PRO-96 *Digital Trunking Handheld Scanner*

20-526 OWNER'S MANUAL – Please read before using this equipment

! IMPORTANT !

If an icon appears at the end of a paragraph, go to the box on that page with the corresponding icon for pertinent information.

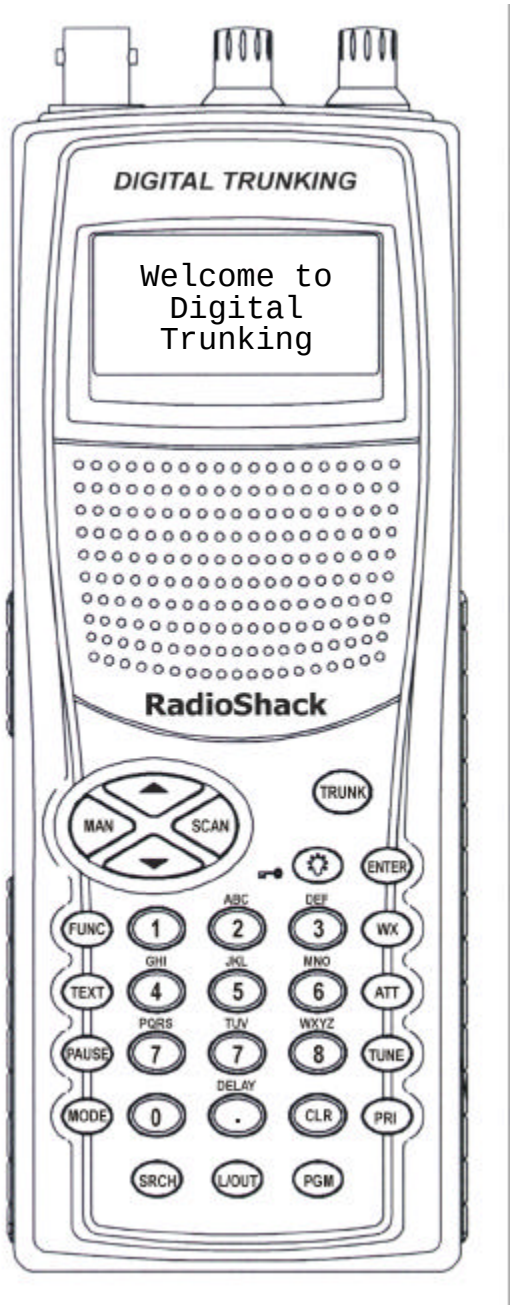
Warning

Caution

Important

Hint

Note



RadioShack

RadioShack PRO-96 Digital Trunking Handheld Scanner – 20-526

TABLE OF CONTENTS

FEATURES

Your RadioShack Digital Trunking Handheld Scanner is the first of an innovative and exciting new generation of RadioShack scanning receivers capable of receiving Phase 1 APCO-25 C4FM/IMBE digital voice modulation from the newest and most sophisticated conventional and trunked radio networks.

Your Radio Shack Digital Handheld Scanner is ready to receive digital conventional and trunked radio transmissions. No additional hardware or add-on cards are needed.

Your Radio Shack Digital Handheld Scanner features Intelligent Adaptive Digital Tracking for optimal reception of digital signals from a variety of digital conventional and trunked radio system types. No special sound quality settings or adjustments are needed for the different digital systems that you monitor.

APCO-25 digital voice modulation provides public safety radio users with clear digital voice signals and other features not available in traditional analog systems. Your scanner uses advanced Digital Signal Processing (DSP) technology to receive and decode APCO-25 digital signals from both conventional and trunked radio networks. Additionally, your scanner features automatic detection of digital signals. No special scanner programming is required to receive conventional or trunked digital traffic.

The DSP module in your scanner features updateable firmware. If DSP improvements become available, you can easily download an update file from the Internet and apply the file to your scanner to obtain the latest DSP firmware version.

Your scanner is designed to track Motorola analog and Astro® digital trunking systems using 3600 baud control channel operation, APCO 25 digital trunking systems using 9600 BPS control channel operation, and M/A-COM EDACS® trunking systems.

The scanner lets you scan conventional transmissions, and is preprogrammed with service search banks for your convenience. By pressing a single button, you can quickly search those frequencies most commonly used by public safety and other agencies.

Your RadioShack Digital Handheld Scanner features RadioShack's exciting new 11-in-1 V-Scanner technology. V-Scanner stands for Virtual Scanner. V-Scanner allows you to build and store eleven separate configuration profiles in V-Scanner folder memory. Stored V-Scanners can be recalled, edited and activated at any time, giving you a

powerful tool that allows you to quickly reconfigure your scanner for use in different areas or applications.

This scanner gives you direct access to over 59,000 frequencies including those used by police and fire departments, ambulance services, government agencies, air, and amateur radio services.

Your scanner includes the following features:

500 Channels – 10 channel storage banks with 50 channels each.

V-Scanner Folders – eleven 500 channel virtual scanner folders at your fingertips.

Phase 1 APCO-25 Digital Reception – automatic detection and reception of digital voice modulation from conventional, trunked and mixed-mode networks.

Intelligent Adaptive Digital Tracking – ensures optimal reception of digital signals from a variety of digital conventional and trunked radio system types.

Digital AGC – automatically compensates for audio level variances in digital transmissions.

Simultaneous Multi-System Trunking Operation – quickly tracks up to ten Motorola, APCO-25 or EDACS trunking systems at the same time. Mix conventional channels and trunking systems in the same channel storage banks. Scan conventional frequencies and trunked systems simultaneously. Automatically detects Motorola 3600 baud or APCO-25 9600 BPS control channel operation.

Automatic Channel Tracking – automatically determines the trunking system frequencies for Motorola and APCO-25 trunking systems, using only the active system control channel.

CTCSS and DCS Subaudible Encoded Squelch Modes – restricts conventional channel reception to transmissions using specified subaudible CTCSS tone or DCS data code when scanning or parked on a single channel. Code Search feature instantly displays the tone or code in use. Takes advantage of subaudible squelch tail elimination turn off codes when they are present.

10 ID List Banks – let you store 1500 IDs in 10 ID banks, each with 5 ID sub-banks. 30 IDs are available in each ID sub-bank. ID text tags let you easily identify the user of a particular talkgroup ID code.

Weather Priority Alert – while scanning, automatically sounds an alarm tone to advise of hazardous weather conditions when it detects the alert signal on the local National Oceanic and Atmospheric Administration (NOAA) weather channel during WX priority operation.

SAME/FIPS Weather Alert – displays the weather event text for the specific cities or counties you choose so you can see and hear the reason for the alert.

Data Cloning – lets you transfer the programmed data to another PRO-96 scanner. You can also upload or download the programmed data to or from a PC using an optional PC interface kit and application software.

12-Character, 4-Line, Alphanumeric Display – shows you detailed operating information clearly.

Triple Conversion Superheterodyne Receiver – virtually eliminates any interference from intermediate frequency (IF) images, so you hear only the frequency you select.

Preprogrammed Frequency Ranges – lets you search for transmissions within preset frequency ranges or within ranges you set, to reduce search time and select interesting frequencies more quickly.

Hyperscan™ and Hypersearch™ – the scanner scans at up to 60 channels per second and searches up to 75 frequencies per second, to help you quickly find transmissions.

Scan Delay – delays scanning for about 2 seconds before moving to another channel in conventional mode, so you can hear more replies that are made on the same channel.

Adjustable Trunking Delay – waits for reply activity on a trunking call for the amount of time you specify.

Priority Channel — allows you to configure the scanner to check one channel every 2 seconds so you do not miss important transmissions.

Attenuator — allows you to set, by channel or globally, a 20 dB attenuator to reduce receiver overload and interference from nearby strong signals.

Text Input — lets you input a text label for each channel, talkgroup ID, channel storage bank, or other memory location so you can easily identify the transmission.

Lock Out Function — lets you set your scanner to skip over specified channels or frequencies when scanning or searching, and skip over IDs when tracking trunked systems.

Key Lock — lets you lock the scanner's keys to prevent accidentally changing the scanner's programming.

Battery Save Circuit — When monitoring a single frequency, allows the receiver to sleep in between receiver activity.

Flexible Antenna with BNC Connector — provides excellent reception and is designed to help prevent antenna breakage.

Memory Backup — keeps the frequencies stored in memory for an extended time even without internal batteries.

Three Power Options — let you power the scanner with internal batteries (non-rechargeable batteries or rechargeable batteries, not supplied). You can also use an AC adapter (not supplied) or power the scanner in a vehicle using a DC adapter (not supplied).

Supplied Trunking Guide — provides a quick reference to public safety trunking radio systems in the United States.

Your scanner can receive these frequencies:

- 25 – 54 MHz
- 108 – 136.9875 MHz
- 137 – 174 MHz
- 216.0025 – 225 MHz
- 406 – 512 MHz
- 806 – 823.9875 MHz
- 849 – 868.9875 MHz

- 894 – 960 MHz
- 1240 – 1300 MHz

Use “A GENERAL GUIDE TO FREQUENCIES” on Page 91 to help you target frequency ranges in your service area so you can search for a wide variety of transmissions.

THE FCC WANTS YOU TO KNOW

This equipment has been tested and found to comply with the limits for a scanning receiver, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna.

Increase the separation between the equipment and receiver.

Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

This device may not cause harmful interference.

This device must accept any interference received, including interference that may cause undesired operation.

SCANNING LEGALLY

Your scanner covers frequencies used by many different groups including police and fire departments, ambulance services, government agencies, private companies, amateur radio services, military operations, pager services, and wireline (telephone and telegraph) service providers. It is legal to listen to almost every transmission your scanner can receive. However, there are some transmissions you should never intentionally listen to. These include:

- Telephone conversations (cellular, cordless, or other private means of telephone signal transmission)
- Pager transmissions
- Any scrambled or encrypted transmissions

According to the Electronic Communications Privacy Act (ECPA), you are subject to fines and possible imprisonment for intentionally listening to, using, or divulging the contents of such a transmission unless you have the consent of a party to the communication (unless such activity is otherwise illegal).

This scanner has been designed to prevent reception of illegal transmissions. This is done to comply with the legal requirement that scanners be manufactured so as to not be easily modifiable to pick up those transmissions. Do not open your scanner's case to make any modifications that could allow it to pick up transmissions that are illegal to monitor. Doing so could subject you to legal penalties.

In some areas, mobile use of this scanner is unlawful or requires a permit. Check the laws in your area. It is also illegal in many areas to interfere with the duties of public safety officials by traveling to the scene of an incident without authorization.

We encourage responsible, safe and legal scanner use.

GETTING FAMILIAR WITH YOUR SCANNER

Though you may be anxious to begin using your new scanner right away, we recommend that you take the time to read this manual thoroughly so that you may fully understand the advanced features and capabilities of your PRO-96 scanning receiver.

Once you understand a few simple terms used in this manual and familiarize yourself with your scanner's features, you can put the scanner to work for you. You simply determine which frequencies and trunking systems you want to receive, and then program the scanner to scan them.

A frequency is the receiving signal location (expressed in MHz). To find active frequencies, you can use frequency guides available from your local RadioShack store, frequency listings posted on the Internet, or the built in search function.

Your scanner’s SEARCH banks contained preprogrammed frequencies in the scanner’s memory (see “Searching a Preprogrammed Frequency Range” on Page 52 for the frequency list). You can even change the frequency range on one of the SEARCH banks (SR6) to customize your own search parameters.

Once you identify the frequencies you wish to monitor, you can store them into programmable memory locations called channels, which are grouped in channel storage banks. You can then scan the channel-storage banks to see if there is activity on the frequencies stored there. Each time the scanner finds an active frequency, it stops and monitors the radio traffic on that channel until the transmission ends, then resumes scanning. For detailed programming instructions, see “PROGRAMMING YOUR SCANNER” on Page 30.

About the Keypad

Here is a brief overview of your scanner's keys and their functions.

SCAN — scans through the programmed channels.

FUNC — lets you use various functions by pressing this key in combination with other keys. When using the FUNC key, press the FUNC key first, then release it, then quickly press the next key in the function key sequence.

MAN — stops scanning and lets you directly enter a channel number.

WX — scans through the seven preprogrammed weather channels.

TRUNK — stores the trunking ID code or holds the trunking ID while scanning.

PRI — sets and turns the priority function on or off.

TEXT — lets you input text.

PAUSE — pauses search or tune operation.

MODE — changes the receive mode (AM, FM, CT, DC, MO, ED).

KEY symbol/LIGHT symbol — turns on/off the display's backlight, or when used with FUNC locks/unlocks the keypad to prevent accidental entries.

TUNE — allows you input a frequency and tunes up or down automatically or manually with the π or θ keys.

ATT — turns attenuation on to reduce the scanner's sensitivity and block extremely strong signals, or turns it off to increase sensitivity.

π or θ — selects the scan or search direction.

SRCH — lets you search the seven search banks.

L/OUT — lets you lock out a selected channel, skip a specified frequency during search, or lock out a selected ID code.

PGM — programs frequencies into channels.

ENTER — completes the entry of frequencies and text.

1 — enters a 1, or inputs characters 0 through 9 in text mode.

2/ABC — enters a 2, or inputs characters A, B, or C.

3/DEF — enters a 3, or inputs characters D, E, or F.

4/GHI — enters a 4, or inputs characters G, H, or I.

5/JKL — enters a 5, or inputs characters J, K, or L.

6/MNO — enters a 6, or inputs characters M, N, or O.

7/PQRS — enters a 7, or inputs characters P, Q, R, or S.

8/TUV — enters an 8, or inputs characters T, U, or V.

9/WXYZ — enters a 9, or inputs characters W, X, Y, or Z.

0 — enters a zero, or inputs characters . - # _ @ + * & / , $ % ! ^ ( ) ? → ’ ←.

./DELAY — enters a decimal point (necessary when programming frequencies), space, or programs delay time for the selected channel/search bank, or hyphen (in trunking ID setting).

CLR — clears an incorrect entry.

Understanding Your Scanner’s Memory Organization

V-Scanners

A V-Scanner folder contains a complete, stored configuration profile of your scanner’s programming. Certain current scanner models allow the user to load, save and edit different scanner configurations using an interface cable, software and a personal computer. The PRO-96 V-Scanner feature extends this functionality by allowing you to store or recall up to eleven scanner configurations in V-Scanner folders on your scanner, without using a personal computer. You can use the V-Scanner feature to build and store configurations for different areas or different scanner applications. Using the cloning feature it is possible to exchange scanner configurations with your friends without losing your existing data. V-Scanners also provide a way for you to easily back up your programmed data without connecting your scanner to a personal computer.

Each V-Scanner folder stores all channel storage banks, channels, trunking Ids, search settings, and other parameters associated with the operation of the scanner.

Channel Storage Banks

A channel storage bank is a storage area for a group of channels. Channels are storage locations for frequencies. Whereas a channel can only contain one frequency, a channel storage bank can hold 50 channels.

To make it easier to identify and select the channels you want to listen to, your scanner divides the channels into 10 banks (0 to 9) of 50 (00 to 49) channels each, a total of 500 channels. You can use each channel-storage bank to group frequencies, such as those used by different public safety agencies and jurisdictions in your area. Channel storage banks can be easily enabled or disabled while scanning by pressing the number key that corresponds with the desired channel storage bank.

For example, a particular city might use four frequencies for police communications, and four frequencies for fire communications. You could program the police frequencies starting with 000 (the first channel in bank 0) and program the fire department frequencies starting with 100 (the first channel in bank 1). This gives you the ability to quickly select what you wish to monitor by activating or deactivating the appropriate channel storage bank. When looking at channel numbers, the first digit identifies the bank (0 to 9). The second and third digits identify the channel within the bank (00 to 49).

Channels

Channels are storage locations for the actual frequencies you wish to monitor. Each channel can be configured with a radio frequency, the desired mode for that frequency, and settings to allow a short delay after a transmission or lock the channel out from scanning operation. A channel can contain a conventional, non-trunked frequency, or a frequency used in a trunking system.

Search Banks

Your scanner has six preprogrammed search banks configured to search various radio services, and one limit search bank that you can configure. You can set the lower and higher frequency limit in the limit search bank.

 Hint

- For example, if you wanted to find active frequencies between a range of 150.1000 and 150.5000, you would put both of those frequencies in the limit search bank.

Understanding Your Scanner's Channel Receive Modes

You can program each channel with any one of six receive modes (AM, FM/Digital, CTCSS, DCS, Motorola, and EDACS).

Each receive mode affects how your scanner operates when scanning and receiving transmissions.

 Note

- Trunked modes (ED and MOT) can only be selected for frequencies above 137 MHz.
- Your scanner's Closed Mode lets you hear transmissions from only those trunking talkgroups you specify. For more information, see "Open and Closed Mode Operation" on Page 83.

AM Mode (AM)

The AM mode sets the scanner to receive transmissions using amplitude modulation (AM), primarily used for aircraft, military, 27 MHz citizen's band, some amateur radio, and some government transmissions. (Refer to "SPECIFICATIONS" on Page 107 for a list of the frequencies covered.) When the scanner receives a transmission on a channel set to the AM mode, it always stops on the transmission.

FM/Digital Mode (FM)

The FM/Digital (FM) mode sets the scanner to receive transmissions using frequency modulation (FM) and APCO-25 digital modulation. FM is used for most public safety transmissions, as well as broadcast, business, and amateur radio transmissions. APCO-25 digital modulation is used in many newer conventional and trunked public safety radio systems. When the scanner receives a transmission on a channel set to the FM/Digital mode, it always stops on the transmission.

