

## Desk-Top Programmable Scanner

Please read before using this equipment

### RADIO SHACK LIMITED WARRANTY

This product is warranted against defects for 1 year from date of purchase from Radio Shack company-owned stores and authorized Radio Shack franchisees and dealers. Within this period, we will repair it without charge for parts and labor. Simply **bring your Radio Shack sales slip** as proof of purchase date to any Radio Shack store. Warranty does not cover transportation costs. Nor does it cover a product subjected to misuse or accidental damage.

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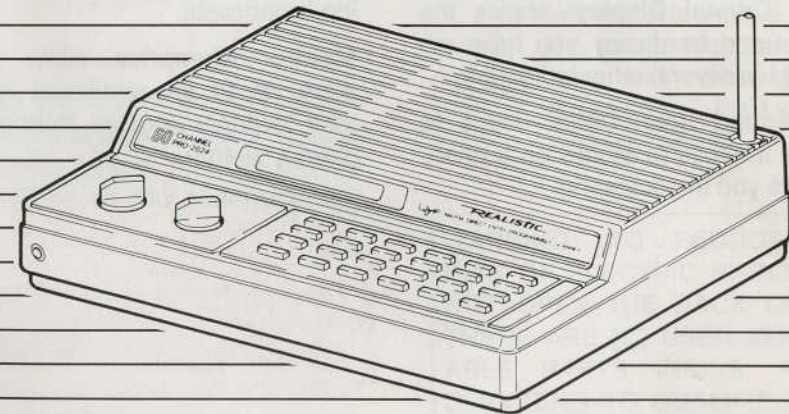
This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

*We Service What We Sell*

### U.S. PATENT NOS.

3,794,925  
3,961,261  
3,962,644  
4,027,251  
4,092,594  
4,123,715  
4,245,348

**RADIO SHACK**  
A Division of Tandy Corporation  
Fort Worth, Texas 76102



Cat. No. 20-129

**REALISTIC**

# INTRODUCTION

Your new Realistic® PRO-2024 Desk-Top Programmable Scanner lets you in on all the action! This scanner gives you direct access to over 23,000 frequencies in exciting radio bands that include the police department, fire department, ambulance, aircraft, ham radio, and transportation services. You can select up to 60 channels for your scanner to scan and change your channel selection at any time.

The secret to your scanner's ability to scan so many channels so easily is its custom-designed microprocessor — a tiny, built-in computer. The microprocessor also gives you these special features:

**Liquid Crystal Display**—shows the channel and frequency you have selected plus several other indicators.

**Two-Second Scan Delay**—helps to prevent the loss of replies on a channel while you are scanning.

**Memory Backup**—keeps the channel frequencies stored in your scanner's memory for up to one hour if your scanner loses power.

**Lock-Out Function**—lets the scanner skip over a specified channel or group of channels.

**Six Channel-Storage Banks**—allow you to group your stored frequencies so that calls are easier to identify.

**Priority Channel**—helps keep you from missing important calls on a priority channel.

**Direct Frequency Search**—gives you direct access to every available frequency so that you can find interesting broadcasts.

**Monitor Memories**—allow you to store up to six additional channels your scanner locates during a frequency search.

Your scanner covers all of these bands:

- 30-50 MHz (VHF Lo/Ham Radio 10 meter)
- 50-54 MHz (Ham Radio 6 meter)
- 118-136 MHz (Aircraft)
- 138-144 MHz (Government)
- 144-148 MHz (Ham Radio 2 Meter)
- 148-174 MHz (VHF Hi)
- 380-450 MHz (Ham Radio and Government)
- 450-470 MHz (UHF Lo)
- 470-512 MHz (UHF TV)

For your permanent records, please record your scanner's serial number in the space below. You can find the serial number on your scanner's back panel.

Serial Number: \_\_\_\_\_

|   |   |   |
|---|---|---|
|    | <b>CAUTION</b><br><b>RISK OF ELECTRIC SHOCK</b><br><b>DO NOT OPEN</b> |  |
| <b>CAUTION:</b><br>TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL. |   |   |



The lightning flash with the arrowhead within the triangle is to alert the user to dangerous voltage inside this scanner that can cause electrical shock. Do not open the enclosure.



