

User Manual

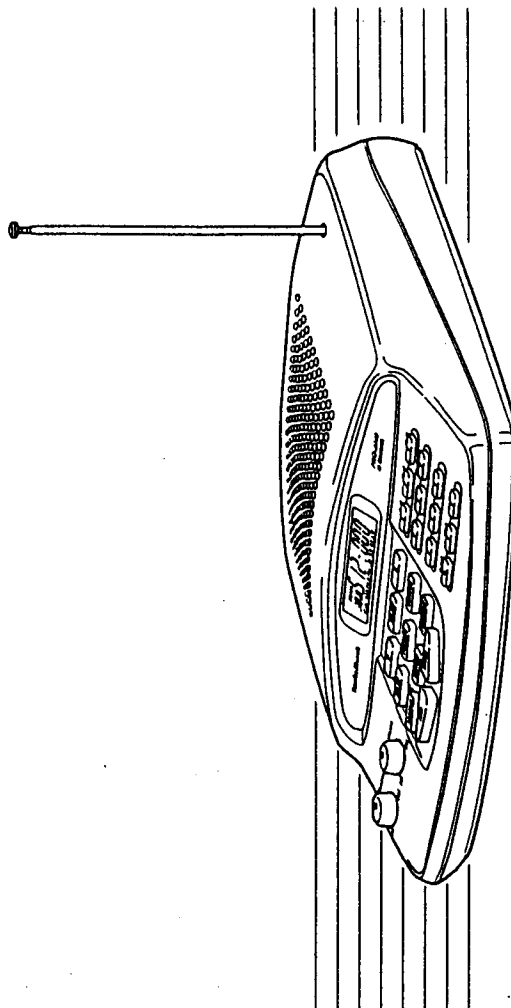
DRAFT COPY OF THE INSTRUCTION MANUAL

Please note for Compliance statement for
FCC 15.21, please see page 35 of the Owners
Manual.

OWNER'S MANUAL

2016
PRO-2040
20-Channel Direct Entry
Programmable Scanner

Please read before using this equipment.



Limited One-Year Warranty

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

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 **RadioShack®**

FEATURES

²⁰¹⁶ 200
Your RadioShack PRO-2049 95-
Channel Direct Entry Programmable
Scanner lets you in on all the action!
This scanner gives you direct access
to over 23,000 frequencies, including
those used by police and fire depart-
ments, ambulance and transportation
services, government agencies, and
amateur radio services. You can se-
lect up to 30 channels to scan and you
can change selections at any time.

The scanner's frequency bands let
you search specific, preset ranges of
frequencies quickly and easily.

Your scanner has all these special
features:

Weather Band Key — scans seven
preprogrammed weather channels to
keep you informed about current
weather conditions.

^{Ten} 20
~~These 30~~ **Channel Storage Banks** —
let you store 30 channels in each of
the banks to group channels so calls
are easier to identify.

^{Ten} ~~three~~ **Monitor Memories** — let you
temporarily save ~~the~~ frequencies lo-
cated during a frequency search, so
you can decide if you want to move
them to permanent channel storage.

Priority Channels — let you set the
scanner to check up to ~~three~~ ^{ten} channels
every 2 seconds so you do not miss
important calls.

Band Search — lets you quickly and
easily search preset frequency rang-
es, so you can find new and unlisted
broadcasts.

Direct Search — lets you search for a
transmission starting from a specified
frequency.

Search Skip — lets you select up to
20 frequencies for the scanner to skip
during a search, so you can search
more efficiently.

**Two-Second Channel Scan/Search
Delay** — lets you set the scanner so it
delays scanning or searching for 2
seconds before moving to another
channel/frequency, so you can hear
more replies.

Lock-Out — keeps channels you se-
lect from being scanned, so you can
skip over busy channels such as
those with a continuous transmission.

Key Confirmation Tones — the
scanner sounds a tone when you per-
form an operation correctly and
sounds an error tone if you make an
error.

Memory Backup — keeps channel
frequencies stored in memory for ~~3~~
~~days or more during a power loss.~~

*an extended time
even if your Pro-2016 loses power.*

External Speaker Jack — lets you
connect an external speaker, or an
earphone or headphones for private
listening.

External Antenna Terminal — lets
you connect an external antenna (not
supplied) for improved reception.

²⁰¹⁶
Your PRO-2049 scanner can receive
all of these frequencies:

- 29-54 MHz (10-Meter Amateur
Radio, VHF Lo, 6-Meter Amateur)
- 108-136.975 MHz (Aircraft)
- 137-174 MHz (Government, 2-
Meter Amateur Radio, VHF Hi)
- 406-512 MHz (UHF Lo, 70-Centi-
meter Amateur Radio, Govern-
ment, UHF "T" Band)

*WX Alert — warns you of
serious weather conditions
by sounding an alarm if the
weather service transmits a
weather alert tone.*

Freq. Range (MHz)	Freq. Step (kHz)
29.000-54.000	5
108.000-136.975	12.5
137.000-144.000	5
144.000-148.000	5
148.000-174.000	5
406.000-450.000	12.5
450.000-470.000	12.5
470.000-512.000	12.5

Note: The frequency steps are preset.
You cannot change them.

Your scanner can also receive these
preprogrammed weather channel fre-
quencies:

- 162.400 MHz
- 162.425 MHz
- 162.450 MHz
- 162.475 MHz
- 162.500 MHz
- 162.525 MHz
- 162.550 MHz

We recommend you record your scan-
ner's serial number here. The number
is on the scanner's bottom panel.

