



**RadioShack®**

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## **PRO-93**

**300 Channel Dual Track-Trunking  
Handheld Scanner**



**Owner's Manual**

Please read before using this equipment.

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## **Features**

Your RadioShack Handheld Scanner is one of a new generation of scanners designed to track Motorola® Type I and II (such as Smartnet® and Privacy Plus®) and hybrid analog trunking systems, and GE/Ericsson (EDACS®) type systems, which are extensively used in many 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 set of frequencies. Instead of selecting a specific frequency for a transmission, the 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 transmission.

Since the trunking system might send a call and its response on different frequencies, it is difficult to listen to trunked communications using a regular scanner. The trunking scanner monitors the data sent with a 2-way radio transmission, so you can hear the call and response for that user and more easily "follow" the conversation.

The scanner also lets you scan conventional transmissions, and is preprogrammed 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.

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

Your scanner includes these features:

**Simultaneous Trunking Operation** — tracks two trunking systems (Motorola and EDACS) and conventional systems at the same time.

**Automatic Channel Programming** — automatically determines the group trunking frequencies, for Motorola

trunking systems only, once the control channels are programmed.

**10 Channel-Storage Banks** — let you store 30 channels in each bank (300 channels) to group channels so calls are easier to identify.

**10 ID-Storage Banks** — let you store 1,000 IDs in 10 ID banks that have 5 sub-ID banks. 20 IDs are programmed in each sub-ID bank and let you easily identify the ID code.

**Weather Alert** — automatically sounds the alarm tone to advise of hazardous weather conditions when it detects the alert signal on the local National Oceanic and Atmospheric Administration (NOAA) weather channel during priority operation.

**Digital Weather Alert** — displays the weather event text with four alert levels so you can see and hear the reason for the alert.

**Data Cloning** — lets you transfer the programmed data to another PRO-93 or a PRO-2053 scanner. You can also upload or download the programmed data to or from a PC using an optional PC interface kit.

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

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

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

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

**Scan Delay** — delays scanning for about 2 seconds before moving to another channel in conventional mode, so

you can hear more replies that are made on the same channel.

**Priority Channel** — lets you set the scanner to check one channel every 2 seconds so you do not miss transmissions.

**Attenuate** — lets you program your scanner to reduce the scanner's sensitivity to strong local signals, to reduce interference or noise caused by these signals.

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

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

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

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

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

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

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

Your scanner can receive these frequencies:

- 25–54 MHz
- 108–136.9875 MHz

- 137–174 MHz
- 216.0025–225 MHz
- 406–512 MHz
- 806–823.9875 MHz
- 849–868.9875 MHz
- 894–960 MHz
- 1240–1300 MHz

Use “A General Guide to Frequencies” on Page 64 to help you target frequency ranges in your service area so you can search for a wide variety of transmissions.

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## ***The FCC Wants You to Know***

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

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

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.



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

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

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

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

## 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 listening to, 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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## *Preparation*

### **POWER SOURCES**

You can power your scanner from any of three sources:

- internal non-rechargeable batteries or rechargeable batteries (not supplied — see “Using Batteries” on Page 10).
- standard AC power (with an optional AC adapter — see “Using AC Power” on Page 13)
- vehicle power (with an optional DC adapter — see “Using Vehicle Battery Power” on Page 13)

#### **Notes:**

- Connecting an AC or DC adapter to the scanner disconnects internal batteries when you use the supplied non-rechargeable battery holder, but it does not disconnect internal batteries when you use the supplied rechargeable battery holder.
- If you install the rechargeable battery holder, you can operate the scanner and recharge the rechargeable batteries at the same time. See “Using Batteries” and “Charging Rechargeable Batteries” on Page 12.
- If the scanner stops working properly after connecting it to power, try resetting it. See “Resetting/Initializing the Scanner” on Page 79.

### **Using Batteries**

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

You can use either the supplied non-rechargeable battery holder (black), or the supplied rechargeable battery holder (yellow). If you use the rechargeable battery hold-

er, we recommend RadioShack nickel-metal hydride (Ni–MH) batteries.

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

**Note:** You must charge rechargeable batteries before you use them the first time. See “Charging Rechargeable Batteries” on Page 12.

**Cautions:**

- The battery holder fits only one way. Do not force it.
- Use only fresh batteries of the required size and recommended type.
- Always remove old or weak batteries. Batteries can leak chemicals that destroy electronic circuits.
- Do not mix old and new batteries, different types of batteries (alkaline or rechargeable), or rechargeable batteries of different capacities.

Follow these steps to install the batteries:

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

*If you are using rechargeable batteries*, place them into the yellow holder as indicated by the polarity symbols (+ and –) marked on the holder.

4. Place the battery holder into the battery compartment.
5. Replace the cover.

When battery power is low, **Low Battery!** appears and the scanner beeps continuously. When battery power is depleted, the scanner turns itself off. Replace all four non-rechargeable batteries, or recharge the rechargeable batteries. See “Charging Rechargeable Batteries” on Page 12.

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

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

## Charging Rechargeable Batteries

Your scanner has a built-in charging circuit that lets you charge nickel-metal hydride (Ni-MH) or nickel cadmium (Ni-CD) rechargeable batteries (not supplied) while they are in the scanner. To charge rechargeable batteries, connect an appropriate AC or DC adapter to the **PWR DC 9V** jack. For best results we recommend RadioShack rechargeable nickel-metal hydride (Ni-MH) 1500mAh batteries.

### Notes:

- To charge batteries with a DC adapter from a DC power source, you must use a 9V, 300 mA DC adapter such as RadioShack Cat. No. 273-1810 or 273-1815 and a size C Adaptaplug™ (neither supplied). Both are available at your local RadioShack store. Make sure the adapter's voltage is set to 9V.
- It takes about 15 hours to recharge fully discharged 1500mAh Ni-MH rechargeable batteries. You can operate the scanner while recharging the rechargeable batteries, but charging takes longer.
- The scanner can also charge Ni-Cd batteries. 600mAh batteries require 6 hours and 850mAh batteries require 8 hours to charge.
- When you charge Ni-Cd batteries, pay attention not to over charge. Overcharging shortens battery life.

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

## Using AC Power

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

### Cautions:



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

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

To connect the adapter.

1. Connect the Adaptaplug to the adapter's cord with the tip set to positive.
2. Plug the adapter's barrel plug into the scanner's **PWR DC 9V** jack.
3. Plug the adapter's two-prong plug into an AC outlet.

## Using Vehicle Battery Power

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

## Cautions:



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

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

To connect the adapter.

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

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

## CONNECTING THE ANTENNA

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

### Connecting an Optional Antenna


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

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

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

**Warning:** Use extreme caution when installing or removing an outdoor antenna. If the antenna starts to fall, let it go! It could contact overhead power lines. If the antenna touches a power line, 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 AN EARPHONE/ HEADPHONES

For private listening, you can plug an  $\frac{1}{8}$ -inch (3.5 mm) mini-plug earphone or headphones (not supplied), available at your local RadioShack store, into the  jack on top of your 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 the volume to the lowest setting before you begin listening. After you begin listening, adjust the volume to a comfortable level.
- Once you set the 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.

## Traffic Safety

Do not wear an earphone or headphones while you drive a vehicle or ride a bicycle. This can create a traffic hazard and can be illegal in some areas. Even though some earphones and headphones let you hear some outside sounds when you listen at normal levels, they still can present a traffic hazard.

## Connecting an Extension Speaker

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

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

## Using the Belt Clip

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

## Transferring Data to and from Another Scanner or a PC

You can transfer the programmed data to and from another PRO-93 or a PRO-2053 using a connecting cable which has  $\frac{1}{8}$ -inch phone plugs on both ends (not supplied). Connect the cable between each scanner's **PC/IF** jacks. See "Cloning the Programmed Data" on Page 49. You can also upload or download the programmed data to or from a PC using an optional PC interface kit available through your local RadioShack store.



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## **About Your Scanner**

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

A frequency is the receiving signal location (expressed in kHz or MHz). To find active frequencies, you can use the search function.

You can also search the SEARCH banks, which are pre-programmed frequencies in the scanner's memory (see "Searching a Preprogrammed Frequency Range" on Page 30 for the frequency list). You can even change the frequency range on one of the SEARCH banks (SR5) to limit the search.

When you find a frequency, you can store it into a programmable memory location called a channel, which is grouped with 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 KEYPAD**

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

**SCAN** — scans through the programmed channels.

**FUNC** (function) — lets you use various functions by pressing this key in combination with other keys.

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

**WX** — scans through the seven preprogrammed weather channels.



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

**PRI** (Priority) — sets and turns the priority function on or off.

**TEXT** — lets you input text.

**PAUSE** — stops search.

**MODE** — changes the receive mode (AM, FM, MOT, ED).

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

**TUNE** — lets you input a frequency and allows you to fine tune a frequency along with ▲ or ▼.

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

▲ or ▼ — selects the scan or search direction.

