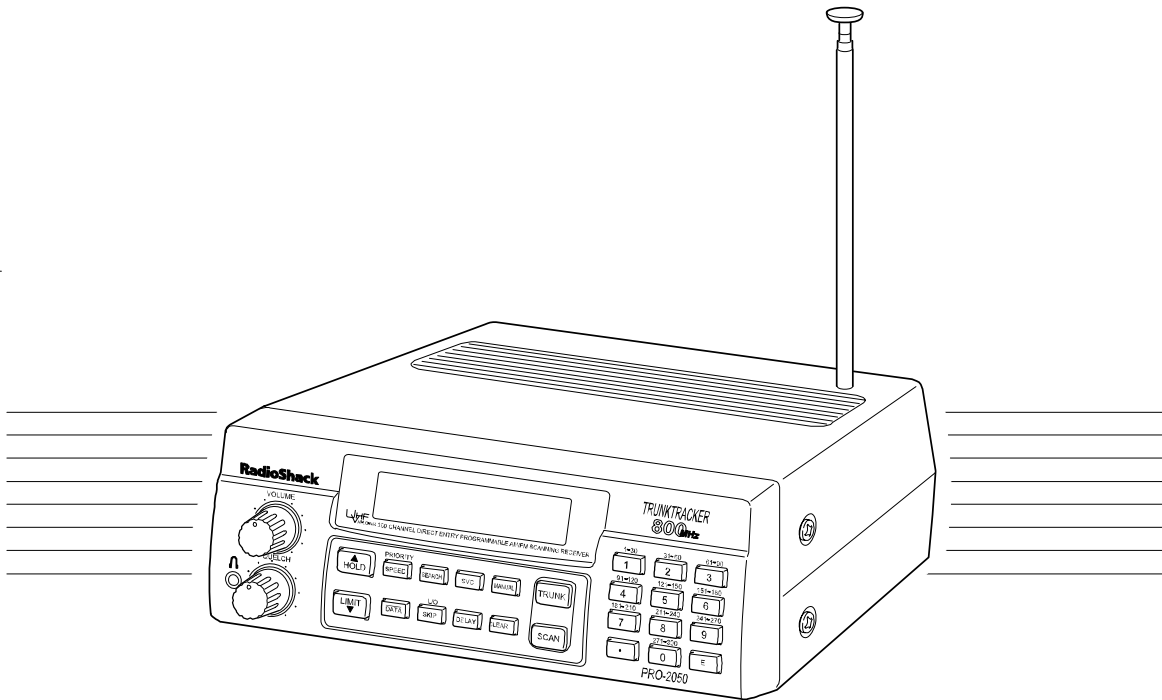


Owner's Manual

Cat. No. 20-430

PRO-2050 VHF/UHF/Air/800MHz 300-Channel TrunkTracker Home Scanner

Please read before using this equipment.



RadioShack®

FEATURES

Your new RadioShack PRO-2050 VHF/UHF/Air/800MHz 300-Channel TrunkTracker Home Scanner is one of a new generation of scanners designed to track Motorola™ Type I, Type II (such as Smartnet™ and Privacy Plus™), and hybrid analog trunking systems, which are extensively used in many 800 MHz communication systems.

Trunking communications systems let a large group of 2-way radio users (or even different groups of 2-way radio users) efficiently use a group of frequencies. Instead of selecting a specific frequency for a transmission, the 2-way radio user simply selects a talk group. The trunking system automatically transmits the call on the first available frequency, and also sends a code that uniquely identifies that 2-way radio user's transmission on a different frequency called a data channel.

Since the trunking system might send individual 2-way radio user's calls and response transmissions on different frequencies, it is difficult to listen to trunked communications using a regular scanner. The PRO-2050 monitors the data channel frequency sent with a 2-way radio user's transmission and instantly switches to an active frequency, so you can hear the call and

response for that 2-way radio user and easily "follow" the conversation.

The scanner also lets you scan conventional transmissions, and is pre-programmed with service-search banks for convenience. By pressing a single button, you can quickly search those frequencies most commonly used by public service and other agencies without tedious and complicated programming.

This scanner gives you direct access to over 30,000 exciting frequencies, including those used by police and fire departments, ambulance services, and amateur radio services, and you can change your selection at any time.

Your scanner also has these special features:

Ten Channel-Storage Banks — let you store 30 channels in each bank to group channels so you can more easily identify calls.

Five Scan Lists — let you store up to 50 IDs in each tracking bank (up to a total of 500).

Triple-Conversion Circuitry — virtually eliminates any interference from IF (intermediate frequency) images, so you hear only the selected frequency.

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HyperSearch and HyperScan are trademarks used by Tandy Corporation.
Motorola, Smartnet, and Privacy Plus are trademarks of Motorola, Inc.



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. In trunk tracking mode, it delays for about 5 seconds before moving to another ID.

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.

Priority Channels — lets you program one channel in each bank (10 in all). As the scanner scans a bank, it checks the bank's priority channel every 2 seconds so you don't miss transmissions on that channel.

Five Service-Search Banks — lets you search preset frequencies in separate public service, police, fire/emergency, aircraft, and weather banks, to make it easy to locate specific types of calls.

HyperSearch™ and HyperScan™ — let you set the scanner to search at up to 300 steps per second (in frequency bands with 5 kHz steps) and scan at up to 50 channels per second, to help you quickly find interesting broadcasts. (The normal search speed is 100 steps per second).

Data Signal Skip — lets you set the scanner to skip non-modulated or data signals during scanning and searches. This lets the scanner avoid non-voice

signals, making a scan or search faster.

Manual Access — lets you directly access any stored channel.

Liquid-Crystal Display — makes it easy to view and change programming information.

Display Backlight — makes the scanner easy to read in low-light situations.

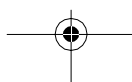
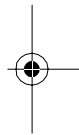
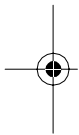
Supplied Telescoping Antenna — provides good reception of strong local signals.

External Antenna Terminal — lets you connect an external antenna with a BNC connector to the scanner for improved reception of distant/weaker signals.

Memory Backup — keeps the channel frequencies stored in memory for an extended time.

Key Confirmation Tones — the scanner sounds a tone when you perform an operation correctly, and an error tone if you make an error.

Duplicate Channel Alert — warns you when the frequency you are storing already exists in memory.



Your PRO-2050 scanner can receive all of these bands:

Frequency Range	Types of Transmissions
29–29.7 MHz	10-Meter Amateur Radio
29.7–50 MHz	VHF Lo
50–54 MHz	6-Meter Ham Band
108–136.975 MHz	Aircraft
137–144 MHz	Military Land Mobile
144–148 MHz	2-Meter Ham Band
148–174 MHz	VHF Hi
406–420 MHz	Federal Government
420–450 MHz	70-cm Ham Band
450–470 MHz	UHF Standard Band
470–512 MHz	UHF “T” Band
806–824 MHz 851–869 MHz 896–956 MHz	Public Service “800” except Cellular Band

Note: See “Specifications” on Page 51 for more information about the scanner’s frequency steps.

FCC NOTICE

Your scanner might cause TV or radio interference even when it is operating properly. To determine if your scanner is causing the interference, turn off your scanner. If the interference goes away, your scanner is causing it. Try to eliminate the interference by:

- Moving your scanner away from the receiver
- Connecting your scanner to an outlet that is on a different electrical circuit from the receiver
- Contacting your local RadioShack store for help

If you cannot eliminate the interference, the FCC requires that you stop using your scanner.

This device complies with Part 15 of the *FCC Rules*. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

We recommend you record your scanner’s serial number here. The number is on the scanner’s back panel.

Serial Number _____

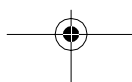
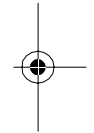
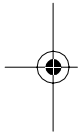


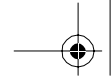
SCANNING LEGALLY

Scanning is a fun and interesting hobby. You can hear police and fire departments, ambulance services, government agencies, private companies, amateur radio services, aircraft, and military operations. It is legal to listen to almost every transmission your scanner can receive. However, there are some electronic and wire communications that are illegal to intentionally intercept. These include:

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

According to the Federal Electronic Communications Privacy Act (ECPA), as amended, you could be fined and possibly imprisoned for intentionally intercepting, using, or disclosing the contents of such a transmission unless you have the consent of a party to the communication (unless such activity is otherwise illegal). These laws change from time to time and there might be state or local laws that also affect legal scanner usage.





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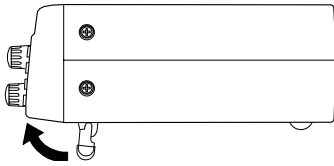
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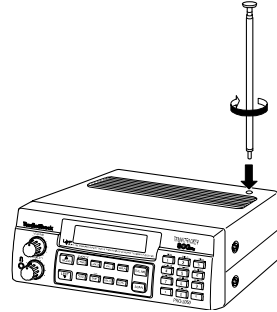
PREPARATION

This scanner is designed primarily for use in the home as a base station. You can place it on a desk, shelf, or table.

Your scanner's front feet fold up or down. Adjust them to give you the best view of the display.



Your scanner's display is protected during shipment by a piece of blue film. Peel off this film before you use the scanner.



The scanner's sensitivity depends on the antenna's length and various environmental conditions. For the best reception of the transmissions you want to hear, adjust the antenna's length.

Frequency	Antenna Length
29–54 MHz	Extend fully
108–174 MHz	Collapse one segment
406–956 MHz	Collapse both segments

CONNECTING AN ANTENNA

Connecting the Supplied Antenna

You must install an antenna before you can operate the scanner.

The supplied telescoping antenna helps your scanner receive strong local signals. To install the antenna, screw it clockwise into the hole on the scanner's top.

