the volume offset level, see [Volume Offset](#).

Trunked system display



Service search with scan hold display



39. Edit Talk Group ID

All Talk Group IDs must be in the proper format for each system type.

Motorola Type I Systems

Enter the Talk Group ID in the following format:

BFFF-SS

- B = Block # (1 digit)
- F = Fleet # (2-3 digits)
- S = Sub-Fleet # (1-2 digits)

Press the decimal key to enter the hyphen.

(If you try to enter a hexadecimal TGID for a Type I system, the scanner treats the entry as a decimal number.)

Motorola Type II Systems

- Decimal format: Enter the TGID in numbers only, up to 5 digits
- Hexadecimal format: up to 3 characters Select the first Hex character (0 through F), then move the cursor to the right and select the second character. Press yes when you're finished.

P25 Single Frequency Systems or Standard System Trunk Site

- Decimal format: Enter the TGID in numbers only, up to 8 digits
- Hexadecimal format: up to 6 characters

Select the first Hex character (0 through F), then move the cursor to the right and select the second character. Press yes when you're finished.

EDACS Wide or Narrow Systems

AFS format

Enter the Talk Group ID in the following format:

AA-FFS

- A = Agency # (00 - 15)
- F = Fleet # (00 - 15)
- S = Sub-fleet # (0 - 7)

Press the decimal key to enter the hyphen.

Leave the Fleet or Sub-Fleet # empty to treat it as a wildcard (any Sub- Fleet within that Fleet). For example, "15-" will match all TGIDs for Agency 15. "15-04-" will match all TGIDs for Agency 15, Fleet 4.

I-Call channel (Motorola, P25 or EDACS)

Enter the Talk Group ID in the following format:

i {ID number }

Press the decimal key to enter the lower-case i, then enter the ID number.

To monitor all iCalls, enter the iCall wildcard i0 in decimal or i in HEX.

LTR systems

Enter the Talk Group ID in the following format:

AHHUUU

- A = Area Code (0 or 1)
- H = Home repeater (01 - 20)
- U = User ID (000 - 254)

Press the decimal key to enter the hyphen.

Leave the User ID empty to treat it as a wildcard. For example, "1-15-" will match all User IDs for Area Code 1, Home repeater 15.

40. Edit Band Plan

(Motorola systems only) The scanner prompts you to choose one of the two standard band plan types: *800/900 Standard* or *800 Splinter*. Choose *Custom* if you need to create your own band plan.

Creating a custom band plan

You will need to create a custom band plan for a Motorola VHF, UHF, and 800 MHz system. When you select *Custom*, the scanner prompts you for the following information:

Band plan number

Select one of the 6 available band plan numbers, from *Band Plan 1* through *Band Plan 6*.

Set Base Freq

1. Input the lower limit of the band frequency.
2. Input the upper limit of the band frequency.

(See [Calculating upper base frequencies](#) for more information.)

Set Offset

Enter the offset.

Set Spacing

Select the number of kHz between each channel. Your options are:

5.00	6.25	10.00	12.50	15.00	18.75	20.00	25.00
30.00	31.25	35.00	37.50	40.00	43.75	45.00	50.00
55.00	56.25	60.00	62.50	65.00	68.75	70.00	75.00
80.00	81.25	85.00	87.50	90.00	93.75	95.00	100.00

41. Calculating upper base frequencies

Custom Band Plans (800 Custom, VHF, UHF) require that you enter both a lower and an upper base frequency value. Here's how to determine these values.

The *Lower Base Frequency* (or *Base*) is always the base frequency as provided in the RRDB. The *Upper Base Frequency* is calculated from the following formulas:

For sites with a single band plan:

$$Base + ((759 - Offset) \times Step)$$

Where:

- *Base* = the lower base frequency listed in RRDB.
- *Offset* = the offset for this entry.
- *Step* = the step for this entry.

For sites with multiple band plans:

$$Upper\ Basen = Basen + (Offset_{n+1} - 1 - Offset_n) \times Step_n$$

Where:

- *Basen* is the lower base frequency for the entry.
- *Offset_{n+1}* is the Offset for the next band plan (for the last table, use 760)
- *Offset_n* is the offset for this band plan
- *Step_n* is the step for this band.

For example:

Custom Frequency Table

Entry	Base	Spacing	Offset
A	155.4150	15.0	380
B	157.2000	12.5	436
C	157.4700	15.0	454

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Plugging these values into our formula, we get:

<i>For entry A:</i>	
Upper BaseA	$= \text{BaseA} + (\text{OffsetB} - 1 - \text{OffsetA}) \times \text{StepA}$
Upper BaseA	$= 155.415 \text{ MHz} + (436 - 1 - 380) \times 15 \text{ kHz}$
Upper BaseA	$= 155.415 \text{ MHz} + 55 \times 0.015 \text{ MHz}$
Upper BaseA	$= 155.415 \text{ MHz} + 0.825 \text{ MHz}$
Upper BaseA	$= \mathbf{156.240 \text{ MHz}}$

<i>For entry B:</i>	
Upper BaseB	$= \text{BaseB} + (\text{OffsetC} - 1 - \text{OffsetB}) \times \text{StepB}$
Upper BaseB	$= 157.200 \text{ MHz} + (454 - 1 - 436) \times 12.5 \text{ kHz}$
Upper BaseB	$= 157.200 \text{ MHz} + 17 \times 0.0125 \text{ MHz}$
Upper BaseB	$= 157.200 \text{ MHz} + 0.2125 \text{ MHz}$
Upper BaseB	$= \mathbf{157.4125 \text{ MHz}}$

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<i>For entry C:</i>	
Upper BaseC	$= BaseC + (Offset_{C+1} - Offset_C) \times StepC$
Upper BaseC	$= 157.470 \text{ MHz} + (760 - 1 - 454) \times 15 \text{ kHz}$
Upper BaseC	$= 157.470 \text{ MHz} + 305 \times 0.015 \text{ MHz}$
Upper BaseC	$= 157.470 \text{ MHz} + 4.575 \text{ MHz}$
Upper BaseC	$= \mathbf{162.045 \text{ MHz}}$

42. Close Call

The Close Call (CC) feature searches for signals that are stronger than other signals on the band (indicating the transmitter is probably somewhere close by). This menu lets you change the operation settings of the close call feature; you can change the overall close call options through the [Srch/CloCall Opt](#) menu.

Close Call Only

Search the selected bands for close call hits; the scanner stops all other scanning for a close call only search.

CC Auto Store

Start a close call search. When a close call hit is detected, the scanner stores that frequency in the system named *Close Call* in the *Found Channels* group. The scanner saves found channels until it reaches the number set in the *Max Auto Store* setting on the [Srch/CloCall Opt](#) menu.

Hits with Scan

The scanner stores the 10 most recent close call hits to a temporary system; you can set the options for this temporary system, just like you can for permanent systems. The scanner deletes the 10 saved frequencies in this temporary system when you turn the power off. If you want to save the any of these frequencies permanently, you need to store them to a programmed system or use the CC Auto Store feature.