The exclamation point within the triangle is to alert the user to important operating and maintenance instructions inside this owner's manual.

|   |
|---|
| <b>WARNING: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT OPEN THE BACK COVER. THERE ARE NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.</b> |
|---|

|   |
|---|
| <b>WARNING: TO PREVENT FIRE OR SHOCK, DO NOT EXPOSE THIS SCANNER TO RAIN OR MOISTURE.</b> |
|---|

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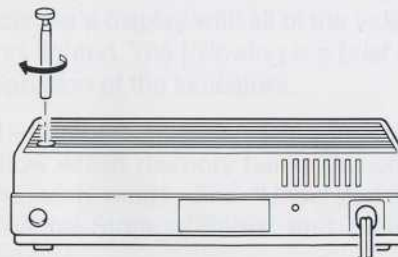
## PREPARATION

### CONNECTING TO AC POWER

Connect the scanner's AC power cord to a standard AC outlet.

**Caution:** The power cord is equipped with a polarized AC plug. (One blade is wider than the other.) The plug fits into an outlet in only one way. Do not attempt to defeat this safety feature.

### CONNECTING THE ANTENNA



The supplied telescoping antenna can receive local signals with your scanner. To install it, simply screw the antenna into the hole on the top of your scanner.

Antenna length affects your scanner's sensitivity to different frequencies. Refer to the table below to adjust the antenna length for best reception at the listed frequencies.

|            |                                      |
|------------|--------------------------------------|
| 30-54MHz   | extend fully                         |
| 118-174MHz | extend 2 segments                    |
| 380-512MHz | collapse fully<br>(one segment only) |

For best reception, attach a multiband outdoor antenna to your scanner. Radio Shack® stores sell a complete line of scanner antennas.

#### To install an outdoor antenna:

1. Select the highest possible location for the antenna.
2. Mount the antenna following the antenna's instructions.
3. Connect the antenna to the scanner using 50-ohm coaxial cable (RG 58 or RG 8). For lengths over 50 feet, we recommend that you use RG 8 low-loss, coaxial cable.

**Warning:** When installing or removing an outdoor antenna, use extreme caution. If the antenna starts to fall, let it go! It could contact overhead power lines. If the antenna touches the 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.

You can also use multiband antenna amplifiers to improve your reception. Consult with your local Radio Shack stores for the antenna systems.



## CONNECTING HEADPHONES

For private listening or in a noisy environment, you can connect headphones (not supplied) to the 1/8-inch jack on the front of your scanner. We recommend a mono headset, available at your local Radio Shack store.

You automatically disconnect the internal speaker when you plug in the headphones.

## HEARING CONFORT AND YOUR HEALTH

Do not listen (especially using headphones) at extremely high volume levels. Extended, high-volume listening can lead to permanent hearing loss.

# UNDERSTANDING YOUR SCANNER

## A LOOK AT THE DISPLAY



The display has several abbreviated indicators that show the scanner's current operating mode.

The above illustration shows your scanner's display with all of the indicators lighted. The following is a brief explanation of the indicators.

**B**—numbers below this indicator show which memory banks are on in the scan mode. See "Understanding Channel-Storage Banks and Search Banks."

**ch**—indicates the current channel.

**MHz**—indicates the current channel frequency.

**Numbers 1-6**—represent the six memory banks and the six monitor memories.

**SCAN**—appears when the scanner is in the scan mode.

**DLY**—appears when the scanner is on a channel that you have programmed with the delay feature. See "Using the Delay Feature."

**L/OUT**—appears when you lock a channel out of the scan mode. See "Locking Out Channels."

**MAN**—appears when the scanner is in the manual channel-selection mode.

**M**—appears when the scanner is in the monitor mode. See "Searching for Active Frequencies" and "Moving a Frequency from a Monitor Memory to a Channel."