Connecting an Outdoor Antenna

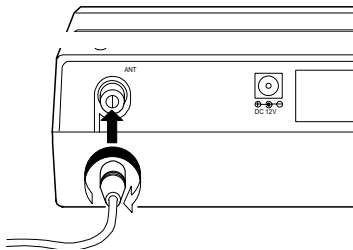
Instead of the supplied antenna, you can connect an outdoor base-station or mobile antenna (not supplied) to your scanner using a BNC connector. Your local RadioShack store sells a variety of antennas. Choose the one that best meets your needs.

When deciding on a mobile or base-station antenna and its location, consider these points:

- The antenna should be as high as possible on the vehicle or building.
- The antenna and its cable should be as far as possible from sources of electrical noise (appliances, other radios, etc.).
- The antenna should be vertical for the best performance.

To connect an optional base-station or mobile antenna, first remove the supplied antenna from the scanner. Always use 50-ohm coaxial cable, such as RG-58 or RG-8, to connect the base-station or mobile antenna. For lengths over 50 feet, use RG-8 low-loss dielectric coaxial cable. If the antenna cable's connector does not fit in the **ANT.** jack, you might also need a Motorola-to-BNC antenna plug adapter, such as RadioShack Cat. No. 278-117. Your local RadioShack store carries a wide variety of coaxial antenna cable and connectors.

Once you choose an antenna, follow the mounting instructions supplied with the antenna. Then route the antenna's cable to the scanner and connect the cable to the **ANT.** jack on the back of the scanner.



Cautions:

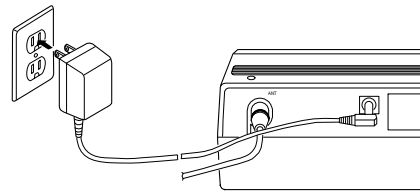
- Do not run the cable over sharp edges or moving parts that might damage it.
- Do not run the cable next to power cables or other antenna cables.

Warning: Use extreme caution when you install or remove 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, contact with 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 POWER

Using AC Power

The scanner's supplied AC adapter lets you power the scanner from a standard AC outlet. To connect power to the scanner, insert the AC adapter's barrel plug into the **DC 12V** jack on the back of the scanner, then plug the AC adapter into a standard AC outlet.



Cautions:

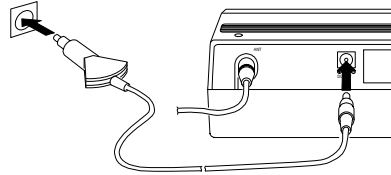
- The supplied AC adapter supplies 12 volts DC power and delivers 500 milliamps. Its center tip is set to positive, and its plug properly fits the scanner's **DC 12V** jack. Using an adapter that does not meet these specifications could damage the scanner or the adapter.
- Be sure to connect the AC adapter to the scanner before you connect it to an AC outlet, and disconnect the AC adapter from the AC outlet before you disconnect it from the scanner.

Warning: Do not use the AC adapter's polarized plug with an extension cord receptacle unless the blades can be fully inserted to prevent blade exposure.

Using Your Vehicle's Battery Power

If your AC power fails (during an emergency, for example), you can power your scanner from your vehicle's cigarette lighter socket with an optional DC cigarette lighter power cable, such as Cat. No. 270-1533 (not supplied).


To connect an optional DC cigarette lighter power cable, insert its barrel plug into the **DC 12V** jack on the back of the scanner, then plug the power cable into your vehicle's cigarette lighter socket.

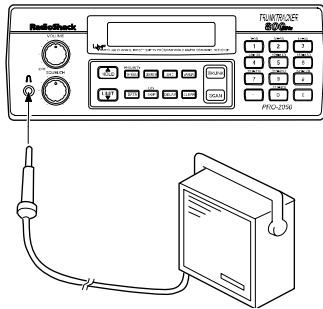
**Cautions:**

- If you use a DC cigarette lighter power cable with the scanner, it must supply 12 volts and at least 500 milliamps of DC automotive power. Its center tip must be set to positive, and its plug must correctly fit the **DC 12V** jack on the back of the scanner. The recommended power cable meets these specifications. Using a power cable that does not meet these specifications could damage the scanner or the power cable.
- If you use a cigarette lighter power cable and your vehicle's engine is running, you might hear electrical noise from the engine while scanning. This is normal.

Note: Mobile use of this scanner is unlawful or requires a permit in some areas. Check the laws in your area.


CONNECTING AN EXTENSION SPEAKER

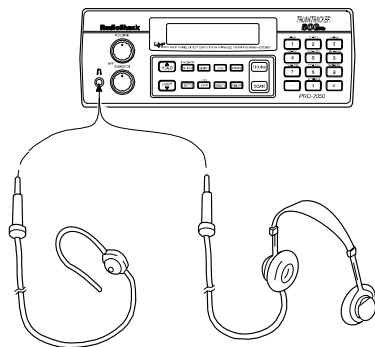
In a noisy area, an amplified extension speaker (such as Cat. No. 21-541), positioned in the right place, might provide more comfortable listening. Plug the speaker cable's 1/8-inch plug into your scanner's  jack.



Note: Connecting an external speaker disconnects the scanner's internal speaker.

CONNECTING AN EARPHONE/HEADPHONES

For private listening, you can connect an earphone or headphones with a $\frac{1}{8}$ -inch plug (such as Cat. No. 33-175 or 20-210) to the  jack on the front of the scanner. This automatically disconnects the internal speaker.



Listening Safely

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

- Do not listen at extremely high volume levels. Extended high-volume listening can lead to permanent hearing loss.
- Set **VOLUME** to the lowest setting before you begin listening. After you begin listening, adjust **VOLUME** to a comfortable level.
- Once you set **VOLUME**, do not increase it. Over time, your ears adapt to the volume level, so a volume level that does not cause discomfort might still damage your hearing.

UNDERSTANDING YOUR SCANNER

Once you understand a few simple terms we use in this manual and familiarize yourself with your scanner's features, you can put the scanner to work for you. You simply determine the type of communications you want to receive, then set the scanner to scan them.

A **frequency** is the tuning location of a station (expressed in kHz or MHz). To find active frequencies, you can use the **search** function.

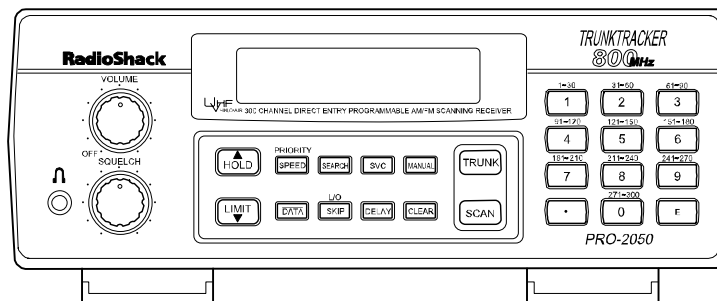
You can also search the **service-search banks**, which are preset groups of frequencies categorized by type of service.

When you find a frequency, you can store it into a programmable memory location called a **channel**, which is grouped with your other channels in a **channel-storage bank**. 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 stays on that channel until the transmission ends.

A LOOK AT THE FRONT PANEL

Your scanner's keys might seem confusing at first, but this information should help you understand each key's function.

Note: Some of the scanner's keys perform more than one function and are marked with more than one label. The steps in this Owner's Manual show only the label on the key appropriate to the action being performed.

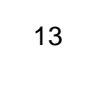
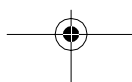
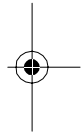
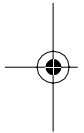


VOLUME Turns the scanner on or off and adjusts the volume.

SQUELCH Adjusts the scanner's squelch.



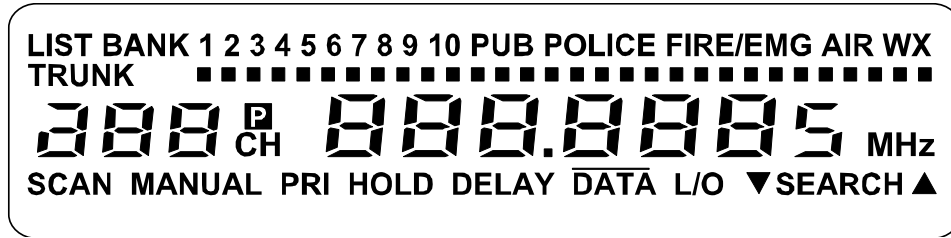
SCAN	Scans through the stored channels.
MANUAL	Stops scanning and lets you directly enter a channel number or frequency.
TRUNK	Switches between conventional and trunk tracking modes.
SVC (service)	Selects a service bank.
PRIORITY/SPEED	Sets and turns on and off the priority feature; turns the HyperSearch mode on and off.
Number Keys	Each key has a single-digit label and a range of numbers. The single digits are used to enter a channel, frequency, or ID number. The range of numbers (31–60, for example) indicates the channels that make up a memory bank.
.	Enters a decimal point.
CLEAR	Clears an entry.
E (enter)	Enters frequencies into channels or enters IDs into a scan list.
LIMIT/t	Sets the frequency range; sets the search direction and holds a frequency search.
DELAY	Programs a 2-second delay for the selected channel, a limit search, or each service scan. Also programs a 5-second delay in the trunk tracking mode.
SEARCH	Searches a specified frequency range to find frequencies; searches for another active ID in the trunk tracking mode.
L/O/SKIP (lock out/skip)	Lets you lock out selected channels or frequencies; lets you lock out a selected ID in the trunk tracking mode.



- HOLD/s** Holds on the current ID in the trunk tracking mode; sets the search direction and holds the frequency search.
- DATA** Turns the data signal skip feature on or off or checks the current trunking bank in the trunk tracking mode.

A LOOK AT THE DISPLAY

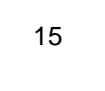
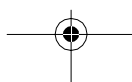
The display has indicators that show the scanner's current operating status. A good look at the display will help you understand how your scanner operates.