Set Quick Key

Assign this close call hits system to a Quick Key so you can easily enable or disable it during scanning. Enter a number from 0 to 99; tap NO (the decimal point) if you don't want to assign this system or site to a Quick Key. (For more information, see [Quick Keys](#).)

Set Number Tag

Assign a number to this system you can use to tune directly to the system. Choose a number from 0 to 999. (For more information, see [Number Tags](#).) Note that you can only set a system number tag for the Close Call system.

Set Lockout

Decide whether you want to lock out the system so the scanner will ignore it during Scan and Search modes. If you lock out the system none of the found channels will be scanned conventionally.

Unlocked: The system is not locked out.

Temporary L/O: The system is locked out until you turn the scanner off and back on.

Lockout: The system is permanently locked out.

Set Hold Time

Set the minimum number of seconds the scanner should spend checking this close call hits system even if there is no traffic on any channel. (The scanner always checks each channel in a close call hits system once even if the hold time is set to 0 seconds.) Select the number of seconds from 0 through 255 (0 is the default).

Set CC Mode

Choose whether scanner runs close call checks in the background, while you're performing other scans or searches. (The scanner never runs close call checks when you're in tone-out mode.)

- *Off* : The scanner does not run close call checks in the background.
- *CC DND* : The scanner runs close call checks every 2 seconds, but it will not leave an active channel for a close call check.
- *CC Pri* : The scanner runs close call checks every 2 seconds, even if the current channel is active. The scanner runs the close call check even while you are monitoring a transmission.

Set CC Override

Choose *On* if you want the scanner to stop its current operation and automatically jump to the frequency when it detects a close call hit. Choose *Off* if you want the scanner to alert you to the close call hit and prompt you to change frequency; if you choose not to change frequency, the scanner times out and returns to its previous operation.

Set CC Alert

Decide whether the scanner triggers an alert tone and light when it detects a close call hit. (Compare this to the system setting [Emergency Alert](#), which triggers a tone and light when a Talk Group contains an emergency flag.) The available options for [Set Alert Tone](#) and [Set Alert Light](#) are common to both types of alerts.

Set Alert Tone

Set Alert Light

Set CC Pause

Choose how long you want the scanner to pause on a close call hit before going back to its previous operation; this setting only applies when the Set CC Override feature is turned off. Choose a pause time of 3, 5, 10, 15, 30, 45, or 60 seconds. If you want the scanner to wait for your input whenever it detects a close call hit, select Infinite.

Set CC Bands

Choose whether you want the scanner to search for close call hits on the frequency bands listed below. Select each band you want to search, then press **YES** to turn that band *On*.

The scanner only searches for close call hits on bands that are turned on.

Band	Frequencies
<i>VHF Low 1</i>	25.0000–53.9900 MHz
<i>VHF Low 2</i>	54.0000–107.9000 MHz
<i>Air Band</i>	108.0000–136.9875 MHz
<i>VHF High 1</i>	137.0000–224.9000 MHz
<i>VHF High 2</i>	225.0000–319.9750 MHz
<i>UHF</i>	320.0000–520.0000 MHz

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<p><i>800 MHz</i> +</p>	<p>758.0000–960.0000 MHz 1240.0000–1300.0000 MHz</p>
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43. Priority Scan

This section applies to conventional system priority mode only. For priority on trunked systems, turn on the Priority ID system option and set the desired channels as priority channels.

Priority mode has two "sub modes" (similar to Close Call and Close Call Only):

- In *Priority Scan* mode, the scanner pauses the current operation at a designated interval to check for activity on any unlocked channels set as priority channels.
After the priority channel check is complete, the scanner resumes the previous operation.
- In *Priority Plus Scan* mode, the scanner stops the current operation and only checks the priority channels.

Priority Scan menu

Use the *Priority Scan* menu to control how Priority mode operates:

Set Priority

Choose one of the following priority scan methods:

- *On* : Enter Priority Scan mode; also, the scanner performs a normal priority scan whenever you enter Priority mode in the future.
- *Plus On* : Enter Priority Plus Scan mode; also, the scanner performs a priority plus scan whenever you enter Priority mode in the future.
- *Off* : Exit Priority mode, and do not go into Priority mode in the future.

Set Interval

Decide how many seconds you want the scanner to wait between priority channel checks. Enter a number between 1 and 10 seconds. (This setting is used in normal priority scans only.)

MaxCHs/Pri-Scan

Decide how many priority channels the scanner checks during each interval. Enter a number between 1 and 100. If the number of priority channels is greater than the number you enter here, the scanner divides them into groups. For example, if you set the maximum channels to 20 and there are 100 priority channels, the scanner checks those 100 channels in groups of 20 and takes a total of 5 intervals to complete the priority scan.

44. Program Location

The *Program Location* menu lets you create and edit points of interest (*POI*), intersections(*Dangerous Xing*), and roads (*Dangerous Road*). The available settings vary for each location type.

POI

Edit Name

Enter a name or edit the existing one. Names can be 16 characters long, and they can contain upper and lower case letters, punctuation, and spaces. Turn the **SELECT VOLUME-SQUELCH** knob on the handheld scanners or the **SCROLL / FUNCTION** knob on mobile scanners to choose the character you want, then press **6** (right cursor) to move the cursor to the next character.

Set Type

When you create a location, the location is created as the type you are currently viewing (POI, Dangerous Xing, or Dangerous Road). If you want to change the location type, you can select the new location type here.

When you change the location type, the scanner goes back to the *Program Location* menu. Select the new location type to edit this location; the scanner resets the available options based on the new location type.

Set Alert

This menu lets you configure whether the scanner triggers an alert tone and light when you approach this location.

Set Alert Light

This setting is exactly the same as its counterpart on the system, site, and channel menus.

Set Alert Tone

Choose one of the available alert tones for this POI:

- *Alert 1* :

1047 Hz for 125 ms / Silence for 50 ms / 1047 Hz for 125 ms / Silence for

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50 ms / 1319 Hz for 125 ms / Silence for 50 ms / 1568 Hz for 125 ms /
Silence for 175 ms / 1319 Hz for 125 ms / Silence for 50 ms / 1568 Hz for
125 ms

– *Alert 2 :*

1047 Hz for 200 ms / Silence for 200 ms / 1760 Hz for 250 ms / Silence for
100 ms / 1397 Hz for 250 ms

– *Alert 3 :*

2093 Hz for 125 ms / Silence for 50 ms / 1976 Hz for 125 ms / Silence for
50 ms / 2093 Hz for 125 ms

– *Alert 4 :*

1319 Hz for 25 ms / Silence for 50 ms / 1397 Hz for 25 ms / Silence for
50ms / 1175 Hz for 25 ms / Silence for 50 ms / 1319 Hz for 25 ms

– *Off* (No alert tone sounded).

If you select an alert tone, the scanner prompts you to select the volume level (*Level 1* through *Level 15*) you want to the alert tone to use; leave the volume at *Auto* to have the scanner sound the alert tone without changing the volume.