**PRI**—appears when you turn on the priority channel feature. See "Using the Priority Feature."

**PGM**—appears when the scanner is ready for you to program. See "Programming the Scanner."

**SRCH**—appears along with **L** during a limit search or **d** during a direct frequency search. The scanner also displays **▲** or **▼** to show the direction of the search. See "Searching for Active Frequencies."

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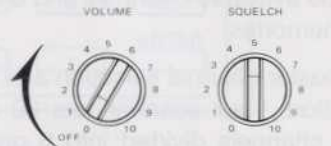
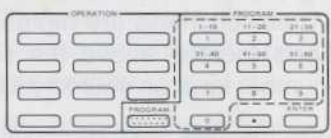
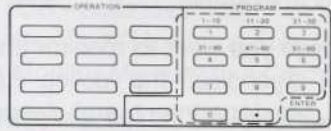
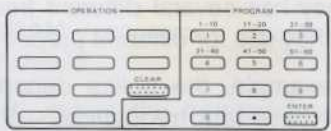

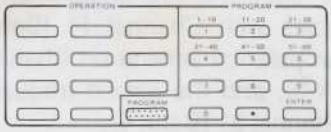
**SRCH**—appears along with **L** during a limit search or **d** during a direct frequency search. The scanner also displays **▲** or **▼** to show the direction of the search. See "Searching for Active Frequencies."



## PROGRAMMING THE SCANNER

A good reference for active frequencies is Radio Shack's *Police Call Directory Including Fire and Emergency Services*.

We update this directory yearly, so be sure to get a current copy. Also, refer to "Reception Notes" and "Searching for Active Frequencies" in this manual.





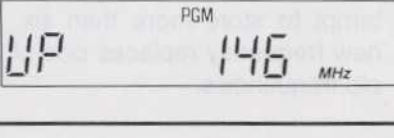
|   |   |
|---|---|
| 1. Turn the VOLUME control clockwise to turn on the scanner.  |    |
| 2. Press [PROGRAM]. Enter the channel number that you want to program, and then press [PROGRAM] again. PGM appears on the display and shows that your scanner is in the programming mode. |    |
| 3. Enter a frequency.   |    |
| 4. Press [ENTER] to store the frequency. If you made a mistake in Step 3, Error appears on the display. Press [CLEAR] and proceed again from Step 3.                                      |   |
| 5. To set your scanner to pause after each transmission before scanning to the next channel, press [DELAY] until DLY appears on the display. See "Using the Delay Feature."               |  |
| 6. To program more channels, repeat Steps 2-4. If you want to program the next channel in sequence, simply press [PROGRAM] and repeat Steps 3-4.  |  |




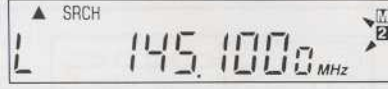
## SEARCHING FOR ACTIVE FREQUENCIES

Use the following two procedures to search for a transmission. These procedures are helpful if you do not have a reference to frequencies in your area. Also see "Guide to the Action Bands."

### Limited Frequency Search

The limited search procedure allows you to search within a specific range of frequencies. Your scanner displays L and SRCH during a limited frequency search.

|  |   |
|--|---|
| 1. Press [PROGRAM].                              |    |
| 2. Press [LIMIT].                                |    |
| 3. Enter the lower limit of the frequency range. |    |
| 4. Press [ENTER], and then press [LIMIT].        |  |
| 5. Enter the upper limit of the frequency range. |  |



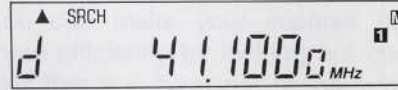
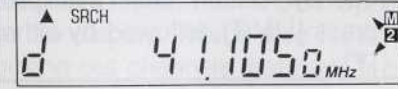
|  |   |
|--|---|
| 6. Press [ENTER].  |  |
| 7. Press [▼] to search from the upper limit down to the lower limit of the frequency range. Or, press [▲] to search upward starting from the lower limit.    |  |
| 8. When the scanner stops on a transmission, press [MONITOR] to store the frequency in the current monitor memory. The monitor memory number stops flashing. |  |
| 9. To continue the search, press [▼] or [▲].   |  |

**Notes:**

- Press [SPEED] to speed up or slow down the search.
- Press [DELAY] until DLY appears, to make the scanner pause 2 seconds after a transmission before proceeding to the next frequency. See "Using the Delay Feature."
- You can store six different frequencies in monitor memory, if you attempt to store more than six, the new frequency replaces one of the old frequencies.