- LIST** Appears with a number (1–5) to indicate the list number.
- BANK** Appears with numbers (1–10) to indicate the scan bank.
- PUB** Appears when you search the public safety service bank.
- POLICE** Appears when you search the police service bank.
- FIRE/EMG** Appears when you search the fire/emergency service bank.
- AIR** Appears when you search the air service bank.
- WX** Appears when you search the weather service bank.
- TRUNK** Appears when the scanner is in trunk tracking mode.



■ (channel activity indicator)	Shows which control/voice channels are currently active.
P	Appears when a priority channel is selected.
SCAN	Appears when you scan channels.
MANUAL	Appears when you set the scanner to its manual mode.
PRI	Appears when the priority feature is turned on.
HOLD	Appears when the scanner is in the hold mode during a search.
DELAY	Appears when you program a delay.
DATA	Appears when the data skip function is active.
L/O (lockout)	Appears when you manually select a channel, frequency, or ID you locked out.
tSEARCHs	Lights steadily during a limit search, service search, and ID search, and blinks while HyperSearch is active and when you monitor IDs. The arrow indicates the search direction.
Error	Appears when you make an entry error.





UNDERSTANDING BANKS

Channel Storage Banks

To make it easier to identify and select the channels you want to listen to, channels are divided into 10 banks of 30 channels each. Use each channel-storage bank to group frequencies, such as those used by the police department, fire department, ambulance services, or aircraft (see "Guide to the Action Bands" on Page 39). For example, the police department might use four frequencies, one for each side of town. You could program the police frequencies starting with Channel 1 (the first channel in bank 1) and program the fire department frequencies starting with Channel 31 (the first channel in bank 2).

Service Banks

The scanner is preprogrammed with the frequencies allocated by public safety, police, fire/emergency, aircraft, and weather services. This is handy for quickly finding active frequencies instead of searching through an entire band (see "Searching Service Banks" on Page 18).

UNDERSTANDING TRUNKING

In the past, groups that broadcast frequently, such as police departments, were restricted to transmitting on just a few frequencies. This resulted in heavy traffic and often required 2-way radio users to wait for a specific frequency to clear before transmitting.

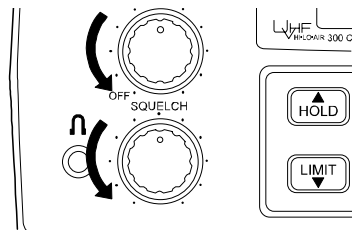
Trunked systems allow more groups of 2-way radio users to use fewer frequencies. Instead of selecting a specific frequency to transmit on, a trunked system chooses one of several frequencies when the 2-way radio user presses PTT (push to talk). The system automatically transmits the call on that frequency, and also sends a code that identifies that 2-way radio user's transmission on a data channel.

You can set this scanner to monitor the data channel frequency, so you can hear both the call and response transmissions for that 2-way radio user and therefore follow the conversation. (You cannot listen to the data channel itself in the trunk mode.)

OPERATION

TURNING ON THE SCANNER AND SETTING SQUELCH

1. Turn **SQUELCH** and **VOLUME** fully counterclockwise.



2. Turn **VOLUME** back clockwise until you hear a hissing sound.
3. Turn **SQUELCH** clockwise, then leave it set to a point just after the hissing sound stops.

Notes:

- If the scanner will not scan, turn **SQUELCH** further clockwise.
- If the scanner picks up unwanted, partial, or very weak transmissions, turn **SQUELCH** clockwise to decrease the scanner's sensitivity to these signals. If you want to listen to a weak or distant station, turn **SQUELCH** counterclockwise.
- If **SQUELCH** is adjusted so you always hear a hissing sound, the scanner does not scan properly.

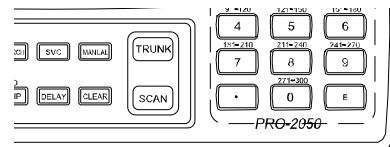
STORING KNOWN FREQUENCIES INTO CHANNELS

Good references for active frequencies are the RadioShack "Police Call Guide including Fire and Emergency Services," "Official Aeronautical Frequency Directory," and "Maritime Frequency Directory." We update these directories every year, so be sure to get a current copy.

Note: To store trunking system frequencies, see "Programming Trunked Frequencies" on Page 26.

Follow these steps to store frequencies into channels.

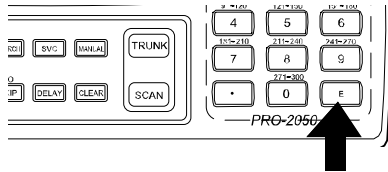
1. Press **MANUAL**, enter the channel number (1–300) where you want to store a frequency, then press **MANUAL** again. The channel number appears.
2. Use the number keys and **•** to enter the frequency (including the decimal point) you want to store.



3. Press **E** to store the frequency into the channel.

stores this setting in the channel.

4. If you want to program the next channel in sequence, press **MANUAL** and repeat Steps 2 and 3.



Notes:

- If you made a mistake in Step 2, **Error** appears and the scanner beeps when you press **E**. Simply start again from Step 2.
- Your scanner automatically rounds the entered frequency to the nearest valid frequency. For example, if you enter a frequency of 151.473, your scanner accepts it as 151.475.
- If you entered a frequency that is already stored in another channel, the scanner beeps three times and displays the lowest channel number where the frequency is already stored. If you want to store the frequency anyway, press **E** again.
- Press **DELAY** if you want the scanner to pause 2 seconds on this channel after a transmission ends before it proceeds to the next channel (see "Delay" on Page 21). The scanner also

SEARCHING SERVICE BANKS

You can search for public service, police, fire/emergency, aircraft, and weather transmissions even if you do not know the specific frequencies that are used in your area. And, you can store any of the frequencies you find into channels.

Your scanner has the following pre-programmed service banks.

- **PUBLIC** — contains 140 public service frequencies
- **POLICE** — contains 2,392 police frequencies
- **FIRE/EMG** — contains 197 fire and emergency service frequencies
- **AIR** — contains 2,319 aircraft and air service frequencies
- **WX** — contains 7 weather frequencies

To select a service bank, press **SVC**. A service bank's name (**PUB**, **POLICE**, **FIRE/EMG**, **AIR**, or **WX**) and one of the preset public service frequencies appear. After a 2-second delay, searching begins.

To select another service bank, repeatedly press **SVC** until the scanner displays the name of the bank you want to use.

Notes:

- To skip data signals (such as modem signals), press **DATA**. See "Skipping Data Signals" on Page 23.
- Because frequencies are not always assigned to the same services everywhere, you might hear transmissions from one service in another service group.

Press **SEARCH** to start searching immediately or to continue searching if you want to skip a frequency.

During service-search, you can press **HOLD** to pause the searching. **HOLD** appears. Press **s** or **t** to move up or down one step, or press **SEARCH** to resume searching.

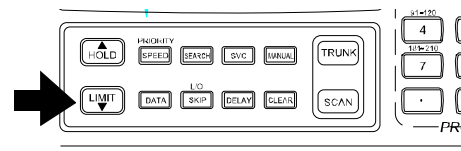
Follow these steps to store frequencies into channels.

1. Press **MANUAL**.
2. Use the number keys to enter the channel number (1–300) where you want to store the frequency, then press **MANUAL**.
3. Press **SVC** then **SEARCH** to select a service bank and begin searching.
4. When the scanner stops on a transmission, press **HOLD**. The frequency appears.
5. Press **E** to store the frequency into the channel.

LIMIT SEARCH

If you do not know a frequency to store, you can search for transmissions within a range of frequencies you select, called the *limit search range*. Then you can store any interesting frequencies you find into channels.

1. Press **MANUAL**, enter the channel number where you want to store a frequency, then press **MANUAL** again. The channel number appears.
2. Use the number keys and **•** to enter the frequency that is the lower limit of the range you want to search.
3. Press **LIMIT**.



4. Use the number keys and **•** to enter the frequency that is the upper limit of the range you want to search.
5. Press **LIMIT**, then press **SEARCH**. The scanner begins to search from the lower limit to the upper limit.
6. When the scanner stops on a transmission, quickly press either:
 - **E** to store the displayed fre-



quency into the channel. The scanner stores the frequency.

- s or t to stop searching so you can listen to the transmission. **HOLD** appears.

To release hold and continue searching, press **SEARCH**.

Notes:

- To step through the frequencies while **HOLD** appears, press s or t.
- If you tune to a search skip frequency, **L/O** appears. See “Locking Out Channels and Frequencies” on Page 23.
- To skip data signals (such as modem signals), press **DATA**. See “Skipping Data Signals” on Page 23.

SCANNING THE STORED CHANNELS

To begin scanning channels, press **SCAN**. The scanner scans through all non-locked channels in all banks that are turned on, then stops on the first transmission it finds. When the transmission ends, the scanner resumes scanning.

Notes:

- Channels with no frequencies are automatically locked out during scanning.
- To scan in the trunk tracking mode, see “Scanning a Trunked Bank” on Page 27.

MANUALLY SELECTING A CHANNEL

You can continuously monitor a single channel without scanning. This is useful if you hear an emergency broadcast on a channel and do not want to miss any details — even though there might be periods of silence — or if you want to monitor a specific channel.

Follow these steps to manually select a channel.

1. Press **MANUAL**.
2. Enter the channel number.
3. Press **MANUAL** again.

Or, if your scanner is scanning and stops at the desired channel, press **MANUAL** one time. (Pressing **MANUAL** additional times causes your scanner to step through the channels.)

To resume scanning, press **SCAN**.

CLEARING A FREQUENCY FROM A CHANNEL

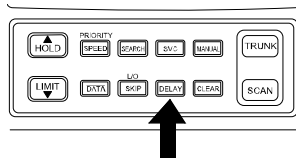
1. Press **MANUAL**.
2. Use the number keys to enter the channel number containing the frequency you want to delete. Then press **MANUAL** again.
3. Press **0**, then press **E**. The frequency is deleted.