Set Location Info

Enter the latitude and longitude for this location.

Set Range

Enter how far out from this location you want the scanner to alert you. You can configure the scanner to sound an alert tone and flash a light when you reach the radius entered here. The scanner treats the number you enter here as miles or kilometres depending on the value you selected in the *Set Unit* field in the *Set GPS Format* menu (under the main [Settings](#) menu). Enter a range from 0.05 through 4.0 mi/km, in 0.05 mi/ km steps.

Set Lockout

Decide whether you want to lock out this location so the scanner no longer checks it.

Choose *Unlocked* (default), *Temporary L/O* (the location is locked out until you turn the scanner off and back on), or *Lockout* (the location is locked out until you change this setting).

Delete Location

Delete this location and its settings, including any alert settings.

New Location

Create a new location.

Dangerous Xing and Dangerous Road menus

(The settings and available options for dangerous crossings and dangerous roads are exactly the same.)

Edit Name

Enter a name or edit the existing one. Names can be 16 characters long, and they can contain upper and lower case letters, punctuation, and spaces. Turn the **SELECTVOLUME- SQUELCH** knob on the handheld scanners to choose the character you want, then press **6** (right cursor) to move the cursor to the next character.

Set Type

When you create a location, the location is created as the type you are currently viewing (POI, Dangerous Xing, or Dangerous Road). If you want to change the location type, you can select the new location type here. When you change the location type, the scanner goes back to the *Program Location menu* . Select the new location type to edit this location; the scanner resets the available options based on the new location type.

Set Alert Volume

Activate the alert tone for this location. Select the volume level (*Level 1* through *Level 15*) you want to the alert tone to use, or select *Auto* to have the scanner sound the alert tone without changing the volume. If you don't want the scanner to sound an alert as you approach this location, select *Off* .

The tone pattern varies depending on what type of location this is:

- Dangerous Xing alert tone:

1175 Hz for 250 ms / Silence for 50 ms / 1319 Hz for 50 ms / Silence for 50 ms / 1397 Hz for 250 ms

- Dangerous Road alert tone

1568 Hz for 250 ms / Silence for 50 ms / 1760 Hz for 50 ms / Silence for 50 ms / 1976 Hz for 250 ms / Silence for 50 ms / 2093 Hz for 50 ms / Silence for 50 ms / 1047 Hz for 250 ms

Set Alert Light

This setting is exactly the same as its counterpart on the system, site, and channel menus.

Set Location Info

Enter the latitude and longitude for this location.

Set Heading

Decide whether the scanner alerts you of this Dangerous Xing or Road each time you approach it or only when you are traveling in a particular direction. To make the alert direction-dependent, select the direction from the list; select *All Range* to be alerted regardless of your direction.

Set Speed Limit

Decide whether the scanner alerts you of this Dangerous Xing or Road each time you approach it or only when you are traveling above a certain speed. To make the alert speed-dependent, enter the speed limit for this location; leave the speed limit blank to be alerted regardless of your speed. The scanner treats the number you enter here as miles or kilometers depending on the value you selected in the Set Unit field in the Set GPS Format menu (under the main Settings menu). Enter a range from 0 through 200 mi/km, in 1 mi/km steps.

Set Lockout

Decide whether you want to lock out this location so the scanner no longer checks it.

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Choose *Unlocked* (default), *Temporary L/O* (the location is locked out until you turn the scanner off and back on), or *Lockout* (the location is locked out until you change this setting).

Delete Location

Delete this location and its settings, including any alert settings.

New Location

Create a new location.

45. Search and Store

With this feature, the scanner searches a system and saves any frequencies it finds activity on. When the scanner detects activity on a frequency, it verifies that the frequency has not already been stored, then adds the frequency to the *Found Channels* group. (Since these frequencies are stored with individual systems, you must have at least one programmed system to use the Search and Store feature.)

The scanner displays a list of all programmed systems. Select the system you want to search and add found channels to. The options you have depend on the type of system you select:

- If the system you selected is a **conventional system** , the scanner prompts you to select a custom search or a preset service search range.
- If the system you selected is a **trunked system** , the scanner prompts you to select a site within that system. The scanner searches the site for active Talk Groups and stores the Talk Group ID to the *Found Channels* group. (If the site you selected is locked, the scanner automatically unlocks it and begins the search.)
- If the system you selected is an **EDACS SCAT system** , the scanner displays an error message: the search and store feature can't be used on EDACS SCAT systems.

46. Search for...

Use this menu to start a search, to change the options for the three different types of searches, and program the 3 search keys.

Service Search

Start a search of one of the 8 preset service bands. Choose from *Air, CB Radio, UHF CB Radio, Racing, FM Broadcast, Police, Marine, Railroad* .

Edit Service

This menu lets you change the default settings for the 12 preset service bands. Select the service you want to edit from the list, then set the following options:

Set Delay Time

Set the number of seconds the scanner should wait after a transmission stops before moving on to the next channel. Select *0, 1, 2 (default), 5, 10, or 30 seconds*. To have scanner leave the channel after a designated number of seconds whether the transmission stops or not, select one of the negative values. Choose *-10* seconds to have the scanner leave the channel after 10 seconds even if the transmission is still going on; choose *-5 seconds* or *-2 seconds* to have the scanner leave after 5 seconds or 2 seconds, respectively.

Set Attenuator

Turn on attenuation to reduce the signal strength by 20 dB. All frequencies in the search range are attenuated during search.

Set Audio AGC

Turn on Automatic Gain Control (AGC) for this system. When you activate this feature, the scanner automatically adjusts the volume for each channel based on the signal strength. You can turn on the gain control for *Analog* and *Digital* signals separately.

To change the settings for the audio AGC, see [Adjust Audio AGC](#)

P25 Waiting Time

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When searching in a band that has a mix of analog and digital signals (i.e., where the *Audio Mode* is set to *All*), it is possible to have *false decode* problems that results in digital noise at the beginning of transmissions. To prevent this, a user-configurable P25 wait time (from 0 to 1000 ms) has been added.

During the wait time, the scanner evaluates the received signal; if it detects P25 data, the scanner opens squelch immediately. If it does not detect any P25 data, the scanner opens squelch as soon as the wait time expires.

Note: Any analog transmissions on this channel will lose the first part of the transmission, up to the wait time you set here.

Select the number of milliseconds (after the start of a transmission) the scanner should wait while checking for P25 data. Choose a number from 0 through 1000 ms in 100 ms increments. The scanner only applies the wait time when *Tone/Code Search* in *Srch/CloCall Opt* is set to *Off*.

Search with Scan

Custom Search

Start a search of the 10 custom search ranges.

Edit Custom

This menu lets you program the ten custom search ranges. Select the custom search you want to edit from the list, then set the following options:

Edit Name

Enter a name or edit the existing one. Names can be 16 characters long, and they can contain upper and lower case letters, punctuation, and spaces. Turn the **SELECTVOLUME- SQUELCH** knob on the handheld scanners or the **SCROLL / FUNCTION** knob on mobile scanners to choose the character you want, then press **6** (right cursor) to move the cursor to the next character.