**SEARCH** — lets you search the six search banks.

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

**PGM** — programs frequencies into channels.

**ENTER** — completes the entry of frequencies and text.

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

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

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

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

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

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

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

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

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

**0** — enters a zero, or inputs characters ., -, #, \_, @, +, \*, &, /, ', \$, %, !, ^, (, ), ?, ->, ` or <-.

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

**CL** - clears an incorrect entry.

## QUICK START

To help familiarize yourself with the scanner's functions, keypad, and available frequencies, you can utilize one of these three features before you begin programming the scanner.

**Preprogrammed Search Banks** — allow you to listen to frequencies and decide which frequencies you want to store when you are ready to program the scanner. See “Searching a Preprogrammed Frequency Range” on Page 30.

**Manual Tuning** — allows you to manually scan through the entire range of available frequencies without programming. (See “Specifications” on Page 81 for a list of the available frequency ranges.) Also, see “Deleting Frequencies from Channels” on Page 41.

**Weather Radio** — allows you to listen to NOAA weather broadcasts without programming. See “Listening to the Weather Band” on Page 37.

## UNDERSTANDING BANKS

### Channel Storage Banks

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

To make it easier to identify and select the channels you want to listen to, your scanner divides the channels into

10 banks (0 to 9) of 30 (00 to 29) channels each, a total of 300 channels. You can use each channel-storage bank to group frequencies, such as those used by Motorola trunking, EDACS trunking, Marine, CB, Police, Fire, Aircraft and Ham (see “Typical Band Usage” on Page 67).

For example, a police department might use four frequencies, one for each side of town. You could program the police frequencies starting with 000 (the first channel in bank 0) and program the fire department frequencies starting with 100 (the first channel in bank 1). The first digit identifies the bank (0 to 9). The second and third digits identify the channel within the bank (00 to 29).

## Search Banks

Your scanner has five preprogrammed search banks and one limit search bank. You can set the lower and higher frequency limit in the limit search bank. (For the default setting, see “Searching a Preprogrammed Frequency Range” on Page 30).

## UNDERSTANDING YOUR SCANNER'S MODES

You can program each channel with any of four receive modes (AM, FM, MOT, and ED). However, you can not program MOT (Motorola), or ED (EDACS) mode in VHF. Each receive mode affects how your scanner operates when scanning and receiving transmissions, and also affects what transmissions you receive when you set the scanner to the closed mode. See “Changing the Receive Mode” on Page 46.

### AM Mode

The AM mode sets the scanner to receive transmissions using amplitude modulation (AM), primarily used for aircraft, military, some amateur radio, and some government transmissions. (Refer to “Specifications” on Page 81 for a list of the frequencies covered.) When the scanner receives a transmission on a channel set to the AM mode, it always stops on the transmission.

## **FM Mode**

The FM mode sets the scanner to receive transmissions using frequency modulation (FM), used for most public safety transmissions, as well as broadcast, business, and amateur radio transmissions. When the scanner receives a transmission on a channel set to the FM mode, it always stops on the transmission.

## **Motorola Mode**

You can set your scanner so it decodes the talk group IDs used with Motorola trunking systems. This setting is called the Motorola mode.

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

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

Motorola trunking systems come in three categories: Type I, Type II, and Type I/II Hybrid. Each category displays and uses talk group IDs in slightly different ways.

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

FFF=Fleet ID

SS=Subfleet ID

Type I systems are usually organized with different user groups assigned to different fleets. For example, a valid fleet-subfleet ID identifying all detectives within a police department might be **000-12**, where 000 identifies all police users and 12 identifies the Detective division.

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

Type II system talk groups are identified by a 5-digit number. Valid talk group IDs are divisible by 16. If you try to enter an invalid talk group ID, the scanner rounds the ID down to the next valid ID.

Type I/II hybrid systems use both fleet-subfleet and 5-digit formats for talk group IDs.

**Note:** If the scanner decodes control channel data while receiving transmissions from a Motorola trunking system, **CTRL** appears on the bottom line of the display.

## EDACS Mode

You can set your scanner so it decodes the talk group IDs used with EDACS (GE/Ericsson) trunking systems. This setting is called the EDACS mode.

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

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

When there is activity on an EDACS system, that information is sent out on the control channel. The scanner decodes the ID for the active talk group. In the open

mode, the scanner then goes to the transmission and displays the talk group ID on the bottom line of the display. In the closed mode, the scanner only goes to transmissions with IDs that match talk group IDs you have stored in the bank's talk group ID list which are not locked out.

Because EDACS scanning requires clear reception of the control channel at all times, EDACS systems tend to have a smaller usable area. An external antenna can greatly improve EDACS scanning in a fringe area. If you are having trouble scanning an EDACS system, try manually selecting the data channel. If you are getting good reception, the scanner will indicate talk group **CTL-01**. Try changing your location or using an outdoor antenna to improve reception.

## Open and Closed Modes

You can set your scanner to change the way it receives signals. These settings, called open mode and closed mode, affect how the scanner receives signals from communications systems that use some type of closed squelch (such as Motorola and EDACS systems).

You can set each of the scanner's channel storage banks to open or closed mode.

In open mode, the scanner scans signals transmitted in all systems. In closed mode, the scanner scans signals transmitted only under the following conditions:

- When the signals are in the FM mode.
- When the signals are in the MOT, or ED mode and the signal's ID code matches the programmed ID code.

You can also select the user or talk groups you want the scanner to receive in closed mode.

When you set a channel storage bank to open mode, **+** appears under the bank's number while scanning. When you set a channel storage bank to closed mode, **-** appears under the channel storage bank's number while scanning. **OPEN** or **CLOSED** appears while the scanner is

in manual mode or while the scanner is receiving a signal during scanning. See “Changing the Open/Closed Mode” on Page 64 for more information about setting the open and closed modes.

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## *Operation*

### **TURNING ON THE SCANNER AND SETTING SQUELCH**

1. Turn **SQUELCH** fully counterclockwise until the indicator points to **MIN** before you turn on the scanner.
2. To turn on the scanner, turn **VOLUME** clockwise. **Welcome To Dual Trunking** appears. After about 3 seconds, you hear a hissing sound.
3. Turn **SQUELCH** clockwise until the hissing sound stops.
4. To turn off the scanner, turn **VOLUME** counterclockwise to **OFF**.

#### **Notes:**

- The scanner does not scan if there are no frequencies stored in channels. If the scanner does not scan and you have already stored frequencies in channels, 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 will not scan properly.
- To ensure the scanner operates properly while in the trunking mode, we suggest you set **SQUELCH** using the steps listed above.



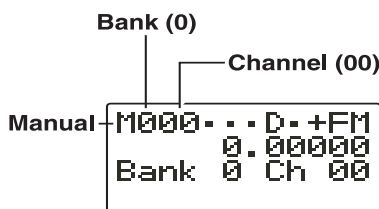
## STORING KNOWN FREQUENCIES INTO CHANNELS

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

**Note:** If you are storing frequencies for an EDACS system, you must store them in logical channel number order, with the first frequency in channel 1 for the current bank.

Follow these steps to store frequencies into channels.

1. Press **MANUAL**, enter the bank (0–9) and channel number (00–29) where you want to store a frequency, then press **MANUAL** again. **M** and the bank and channel number appear at the upper left corner of the display (for example: **M000**).



**Note:** When **M** is on the display, you can also select your desired bank and channel number with the **FUNC** and arrow keys.

- Press **FUNC** then press **▲** or **▼**. The bank number moves in the direction of the arrow pressed.
  - Press **FUNC** then press and hold **▲** or **▼**. The bank number moves continuously in the assigned direction.
  - Press **▲**. The channel number moves upward one by one. Or, press **▼**. The channel number moves downward one by one.
2. Press **PGM**. **M** changes to **P**.

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

If you make a mistake, press **CL** to delete a single digit or press and hold **CL** about 2 seconds to delete all digits.

4. Press **ENTER** to store the frequency into the channel.

#### **Notes:**

- If you made a mistake in Step 3, **Invalid Freq** briefly appears and the scanner beeps when you press **ENTER**. Start again from Step 3.
  - Your scanner automatically rounds the entered frequency to the nearest valid frequency. For example, if you enter a frequency of 151.553, your scanner accepts it as **151.550**.
  - To have the scanner pause for 2 seconds on this channel after a transmission before proceeding to the next active transmission, press **./DELAY** to turn the delay function on. See "Using the Delay Function" on Page 42. The scanner stores this setting in the channel.
5. If necessary, press **MODE** to change the receiving mode.
  6. If desired, program a text tag for the channel (see "Assigning a Text Tag to a Channel" on Page 27).
  7. The next channel in sequence is ready for programming. Press **PGM** and then repeat steps 3 through 6.

## **STORING TRUNKING FREQUENCIES INTO CHANNELS**

1. Press **PGM** and **FUNC** then **▲** or **▼** to select the desired bank to program.
2. Press **TRUNK** to enter into trunking mode.

3. Repeatedly press **MODE** to select **MOT** (Motorola) or **ED** (EDACS).
4. Press **PGM** and select the channel number using **▲** or **▼**.
5. Enter the UHF trunking frequency and press **ENTER**.
6. Repeat Steps 4 and 5 to enter the other trunking group frequencies for EDACS or additional control channel frequencies for Motorola systems.
7. If necessary, press **MODE** to change the receiving mode.