SPECIAL FEATURES

DELAY

Many agencies use a two-way radio system that might have a period of 2 or more seconds between a query and a reply. To keep from missing a reply, you can program a 2-second delay into any channel or frequency. The scanner continues to monitor the frequency for 2 seconds after the transmission stops before resuming scanning or searching.

To program a 2-second delay:



- If the scanner is scanning channel-storage banks and stops on an active channel where you want to store a delay, quickly press **DELAY** before scanning resumes. **DELAY** appears.
- If the desired channel is not selected, manually select the channel, then press **DELAY**. **DELAY** appears.
- If the scanner is searching, press **DELAY**. **DELAY** appears and the scanner automatically adds a 2-second delay to every transmission it stops on in that band or limit range.

To turn off the 2-second delay, press **DELAY** while the scanner is monitoring the channel or searching service banks or limit ranges. **DELAY** disappears.

TURNING CHANNEL-STORAGE BANKS ON AND OFF

You can turn each channel-storage bank on and off. When you turn off a bank, the scanner does not scan any of the 30 channels in that bank.

While scanning, press the number key that corresponds to the bank you want to turn on or off. If the bank number is on, the bank is turned on and the scanner scans all channels within that bank that are not locked out. If the bank number is off, the scanner does not scan any of the channels within that bank.

Notes:

- You can manually select any channel within a bank, even if that bank is turned off.
- You cannot turn off all banks. One bank is always active.

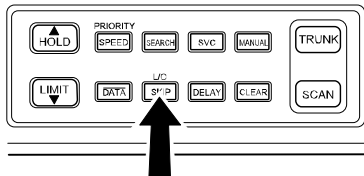
LOCKING OUT CHANNELS AND FREQUENCIES

You can scan existing channels or search frequencies faster by locking out channels or frequencies that have a continuous transmission, such as a weather channel.

Note: If you just want to skip over a lengthy transmission (such as a modem signal), see "Skipping Data Signals" on Page 23.

Locking Out Channels

To lock out a channel while scanning, press **L/O** when the scanner stops on the channel. To lock out a channel manually, select the channel and press **L/O** until **L/O** appears.



Note: You can still manually select locked-out channels.

To remove the lockout from a channel, select the channel and press **L/O** until **L/O** disappears.

To remove the lockout from all channels in the channel-storage banks that are turned on, press **MANUAL** to stop

scanning, then hold down **L/O** until the scanner beeps twice.

Locking Out Frequencies

To lock out a frequency during a limit search or service bank search, press **L/O** when the scanner stops on the frequency. The scanner locks out the frequency, then continues searching. To lock out a frequency manually, select the frequency and press **L/O** until **L/O** appears.

Notes:

- The scanner does not display locked-out frequencies during a search.
- **L/O** appears when you select a locked-out frequency.
- You can lock out up to 50 frequencies during a limit search and 20 during a service bank search. If you try to lock out more frequencies, the first locked-out frequency is automatically unlocked.

To remove the lockout from a frequency, select the frequency then press **L/O**. **L/O** disappears.

To remove the lockout from all frequencies, while searching, press **HOLD** then hold down **L/O** until the scanner beeps twice (about 2 seconds).

TURNING THE KEY TONE ON AND OFF

To turn the key tone off, turn off the scanner. Then, while holding down **L/O/SKIP**, turn on the scanner. **OF BEEP** appears.

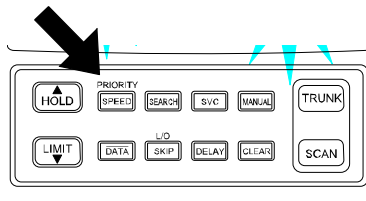
To turn the key tone back on, repeat the above procedure. **ON BEEP** appears.

CHANGING SEARCH SPEEDS

The PRO-2050 has two search speeds for a limit search.

Normal Search	HyperSearch
100 steps/second	300 steps/second

To switch between the normal and HyperSearch speeds, during a limit search, press **SPEED**. **SEARCH** flashes during HyperSearch.



Note: You can use HyperSearch only in the 5 kHz step bands (29–54 MHz and 137–174 MHz).

SKIPPING DATA SIGNALS

You can set the scanner so it skips nonmodulated or data signals (such as modem transmissions) during a scan or search.

Note: Since data signals are not generally found in the air band, this feature does not work in the air service bank.

To turn on the data skip feature, be sure the priority feature is turned off (see “Priority” on Page 24), then press **DATA**. **DATA** appears. To turn off the feature, press **DATA** again. **DATA** disappears.

TRUNK TRACKING

Your scanner is designed to track transmissions on Motorola Type I, Type II, and hybrid analog trunking systems, which are extensively used in 800 MHz communications. Remember these important points when tracking transmissions:

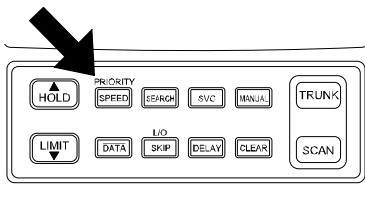
- Your scanner monitors Type II systems by default. However, you can change this if the system in your area is different (see “Types of Trunking Systems” on this page and “Scanning Type I and Hybrid Trunked Systems” on Page 33 for more information).

PRIORITY

The priority feature lets you scan through channels and still not miss important or interesting calls on specific channels. You can program one stored channel in each bank as a priority channel (for up to a total of 10 stored channels). As the scanner scans the bank, if the priority feature is turned on, the scanner checks the priority channel for activity every 2 seconds.

The scanner automatically designates each bank's first channel as its priority channel. Follow these steps to select a different channel as the priority channel for a bank.

1. Press **MANUAL**.
2. Enter the channel number you want to select as the priority channel, then press **MANUAL** again.
3. Hold down **PRIORITY** until the scanner beeps twice. **P** appears to the right of the channel number.



4. Repeat Steps 2–3 for the channel in each bank you want to program as a priority channel.

To turn on the priority feature, press **PRIORITY** during scanning. **PRI** appears. As you scan the bank, the scanner checks the bank's priority channel every 2 seconds in each bank that is turned on, starting from the lowest to the highest-numbered priority channel.

To turn off the priority feature, press **PRIORITY**. **PRI** disappears.

Notes:

- The priority feature must be turned off to use the data skip feature (see "Skipping Data Signals" on Page 23).
- You can lock out priority channels. If you lock out all priority channels, **P CH Loc Out** appears when you turn on the priority feature.

P CH Loc Out

- Your scanner cannot track transmissions on non-Motorola trunking systems.
- Your scanner tracks an 800 MHz trunked system *or* scans frequencies in conventional mode, but it cannot do both at the same time.
- The frequencies for many of the 800 MHz public safety systems are listed in the separate "National Public Safety Trunked System Frequency Guide" included with your PRO-2050.

TYPES OF TRUNKING SYSTEMS

Your trunk tracking scanner can monitor two basic types of systems — *Type I* and *Type II*. Instead of selecting a specific frequency to transmit on, a trunked system chooses one of several frequencies in a 2-way radio user's talk group when that user presses PTT (push to talk). Thus, trunking systems allocate a few frequencies among many different users, but the way Type I and Type II systems do this is slightly different. One important distinction between these systems is the amount of data transmitted by each radio when its PTT button is pressed. In a Type I system, the radio's ID and its current affiliation (the trunk system it belongs to) are both transmitted. In a Type II system, only the radio's ID is transmitted.

Why the difference? In Type I systems, each radio in the trunk group individually transmits its own affiliation, while the trunk system maintains a database that determines each radio's affiliation(s) in Type II systems.

Another difference between the systems is that Type I systems are arranged in a fleet-subfleet hierarchy. For example, it is possible for a city using a Type I system to designate 4 fleets, each with 8 subfleets.

The fleets might be the police department, the fire department, utilities, and city administration. The police might decide to further divide its fleet into

subfleets such as dispatch, tactical operations, detectives, north, south, east and west side patrols, and supervisors. All the available police radios would then be assigned to one of the police subfleets, letting the police centralize their communications and control the type of users on a single system. Determining the exact fleet-subfleet hierarchy for a particular area is referred to as *fleet map programming*.

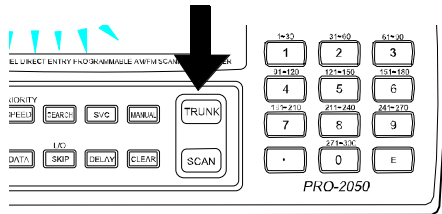
The disadvantage of a Type I system is that the brief burst of data sent when a user transmits must contain the radio's ID and its fleet and subfleet. This is three times the amount of data a Type II system radio sends. Since the data capacity of Type I systems is limited and the amount of data increases with each user, Type I systems usually accommodate fewer users than Type II systems. Nevertheless, Type I systems are still in use.

There are also *hybrid* systems which are a combination of both Type I and Type II. Your scanner defaults to monitor Type II systems, but you can change to Type I or a hybrid of Type I and Type II systems by selecting a preprogrammed fleet map or creating a custom fleet map for your area (see "Scanning Type I and Hybrid Trunked Systems" on Page 33).

You do not need to determine the fleet-subfleet hierarchy for Type II systems unless you are tracking hybrid systems that contain both Type I and Type II systems.

SETTING THE SCANNER TO THE TRUNK TRACKING MODE

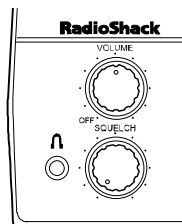
Press **TRUNK** to switch between the scanner's conventional and trunk tracking modes.



SETTING SQUELCH FOR THE TRUNK TRACKING MODE

Your scanner's squelch setting is automatically adjusted in the trunking mode, which means you do not need to manually adjust squelch while tracking trunked transmissions. However, the squelch setting can affect how fast your scanner acquires the data channel, and, in some instances, can prevent your scanner from acquiring the data channel at all.

We recommend you set **SQUELCH** to this position before selecting a trunked bank.



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Note: You can change this setting, if necessary, to provide better performance in your area.