CTCSS Mode (CT)

CTCSS mode sets the scanner to receive transmissions using frequency modulation (FM) with Continuous Tone Coded Squelch System (CTCSS) subaudible tone codes. CTCSS allows multiple users to share a single radio frequency without hearing each other's transmissions. In your PRO-96 scanner, the CTCSS feature can be used to block the reception of transmissions on shared channel to only those that use the CTCSS tone that you have specified. CTCSS mode also features a Code Search setting that allows you to instantly display and store unknown codes into the channel memory. CTCSS tones can sometimes be heard as a low "hum" in the background of a voice transmission.

Many systems that use CTCSS transmit a special “turn off code” at the end of each transmission. The turn off code causes a properly equipped receiver to mute before the transmission ends, eliminating the “squelch tail” burst of noise the commonly occurs when the signal is lost. CTCSS turn off code performance can be affected by weak signals.

DCS Mode (DC)

DCS mode sets the scanner to receive transmissions using frequency modulation (FM) with Digital Coded Squelch (DCS) subaudible data signaling. DCS is very similar to CTCSS, except that a digital code is transmitted instead of an audio tone. Like CTCSS, DCS allows multiple users to share a single radio frequency without hearing each other’s transmissions. In your PRO-96 scanner, the DCS feature can be used to block the reception of transmissions on shared channel to only those that use the DCS tone that you have specified. DCS mode also features a Code Search setting that allows you to instantly display and store unknown codes into the channel memory. DCS data can sometimes be heard as a low “purring” sound in the background of a voice transmission. Some DCS systems transmit a special “turn off code” at the end of each transmission. The turn off code causes a properly equipped receiver to mute before the transmission ends, eliminating the “squelch tail” burst of noise the commonly occurs when the signal is lost. DCS turn off code performance is typically more immune to weak signals than CTCSS.

Motorola/APCO-25 Trunking Mode (MO)

You can set your scanner so it decodes the talkgroup IDs used with Motorola and APCO-25 trunking systems and follows talkgroup calls in the trunking system. This setting is called the Motorola mode.

Motorola systems are trunking systems used primarily by business and public safety agencies to efficiently allocate a small number of frequencies (as few as three) to many groups of users (as many as several thousand). To do this, each group of users in the system is assigned to a specific talkgroup. For example, a city’s east side patrol officers might all be assigned to talkgroup 2160. One channel in the system is continuously transmitting data that identifies which talkgroups are active on which channel. In addition, this talkgroup information is also transmitted as subaudible data on each active channel.

When the scanner receives a transmission on a channel set to the Motorola mode, it first decodes the talkgroup ID data included with the transmission. In the Open Mode, the scanner stops on the transmission and displays the talkgroup ID on the bottom line of the display. In the Closed Mode, the scanner only stops on the transmission if the talkgroup ID matches a talkgroup ID that you have stored in the bank's talkgroup ID list and have not locked out.

Trunking systems covered by the Motorola mode come in four categories: Type I, Type II, Type I/II Hybrid and APCO-25. Each category displays and uses talkgroup IDs in slightly different ways.

Motorola Type I IDs are in the form FFF-SS, where;

FFF=Fleet ID

SS=Subfleet ID

Type I systems are usually organized with different user groups assigned to different fleets.

 Note

- For example, a valid fleet-subfleet ID identifying all detectives within a police department might be 000-12, where 000 identifies all police users and 12 identifies the Detective division.

To properly map the raw Type I data to the correct fleet-subfleet format, you must program the correct fleet map into the scanner. Fleet map information is widely available on the Internet for most Type I systems in use.

Type II and APCO-25 system talkgroups are identified by a 5-digit number. Valid Type II talkgroup IDs are divisible by 16, while APCO-25 talkgroups are not. Use care to ensure that you enter the correct Type II IDs into your scanner. Type I/II hybrid systems use both fleet-subfleet and 5-digit formats for talkgroup IDs.

 Note

- Tuning the scanner to an active control channel while in Motorola mode will display the Motorola System ID and the approximate control channel message decode success rate. This information can help you identify the Motorola trunking system that you are monitoring and the receive quality of the control channel signal.

EDACS Trunking Mode (ED)

You can set your scanner so it decodes the talkgroup IDs used with EDACS (GE/Ericsson/M/A-COM) trunking systems. This setting is called the EDACS mode.

EDACS systems are used primarily by business or private communications service providers, as well as by some public safety organizations. EDACS systems transmit active talkgroup information only on a dedicated control channel.

EDACS frequencies are organized in a specific order. Each frequency is assigned a Logical Channel Number (LCN). For the scanner to correctly switch to an active frequency, you must program the frequencies in LCN order, starting with Memory 01. EDACS talkgroup IDs are entered as a 4-digit decimal number from 0001 to 2047 or AFS (Agency Fleet Subfleet) number from 00-001 to 15-157.

When there is activity on an EDACS system, that information is sent out on the control channel. The scanner decodes the ID for the active talkgroup. In the Open Mode, the scanner then goes to the transmission and displays the talkgroup ID on the bottom line of the display. In the Closed Mode, the scanner only goes to transmissions with IDs that match talkgroup IDs you have stored in the bank's talkgroup ID list that are not locked out.

Listening Safely

To protect your hearing, follow these guidelines when you use headphones.

- Set the volume to zero before putting on headphones. With the headphones on, adjust the volume to a comfortable level.
- Avoid increasing the volume once you set it. Over time, your sensitivity to a volume level decreases, so volume levels that do not cause discomfort might damage your hearing.
- Avoid or limit listening at high volume levels. Prolonged exposure to high volume levels can cause permanent hearing loss.

Traffic Safety

Wearing headphones while operating a motor vehicle or riding a bicycle can create a traffic hazard and is illegal in most areas.

Even though some headphones let you hear some outside sounds when listening at normal volume levels, they still can present a traffic hazard. Exercise extreme caution!

Power Sources

You can power your scanner from any of these sources:

Internal non-rechargeable batteries or rechargeable batteries (not supplied – see “Using Batteries” on Page 24).

Standard AC power (with an optional AC adapter – see “Using AC Power” on Page 27).

Vehicle power (with an optional DC adapter – see “Using Vehicle Battery Power” on Page 27).

 Notes

- Connecting an AC or DC adapter to the scanner disconnects internal batteries when you use the supplied non-rechargeable battery holder, but it does not disconnect internal batteries when you use the supplied yellow rechargeable battery holder.
- If you install the yellow rechargeable battery holder, you can operate the scanner and recharge the rechargeable batteries at the same time. See “Using Batteries” and “Charging Rechargeable Batteries” on Page 24.
- If the scanner stops working properly after connecting it to power, try resetting it. See “RESETTING/INITIALIZING THE SCANNER” on Page 104.
- You must charge rechargeable batteries before you use them the first time. See “Charging Rechargeable Batteries” on Page 26.

Using Batteries

You can power the scanner with four AA batteries (not supplied). For the longest operation and best performance, we recommend alkaline batteries, available at your local RadioShack store.

You can use either the supplied non-rechargeable battery holder (black), or the supplied rechargeable battery holder (yellow). If you use the rechargeable battery holder, we recommend RadioShack nickel-metal hydride (Ni-MH) batteries.

 WARNING

Never install non-rechargeable batteries in the rechargeable yellow battery holder. Non-Rechargeable batteries can get hot or explode if you try to recharge them.

 CAUTION

- The battery holder fits only one way. Do not force it.
- Use only fresh batteries of the required size and recommended type.
- Always remove old or weak batteries. Old batteries can leak chemicals that destroy electronic circuits.

- Do not mix old and new batteries, different types of batteries (alkaline or rechargeable), or rechargeable batteries of different capacities.
- If you do not plan to use the scanner with batteries for a month of longer, remove the batteries. Batteries can leak chemicals that can destroy electronic parts.

Follow these steps to install the batteries.

1. Press in on the top center of the battery compartment cover on the back of the scanner and slide the cover down to remove it.
2. Pull the battery holder out of the battery compartment.
3. If you are using non-rechargeable batteries, place them into the black holder as indicated by the polarity symbols (+ and -) marked on the holder.

   If you are using rechargeable batteries, place them into the yellow holder as indicated by the polarity symbols (+ and -) marked on the holder.
4. Place the battery holder into the battery compartment.
5. Replace the cover.

When battery power is low, `Low Battery!` is displayed and the scanner beeps once every 30 seconds. When battery power is depleted, the scanner turns itself off. Replace all four non-rechargeable batteries, or recharge the rechargeable batteries. See “Charging Rechargeable Batteries” on Page 26.

 WARNING

Always dispose of old batteries promptly and properly. Do not bury or burn them.

 CAUTION

If you do not plan to use the scanner with batteries for a month or longer, remove the batteries. Batteries can leak chemicals that can destroy electronic parts.

Charging Rechargeable Batteries

Your scanner has a built-in charging circuit that lets you charge nickel-metal hydride (Ni-MH) or nickel cadmium (Ni-CD) rechargeable batteries (not supplied) while they are in the scanner. To charge rechargeable batteries, connect an appropriate AC or DC adapter to the PWR DC 9V jack. For best results we recommend RadioShack rechargeable nickel-metal hydride (NiMH) 1800 mAh batteries.

! IMPORTANT

The EPA certified RBRC© Battery Recycling Seal on rechargeable batteries indicates RadioShack is voluntarily participating in an industry program to collect and recycle these batteries at the end of their useful life, when taken out of service in the United States or Canada. The RBRC program provides a convenient alternative to placing used rechargeable batteries into the trash or the municipal waste stream, which may be illegal in your area. Please call 1-800-THE-SHACK (1-800-843-7422) for information on rechargeable battery recycling and disposal bans/restrictions in your area. RadioShack's involvement in this program is part of the company's commitment to preserving our environment and conserving our natural resources.

To charge batteries with a DC adapter from a DC power source, you must use a 9V, 300 mA DC adapter such as RadioShack Cat. No. 273-1810 and a size C Adaptaplug™ (neither supplied). Both are available at your local RadioShack store. Make sure the adapter's voltage is set to 9V.

It takes about 16 hours to recharge fully discharged 1800 mAh NiMH rechargeable batteries. You can operate the scanner while recharging the rechargeable batteries, but charging takes longer.

 Notes

- The scanner can also charge Ni-Cd batteries. 600 mAh batteries require 6 hours and 850 mAh batteries require 8 hours to charge.
- When you charge Ni-Cd batteries, do not overcharge them. Overcharging shortens battery life.

- Rechargeable batteries last longer and deliver more power if you let them fully discharge once a month. To do this, use the scanner until `Low Battery!` appears in the scanner's display. Then fully charge the rechargeable batteries.

Using AC Power

You can power the scanner using a 9V, 300 mA AC adapter and a size C Adaptaplug™ (neither supplied). Both are available at your local RadioShack store.

1. Connect the Adaptaplug™ to the adapter's cord with the tip set to positive.

 CAUTION

! You must use a Class 2 power source that supplies 9V DC and delivers at least 300 mA. Its center tip must be set to positive and its plug must fit the scanner's PWR DC 9V jack. Using an adapter that does not meet these specifications could damage the scanner or the adapter.

 Note

- Always connect the AC or DC adapter to the scanner before you connect it to AC power source. When you finish, disconnect the adapter form AC power or the power source before you disconnect it from the scanner.

2. Plug the adapter's barrel plug into the scanner's PWR DC 9V jack.

3. Plug the adapter's two-prong plug into an AC outlet.

Using Vehicle Battery Power

You can power the scanner from a vehicle's 12V power source (such as cigarette-lighter socket) using a 9V, 300 mA DC adapter and a size C Adaptaplug™ adapter (neither supplied). Both are available at your local RadioShack store.

 CAUTION

You must use a Class 2 power source that supplies 9V DC and delivers at least 300 mA. Its center tip must be set to positive and its plug must fit the scanner's PWR DC 9V jack. Using an adapter that does not meet these specifications could damage the scanner or the adapter.

 Note

- Always connect the AC or DC adapter to the scanner before you connect it to AC power source. When you finish, disconnect the adapter form AC power or the power source before you disconnect it from the scanner.

1. Connect the Adaptaplug™ to the adapter's cord with the tip set to positive.
2. Plug the adapter's barrel plug into the scanner's PWR DC 9V jack.
3. Plug the adapter's cigarette-lighter plug into your 12V power source.

 Note

- If the scanner does not operate properly when you connect a DC adapter, unplug the DC adapter from the power source and clean the socket, or check the adapter's internal fuse.

Antenna

Connecting the Supplied Antenna

To attach the supplied flexible antenna to the antenna jack on the top of your scanner, align the slots around the antenna's connector with the studs on the antenna jack. Press the antenna down over the jack and turn the antenna's base clockwise until it locks into place.

Connecting an Optional External Antenna

The antenna connector on your scanner makes it easy to use the scanner with a variety of antennas, such as an external mobile antenna or outdoor base station antenna. Your local RadioShack store sells a variety of antennas.

Always use 50-ohm coaxial cable, such as RG-58 or RG-8, to connect an outdoor antenna. For length over 50 feet, use RG-8 low-loss dielectric coaxial cable. If your antenna's cable does not have a BNC connector, you will also need a BNC adapter (not supplied, available at your local RadioShack store).

Follow the installation instructions supplied with the antenna, route the antenna cable to the scanner, then connect it to the antenna jack.

 WARNING

Use extreme caution when installing or removing an outdoor antenna. If the antenna starts to fall, let it go! It could contact overhead power lines. If the antenna touches a power line, touching the antenna, mast, cable, or guy wires can cause electrocution and death. Call the power company to remove the antenna. DO NOT attempt to do so yourself.

Connecting an Earphone/Headphones

For private listening, you can plug an 1/8-inch (3.5 mm) mini-plug earphone or headphones (not supplied), available at your local RadioShack store, into the HEADPHONE jack on top of your scanner. This automatically disconnects the internal speaker.

Connecting an External Speaker

In a noisy area, an amplified speaker (not supplied), available at your local RadioShack store, might provide more comfortable listening. Plug the speaker cable's 1/8-inch (3.5 mm) mini-plug into your scanner's HEADPHONE jack.

 Note

- You must use an amplified speaker with this scanner. Non-amplified speakers do not provide sufficient volume for comfortable listening.

Using the Belt Clip

You can use the belt clip attached to the back of the scanner for hands-free carrying when you are on the go. Slide the belt clip over your belt or waistband.

PROGRAMMING YOUR SCANNER

Programming Conventional Channels

Good references for active frequencies are RadioShack's Police Call, Aeronautical Frequency Directory, and Maritime Frequency Directory. We update these directories every year, so be sure to get a current copy.

Storing Conventional Frequencies

Follow these steps to store conventional frequencies in to channels.

 Notes

- When the scanner is in Manual or Program mode, indicated with M or P in the top left hand corner of the display, you can select your desired bank and channel number using direct channel entry, the π or θ arrow keys, and with FUNC and the π or θ arrow keys.

- For direct channel entry, press MAN or PGM, enter the channel storage bank (0-9) and channel number (00-49) where you want to store a frequency, then press MAN or PGM again. For example, Bank 3, Channel 23 is entered as "323". The scanner advances to the selected channel storage bank and channel, and the channel storage bank and channel number appear at the upper left corner of the display (for example: M323 or P323).

- Press FUNC, then π or θ to jump to the next or previous channel storage bank.

- Press FUNC, then hold π or θ to scroll through the channel storage banks.

1. To begin programming your scanner, press PGM. M changes to P. Select the desired channel storage bank and channel, and press PGM to advance to that channel.

2. Use the number keys and ./DELAY to enter the frequency (including the decimal point) you want to store.

   If you make a mistake, press CLR to backspace and correct the incorrect digit, or press and hold CLR for about 2 seconds to clear the entire field and start over.

3. Press ENTER to store the frequency into the channel.

4. By default, the scanner will configure the channels you enter for a two second delay after a transmission is received. This is indicated by the D character that appears in the top row of the display. If you do not want the scanner to pause for reply traffic before resuming scanning operation, press ./DELAY until D is not visible in the top line of the display.

5. If necessary, press MODE to change the receiving mode. Valid modes for conventional frequencies include AM, FM/Digital, CTCSS and DCS. To program a specific code for CTCSS or DCS mode, press FUNC MODE, then enter the desired code followed by ENTER, or use the π or θ keys to scroll to the desired code and press ENTER to store the code with the channel memory. For more information on CTCSS and DCS programming, see “Programming channels for CTCSS and DCS operation” on Page 42.

6. If desired, program a text tag for the channel (see “Assigning a Text Tag to a Channel” on Page 46).

 Notes

- If you made a mistake in entering the frequency, `Invalid Freq` briefly appears and the scanner beeps when you press ENTER. Enter the frequency again.

- Your scanner automatically rounds the entered frequency to the nearest valid frequency. For example, if you enter a frequency of 151.53, your scanner accepts it as 151.5275. Reception of the frequency will not be adversely affected.

- If you enter a frequency that has already been entered elsewhere in the same bank, the scanner sounds an error tone and displays `Dupl.f` and the channel number that has been duplicated. If the dual entry is an error press CLR and enter the correct frequency. If the dual entry is intentional press ENTER to accept.