**Direct Frequency Search**

When you are in the program or manual listening mode, you can search up or down from the current frequency. Your scanner shows **d** on the display during a direct frequency search.

|   |  |
|---|--|
| 1. Select a programmed channel by pressing [MANUAL], the channel number, and then either [MANUAL] or [PROGRAM].                                 |   |
| 2. Press [▲] to search through higher frequencies or [▼] to search through lower frequencies.   |   |
| 3. When the scanner stops on a frequency, you can store it in a monitor memory by pressing [MONITOR]. The monitor memory number stops flashing. |   |
| 4. To continue the search, press [▲] or [▼].  |  |









## MOVING A FREQUENCY FROM A MONITOR MEMORY TO A CHANNEL

In the monitor mode, the monitor memory number shows the current monitor memory. To listen to monitor memories, press [MANUAL], and then press [MONITOR] to put the scanner in the monitor mode.

To listen to a monitor memory, simply, press [MONITOR] until your desired monitor memory appears.

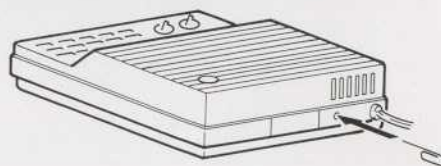
To move a frequency from a monitor memory to a channel:

|  |   |
|--|---|
| 1. Press [MANUAL], the channel number, and then [PROGRAM].   |  |
| 2. Repeatedly press [MONITOR] until your desired frequency appears.  |  |
| 3. Press [ENTER]. The frequency is stored in the specified channel.  |  |
| 4. If you want to return to a limited frequency search after this procedure, press [LIMIT], followed by either [▲] or [▼]. |  |

## USING THE RESET BUTTON

The scanner's display might lock up when you first connect power to it or if power fails for more than 1 hour. If the display locks up, use a pointed object such as a paper clip to press RESET (on the back panel). This clears all programmed information from the scanner. Use this procedure only

when you are sure your scanner is not working properly.



## SETTING THE VOLUME AND SQUELCH

Use the SQUELCH control to decrease the scanner's sensitivity to weak signals and enable the scanner to receive only the strongest transmissions.

1. Turn the SQUELCH and VOLUME controls fully counterclockwise.
2. Turn the VOLUME control clockwise until you hear a hissing sound.
3. Slowly turn the SQUELCH control clockwise until the hissing stops.

## SCANNING THE CHANNELS

To begin scanning the channels, press [SCAN]. Your scanner scans through all the channels (except the ones you have locked out) that are contained in the activated banks. Be sure to read the following sections to get the full benefit from the special features of your scanner.

## SETTING THE SCANNING SPEED

Your scanner has two different scanning speeds—8 channels per second and 16 channels per second. To switch between the two scanning speeds, press [SPEED] during scanning.

## USING THE DELAY FEATURE

Many agencies use a two-way radio system that can have a period of 2 or more seconds between a query and a reply. To keep from missing a reply, program a delay on the channels you identify as operating this way.

To program a delay, select the channel and press [DELAY] so that **DLY** appears on the display. This makes your scanner pause for 2 seconds after the completion of each transmission on that channel before it resumes scanning.

For immediate scanning, select the channel and be sure that **DLY** is not on the display. If **DLY** appears on the display, press [DELAY] to turn it off for that channel.