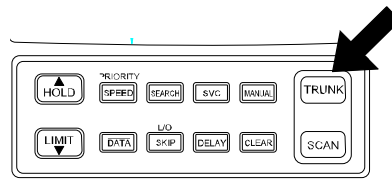
PROGRAMMING TRUNKED FREQUENCIES

Before you program your scanner to track a trunked system, consider the following:

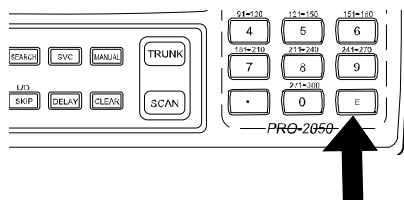
- Valid trunked system frequencies range from 851.0000–868.9875 in 12.5 kHz steps.
- You can use any of your scanner's banks as either a trunk tracking bank or conventional scanning bank, but you cannot mix the two.
- The scanner only scans one trunked system at a time. Although you can store frequencies for more than one trunked system in one of your scanner's banks, the scanner only scans the frequencies associated with the first data channel it finds.

Before scanning a trunked system's transmissions, you must store the trunked system's frequencies in one of the banks in your scanner by following these steps.

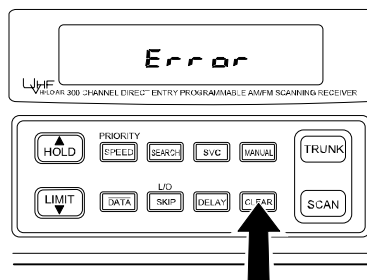
1. Hold down **TRUNK** until the scanner beeps twice. **BANK**, **TRUNK**, and the bank numbers flash.



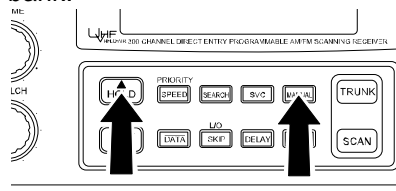
2. Select the bank you want to store the trunked system's frequencies in by pressing a number key. The scanner automatically selects the first channel in the bank.
3. Use the number keys to enter the trunked system's frequencies, then press **E**.



4. **Note:** If you entered an invalid frequency in Step 3, the scanner beeps, the channel number flashes and **Error** appears. If this happens, press **CLEAR** to clear the frequency, then repeat Step 3.



5. Press either **MANUAL** or **S** to select the next channel in the bank.

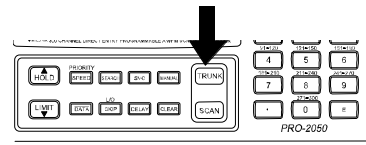


6. Repeat Steps 3 and 4 until all frequencies have been entered.

SCANNING A TRUNKED BANK

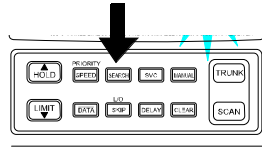
You can scan one trunked bank at a time. Once you have stored frequencies for a trunked system in one or more of the 10 available banks and you are scanning non-trunked frequencies, follow these steps to begin trunk scanning.

1. Press **TRUNK**. The indicators for all banks flash.



2. Use the number keys to enter the number for the trunked bank you want to scan, then press **SEARCH** to begin searching for the trunk's data channel (the channel that controls the trunk). **SEARCH** flashes as the scanner searches for a data channel. When the scanner finds it, it begins trunk tracking.

If you entered all of the trunk's frequencies, you should be able to follow conversations between broadcasters even when they change frequencies. IDs, which represent different service groups, appear.



Note: To see the bank currently in use for about 5 seconds, press **DATA** while in the trunk tracking mode.

3. To return to conventional scanning, press **TRUNK** again.

Hint: While scanning, you will not know exactly whom the IDs are assigned to until you listen awhile or until you locate ID lists in frequency guides or on internet sites such as www.trunkscanner.com. Within a few minutes, you can usually figure out if what you are listening to is a police, fire, or emergency medical 2-way radio user. Other IDs might take some time, but determining whom each ID represents is half the fun of trunk tracking!

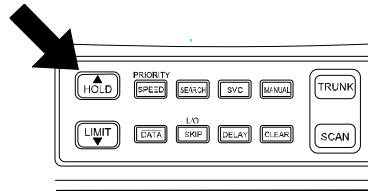
Monitoring an Active ID

When the scanner stops on a transmission, you can hold the scanner on that transmission.

1. Press **HOLD**. **HOLD** appears and the scanner stays on the current ID.
2. If you want to listen to a different ID, use the number keys to enter

the ID you want to hold. **LIST 1** appears

3. Press **HOLD** again. **HOLD** flashes and the scanner monitors that ID.



4. When you want to stop the hold and resume searching for a data channel so you can continue trunk tracking, press **SEARCH**.

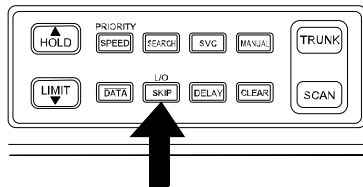
Note: You can also follow these steps to hold on an ID while scanning a scan list. See "Scan Lists" on Page 31.

Locking Out IDs

As with conventional scanning, it is possible to lock out unwanted traffic. This is particularly important in trunked systems because signals you cannot listen to (such as water meters, door alarms, traffic signals, and encrypted signals) are assigned IDs just like other users. You can have up to 100 IDs locked out at one time.

Note: If you lock out an ID while searching, it is also locked out of the scan list(s). See "Scan Lists" on Page 31.

To lock out an ID, press **L/O** when the ID appears.



The ID is locked out, and the next active ID appears.

Unlocking a Single ID

1. Hold down **L/O** until you hear two short beeps.
2. Repeatedly press **t** or **s** to select the ID you want to unlock.
3. Press **L/O**.

The ID is unlocked and the next locked ID appears.

4. Press **SEARCH** to continue the scanner's previous function.

Unlocking All IDs

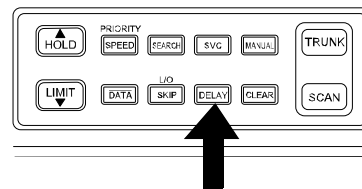
Hold down **L/O** until you hear two short beeps. Then press **E** to unlock all the IDs at once.- The scanner beeps twice.

Note: When you unlock all the IDs, the scan list mode appears. Press **SCAN** to scan the IDs stored in your scan lists or press **SEARCH** to continue the scanner's previous function. For more information about scan lists, see "Scan Lists" on Page 31.

Using Trunk Tracking Scan Delay

Many trunked systems have a period of 2 or more seconds between a query and a reply. You can program a 5-second delay so the scanner holds on an ID for 5 seconds to wait for a reply. The scanner continues to monitor the frequency for 5 seconds after the transmission stops before resuming scanning.

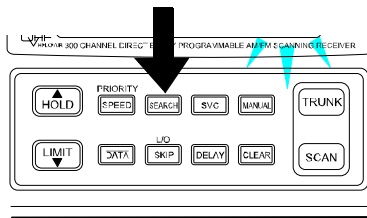
Press **DELAY** to turn trunk tracking scan delay on or off. **DELAY** appears when trunk tracking scan delay is set.



Note: If you consistently miss responses even with trunk tracking scan delay set, you might need to change the default system type or the fleet map you are using. See "Scanning Type I and Hybrid Trunked Systems" on Page 33.

Monitoring IDs

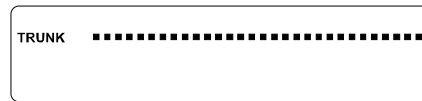
You can use your scanner's display to monitor the frequencies in a trunked system for activity. You cannot hear conversations in this mode, but this is an excellent way to determine which talk groups are the most active. To set the scanner to monitor IDs, hold down **SEARCH** until the scanner beeps twice. **SEARCH** flashes, and all active talk group IDs appear in succession. To stop monitoring IDs, press **SEARCH** again.



Note: When you monitor IDs, locked-out IDs also appear.

CHANNEL ACTIVITY INDICATORS

Your scanner has 30 channel activity indicators (bars) which show the activity taking place on a trunked system. You can see how many frequencies are being used and generally monitor how much communication traffic is occurring.

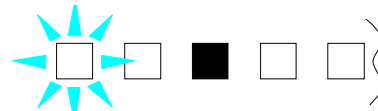


Each frequency you store in a trunking bank has a corresponding activity indicator.

- The indicator that remains on steadily even when there are no current transmissions represents the frequency being used as the data channel.



- The indicator that flashes when an ID appears represents the frequency being used by the radio you are currently hearing.



- If an indicator turns on but you do not hear a conversation, the channel is probably being used for a telephone interconnect call or a private call, or the indicator might be a locked-out ID. Your scanner does not monitor these types of calls.
- If the scanner is holding on an ID which is not active, the other activity indicators turn on and off as other groups use the system.

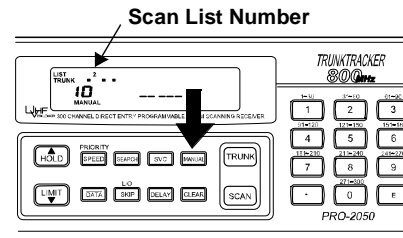
SCAN LISTS

When you program trunked frequencies into a bank (see "Programming Trunked Frequencies" on Page 26), your scanner sets up 5 scan lists into which you can store your favorite IDs. Each list can contain up to 10 IDs, so you can store a total of 50 IDs for each trunk tracking bank (500 IDs if you use all banks as trunking banks!).

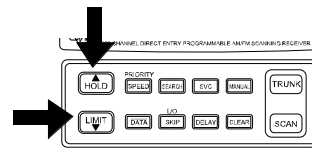
Scan lists help you organize trunking system users into categories. For example, you might use List 1 for police IDs, List 2 for fire department IDs, List 3 for emergency medical service IDs, and so on. Once IDs are stored in lists, you can scan them like you scan conventional channels. You can program IDs into scan lists manually, during a search, or automatically.