Serial Number _____

FCC NOTICE

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

- moving your scanner away from the receiver
- connecting your scanner to an outlet that is on a different electrical circuit from the receiver
- contacting your local RadioShack store for help

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

SCANNING LEGALLY

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

- telephone conversations (cellular, cordless, or other private means of telephone signal transmission)
- pager transmissions
- any scrambled or encrypted transmissions

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

This scanner has been designed to prevent reception of illegal transmissions. This is done to comply with the legal requirement that scanners be manufactured so as to not be easily modifiable to pick up those transmissions.

Do not open your scanner's case to make any modifications that could allow it to pick up transmissions that it is not legal to listen to. Doing so could subject you to legal penalties.

We encourage responsible, legal scanner use.

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PREPARATION

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

REMOVING THE DISPLAY PROTECTOR

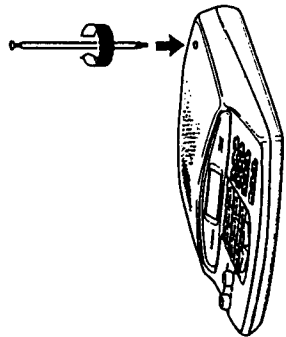
Your scanner's display is protected during shipment by a piece of film. Peel off this film before you use the scanner.

CONNECTING AN ANTENNA

Connecting the Supplied Antenna

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

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



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

Frequency	Antenna Length
29-54 MHz	Extend fully
108-174 MHz	Collapse one segment
406-512 MHz	Collapse both segments

Connecting an Outdoor Antenna

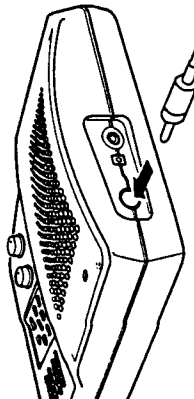
Instead of the supplied antenna, you can connect an outdoor base-station antenna (not supplied) to your scanner. Your local RadioShack store sells a variety of antennas. Choose the one that best meets your needs.

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

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

To connect an optional base-station antenna, first remove the supplied antenna from the scanner. Always use 50-ohm coaxial cable, such as RG-58 or RG-8, to connect the base-station antenna. For lengths over 50 feet, use RG-8 low-loss dielectric coaxial cable. If the antenna cable's connector does not fit in the ANT. jack, you might also need an antenna plug adapter such as RadioShack Cat. No. 278-208. Your local RadioShack store carries a wide variety of coaxial antenna cable and connectors.

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

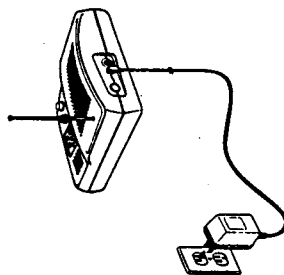


Cautions:

- Do not run the cable over sharp edges or moving parts that might damage it.
- Do not run the cable next to power cables or other antenna cables.
- Follow all cautions and warnings included with your antenna.

CONNECTING POWER

The scanner's supplied AC adapter lets you power the scanner from a standard AC outlet. To connect power to the scanner, insert the AC adapter's barrel plug into the AC 10V jack on the back of the scanner, then plug the AC adapter into a standard AC outlet.



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

Cautions:

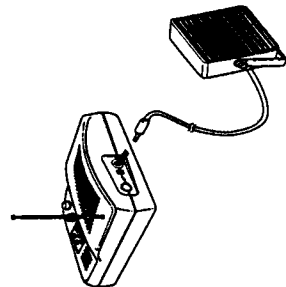
! You must use a Class 2 power source that supplies 10 volts AC and delivers at least 300 mA. Its plug must fit the scanner's AC 10V jack. The supplied adapter meets these specifications. Using an adapter that does not meet these specifications could damage the scanner or the adapter.

- Use only the supplied AC adapter to power your scanner. Using another adapter could damage your scanner. A replacement adapter is available by special order through your local RadioShack store.
- Be sure to connect the AC adapter to the scanner before you connect it to an AC outlet, and disconnect the AC adapter from the AC outlet before you disconnect it from the scanner.

CONNECTING AN EXTERNAL SPEAKER

You can connect an optional external speaker with a 1/8-inch (3.5-mm) plug to the scanner. Use an 8-ohm external speaker that can handle at least 2.5 watts of power. Your local RadioShack store sells scanner accessories, including external speakers.

Insert the speaker's plug into the EXT. SP. jack on the back of the scanner.

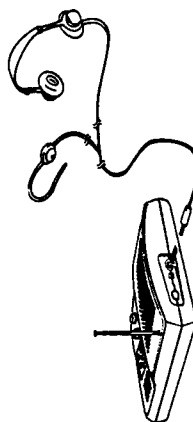


Note: Plugging in an external speaker disconnects the scanner's internal speaker.

CONNECTING AN EARPHONE/HEADPHONES

You can connect an optional earphone or pair of monaural headphones with a 1/8-inch (3.5-mm) plug to the scanner. Your local RadioShack store sells a complete line of earphones and headphones.

Insert the earphone's or headphones' plug into the EXT. SP. jack on the back of the scanner.



Note: Plugging in an earphone or headphones disconnects the scanner's internal speaker.

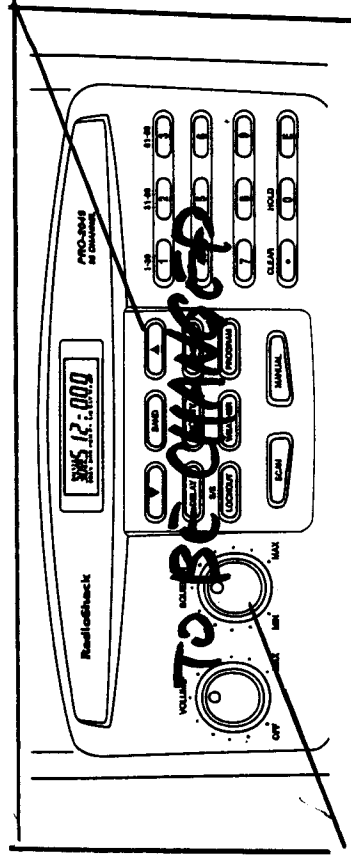
Listening Safely

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

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

UNDERSTANDING YOUR SCANNER

A LOOK AT THE FRONT PANEL



A quick glance at this section should help you understand each control's function.