## STORING TEXT TAGS

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

### Assigning a Text Tag to a Channel

1. Press **MANUAL**, enter the channel number where you want to enter the text, then press **MANUAL** again. **M** and the bank and channel number appear at the upper left corner of the display (for example: **M100**).
2. Press **PGM**. **M** changes to **P**.
3. Press **TEXT**. The cursor appears at the third line.
4. Enter the text using the numeral keys (see "Text Input Chart" on Page 29).

**Note:** If you make a mistake, press **▲** or **▼** to move to the character you want to change.

For example, to identify amateur (ham) radio transmissions in the 6 meter range, input "HAM 6m" as follows:

- "H" is the second letter associated with 4 on the keypad. Press **4** then **2**.

- "A" is the first letter associated with 2 on the keypad. Press **2** then **1**.
  - "M" is the first letter associated with 6 on the keypad. Press **6** then **1**.
  - "Space." Press **/DELAY**.
  - "6" is the sixth number associated with 1 on the keypad. Press **1** then **6**.
  - "m" is the first letter associated with 6 on the keypad. Press **6** and **FUNC** (for the lower case set), then press **1**.
5. Press **ENTER** to input the text.

## Assigning a Text Tag to a Group ID

1. Press **PGM**.
2. Press **TRUNK**.
3. Press **FUNC** then **▲** or **▼** to select the desired bank.
4. Press **TRUNK** to select the desired sub-bank.
5. Press or hold down **▲** or **▼** to select the desired group ID.
6. Press **TEXT** then enter the tag using the keypad. (See "Text Input Chart" on Page 29.)
7. Press **ENTER** to store.

## Assigning a Text Tag to a Bank

1. Select a channel within the desired bank by pressing **MANUAL** and entering the bank number (**000** for bank 0 or **200** for bank 2, for example). Press **MANUAL** again.
2. Press **PGM**.
3. Press **FUNC** then **7**. The cursor appears at the third line of the display. Enter the text using the keypad. (See "Text Input Chart" on Page 29.)

4. Press **ENTER** to store.

## Text Input Chart

### Notes:

- To access the numbers, after you press **TEXT** (when you assign the text tag to a channel) or you press **FUNC** and **7** (when you assign the text tag to a bank), press **1**. Then press the desired number you want to enter.
- To enter a lowercase character or a character from the second set for key **0**, press **FUNC** after pressing the first numeral key.

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

## FINDING AND STORING ACTIVE FREQUENCIES

You can search for transmissions in the scanner's pre-programmed search bank. The search bank is divided into six search bands. You can change the search range of Bank SR5 manually by setting the lower and higher ends of the search range.

### Notes:

- You can use the scanner's delay feature while searching the search bank. See "Using the Delay Function" on Page 42.
- The scanner does not search locked-out frequencies while searching ranges. See "Locking Out Channels or Frequencies" on Page 42.

### Searching a Preprogrammed Frequency Range

The scanner contains these preprogrammed search ranges, stored in the search bank (SR0 – SR5).

<b>Bank</b>	<b>Band</b>
SR0 .....	Marine
SR1 .....	CB
SR2 .....	Police/Fire
SR3 .....	Aircraft
SR4 .....	Ham
SR5 .....	Limit search (User changeable)

To select preprogrammed search bands and search them for active frequencies:

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

Current	SR0 ...D..FM
Search	M 156.80000
Bank	Channel 16
	Marine Band

2. In the marine and CB bands, you can directly select a channel or search through the band. When **M** appears at the left most position of the second line, you can directly select a channel (refer to the following band charts). Press the desired channel number while **M** appears to select it. You can also change the channels by pressing **▲** or **▼**.
3. Press **FUNC** then **SEARCH** while **M** appears. **M** changes to **S** and now you can search through the band. Press **FUNC** then **SEARCH** again to return to the previous mode.
4. Rotate **SQUELCH** clockwise and leave it set to a point just after the hissing sound stops. After 2 seconds (if the delay feature is on), the received frequency appears and the scanner starts searching.
5. When the scanner finds an active frequency, it stops searching.

### Search bank: SR0 Marine band

#### Receive mode: FM

CHANNEL	FREQUENCY (MHz)	CHANNEL	FREQUENCY (MHz)
01	156.050	05	156.250
06	156.3000	07	156.3500
08	156.4000	09	156.4500
10	156.5000	11	156.5500
12	156.6000	13	156.6500
14	156.7000	15	156.7500

CHANNEL	FREQUENCY (MHz)	CHANNEL	FREQUENCY (MHz)
16	156.8000	17	156.8500
18	156.9000	19	156.9500
20	157.0000 161.6000	21	157.0500
22	157.1000	23	157.1500
24	157.2000 161.8000	25	157.2500 161.8500
26	157.3000 161.9000	27	157.3500 161.9500
28	157.4000 162.0000	63	156.1750
64	156.2250 160.825	65	156.2750
66	156.3250	67	156.3750
68	156.4250	69	156.4750
70	156.5250	71	156.5750
72	156.6250	73	156.6750
74	156.7250	77	156.8750
78	156.9250	79	156.9750
80	157.0250	81	157.0750
82	157.1250	83	157.1750
84	157.2250 161.8250	85	157.2750 161.8750
86	157.3250 161.9250	87	157.3750 161.9750
88	157.4250		

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



**Search bank: SR1 CB band**

**Receive mode: AM**

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

**Search bank: SR2 Police/Fire band****Receive Mode: FM**

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

**Search bank: SR3 Aircraft**

**Receive mode: AM**

FREQUENCY (MHz)	STEP (kHz)
108.000–136.9875	12.5

**Search bank: SR4 Ham band**

**Receive mode: FM**

GROUP	FREQUENCY (MHz)	STEP (kHz)
0	28.0000–29.7000	5
1	50.0000–54.0000	5
2	144.0000–148.0000	5
3	222.0000–225.0000	5
4	420.0000–450.0000	12.5
5	1240.0000–1300.0000	6.25

**Search bank: SR5 Programmable limit search**

**Receive mode: FM (Default setting)**

## Searching Active Frequencies in Your Desired Frequency Range

You can program the desired frequency range for a search.

1. Repeatedly press **SEARCH** to select **SR5**.
2. Press **PGM** then **SEARCH**. **PSR** (Program Search) appears in the top line and the cursor blinks **L** on the second line for the lower-end limit frequency.
3. Enter the desired lower-end limit frequency (including the decimal point) with the number keys and **/DELAY**.

4. Press **ENTER** to set the frequency. The cursor moves to **H**. If the entered frequency is incorrect, **Invalid Freq** briefly appears.
5. Enter your desired higher-end frequency and press **ENTER**.
6. Rotate **SQUELCH** clockwise and leave it set to a point just after the hissing sound stops.
7. Press **SEARCH** to start searching. When the scanner finds an active frequency, it stops searching.

### Special Notes:

- You can copy and save a frequency into a specified bank, channel, or priority channel when the scanner finds an active frequency. See “Using Frequency Copy Function” on Page 39 to save the frequency. The frequency copy functions only in search banks 2, 3, 4 and 5.
- While the scanner is searching, you can use the seek search by pressing **FUNC** then **7**. The display indicates **Seek ON** at the bottom line. The scanner stops at an active frequency for five seconds and restarts searching automatically. The scanner repeats this operation.
- You can set Zeromatic on or off by pressing **FUNC** then **0**. Press **FUNC** then **0** again to reverse the Zeromatic setting. Whenever this feature is turned on, **Zeromatic ON** briefly appears then **z** appears at the first digit of the second line and the scanner stops at the correct frequency. When you turn this feature off, **z** disappears and the scanner stops when it detects an active signal. Zeromatic functions only in search bank 2, 3, 4 and 5.
- There are several group banks in SR2 Police/Fire and SR4 ham bands. You can turn off or on the groups by pressing the group numbers. For example to turn off **0**, press **0**.
- In the Air and the Limit search bands, press **FUNC** then **▲** to start searching up from the lowest fre-

quency and press **FUNC** then ▼ to start searching down from the highest frequency.

## Manually Tuning a Frequency

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

1. Press **TUNE**. **TUNE** and the current frequency appears. The scanner automatically begins tuning up or down.
2. Use the number keys to enter the frequency where you want the scanner to start.
3. Press **ENTER**.
4. Press ▲ or ▼ to move up or down. When the scanner finds an active frequency, it stops on the frequency.

**Note:** If you press **PAUSE** while tuning, the scanner stops tuning and **\*\* PAUSED \*\*** appears. Press **PAUSE** again, and the scanner resumes tuning.

## LISTENING TO THE WEATHER BAND

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

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

### Listening to a Weather Channel

To hear your local forecast and regional weather information, press **WX**. Your scanner scans through the weather band then stops within a few seconds on the strongest weather broadcast.


## Displaying Weather Messages

The weather service precedes each weather alert with a digitally-encoded SAME (Specific Area Message Encoding) signal, then a 1050 Hz tone. You can set the scanner to decode and display the SAME message when an alert is broadcast. Then if you are monitoring a weather channel with a digitally-encoded SAME signal when an alert is broadcast, the scanner will show the type of alert being broadcast such as **Warning**, **Watch**, **Statement**, or **Test Message**. The scanner will also sound alternating alert tones and display **Weather ALERT** when the scanner receives a 1050 Hz tone.