Manually Storing IDs into Scan Lists

1. Select the trunking bank you want (see "Scanning a Trunked Bank" on Page 27).
2. After the scanner begins trunk tracking, press **MANUAL**. A scan list number appears at the top of the display, and a bar shows the channel activity.



3. Repeatedly press **s** or **t** to select the scan list location (shown at the top of the display) you want to program.



4. Enter the Type II ID you want to store, then press **E**.

Or, to enter a Type I ID:

- a. Use the number keys to enter the block number and the fleet number, then press **•**.
- b. Enter the subfleet number, then press **E**.

Note: To clear a mistake while entering an ID, press **CLEAR**, then start over at Step 4.

5. Repeatedly press **MANUAL** or **s** to select the next scan list location you want to program. Then repeat Step 4 to enter another ID.

Storing IDs into Scan Lists While Searching

Follow these steps to select a scan list location and store an ID during a search.

1. When your scanner stops on an ID you want to store, press **PRIORITY**. The currently selected scan list memory location flashes.
2. Press **E** to store the ID in the selected scan list memory location. Or, repeatedly press **s** or **t** to select the scan list memory location you want, then press **E**.
3. Press **SEARCH** to resume searching.

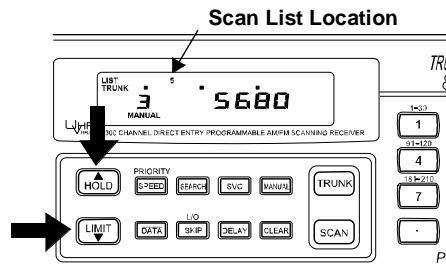
Automatically Storing an ID in a Scan List Location

To display a scan list location and store an ID in that location during a search, press **PRIORITY** to display the current scan list location, then press **E** when your scanner stops on an ID you want to store.

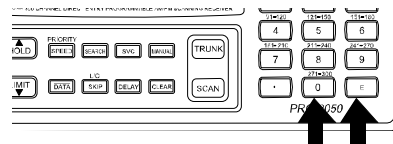
To store an ID in the first available scan list location during a search, press **E** at any time.

Deleting a Stored ID

1. Press **MANUAL**.
2. Repeatedly press **s** or **t** to select the scan list location (shown at the top of the display) you want to delete.



3. Press **0** then **E**.



SCANNING THE SCAN LISTS

Press **SCAN** to begin scanning the lists you have programmed. **SCAN** scrolls on the display.

Note: If you haven't programmed any IDs, **SCAN** scrolls on the display but your scanner does not stop on an active conversation.

To remove a scan list from active scanning, use the number keys to enter the scan list's number. The scan list indicator turns off, and the IDs in that list are not scanned.

Note: You cannot remove all the scan lists. One scan list must always be active.

To restore a scan list to active scanning, use the number keys to enter its number again.

Press **SEARCH** to return to the scanner's previous function.

SCANNING TYPE I AND HYBRID TRUNKED SYSTEMS

Your PRO-2050 is set to scan Type II user IDs by default. When you scan trunked frequencies, each Type II user ID you see appears as an even number without a dash (such as 2160). Your PRO-2050 can also scan Type I trunked systems. Each Type I ID appears as a three- or four-digit number, followed by a hyphen, followed by a one- or two-digit number (such as 200-14).

If you notice a mix of odd- and even-user IDs (such as 6477, 2160, 6481, 6144, and 1167), then you are probably monitoring either a Type I or hybrid (a combination of Type I and Type 2

user IDs) system. (See "Types of Trunking Systems" on Page 25.)

You might also notice that you are missing responses when you hold on an active ID. Unlike Type II systems, Type I and hybrid systems require a fleet map that sets specific fleet-subfleet parameters. It is easy to select a fleet map to scan; what is not always easy is selecting or programming a map that is being used in your particular area.

When a Type I system is designed, the address information for all its user IDs is divided into 8 equal-size blocks, numbered 0–7, and each block is assigned a size code. When you set up your scanner to track a Type I system, you must choose a size code for each block. When you have chosen a size code for all 8 blocks, you will have duplicated the *fleet map* for the system you are tracking. If you have chosen correctly, you will be able to track transmissions in that system.

Each size code defines the number of fleets, subfleets, and IDs each block has. For example, you can see in the following table that a size code of S4 has one fleet, which is divided into 16 separate subfleets, and it has a total of 512 individual IDs.

Size	Fleets	Sub-fleets	IDs	Block Used
S0	Reserved block for Type II IDs			
S1	128	4	16	1

S2	16	8	64	1
S3	8	8	128	1
S4	1	16	512	1
S5	64	4	32	1
S6	32	8	32	1
S7	32	4	64	1
S8	16	4	128	1
S9	8	4	256	1
S10	4	8	256	1
S11	2	16	256	1
S12	1	16	1024	2
S13	1	16	2048	4
S14	1	16	4096	8

Each ID in the block is unique. The left-most digit is the block number in the ID. The next two digits identify which fleet is active, and the last digit(s) (after the hyphen) identifies the subfleet.

The size codes selected by a Type I system designer depend on the specific needs of the system's users. Some organizations might want many subfleets with only a few radios each, while another organization might want only a few subfleets, with many radios each. To scan Type I systems, you must select or program a fleet map with the same size code assignments as the trunked system. If you do this accurately, you will track all the fleet and subfleet combinations used by the system. In other words, you will hear complete communications while monitoring a trunked system.

Note: *www.trunkscanner.com* plans to make preset fleet maps available as they become known.

If you do not already know the size codes used, you will have to guess them. But since you do not have to figure out all the blocks at once, this is not as hard as it seems. Select a size code for a block, then press **SEARCH**. Now listen to the communications. If you decide you are receiving most of the replies to the conversations with IDs assigned to the block you just programmed, then you have probably selected the right size code and can work on the next block of the map.

There are 16 preset fleet maps to choose from, and it is best to start with these when setting up a Type I or hybrid trunk tracking bank. If none of the following preset fleet maps allow you to follow complete conversations, then you probably need to program your own fleet map (see "Programming a Fleet Map" on Page 36)

E1P1		E1P2	
Block	Size Code	Block	Size Code
0	S11	0	S4
1	S11	1	S4
2	S11	2	S4
3	S11	3	S4
4	S11	4	S4
5	S11	5	S4
6	S11	6	S4
7	S11	7	S4

E1P3	E1P4
------	------

Block	Size Code	Block	Size Code
0	S4	0	S12
1	S4	1	—
2	S4	2	S4
3	S4	3	S4
4	S4	4	S4
5	S4	5	S4
6	S12	6	S4
7	—	7	S4
E1P5		E1P6	
Block	Size Code	Block	Size Code
0	S4	0	S3
1	S4	1	S10
2	S12	2	S4
3	—	3	S4
4	S4	4	S12
5	S4	5	—
6	S4	6	S12
7	S4	7	—

E1P7		E1P8	
Block	Size Code	Block	Size Code
0	S10	0	S1
1	S10	1	S1
2	S11	2	S2
3	S4	3	S2
4	S4	4	S3
5	S4	5	S3

6	S4	6	S4
7	S4	7	S4

E1P9		E1P10	
Block	Size Code	Block	Size Code
0	S4	0	S0
1	S4	1	S0
2	S0	2	S0
3	S0	3	S0
Block	Size Code	Block	Size Code
4	S0	4	S0
5	S0	5	S0
6	S0	6	S4
7	S0	7	S4

E1P11		E1P12	
Block	Size Code	Block	Size Code
0	S4	0	S0
1	S0	1	S0
2	S0	2	S0
3	S0	3	S0
4	S0	4	S0
5	S0	5	S0
6	S0	6	S0
7	S0	7	S4

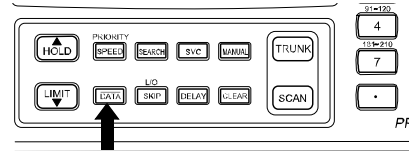
E1P13	E1P14
-------	-------

Block	Size Code	Block	Size Code
0	S3	0	S4
1	S3	1	S3
2	S11	2	S10
3	S4	3	S4
4	S4	4	S4
5	S0	5	S4
6	S0	6	S12
7	S0	7	—
E1P15		E1P16	
Block	Size Code	Block	Size Code
0	S4	0	S3
1	S4	1	S10
2	S4	2	S10
3	S11	3	S11
4	S11	4	S0
5	S0	5	S0
6	S12	6	S12
7	—	7	—

Selecting a Preset Fleet Map

1. Press **SCAN**, then hold down **TRUNK** until the scanner beeps twice. **BANK**, **TRUNK** and the bank numbers flash.
2. Select the bank where you want to store the preset fleet map by pressing a number key.

3. Press **DATA**.



4. Repeatedly press **s** or **t** to select **E1** (Type I and hybrid), then press **DATA** again.

Note: To select Type II, press **E** when **E2** appears.

5. Repeatedly press **s** or **t** to select the name of the map you want (such as **E1P7**), then press **E**.

The scanner then searches for transmissions using the preset map you chose.

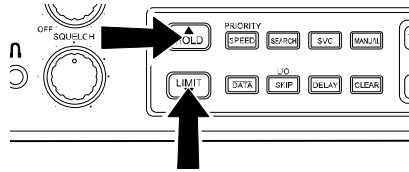
Note: When the scanner searches for transmissions, you see Type I fleet and subfleet IDs such as **100-12**, **100-9**, **000-12**, or **400-8**.

How do you know if the preset map you selected is correct? Listen to see if you are following complete conversations. If not, try another preset map.

Programming a Fleet Map

1. Hold down **TRUNK** until the scanner beeps twice. **BANK**, **TRUNK** and the bank number flash.
2. Select the bank where you want to program the fleet map by pressing a number key.
3. Press **DATA**.
4. Repeatedly press **s** or **t** until **E1** appears, then press **DATA**.