- You may replace any frequency by selecting the bank and channel, pressing PGM and entering the new frequency.
- You can clear programmed frequency data by pressing FUNC, then CLR.
- If you make an error in the entry process, press CLEAR as often as needed to erase the incorrect data, or press and hold CLEAR for one second to clear the entire field.

When you are ready to program additional channels, press PGM or π to move up to the next channel memory location, or θ to move down.

Programming Trunked Systems

This section of the manual provides instructions to program your scanner to receive trunked radio systems. If you are just getting started with trunked system monitoring or have any questions about how your PRO-96 scanner operates when tracking trunked radio systems, we suggest you read the manual section “TRUNKING SPECIAL FEATURES”, beginning on Page 80. Also see the supplied Trunking Guide.

For best results, program only one trunking system in each channel storage bank of your scanner. Your scanner will lock on to the first active control channel it finds in a channel storage bank and follow the activity from that trunking system.

Channel storage banks may contain both conventional, non-trunked channels, and control or system channels for a trunked system. The scanner will check for activity on the conventional channels after processing the trunking system.

 Hint

Certain multi-zone Motorola systems use the same talkgroup IDs at multiple radio sites to cover a large geographical area. In these types of systems it may be possible to program multiple control channel frequencies into the same channel storage bank and allow the scanner to lock on to the different control channels as you move from zone to zone. This approach only works in networked systems where the same talkgroup IDs are used at multiple sites. It is not possible to program Motorola/APCO-25 and EDACS systems into the same channel storage bank.

Programming Motorola analog, digital, and APCO-25 trunking systems

1. Press PGM and FUNC then π or θ to select the desired channel storage bank to program.

2. Press TRUNK to access the ID list and set the correct trunking bank type. If the bank has never been programmed with a trunking system, the scanner will display `Not trunked! Press mode`.

3. Press MODE until MOT (Motorola) appears in the display. This sets the channel storage bank for Motorola operation.

4. Press PGM to return to the channel storage bank.

5. Select a channel to begin programming trunking system frequencies. Used direct channel entry or the π or θ keys.

6. Enter the trunking frequency and press ENTER. If necessary, press MODE to change the receiving mode to MOT.

7. Repeat Steps 5 and 6 to enter the other trunking system control channel frequencies for the system you wish to monitor.

 Notes

- You can also press FUNC, then TRUNK access the ID list from manual mode.
- When monitoring Motorola trunked radio systems, it is only necessary to program the trunking control channel.
- For APCO-25 trunking systems using the 9600 BPS control channel, program the system using the steps outlined above for Motorola systems. Your scanner will automatically detect the proper control channel type.
- Some systems rotate the control channel on a daily basis. For best results, program all known control channel frequencies into the trunking channel storage bank.
- To program Motorola UHF trunking systems, see “Programming Motorola VHF and UHF Trunking Systems” on Page 35

- To program Motorola 800 MHz “splinter” systems, see “Programming Motorola 800 MHz Splinter Systems” on Page 36.

- To program Motorola Type I/IIi fleet maps, see “Programming Fleet Maps” Page 36

Programming EDACS Trunking Systems

 Note

- It is necessary to program all EDACS system channels into your scanner in Logical Channel Number (LCN) order, beginning with LCN 1 in channel 01 of the channel storage bank. Do not program EDACS system channels in channel 00 of a channel storage bank. Refer to frequency publications or Internet sites to obtain correct LCN frequencies for the EDACS systems you wish to monitor. If the EDACS system you are programming skips channels in the LCN order, leave those channels blank in your scanner.

1. Press PGM and FUNC then π or θ to select the desired channel storage bank to program.

2. Press TRUNK to access the ID list and set the correct trunking bank type. If the bank has never been programmed with a trunking system, the scanner will display `Not trunked Press mode`.

3. Press MODE until ED (EDACS) appears in the display. This sets the channel storage bank for EDACS operation.

4. Press PGM to return to the channel storage bank.

5. Select a channel to begin programming trunking system frequencies. Used direct channel entry or the π or θ keys.

6. Enter the trunking frequency and press ENTER. If necessary, press MODE to change the receiving mode to ED.

7. Repeat Steps 5 and 6 to enter the other EDACS trunking system channels for the system you wish to monitor.

Programming Motorola VHF and UHF Trunking Systems

Your scanner is capable of receiving Motorola trunked radio systems operating in the VHF and UHF bands. To monitor these systems it is necessary to program the scanner with three additional parameters, the **base frequency**, **step** and **offset.**

 Hint

- Base frequency, step and offset vary for each individual UHF trunking system. You can get information about these frequencies for the trunking system you want to scan using www.trunkscanner.com, other Internet sources, or locally published guidebooks.
- Systems with multiple channel ranges can be programmed using PC application software.

Follow these steps to program Motorola trunking frequencies in the VHF or UHF bands:

1. Press PGM then TRUNK to enter the ID program mode.
2. Press FUNC and press (or hold) π or θ to select the bank.
3. Press MODE until MO appears in the display.
4. Press FUNC then 2. The display indicates

```
Base Freq:
406.0000
OFFset: 380
Step:25.0kHz
```

5. While B in Base blinks, if necessary, enter the desired Base frequency with the number keys and press ENTER. Confirm the entry. If it is incorrect, press the number keys again to set the base frequency. After you confirm the input, press ENTER again.
6. While O in OFFset blinks, if necessary, enter the offset number and press ENTER. Confirm the entry. If it is incorrect, then press the number keys again to set the frequency. After you confirm the input, press ENTER again.

7. While S in Step blinks, repeatedly press π or θ to select the step number, 5, 6.25, 7.5, 12.5, 15, 25.0, or 50.0kHz, then press ENTER.

Programming Motorola 800 MHz Splinter Systems

Certain 800 MHz Motorola trunked radio systems operate using splinter channels that are in between the channels in the normal 800 MHz band plan. These systems are known as **splinter systems**. Your scanner features an offset mode to allow reception of these systems.

 Notes

- If the radio appears to be trunking to the wrong frequencies when monitoring an 800 MHz system, you should try to configure the system for splinter operation.
- Splinter systems exist only in the 800 MHz band, and only use the 3600 baud control channel type. Setting splinter configuration on VHF, UHF, 900 MHz and 800 MHz APCO-25 systems will have no effect.

1. Press PGM then TRUNK to enter the ID program mode.
2. If necessary, press FUNC then π or θ to select the desired bank.
3. If necessary, press MODE to select Motorola trunking mode.
4. Press FUNC then 3 to edit the 3600 CC Mode.
5. Press π or θ to select `Normal` or `Splinter Table, Multi Table` and press ENTER.

Programming Fleet Maps

You must set the fleet map if you want to receive a Motorola Type I system. Fleet maps are included along with other information about Motorola Type I systems at www.trunkscanner.com.

Follow these steps to program a fleet map.

1. Press PGM then TRUNK.

2. Press FUNC then π or θ to select the desired bank.

3. Press FUNC, then press 8. `Block 0 size code. Use 15 for type II. S-00` is displayed.

4. Enter the size code supplied with the Type I system information, referring to the prompts that appear in the display. If the information for your Type I system is not available, try the following common fleet maps:

Block	Size Code							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
0	S11	S4	S4	S12	S4	S3	S10	S1
1	S11	S4	S4	—	S4	S10	S10	S1
2	S11	S4	S4	S4	S12	S4	S11	S2
3	S11	S4	S4	S4	—	S4	S4	S2
4	S11	S4	S4	S4	S4	S12	S4	S3
5	S11	S4	S4	S4	S4	—	S4	S3
6	S11	S4	S12	S4	S4	S12	S4	S4
7	S11	S4	—	S4	S4	—	S4	S4

Block	Size Code							
	9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
0	S4	S0	S4	S0	S3	S4	S4	S3
1	S4	S0	S0	S0	S3	S3	S4	S10
2	S0	S0	S0	S0	S11	S10	S4	S10
3	S0	S0	S0	S0	S4	S4	S11	S11
4	S0	S0	S0	S0	S4	S4	S11	S0
5	S0	S0	S0	S0	S0	S4	S0	S0
6	S0	S4	S0	S0	S0	S12	S12	S12
7	S0	S4	S0	S4	S0	—	—	—

Press ENTER for each entry. If you make a mistake, press CLR and enter the correct size code.

Notes

- The default setting of the bank is for Motorola Type II. However, if you set Type I and wish to restore Type II, enter 15 at Step 5.
- To confirm the input, repeat Steps 1-5 and press ENTER. Each time you press ENTER, you confirm the size code. If you find an error, press CLR and begin again at Step 1.

Talkgroup IDs

Each channel storage bank has an associated talkgroup ID list, for a total of 10 talkgroup ID lists. Each ID list has 5 sub-banks. Each sub-bank has 30 ID locations. You can program up to 150 talkgroup IDs in each bank, so you can program up to 1500 talkgroup IDs in 10 banks. When the scanner stops on a transmission in the Motorola or EDACS mode, it checks to see if the ID has been stored in the associated ID list. In the Closed Mode, the scanner only stops on the transmission and displays its text tag if you have stored and not locked out the ID. In the Open Mode, the scanner always stops on all transmissions except those you specifically exclude, and displays the ID's text tag if you have stored the ID. For a detailed description of Open and Closed Mode operation, see "Open and Closed Mode Operation" on Page 83.

Storing Talkgroup IDs

Each talkgroup on a trunked radio system is identified by a talkgroup ID. You can store talkgroup IDs automatically while scanning the trunked system in Open mode, or manually by entering the IDs directly in the ID list.

To automatically store a talkgroup ID, press TRUNK when the scanner stops on a voice channel transmission or when a talkgroup ID is indicated in the manual mode. The ID of the active talkgroup will be automatically stored in the next available ID memory location. The bottom line of the scanner display indicates where the ID was stored as ID save X-YY and then changes to ID#ZZZZZ, where X is the sub-bank number, YY is the ID number within the sub-bank, and ZZZZZ is the stored talkgroup ID code.

If the ID has already been stored when you press TRUNK, `ID was saved` appears in the scanner's display.

Note

- When you try to store more than 150 talkgroup IDs in a bank, `Memory Full!` appears in the scanner's display. Clear some talkgroup IDs in order to store new ones (see "Clearing Talkgroup Ids" on Page 86).

Follow these steps to manually store talkgroup IDs or to edit a stored ID.

Notes

Use the following keystrokes to navigate through the ID lists:

- Press PGM TRUNK to enter the ID list for the current channel storage bank.
- Press and release the π or θ keys to scroll through the ID memories one at a time.
- Press and hold the π or θ keys to scroll through the ID memories rapidly.
- Press TRUNK to advance to the next ID sub-bank.
- Press FUNC π or θ to advance to the next or previous ID list.

1. Navigate to a channel in the desired trunking bank using MAN or the π or θ keys
2. Press PGM.
3. Press TRUNK.
4. Select the ID memory you wish to edit using any of the methods described above.
5. Enter the talkgroup ID and press ENTER. If necessary, use the decimal point for a hyphen.
6. If you want to tag the ID, press TEXT, enter the desired text tag for the ID. Then press ENTER (see "Text Input Chart" on Page 48).
7. To store the next ID memory in sequence, press π and repeat Step 5.
8. Press SCAN to start scanning.

 Notes

- If you made a mistake in Step 4, `Invalid ID.` appears and the scanner beeps when you press ENTER. Start again at Step 3.
- You can enter either decimal or AFS code for ED (EDACS) ID. The default setting is decimal ID entry. To toggle AFS or decimal EDACS ID display, press FUNC then 2. `AFS Format` will appear in the display for about 2 seconds. Now you can enter EDACS ID codes in AFS format.
- If you entered an ID code that is already stored in another ID channel, `Dupl ID` appears in the scanner's display. If you want to store the ID code anyway, press ENTER. To cancel the operation, press CLR.

 Hint

- When automatically storing trunked IDs in the ID list by pressing TRUNK during a trunked transmission, the scanner will automatically store the active ID in the next available open ID storage location in the ID list. We suggest leaving ID sub-bank 0 empty when first setting up an ID list. This provides a location for new auto-store IDs to be placed and organized.

Programming the Priority Channel

In addition to the 500 programmable memory channels, the scanner has one priority channel.

With the priority feature, you can scan through programmed channels and still not miss an important or interesting transmission on the priority channel. When priority is turned on, the scanner checks the priority channel every 2 seconds, and stays on the channel if there is activity until the activity stops.

 Notes

- The priority feature does not operate while the scanner receives a trunking voice channel or during trunking delay time. Traffic on the priority channel may be missed if it occurs while the scanner is monitoring a trunking voice call.
- If you program a weather channel as the priority channel, then activate priority mode, the scanner stops on the weather channel only when the scanner detects the 1050 Hz weather alert tone.

Programming a stored channel frequency in the priority channel:

1. Press MAN.
2. Use the number keys to enter the channel number that contains the frequency you want to program as the priority channel, and then press MAN again.
3. Press FUNC then PRI. `Pri Channel` blinks on the bottom line to indicate storage of the current frequency into priority channel memory.

Programming the Priority Channel Directly

1. Press PGM.
2. Press PRI.
3. Enter the frequency you want to enter into the priority channel, then press ENTER.
4. If desired, set the priority channel mode. You can set a priority channel for CTCSS or DCS operation with a programmed code.

Programming a Weather Channel as Priority

1. Press WX.
2. Select the weather channel you want to program as the priority channel by pressing WX repeatedly until the desired weather channel is displayed.
3. Press FUNC then PRI. `Pri Channel` flashes on the bottom line two times.

Activating the Priority Feature

Press PRI while scanning while manually parked on a channel. PRIon (or PRIwx if you set the priority to a weather frequency) appears on the bottom line of the display, and P will appear in the top line while scanning or parked on a channel in manual mode. If the scanner detects activity on the priority channel, Pri Channel appears in the scanner's display. If the scanner detects the 1050 Hz weather alert tone in Priority WX mode, the display will show Weather ALERT and the scanner sounds an alert tone (see "SAME Standby Mode" on Page 63). Press WX to listen to the weather alert message.

 Notes

- This scanner cannot set a channel as the priority channel if the channel's receive mode is MOT or ED.
- In Priority WX mode, the scanner samples the selected weather channel once every 1.5 seconds.
- In the event of a weather or other hazard warning, a 1050 Hz tone is transmitted prior to the message. The scanner detects the presence of this tone during the sampling process. The scanner sounds an audible alert and switches to the weather frequency if the alert tone is detected.
- Because the scanner does not priority sample the weather channel while monitoring trunked talkgroup calls, it is possible that the 1050 Hz alert tone may be missed between sample intervals when trunked systems are being scanned. We recommend the use of a dedicated RadioShack Weatheradio® during times when severe weather notification is critical for your safety, such as when boating or when you know that the potential for severe weather exists in your area.
- To turn off the priority feature, press PRI.

Programming channels for CTCSS and DCS operation

Your PRO-96 scanner features an advanced, DSP based CTCSS and DCS decoder. CTCSS and DCS allow you to program frequencies into your scanner that are used by more than one group in your area and listen only to the group that is of interest to you by

specifying the group's specific CTCSS or DCS code. CTCSS and DCS can also help reduce instances where interfering signals cause your scanner to stop on one channel.

There are two ways you can program your scanner to operate with CTCSS and DCS. If you know the CTCSS or DCS code that is used on a particular frequency, you can manually enter the code when you are programming the scanner, or any time afterwards.

You can also set a special search code up that will instantly decode the CTCSS or DCS code on a received transmission. Channels programmed with the search code will receive all traffic on the channel, and will instantly decode and display any CTCSS or DCS code that is found with the transmission. You can then store the found code in the channel memory with one keystroke.

This section of the manual describes the process for configuring a memory channel for CTCSS or DCS operation and manually programming a known code. For more information on using the CTCSS and DCS feature while scanning, see "Using CTCSS and DCS" on Page 51.

To program channel memories for CTCSS or DCS operation, follow these steps:

1. First, enter a conventional frequency by following the steps described in "Storing Conventional Frequencies" on Page 30.

2. Once you have entered the frequency, press MODE until the desired mode appears in the upper left hand corner of the display. Use CT for CTCSS, and DC for DCS.

3. By default, the search code (indicated with SEARCH in the bottom of the display) is programmed. To program a specific code, press FUNC MODE, then use the arrow keys to scroll to the desired CTCSS or DCS code. You can also use the keypad to enter the code manually. Note that the scanner will automatically fill the code field as you enter the code.

4. Once the desired code is selected, press ENTER to store the code in the channel memory.

5. It is possible to program memory channels for CTCSS or DCS operation at any time. Simply place the scanner in program mode, navigate to the channel you wish to change, and follow the steps above.

6. When stopped on an active conventional channel while scanning, you can press MODE to cycle through the valid modes for that channel, including CTCSS and DCS. This will reset any stored CT or DC code to the search code, allowing you to easily check for other CT or DC codes that may be present on the frequency.

CTCSS Code Table:

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

DCS Code Table:

6	54	145	245	332	452	612
7	65	152	246	343	454	624
15	71	155	251	346	455	627
17	72	156	252	351	462	631
21	73	162	255	356	464	632
23	74	165	261	364	465	654
25	114	172	263	365	466	662
26	115	174	265	371	503	664
31	116	205	266	411	506	703
32	122	212	271	412	516	712
36	125	214	274	413	523	723
43	131	223	306	423	526	731
47	132	225	311	431	532	732
50	134	226	315	432	546	734
51	141	243	325	445	565	743
53	143	244	331	446	606	754

Notes

- CTCSS, DCS and digital voice all operate independently of each other. If a channel is configured for CTCSS or DCS, it will not be able to decode digital transmissions. Use the FM mode when mixed analog and digital voice reception is desired.