VOLUME

Turns the scanner on or off and adjusts the volume.

SQUELCH

Adjusts the scanner's squelch. See "Turning On the Scanner/Setting Volume and Squelch" on Page 17.

▲ / ▼

Enters the search direction.

BAND

Searches a band you select. See "Frequency Bands" on Page 15.

DELAY

Programs a 2-second delay for the selected channel.

PRIORITY / ALERT

Sets and turns on or off priority for a particular channel. Sets the scanner to the weather alert mode. Stores frequencies into and accesses the three monitor memories. See "Monitor Memories" on Page 15.

MONITOR

S/S-LOCKOUT (search/skip/lockout)

Skips a specified frequency during a band or direct search or locks out selected channels during scanning.

WEATHER WX/E

Scans the seven preprogrammed weather channels.

PROGRAM

Programs frequencies into channels.

SCAN

Scans through the channels.

Stores frequencies into channels. See "Manually Storing Frequencies into Channels" on Page 11.

MANUAL

Stops scanning to let you listen to a monitor memory or directly enter a channel number.

~~1-9~~ 1-0

Each key has a single-digit label, and the ~~1-9~~ keys also have a range of numbers. Use the digits on the keys to enter the numbers for a channel or a frequency. Use the range of numbers above the key (~~1-9~~, for example) to select the channels in a channel-storage bank. See "Channel-Storage Banks" on Page 15.

~~Also, pressing HOLD for during a search pauses the scanner.~~

CLEAR/

Clears an incorrect entry, or enters the decimal point when you enter a frequency.

E (Enter)

Stores frequencies into channels. See "Manually Storing Frequencies into Channels" on Page 18.

HOLD

Pressing Hold during a search pauses the scanner.

A LOOK AT THE DISPLAY

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



BANK

Appears with a number (~~1-9~~) to its right to show which channel-storage banks are turned on for scanning. See "Understanding Banks and Bands" on Page 15.

MON

Appears with a number (~~1-9~~) to its right to show which monitor memory you are listening to.

P

Appears when you tune to a priority channel.

CH

Appears with a number (~~1-9~~) to its left to show which channel the scanner is tuned to.

SCAN

Appears when you scan channels.

MAN

Appears when you manually select a channel.

PGM

Appears when you program the scanner.

PRI

Appears when the priority feature is turned on.

L/O (lockout)

Appears when you skip a channel or frequency, when you manually select a channel or frequency that is locked out or skipped, or when a frequency is stored in search skip memory during a direct search or band search hold.

DLY

Appears when the scanner is scanning and stops at a channel, or during a search when you have programmed a 2-second delay.

Appears during WX ALERT mode

and flashes when the scanner receives WX ALERT.

UNDERSTANDING BANKS AND BANDS

WX (weather)

Appears when the scanner is searching the weather band.

▲ / ▼

Indicates the search direction during a search.

b

Appears instead of the channel number during a band search.

d

Appears instead of the channel number during a direct search.

H

Appears during a band search hold.

h

Appears during a direct search hold.

MONITOR MEMORIES

Monitor memories are temporary storage areas where you can store up to ~~three~~ frequencies during a search while you decide whether to save them into channels. You can manually select and listen to monitor memories.

FREQUENCY BANDS

Your scanner has eight frequency bands, each covering a specific range of frequencies. You can search these bands for specific broadcasts by repeatedly pressing **BAND** until the scanner displays the band you want.

For example, you can search through all frequencies between 29.000 and 54.000 MHz for specific broadcasts by repeatedly pressing **BAND** until **29-54** appears on the display. The scanner then automatically searches the frequencies in that band.

You can store frequencies into either a permanent memory location called a channel, or a temporary memory location called a monitor memory. You can store up to ~~30~~ channels and up to ~~3~~ ¹⁰ monitor memories.

Your scanner also has eight frequency bands, each covering a specific range of frequencies you can search.

CHANNEL-STORAGE BANKS

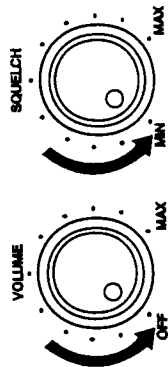
To make it easier to identify and select the frequencies you want to listen to, the scanner's channels are divided into ~~3~~ ¹⁰ channel-storage banks (each) of ~~30~~ channels each. You can use each channel-storage bank to group frequencies, such as those used by the police department, fire department, ambulance services, and amateur radio operators (see "Guide to the Action Bands" on Page 28).

For example, there might be three or four police departments in your area, each using several different frequencies. Additionally, there might be other law enforcement agencies such as state police, county sheriffs, or SWAT teams that use their own frequencies. You could program all law enforcement frequencies starting with Channel 1 (the first channel in Bank 1), then program the fire department, paramedic, and other public safety frequencies starting with Channel ~~31~~ ²¹ (the first channel in Bank ~~3~~ ²).

OPERATION

TURNING ON THE SCANNER/SETTING VOLUME AND SQUELCH

1. Turn OFF/VOLUME and SQUELCH fully counterclockwise.



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

Notes:

- 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 the scanner will not scan, turn SQUELCH further clockwise.

This table shows the frequency band ranges displayed by the scanner and the typical usage, frequency coverage, and step for each.