5. Repeatedly press **s** or **t** until **USR** appears.



6. Press **DATA**.
7. Repeatedly press **s** or **t** to select the size code for the first block, then press **E**. The next available block appears.
8. Repeat Step 7 until you have selected a size code for each block you want to work with.
9. Press **SEARCH**. The scanner exits the trunking programming mode, tunes the data channel, then begins to search using the map you programmed.

Note: If you select size code S12, S13, or S14, these restrictions apply:

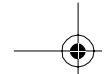
- S12 can only be assigned to Blocks 0, 2, 4, or 6.
- S13 can only be assigned to Blocks 0 and 4.
- S14 can only be assigned to Block 0.

Since these size codes require multiple blocks, you will be prompted for the next available block when programming a fleet map. For example, if you assign Block 0 as an S12, the scanner prompts you for **b2**, the next block available, instead of **b1**. And if you assign Block 0 as an S14, you

would not see another prompt because it uses all available blocks.

PROGRAMMING A HYBRID SYSTEM

A hybrid system is simply a Type I system with some of its blocks designated as Type II blocks. To program a hybrid system, follow the steps listed in "Programming a Fleet Map." However, if you want a block to be Type II, select size code **S0** in Step 7.



A GENERAL GUIDE TO SCANNING

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.

GUIDE TO FREQUENCIES

National Weather Frequencies

162.400	162.475	162.525	162.425
162.500	162.550	162.450	

Canadian Weather

Frequencies

161.650	161.775	163.275
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Note: These three frequencies are not pre-programmed in the weather service bank but can be manually programmed into a channel.

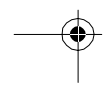
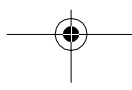
frequencies might interfere with broadcasts on the same frequencies. If you program one of these frequencies, you hear only noise on that frequency. If the interference is not severe, you might be able to turn **SQUELCH** clockwise to cut out the birdie. This scanner's birdie frequencies (in MHz) are:

Birdie Frequencies

Every scanner has birdie frequencies. Birdies are signals created inside the scanner's receiver. These operating

171.25	406.7625	407.8125	413.175	413.225
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To find the birdies in your individual scanner, begin by disconnecting the antenna and moving it away from the scanner. Make sure that no other nearby radio or TV sets are turned on near the scanner. Use the search function and search every frequency range from its lowest frequency to the highest. Occasionally, the searching will stop as if it had found a signal, often without any sound. That is a birdie. Make a list of all the birdies in your scanner for future reference.



GUIDE TO THE ACTION BANDS

Typical Band Usage

VHF Band

Low Range	29.00–50.00 MHz
6-Meter Amateur	50.00–54.00 MHz
Aircraft	108.00–136.00 MHz
U.S. Government	137.00–144.00 MHz
2-Meter Amateur	144.00–148.00 MHz
High Range	148.00–174.00 MHz

UHF Band

U.S. Government	406.00–420.00 MHz
70-cm Amateur	420.00–450.00 MHz
Low Range	450.00–470.00 MHz
FM-TV Audio Broadcast, Wide Band	470.00–512.00 MHz
Public Service	806.00–823.93 MHz
Conventional Systems	851.00–856.00 MHz
Conventional/Trunked Systems	856.00–861.00 MHz
Trunked Systems	861.00–866.00 MHz
Public Safety	866.00–868.93 MHz
High Range	896.11–902.00 MHz
33-Centimeter Amateur	902.00–928.00 MHz
Private Trunked	935.00–940.00 MHz
General Trunked	940.00–941.00 MHz
Fixed Services	941.00–944.00 MHz
Studio-to-Transmitter Broadcast Links	944.00–952.00 MHz
Private Fixed Services, Paging	952.00–960.00 MHz
Aeronautical Navigation	960.00–1000.00 MHz

Primary Usage

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

Activities

Government, Police, and Fire
Emergency Services
Railroad

VHF Band

Frequencies

153.785–155.980 MHz
158.730–159.460 MHz
160.000–161.900 MHz

UHF Band

Activities

Land-Mobile “Paired” Frequencies
Base Stations
Mobile Units
Repeater Units
Control Stations

Frequencies

450.000–470.000 MHz
451.025–454.950 MHz
456.025–459.950 MHz
460.025–464.975 MHz
465.025–469.975 MHz

Note: Remote control stations and mobile units operate at 5 MHz higher than their associated base stations and relay repeater units.

Abbreviations/Services

BIFCBoise (ID) Interagency Fire Cache
BUSBusiness
CAPCivil Air Patrol
CBCCitizens Band
CCACommon Carrier
CSBConventional Systems
CTSBConventional/Trunked Systems

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 the “Police Call Radio Guide including Fire and Emergency Services,” available at your local RadioShack store.

FIRE	.....	Fire Department
HAM	.....	Amateur (Ham) Radio
GOVT	.....	Federal Government
GMR	.....	General Mobile Radio
GTR	.....	General Trunked
IND	.....	Industrial Services
	.....	(Manufacturing, Construction, Farming, Forest Products)
MAR	.....	Military Amateur Radio
MARI	.....	Maritime Limited Coast
	.....	(Coast Guard, Marine Telephone,
	.....	Shipboard Radio, 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, Forestry Conservation)
PSB	.....	Public Safety
PTR	.....	Private Trunked
ROAD	.....	Road & Highway Maintenance
RTV	.....	Radio/TV Remote Broadcast Pickup
TAXI	.....	Taxi Services
TELB	.....	Mobile Telephone
	.....	(Aircraft, Radio Common Carrier, Landline Companies)
TELC	.....	Cordless Phones
TELM	.....	Telephone Maintenance
TOW	.....	Tow Trucks
TRAN	.....	Transportation Services
	.....	(Trucks, Tow Trucks, Buses, Railroad, Other)
TSB	.....	Trunked Systems
TVn	.....	FM-TV Audio Broadcast
USXX	.....	Government Classified
UTIL	.....	Power & Water Utilities
WTHR	.....	Weather

HIGH FREQUENCY (HF) — (3 MHz–30 MHz)

10-Meter Amateur Band (28.0–29.7 MHz)

29.000–29.700 HAM

VERY HIGH FREQUENCY (VHF) — (30 MHz–300 MHz)

VHF Low Band (29.7–50 MHz—in 5 kHz steps)

29.700–29.790	.....	IND
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, PUB, IND, TELM
36.000–36.230	GOVT, MIL
36.230–36.990	Oil Spill Cleanup, 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	TELM, IND, PUB
43.700–44.600	TRAN
44.620–46.580	POL, PUB
46.600–46.990	GOVT, TELC
47.020–47.400	PUB
47.420	American Red Cross
47.440–49.580	IND, PUB
49.610–49.990	MIL, TELC

6-Meter Amateur Band (50–54 MHz)

50.00–54.00	HAM
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Aircraft Band (108–136 MHz)

108.000–121.490	AIR
121.500	AIR Emergency
121.510–136.000	AIR

U.S. Government Band (137–144 MHz)

137.000–144.000	GOVT, MIL
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2-Meter Amateur Band (144–148 MHz)

144.000–148.000	HAM
-----------------	-----

VHF High Band (148–174 MHz)

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
152.030–152.240	TELB
152.270–152.480	IND, TAXI, BUS
152.510–152.840	TELB
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
157.770–158.100	TELB
158.130–158.460	BUS, IND, OIL, TELM, UTIL
158.490–158.700	TELB
158.730–159.465	POL, PUB, ROAD
159.480	OIL
159.495–161.565	TRAN
161.580–162.000	OIL, MARI, RTV
162.0125–162.35	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
169.55–169.9875	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
173.60–173.9875	GOVT

ULTRA HIGH FREQUENCY (UHF) — (406 MHz–3 GHz)

U. S. Government Band (406–420 MHz)

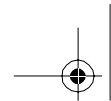
406.125–419.975	GOVT, USXX
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70-Centimeter Amateur Band (420–450 MHz)

420.000–450.000	HAM
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Low Band (450–470 MHz)

450.050–450.925	RTV
451.025–452.025	IND, OIL, TELM, UTIL
452.0375–453.00	IND, TAXI, TRAN TOW, NEWS
453.0125–454.000	PUB, OIL
454.025–454.975	TELB
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 Wide Band (470–512 MHz)
(Channels 14 through 69 in 6 MHz steps)**

475.750	Channel 14
481.750	Channel 15
487.750	Channel 16
...	...
511.750	Channel 20

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

Conventional Systems Band – Locally Assigned

851.0125–855.9875	CSB
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Conventional/Trunked Systems Band – Locally Assigned

856.0125–860.9875	CTSB
-------------------------	------

Trunked Systems Band – Locally Assigned

861.0125–865.9875	TSB
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Public Safety Band – Locally Assigned

866.0125–868.9875	PSB
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33-Centimeter Amateur Band (902–928 MHz)

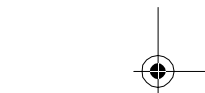
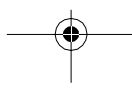
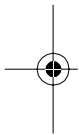
902.0000–928.0000	HAM
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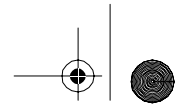
Private Trunked

935.0125–939.9875	PTR
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General Trunked

940.0125–940.9875	GTR
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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.

$$1 \text{ MHz (million)} = 1,000 \text{ kHz (thousand)}$$

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

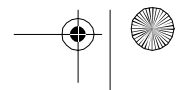
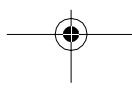
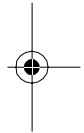
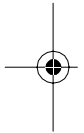
$$9.62 \text{ (MHz)} \times 1000 = 9620 \text{ kHz}$$

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

$$2780 \text{ (kHz)} \div 1000 = 2.780 \text{ MHz}$$

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

$$300 \div 7.1 \text{ MHz} = 42.25 \text{ meters}$$



TROUBLESHOOTING

If your scanner is not working as it should, these suggestions might help you eliminate the problem. If the scanner still does not operate properly, take it to your local RadioShack store for assistance.