General Programming Notes

Storing Text Tags

You can customize your scanner by storing text tags (up to 12 characters) for easy identification of channel transmissions, trunk IDs, or banks.

Assigning a Text Tag to a Channel

1. Navigate to the channel that you wish to label using direct channel entry, π or θ or FUNC π or θ
2. Press PGM. M in the display changes to P to indicate program mode.
3. Press TEXT. A cursor will appear at the third line.
4. Enter the text using the numeral keys (see “Text Input Chart” on Page 48).

Note

- If you make a mistake, press π or θ to move to the character you want to change, or CLR to backspace and delete unwanted characters, or press and hold CLR to abort the text entry.

For example, to identify a channel as “FIRE Ch 6” (for “Fire Channel 6”):

“F” is the third letter associated with 3 on the keypad. Press 3 then 3.

“I” is the third letter associated with 4 on the keypad. Press 4 then 3.

“R” is the third letter associated with 7 on the keypad. Press 7 then 3.

“E” is the second letter associated with 3 on the keypad. Press 3 then 2.

Space is entered by pressing ./DELAY.

“C” is the third letter associated with 2 on the keypad. Press 2 then 3.

“h” is the second letter associated with 4 on the keypad. Press 4 then FUNC (for the lower case set), then press 2.

Space is entered by pressing ./DELAY.

“6” is the sixth number associated with 1 on the keypad. Press 1 then 6.

5. Press ENTER to store the text with the channel.

Assigning a Text Tag to a Group ID

1. Press PGM.
2. Press TRUNK.
3. Press FUNC then π or θ to select the desired bank.
4. Press TRUNK to select the desired sub-bank.
5. Press or hold down π or θ to select the desired group ID.
6. Press TEXT then enter the text using the numeral keys (see “Text Input Chart” on Page 48). Use π, θ, or CLR to edit your entry, or press and hold CLR to abort the text entry.

Press ENTER to store the text with the ID.

Assigning a Text Tag to a Channel Storage Bank

1. Select a channel within the desired channel storage bank by pressing MAN and entering the channel storage bank number (000 for bank 0 or 200 for bank 2, for example). Press MAN again.
2. Press PGM.

3. Press FUNC then 7. The cursor appears at the third line of the display. Enter the text using the keypad. (See “Text Input Chart” below). Use π, θ, or CLR to edit your entry, or press and hold CLR to abort the text entry.

4. Press ENTER to store the text with the bank.

Text Input Chart

 Notes

- To enter a number, press 1, then press the desired number you want to enter.
- To enter a lowercase character or a character from the second set for the key 0, press FUNC after pressing the first numeral key.

Press	Character	Press	Character
1	1 2 3 4 5 6 7 8 9 0		
2	A B C	2 FUNC	a b c
3	D E F	3 FUNC	d e f
4	G H I	4 FUNC	g h i
5	J K L	5 FUNC	j k l
6	M N O	6 FUNC	m n o
7	P Q R S	7 FUNC	p q r s
8	T U V	8 FUNC	t u v
9	W X Y Z	9 FUNC	w x y z
0	. - # _ @ + * & / ,	0 FUNC	$ % ! ^ ( ) ? ® ‘ ¬
./DELAY	Space	CL	Backspace

OPERATING YOUR SCANNER

Initial Preparation

Turning on the Scanner and Setting Squelch

1. To turn on the scanner, turn VOLUME clockwise. DSP loading message and `Welcome To Digital Trunking` appears in the display. After about 5 seconds, you might hear a rushing sound. Then adjust VOLUME to a comfortable level.

2. Turn SQUELCH fully counterclockwise until the indicator points to MIN, then turn SQUELCH clockwise until the rushing sound stops.

3. To turn off the scanner, turn VOLUME counterclockwise to OFF.

 Notes

- The scanner will not enter scan mode if there are no frequencies stored in channels, or if all channels are locked out in the channel storage bank(s) that you are attempting to scan. In either of these cases, the scanner will display `All channels Locked out!` See “PROGRAMMING YOUR SCANNER” on Page 30.

- If SQUELCH is adjusted so you always hear a rushing sound, the scanner will not scan properly. Rotate the squelch control until the rushing sound stops.

- If SQUELCH is adjusted precisely at the threshold where the rushing sound stops, the radio will be most sensitive to very weak signals. The radio may also receive unwanted noise or signals that are too weak to understand. Most users prefer to position the squelch control a little bit past the point of threshold to avoid receiving noise or signals that are too weak to understand.

Scanning

To begin scanning channels or to start scanning again after monitoring a specific channel, press SCAN.

 Notes

- You must store frequencies into channels before the scanner can scan them. The scanner does not scan through empty channels.

- To change the scanning direction, press π or θ while scanning.

The scanner scans through all channels (except those you have locked out) in the active channel storage banks (see “Turning Channel Storage Banks Off and On” on Page 50 and “Locking Out Channels or Frequencies” on Page 65).

Turning Channel Storage Banks Off and On

To turn off channel storage banks while scanning, press the bank's number key so the bank's number disappears. For example, to turn off bank 1, press 1. The scanner does not scan any of the channels within the banks you turned off.

To turn on channel storage banks while scanning, press the number key until the bank’s number appears. For example to turn bank 1 on again, press 1.

 Hints:

- You cannot turn off all channel storage banks. There must be at least one active channel storage bank.

- You can manually select any channel in a channel storage bank, even if the bank is turned off.

Monitoring a Single Channel/Battery Save Circuit

You can monitor a single channel with your scanner by navigating to that channel while in manual mode. The scanner will receive traffic on the selected frequency.

Your scanner features a battery save circuit that is automatically activated any time you manually select a channel. The battery save mode works by allowing the receiver to “sleep” briefly while waiting for a call on the selected channel. The battery save circuit is disabled when the scanner is tuned to a channel in program mode.

Using CTCSS and DCS

Your scanner's advanced, DSP based CTCSS and DCS decoder allows you to listen only to the group that is of interest to you by specifying the group's specific CTCSS or DCS code for a certain frequency. CTCSS and DCS can also help reduce instances where interfering signals cause your scanner to stop on one channel.

When your scanner stops on a conventional frequency that is configured for CTCSS or DCS, it checks for a match between the transmitted CTCSS or DCS code and the code that is stored with the channel memory. If the transmitted and stored codes match, the scanner stops on the transmission and allows the audio to pass to the speaker. If the codes do not match, the scanner resumes scan operation. If the special "search" code is in use, the scanner will instantly display any detected CTCSS code if programmed for CTCSS mode, or DCS code if programmed for DCS code. You can store the detected code into the channel memory by pressing ENTER while the code is displayed.

For more information about your scanner's receive modes, including CTCSS and DCS, see "Understanding Your Scanner's Channel Receive Modes" on Page 18. For information on programming memory channels for CTCSS or DCS operation, see "Programming channels for CTCSS and DCS operation" on Page 42.

Deleting Frequencies from Channels

In certain circumstances you may wish to completely clear the contents of a channel. One example would be to create empty channels in a selected channel storage bank so the frequency copy function has empty channels available for copied frequencies. (See "Copying a Frequency into a Vacant Channel in a Specified Bank" on Page 61.)

1. Press PGM.
2. Use the number keys and press PGM to select the channel with the frequency you want to delete, or use the π or θ keys to navigate to the desired channel.
3. Press FUNC, then CLR. The frequency is cleared, 0.0000 appears in the display.

Searching and Tuning

Finding and Storing Active Frequencies

You can search for transmissions using the scanner's preprogrammed search banks. The search banks include six preprogrammed search ranges, SR0 to SR5. You can change the search range of Bank SR6 manually by setting the lower and higher ends of the search range.

 Notes

- You can use the scanner's delay feature while searching the search bank. See "Using the Delay Function" on Page 65.
- You can set CTCSS or DCS mode when searching any search range, except for SR0, SR1, and SR4. The scanner will display detected CTCSS or DCS codes depending on the mode setting. See "Using CTCSS and DCS" on Page 51.
- The scanner does not search locked-out frequencies while searching ranges. See "Locking Out Channels or Frequencies" on Page 65.
- You can use the PAUSE key to temporarily pause the search operation. The scanner will remain on the frequency that was active when PAUSE was pressed until you press PAUSE again. You can simply listen to the radio traffic on the paused frequency, or perform copy operations to save the frequency to a channel before you resume your search (see "Using Frequency Copy" on Page 60).

Searching a Preprogrammed Frequency Range

The scanner contains these preprogrammed search ranges, stored in the search bank (SR0-SR6).

Bank	Band
SR0	Marine
SR1	CB
SR2	FRS/GMRS/MURS
SR3	Police/Fire
SR4	Aircraft

SR5 Ham
SR6 Limit search (User configurable)

Follow these steps to select preprogrammed search bands and search them for active frequencies:

1. Repeatedly press SRCH to select your desired search bank (SR0, SR1, SR2, SR3, SR4, SR5, or SR6).

2. In the marine and CB bands, you can directly select a channel or search through the band. When M appears at the left most position of the second line, you can directly select a channel (refer to “Search Band Charts” beginning on Page 54). Use the numeric keypad to select a specific two digit channel number (for example, press 1 6 ENTER to select Channel 16, or 0 5 ENTER to select channel 5). You can also change the channels by pressing π or θ.

   There are several group banks in SR2 Police/Fire and SR4 ham bands. You can turn on the groups by pressing the group numbers. For example, to turn off group 0, press 0.

3. Press FUNC then SRCH while M is displayed. M changes to S and now you can search through the band. Press FUNC then SRCH again to return to the previous mode.

4. Rotate SQUELCH clockwise and leave it set to a point just after the rushing sound stops. After 2 seconds (if the delay feature is on), the received frequency appears and the scanner starts searching.

5. When the scanner finds an active frequency, it stops searching, and resumes when the transmission ends. If delay is programmed with the search range the scanner will pause for a reply before search resumes.

Search Band Charts

Search bank: SR0 Marine band

Receive mode: FM/Digital

Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	156.0500	05	156.2500
06	156.3000	07	156.3500
08	156.4000	09	156.4500
10	156.5000	11	156.5500
12	156.6000	13	156.6500
14	156.7000	15	156.7500
16	156.8000	17	156.8500
18	156.9000	19	156.9500
20	157.0000 161.6000	21	157.0500
22	157.1000	23	157.1500
24	157.2000 161.8000	25	157.2500 161.8500
26	157.3000 161.9000	27	157.3500 161.9500
28	157.4000 162.0000	63	156.1750
64	156.2250 160.8250	65	156.2750
66	156.3250	67	156.3750
68	156.4250	69	156.4750
70	156.5250	71	156.5750
72	156.6250	73	156.6750
74	156.7250	77	156.8750
78	156.9250	79	156.9750
80	157.0250	81	157.0750
82	157.1250	83	157.1750
84	157.2250 161.8250	85	157.2750 161.8750
86	157.3250 161.9250	87	157.3750 161.9750
88	157.4250		

 Note

- Two frequencies are assigned in one channel in some Marine frequencies. For example, 157.000 and 161.600 are assigned in Channel 20.

Search bank: SR1 CB band
Receive mode: AM

Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	26.9650	02	26.9750
03	26.9850	04	27.0050
05	27.0150	06	27.0250
07	27.0350	08	27.0550
09	27.0650	10	27.0750
11	27.0850	12	27.1050
13	27.1150	14	27.1250
15	27.1350	16	27.1550
17	27.1650	18	27.1750
19	27.1850	20	27.2050
21	27.2150	22	27.2250
23	27.2550	24	27.2350
25	27.2450	26	27.2650
27	27.2750	28	27.2850
29	27.2950	30	27.3050
31	27.3150	32	27.3250
33	27.3350	34	27.3450
35	27.3550	36	27.3650
37	27.3750	38	27.3850
39	27.3950	40	27.4050

Search bank: SR2 FRS/GMRS/MURS

Receive Mode: FM/Digital, CT or DC

Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	462.5625	02	462.5875
03	462.6125	04	462.6375
05	462.6625	06	462.6875
07	462.7125	08	467.5625
09	467.5875	10	467.6125
11	467.6375	12	467.6625
13	467.6875	14	467.7125
15	462.5500	16	462.5750
17	462.6000	18	462.6250
19	462.6500	20	462.6750
21	462.7000	22	462.7250
23	151.8200	24	151.8800
25	151.9400	26	154.5700
27	154.6000		

Search bank: SR3 Police/Fire band
Receive Mode: FM/Digital, CT or DC

Group	Frequency (MHz)	Step (kHz)
0	33.420-33.980	20
	37.020-37.420	20
	39.020-39.980	20
	42.020-42.940	20
	44.620-45.860	40
	45.880	
	45.900	
	45.940-46.060	40
	46.080-46.500	20
1	153.770-154.130	60
	154.145-154.445	15
	154.650-154.950	15
	155.010-155.370	60
	155.415-155.700	15
	155.730-156.210	60
	158.730-159.210	60
	166.250	
	170.150	
2	453.0375-453.9625	12.5
	458.0375-458.9625	12.5
	460.0125-460.6375	12.5
	465.0125-465.6375	12.5
3	856.2125-860.9875	25
	866.0125-868.9875	12.5

Search bank: SR4 Aircraft
Receive mode: AM

Frequency (MHz)	Step (kHz)
108.000-136.9875	12.5

Search bank: SR5 Ham band
Receive mode: FM/Digital, CT, DC or AM (depending on group)

Group	Frequency (MHz)	Step (kHz)
0	28.0000-29.7000	5
1	50.0000-54.0000	5
2	144.0000-148.0000	5
3	222.0000-225.0000	5
4	420.0000-450.0000	12.5
5	1240.0000-1300.0000	6.25

Search bank: SR6 Programmable limit search
Receive mode: FM/Digital, AM, CT or DC

Searching Active Frequencies in Your Desired Frequency Range

You can search a specific range of frequencies by programming SR6 with lower and upper frequency limits.

1. Press PGM then SRCH. PSR (Program Search) appears in the top line and the cursor blinks L on the second line for the lower limit frequency.

2. Use the number keys and ./DELAY to enter the desired lower limit frequency (including the decimal point).

3. Press ENTER to set the lower limit frequency. The cursor moves to upper frequency field. If the entered frequency is incorrect, Invalid Freq briefly appears in the scanner's display.

4. Enter your desired upper frequency and press ENTER.

5. Rotate SQUELCH clockwise and leave it set to a point just after the rushing sound stops.

6. Press SRCH to start searching. When the scanner finds an active frequency, it stops searching.

Using Zeromatic

You can set Zeromatic on or off by pressing FUNC then 0. Press FUNC the 0 again to toggle the Zeromatic setting. When this feature is turned on, `Zeromatic ON` briefly appears in the display, then z appears at the first digit of the second line. When searching with Zeromatic on, the scanner will automatically tune to the correct center frequency (or the step increment closest to the correct center frequency). When searching with Zeromatic off, the scanner will unmute faster on a detected signal but the frequency may not be exact. If the scanner stops on a signal before it reaches the correct center frequency, you can step up or down to the correct frequency using the π or θ keys. Zeromatic functions only in search banks 2, 3, 4, 5 and 6.

Using Seek Search

While the scanner is searching, you can activate seek search by pressing FUNC then 7. Seek ON appears on the bottom line. The scanner stops on each active frequency for five seconds and resumes searching automatically.

 Notes

- You can copy and save a frequency into a specified bank, channel, or priority channel when the scanner finds an active frequency. See “Using Frequency Copy” on Page 60 to save the frequency. The frequency copy works only in search banks 1, 2, 3, 4, 5, and 6.

- There are several group banks in SR2 Police/Fire and SR4 ham bands. You can turn off or on the groups by pressing the group numbers. For example, to toggle group bank 0, press 0.

- In the Air and Limit search bands, press FUNC then press π to start searching up from the lowest frequency or press θ to start searching down from the highest frequency.

- You can press π or θ at any time to change the search direction, or force a search resume while stopped on an active frequency.
- Use π or θ while paused to increment the frequency one step at a time.

Manually Tuning a Frequency

You can manually set the scanner to move through all receivable frequencies, or select a specific frequency as a starting point.

1. Press TUNE. TUNE and the current frequency appear in the display. The scanner automatically begins tuning up or down.
2. Use the number keys to enter the frequency where you want the scanner to start.
3. Press ENTER. After two seconds the scanner will automatically tune from the entered frequency
4. Press π or θ to change the direction of the tune. When the scanner finds an active frequency, it stops on the frequency.

 Note

- If you press PAUSE while tuning, the scanner stops tuning and **PAUSED** appears in the display. Press PAUSE again, and the scanner resumes tuning. While tune mode is paused, you can step up or down one frequency at a time by using the π or θ keys.

Using Frequency Copy

You can easily copy a frequency into a specified channel, a vacant channel in a specified bank, or a priority channel. This feature provides and easy method of storing frequencies of interest you encounter while searching or tuning.

 Note

- You cannot copy a frequency from the Marine search bands.

Copying a Frequency into a Specified Channel

You can copy a frequency into a specified channel when the scanner stops on that frequency during search mode or manual tuning. If a CTCSS or DCS code is detected on the transmission, the detected code will be copied into the channel memory as well.