Displayed Frequency Band Range	Typical Usage	Frequency Coverage (MHz)	Step (kHz)
29-54	10-Meter Amateur Radio, VHF Lo, 6-Meter Amateur Radio	29.000 to 54.000	5.0
108-137	Aircraft	108.000 to 136.975	12.5
137-144	Government	137.000 to 144.000	5.0
144-148	2-Meter Amateur Radio	144.000 to 148.000	5.0
148-174	VHF Hi	148.000 to 174.000	5.0
406-450	Government, 70-Centimeter Amateur Radio	406.000 to 450.000	12.5
450-470	UHF Lo	450.000 to 470.000	12.5
470-512	UHF "T" Band	470.000 to 512.000	12.5

Notes:

- Your scanner searches at the preset frequency step rate (5 or 12.5 kHz) for each frequency. You cannot change the frequency step rate.
- The scanner displays the nearest 1 kHz step. For example, if you tune to 406.1125, the scanner displays 406.112.
- While searching through a frequency band, you might hear a frequency you want to store. You can store any frequency into a monitor memory.
- You cannot change or delete any of the frequencies in the frequency bands.

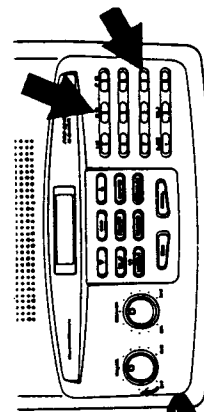
RESETTING THE SCANNER

You might need to reset the scanner in any of the following conditions.

- before you use it for the first time (to clear anything that might already have been stored in memory)
- if the scanner's display locks up
- if the scanner does not work properly after you connect power
- if the scanner is dropped or subjected to a physical or electrical shock

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

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



To PE CHANNEL

MANUALLY STORING FREQUENCIES INTO CHANNELS

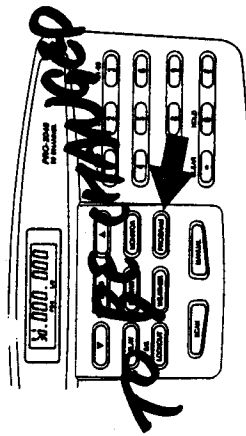
If you know a frequency you want to store, you can store it manually into a channel.

Good references for active frequencies are RadioShack's "Police Call Radio Guide Including Fire and Emergency Services," "Aeronautical Frequency Directory," and "Maritime Frequency Directory." We update these directories every year, so be sure to get a current copy. See also "Guide to the Action Bands" on Page 28 in this manual.

Note: If you do not have a reference to frequencies in your area, follow the steps in "Searching For and Temporarily Storing Active Frequencies" on Page 19 to search for transmissions.

Follow these steps to manually store a frequency into a channel.

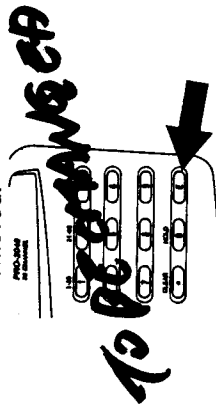
1. If the scanner is scanning, press **MANUAL**.
2. Using the number keys, enter the channel number where you want to store a frequency. **BANK**
3. Press **PROGRAM**, **↵** and the bank number, the selected channel number and **CH**, **PGM**, **L/O** (if the selected channel number is empty), and **000.000** (or the previously programmed frequency) appear on the display.



4. Using the number keys, enter the frequency you want to store into that channel, including the decimal point.

Note: Your scanner automatically rounds the entered frequency up to the closest valid frequency. For example, if you try to enter a frequency of 151.473, your scanner accepts it as 151.475.

5. Press **E** to store the frequency. If the channel was locked out, the lockout is removed.



Note: If you entered an invalid frequency in Step 4, the scanner displays **Error**. Press **CLEAR**, then repeat Steps 4 and 5.

6. To program the next channel in sequence, repeat Steps 3-5. To program another channel (not in sequence), repeat Steps 2-5.

SEARCHING FOR AND TEMPORARILY STORING ACTIVE FREQUENCIES

You can search for transmissions using either a band or direct search, then temporarily store the frequencies for those transmissions into monitor memories.

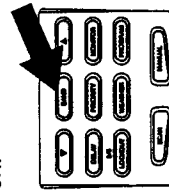
Notes:

- If you manually tune to a search skip frequency, the display shows **L/O** (see "Skipping Frequencies/Channels" on Page 23).
- You can use the scanner's delay feature while using band or direct search. See "Delay" on Page 23.

Band Search

Using band search, you can select a frequency band and search for transmissions within only that band.

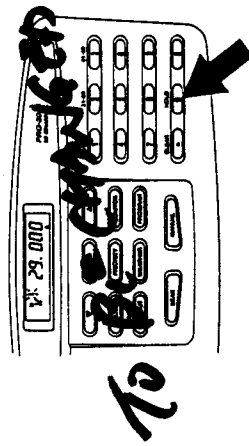
1. Repeatedly press **BAND** until you see the frequency band you want to search.



The scanner displays **▲** or **▼**, the range for each frequency band, and the number of the current monitor memory blinks on the display. Then the scanner starts to search the frequencies in the

band. When the scanner finds a transmission, it stops and displays the frequency's number until the transmission stops, then it starts searching again.

2. To manually search the band, press **HOLD** after the scanner starts automatically searching the frequencies. The scanner displays **H** (hold), **▲** or **▼**, and a frequency within the band you selected.



3. Repeatedly press **▲** to step from the lower to the upper range, or **▼** to step from the upper to the lower range.

Hold down **▲** or **▼** or press **HOLD** to return to automatic search.

4. When the scanner finds an active frequency, you can do any of the following:

- save the frequency into the current monitor memory by pressing **MONITOR**.
- continue searching by pressing **▲** or **▼**.
- stop searching and listen to the frequency by pressing **HOLD**. **H** (hold) appears.