To set the scanner to decode and display SAME messages, press **FUNC** then **WX** while you listen to the weather channel. **DIG WX STBY** and **Cancel: F+WX** appear.

To set the scanner out of the SAME standby mode, press **FUNC** then **WX**. **DIG WX STBY** disappears.

### Notes:

- The scanner does not display the actual area affected by SAME messages. It uses only the message portion of the SAME signal (**Warning**, **Watch**, **Statement**, or **Test Message**).
- Your scanner can also receive weather alert tones (see "Priority" on Page 44). The scanner sounds an alert or beep when it receives the SAME code. If you do not stop the alert, it sounds the alert (or beep) for five minutes. Then the alert stops and the scanner beeps every ten seconds. If the scanner receives a new message after five minutes, it sounds the alert or beep. To stop the sound and ready the scanner to receive a new alert signal before the five minute time out, press any key except .

## WX Alert and Beep Tone Confirmation

1. To test the WX alert, press **WX** for more than 2 seconds while the display indicates **DIG WX STBY**.

The display indicates the type of message, and sounds an alert or series of beeps which automatically changes every 3 seconds.

2. Press any key except  to stop test sound mode.

## USING FREQUENCY COPY FUNCTION

You can copy a frequency into a specified channel, a vacant channel in a specified bank, or a priority channel. However, you cannot copy a frequency from the Marine and CB search bands.

### Copying a Frequency into a Specified Channel

You can copy a frequency into a specified channel when the scanner stops on that frequency during search mode or manual tuning.

1. Press **FUNC** then **PGM** when you find a frequency.

**Chan Store?** appears at the bottom line. After about 1 second, the frequency to be copied flashes on the indicator.

2. Press the desired bank and the channel number where you want to store the frequency. The display indicates the bank and channel number. After about 1 second, the frequency to be copied flashes.
3. Press **ENTER**. All the conditions such as receiving mode and delay condition are copied on the channel. **Chan Store!** briefly appears. The scanner automatically returns to search mode.

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

## Copying a Frequency into a Vacant Channel in a Specified Bank

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

1. Press **FUNC** then **ENTER** when you find a frequency you want to copy. **Bank9 Store?** appears.
2. If you want to copy the frequency into bank 9, press **ENTER**. It is stored in the first available vacant channel in the bank. Or, press your desired bank number to store, then press **ENTER**. **Chan Store!** appears for 2 seconds. All the conditions such as receiving mode and delay condition are copied on the channel. After about 2 seconds, the scanner automatically returns to search mode.
3. If you try to copy a frequency which is already stored, the scanner sounds the notice tone 3 times after you press **ENTER**. **Dup1.f Chxxx** appears at the bottom line. If you want to copy the duplicate frequency anyway, press **ENTER**, or if not, press **CL** to cancel.

## Copying a Frequency into the Priority Channel

You can copy a frequency into the priority channel (see "Priority" on Page 44) when the scanner stops on the frequency during Search, Scan, Manual, Tune, or WX mode.

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

## SCANNING THE CHANNELS

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

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



The scanner scans through all channels (except those you have locked out) in the active banks (see "Turning Channel-Storage Banks Off and On" and "Locking Out Channels or Frequencies" on Page 42).

**Note:** To change the scanning direction, press ▲ or ▼.

## Turning Channel-Storage Banks Off and On

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

<pre> 01234- = 789 +++-- . . +++ Scan UP = = PRion         </pre>	<ul style="list-style-type: none"> <li>▪ Bank Off</li> <li>+ Selected for Scanning in Open Mode</li> <li>– Selected for Scanning in Closed Mode</li> </ul>
Scan Mode	

### Notes:

- You cannot turn off all banks. There must be at least one active bank.
- You can manually select any channel in a bank, even if the bank is turned off.

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

## Deleting Frequencies from Channels

1. Press **MANUAL**.
2. Use the number keys to enter the channel with the frequency you want to delete.
3. Press **MANUAL** again.
4. Press **PGM** to enter the program mode. **M** changes to **P**.

5. Press **FUNC**.
6. Press **CL**. The frequency number changes and **0.0000** appears.

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## **Special Features**

### **USING THE DELAY FUNCTION**

**Note:** Delay is automatically set as the default for each channel when you turn on the scanner.

Many conversations might have a pause of several seconds between a query and a reply. To avoid missing a reply, you can program a 2-second delay into any of your scanner's channels. Then, when the scanner stops on the channel, **D** appears and the scanner continues to monitor the channel for 2 seconds after the transmission stops before it resumes scanning or searching.

To turn delay on or off, press **. /DELAY**.

### **LOCKING OUT CHANNELS OR 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.

#### **Locking Out Channels**

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

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

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

## Reviewing the Lock-Out Channels

To review all locked out channels, press **MANUAL**, then repeatedly alternate between pressing **FUNC** then **L/OUT** to view each locked-out channel. When you finish reviewing locked-out channels, press **MANUAL**.

## Locking Out Frequencies

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

### Notes:

- The scanner does not store locked out frequencies during a search.
- You can lock out as many as 50 frequencies in each bank. If you try to lock out more, **Memory full!** appears.
- If you lock out all frequencies in one search bank and only this search bank is activated, **All ranges Locked out!** appears and the scanner does not search.

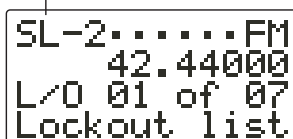
## Reviewing Locked-Out Frequencies

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

1. Press **SEARCH** to set search mode.
2. Press **FUNC** then **L/OUT**. The locked-out frequency and **Lockout list** appear. Press **▲** or **▼** to review the list. The locked-out number and the total locked-out number also appear as **L/O XX of YY**. (The tenth of thirty locked out numbers would appear as **L/O 10 of 30**.) If the search bank has no locked-out frequencies, **Empty. Lockout list** appears. Press

**FUNC** then **L/OUT** again to cancel reviewing locked-out frequencies.

#### Locked-out



```
5L-2.....FM
      42.44000
L/O 01 of 07
Lockout list
```

## Clearing a Locked-Out Frequency

To clear a locked-out frequency, select that frequency (see “Reviewing Locked-Out Frequencies”), then press **CL**.

If all locked out frequencies are cleared within a bank, **Empty. Lockout list** appears.

## Clearing All Locked-Out Frequencies in a Search Bank

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

**Note:** You cannot clear all locked-out frequencies if all frequencies in the selected bank are locked out.

## PRIORITY

In addition to the 300 programmable memory channels, the scanner has one priority channel.

With the priority feature, you can scan through programmed channels and still not miss an important or in-

teresting transmission on a specific channel. When priority is turned on, the scanner checks that channel every 2 seconds, and stays on the channel if there is activity until the activity stops.

**Notes:**

- The priority feature does not operate while the scanner receives trunking (voice channel) frequencies.
- If you program a weather channel as the priority channel, the scanner stays in the priority channel only when the scanner detects the weather alert tone.

To program a frequency in the priority channel:

1. Press **MANUAL**.
2. Use the number keys to enter the channel number which contains the frequency you want to program as the priority channel. Then press **MANUAL** again.
3. Press **FUNC** then **PRI**. **Pri Channel** blinks on the bottom line.

To program the priority channel directly:

1. Press **PGM**.
2. Press **PRI**.
3. Enter the frequency you want to enter into the priority channel, then press **ENTER**.

**Note:** This scanner cannot set a channel as the priority channel if the channel's receive mode is MOT or ED.

To program a weather channel as the priority channel:

1. Press **WX**.
2. Select the weather channel you want to program as the priority channel.
3. Press **FUNC** then **PRI**. **Pri Channel** flashes on the bottom line two times.

To turn on the priority feature, press **PRI** so **P** appears at the top line while scanning. **PRI**on (or **PRI**wx if you set the priority to a weather frequency) appears on the bottom line. If the scanner detects activity on the priority channel, **Pri Channel** appears for 3 seconds. Or if the scanner detects a weather alert tone in Priority WX mode, **Pri Channel** appears for 3 seconds then changes to **Weather ALERT** and the scanner sounds an alert tone (see “Displaying Weather Messages” on Page 38).

**Notes:**

- Priority WX is only for receiving a weather alert.
- When the scanner detects a 1050 Hz alert tone, priority WX activates and you receive a weather alert.
- If you program a weather frequency into the priority channel and the scanner detects a weather alert tone on that frequency, the scanner sounds the alert tone.

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

## CHANGING THE RECEIVE MODE

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

If you want to listen to trunking transmissions in closed mode, you might have to change the receive mode.

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

**AM** — accesses the AM mode

**FM** — accesses the FM mode

**MD** — accesses the FM Mode, Motorola Trunking System (with a 4- or 5-digit ID code)

**ED** — accesses the FM Mode, EDACS Trunking System (with 4-digit decimal ID code or 5-digit AFS code)

**Note:** MO (MOT) and ED modes are not available when the scanner tunes up or down through the frequency ranges in which the trunking operation is not used.