1. Press FUNC then PGM when you find a frequency. `Chan Store?` appears on the bottom line. After about 1 second, the frequency to be copied flashes on the indicator.

2. Press the desired bank and the channel number where you want to store the frequency. The display indicates the bank and channel number, and briefly displays the frequency that is currently programmed into the selected channel. You can repeat this step as needed until you find an acceptable destination channel. After about 1 second, the frequency to be copied flashes.

3. Press ENTER. All the conditions such as receive mode and delay condition are copied onto the channel. `Chan Store!` briefly appears in the scanner's display. The scanner automatically returns to search mode.

 Note

- If you try to copy a frequency that is already stored, the scanner sounds the notice tone 3 times after you press ENTER. `Dupl.f Chxxx` appears at the bottom line. If you want to copy the duplicate frequency anyway, press ENTER, or if not, press CLR to cancel.

Copying a Frequency into a Vacant Channel in a Specified Bank

You can copy a frequency into a vacant channel in a specified bank when the scanner stops on the frequency during search or tune mode.

1. Press FUNC then ENTER when you find a frequency you want to copy. `Bank9 Store?` appears in the scanner's display.

2. If you want to copy the frequency into bank 9, press ENTER. It is stored in the first available vacant channel in the bank. Or, press your desired bank number to store, then press ENTER to store the frequency in the selected bank. `Chan Store!` appears for 2 seconds. All the conditions such as receiving mode and delay

condition are copied on the channel. After about 2 seconds, the scanner automatically returns to search mode.

 Note

- If you try to copy a frequency that is already stored, the scanner sounds the notice tone 3 times after you press ENTER. `Dupl.F Chxxx` appears at the bottom lime. If you want to copy the duplicate frequency anyway, press ENTER, r if not, press CLR to cancel.

Coping a Frequency into the Priority Channel

You can copy a frequency into the priority channel (see “Programming the Priority Channel” on Page 35) when the scanner stops on the frequency during Search, Scan, Manual, Tune, or WX mode.

Press FUNC then PRI when the frequency is on the display. The display flashes twice and the frequency is copied to the priority channel.

SPECIAL FEATURES

Listening to the Weather band

The FCC (Federal Communications Commission) has allocated channels for use by the National Oceanic and Atmospheric Administration (NOAA). Regulatory agencies in other countries have also allocated channels for use by their weather reporting authorities.

NOAA and your local weather reporting authority broadcast your local forecast and regional weather information on one or more of these channels.

Listening to a Weather Channel

To hear your local forecast and regional weather information, press WX. Your scanner scans through the weather band then stops on the first active weather frequency. Press WX repeatedly to find the strongest weather frequency for your location. If necessary, use ATT to apply attenuation to weather channels with interference.

SAME Standby Mode

The National Weather Service precedes each weather alert with a digitally encoded SAME (Specific Area Message Encoding) signal, then a 1050 Hz tone. The SAME signal includes a FIPS (Federal Information Processing Standard) area code, and an event code that corresponds with the type of alert being sent. You can configure your scanner to operate in SAME Standby mode, where it monitors a selected weather radio station for SAME alerts for areas you specify. You can program your scanner with up to 10 FIPS codes for the areas you desire. The National Weather Service maintains a current list of FIPS codes at http://www.nws.noaa.gov/nwr/.

To configure your scanner for SAME Standby mode, follow these steps:

1. Press WX until you identify the weather station with the strongest signal for your location.

2. Press FUNC, then PROG to access the FIPS code entry table.

3. Use the π or θ keys to select the desired FIPS code storage location.

4. Use the numeric keys to enter the desired FIPS code, the press ENTER to store the code. Press TEXT to label the code entry with an alphanumeric text table if desired. Repeat this process for all the FIPS codes that you wish to store.

5. Press L/OUT to lock out or enable specific FIPS entries.

6. Press WX to exit the FIPS code entry table.

7. Press FUNC, then WX to initiate SAME standby. The scanner will monitor the selected weather radio station for alerts with FIPS codes that match the codes you entered in the FIPS entry table. To exit SAME standby, press FUNC, then WX.

 Notes

- Press WX, then the numeric keys 0-9 to quickly review stored FIPS codes. Press L/OUT to toggle lockout status.

- Your scanner can also detect the 1050 Hz weather alert tone when a weather channel is set as the priority channel and weather priority operation is enabled. (see “Programming a Weather Channel as Priority” on Page 41). In this mode all alerts are received. FIPS settings are ignored.

- The scanner sounds an alert or beep when it receives the SAME code. If you do not stop the alert (or beep) for five minutes, the alert stops and the scanner beeps every ten seconds. If the scanner receives a new message after five minutes, it sounds the alert or beep. To stop the sound and ready the scanner to receive a new alert signal before the five minute time out, press any key except LIGHT.

Weather Alert Alarm Demonstration

To hear the SAME weather alert alarms, press WX for more than 2 seconds while SAME Standby is active.

The display indicates the type of message, and the scanner sounds the alarm associated with that type of message. The alarm sound changes automatically every 3 seconds.

Press any key except LIGHT to end the alarm demonstration mode.

Using the Delay Function

You can configure your conventional, non-trunked channels for a 2 second delay to avoid missing reply traffic on the same channel. When delay is set for a conventional channel, the scanner will pause for reply traffic before resuming the scan operation.

To toggle the delay setting for a channel, press./DELAY

 Notes

- Delay is automatically set as the default for each channel when you turn on the scanner.
- The delay function operates differently when monitoring trunked radio systems. For more information, see “Trunked Delay Function” on Page 85.

Locking Out Channels or Frequencies

You can lock out channels to force the scanner to skip and ignore any traffic while scanning. You can also lock out up to 50 frequencies while searching to skip undesired transmissions.

Locking Out Channels

To lock out a channel while scanning, press L/OUT when the scanner stops on the channel. To lock out a channel manually, select the channel then press L/OUT so L appears in the scanner’s display.

 Notes

- You can still manually select and monitor locked-out channels.
- Locking out a channel with an active trunking control channel will disable monitoring of that trunking system.

To remove the lockout from a channel, manually select the channel and press L/OUT so L disappears.

Reviewing the Lock-Out Channels

To review all locked out channels, press MAN, then repeatedly press FUNC then L/OUT. The scanner will advance to the next locked out channel each time you press FUNC, then L/OUT.

Locking Out Search Frequencies

To lock out a frequency during a search, press L/OUT when the scanner stops on that frequency. The scanner will lock out the frequency and continues searching.

 Notes

- You can lock out as many as 50 frequencies in each search bank. If you try to lock out more, `Memory Full!` will appear in the display, and you will be unable to lock out any more frequencies until some have been cleared. See “Clearing a Locked-Out Frequency” below.
- If you lock out all frequencies in one search bank and only this search bank is activated, All ranges Locked out! appears in the display and the scanner will not search.

Reviewing Locked-Out Search Frequencies

To review the frequencies within a search bank that you locked out:

1. Press SRCH to set search mode, and select the desired search bank to review its locked out frequencies.
2. Press FUNC then L/OUT. The last locked-out frequency and `Lockout list` appear. Press π or θ to scroll through the list. The locked-out number and the total locked-out number also appears as `L/O XX of YY`. (The tenth of twenty five locked out frequencies would appear as `L/O 10 of 25`). If the search bank has no locked-out frequencies, `Empty. Lockout List` appears in the scanner’s display. Press SRCH to cancel reviewing locked-out frequencies.

Clearing a Locked-Out Search Frequency

To clear a locked-out frequency, select that frequency (see “Reviewing Locked-Out Search Frequencies” on Page 66), then press CLR.

If all locked-out frequencies are cleared within a channel storage bank, `Empty. Lockout list` appears in the scanner’s display.

Clearing All Locked-Out Frequencies in a Search Bank

1. Press SEARCH.
2. Select the search bank in which you want to clear all locked-out frequencies.
3. Press FUNC then press L/OUT. Lockout list appears in the scanner’s display.
4. Press FUNC then 6. The scanner will display `Confirm list clear? 1=Yes Press other key for NO`. Press 1 to clear all locked-out frequencies. `List cleared` appears for about 2 seconds. Press any key other than 1 to cancel clear.

Changing the Receive mode

The scanner defaults to the commonly used AM or FM/Digital receive mode for each frequency range. The preset mode is correct in most cases. However, some amateur radio transmissions and trunked systems do not operate in the preset mode. If you try to listen to a transmission when the scanner is not set to the correct receive mode, the transmission might sound weak or distorted.

To change the receive mode, repeatedly press MODE. The receive mode changes as follows:

AM – configures the channel for AM mode

FM/DIGITAL– configures the channel for the FM/DIGITAL mode

CT – configures the channel for CTCSS mode

DC – configures the channel for DCS mode

MO – configures the channel for the MO mode for analog or digital Motorola trunking system channels, or APCO-25 trunking system channels

ED – configures the channel for the ED mode for EDACS trunking system channels

Note

- MO (MOT) and ED modes are not available when performing service searches, limit searches and the TUNE function.

Using the Attenuator

To reduce interference or noise caused by strong signals, you can reduce the scanner's sensitivity with the attenuator.

There are two attenuator modes in your scanner. Normal attenuator mode allows you to set the attenuator on a per-channel basis. Normal mode is useful when individual channels are found to be prone to interference.

Global attenuator mode applies attenuation to every channel in the scanner, and overrides any normal mode attenuator settings that you may have entered

To assign attenuation to a channel in the scanner:

Press ATT when the scanner is stopped on a channel, or by manually navigating to a channel by using direct channel entry or pressing the π or θ arrow keys. An "A" will appear in the top line of the display. Press ATT again to toggle attenuation off.

To assign attenuation to a search bank:

Press ATT while searching. Attenuation will be applied to the active search bank, or search group within a search bank. Press ATT again to turn attenuation off.

To use the global attenuator:

Press FUNC and then ATT to set the attenuator to global mode. Global ATT will appear for 2 seconds at the bottom line, then

ATT- appears in the scanner's display while scanning.

Press ATT to activate the attenuator. ATT On appears in the bottom line of the display. When the scanner is stopped on a channel or searching, a lower case "a" will appear in the top line of the display. Press ATT to toggle global attenuation off. ATT- appears on the bottom line of the display while scanning.

Press FUNC and then ATT again to turn off the global attenuation mode. Normal ATT appears on the bottom line for about 2 seconds.

 Notes

- The attenuator is very effective at reducing strong signal overload interference when using the scanner in areas close to cellular telephone transmitting facilities, like the tower shown on Page 67.
- If you turn on the attenuator, the scanner might not receive weak signals.
- Activating the normal attenuator mode on a Motorola or APCO Project 25 trunking control channel will apply attenuation to all calls received on that trunking system. You can press ATT during a trunking call or while manually tuned to a system control channel to toggle attenuation on or off for the trunking system.

Turning the Key Tone On and Off

Each time you press any of the scanner's keys, the scanner sounds a tone. To turn the scanner's key tone off or on:

1. If the scanner is on, turn VOLUME OFF/MAX counterclockwise until it clicks to turn the scanner off.
2. Turn VOLUME OFF/MAX clockwise to turn the scanner on. `Welcome To Digital Trunking` appears in the scanner's display.
3. While `Welcome To Digital Trunking` appears, press 1 to turn on the key tone or 2 to turn it off.

Using the Display Backlight

Your PRO-96 features a backlit keypad and display for easy viewing and use in dark environments. There are three backlight modes you can choose from to control backlight activation, Normal mode, Keypress mode, and first keypress Ignore mode.

With Normal mode, simply press the LIGHT key to activate the backlight. The backlight will activate and remain on for the factory default setting of 5 seconds. The backlight continues to remain on while you are operating the keypad. To turn off the backlight before it automatically turns off, press LIGHT again.

With Keypress mode, the backlight will light automatically when you press any key on the keypad, and function as described above in Normal mode. This mode is useful if you want the backlight to come on automatically when you perform an operation using the keypad.

With Ignore mode, the backlight functions as described in Keypress mode, except that the scanner ignores the first keypress. This mode is useful when you wish to quickly illuminate the display and keypad without having to search for the LIGHT key. The first keypress is ignored, and the scanner sounds the low pitched error beep to remind you that the first key pressed to activate the backlight is ignored by the scanner.

In any backlight mode, you can press and hold LIGHT for about 1 second to force the backlight on full time. Press LIGHT while the backlight is on to turn it off.

Follow these steps to change the backlight mode and duration:

1. If the scanner is on, turn it off and back on again. `Welcome To Digital Trunking` appears in the scanner's display.

2. While `Welcome To Digital Trunking` appears, press LIGHT.

3. Press π or θ to select the desired backlight mode and duration. Selecting 3, 5, 10 or 20 sets the backlight mode for normal operation for the selected duration. Selecting K3, K5, K10 or K20 sets the backlight mode for Keypress operation for the selected duration. Selecting I3, I5, I10 or I20 sets the backlight mode for Ignore operation for the selected duration. Press ENTER to store your selection.

Using the Keylock

Once you program your scanner, you can protect it from accidental program changes by turning on the key lock feature. When the keypad is locked, the only controls that operate are FUNC, KEY/LIGHT, SQUELCH, and VOLUME.

You cannot activate the key lock while you are entering a frequency into a channel.

1. To turn on the key lock, press FUNC then KEY/LIGHT. `Keylocked.` Appears for about 1 second. `Key locked.` appears when you press any key after locking the keypad, and the scanner sounds the low pitched Invalid tone.

2. To turn off the key lock, press FUNC the KEY/LIGHT. The scanner beeps three times and `Key unlocked` appears in the scanner's display.

Changing the Display Contrast

1. Press MANUAL.

2. Press FUNC then 9. `Use Up/Down keys to set contrast.` appears in the scanner's display.

3. Press π or θ to adjust the contrast.

4. Press ENTER to set the display contrast.

Working with V-Scanners

The PRO-96 V-Scanner (Virtual Scanner) feature allows you to edit, store, recall and use up to eleven full sets of scanner memory profiles. With V-Scanners it is possible to create separate scanner memory profiles for different areas you visit or different ways that you use the scanner.

Your scanner contains two types of storage memory. **Working memory** is the memory that your scanner uses while you are programming, cloning, or using your scanner. **V-Scanner memory** is the memory that your scanner uses to store saved configurations in **V-Scanner folders** for later recall and use. Your scanner features ten V-Scanner folders (0-9) for configuration storage. An additional "scratchpad" V-Scanner folder can be accessed with the decimal point (.) key and is indicated in the display with the "#"

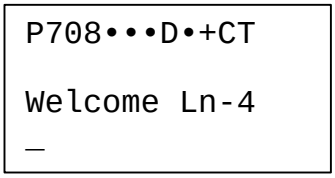
symbol. The scratchpad folder offers a convenient location to temporarily store the contents of working memory when managing the V-Scanner memory.

Working with V-Scanner folders is much like working with computer application files, such as spreadsheets and word processing documents. Any programming changes you make to the scanner's working memory can be saved to one of the ten V-Scanner folders, or the scratchpad folder. When you save working memory to a V-Scanner folder, all settings contained in working memory are saved, including channels, talkgroups, lockout status, contrast settings, etc. Previously saved V-Scanner folders can be recalled and loaded into working memory. You can also erase the contents of V-Scanner folders, or move the contents of one folder to another using working memory. V-Scanner folder names are stored in Line 4 from the Welcome screen that appears when you first power on the scanner. You can change the contents of line 4 from the current working memory configuration. This information is saved when you store the V-Scanner.

Follow these steps to edit the V-Scanner name stored in Line 4 of the Welcome screen:

1. Press PGM

2. Press FUNC TEXT. The scanner will display the Line 4 edit screen with a flashing cursor:



3. Use standard text entry procedures to enter a V-Scanner name, up to 12 characters long. Press ENTER when finished. Please refer to the Text Input Chart on Page 48 for more information on text entry.

Note

- You can only change the name of a V-Scanner while it is loaded into working memory. It is not possible to change the V-Scanner folder name from the V-Scanner menus. Always use FUNC TEXT while in program mode to assign a V-Scanner folder name to the current working memory. This name will be stored with the V-Scanner when it

is saved, and will appear while you are performing V-Scanner operations. If you press TEXT while in a V-Scanner operations menu, you will be prompted to use FUNC TEXT while in program mode to assign or change the name of the V-Scanner folder.

Follow these steps to perform V-Scanner operations:

1. Press PGM

2. Press FUNC PGM. The scanner will display the V-Scanner menu:

```
V-Scanner
1-SAVE
2-LOAD 3-DEL
CL-EXIT
```

   Select the option that corresponds with the function that you wish to execute.

3. If you want to save the contents of the scanner's working memory to a V-Scanner folder, press 1. The scanner will display:

```
Save to
V-Scanner:
ENTER if YES
CL to EXIT
```

   Press the number key that corresponds with the V-Scanner folder you wish to save the current configuration to, or press CLR to return to the V-Scanner menu. Your selected folder location and the name of any previously stored V-Scanner will appear in the display. For example, assume you are saving to V-Scanner folder 1, and have previously stored a V-Scanner configuration with the name "My V-Scanner" in that location. If you choose V-Scanner Folder 1, the scanner will display:

```
Save to
V-Scanner: 1
ENTER if YES
My V-Scanner
```

Press ENTER to accept the choice, another number key to change your selection, or CLR to abort and return to the V-Scanner menu. The scanner gives you one final opportunity to abort before proceeding:

```
Save to
V-Scanner: 1
ENT= CONFIRM
My V-Scanner
```

Press ENTER to confirm your choice and proceed with the V-Scanner save operation.