PROBLEM	POSSIBLE CAUSE	REMEDY
Scanner is on but will not scan.	SQUELCH is not correctly adjusted.	Adjust SQUELCH clockwise.
	Only one channel or no channels are stored.	Store frequencies into more than one channel.
Scanner is totally inoperative.	No power.	Make sure the scanner is plugged into a working AC or DC outlet.
	The AC or DC adapter is not connected.	Be sure the adapter's barrel plug is fully inserted into the DC 12V jack.
	The scanner must be reset.	Reset the scanner (see "Resetting the Scanner" on Page 49).
Poor or no reception	An antenna is not connected or connected incorrectly.	Make sure an antenna is connected to the scanner.
Error appears.	Programming error.	Reprogram the frequency correctly, including the decimal point.
In the scan mode, the scanner locks on frequencies that have an unclear transmission.	Programmed frequencies are the same as "birdie" frequencies.	Avoid programming frequencies listed under "Birdie Frequencies" on Page 38 or only listen to them manually.
Scanner will not track a trunked system.	The transmission might not use a system that can be tracked by your scanner.	Scan another transmission.

PROBLEM	POSSIBLE CAUSE	REMEDY
Scanner will not track a trunked system. <i>(continued)</i>	The data frequency is missing.	Find the data frequency (see "Programming Trunked Frequencies" on Page 26).
	The system you are trying to track is a Type I system, and the scanner is set to scan Type II systems.	Set the scanner to receive Type I trunked frequencies. See "Scanning Type I and Hybrid Trunked Systems" on Page 33.
Scanner will not stop while scanning a scan list.	No IDs have been stored.	Store one or more IDs (see "Scan Lists" on Page 31).
	The IDs you have stored are not active.	Scan another transmission.
Scanner will not acquire a data channel.	SQUELCH is not correctly adjusted for trunk tracking.	Adjust squelch for trunk tracking. See "Setting Squelch for the Trunk Tracking Mode" on Page 26.
	The frequency used for the data channel is missing.	Add the frequency used for the data channel to the frequency list. (see "Programming Trunked Frequencies" on Page 26).
Missing replies to conversations.	The system you are trying to track is a Type I system, and the scanner is set to scan Type II systems.	Set the scanner to receive Type I trunked frequencies. See "Scanning Type I and Hybrid Trunked Systems" on Page 33.

PROBLEM	POSSIBLE CAUSE	REMEDY
Missing replies to conversations. (continued)	The selected fleet map is incorrect.	Try another preset fleet map or program your own fleet map (see "Scanning Type I and Hybrid Trunked Systems" on Page 33).
	Not all of the trunk's frequencies have been entered.	Enter all of the trunk's frequencies.
Channel activity indicators are lighting but no sound is heard.	The transmission might be a private or telephone interconnect call. The scanner does not scan these types of transmissions.	Scan for another transmission.
	The ID is locked out.	Unlock the ID (see "Unlocking a Single ID" on Page 29 or "Unlocking All IDs" on Page 29).

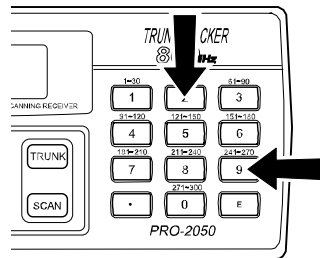
RESETTING THE SCANNER

You might need to reset the scanner if any of the following occur:

- The scanner's display locks up.
- The scanner does not work properly after you connect power.
- The scanner is dropped or subjected to a physical or electrical shock.

Caution: This procedure clears all the information you have programmed into the scanner. Use this procedure only when you are sure your scanner is not working properly.

1. Turn off the scanner.
2. While you press and hold down **2** and **9**, turn on the scanner.



Note: It takes about 10 seconds until the reset is completed. **CLEAR** appears during resetting.

Caution: Do not turn off the scanner while you reset it.

CARE AND MAINTENANCE

Your RadioShack PRO-2050 VHF/UHF/Air/800MHz 300-Channel TrunkTracker Home Scanner is an example of superior design and craftsmanship. The following suggestions will help you care for your scanner so you can enjoy it for years.



Keep the scanner dry. If it gets wet, wipe it dry immediately. Liquids can contain minerals that can corrode the electronic circuits.



Handle the scanner gently and carefully. Dropping it can damage circuit boards and cases and can cause the scanner to work improperly.



Use and store the scanner only in normal temperature environments. Temperature extremes can shorten the life of electronic devices and distort or melt plastic parts.



Keep the scanner away from dust and dirt, which can cause premature wear of parts.



Wipe the scanner with a damp cloth occasionally to keep it looking new. Do not use harsh chemicals, cleaning solvents, or strong detergents to clean the scanner.

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

SPECIFICATIONS

Frequency Coverage:

10 Meter Amateur Radio	29.000–29.6950 MHz (in 5 kHz steps)
VHF Lo	29.7000–49.9950 MHz (in 5 kHz steps)
6 Meter Amateur Radio	50.0000–54.0000 MHz (in 5 kHz steps)
Aircraft	108.0000–136.9750 MHz (in 12.5 kHz steps)
Government	137.0000–143.9950 MHz (in 5 kHz steps)
2 Meter Amateur Radio	144.000–147.9950 MHz (in 5 kHz steps)
VHF Hi	148.0000–174.0000 MHz (in 5 kHz steps)
Amateur Radio/Government	406.0000–419.9875 MHz (in 12.5 kHz steps)
70-cm Amateur Radio	420.0000–449.9875 MHz (in 12.5 kHz steps)
UHF Standard	450.0000–469.9875 MHz (in 12.5 kHz steps)
UHF "T"	470.0000–512.0000 MHz (in 12.5 kHz steps)
Public Service	806.0000–823.9375 MHz (in 12.5 kHz steps)
Public Service/Trunking Repeater	851.0000–868.9875 MHz (in 12.5 kHz steps)
Public Service	896.1125–956.0000 MHz (in 12.5 kHz steps)

Channels of Operation Any 300 channels in any band combinations
(30 channels ¥ 10 banks), 50 search skip memories, and
20 service search skip memories

Sensitivity (S+N)/N=20 dB:

29–54 MHz	0.5 µV
108–136.975 MHz	1.5 µV
137–174 MHz	0.5 µV
406–512 MHz	0.4 µV
806–956 MHz	1.0 µV

Search Speed:

Normal	100 Steps/Sec (Max)
Hyper	300 Steps/Sec (Max) (only 5 kHz step band)

Scan Speed 50 Channels/Sec. (Nominal)

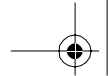
Delay Time 2 Seconds

IF Frequencies:

1st IF	29–174 MHz: 380.6050–380.7000 MHz
	406–512 MHz: 380.6125–380.700 MHz
	806–956 MHz: 380.7000–380.7875 MHz
2nd IF	10.85 MHz
3rd IF	450 kHz

Squelch Sensitivity:

Threshold	Less than 0.6 mV
Tight	VHF Lo, Hi, UHF (S + N)/N 25 dB Aircraft (S + N)/N 15 dB



Audio Power 1.1 W Maximum

Power Requirements:

AC Adapter 12 Volts DC

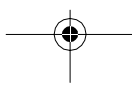
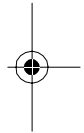
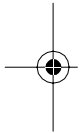
DC Adapter 12 Volts DC (such as
Cat. No. 270-1533)

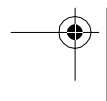
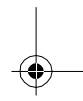
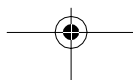
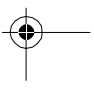
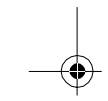
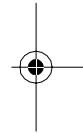
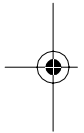
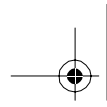
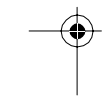
Dimensions $2\frac{3}{4} \times 8\frac{1}{16} \times 7\frac{11}{16}$ Inches
(HWD)

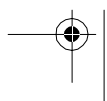
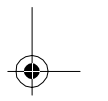
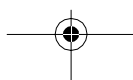
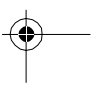
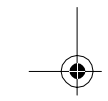
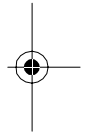
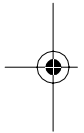
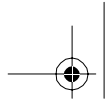
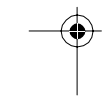
(70 × 205 × 195 mm)

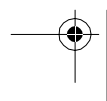
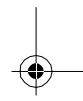
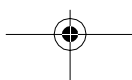
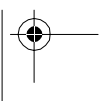
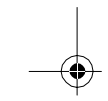
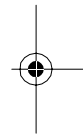
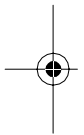
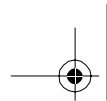
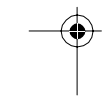
Weight 26.5 oz. (750 g)

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









Limited One-Year Warranty

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Some states do not allow the limitations on how long an implied warranty lasts or the exclusion of incidental or consequential damages, so the above limitations or exclusions may not apply to you.

In the event of a product defect during the warranty period, take the product and the RadioShack sales receipt as proof of purchase date to any RadioShack store. RadioShack will, at its option, unless otherwise provided by law: (a) correct the defect by product repair without charge for parts and labor; (b) replace the product with one of the same or similar design; or (c) refund the purchase price. All replaced parts and products, and products on which a refund is made, become the property of RadioShack. New or reconditioned parts and products may be used in the performance of warranty service. Repaired or replaced parts and products are warranted for the remainder of the original warranty period. You will be charged for repair or replacement of the product made after the expiration of the warranty period.

This warranty does not cover: (a) damage or failure caused by or attributable to acts of God, abuse, accident, misuse, improper or abnormal usage, failure to follow instructions, improper installation or maintenance, alteration, lightning or other incidence of excess voltage or current; (b) any repairs other than those provided by a RadioShack Authorized Service Facility; (c) consumables such as fuses or batteries; (d) cosmetic damage; (e) transportation, shipping or insurance costs; or (f) costs of product removal, installation, set-up service adjustment or reinstallation.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

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