## USING THE ATTENUATOR

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

There are two attenuator modes in your scanner. One is normal attenuator mode in which you set the attenuator in each channel or each band/group in the search and tune mode. The other is global mode in which you set the attenuator only once. This setting is applied all the time in every mode.

Press **ATT** to turn on or off the attenuator while the channel number is indicated or while the scanner is searching through bands/groups. When the attenuator is on, **A** appears at the seventh digit in the top line.

When you turn it off, **A** changes to ".". You cannot set the attenuator while the scanner is scanning.

Press **FUNC** then **ATT** to set the attenuator to the global mode. **Global ATT.** appears for 2 seconds at the bottom line and **a** or **-** appears. **a** means the attenuator is on and **-** means off. Press **ATT** to turn on or off the attenuator. **ATTon** or **ATT-** appears on the bottom line while scanning.

Press **FUNC** then **ATT** again to turn off the global attenuation mode. **Normal ATT** is indicated at the bottom line for 2 seconds.



**Note:** If you turn on the attenuator, the scanner might not receive weak signals.



## TURNING THE KEY TONE ON AND OFF

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




1. If the scanner is on, turn **VOLUME OFF/MAX** counter-clockwise until it clicks to turn the scanner off.
2. Turn **VOLUME OFF/MAX** clockwise to turn the scanner on. **Welcome To Dual Trunking** appears.
3. While **Welcome To Dual Trunking** appears, press 1 to turn on the key tone or 2 to turn it off.

## USING THE DISPLAY BACKLIGHT

You can turn on the display's backlight for easy viewing in dimly lit areas. Press  to turn on the display light for 5 seconds. To turn off the light before it automatically turns off, press  again.

Press  for more than 1 second to engage the light as continuously on. Press  while the backlight is on to turn it off.


You can select the amount of time the light stays on. Follow these steps to change the illuminated time:

1. If the scanner is on, turn it off and back on again. **Welcome to Dual Trunking** appears.
2. While **Welcome to Dual Trunking** is displayed, press .
3. Use **Up/Down** keys to set **Lit off time 5 seconds** appears
4. Press  or  to select **3, 5, 10** or **20 seconds** then press **ENTER**.



## USING THE KEYS LOCK



Once you program your scanner, you can protect it from accidental program changes by turning on the key lock feature. When the keypad is locked, the only controls



that operate are **FUNC**, , , **SQUELCH**, and **VOLUME**.

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

To turn on the key lock, press **FUNC** then , . **Key locked.** appears for about 1 second. **Key locked.** appears when you press any key after locking the keypad.

To turn off the key lock, press **FUNC** then , . The scanner beeps three times and **Key unlocked** appears.

## CHANGING THE DISPLAY CONTRAST

1. Press **MANUAL**.
2. Press **FUNC** then **9**. **Use Up/Down keys to set contrast.** appears.
3. Press **▲** or **▼** to select the contrast.
4. Press **ENTER** to set the display contrast.

## CLONING THE PROGRAMMED DATA

You can transfer the programmed data to and from another RadioShack Pro-93 or a Pro-2053 scanner using an optional connecting cable with 1/8-inch phone plugs on both ends, (not included) available at your local RadioShack store.

Follow these steps to clone the data.

1. Turn on both scanners.
2. Connect the connecting cable to each scanner's **PC/IF** jack. **\*CLONE MODE\* UP to send. remove cable to exit.** appears.
3. Press **▲**. **Confirm send data? 1=YES Press other key for NO.** appears.
4. Press **1** to send the data to the other unit or press any other key to cancel the operation.

The scanner sends the data. To exit the clone mode, remove the cable.

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## □ **Trunking Operation**

The scanner tracks transmissions that use the Motorola Type I and Type II (such as Smartnet and Privacy Plus) and hybrid analog trunking systems, plus GE/Ericsson (EDACS) type systems extensively used in many communication systems.

Trunking systems allocate a few frequencies to many different users. When the mobile unit transmits a signal, one frequency is chosen from among the allocated frequencies in that trunking system. The user's ID talk group is sent with the signal.

To receive trunking signals, you must store all the trunking *control* frequencies for Motorola systems or all the trunking *group* frequencies for EDACS in one bank (see "Storing Known Frequencies into Channels" on Page 25) and input ID codes in the ID memory (see "Storing Talk Group IDs" on Page 58).

Your PRO-93 automatically calculates Motorola voice channel frequencies when it decodes the control channel. This eliminates the need to enter all the Motorola group frequencies.

The control channels are subject to change depending on the day. Therefore enter all the control frequencies in the same bank. If you do not know which is the control channel, it is better to enter all the system frequencies into the same bank. (Refer to the supplied *Trunking Guide*.)

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

**Important:** To listen to the transmission, the mode of the programmed channel must be the same as that of the trunking channel (MOT, or ED).

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

**Note:** There might be more than one talk group transmitting at a time in some Motorola trunking systems. If you set the scanner to manually tune in Motorola trunking mode, you will hear the talk group on that channel, but the display will alternate between all active IDs.

Trunking group frequencies are included in the supplied *Trunking Guide*. Frequency fleet map and talk group information is also widely available on the Internet, (for example, at [www.trunkscanner.com](http://www.trunkscanner.com)).

## UNDERSTANDING TRUNKING

In the past, groups that transmit frequently, such as police departments, could transmit on only 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 transmits. The system automatically transmits the call on that frequency, and also sends a code that identifies that 2-way radio user's transmission on a control channel.

Your scanner lets you easily hear both the call and response transmissions for that 2-way radio user and therefore follow the conversation. For EDACS and Motorola (above 406 MHz range), the scanner monitors the control channel between each transmission to identify talk groups.

## SETTING SQUELCH FOR THE TRUNKING MODE

Your scanner automatically mutes the audio during trunk scanning when it decodes control channel data. However, we recommend you turn **SQUELCH** clockwise and leave it set to a point just after the hissing sound stops. This lets the scanner quickly acquire the data channel.

## PROGRAMMING TRUNKING FREQUENCIES

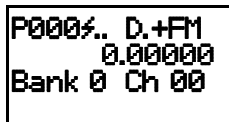
You program trunking frequencies the same as non-trunked frequencies, except that you must store the appropriate mode (MOT or ED) with each frequency.

### Notes:

- You can scan only one type of trunked frequency, either EDACS or Motorola in a bank at one time. You can, however, mix conventional channels and frequencies in a bank.
- If you are programming trunked frequencies for Motorola Type I and hybrid systems, you must first program the fleet map (see "Programming Fleet Maps" on Page 56).
- If you are programming frequencies for an EDACS system you must store them in the Logical Channel Number order (usually listed as LCN#). For example, LCN1 would go into channel 01 for the current bank, and LCN2 would go into channel 02.

Follow these steps to program trunked frequencies:

1. Press **PGM** and press (or hold down) **▲** or **▼** to select the bank.



**Note:** To move through the bank selection faster, press **PGM** then **FUNC** and hold down **▲** or **▼**. To move through the banks one at a time, repeat the

sequence of **PGM**, **FUNC** then **▲** or **▼** until you reach the desired bank.

2. Press **TRUNK** to enter the ID program mode.
3. Repeatedly press **MODE** to select **MOT** for Motorola, or **ED** for the EDACS (GE/Ericsson) system to scan. This sets the talk group ID decoding method to be used for the bank.

```
Bank 0-0  ON
ID NO. 00
MOT: none
```

**Notes:**

- If you select **Not trunked** instead of **MOT**, or **ED**, the scanner does not scan trunked frequencies. Instead, **Not trunked. Press mode** appears.

```
Bank 0
Not trunked
Press mode.
```

- If you programmed a Motorola Type I or Hybrid system, see “Programming Fleet Maps” on Page 56.

4. Press **PGM** to enter the program mode.

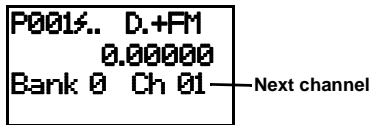
```
P000%. D.+FM
      0.00000
Bank 0 Ch 00
```

5. Enter the desired trunking frequency using the keypad and decimal point then press **ENTER** to store.

```
P000%. D.+FM
      866.3875 — Frequency
Bank 0 Ch 00
```

6. To enter additional trunking frequencies as subsequent channels in the same bank, press **PGM** or

▲ to access the next open channel then enter the frequencies. (See “Storing Known Frequencies into Channels” on Page 25).



7. Press **SCAN** to start scanning.

**Notes:**

- If you make an error in the entry process, press **CL** as often as needed to erase the incorrect data.
- If you enter a frequency that has already been entered, the scanner sounds an error tone and displays **Dupl. f** and the channel number that has been duplicated. If the dual entry is an error press **CL** and enter the correct frequency. If the dual entry is intentional press **ENTER** to accept.
- You may replace any frequency by selecting the bank and channel, pressing **PGM** and entering the new frequency.

## Programming Motorola Trunking Systems (UHF-Lo)

You can program the scanner to receive transmissions in the UHF-Lo band (406-512 MHz) of the Motorola trunking system. You can receive these transmissions by checking the trunking system's control channel. You must program the system's base frequency and offset frequency to do this.

**Notes:**

- Base and offset frequencies vary for each type of trunking system. You can get information about these frequencies for the trunking system you want to scan using [www.trunkscanner.com](http://www.trunkscanner.com), other Internet sources, or locally-published guidebooks.