While saving, the scanner will display:

```
Saving to
V-Scanner: 1
Please Wait
```

 Note

- The contents of the selected V-Scanner folder will be replaced with your current working memory data.

4. To load the contents of a V-Scanner folder to the scanner's working memory, press 2. The scanner will display:

```
Load from
V-Scanner:
ENTER if YES
CL to EXIT
```

Press the number key that corresponds with the V-Scanner folder you wish to load into the scanner's working memory, or press CLR to return to the V-Scanner menu. If you select a V-Scanner folder, the scanner will prompt you to verify your choice. For example, if you choose V-Scanner Folder 1, the scanner will display:

```
Load from
V-Scanner: 1
ENTER if YES
My V-Scanner
```

Press ENTER to accept the choice, another number key to change your selection, or CLR to abort and return to the V-Scanner menu. The scanner gives you one final opportunity to abort before proceeding:

```
Load from
V-Scanner: 1
ENT= CONFIRM
My V-Scanner
```

While loading, the scanner will display:

```
Loading from
V-Scanner: 1
Please Wait
```

 Note

- The contents of the scanner's current working memory will be replaced with the data from the selected V-Scanner folder.

5. To delete the contents of a V-Scanner folder, select 3. The scanner will display:

```
Delete
V-Scanner:
ENTER if YES
CL to EXIT
```

Press the number key that corresponds with the V-Scanner folder you wish to clear, or press CLR to return to the V-Scanner menu. If you select a V-Scanner folder, the scanner will display the name of the V-Scanner currently stored in that folder, and

prompt you to verify your choice. For example, if you choose V-Scanner Folder 1, the scanner will display:

```
Delete
V-Scanner: 1
ENTER if YES
My V-Scanner
```

Press ENTER to accept the choice, another number key to change your selection, or CLR to abort and return to the V-Scanner menu. The scanner gives you one final opportunity to abort before proceeding:

```
Delete
V-Scanner: 1
ENT = CONFIRM
My V-Scanner
```

While the folder is being cleared, the scanner will display

```
Clearing
V-Scanner: 1
Please Wait
```

 Notes

- The scanner will display

```
V-Scanner
Operation
Complete
Press ENTER
```

after each V-Scanner operation. Pressing ENTER will return to the main V-Scanner menu. Press CLR to exit the V-Scanner main menu.

- The scanner will display

```
V-Scanner
Operation
Failure
Press ENTER
```

  if a failure is encountered while performing a V-Scanner operation. Press ENTER to try again.

- If you wish to create a new configuration based on your current one, save the current working memory to a V-Scanner folder, then edit the working memory with your changes. When you are finished with your edits, save your updated working memory to a new V-Scanner folder, leaving the V-Scanner folder with your original configuration intact. You may then use either your original configuration or the modified one.

- Be sure to assign a name to each V-Scanner before you save it to a V-Scanner folder. You assign a V-Scanner name while using the configuration in working memory by pressing PGM, then FUNC TEXT. The text you enter here is stored in line 4 of the welcome message and saved with the contents of the V-Scanner when you write it to a folder.

- You can use the V-Scanner feature to back up your work. Save your configuration to a V-Scanner folder after you make changes to a working memory configuration. If for any reason your scanner's working memory is accidentally altered or lost, you can recall the backup configuration data from the V-Scanner folder.

- There will be an approximately 13 second pause after you select the desired V-Scanner and press the ENTER key to confirm your choice when saving or loading V-Scanner data. During this period the scanner is transferring V-Scanner data to or from working memory. It is important not to interrupt power to the scanner while this is taking place. Loss of power while performing V-Scanner operations may result in lost data. The scanner will not allow you to perform a V-Scanner operation when a low

battery condition exists. If you attempt to perform a V-Scanner operation with low battery power, the scanner will display:

```
V-Scanner
Battery Low
Aborted
CL-EXIT
```

Using the Digital AGC Function

You may find that the audio level varies greatly among different users on digital systems that you monitor. Many analog conventional and trunked radio systems include components with automatic gain control to help normalize the audio levels of analog transmissions in the system. Digital radio systems typically do not include any automatic gain control functionality and tend to reproduce a user's voice audio signal more faithfully with regard to audio levels. This can result in a low level audio signal if a user on the system is not speaking close enough to their radio microphone.

Your PRO-96 features Digital AGC, which can compensate for these low audio levels when they occur. By default, Digital AGC is turned on. If desired, you can toggle the Digital AGC function on or off by pressing FUNC, then MAN at any time. The display will briefly show `DSP AGC Off` or `DSP AGC On` accordingly.

 Notes

- Digital AGC has no effect on analog transmissions.
- You may notice more background noise with Digital AGC on.

Cloning the Programmed Data

You can transfer the contents of the current scanner working memory to and from another PRO-96 scanner using an optional connecting cable with 1/8-inch (3.5 mm) phone plugs on both ends (use Radio Shack part number 42-2420 available at your local RadioShack store), or to a computer application designed to work with this scanner using a PC interface cable (use Radio Shack part number 20-289, available at your local RadioShack store).

Note

- CLONE MODE Incorrect Model appears if the scanner receives data from another scanner other than a PRO-96.

Follow these steps to clone the data.

1. Turn on both scanners.
2. Connect the connecting cable to each scanner's PC/IF jack. CLONE MODE UP to send, remove cable to exit appears in the scanner's display.
3. Press π. Confirm send data? 1=YES Press other key for NO. appears in the scanner's display.
4. Press 1 to send the data to the other unit or press any other key to cancel the operation.
5. The scanner sends the data. Do not disconnect the PC/IF cable or interrupt power to either scanner while the transfer is taking place.
6. To exit the clone mode, remove the cable.

TRUNKING SPECIAL FEATURES

Trunking Operation

Your scanner tracks transmissions from Motorola Type I, II and IIi analog trunked systems, Motorola digital trunked systems, and APCO 25 digital trunked systems. Your scanner also follows transmissions on GE/Ericsson/M/A-COM (EDACS) type systems.

Trunking systems allocate a few frequencies to many different users, and use a control channel to send system activity data to all of the mobile units operating on the system. When a mobile unit wishes to place a call, it sends a call request signal to the trunking system. The system chooses one frequency from allocated system channels in that trunking system and announces the start of the call on the control channel. Your scanner uses the control channel data to follow activity on the talkgroups you wish to monitor.

Traditional conventional radio systems operate using a single radio frequency for each group of radio users, and in some cases, multiple groups sharing the same radio channel in the same geographical area. This frequently results in heavy traffic and often requires that radio users wait long periods for the frequency to clear before they can place their calls. Trunked systems allow large groups of radio users to use radio frequencies more efficiently. Instead of selecting a specific frequency to transmit on, a trunked system chooses one of several frequencies when the 2-way radio user transmits. The system automatically transmits the call on that frequency, and also sends a code that identifies that 2-way radio user's transmission on a control channel.

Your scanner lets you easily hear both the call and response transmissions for that 2-way radio user and therefore follow the entire conversation. For Motorola, APCO-25 and EDACS trunking systems, the scanner monitors the control channel between each transmission to determine active talkgroups.

To receive trunking signals from a trunked radio system, you must:

- Store all the trunking control frequencies for Motorola or APCO-25 systems in one channel storage bank, or
- Store all the trunking system frequencies for EDACS in one channel storage bank, and

- Configure the channel storage bank ID list for the type of trunking system being monitored, and
- Enter ID codes into the ID memory for the bank
- For detailed trunked system programming instructions, see “Programming Trunked Systems” on Page 32 and “Storing Talkgroup IDs” on Page 38

Your PRO-96 automatically calculates Motorola and APCO-25 trunking system voice channel frequencies while decoding the control channel. This eliminates the need to enter all the Motorola system frequencies.

The control channels for some Motorola trunked radio systems may change on a day-to-day basis. To ensure that you will not miss traffic when the control channel changes, enter all the known control channel frequencies into the channel storage bank. If the control channel changes, your scanner will automatically lock on to the new control channel. If you do not know which system channels are used for the control channel operation, we recommend that you enter all the system frequencies into the same bank. (Refer to the supplied Trunking Guide).

When the scanner decodes the Motorola control channel and finds talkgroup activation on a voice channel, the scanner displays the control channel memory location on the top line, the received frequency with VC (voice channel) on the second line, the bank and control channel memory location number on the third line and the Motorola talkgroup ID number on the bottom line.

! IMPORTANT

To listen to the transmission, the mode setting of the trunking control or system channels must match the mode setting of the associated ID list (MOT for Motorola and APCO-25, or ED for EDACS).

When an ID code is received, the ID list for the bank is searched, and if found, the text name stored for the ID appears in the scanner’s display. If not found, scanning resumes immediately unless the bank is in open trunking mode.

Notes

- Trunking group frequencies are included in the supplied Trunking Guide. Frequency fleet map and talkgroup information are also widely available on the Internet, for example, at www.trunkscanner.com.

Setting Squelch for Trunking

For optimal receiver performance when scanning both trunked and conventional systems, we recommend that you set the squelch close to threshold. Navigate to a programmed channel in manual mode. While the channel is idle, turn the squelch control fully counterclockwise. You will hear a loud rushing noise from the speaker. Turn the squelch control clockwise until the noise stops. You may find it necessary to set the control a bit further in the clockwise direction to prevent very weak signals or interference from stopping the scan operation.

Talkgroup ID Hold

You can set your scanner to follow a trunking signal that you want to track during scanning.

While the scanner is stopped on a voice channel (VC appears next to the frequency in the display), hold down TRUNK until ID hold ON appears in the scanner's display.

To manually activate ID hold mode on a selected ID, enter the ID list, scroll to the desired ID, then press FUNC TRUNK. The scanner will initiate ID hold operation on the selected talkgroup.

When ID hold is activated and the scanner receives a voice channel, the scan indication S at the first digit in the top line changes to H to indicate that the call is being monitored while the scanner is in ID hold.

To release ID hold, press SCAN or TRUNK.

Turning an ID Sub-Bank On or Off

Follow these steps to turn the ID sub-bank on or off during the program mode:

1. Press TRUNK repeatedly to select the desired sub-bank.

2. Press FUNC then 1 to toggle the sub-bank on or off. The on/off state of the sub-bank will appear in the scanner's display.

Follow these steps to turn the ID sub-bank on or off during the scan mode:

1. The channel storage bank must be set to Closed Mode to change the state of a sub-bank while scanning.

2. Press FUNC then TRUNK while the scanner is stopped on a voice channel transmission. The bank text display is replaced with a sub-bank status display, `T IDbk 01234.` The flashing cursor will indicate the current active sub-bank.

3. Press FUNC and the number of the sub-bank you wish to turn on or off (0-4). For example, to toggle sub-bank 4 on or off, press FUNC, then 4.

Open and Closed Mode Operation

You can set your scanner to change the way it receives transmissions on Motorola, APCO-25 and EDACS trunked radio systems. These settings, called Open Mode and Closed Mode, control whether the scanner monitors all traffic from a trunked radio system, or only traffic from talkgroups you specify. Unlike the channel mode settings described above, Open/Close mode settings apply to a trunking system programmed into a single bank.

 Notes

- In Open Mode, you hear all active talkgroups except those you specifically exclude, making it easy to hear everything going on. In Closed Mode, you hear only those talkgroups you specify. This makes it easy to listen only to talkgroups you are interested in and exclude others.

Each scanner bank can be programmed with one trunked system. You can set each of the scanner's channel storage banks to Open or Closed Mode.

Conventional modes (AM, FM/Digital, CT and DC) are not affected by the Open/Closed Mode setting of a bank.

When you set a channel storage bank to Open Mode, + appears under the bank's number while scanning. When you set a channel storage bank to Closed Mode, - appears under the channel storage bank's number while scanning.

Traffic on locked out talkgroup IDs is ignored when the scanner is operating in Open and Closed Modes.

In Open Mode, the scanner will stop on all talkgroup traffic, except for traffic on talkgroups that are entered in the ID list and locked out. In Closed Mode, the scanner will only stop on talkgroup traffic if the ID is entered in the ID list and not locked out.

Open Mode scanning is useful in cases where you wish to monitor all traffic on the trunked system, except for certain talkgroups which you specify by entering them into the ID list and locking them out. Open Mode scanning allows you to search the trunking system for new or previously unknown talkgroup activity while ignoring traffic on undesired talkgroups.

Closed Mode scanning is useful in cases where you wish to restrict the traffic you monitor to a certain set of talkgroups only these talkgroups are specified in the ID list and not locked out.

Toggling Open and Closed Modes

To toggle Open or Closed Mode state for a bank, press FUNC 5 while stopped on a channel in the bank in SCAN, MAN or PGM modes. The scanner will briefly display `Bank OPEN` or `Bank CLOSED` to indicate the new Open or Closed Mode state for the bank.

Manual ID Lockout Toggle

1. Press PGM.
2. Press TRUNK.
3. Press FUNC, then π or θ to move to the desired bank.
4. Press π or θ to select the ID memory.
5. Press L/OUT to toggle the lock out status of the selected ID.

Activating ID Lockout While Scanning

When scanning a trunked radio system in Open Mode, you can lock out a trunked ID by pressing L/OUT while the scanner is stopped on a voice call. If the ID has not been previously entered into the ID list for that bank, it will be added and locked out automatically.

When scanning a trunked radio system in Closed Mode, it is possible to lock out an ID by pressing L/OUT while the ID is active with a voice call.

Reviewing Locked-Out Talkgroup IDs

You can easily review and clear locked talkgroup IDs in the ID list. This process is similar to finding and clearing locked out conventional channels, except it is performed while in a trunked ID list.

1. Press PGM then TRUNK.
2. Press FUNC, then L/OUT. The first locked out ID in the ID list is displayed.
3. Press L/OUT to unlock the selected ID, or press FUNC, then L/OUT again to continue reviewing locked IDs.

Changing from ID Text Tag Display to ID Code Display

By default, your scanner displays the stored alphanumeric text tag when receiving a trunked voice call. You can toggle the display to show the text tag or the talkgroup ID code by pressing TEXT while the scanner is stopped on a trunked talkgroup call.

Trunked Delay Function

The trunking ID delay is set separately from the channel delay on a per channel storage bank basis. Trunking ID delay specifies the amount of time the scanner dwells on the control channel looking for reply traffic on the previous talkgroup before resuming scan operation. Customizing the trunked ID delay may be useful if you are missing a lot of reply traffic on a particular system. We recommend starting with the default value of 2.0 seconds.

1. While in the desired ID list, press FUNC, then ./DELAY.

2. Press π or θ to select None, 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, or 4.0 seconds.

3. Press ENTER.

 Hint

- Most Motorola trunking systems include a “hang time” where the channel remains assigned to a talkgroup for a short period after the user unkeys their microphone. This hang time is typically 1.5 seconds but can vary among different systems. The scanner’s trunked delay function begins after this hang time expires. Therefore, the total amount of delay present after a user unkeys their microphone equals the trunking system hang time, plus any trunked ID delay that you have programmed into the scanner. For example, if you wish to wait a total of two seconds for a reply trunked call, and the system you are monitoring is using 1.5 seconds of hang time, you should set the trunked delay for that system to 0.5 seconds. EDACS systems do not employ hang time.

- Conventional channel delay is fixed at 2 seconds and is controlled independently of trunked ID delay. Refer to “Using the Delay Function” on Page 65 for more information.

Clearing Talkgroup Ids

You can clear IDs from the ID list to make room for new IDs.

1. Press PGM then TRUNK.

2. Press FUNC, π or θ to select an ID memory.

3. Press FUNC then CLR to clear the contents of the selected ID.

Clearing All Talkgroup IDs in One Bank

You can clear all talkgroup IDs within a bank. This lets you quickly delete all talkgroup IDs from a bank if you want to use the bank to store different data (such as a new set of talkgroup IDs).

1. Press PGM.

2. Press TRUNK to enter a talk group ID memory mode.

3. Select a talkgroup ID bank using FUNC, π or θ.

4. Press FUNC then 6. `Confirm list clear? 1=YES Press other key for NO`. appears in the scanner's display.

5. Press 1 to clear all talkgroup IDs within a bank. `List cleared` appears in the scanner's display.

To cancel the delete operation, press any key except 1. The scanner returns to the talkgroup ID memory mode.

Digital Operation

Your scanner is equipped with advanced Digital Signal Processing circuitry to receive and decode Phase 1 APCO-25 C4FM (four level FM) digital voice transmissions. This section of the manual will help you understand the differences between traditional analog and digital modulation.

For ease of use, your scanner is designed to automatically detect digital modulation on any conventional channel programmed for FM/Digital (FM) modulation. It is not necessary to configure individual channels for digital operation.

Many digital trunked radio systems are actually mixed mode systems that support both analog and digital modulation. Certain user groups on these systems may use analog modulation, while others use digital modulation. Your scanner will automatically detect the type of modulation being used and switch to the correct modulation mode without special programming or user intervention.

Your scanner also features Intelligent Adaptive Digital Tracking for optimal reception of digital signals from a variety of digital conventional and trunked radio system types. No special sound quality settings or adjustments are needed for different C4FM system types.

Digital modulation represents a breakthrough in public safety communications technology. Digital modulation typically provides a clear, distortion free audio signal throughout the service area of the system you are monitoring. However, there are some important differences between analog and digital voice performance that you should be aware of while scanning.