Edit Srch Limit

Change the range of frequencies covered by this custom search. The scanner prompts you to input the lower frequency limit and then the upper frequency limit.

Set Delay Time

Set the number of seconds the scanner should wait after a transmission stops before moving on to the next channel. Select *0, 1, 2 (default), 5, 10, or 30 seconds*.

To have scanner leave the channel after a designated number of seconds whether the transmission stops or not, select one of the negative values. Choose *-10* seconds to have the scanner leave the channel after 10 seconds even if the transmission is still going on; choose *-5 seconds* or *-2 seconds* to have the scanner leave after 5 seconds or 2 seconds, respectively.

Set Modulation

Select what type of modulation the scanner should use for this frequency or channel. (Only the modulation types available for this frequency or channel are displayed.)

Auto	The scanner uses the default modulation type for this frequency's band.
AM	The scanner treats the frequency as an AM band.
NFM	The scanner treats the frequency as a Narrowband FM band.
FM	The scanner treats the frequency as an FM band.
WFM	The scanner treats the frequency as a Wideband FM band.
FMB	The scanner treats the frequency as an FM broadcast band.

Set Attenuator

Turn on attenuation to reduce the signal strength by 20 dB. All frequencies in the search range are attenuated during search.

Set Step

Select the number of kHz between each channel. Choose *5.0, 6.25, 7.5, 8.33, 10.0, 12.5, 15.0, 20.0, 25.0, 50.0 or 100.0 kHz*. Select *Auto* to use the default step for this band.

Set C-Ch Only

If you set C-Ch Only Mode to On, the scanner will only search for control channel data. If it detects such data it will stop on the control channel and display channel activity for the found system. For Motorola systems, it will try to follow voice channel traffic using the Motorola Band Plan you select in the next setting. It will

also display the name of the found system if the system's ID matches a known system.

Set MOT Band Plan

If this custom search is a Motorola system, you need to select a band plan, just like you do when you program a Motorola system for scanning. See [Edit Band Plan](#) for more information.

Set Audio AGC

Turn on Automatic Gain Control (AGC) for this system. When you activate this feature, the scanner automatically adjusts the volume for each channel based on the signal strength. You can turn on the gain control for *Analog* and *Digital* signals separately.

To change the settings for the audio AGC, see [Adjust Audio AGC](#)

P25 Waiting Time

When searching in a band that has a mix of analog and digital signals (i.e., where the *Audio Mode* is set to *All*), it is possible to have *false decode* problems that results in digital noise at the beginning of transmissions. To prevent this, a user-configurable P25 wait time (from 0 to 1000 ms) has been added.

During the wait time, the scanner evaluates the received signal; if it detects P25 data, the scanner opens squelch immediately. If it does not detect any P25 data, the scanner opens squelch as soon as the wait time expires.

Note: Any analog transmissions on this channel will lose the first part of the transmission, up to the wait time you set here.

Select the number of milliseconds (after the start of a transmission) the scanner should wait while checking for P25 data. Choose a number from 0 through 1000 ms in 100 ms increments. The scanner only applies the wait time when *Tone/Code Search* in *Srch/CloCall Opt* is set to *Off*.

Search with Scan

Search and Store

Search a stored system and save the frequency information of any active channels.

Set Search Key

The scanner has three one-touch search keys (number keys **1** , **2** , and **3**) that you can assign to any saved search range.

1. Select the search key you want to program (*Search Key 1* through *Search Key 3*).
2. Select the search range you want to assign to this key. The search range can be a service search, a custom search, a tone-out search, or a band scope search.
3. Press **YES** to confirm the selection.

Once you assign a search range to a key, you can start the search just by pressing the appropriate key.

47. Search with Scan

Set Quick Key

Assign this search range to a Quick Key so you can easily enable or disable it during scanning. Enter a number from 0 to 99; tap NO (the decimal point) if you don't want to assign this search range to a Quick Key. (For more information, see [Quick Keys](#).)

Set Startup Key

Assign this search range to a Startup Key so you can lock or unlock it during power up. Enter a number from 0 to 9; tap NO (the decimal point) if you don't want to assign this search range to a Startup Key. (For more information, see [Startup Keys](#).)

Set Number Tag

Assign a number to this search range that you can use to quickly access the first frequency of the the search range. Choose a number from 0 to 999. (For more information, see [Number Tags](#).)

Set Lockout

Decide whether you want to lock out the search so the scanner will ignore it during Scan and Search modes. Choose one of the following options:

- *Unlocked*: The search range is included while scanning.
- *Temporary L/O*: The search range is locked out until you turn the scanner off and back on.
- *Lockout*: The search range is permanently locked out.

Set Hold Time

Set how long the scanner spends checking this search range before moving to the next search range or system. (2 seconds is the default).

48. Set Alert Tone

Choose one of the 9 different tone patterns for the scanner to use for the alert tone:

Alert 1	4000 Hz for 50 ms » Silence for 20 ms » 4000 Hz for 50 ms » Silence for 20 ms » 4000 Hz for 50 ms
Alert 2	800 Hz for 50 ms » Silence for 20 ms » 1050 Hz for 50 ms » Silence for 20 ms » (repeat twice)
Alert 3	800 Hz for 50 ms » Silence for 20 ms » 1050 Hz for 50 ms » Silence for 20 ms » 4000 Hz for 100 ms
Alert 4	120 Hz for 10 ms » 800 Hz for 10 ms » 1200 Hz for 10 ms (repeat 5 times)
Alert 5	1200 Hz for 150 ms
Alert 6	1200 Hz for 70 ms » Silence for 50 ms » 1200 Hz for 70 ms
Alert 7	2000 Hz for 200 ms » Silence for 10 ms » 800 Hz for 150 ms (repeat 3 times)
Alert 8	500 Hz for 40 ms » Silence for 10 ms » 500 Hz for 40 ms » Silence for 10 ms » 500 Hz for 40 ms
Alert 9	2400 Hz for 70 ms » Silence for 20 ms » 3000 Hz for 70 ms » Silence for 70ms (repeat twice)
Off	No alert tone sounded.

If you select an alert tone, the scanner prompts you to select the volume level (*Level 1* through *Level 15*) you want the alert tone to use; leave the volume at *Auto* to have the scanner sound the alert tone without changing the volume.

49. Srch/CloCall Opt

This menu lets you set general options for how the scanner operates in Search and Close Call modes.

Freq Lockouts

- *Rvw Search L/O* : This option displays a list of all locked out frequencies. To unlock any frequency on the list, just select it and press **YES**.
- *Unlock All* : This option removes the locks on all frequencies at once.