Note: You can change the direction of either an automatic or manual search by pressing ▲ or ▼ once.

Direct Search

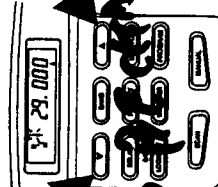
Using direct search, you can enter a frequency, then search for transmissions above or below that frequency within all of the frequency bands.

1. Press **MANUAL**.



2. Use the number keys to enter the frequency where you want to start the search. Press **•** to enter the decimal point.

3. Press ▲ or ▼ to search up or down from the selected frequency. ▲ (direct) and ▲ or ▼ appear, and the next available monitor memory number flashes.



Note: If you entered an invalid frequency in Step 2, the scanner displays **Error**. Press **CLEAR**, then repeat Steps 2 and 3.

4. When the scanner finds an active frequency, you can do any of the following:

- save the frequency into the current monitor memory by pressing **MONITOR**.
- continue searching or change the search direction by pressing ▲ or ▼.
- stop searching and listen to the frequency by pressing **HOLD**. **H** (hold) appears.

To manually step through frequencies one at a time after you stop a search, repeatedly press ▲ or ▼. To continue searching, either press **HOLD** or press and hold down ▲ or ▼ for about 1 second.

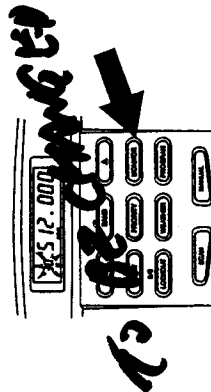
LISTENING TO MONITOR MEMORIES

After you store frequencies into the scanner's monitor memories, you can listen to them by pressing **MANUAL**, **MONITOR** then the number for the desired monitor memory.

Note: To listen to the monitor memories, the priority channel feature must be turned off (see "Priority" on Page 24).

MOVING A FREQUENCY FROM A MONITOR MEMORY TO A CHANNEL

1. If the scanner is scanning, press **MANUAL**.
2. Use the number keys to enter the channel number where you want to store the monitor frequency, then press **PROGRAM**. **PGM** appears on the display.
3. Press **MONITOR**. The channel number flashes.

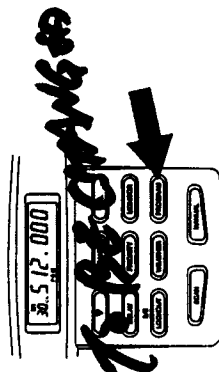


4. Use the number keys to enter the monitor memory number that has the frequency you want to store into the channel. The frequency appears.
5. Press **E**. The scanner stores the frequency in the selected channel.

DELETING A FREQUENCY FROM A CHANNEL

1. If the scanner is scanning, press **MANUAL**.

2. Use the number keys to enter the channel number containing the frequency you want to delete.
3. Press **PROGRAM**.



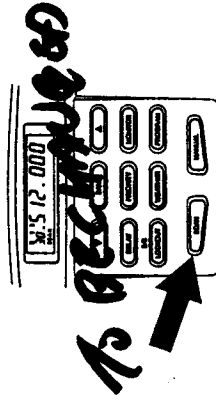
4. Press **0** then **E**. The frequency is deleted from the channel.

To delete a frequency from a monitor memory, store a new frequency in that monitor memory.

SCANNING CHANNELS

Note: You cannot scan channels until you have stored frequencies in them.

To scan channels stored in the channel-storage banks, press **SCAN**. The scanner scans through all channels in the active banks.



To select one or more channel-storage banks while scanning, select each bank you want to scan by pressing its number key so the bank's number appears on the display.



To turn off channel-storage banks, press the number key for the bank(s) so the bank's number disappears. The scanner does not scan any of the stored channels within banks you have turned off.

Notes:

- You can manually select any channel in a bank, even if the bank is turned off.
- You cannot turn off all ^{two} three banks.
- The scanner skips channels that have been locked out (see "Skipping Frequencies/Channels" on Page 23).

MANUALLY SELECTING A CHANNEL

You can continuously monitor a specific channel without scanning. This is useful if you hear an emergency broadcast on a channel and want to hear all the details (even though there might be periods of silence) or if you want to monitor only a specific channel or a locked-out channel.

Follow these steps to manually select a channel.

1. Press **MANUAL**.
2. Use the number keys to enter the channel number you want to hear, then press **MANUAL** again.

Notes:

- If your scanner is scanning and stops at the channel you want, simply press **MANUAL** to manually select the channel.
- If you repeatedly press **MANUAL**, the scanner steps through the channels.

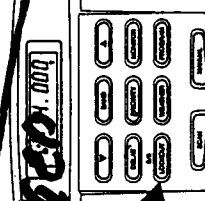
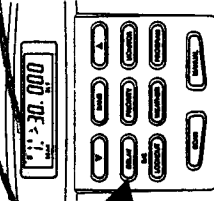
SPECIAL FEATURES

DELAY

Many agencies use a two-way radio system that 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 or frequencies. Then, when the scanner stops on the channel or frequency, **DLX** appears on the display and the scanner continues to monitor the channel/frequency for 2 seconds after the transmission stops before it resumes scanning or searching.

You can program a 2-second delay in any of the following ways:

- If the scanner is scanning and stops on an active channel, quickly press **DELAY** before it starts to scan again.



- If the desired channel is not selected, manually select the channel then press **DELAY**.

- If the scanner is searching, press **DELAY** during the search. **DLX** appears on the display and the scanner automatically adds a 2-second delay to every transmission it stops on.

SKIPPING FREQUENCIES/CHANNELS

You can scan channels and search for frequencies faster by skipping ones that have a continuous transmission, such as a weather channel. You can skip up to all ~~20~~ channels while scanning or up to 20 frequencies during a band or direct search.