In most cases, digital voice transmissions will be surprisingly crisp and clear, and without noise or distortion, even when corresponding analog signals from the same system contain some static. However, if you are in a location with marginal reception, you may find that the voice quality of digital signals deteriorates very rapidly, resulting in missing syllables or entire words. If this happens, try reorienting the scanner or antenna for better reception. You may also try pressing the ATT key and apply attenuation to reduce the overload effects of nearby strong transmitters.

Under certain very weak digital signal conditions, the scanner may lose synchronization with the digital signal and briefly revert to analog FM, resulting in the reception of the raw,

undecoded digital signal. This is a normal indication of a digital signal that is too weak to decode. Follow the steps outlined above to improve digital reception.

Updating the DSP Firmware

If necessary, the firmware for the DSP module can be updated by the user in the field by downloading a file from the Internet and transferring it to the scanner.

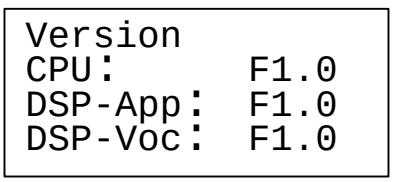
From time to time, improvements may be incorporated into the DSP firmware. These improvements will typically be designed to address issues that may be present with decoding the digital audio signals, and audio quality improvements. With updateable DSP firmware, you can ensure that your scanner is using the most recent DSP version available.

To update your scanner's DSP firmware, you will need the following items:

- The PC to scanner interface cable
- A personal computer running Windows 95 or greater
- A firmware update file from www.radioshack.com

Follow these steps to update your scanner's DSP firmware:

1. Go to http://www.radioshack.com
2. Click on the Support button.
3. Click on Scanner Firmware Downloads.
4. Click on PRO-96 DSP Firmware
5. Full download and upgrade instructions are provided on the Firmware Upgrade page.
6. To check the DSP version number, turn on the scanner and press the 3 key while Welcome to Digital Trunking appears in the scanner display. The scanner will display version information as follows:



The “CPU” and “DSP-Voc” firmware versions are permanently installed at time of manufacture and cannot be updated in the field. The “DSP-App” version is field upgradeable. The original factory version is indicated by “F” preceding the version number. The DSP-App version number will be preceded by “U” after the DSP version is updated via Internet download.

A GENERAL GUIDE TO FREQUENCIES

Reception of the frequencies covered by your scanner is mainly “line-of-sight.” That means you usually cannot hear stations that are beyond the horizon.

US Weather Frequencies (in MHz)

162.400	162.425	162.450
162.475	162.500	162.525
162.550		

Ham Radio Frequencies

Ham radio operators often transmit emergency information when other means of communication break down. The chart below shows the frequencies the scanner receives that ham radio operators normally use.

Wavelength	Frequencies (MHz)
10-Meter	28.000–29.700
6-Meter	50.000–54.000
2-Meter	144.000–148.000
70-cm	420.000–450.000
33-cm	902.000–928.000
23-cm	1240.000–1300.000

Birdie Frequencies

Every scanner has birdie frequencies. Birdies are signals created inside the scanner’s receiver. On rare occasions, birdies can cause interference to channels you want to listen to.

Birdies typically occur with approximately equal strength with and without the scanner’s antenna attached. If you receive an interfering signal and suspect that it is a birdie, try removing the scanner’s antenna. If the interference disappears, the interference may be the result of other electronic equipment in the vicinity of the scanner. If the interference remains, it is likely a birdie signal.

It may be possible to adjust the squelch control and/or attenuator to minimize the effects of a birdie signal on scanning operation. Both of these methods will likely have some effect on the signal you are trying to monitor as well.

The scanner's birdie frequencies (in MHz) are:

Add birdie frequencies

Though your scanner's receiver is an advanced, triple conversion design engineered to minimize birdie interference, some birdie signals cannot be avoided and may impair your ability to monitor certain frequencies.

GUIDE TO THE ACTION BANDS

Typical band Usage (in MHz)

HF Band

HF Range.....25.000–26.960
Citizen's Band.....26.965–27.405
10-Meter Amateur.....28.000–29.700

VHF Band

Low Range 29.700–50.000
6-Meter Amateur.....50.000–54.000
2-Meter Amateur.....144.000–148.000
High Range.....148.000–174.000

220 MHz Band

Narrow Band.....220.000–222.000
1 1/4 –Meter Amateur.....222.000–225.000

UHF Band

U.S. Government.....406.000–420.000
70-cm Amateur 420.000–450.000
UHF-Low Band 450.000–470.000
UHF-T Band 470.000–512.000

800MHz Band

System Inputs.....806.000–824.000
System Outputs.....851.000–869.000
Trunked Private/General.....894.000–960.000

25-cm Amateur.....1240.000–1300.000

Primary Usage

As a general rule, most radio activity is concentrated on the following frequencies:

VHF Band

Activities	Frequencies
Government, Police and Fire	153.785–155.980 MHz
Emergency Services	158.730–159.460 MHz
Railroad	160.000–161.900 MHz
Land-Mobile “Paired” Frequencies	220.000–222.000 MHz

UHF Band

Activities	Frequencies
Land-Mobile “Paired” Frequencies	450.000–470.000 MHz
Base Stations	451.025–454.950 MHz
Mobile Units	456.025–459.950 MHz
Repeater Units	460.025–464.975 MHz
Control Stations	465.025–469.975 MHz

 Note

- Remote control stations and mobile/portable units operate at 5 MHz higher than their associated base stations and relay repeater units in the UHF band.

BAND ALLOCATION

To help decide which frequency ranges to scan, use the following listing of the typical services that use the frequencies your scanner receives. These frequencies are subject to change, and might vary from area to area. For a more complete listing, refer to Police Call Radio Guide including Fire and Emergency Services, available at your local RadioShack store.

Abbreviations	Services
AIR	Aircraft
BIFC	Boise (ID) Interagency Fire Cache
BUS	Business
CAP	Civil Air Patrol
CCA	Common Carrier
CB	Citizens Band

CSB.....Conventional Systems

CTSB.....Conventional/Trunked Systems

FIRE.....Fire Department

HAM.....Amateur (Ham) Radio

GOVT.....Federal Government

GMR.....General Mobile Radio

GTR.....General Trunked

IND.....Industrial Services (Manufacturing, Construction, Farming and Forest Products)

MAR.....Military Amateur Radio

MARI.....Maritime Limited Coast (Coast Guard, Marine Telephone, Shipboard Radio, and Private Stations)

MARS.....Military Affiliate Radio System

MED.....Emergency/Medical Services

MIL.....U.S. Military

MOV.....Motion Picture/Video Industry

NEW.....New Mobile Narrow

NEWS.....Relay Press (Newspaper Reporters)

OIL.....Oil/Petroleum Industry

POL.....Police Department

PUB.....Public Services (Public Safety, Local Government, and Forestry Conservation)

PSB.....Public Safety

PTR.....Private Trunked

ROAD.....Road & Highway Maintenance

RTV.....Radio/TV Remote Broadcast Pickup

TAXI.....Taxi Services

TELM.....Telephone Maintenance

TOW.....Tow Trucks

TRAN.....Transportation Services (Trucks, Tow Trucks, Buses, Railroad, and Other)

TSB.....Trunked Systems

TVN.....FM-TV Audio Broadcast

USXX.....Government Classified

UTIL.....Power & Water Utilities

WTHR.....Weather

HIGH FREQUENCY (HF)

High Band-(25.00–27.63 MHz in 5 or 10 kHz steps)

Range.....Service

25.020–25.320.....IND

25.870–26.470.....RTV

26.62 .....CAP

26.965–27.405.....CB

27.430–27.630.....BUS

10-Meter Amateur Band (in 5 kHz steps)

Frequency Range..... Service

28.000–29.700 MHz.....HAM

VERY HIGH FREQUENCY (VHF)

VHF Low Band-(29–50 MHz in 5 kHz steps)

Frequency Range.....Service

29.900–30.550.....GOVT, MIL

30.580–31.980.....IND, PUB

32.000–32.990.....GOVT, MIL

33.020–33.980.....BUS, IND, PUB

34.010–34.990.....GOVT, MIL

35.020–35.980.....BUS, IND, TELM, PUB

36.000–36.230.....GOVT, MIL

36.250 .....Oil Spill Cleanup

36.270–36.990.....GOVT, MIL

37.020–37.980.....PUB, IND

38.000–39.000.....GOVT, MIL

39.020–39.980.....PUB

40.000–42.000.....GOVT, MIL, MARI

42.020–42.940.....POL

42.960–43.180.....IND

43.220–43.680.....IND, PUB, TELM

43.700–44.600.....TRAN

44.620–46.580.....POL, PUB

46.600–46.990.....GOVT

47.020–47.400.....PUB

47.420 .....American Red Cross

47.440–49.580.....IND, PUB

49.610–49.990.....MIL

6-Meter Amateur Band-(50–54 MHz in 5 kHz steps)

Frequency Range.....Service

50.000–54.000.....HAM

Aircraft Band-(108–137 MHz in 12.5 kHz steps)

Frequency Range.....Service

108.000–121.490.....AIR

121.500 .....AIR Emergency

121.510–136.975.....AIR

U.S. Government Band (137–144 MHz in 5 kHz steps)

Frequency Range.....Service

137.000–144.000.....GOVT, MIL

2-Meter Amateur Band (144–148 MHz in 5 kHz steps)

Frequency Range.....Service

144.000–148.000.....HAM

VHF High Band (148–174 MHz in 5, 6.25 or 7.5 kHz steps)

Frequency Range.....Service

148.050–150.345.....CAP, MAR, MIL

150.775–150.790.....MED

150.815–150.980.....TOW, Oil Spill Cleanup

150.995–151.475.....ROAD, POL

151.490–151.955.....IND, BUS

151.985 .....TELM

152.0075 .....MED

152.270–152.480.....IND, TAXI, BUS

152.870–153.020.....IND, MOV

153.035–153.725.....IND, OIL, UTIL

153.740–154.445.....PUB, FIRE

154.490–154.570.....IND, BUS

154.585 .....Oil Spill Cleanup

154.600–154.625.....BUS

154.655–156.240.....MED, ROAD, POL, PUB

156.255–157.425.....OIL, MARI

157.450 .....MED

157.470–157.515.....TOW

157.530–157.725.....IND, TAXI

157.740 .....BUS

158.130–158.460.....BUS, IND, UTIL, OIL, TELM

158.730–159.465.....POL, PUB, ROAD

159.480 .....OIL

159.495–161.565.....TRAN

161.580–162.000.....OIL, MARI, RTV

162.0125–162.350.....GOVT, MIL, USXX

162.400–162.550.....WTHR

162.5625–162.6375.....GOVT, MIL, USXX

162.6625 .....MED

162.6875–163.225.....GOVT, MIL, USXX

163.250 .....MED

163.275–166.225.....GOVT, MIL, USXX

166.250 .....GOVT, RTV, FIRE

166.275–169.400.....GOVT, BIFC

169.445–169.505.....Wireless Mikes, GOVT

169.550–169.9875.....GOVT, MIL, USXX

170.000–170.150.....BIFC, GOVT, RTV, FIRE

170.175–170.225.....GOVT

170.245–170.305.....Wireless Mikes

170.350–170.400.....GOVT, MIL

170.425–170.450.....BIFC

170.475 .....PUB

170.4875–173.175.....GOVT, PUB, Wireless Mikes

173.225–173.5375.....MOV, NEWS, UTIL, MIL

173.5625–173.5875.....MIL, Medical/Crash Crews

173.600–173.9875.....GOVT

New Mobile Narrow Band (220–222 MHz in 5 kHz steps)

Frequency Range.....Service

220.000–222.000.....NEW

1 1/4-Meter Amateur band (222.000–225.000 MHz in 5 kHz steps)

Frequency Range.....Service

222.000–225.000.....HAM

ULTRA HIGH FREQUENCY (UHF)

U. S. Government Band (406–420 MHz in 6.25 kHz steps)

Frequency Range.....Service

406.125–419.975.....GOVT, USXX

70-cm Amateur Band (420–450 MHz in 6.25 kHz steps)

Frequency Range.....Service

420.000–450.000.....HAM

Low Band (450–470 MHz- in 6.25 kHz steps)

Frequency Range.....Service

450.050–450.925.....RTV

451.025–452.025.....IND, OIL, UTIL, TELM

452.0375–453.000.....IND, TAXI, TRAN, TOW, NEWS

453.0125–454.000.....PUB, OIL

455.050–455.925.....RTV

457.525–457.600.....BUS

458.025–458.175.....MED

460.0125–460.6375.....FIRE, POL, PUB

460.650–462.175.....BUS

462.1875–462.450.....BUS, IND

462.4625–462.525.....IND, OIL, TELM, UTIL

462.550–462.925.....GMR, BUS

462.9375–463.1875.....MED

463.200–467.925.....BUS

FM-TV Audio Broadcast, UHF T Band (470–512 MHz in 6.25 kHz steps) (Channels 14 through 69 in 6 MHz steps)

Frequency .....Channel

475.750 14

481.750 15

487.750 16

493.750 17

499.750 18

505.750 19

511.750.....20

Note: Some cities use the 470–512 MHz band for land/mobile service.

Conventional Systems Band — Locally Assigned (in 6.25 kHz steps)

Frequency Range.....Service

851.0125–855.9875 MHz.....CTSB

Conventional/Trunked Systems Band — Locally Assigned (in 6.25 kHz steps)

Frequency Range.....Service

856.0125–860.9875 MHz.....TSB

Trunked Systems Band — Locally Assigned (in 6.25 kHz steps)

Frequency Range.....Service

861.0125–865.9875 MHz.....TSB

Public Safety Band — Locally Assigned (in 6.25 kHz steps)

Frequency Range.....Service

866.0125–868.9875 MHz.....PSB

33-Centimeter Amateur Band (902–928 MHz in 6.25 kHz steps)

Frequency Range.....Service

902.000–928.000.....HAM

Private Trunked Band (in 6.25 kHz steps)

Frequency Range.....Service

935.0125–939.9875 MHz.....PTR

General Trunked Band (in 6.25 kHz steps)

Frequency Range.....Service

940.0125–940.9875 MHz.....GTR

23-Centimeter Amateur Band (in 6.25 kHz steps)

Frequency Range.....Service

1240.000–1300.000 MHz.....HAM

FREQUENCY CONVERSION

The tuning location of a station can be expressed in frequency (kHz or MHz) or in wavelength (meters). The following information can help you make the necessary conversions.

1 MHz (million) = 1,000 kHz (thousand)

To convert MHz to kHz, multiply the number of megahertz by 1,000:

30.62 (MHz) x 1000 = 30,620 kHz

To convert from kHz to MHz, divide the number of kilohertz by 1,000:

127,800 (kHz) / 1000 = 127.8 MHz

To convert MHz to wavelength in meters, divide 300 by the number of megahertz:

300/50 MHz = 6 meters

TROUBLESHOOTING

If you have problems with your scanner, please refer to the following chart for some suggestions that might help you eliminate the problem. If the scanner is still not operating correctly after trying these tips, take your scanner to your local RadioShack store for assistance.

Troubleshooting Chart

Problem	**Possible Cause**	**Remedy**
Poor reception	Weak signals from distant stations	Reposition radio for best reception
	Attenuator in use on weak signals	Check performance with and without attenuator activated, use setting with best reception
	Strong signal overload from nearby transmitter(s)	Check performance with and without attenuator activated, use setting with best reception
Scanner will not power on	AC or DC power supply not properly connected	Check connection to AC or DC power source
	Dead batteries	Replace batteries
The keypad does not work	Keypad lock is activated	Press FUNC LOCK to disable keypad lock
	The scanner may need to be reset or initialized	Follow steps to reset or initialize the scanner on Page 104
Scanner will not scan when SCAN key is pressed	Possible “birdie” frequency programmed	Tighten squelch, apply attenuator or lock out the “birdie” frequency
	The scanner may need to be reset or initialized	Follow steps to reset/reinitialize the scanner on Page 104
	No channels programmed, or only one channel programmed, or all channels locked out	Ensure that the scanner has more than one channel programmed and enabled for scanning
	SQUELCH control is not adjusted properly	Turn SQUELCH control clockwise until scanning resumes
The scanner does not receive digital transmissions on digital frequencies or trunking systems	The digital channel or talkgroup is not using APCO-25 digital modulation	The scanner can only receive APCO-25 C4FM IMBE digital signals
	The digital channel or talkgroup is encrypted	The scanner will not receive encrypted traffic
	The digital channel or talkgroup is being transmitted from a distant location	Reposition the scanner or use an outdoor antenna to improve reception

RESETTING/INITIALIZING THE SCANNER

If the scanner's display locks up or does not work properly after you connect a power source, you might need to reset or initialize it.

! IMPORTANT

If you have problems with the scanner, first try to reset it to retain all memory. If that does not work, you can initialize the scanner.

You may be able to save the information in your scanner's memory into your computer, a V-Scanner folder or another scanner before trying to initialize it. See "Cloning the Programmed Data" on Page 78 and "Working with V-Scanners" on Page 71.

Resetting the Scanner

1. Turn off the scanner, then turn it on again.
2. Insert a pointed object, such as a straightened paper clip, into the reset opening on the side of the scanner. Then gently press and release the reset button inside the opening.

 Note

- Pressing the reset button does not clear the scanner's working memory or the V-Scanner folders.