Broadcast Screen

Choose whether you want the scanner to screen out common broadcast bands and ignore hits on these bands. You can screen out signals on 4 preset bands and up to 10 custom bands. The preset bands are:

- *Pager* (148.0000 – 149.2500 MHz)
- *FM* (88.0000 - 108.0000 MHz)
- *UHF TV* (764.0000 - 775.9999 MHz)
(794.0000 – 819.9999 MHz)
- *VHF TV* (50.0000 - 70.0000 MHz)
(174.0000 - 225.0000 MHz)

Your options for broadcast screening are listed below:

Set All Band On

Turn on screening for all broadcast bands and ignore any hits on these frequencies.

Set All Band Off

Turn off screening for all broadcast bands, and treat hits on these frequencies the same as any other band.

Set Each Band

Turn screening on or off for each band individually. The scanner displays the bands listed above. Select the band you want to change, then press **YES** to toggle the setting.

Program Band

Create up to 10 custom bands that you want the scanner to screen out hits on.

1. Select a custom band slot (Band 1 through Band 10).
2. When the scanner prompts you, input the lower frequency limit.
3. When the scanner prompts you, input the upper frequency limit.
4. Once you create the custom band, turn screening on or off the same way you did for the preset bands.

Tone/Code Search

Choose whether the scanner searches an active frequency for CTCSS/DCS tones (*CTCSS/DCS Search*), P25 NAC codes (*P25 NAC Search*), or neither (*Off*). (The scanner ignores this setting in AM, WFM, and FMB bands.)

Repeater Find

If you turn this feature on, whenever the scanner detects a signal on a common repeater input frequency, it automatically searches for that signal on the output frequency. If it finds the signal on the output frequency, the scanner displays *Repeater Found* and switches to monitor the output frequency.

Max Auto Store

Enter the maximum number of hits you want the scanner to store during Search and Store mode or Close Call Auto Store mode. When the number of stored hits reaches the number you enter here, the scanner stops storing hits. Enter a number from 1 to 256.

Set Delay Time

This setting is used to set the delay time for Quick Search, Close Call, and the CC Hits system.

Set the number of seconds the scanner should wait after a transmission stops before moving on to the next channel. Select 0, 1, 2 (default), 5, 10, or 30 *seconds*.

To have scanner leave the channel after a designated number of seconds whether the transmission stops or not, select one of the negative values. Choose -10 seconds to have the scanner leave the channel after 10 seconds even if the

transmission is still going on; choose *-5 seconds* or *-2 seconds* to have the scanner leave after 5 seconds or 2 seconds, respectively.

Set Attenuator

Turn on attenuation to reduce the signal strength by 20 dB. When you turn on this setting, all frequencies in Quick Search mode, Close Call mode, and the Band Scope will be attenuated.

Set Audio AGC

Turn on Automatic Gain Control (AGC) for this system. When you activate this feature, the scanner automatically adjusts the volume for each channel based on the signal strength. You can turn on the gain control for *Analog* and *Digital* signals separately.

To change the settings for the audio AGC, see [Adjust Audio AGC](#)

P25 Waiting Time

During search and Close Call operation, it is possible to have *false decode* problems that result in digital noise at the beginning of transmissions. To prevent this, a userconfigurable P25 wait time (from 0 to 1000 ms) has been added.

During the wait time, the scanner evaluates the received signal; if it detects P25 data, the scanner opens squelch immediately. If it does not detect any P25 data, the scanner opens squelch as soon as the wait time expires.

Note: Any analog transmissions will lose the first part of the transmission, up to the wait time you set here.

Select the number of milliseconds (after the start of a transmission) the scanner should wait while checking for P25 data. Choose a number from 0 through 1000 ms in 100 ms increments. This setting will be applied in Close Call, Quick Search, and Band Scope modes.

50. Startup Keys

Startup Keys let you change the lockout state for several systems, sites, and search ranges all at the same time. When you activate the Startup Key, the scanner checks all systems, sites, or search ranges and locks or unlocks them according to these rules:

- If any systems, sites, or search ranges *do not have* a Startup Key assigned, the scanner does not change their locked/unlocked state (i.e., if they are unlocked, it leaves them unlocked).
- If any systems, sites, or search ranges *do have* an assigned Startup Key, the scanner compared the assigned Startup Key to the one you activated:
 - If a system's Startup Key *does not match* the one you activated, the scanner *locks* that system.
 - If a system's Startup Key *matches* the one you activated, the scanner *unlocks* that system and enables all of its Quick Keys.

Assigning Startup Keys

- Multiple systems, sites, and search ranges can share the same Startup Key.
- Startup Keys range from 0 to 9 .
- If you do not want a system, site, or search range to be affected by any Startup Keys, enter the decimal point for the Startup Key (this is the default setting).

To a conventional system:

1. Open the [Program System](#) menu.
2. Select the system you want to assign the Startup Key to.
3. Select [Edit Sys Option](#), then select [Set Startup Key](#).
4. Enter the Startup Key you want to use for this system.

To a trunked system:

1. Open the [Program System](#) menu.
2. Select the system you want to assign the Startup Key to.
3. Select [Edit Site](#), then select the site you want.
4. Select [Set Startup Key](#), then enter the Startup Key you want to use for this site.

To a service search range :

1. Open the [Search for...](#) menu.

2. Select [Edit Service](#), then select the service search range you want to assign the Startup Key to.
3. Select [Search with Scan](#), then select [Set Startup Key](#).
4. Enter the Startup Key you want to use for this search range.

To a custom search range :

1. Open the [Search for...](#) menu.
2. Select [Edit Custom](#), then select the custom search range you want to assign the Startup Key to.
3. Select [Search with Scan](#), then select [Set Startup Key](#).
4. Enter the Startup Key you want to use for this custom search range.

Using Startup Keys

To activate a Startup Key:

1. Turn the scanner off.
2. Press & hold the number key that corresponds to the Startup Key while you power the scanner on. (e.g. To activate Startup Key configuration # 2, press & hold **2** on the number pad while turning the scanner on.)
3. Continue holding the number key until the scanner display shows the number of the Startup Key configuration (In the example above, the display shows *Startup Config. Key No. 2*).

For example, say you have 4 systems programmed according to the table below:

Assigned Startup Key	State
3	Locked
None (.)	Unlocked
None (.)	Locked
9	Unlocked

Here is the result if you power on the scanner while you press and hold **3** :

Assigned Startup Key	Previous state	Resulting state
3	Locked	Unlocked
None (.)	Unlocked	Unlocked (no change)

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None (.)	Locked	Locked (no change)
9	Unlocked	Locked

Here is the result if you power on the scanner while you press and hold **5** :

Assigned Startup Key	Previous state	Resulting state
3	Locked	Locked
None (.)	Unlocked	Unlocked (no change)
None (.)	Locked	Locked (no change)
9	Unlocked	Locked

51. Tone A and Tone B Settings

You can configure the scanner to search for tones in several different ways, based on the values you enter for Tone A and Tone B:

	Tone A setting	Positive number	Tone B Setting	Positive number
Operation	Monitor the channel for two-tone pages only. The scanner opens squelch and displays the tone information when the following occur: <ol style="list-style-type: none"> 1. The scanner detects a tone that matches the value you set for Tone A. 2. The tone is at least 250 ms long. 3. Within 500 ms, the scanner detects a second tone that matches the value set for Tone B. 4. The second tone is at least 100 ms long. 			
	Tone A setting	Positive number	Tone B Setting	0.0 Hz
Operation	Monitor the channel for single-tone pages only. The scanner opens squelch and displays the tone information when the following occur: <ol style="list-style-type: none"> 1. The scanner detects a tone that matches the value you set for Tone A. 2. The tone is at least 1.25 seconds long and not more than 3.75 seconds long. 			
	Tone A setting	0.0 Hz	Tone B Setting	Positive number
Operation	Monitor the channel for group tones only. The scanner opens squelch and displays the tone information when the following occur: <ol style="list-style-type: none"> 1. The scanner detects a tone that matches the value you set for Tone B. 2. The tone is at least 3.75 seconds long. 			
	Tone A setting	0.0 Hz	Tone B Setting	0.0 Hz
Operation	Monitor the channel for two-tone pages, single-tone pages, and group tones. This tone out search mode works as follows: <ol style="list-style-type: none"> 1. All detected tones are compared to the three criteria listed above. 			

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	<ol style="list-style-type: none">2. If the tone meets any one of the criteria, the scanner checks to see if this tone frequency is already saved to a tone out channel with the same frequency, modulation, and attenuator settings.3. If the detected tone matches a saved tone, the scanner opens squelch.4. If the detected tone does not match any saved tones, the scanner opens squelch, flashes the tone information on the display, and asks if you want to save the tone information.
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52. Tone-Out for...

Tone-Out Standby

Check the tone out channels for paging tones, according to each channel's individual settings.

Tone-Out Setup

This menu lets you configure the 10 tone-out channels. Select the channel you want to edit from the list, then set the frequency, tone, and other options for that channel.

Edit Name

Enter a name or edit the existing one. Names can be 16 characters long, and they can contain upper and lower case letters, punctuation, and spaces. Turn the **SELECTVOLUME-SQUELCH** knob on the handheld scanners to choose the character you want, then press **6** (right cursor) to move the cursor to the next character.

Set Frequencies

Use this menu to program frequencies for this Tone Out channel.

Set Tone

This menu lets you configure the type of tone out search. Select the tone you want to edit (*Edit Tone A* or *Edit Tone B*), then set the frequency for that tone. Enter a frequency between 250 Hz and 3500 Hz, or set the frequency to 0 Hz. (See [Tone A and Tone B Settings](#) for more information.)

Set Delay Time

Set the number of seconds the scanner should wait after a transmission stops before moving on to the next channel. Select *0*, *1*, *2* (default), *5*, *10*, or *30 seconds*. To have the scanner wait for your input before moving on to the next channel, select *Infinite*.

Set Alert

Decide whether the scanner triggers an alert tone and light when it detects a tone on this channel. (Compare this to the system setting [Emergency Alert](#), which triggers a tone and light when a Talk Group contains an emergency flag.) The available options for [Set Alert Tone](#) and [Set Alert Light](#) are common to both types of alerts.

Set Alert Tone

Set Alert Light

Set Audio AGC

Turn on Automatic Gain Control (AGC) for this Tone-Out channel. When you activate this feature, the scanner automatically adjusts the volume for the channel based on the signal strength.

To change the settings for the audio AGC, see [Adjust Audio AGC](#).

Tone-Out Search

You can set the scanner to search for and identify the tones used in tone-outs. To do so, you set both the A and B tones to a value of "0". See [Tone A and Tone B Settings](#) for more information.


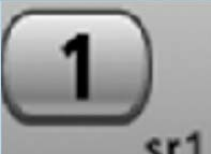
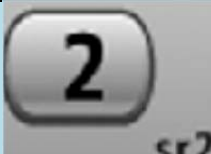

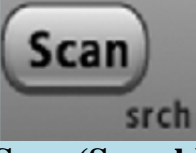

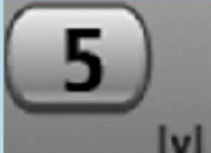

53. Key Safe Mode






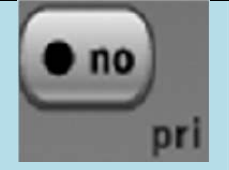

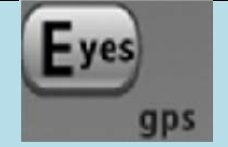
Key Safe mode locks out the programming menu and more advanced functions so the user can't accidentally "break" the scanner. This mode is ideal for any situation where you want another person to be able to use the scanner without changing any of the settings.

To turn Key Safe mode on (or off)

- Turn the scanner off.
- Press and hold **FUNCTION** while you turn the scanner back on.
- The scanner display shows *Key Safe Mode On* (or *Key Safe Mode Off*), then returns to the operation it was performing when you turned it off.
- While Key Safe mode is on, **MENU** is disabled along with the key combinations described in the table below.
- When you try to use a disabled key combination, the scanner display shows *Key Safe Mode. Press FUNC while Power On for Full Operation*.

The table below shows which key combinations are disabled and which ones operate normally (depending on the operating mode the scanner is in):

Key Name (2 nd operation) Action on:	 Hold (Close call)	 1 (Search 1)	 2 (Search 2)	 3 (Search 3)
Tap	Normal operation			
Press & hold	Normal operation			
FUNCTION + Tap	Normal operation	While Scanning: Normal operation While Holding: Disabled		
FUNCTION + Press & hold	Disabled			
Key Name (2 nd operation) Action on:	 Scan (Search)	 4 (IF exchange)	 5 (Volume offset)	 6 (Display mode)
Tap	In Close Call, Tone-Out, GPS, and Band Scope	Normal operation.		

	modes, this key is disabled. In Search mode, this operates as the Resume function.			
FUNCTION + Tap	Disabled	While Scanning: Normal operation While Holding: Disabled		
Key Name (2 nd operation) Action on:	 Lockout	 7 (Attenuation)	 8 (Reverse freq.)	 9 (Modulation)
Tap	Normal operation (Temporary Lockout Only).	Normal operation.		
Double tap	NA	Normal operation.		
Press & hold	Disabled	Normal operation		
FUNCTION + Tap	Normal Operation (Temporary Lockout Only).	While scanning: Normal operation While Holding: Disabled		
FUNCTION + Double tap	NA	While scanning: Normal operation While Holding: Disabled	Disabled	While scanning: Normal operation While Holding: Disabled
FUNCTION + Press & hold	Disabled	While scanning: Normal operation While Holding: Disabled	Normal operation.	While scanning: Normal operation While Holding: Disabled
Key Name (2 nd operation) Action on:	 Backlight (Power, Lock)	 No (Decimal, Priority)	 0	 Yes (Enter, GPS)

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Tap	Normal operation		Disabled
Press & hold	Normal operation		Disabled
FUNCTION + Tap	Normal operation	While Scanning: Normal operation While Holding Disabled	Disabled
FUNCTION + Press & hold	Normal operation		Disabled

54. Settings

Set Backlight

This menu lets you configure the display and key backlight.