To skip a channel/frequency while scanning or searching, press **S/S-LOCKOUT** when the scanner stops on it.

- If you skip more than 20 search frequencies, each new frequency replaces an earlier one, starting from the first stored frequency.
- You can manually select skipped frequencies after you press **HOLD** to stop a search. The scanner displays **L/O** when you select a skipped frequency.

Removing Skip from Frequencies

To remove the skip from a frequency while searching, press **HOLD** to stop the search, press **▲** or **▼** to select the skipped frequency, then press **S/S** until **L/O** disappears.

To remove the skip from all frequencies at once while searching, hold down **S/S-LOCKOUT** until the scanner beeps twice.

Note: If you turned the key tone off (see "Turning the Key Tone On or Off" on Page 25), the scanner does not beep when you hold down **S/S-LOCKOUT**.

Removing Skip from Channels

Follow these steps to remove the skip from a channel while scanning.

1. Press **MANUAL** to stop scanning.
2. Use the number keys to enter the channel number you want to delete.
3. Press **MANUAL**.
4. Hold down **LOCKOUT** until **L/O** disappears.

To remove skip from all channels while scanning, select the banks containing the skipped channels, press **MANUAL**, then hold down **LOCKOUT** until the scanner beeps twice.

Note: If you turned the key tone off (see "Turning the Key Tone On or Off"

on Page 25), the scanner does not beep when you hold down **LOCKOUT**.

PRIORITY

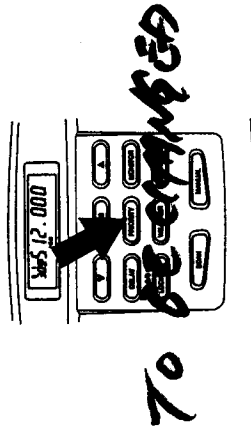
The priority feature lets you scan through programmed channels and still not miss important or interesting calls on specific channels. You can program one stored channel in each bank as a priority channel (up to 4 total). As the scanner scans, it checks the priority channels in each selected bank for activity every 2 seconds.

Notes:

- You can skip priority channels. If you skip all priority channels, the scanner displays **CH LOC OUT** when you turn on the priority feature. See "Skipping Frequencies/Channels" on Page 23.
- The priority feature must be turned off to listen to monitor memories.

The scanner automatically designates the first channel in each bank as that bank's priority channel. Follow these steps to program a different channel as the priority channel.

1. Press **PROGRAM**.
2. Use the number keys to enter the channel number you want to program as the priority channel, then press **PRIORITY**. **P** appears to the right of the channel number.



3. Repeat Steps 1 and 2 for each channel you want to program as a priority channel.

To confirm priority channel numbers for all banks, press **PROGRAM** then repeatedly press **PRIORITY**.

To turn on priority, press **PRIORITY** during scanning. **PRI** appears, and the scanner checks the priority channel in each selected bank every 2 seconds. It stays on the channel if there is activity, and **P** appears.

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

Note: If you are scanning more than one bank in which a priority channel has been programmed, the scanner stops on the lowest-numbered priority channel first while scanning.

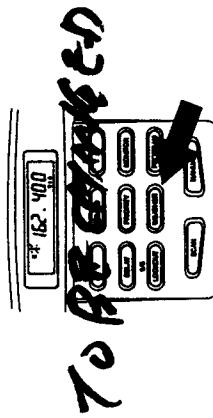
LISTENING TO THE WEATHER BAND

The National Oceanic and Atmospheric Administration (NOAA) uses 7 frequencies to broadcast local forecasts

and regional weather information. We have preprogrammed your scanner with these frequencies.

Note: For a list of all 7 national weather frequencies, see "National Weather Frequencies" on Page 26.

To scan the preprogrammed weather channels, press **WEATHER**. **WX** appears, and the scanner searches the weather channels and stops on an active broadcast. If a broadcast is weak, press **WEATHER** again to continue searching through the weather channels.



Weather Alert

TURNING THE KEY TONE ON OR OFF

The scanner is preset to sound a tone each time you press any of its keys.

Follow these steps to turn the scanner's key tone on or off.

1. If the scanner is turned on, turn **VOLUME** counterclockwise until it clicks to turn it off.
2. Hold down **S/S-LOCKOUT** while you turn on the scanner. **no BEEP** (if the key tone is off) or **On BEEP** (if the key tone is on) appears for about 3 seconds.

A GENERAL GUIDE TO SCANNING

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

HAM RADIO FREQUENCIES

Ham radio operators often broadcast emergency information when other means of communication break down.

The following chart shows the voice frequencies that you can monitor:

Wavelength (Meters)	Voice (MHz)
10-meter	29.000-29.700
6-meter	50.100-54.000
2-meter	144.100-148.000
70-cm	420.000-450.000

NATIONAL WEATHER FREQUENCIES

162.400	162.425	162.450	162.475
162.500	162.525	162.550	

Weather Alert

Your scanner's weather alert feature can warn you when your local weather station broadcasts a severe weather emergency signal. (See "Testing Alert Operation" on Page 10.)

1. Press **WX** to find the clearest local weather broadcasting station.
2. Press **ALERT**. **ALERT** appears.

When a severe weather emergency signal is broadcasted, the scanner

UNITED STATES BROADCAST BAND

In the United States, there are several broadcast bands. The standard AM and FM bands are probably the most well known. There are also four television audio broadcast bands — the lower three transmit on the VHF band and the fourth transmits on the UHF band. You can use your scanner to monitor the 470-512 MHz range of the UHF band.

sounds a loud alarm (regardless of the volume control setting). The alarm continues until the emergency signal stops transmitting.

To manually turn off the siren and exit the weather alert mode, press **ALERT** or **WX**.