- If you try to program an offset frequency in the UHF-Hi bands (806-960 MHz), the scanner ignores the entry.

Follow these steps to program Motorola trunking frequencies in the UHF-Lo band:

1. Press **PGM** then **TRUNK** to enter the ID program mode.
2. Press **FUNC** and press (or hold) **▲** or **▼** to select the bank.
3. Press **MODE** and select **MOT**.
4. Press **FUNC** then **2**. The display indicates **Base freq.:** on the first line, **406.0000** on the second line, **Offset: 300** on the third line and **Step: 25.0kHz** on the bottom line.
5. While **B** in **Base** blinks, if necessary, press the desired Base frequency with the number keys and press **ENTER**. Confirm the entry. If it is incorrect, press the number keys again to set the base frequency. After you confirm the input, press **ENTER** again.
6. While **0** in **Offset** blinks, if necessary, enter the offset number and press **ENTER**. Confirm the entry. If it is incorrect, then press the number keys again to set the frequency. After you confirm the input, press **ENTER** again.
7. While **5** in **Step** blinks, repeatedly press **▲** or **▼** to select the step number, **25.0**, **50.0** or **12.5 kHz**. then press **ENTER**.
8. Press **PGM** to enter the program mode. Store the trunking IDs into the sub-bank in the same bank.

## Programming Motorola Trunking System (800 MHz)

### Notes:

- On the 800 MHz trunking band, you can select a base frequency (normal or offset).

- On the 900 MHz trunking band, you do not need to set the base frequency (base, offset, step).

Follow these steps to program 800 MHz band Motorola trunking.

1. Press **PGM** then **TRUNK** to enter the ID program mode.
  2. Press **FUNC** then **▲** or **▼** to select the desired bank.
  3. Press **MODE** and select Motorola trunking mode.
  4. Press **FUNC** then **3**. Use **Up/Down** keys to set **800MHz** base. **Normal** appears.
  5. Press **▲** or **▼** to select **Normal** or **Offset** and press **ENTER**.
- If you are uncertain about the base frequency, use the default setting. The default setting is **Normal**.
  - If you cannot receive with the **Normal** setting, change to **Offset**. The base frequency in **Normal** is 851.0125 MHz. The base frequency in **Offset** is 851.0000 MHz.

## Programming Fleet Maps

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

Follow these steps to program a fleet map.

1. Press **PGM** then **TRUNK**.
2. For each bank you want to program, repeatedly press **FUNC**, then **▲** or **▼** to select the bank.
3. Press **FUNC**.



4. Press 8. **Block 0 size code. Use 15 for type II S-00** appears.

<p>Block 0 size code. Use 15 for type II. S-00</p>
--

5. Enter the size code supplied with the Type I system information, referring to the instruction that appears on the display. If the information was not supplied, try the following common fleet maps.

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

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

Block	Size Code							
	9	10	11	12	13	14	15	16
7	S0	S4	S0	S4	S0	—	—	—

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

**Notes:**

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

7. Press **SCAN** to start scanning.

## Talk Group IDs

There are 10 talk group ID banks and each ID bank has 5 sub-banks. Each sub-bank has 20 ID locations. You can program up to 100 talk group IDs in each bank, so you can program up to 1,000 talk group IDs in 10 banks. When the scanner stops on a transmission in the Motorola, or EDACS mode, it checks to see if the ID has been stored. In the closed mode, the scanner only stops on the transmission and displays its text tag if you have stored and not locked out the ID. In the open mode, the scanner always stops on a transmission, but it displays the ID's text tag if you have stored the ID.

## Storing Talk Group IDs

To store a talk group ID, press **TRUNK** when the scanner stops on a voice channel transmission or when a talk group ID is indicated in the manual mode. The bottom line indicates where the ID was stored as **ID save X-XX** and then changes to **ID#XXX**.

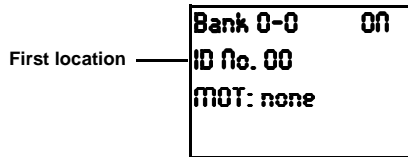
The first **X** in **ID save X-XX** is the sub-bank number (**0-4**) in the bank. **XX** is the number of IDs from (**00-19**) in each sub-bank.

If the ID has already been stored when you press **TRUNK**, the display shows **ID was saved**.

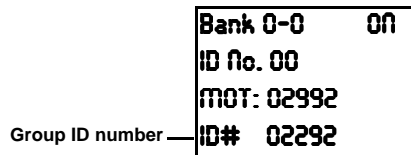
**Note:** When you try to store more than 100 talk group IDs in a bank, **Memory full!** appears. Clear some talk group IDs in order to store new ones (see “Clearing Talk Group IDs” on Page 62).

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

1. Press **PGM**.
2. Press **TRUNK**.
3. To select the bank where you want to store the ID, repeatedly press **FUNC** then **▲** or **▼** until you reach the desired bank.

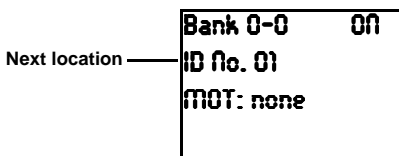


4. Press **MODE** to select MOT or ED.
5. Press **TRUNK** repeatedly to select the sub-bank.
6. Press **▲** or **▼** to select the location where you desire to store the ID number.
7. Enter the talk group ID and press **ENTER**. If necessary, use the decimal point for a hyphen.



8. If you want to tag the ID, press **TEXT**, enter the desired text tag for the ID, then press **ENTER**. (See “Text Input Chart” on Page 29.)

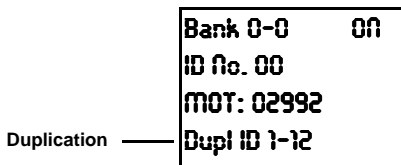
9. To store the next ID memory in sequence, press **▲** and repeat Step 4.



10. Press **SCAN** to start scanning.

#### Notes:

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



## Talk Group ID Hold

You can set your scanner to follow a trunking signal that you want to track during scanning. Hold down **TRUNK** for more than 2 seconds. **ID hold ON** appears.

When ID hold is activated and the scanner receives a voice channel, the scan indication **S** at the first digit in the top line is changed to **H**.

To release ID hold, press **SCAN** or **TRUNK**.

## Turning an ID Sub-Bank On or Off

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

1. Press **TRUNK** repeatedly to select the desired sub-bank.
2. Press **FUNC** then 1 to turn the sub-bank on if it is off or off if it is on.

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

1. Press **FUNC** while the scanner is stopped on a voice channel transmission.
2. Press **TRUNK**. The display indicates which sub-bank is turned on or off, and the active sub-bank number flashes.
3. Press **FUNC** and the number of the sub-bank you desire to turn on or off. For example to turn sub-bank 4 on or off, press **FUNC** then 4.

## Locking Out Talk Group IDs

**Note:** You can only lock out talk group IDs when the scanner is in the closed mode (see "Open and Closed Modes" on Page 63).

1. Press **PGM**.
2. Press **TRUNK**.
3. Press **FUNC**, **▲** or **▼** to move to the desired bank.
4. Press **▲** or **▼** to select the ID memory.
5. Press **L/OUT** to lock out the ID. **L** appears.
6. To remove the lockout from a trunking ID, manually select the ID memory, and press **L/OUT** until **L** disappears.

You can confirm the ID code while the scanner shows the text when the received signal is a voice channel.

1. Press **TEXT** while the scanner is receiving the voice channel and indicating the text name. The ID code appears as **MOT:XXXXXX** or **ED:XXXX**.
2. Press **TEXT** again to cancel.

## Delay Function in ID Indication Mode

You can set the ID delay function separate from the channel delay.

1. Press **FUNC** then **/DELAY** while you are programming the trunked ID. Use **Up/Down keys** to set **ID delay**. **2.0 seconds** appears.
2. Press **▲** or **▼** to select **None, 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5** or **4.0 seconds**.
3. Press **ENTER**.

**Note:** When activated, ID delay watches the control channel command for the delay time when the signal disappears from the voice channel.

## Reviewing Locked-Out Talk Group IDs

**Note:** You cannot clear all lockouts from a talk group at the same time.

1. Press **PGM** then **TRUNK**.
2. Press **FUNC** then **L/OUT**. The locked out ID appears. If the ID memory bank has no locked out ID, you hear the low beep tone.
3. Press **FUNC** then **▲** or **▼** to select a search bank. Or, just press **▲** or **▼** to search for any locked out IDs in a bank.

## Clearing Talk Group IDs

1. Press **PGM** then **TRUNK**.
2. Press **FUNC**, **▲** or **▼** to select ID memory.
3. Press **FUNC** then **CL**.

## Clearing All Talk Group IDs in One Bank

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

1. Press **PGM**.
2. Press **TRUNK** to enter a talk group ID memory mode.
3. Select a talk group ID bank using **FUNC**, **▲** or **▼**.
4. Press **FUNC** then **6**. **Confirm list clear? 1=YES**  
**Press other key for NO.** appears.
5. Press **1** to clear the all talk group IDs within a bank.  
**List cleared** appears.