Initializing the Scanner

! IMPORTANT

This procedure clears all information you stored in the scanner's working memory. Initialize the scanner only when you are sure the scanner is not working properly. V-Scanner memory is not affected when the scanner is initialized.

1. Turn off the scanner, then turn it on again. The scanner briefly displays the DSP boot version, and then `Welcome To Digital Trunking` appears.
2. Press 0. The scanner displays

```
System Tests
Select Test
Exits if no
Key Press
```

3. Press 1. The scanner displays

```
Factory Init
Erase Memory
ENTER if Yes
CL to Exit
```

4. Press ENTER. The scanner displays

```
Initializing
Clr Main Mem
V-Scan is OK
Please Wait
```

 Notes

- Do not turn off the scanner until the initialization is complete. When the initialization is complete, M000 appears on the top line of the display. Bank 0 Ch 00 appears on the bottom line.
- It may be possible to save your working memory to a V-Scanner folder prior to performing initialization. See “Working with V-Scanners” on Page 71 for more information on V-Scanner operations.

CARE

Keep the scanner dry; if it gets wet, wipe it dry immediately. Use and store the scanner only in normal temperature environments. Handle the scanner carefully; do not drop it. Keep the scanner away from dust and dirt, and wipe it with a damp cloth occasionally to keep it looking new.

Modifying or tampering with the scanner’s internal components can cause a malfunction and might invalidate its warranty and void your FCC authorization to operate it. If your scanner is not performing as it should, take it to your local RadioShack store for assistance.

SPECIFICATIONS

Frequency Coverage:

Frequency Range	Programming/Search Step Value
25–54 MHz	5 kHz steps
108–136.9875 MHz	12.5 kHz steps
137–174 MHz	5, 6.25 or 7.5 kHz steps
216.0025–221.9975 MHz	5 kHz steps
220.0000 –225.0000 MHz	5 kHz steps
406–512 MHz	6.25 kHz steps
806–823.9875 MHz	6.25 kHz steps
849–868.9875 MHz	6.25 kHz steps
894–960 MHz	6.25 kHz steps
1240–1300 MHz	6.25 kHz steps

Memory Organization :

V-Scanners.....eleven 500 channel virtual scanners
Memory channels.....500
Channel storage banks.....10
Number of channels per channel storage bank 50
Talkgroup ID memories.....1500
ID memory banks 10
Sub-banks per bank.....5
Number of memory IDs per sub-bank 30

Sensitivity (20 dB S/N):

FM:

25–54 MHz .....0.3 µV
108–136.9875 MHz .....0.3 µV
137–174 MHz .....0.5 µV
216–225 MHz .....0.5 µV
406–512 MHz .....0.5 µV

806–960 MHz .....0.7 µV
1240–1300 MHz .....0.7 µV

AM:

25–54 MHz .....1 µV
108–136.9875 MHz .....1 µV
137–174 MHz .....1.5 µV
216–225 MHz .....1.5 µV
406–512 MHz .....2 µV
806–960 MHz .....2 µV`
1240–1300 MHz .....3 µV

Selectivity:

25 – 27.995 MHz in AM mode
-6 dB.....+/-5 kHz
-50 dB.....+/-6 kHz
All frequencies at AM and FM mode except 25 – 27.995 MHz at AM

-6 dB.....+/-10 kHz
-50 dB.....+/-18 kHz

IF Rejection

380.8 MHz at 154.1 MHz .....60 dB
21.4 MHz at 154.1 MHz.....100 dB

Spurious Rejection

(at 154.1 MHz FM).....40 dB

Scanning Speed and Delay

Scanning Rate.....Up to 60 Channels per Second
Search Rate.....Up to 75 Steps per Second
Conventional Channel Delay Time .....2 seconds
Priority Sampling .....2 seconds
Trunking Talkgroup Delay Time .....User configurable

Intermediate Frequencies (IF):

1st	380.8 MHz
2nd	21.4 MHz
3rd	455 kHz

Squelch Sensitivity:

Threshold (FM and AM)	0.5 µV
Tight (FM)	25 dB
Tight (AM)	20 dB
Antenna Impedance	50 Ohms
Audio Output Power (10% THD)	170 mW
Built-in Speaker	1 3/8 Inches (36 mm) 8-ohm Dynamic Type

Power Requirements:

Batteries	4 AA Alkaline Batteries or 4 AA Rechargeable Batteries
External Power	9V DC
Current Drain (Squelched)	90 mA
Battery Charge Current	150 mA

Physical

Dimensions (HWD)	6 3/16 x 2 7/16 x 1 3/4 inches (157 x 62 x 41 mm)
Weight (without antenna and batteries)	8.8 oz. (250 g)
Operating Temperature	14 to 140° F (-10 to 60° C)

Specifications are typical: individual units might vary. Specifications are subject to change and improvement without notice.

Insert Address and Warranty

Command Quick Reference Guide

Scan Mode

Keystrokes	Function	Page
SCAN	Activates Scan Mode, resumes scan when stopped on a channel or talkgroup	49
MAN	If scanning or monitoring a trunked call, stops scan operation, activates Manual Mode If monitoring conventional call, stops scan operation, activates Manual Mode, holds on active channel	50
PGM	If scanning or monitoring a trunked call, stops scan operation, activates Program Mode If monitoring conventional call, stops scan operation, activates Program Mode, holds on active channel	30
WX	Activates Weather Mode	63
TRUNK	If monitoring a trunking talkgroup, stores the ID into the next available ID list memory location	38
TRUNK (hold)	If monitoring a trunking talkgroup, activates ID Hold Mode, scanner holds on the active talkgroup	82
PRI	Toggles priority	40
TUNE	Enters Tune Mode	60
ATT	Toggles attenuation for active channel, or, if global attenuation is set, toggles global attenuation on or off	68
TEXT	If monitoring a trunking talkgroup, toggles talkgroup alphanumeric text tag or trunking ID display	85
L/OUT	If monitoring a trunking talkgroup, locks out the active talkgroup so it will not be monitored If monitoring a conventional channel, locks out the active channel so it will not be monitored	65, 85
MODE	If monitoring a conventional channel, cycles through the valid modes, clears any stored CT or DC code	42
SRCH	Activates Search Mode	52
NUMBER KEYS 0-9	Toggles scan banks on or off	50
DECIMAL POINT	When monitoring a conventional channel, toggles delay for that channel on or off	65
ENTER	When monitoring a conventional channel that is programmed for CT or DC Search Mode, stores a detected CT or DC code with the channel memory	51
π or θ	Changes scan direction, up or down	49
FUNC + MAN	Toggles digital AGC	78

FUNC + TRUNK	When monitoring a talkgroup call, toggles display of control channel text tag or Trunked ID sub-bank status	82
FUNC + PRI	If monitoring a conventional channel, stores the frequency into the priority channel	41
FUNC + TUNE	If monitoring a conventional channel, stores the frequency into the tune memory	60
FUNC + ATT	Toggles attenuator mode, normal or global	68
FUNC + 5	Toggles open or closed mode for current bank	83
FUNC + 0-4	When Trunked ID sub-bank display is active, and while monitoring a talkgroup call, toggles ID sub banks 0-4 on or off	82

Manual Mode

Keystrokes	Function	Page
SCAN	Activates Scan Mode	49
MAN	Increments to the next channel memory	50
PGM	Activates Program Mode	30
WX	Activates Weather Mode	63
PRI	Toggles priority	40
TUNE	Enters Tune Mode	60
ATT	Toggles attenuation for selected channel, or, if global attenuation is set, toggles global attenuation on or off	68
L/OUT	Toggles lockout on the selected channel	65
MODE	Cycles through valid modes for the selected channel, clears any stored CT or DC settings	42
SRCH	Activates Search Mode	52
2, 3, MAN	Jumps to channel 23 in the current bank	30
1, 2, 3, MAN	Jumps to bank 1, channel 23	30
DECIMAL POINT	Toggles delay on selected channel on or off	65
ENTER	When monitoring a conventional channel that is programmed for CT or DC Search Mode, stores a detected CT or DC code with the channel memory	51
π or θ	π steps to the next channel, θ steps to the previous channel, hold down to scroll	30
FUNC + MAN	Toggles digital AGC	78
FUNC + TRUNK	Enters trunked ID list for current bank	33
FUNC + PRI	Stores the frequency of the selected channel into the priority channel	41
FUNC + TUNE	Stores the frequency of the selected channel frequency into the tune memory	60
FUNC + ATT	Toggles attenuator mode, normal or global	68
FUNC + 5	Toggles open or closed mode for current bank	83
FUNC + 9	Adjust display contrast, use π or θ then ENTER	71
FUNC + L/OUT	Jumps to the next locked out channel	66
FUNC + π or θ	π jumps forward to the next bank, θ jumps to the previous bank, hold down to scroll	30

Program Mode

Keystrokes	Function	Page
SCAN	Activates Scan Mode	49
MAN	Activates Manual Mode	50
PGM	Increments to the next channel memory	30
WX	Activates Weather Mode	63
PRI	Selects priority channel for programming	40
TEXT	Edits text tag for selected channel	46
TRUNK	Enters ID List Edit for the selected bank	38
TUNE	Enters Tune Mode	60
ATT	Toggles attenuation for selected channel, or, if global attenuation is set, toggles global attenuation on or off	68
L/OUT	Toggles lockout on the selected channel	65
MODE	Cycles through valid modes for the selected channel, clears any stored CT or DC settings	18
SRCH	Sets search range for programmable search range (PSR)	52
2, 3, PGM	Jumps to channel 23 in the current bank	30
1, 2, 3, PGM	Jumps to bank 1, channel 23	30
DECIMAL POINT	Toggles delay on selected channel on or off	65
<frequency> ENTER	Enters a frequency into channel memory	30
π or θ	π steps to the next channel, θ steps to the previous channel, hold down to scroll	30
FUNC + MAN	Toggles digital AGC	78
FUNC + MODE	If selected channel mode is set to CT or DC, edits CT or DC code	30
FUNC + PRI	Stores the frequency of the selected channel into the priority channel	41
FUNC + TUNE	Stores the frequency of the selected channel frequency into the tune memory	60
FUNC + ATT	Toggles attenuator mode, normal or global	68
FUNC CLR	Clears all programming data in selected channel	30
FUNC + 5	Toggles open or closed mode for current bank	83
FUNC + 7	Edits bank text tag	47
FUNC + L/OUT	Jumps to the next locked out channel	66
FUNC + TEXT	Edits welcome screen line 4 (stored with V-Scanner as folder name)	71
FUNC + PROGRAM	Enters V-Scanner function menu	71
FUNC + π or θ	π jumps forward to the next bank, θ jumps to the previous bank, hold down to scroll	30

Search Mode

Keystrokes	Function	Page
SCAN	Activates Scan Mode	49
MAN	Activates Manual Mode	50
PGM	Activates Program Mode	30
WX	Activates Weather Mode	63
PRI	Toggles priority	40
TUNE	Enters Tune Mode	60
ATT	Toggles attenuation for active search range, or, if global attenuation is set, toggles global attenuation on or off	68
L/OUT	Locks out undesired search frequencies or search channels	66
PAUSE	Pauses and resumes search operations	52
MODE	Cycles through AM/FM/CT/DC modes for selected search range	52
SRCH	Steps through the available search ranges	52
DECIMAL POINT	Toggles delay on or off in selected search range or search channel	52
π or θ	Changes search direction	52
FUNC + MAN	Toggles digital AGC	78
FUNC + PRI	When searching SR1to SR6, stores active search frequency in priority memory	41
FUNC + TUNE	When searching SR3, SR4, SR5 and SR6, stores active search frequency in tune memory	60
FUNC + ATT	Toggles attenuator mode, normal or global	68
FUNC + L/OUT	In SR0, SR1, SR2, steps to next locked out search channel, must be in “M” state. In SR3, SR4, SR5 and SR6, enters Search Lockout Review, use arrow keys to review locked frequencies, use CLR to clear locked frequencies, use FUNC + 6 to clear all locked frequencies	67
FUNC + MODE	Sets mode to default for active search range	52
FUNC + SRCH	Toggles Manual Channel Select or Search Channels for SR0, SR1 and SR2	52
FUNC + PGM	When searching SR3, SR4, SR5 and SR6, stores active search frequency in desired bank and channel (e.g., “123 + ENTER” stores the active frequency in Bank 1, Channel 23)	61
FUNC + ENTER	When searching SR3, SR4, SR5 and SR6, stores active search frequency in next available channel in desired bank (e.g., “1 + ENTER” stores active frequency in next empty channel in Bank 1)	61
FUNC + 7	Toggles Seek on or off	59
FUNC + 0	Toggles Zeromatic on or off	59

Weather Mode

Keystrokes	Function	Page
SCAN	Activates Scan Mode	49
MAN	Activates Manual Mode	50
PGM	Activates Program Mode	30
WX	Steps to next weather channel	63
WX, then hold WX	Weather alert alarm demonstration, press any key to exit	64
TUNE	Enters Tune Mode	60
ATT	Toggles attenuation for selected weather frequency, or, if global attenuation is set, toggles global attenuation on or off	68
SRCH	Enters Search Mode	52
NUMBER KEYS 0-9	Quick FIPS code review for FIPS memories 0-9, press L/OUT to toggle lockout status	63
FUNC + PRI	Stores active weather frequency in priority memory, press PRI in Scan, Search, Manual, Program modes to activate WX Priority	41
FUNC + ATT	Toggles attenuator mode, normal or global	68
FUNC + PGM	FIPS code entry, use π or θ to scroll, key in FIPS code + ENTER to store, press L/OUT to toggle lockout of FIPS code, press TEXT and enter text label for FIPS memory, press WX to exit	63
FUNC + WX	Activate FIPS/SAME weather alert mode, press FUNC + WX to exit	63

Tune Mode

Keystrokes	Function	Page
SCAN	Activates Scan Mode	49
MAN	Activates Manual Mode	50
PGM	Activates Program Mode	30
WX	Activates Weather Mode	63
PRI	Toggles priority	40
ATT	Toggles attenuation for active search range, or, if global attenuation is set, toggles global attenuation on or off	68
PAUSE	Pauses and resumes tune operations	52
MODE	Cycles through AM/FM/CT/DC modes	52
SRCH	Activates Search Mode	52
DECIMAL POINT	Toggle tune delay on or off	52
π or θ	Changes tune direction, resumes tune operation after stopping on an active frequency	52
FUNC + MAN	Toggles digital AGC	78
FUNC + PRI	Stores active tune frequency in priority memory	41
FUNC + ATT	Toggles attenuator mode, normal or global	68
FUNC + MODE	Sets mode to default for active search range	52
FUNC + PROGRAM	Stores active tune frequency in desired bank and channel (e.g., “123 + ENTER” stores the active frequency in Bank 1, Channel 23)	61
FUNC + ENTER	Stores active tune frequency in next available channel in desired bank (e.g., “1 + ENTER” stores active frequency in next empty channel in Bank 1)	61

ID List Edit

Keystrokes	Function	Page
SCAN	Activates Scan Mode	49
MAN	Activates Manual Mode	50
PGM	Activates Program Mode	30
WX	Activates Weather Mode	63
TEXT	Edits text tag for selected ID	47
TRUNK	Steps to first ID in next ID sub bank	38
TUNE	Enters Tune Mode	60
L/OUT	Toggles lockout on the selected ID	85
MODE	Cycles trunking mode through MO, ED and “not trunked”	33
SRCH	Activates Search Mode	52
<id> ENTER	Stores ID into selected location	33
π or θ	π steps to the next ID, θ steps to the previous ID, hold down to scroll	33
FUNC + MAN	Toggles digital AGC	78
FUNC + DECIMAL POINT	Selects ID delay duration for selected bank	85
FUNC CLR	Clears all programming data in selected ID	33
FUNC + 1	Toggles active sub bank on or off	82
FUNC + 2	Base/offset/step table entry for Motorola, toggles AFS or Decimal display for EDACS	35
FUNC + 3	Motorola 3600 control channel mode select	36
FUNC + 4	Motorola/P25 9600 control channel mode select	TBD
FUNC + 6	Clears all ID entries in current ID list	86
FUNC + 8	Sets Motorola Type I fleetmap	36
FUNC + L/OUT	Jumps to the next locked out ID	85
FUNC + TRUNK	Launches ID hold mode on selected ID	82
FUNC + PGM	Enters V-Scanner function menu	71
FUNC + π or θ	π jumps forward to the next ID bank, θ jumps to the previous ID bank, hold down to scroll	33

Startup keys (entry during welcome screen display)

Keystrokes	Function	Page
1	Turns key tones on	N/A
2	Turns key tones off	N/A
3	Displays CPU, DSP application and DSP vocoder versions	N/A
LIGHT	Adjust backlight properties	N/A
0 then 1	**Destructive**, initializes working memory to factory defaults, does not affect V-Scanner memory	N/A
0 then 2	**Destructive**, loads test frequencies into working memory, does not affect V-Scanner memory	N/A
0 then 5	**Destructive**, EEPROM memory test #1, initializes working memory, does not affect V-Scanner memory	N/A
0 then 6	**Destructive**, EEPROM memory test #2, initializes working memory, does not affect V-Scanner memory	N/A
0 then PGM	Upgrade DSP application firmware	N/A
0 then TEXT	DSP factory tests	N/A
0 then CLR	**Destructive**, reverts to factory DSP application version, any DSP upgrades are lost	N/A

NOTES