Set Mode

Choose how you want the backlight to operate:

10 sec	The scanner keeps the backlight on for 10 seconds after the last operation.
30 sec	The scanner keeps the backlight on for 30 seconds after the last operation.
Squelch	The scanner turns on the backlight when a signal breaks squelch.
Keypress	The scanner turns on the backlight when you press a key.
Infinite	The scanner leaves the backlight on all the time.

Set Dimmer

Select the brightness of the backlight. Your options are high (brightest), middle, and low (dimpest).

Set Color

Select the color of the backlight. Your options are blue, red, magenta, green, cyan, yellow, and white.

Adjust Key Beep

Select the volume level (Level 1 through Level 15) you want the keybeep to use, or select *Auto* to have the scanner sound the keybeep without changing the volume. If you don't want the scanner to beep when you press the keys, select *Off*.

Battery Option

This menu lets you configure the advanced battery control features:

Set Battery Save

Turn the battery save feature on or off.

Set Charge Time

Enter the amount of time you want the battery to draw power while charging.

Adjust Audio AGC

Configure how the scanner handles the *Automatic Gain Control (AGC)* for Analog and Digital signals:

Parameter	Definition	Analog settings	Digital settings
Response Time	How frequently the AGC factor updates. Decrease this value to make AGC respond faster (but this could result in pumping). Increase this value to make AGC respond more slowly.	-4 to +6 (default=0)	-8 to +8 (default=0)
Reference Gain	The reference level that AGC attempts to adjust the volume to. If digital and analog volumes don't match, adjust this parameter.	-5 to +5 (default=0)	-5 to +5 (default=0)
Gain Range	The total dynamic range of the AGC adjustments. A larger value allows a wider variation in volume.	0 to 15	NA

Adjust Contrast

Select one of the 15 available contrast levels for the display. As you scroll through the options, the display adjusts to the highlighted contrast level; press **YES** when you see the display contrast you want to use.

Set C-CH Output

Choose how you want the scanner to handle control channel data:

- *Off* : The scanner will not output the control channel data.
- *On* : The scanner will output the control channel data.
- *Extend* : The scanner will output the control channel data along with any description.

Set GPS Format

Configure how the scanner displays position coordinates, time, and units during GPS operation:

Set Pos Format

Select how the scanner displays longitude and latitude:

- *DMS: DDD° MM' SS.ss* : Display coordinates in degrees (DDD), minutes (MM), and seconds (SS.ss).
- *DEG: DDD.dddddd* : Display coordinates as decimal degrees.

Set Time Format

Select 12H for 12-hour (am/pm) time format or 24H for 24-hour time format.

Set Time Zone

Set the number of hours your local time zone differs from universal time (GMT/UTC). Select from -14 hours to +14 hours in half-hour (0.5 h) increments.

Set Unit

Select the unit used for distance: mile or kilometer (km).

Set Serial Port

Set the baud rate for the scanner's serial port. Choose from 4800, 9600, 19200, 38400, 57600, or 115200 bps; select *Off* to disable the serial port.

Band Defaults

Use this menu to change the default modulation and frequency step or spacing used for each band. The scanner displays the list of available bands in the following format:

{Frequency} : {modulation type} / {step}

Select the frequency band you want to edit. The scanner prompts you for the following information:

Set Modulation

Select the type of modulation you want the scanner to use as the default for this band:

AM, Narrowband FM (NFM), FM, Wideband FM (WFM), or FM broadcast (FMB).

Set Step

Select the number of kHz between each frequency or channel step: 5.0, 6.25, 7.5, 8.33, 10.0, 12.5, 15.0, 20.0, 25.0, 50.0, or 100.0 khz.

P25 LP Filter

This setting lets you set the scanner to apply a software filter that removes the 4kHz tone you can hear on some P25 systems. Note that turning on this setting increases the CPU load and could slightly degrade P25 decode performance on some systems.

Display Unit ID

The Unit ID (UID) feature lets you see the unit ID of the radio currently transmitting on Motorola, EDACS, and APCO P25 systems. To see the Unit ID, you need to first turn on the global Unit ID option in the Settings menu.

Press MENU.

Scroll to SETTINGS and press E/yes.

Scroll to Disp. Unit ID and press E/yes.

Scroll to On and press E/yes.

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When turned on, in Display Modes 1 and 2 the scanner will alternate the current channel information and the Unit ID information in Line 2 of the display. In Display Mode 3, the scanner will display the Unit ID information on Line 3 of the display.

If you program a Unit ID into a channel, you can assign an Alpha to the Unit ID. You program a Unit ID just like an iCall ID (press ./no then the Unit ID).

Notes:

In some cases where you catch a transmission already in progress you will not see the Unit ID.

In some cases where a second party responds to a transmission before the channel is released, you will not see the second party's Unit ID and will continue to see the first party's Unit ID.

See Scanner Info

This menu lets you see detailed information about the memory and firmware.

% Memory Used

See the percent of overall memory used (*Memory Used*) along with the number of programmed *Systems*, *Sites* , and channels (*CHN*) and the percent of available memory positions used for each.

Firmware Version

See the firmware version (*Version*) and the serial number (*SN*) of the scanner.

55. Wired Clone

This feature allows you to copy all the settings from one scanner to another of the same model:

- Use the included data transfer cables to connect the two scanners. Plug each of the cables DB9 connector into one side of a Gender Changer/Null-Modem Adaptor.
- On the scanner you want to copy from, go to the *Wired Clone* menu and select *Master*.
- On the scanner you want to copy to, go to the *Wired Clone* menu and select *Slave*.

The master scanner checks to make sure the slave is properly connected and ready to receive, then begins the data transfer. **Do not disconnect the data transfer cable or turn off either scanner during the transfer.**

When the transfer is finished, both scanners display a *Complete* message. Reboot the slave scanner to load the new settings.

All settings and data saved on the Slave scanner will be erased!

56. UBCD396XT Specifications

General

Attenuation	20dB nominal
Audio Output Power	310mW nominal into 24Ω speaker
	20mW nominal into 32Ω stereo headphone
Scan Rate	100 channels per second max (Conventional mode)
Search Rate	300 steps per second max (5kHz steps only)
External Jacks	Antenna Jack: SMA Type
	Phone Jack: 3.5mm Stereo Type
	DC Power Jack: EIAJ TYPE-II(Center Positive)
	GPS/Remote Interface Jack: 4pin Mini Type
Internal Speaker	24Ω, 0.8 W Max.32mm
Power Requirements	3 x AA Size Rechargeable Ni-MH Batteries (2300mAh)
	3 x AA size Alkaline Batteries
	AC Adapter (6V DC 800mA Regulated) (PS-S0680BL2)
Operating Temperature	Nominal: -20°C to +60°
	Close Call: -10°C to +60°C
Size	61.0mm(W) x 31.0mm(D) x 136.0mm(H) (Without Antenna)
Weight	167g (Without Battery and Antenna)
Remote Functions	Direct PC control
	Database management
	Wired cloning
Display	64 x 128 Full Dot Matrix LCD with multi-color back light