**Note:** To cancel the deletion, press any key except **1**. The scanner returns to the talk group ID memory mode.

## OPEN AND CLOSED MODES

When set to the open mode, the scanner stops on any ID code and only uses the ID list to look up ID text tags.

When set to the closed mode, the scanner stops only on signals that have an ID code which is found in the ID list for the bank.

**Note:** When you select a channel manually, any transmission opens squelch, regardless of the current mode.

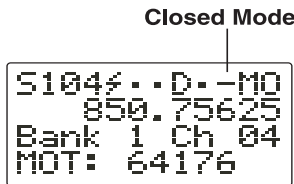
The open or closed mode is set in each channel storage bank. **+** (open) or **-** (closed) appears under the channel storage bank's number while scanning. Or, the status display shows the **+** or **-** at the top line while the scanner is in manual mode or receiving a signal during scanning.

When no ID code is programmed into the scanner, it receives the signal in MOT or ED mode. In *open* mode the scanner stops on any transmission. If the ID is stored, the text tag appears in the display. Otherwise, the talk group ID appears in the display. In *closed* mode the scanner only stops on a transmission if the ID is stored.

This is very useful when you want to narrow the scan in areas where numerous entities utilize the same trunking system. For example, if the police department, sheriff's department, fire department and EMS all use the same system in your area you can program the identical trunking frequencies on 4 separate banks. Then by manually storing their respective group IDs into corresponding banks (i.e. police IDs in bank 1, sheriff's IDs in bank 2, fire rescue IDs on bank 3 and EMS IDs on bank 4) and setting the banks to the closed mode, you can choose which service you want to listen to. (See "Turning Channel-Storage Banks Off and On" on Page 41.)

## Changing the Open/Closed Mode

1. Press **MANUAL**.
2. Press **FUNC** then ▲ or ▼ to select the channel storage bank.
3. Press **FUNC** then **5. Bank OPEN**, or **Bank CLOSED**, appears. After that message disappears, the tenth digit on the top line of the display changes from + to - or vice versa.



4. Repeat Steps 2 and 3 for each bank.

---

## **A General Guide to Frequencies**

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



## US Weather Frequencies in MHz

162.400 162.425 162.450 162.475 162.500 162.525  
162.550

## Ham Radio Frequencies

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

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

## Birdie Frequencies

Every scanner has birdie frequencies. Birdies are signals created inside the scanner's receiver. These operating frequencies might interfere with transmissions 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 omit the birdie.

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

VHF Low Band (MHz)			
25.5000	38.2500	41.8900	51.000

<b>VHF High Band (MHz)</b>			
114.7500	116.7375	119.8125	121.1250
123.9750	124.2000	125.9500	126.8250
126.9000	126.9750	127.0500	127.5000
129.0250	129.1500	132.1000	134.7625
135.6750	137.7000	140.2500	140.3850
146.0050	168.9800		

<b>UHF Low Band (MHz)</b>			
408.0000	420.7500	433.5000	446.2500
459.0000	471.7500	482.30625	484.5000
497.2500	510.0000		

<b>UHF High Band (MHz)</b>			
812.7000	816.0750	852.96875	867.20625
930.64375	1246.1750	1246.2500	1268.7750

To find the birdies in your 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 scan 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. This is a birdie. Make a list of all the birdies in your scanner for future reference.

# GUIDE TO THE ACTION BANDS

## Typical Band Usage

### HF Band

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

### VHF Band

Low Range	29.700–50.000 MHz
6-Meter Amateur	50.000–54.000 MHz
U.S. Government	137.000–144.000 MHz
2-Meter Amateur	144.000–148.000 MHz
High Range	148.000–174.000 MHz
New Mobile Narrow Band	220.000–222.000 MHz
1 <sup>1</sup> / <sub>4</sub> -Meter Amateur	222.000–225.000 MHz

### UHF Band

U.S. Government	406.000–420.000 MHz
70-cm Amateur	420.000–450.000 MHz
Low Range	450.000–470.000 MHz
FM-TV Audio Broadcast, Wide Band	470.000–512.000 MHz
800 band Law Enforcement	806.000–824.000 MHz
Conventional Systems	851.000–856.000 MHz
Conventional/Trunked Systems	856.000–861.000 MHz
Public Safety	866.000–869.000 MHz
Trunked Private/General	894.000–960.000 MHz

25-cm Amateur	1240.000–1300.000 MHz
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## Primary Usage

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

### VHF Band

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

### UHF Band

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

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

## 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, including Fire and Emergency

Services, refer to *Police Call Radio Guide* available at your local RadioShack store.

**Abbreviations**

**Services**

AIR .....	Aircraft
BIFC .....	Boise (ID) Interagency Fire Cache
BUS .....	Business
CAP .....	Civil Air Patrol
CCA .....	Common Carrier
CB .....	Citizens Band
CSB .....	Conventional Systems
CTSB .....	Conventional/Trunked Systems
FIRE .....	Fire Department
HAM .....	Amateur (Ham) Radio
GOVT .....	Federal Government
GMR .....	General Mobile Radio
GTR .....	General Trunked
IND .....	Industrial Services (Manufacturing, Construction, Farming and Forest Products)
MAR .....	Military Amateur Radio
MARI .....	Maritime Limited Coast (Coast Guard, Marine Telephone, Shipboard Radio, and Private Stations)
MARS .....	Military Affiliate Radio System
MED .....	Emergency/Medical Services
MIL .....	U.S. Military
MOV .....	Motion Picture/Video Industry
NEW .....	New Mobile Narrow

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

OIL ..... Oil/Petroleum Industry

POL ..... Police Department

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

PSB ..... Public Safety

PTR ..... Private Trunked

ROAD ..... Road & Highway Maintenance

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

TAXI ..... Taxi Services

TELM ..... Telephone Maintenance

TOW ..... Tow Trucks

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

TSB..... Trunked Systems

Ten ..... FM-TV Audio Broadcast

USXX ..... Government Classified

UTIL ..... Power & Water Utilities

WTHR ..... Weather

### **HIGH FREQUENCY (HF)**

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

<b>Range</b>	<b>Service</b>
25.020–25.320	IND
25.870–26.470	RTV
26.62	CAP
26.965–27.405	CB
27.430–27.630	BUS

10-Meter Amateur Band (in 5 kHz steps)

Frequency Range	Service
28.000–29.700 MHz	HAM

**VERY HIGH FREQUENCY (VHF)**

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

Frequency Range	Service	Frequency Range	Service
29.900–30.550	GOVT, MIL	30.580–31.980	IND, PUB
32.000–32.990	GOVT, MIL	33.020–33.980	BUS, IND, PUB
34.010–34.990	GOVT, MIL	35.020–35.980	BUS, IND, TELM, PUB
36.000–36.230	GOVT, MIL	36.250	Oil Spill Cleanup
36.270–36.990	GOVT, MIL	37.020–37.980	PUB, IND
38.000–39.000	GOVT, MIL	39.020–39.980	PUB
40.000–42.000	GOVT, MIL, MARI	42.020–42.940	POL
42.960–43.180	IND	43.220–43.680	IND, PUB, TELM
43.700–44.600	TRAN	44.620–46.580	POL, PUB
46.600–46.990	GOVT	47.020–47.400	PUB
47.420	American Red Cross	47.440–49.580	IND, PUB
49.610–49.990	MIL		

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

Frequency Range	Service
50.000–54.000	HAM

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

Frequency Range	Service
108.000–121.490	AIR
121.500	AIR Emergency
121.510–136.975	AIR

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

Frequency Range	Service
137.000–144.000	GOVT, MIL

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

Frequency Range	Service
144.000–148.000	HAM

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

Frequency Range	Service
148.050–150.345	CAP, MAR, MIL
150.775–150.790	MED
150.815–150.980	TOW, Oil Spill Cleanup
150.995–151.475	ROAD, POL
151.490–151.955	IND, BUS
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



<b>Frequency Range</b>	<b>Service</b>
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, 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
162.0125–162.350	GOVT, MIL, USXX
162.400–162.550	WTHR
162.5625–162.6375	GOVT, MIL, USXX
162.6625	MED
162.6875–163.225	GOVT, MIL, USXX
163.250	MED
163.275–166.225	GOVT, MIL, USXX
166.250	GOVT, RTV, FIRE
166.275–169.400	GOVT, BIFC
169.445–169.505	Wireless Mikes, GOVT
169.550–169.9875	GOVT, MIL, USXX

<b>Frequency Range</b>	<b>Service</b>
170.000–170.150	BIFC, GOVT, RTV, FIRE
170.175–170.225	GOVT
170.245–170.305	Wireless Mikes
170.350–170.400	GOVT, MIL
170.425–170.450	BIFC
170.475	PUB
170.4875–173.175	GOVT, PUB, Wireless Mikes
173.225–173.5375	MOV, NEWS, UTIL, MIL
173.5625–173.5875	MIL, Medical/Crash Crews
173.600–173.9875	GOVT