## LOCKING OUT CHANNELS

You can make your scanner scan more efficiently by locking out channels that you have not programmed. Manually select the channel and press [LOCK OUT] so that **L/OUT** appears on the display. This is also handy for locking out channels that have a continuous transmission, such as a weather channel. You can still manually select locked-out channels for listening.

To disable the lock-out function, manually select the channel and press [LOCK OUT] so that **L/OUT** disappears from the display.

**Note:** You can lock out all but one channel in each bank.



## TURNING BANKS ON AND OFF

To turn banks on and off, you must be in the scan mode.

Press [SCAN]. The bank numbers appear on the display and your scanner begins to scan.

To turn off a bank, press the number key that corresponds to that bank. The bank number disappears.

The scanner does not scan any of the channels within that bank, but you can still manually select any channel in that bank.

**Note:** You can turn all but one bank off.

To turn on a bank, press the number key that corresponds to that bank. The bank number appears on the display.

The scanner scans all the channels within that bank (except the ones that you have locked out.)

## USING THE PRIORITY FEATURE

Channel 1 is designated as your scanner's priority channel. You can turn on the priority feature so that you do not miss transmissions on Channel 1, even if you are monitoring another channel.

Press [PRIORITY] so that **PRI** appears on the display. Now your scanner checks Channel 1 every 2 seconds, and stays on the channel if there is any activity.

## MANUALLY SELECTING A CHANNEL

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

To select a channel to monitor, press [MANUAL], enter the channel number, and then press [MANUAL] again. Or, if your scanner is scanning and has stopped at the desired channel, simply press [MANUAL] one time. Pressing [MANUAL] additional times causes your scanner to step through the channels one at a time.

## BIRDIES

Birdies are the products of internally generated signals that make some frequencies difficult or impossible to receive. If you program one of these frequencies, you hear only noise on that frequency.

If the noise is not severe, you might be able to cut out the birdie by turning the SQUELCH control clockwise. The most common birdies to watch for are listed below.

### Birdie Frequencies

| Low Band (MHz) | High Band (MHz) |
|----------------|-----------------|
| 38.4000        | 138.0000        |
| 47.9200        | 140.8000        |
| 51.2000        | 149.4000        |
|                | 149.7550        |
|                | 153.6000        |
|                | 162.2000        |
|                | 166.4000        |
| Air Band (MHz) | UHF Band (MHz)  |
| 120.0000       | 510.6500        |
| 120.2000       | 512.0000        |
| 122.5500       |                 |
| 123.1000       |                 |
| 128.0000       |                 |
| 128.3750       |                 |
| 132.2000       |                 |

## RECEPTION NOTES

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

During the summer months, you might be able to hear stations in the 30-50 MHz range located several hundred or even thousands of miles away. This is caused by summer atmospheric conditions. This type of reception is unpredictable but often very interesting!

One very useful service is the National Weather Service's continuous weather broadcasts. These broadcasts contain weather forecasts and data for the area around the station, plus bulletins on any threatening weather conditions. These stations use three frequencies: 162.40, 162.475, or 162.55 MHz. In most areas of the country, you can receive one of these frequencies.







**Band Usage:****30–50 MHz:**

|                  |   |
|------------------|---|
| 30.00–30.55..... | USA,UAR,USN,UCG,UAF   |
| 30.58–31.98..... | IS,IP,IB,LU,PO  |
| 32.00–32.99..... | USA,UAR,USN,UCG,UGX,UAF,UIR   |
| 33.02–33.98..... | PS,PH,IS,IB,IP,PF   |
| 34.01–34.99..... | UCG,UER,USA,UAR,UAF,<br>USN,UGX,UIP,UIF   |
| 35.02–35.98..... | IB,IT,RC,RT,IS,PS   |
| 36.01–36.99..... | UIX,UER,USA,UAR,USN,UTR,<br>UCO,IP,UHW,UGF,UGX,UAF                                      |
| 37.02–37.98..... | PP,PL,IW,PH,PS  |
| 38.27–38.99..... | USA,USN,UGX,UGF,UAR,<br>UAF,UIX,UTV,UVA   |
| 39.02–39.98..... | PP,PL   |
| 40.01–41.99..... | UIA,UAR,UIP,UAF,USA,UVA,UER,<br>USN,UIF,UIR,UTV,UIM,IP,UIX,UEP,<br>UCG,UIL,BIFC,UHW,UTX |
| 42.02–42.94..... | PP  |
| 42.96–43.68..... | IB,IS,IT,RC,RT,PS   |
| 43.70–44.60..... | LU,LJ   |
| 44.62–46.58..... | PP,PO,PL,PH,PF,PS   |
| 46.61–46.99..... | USA,UIL,BIFC,UAF,UAR,UGX,UGF  |
| 47.02–49.58..... | PH,PS,IS,IW,IF,IP   |
| 49.61–49.99..... | UIL,UAR,UGC,UAF,UAR,<br>UGX,UGF,USA   |