Using the Weather Alert Standby Mode

When you set the scanner to the weather alert standby mode, the scanner's display and speaker turn off until the scanner receives the severe weather emergency signal. When the scanner receives the signal, it sounds a loud alarm. To set the scanner to the weather alert standby mode, follow these steps.

1. Press **WX**.
2. When the scanner stops on a weather channel, press **ALERT** for 2 seconds. The scanner displays **on ALERT** for 10 seconds, then the display turns off and your scanner is in the weather alert standby mode.

To exit the weather alert standby mode, press **ALERT** or **WX**.

GUIDE TO THE ACTION BANDS

Typical Band Usage

VHF Band (29.00–300.0 MHz)	
Low Range	29.00–50.00 MHz
6-Meter Amateur	50.00–54.00 MHz
U.S. Government	137.00–144.00 MHz
2-Meter Amateur	144.00–148.00 MHz
High Range	148.00–174.00 MHz
UHF Band (300.00 MHz–3.0 GHz)	
U.S. Government	406.00–420.00 MHz
70-Centimeter Amateur	420.00–450.00 MHz
Low Range	450.00–470.00 MHz
FM-TV Audio Broadcast, Wide Band	470.00–512.00 MHz

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
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, refer to the "Police Call Radio Guide including Fire and Emergency Services," available at your local RadioShack store.

Abbreviations

Services

BIFC	Boise (ID) Interagency Fire Cache
BUS	Business
CAP	Civil Air Patrol
CB	Citizens Band
CCA	Common Carrier
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
MAR	(Manufacturing, Construction, Farming, Forest Products)
MARI	Military Amateur Radio
	Maritime Limited Coast
	(Coast Guard, Marine Telephone, Shipboard Radio, Private Stations)
MARS	Military Affiliate Radio System
MED	Emergency/Medical Services
MIL	U.S. Military
MOV	Motion Picture/Video Industry
NEW	New Mobile Narrow
NEWS	Relay Press. (Newspaper Reporters)
OIL	Oil/Petroleum Industry
POL	Police Department
PUB	Public Services
	(Public Safety, Local Government, Forestry Conservation)
PSB	Public Safety
PTR	Private Trunked
ROAD	Road & Highway Maintenance
RTV	Radio/TV Remote Broadcast Pickup
TAXI	Taxi Services
TELB	Mobile Telephone
	(Aircraft, Radio Common Carrier, Landline Companies)
TELC	Cordless Phones
TELM	Telephone Maintenance
TOW	Tow Trucks
TRAN	Transportation Services
	(Trucks, Tow Trucks, Buses, Railroad, Other)
TSB	Trunked Systems

TV_n FM-TV Audio Broadcast
 USXX Government Classified
 UTIL Power & Water Utilities
 WTHR Weather

HIGH FREQUENCY (HF) — (3 MHz–29.7 MHz)

10-Meter Amateur Band (28.0–29.7 MHz)

29.000–29.700 HAM

VERY HIGH FREQUENCY (VHF) — (29.7 MHz–54 MHz, 137 MHz–174 MHz)

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

29.700–29.790 IND
 29.900–30.550 GOVT, MIL
 30.580–31.980 IND, PUB
 32.000–32.990 GOVT, MIL
 33.020–33.980 BUS, IND, PUB
 34.010–34.990 GOVT, MIL
 35.020–35.980 BUS, PUB, IND, TELM
 36.000–36.230 GOVT, MIL
 36.230–36.990 Oil Spill Cleanup, GOVT, MIL
 37.020–37.980 PUB, IND
 38.000–39.000 GOVT, MIL
 39.020–39.980 PUB
 40.000–42.000 GOVT, MIL, MARI
 42.020–42.940 POL
 42.960–43.180 IND
 43.220–43.680 TELM, IND, PUB
 43.700–44.600 TRAN
 44.620–46.580 POL, PUB
 46.600–46.990 GOVT, TELC
 47.020–47.400 PUB
 47.420 American Red Cross
 47.440–49.580 IND, PUB
 49.610–49.990 MIL, TELC

6-Meter Amateur Band (50–54 MHz)

50.00–54.00 HAM

U.S. Government Band (137–144 MHz)

137.000–144.000 GOVT, MIL

2-Meter Amateur Band (144–148 MHz)

144.000–148.000 HAM

VHF High Band (148–174 MHz)

148.050–150.345 CAP, MAR, MIL
 150.775–150.790 MED
 150.815–150.980 TOW, Oil Spill Cleanup
 150.995–151.475 ROAD, POL
 151.490–151.955 IND, BUS
 151.985 TELM
 152.0075 MED
 152.030–152.240 TELB
 152.270–152.480 IND, TAXI, BUS
 152.510–152.840 TELB
 152.870–153.020 IND, MOV
 153.035–153.725 IND, OIL, UTIL
 153.740–154.445 PUB, FIRE
 154.490–154.570 IND, BUS
 154.585 Oil Spill Cleanup
 154.600–154.825 BUS
 154.655–156.240 MED, ROAD, POL, PUB
 156.255–157.425 OIL, MARI
 157.450 MED
 157.470–157.515 TOW
 157.530–157.725 IND, TAXI
 157.740 BUS
 157.770–158.100 TELB
 158.130–158.460 BUS, IND, OIL, TELM, UTIL
 158.490–158.700 TELB
 158.730–159.465 POL, PUB, ROAD
 159.480 OIL
 159.495–161.565 TRAN
 161.580–162.000 OIL, MARI, RTV
 162.0125–162.35 GOVT, MIL, USXX
 162.400–162.550 WTHR
 162.5625–162.6375 GOVT, MIL, USXX
 162.6625 MED
 162.6875–163.225 GOVT, MIL, USXX
 163.250 MED
 163.275–166.225 GOVT, MIL, USXX
 166.250 GOVT, RTV, FIRE
 166.275–169.400 GOVT, BIFC
 169.445–169.505 Wireless Mikes, GOVT
 169.55–169.9875 GOVT, MIL, USXX
 170.000–170.150 BIFC, GOVT, RTV, FIRE
 170.175–170.225 GOVT
 170.245–170.305 Wireless Mikes
 170.350–170.400 GOVT, MIL
 170.425–170.450 BIFC
 170.475 PUB
 170.4875–173.175 GOVT, PUB, Wireless Mikes
 173.225–173.5375 MOV, NEWS, UTIL, MIL
 173.5625–173.5875 MIL Medical/Crash Crews
 173.60–173.9875 GOVT