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

<b>Frequency Range</b>	<b>Service</b>
220.000–222.000	NEW

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

<b>Frequency Range</b>	<b>Service</b>
222.000–225.000	HAM

### **ULTRA HIGH FREQUENCY (UHF)**

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

<b>Frequency Range</b>	<b>Service</b>
406.125–419.975	GOVT, USXX

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

Frequency Range	Service
420.000–450.000	HAM

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

Frequency Range	Service
450.050–450.925	RTV
451.025–452.025	IND, OIL, UTIL
452.0375–453.000	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, 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 in 6.25 kHz steps) (Channels 14 through 69 in 6 MHz steps)

Frequency	Channel	Frequency	Channel
475.750	14	481.750	15
487.750	16	493.750	17
499.750	18	505.750	19

Frequency	Channel	Frequency	Channel
511.750	20		

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

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

Frequency Range	Service
851.0125–855.9875 MHz	CSB

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

Frequency Range	Service
856.0125–860.9875 MHz	CTSB

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

Frequency Range	Service
861.0125–865.9875 MHz	TSB

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

Frequency Range	Service
866.0125–868.9875 MHz	PSB

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

Frequency Range	Service
902.000–928.000	HAM

Private Trunked Band (in 6.25 kHz steps)

Frequency Range	Service
935.0125–939.9875 MHz	PTR

General Trunked Band (in 6.25 kHz steps)

Frequency Range	Service
940.0125–940.9875 MHz	GTR

23-Centimeter Amateur Band (in 6.25 kHz steps)

Frequency Range	Service
1240.000–1300.000 MHz	HAM

## FREQUENCY CONVERSION

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

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

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

$$30.62 \text{ (MHz)} \times 1000 = 30,620 \text{ kHz}$$

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

$$127.800 \text{ (kHz)} / 1000 = 127.8 \text{ MHz}$$

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

$$300/50 \text{ MHz} = 6 \text{ meters}$$

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## **Troubleshooting**

If you have problems with your scanner, here are some suggestions that might help you eliminate the problem. If they do not, take your scanner to your local RadioShack store for assistance.

<b>Problem</b>	<b>Possible Cause</b>	<b>Remedy</b>
Scanner is on but will not scan	<b>SQUELCH</b> is not adjusted correctly	Turn <b>SQUELCH</b> clockwise. See "Turning on the Scanner and Setting Squelch" on Page 24
Poor or no reception	An antenna is not connected or is connected incorrectly	Make sure an antenna is connected to the scanner
	Programmed frequencies are the same as birdie frequencies	Avoid programming birdies or only select them manually. See "Birdie Frequencies" on Page 65
In scan mode, the scanner locks on frequencies with an unclear transmission	Stored frequencies are the same as birdie frequencies	Avoid programming birdies or only select them manually
Scanner is totally inoperative. No power	Batteries have failed	Recharge the rechargeable batteries or replace the standard batteries
	Batteries are installed improperly	Install the batteries according to the polarity markings, see "Using Batteries" on Page 10

Problem	Possible Cause	Remedy
Scanner is totally inoperative. No power	The AC or DC adapter is not connected properly	Be sure the adapter's barrel plug is properly connected to the <b>PWR DC 9V</b> jack
Keypad does not work	Keylock is on	Turn keylock off, see "Using the Keylock" on Page 48
Keys do not work or display changes	Undetermined error	Turn scanner off then on again, or reset the scanner, see "Resetting/Initializing the Scanner"

## RESETTING/INITIALIZING THE SCANNER

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

**Important:** If you have problems with the scanner, first try to reset it to retain all memory. If that does not work, you can initialize the scanner; however, initializing clears all information stored in the scanner's memory.

### Resetting the Scanner

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

**Note:** Pressing the reset button does not clear the scanner's memory.

### Initializing the Scanner

**Important:** This procedure clears all information you stored in the scanner's memory. Initialize the scanner

only when you are sure the scanner is not working properly.

1. Turn off the scanner, then turn it on again. **Welcome To Dual Trunking** appears.
2. Press **0** then **1** while **Welcome To Dual Trunking** appears. **Initializing Please Wait.** appears for about 2 seconds.

**Note:** Do not turn off the scanner until the initialization is complete. When the initialization is complete **M000** appears on the top line of the display. **Bank 0 Ch 00** appears on the bottom line.

## CARE

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

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



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## Specifications

### Frequency Coverage:

25–54 MHz.....	(in 5 kHz steps)
108–136.9875 MHz .....	(in 12.5 kHz steps)
137–174 MHz.....	(in 5, 6.25 or 7.5 kHz steps)
216.0025–221.9975 MHz .....	(in 5 kHz steps)
220.0000–225.0000 MHz .....	(in 5 kHz steps)
406–512 MHz .....	(in 6.25 kHz steps)
806–823.9875 MHz .....	(in 6.25 kHz steps)
849–868.9875 MHz .....	(in 6.25 kHz steps)
894–960 MHz .....	(in 6.25 kHz steps)
1240–1300 MHz .....	(in 6.25 kHz steps)
Memory channels .....	300
Channel memory banks .....	10
Number of memory channels per bank .....	30
Talk group ID memories .....	1,000
ID memory banks .....	10
Sub-banks per bank .....	5
Number of memory IDs per sub-bank .....	20

Sensitivity (20 dB S/N):

### FM:

25–54 MHz.....	0.3 $\mu$ V
108 –136.9875 MHz .....	0.3 $\mu$ V
137–174 MHz .....	0.5 $\mu$ V
216–225 MHz .....	0.5 $\mu$ V
406–512 MHz.....	0.5 $\mu$ V
806–960 MHz.....	0.7 $\mu$ V
1240–1300 MHz .....	0.7 $\mu$ V

### AM:

25–54 MHz .....	1 $\mu$ V
108–136.9875 MHz .....	1 $\mu$ V
137–174 MHz .....	1.5 $\mu$ V
216–225 MHz .....	1.5 $\mu$ V
406–512 MHz .....	2 $\mu$ V

806–960 MHz .....	2 $\mu$ V
1240–1300 MHz .....	3 $\mu$ V
Selectivity:	
25 – 27.995 MHz at AM mode	
-6 dB .....	+/-5 kHz
-50 dB .....	+/-6 kHz
All frequencies except 25 - 27.995 MHz at AM and FM mode	
-6 dB .....	+/-10 kHz
-50 dB .....	+/-18 kHz
Spurious Rejection (at 154.1 MHz FM) .....	40 dB
Scanning Rate .....	Up to 60 Channels per Second
Search Rate .....	Up to 75 Steps per Second
Delay Time .....	2 seconds
Intermediate Frequencies (IF):	
1st .....	380.8 MHz
2nd .....	21.4 MHz
3rd .....	455 kHz
Priority Sampling .....	2 seconds
Operating Temperature .....	-14 to 140° F
.....	(-10 to 60° C)
IF Rejection	
380.8 MHz at 154.1 MHz.....	60 dB
21.4 MHz at 154.1 MHz .....	100 dB
Squelch Sensitivity:	
Threshold (FM and AM) .....	0.5 $\mu$ V
Tight (FM) .....	25 dB
Tight (AM) .....	20 dB
Antenna Impedance .....	50 Ohms
Audio Output Power (10% THD) .....	170 mW
Built-in Speaker .....	1 <sup>3</sup> / <sub>8</sub> Inches
	(36 mm)
	(8-ohm,Dynamic Type)
Power Requirements:	
Batteries .....	4 AA Alkaline Batteries
	or 4 AA Rechargeable Ni-MH Batteries
External Power .....	9V DC

Current Drain (Squelched) .....	90 mA
Battery Charge Current .....	150 mA
Dimensions (HWD).....	$6 \frac{3}{16} \times 2 \frac{7}{16} \times 1 \frac{3}{4}$ Inches (157 × 62 × 41 mm)
Weight (without antenna and batteries).....	8.5 oz. (240 g)

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

### **Limited One-Year Warranty**

This product is warranted by RadioShack against manufacturing defects in material and workmanship under normal use for one (1) year from the date of purchase from RadioShack company-owned stores and authorized RadioShack franchisees and dealers. EXCEPT AS PROVIDED HEREIN, RadioShack MAKES NO EXPRESS WARRANTIES AND ANY IMPLIED WARRANTIES, INCLUDING THOSE OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED IN DURATION TO THE DURATION OF THE WRITTEN LIMITED WARRANTIES CONTAINED HEREIN. EXCEPT AS PROVIDED HEREIN, RadioShack SHALL HAVE NO LIABILITY OR RESPONSIBILITY TO CUSTOMER OR ANY OTHER PERSON OR ENTITY WITH RESPECT TO ANY LIABILITY, LOSS OR DAMAGE CAUSED DIRECTLY OR INDIRECTLY BY USE OR PERFORMANCE OF THE PRODUCT OR ARISING OUT OF ANY BREACH OF THIS WARRANTY, INCLUDING, BUT NOT LIMITED TO, ANY DAMAGES RESULTING FROM INCONVENIENCE, LOSS OF TIME, DATA, PROPERTY, REVENUE, OR PROFIT OR ANY INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, EVEN IF RadioShack HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Some states do not allow limitations on how long an implied warranty lasts or the exclusion or limitation 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.

RadioShack Customer Relations, 200 Taylor Street, 6th Floor, Fort Worth, TX 76102

*We Service What We Sell*

12/99