Sensitivity (nominal) 12dB SINAD		
0.3μV	25—27.995 MHz	AM
0.2μV	28—87.9875 MHz	FM
0.4μV	88—107.9 MHz	FMB
0.3μV	108—136.9875 MHz	AM

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0.2 μ V	137—173.9875 MHz	FM
0.5 μ V	174—224.9 MHz	WFM
0.3 μ V	225—399.975 MHz	AM
0.3 μ V	400—520 MHz	NFM
0.3 μ V	758—960 MHz	NFM
0.6 μ V	1240—1300 MHz	NFM

Signal Noise Ratio (nominal)		
50dB	25—27.995 MHz	AM
48dB	28—87.9875 MHz	FM
60dB	88—107.9 MHz	FMB
50dB	108—136.9875 MHz	AM
47dB	137—173.9875 MHz	FM
55dB	174—224.9 MHz	WFM
50dB	225—399.975 MHz	AM
40dB	400—520 MHz	NFM
41dB	758—960 MHz	NFM
37dB	1240—1300 MHz	NFM

Close Call Sensitivity (nominal)	
350 μ V	VHF Low1 Band
160 μ V	VHF Low2 Band
70 μ V	Air Band
60 μ V	VHF High1 Band
56 μ V	VHF High2 Band
100 μ V	UHF Band

200μV	800MHz+ Band
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Frequency Range

Frequency Range (MHz)	Modulation	Step(kHz)
25.0000—27.9950	AM	5
28.0000—69.9900	FM	10
70.0000—87.9875	FM	12.5
88.0000—107.9000	FMB	100
108.0000—136.9875	AM	12.5
137.0000—147.9950	FM	5
148.0000—173.9875	FM	12.5
174.0000—224.9000	WFM	100
225.0000—399.9750	AM	25
400.0000—520.0000	NFM	6.25
758.0000—787.9875	NFM	12.5
788.0000—805.9875	NFM	12.5
806.0000—960.0000	NFM	12.5
1240.0000—1300.0000	NFM	12.5

Special Functions

Band Scope Function

- Frequency Span 0.2 MHz To 500 MHz
- Frequency Step 5 kHz To 100 kHz

Two-Tone-Sequential

- 250.0-3500.0Hz , 0.1Hz Step Programmable

Supported trunking systems

- Motorola Systems: Type I, II, II/I (hybrid)

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- EDACS Systems: FM, NFM, and SCAT
- LTR Systems
- APCO Systems: Astro Imbe, Astro 25

Dynamic memory allocation capacity

- Systems: 500 max
- Groups: 20 per system
- Site: 1000 max (All) 256 per system
- Channels: 25000 max
- Channels per Trunked System: 500 max

Heterodyne System

- 1st IF: 380.7 to 380.8 MHz / 265.5 to 265.6 MHz
- 2nd IF: 10.8 MHz
- 3rd IF: 450 kHz

CTCSS and DCS Tones

CTCSS Tone Frequencies — 50 frequencies total (Hz)									
67.0	69.3	71.9	74.4	77.0	79.7	82.5	85.4	88.5	91.5
94.8	97.4	100.0	103.5	107.2	110.9	114.8	118.8	123.0	127.3
131.8	136.5	141.3	146.2	151.4	156.7	159.8	162.2	165.5	167.9
171.3	173.8	177.3	179.9	183.5	186.2	189.9	192.8	196.6	199.5
203.5	206.5	210.7	218.1	225.7	229.1	233.6	241.8	250.3	254.1

DCS Tone Codes — 104 codes total							
023	025	026	031	032	036	043	047
051	053	054	065	071	072	073	074
114	115	116	122	125	131	132	134
143	145	152	155	156	162	165	172
174	205	212	223	225	226	243	244

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245	246	251	252	255	261	263	265
266	271	274	306	311	315	325	331
332	343	346	351	356	364	365	371
411	412	413	423	431	432	445	446
452	454	455	462	464	465	466	503
506	516	523	526	532	546	565	606
612	624	627	631	632	654	662	664
703	712	723	731	732	734	743	754

57. WARRANTY

Important:

Satisfactory evidence of the original purchase is required for warranty service

Warrantor:

The warrantor is either Uniden Australia Pty Limited ABN 58 001 865 498 ("Uniden Aust") or Uniden New Zealand Limited ("Uniden NZ") as the case may be.

Terms of Warranty:

Uniden Aust/NZ warrants to the original retail purchaser only that (UBCD396XT) ("the Product"), will be free from defects in materials and craftsmanship for the duration of the warranty period, subject to the limitations and exclusions set out below.

Warranty period:

This warranty to the original retail purchaser is only valid in the original country of purchase for a Product first purchased either in Australia or New Zealand and will expire one (1) year from the date of the original retail sale. If a warranty claim is made, this warranty will not apply if the Product is found by Uniden to be:

- (A) Damaged or not maintained in a reasonable manner or as recommended in the relevant Uniden Owner's Manual;
- (B) Modified, altered or used as part of any conversion kits, subassemblies or any configurations not sold by Uniden Aust or Uniden NZ;
- (C) Improperly installed contrary to instructions contained in the relevant Owner's Manual
- (D) Repaired by someone other than an authorized Uniden Repair Agent in relation to a defect or malfunction covered by this warranty; or
- (E) Used in conjunction with any equipment, parts or a system not manufactured by Uniden.

Parts Covered:

This warranty covers the Product and included accessories.

User-generated Data:

This warranty does not cover any claimed loss of or damage to user-generated data (including but without limitation phone numbers, addresses and images) that may be stored on your Product.

Statement of Remedy:

If the Product is found not to conform to this warranty as stated above, the Warrantor, at its discretion, will either repair the defect or replace the Product without any charge for parts or service. This warranty does not include any reimbursement or payment of any consequential damages claimed to arise from a Product's failure to comply with the warranty.

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Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and for compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

This warranty is in addition to and sits alongside your rights under either the COMPETITION AND CONSUMER ACT 2010 (Australia) or the CONSUMER GUARANTEES ACT (New Zealand) as the case may be, none of which can be excluded.

Procedure for obtaining warranty service:

Depending on the country in which the Product was first purchased, if you believe that your Product does not conform with this warranty, you should deliver the Product, together with satisfactory evidence of your original purchase (such as a legible copy of the sales docket) to Uniden at the addresses shown below. You should contact Uniden regarding any compensation that may be payable for your expenses incurred in making a warranty claim. Prior to delivery, we recommend that you make a backup copy of any phone numbers, images or other data stored on your Product, in case it is lost or damaged during warranty service.

UNIDEN AUSTRALIA PTY LTD

Service Division
345 Princes Highway,
Rockdale, NSW 2216
Phone number: 1300 366 895
Email: custservice@uniden.com.au

UNIDEN NEW ZEALAND LTD

Service Division
150 Harris Road, East Tamaki
Auckland 2013
Phone number: (09) 273 8377
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