ULTRA HIGH FREQUENCY (UHF) — (300 MHz–512 MHz)

U. S. Government Band (406–450 MHz)

406.125–419.975 GOVT, USXX

70-Centimeter Amateur Band (420–450 MHz)

420.000–450.000 HAM

Low Band (450–470 MHz)

450.050–450.925 RTV
451.025–452.025 IND, OIL, TELM, UTIL
452.0375–453.00 IND, TAXI, TRAN TOW, NEWS
453.0125–454.000 PUB, OIL
454.025–454.975 TELB
455.050–455.925 RTV
457.525–457.600 BUS
458.025–458.175 MED
460.0125–460.6375 FIRE, POL, PUB
460.650–462.175 BUS
462.1875–462.450 BUS, IND
462.4625–462.525 IND, OIL, TELM, UTIL
462.550–462.925 GMR, BUS
462.9375–463.1875 MED
463.200–467.925 BUS

FM-TV Audio Broadcast, UHF Wide Band (470–512 MHz) (Channels 14 through 20 in 6 MHz steps)

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

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

AVOIDING IMAGE FREQUENCIES

You might discover one of your regular stations on another frequency that is not listed. It might be what is known as an image frequency. For example, you might find a service that regularly uses a frequency of 431.975 also on 474.775.

To see if it is an image, do a little math.

Note the new frequency.

Double the intermediate frequency of 21.4 MHz (42.800)
and subtract it from the new frequency.

If the answer is the regular frequency,
then you have tuned to an image.

Occasionally, you might get interference on a weak or distant channel from a strong broadcast 42.8 MHz below the tuned frequency. This is rare, and the image signal is usually cleared whenever there is a broadcast on the actual frequency.

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:

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

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

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

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

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

TROUBLESHOOTING

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

SYMPTOM	SUGGESTION
Scanner is on, but will not scan.	Be sure SQUELCH is adjusted properly. See "Turning On the Scanner/Settling Volume and Squelch" on Page 17.
Scanner receives stations poorly or not at all.	Check the antenna (indoor or outdoor). Signals may be blocked from being received by the scanner due to metal frames or material in the building. Change the scanner's location and try again.
- The scanner's keys do not work. - The display shows random segments.	The scanner might be locked. Reset the scanner. See "Resetting the Scanner" on Page 17.
Scanner does not work at all.	Check that the power supply is working. The scanner might be locked. Reset the scanner. See "Resetting the Scanner" on Page 17.
Scanner locks on frequencies that have an unclear transmission.	Be sure SQUELCH is adjusted properly. See "Turning On the Scanner/Settling Volume and Squelch" on Page 17. Be sure birdie frequencies are not programmed, or listen to birdie frequencies manually. See "Birdie Frequencies" on Page 27.

CARE AND MAINTENANCE

2016 200
Your RadioShack PRO-2049 90-Channel Programmable Home Scanner is an example of superior design and craftsmanship. The following suggestions will help you care for your scanner so you can enjoy it for years.



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



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



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



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



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

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

SPECIFICATIONS

Frequency Coverage:

VHF Lo	29.7-50 MHz (in 5 kHz steps)
Amateur Radio	29-29.7 MHz (in 5 kHz steps) 50-54 MHz (in 5 kHz steps) 144-148 MHz (in 5 kHz steps) 420-450 MHz (in 12.5 kHz steps)
Aircraft	108-136.975 MHz (in 12.5 kHz steps)
Government	137-144 MHz (in 5 kHz steps) 406-420 MHz (in 12.5 kHz steps)
VHF Hi	148-174 MHz (in 5 kHz steps)
UHF Lo	450-470 MHz (in 12.5 kHz steps)
UHF "T"	470-512 MHz (in 12.5 kHz steps)

Channels of Operation Any ²⁰⁰ channels in any band combinations

Sensitivity (20 dB S/N with 3 kHz deviation for FM, 60% modulation for AM):
(30 channels x 3 banks) and 3 monitor channels

29-54 MHz	0.5 µV
108-136.975 MHz	1.8 µV
137-174 MHz	0.6 µV
406-512 MHz	0.6 µV

Selectivity:

±10 kHz	-6 dB
±16 kHz	-50 dB

Direct Search Speed/Band Search Speed 20 Steps/Sec (Max)

Scan Speed 20 Channels/Sec. (Nominal)

Priority Sampling 2 Seconds

Delay Time 2 Seconds

IF Frequencies 21.4 MHz and 450 kHz

Squelch Sensitivity:

Threshold	Less than 0.4 µV
Tight	(S + N)/N 25 dB
Air	(S + N)/N 17 dB
Antenna Impedance	50 Ohms
Audio Power	850 mW Maximum
Memory Backup	3 Days (Nominal)
Built-In Speaker	2 1/4 Inch (57 mm) 8-Ohm, Dynamic Type
AC Adapter	10 Volts AC
Dimensions (HWD)	2 1/4 x 9 1/4 x 6 11/16 Inches (57 x 235 x 170 mm)
Weight (without AC Adapter)	1 lb, 0.6 oz. (470 g)

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

an extended time ←