**150–173 MHz**

|                       |                                  |
|-----------------------|----------------------------------|
| 150.775–151.985.....  | PM,LA,IF,PH,PO,IS,IB             |
| 152.0075–152.84.....  | PM,RC,LX,IF,IB,RT                |
| 152.87–153.725.....   | IM,IS,IP,IX,IF,IW                |
| 153.74–156.24.....    | PL,PF,IS,IB,PP,PM,PH             |
| 156.255–157.45.....   | IP,MC,MS,MG,MP,PM                |
| 157.47–158.70.....    | LA,LX,IF,IS,IB,RT,IW,IP,IX,IT,RC |
| 158.73–159.48.....    | PP,PL,PH,PO,IP                   |
| 159.495–161.565.....  | LR,LJ                            |
| 161.58–162.00.....    | IP,MC,BA,MP                      |
| 162.025–173.9875..... | Misc. Govt. Agencies             |

**406–512 MHz**

|                      |                            |
|----------------------|----------------------------|
| 406.125–419.975..... | Misc. Govt. Agencies       |
| 450.05–450.925.....  | BA                         |
| 451.00–451.70.....   | IW,IF,IP,IT,IX             |
| 451.725–452.175..... | IS,IF,IP,LX                |
| 452.20–452.95.....   | LX,LJ,LR,LA                |
| 452.975–453.975..... | IY,PL,PH,PF,PO,PP          |
| 454.00–457.6.....    | IP,RC,RT,RA,BA,IB          |
| 458.025–467.925..... | PM,PP,IB,IX,IF,IP,IT,IW,GM |
| 482.00–508.9875..... | Mixed Public Safety        |

These frequencies are subject to change and might vary some from area to area. For a more complete listing, refer to the *Police Call Radio Guide Including Fire and Emergency Services* at your local Radio Shack.

You might discover one of your regular stations on a frequency that is not listed. This could be what is known as an *image*. For example, if you suddenly find a station on 453.4750 you also hear on 474.8750, do a little math to see if it is an image. Take the intermediate frequency of 10.7 MHz and double it. Then subtract it from the "new" frequency. If the answer is the regular frequency, you have tuned to an image. Occasionally, you might get interference on a weak or distant channel from a strong broadcast 21.4 MHz (2 x 10.7 MHz) below the tuned frequency. This is rare, and the image signal is usually cleared whenever a broadcast on the actual frequency is in progress.

**IF YOU HAVE PROBLEMS...**

Here are some suggestions which might help.

| PROBLEM  | POSSIBLE CAUSE                                 | REMEDY   |
|--|--|--|
| Scanner is totally inoperative.  | No power.                                      | Check to see that you plugged the scanner into a working AC outlet.                  |
| Scanner is on but will not scan.   | The SQUELCH control is not correctly adjusted. | Adjust the SQUELCH control clockwise.  |
| In the scan mode the scanner locks on frequencies that have an unclear transmission. | "Birdies"                                      | Avoid programming frequencies listed on under "Birdies", or listen to them manually. |
| The keys are inoperative or the display is random.                                   | The CPU is locked up.                          | Using a paper clip, press the reset button on the scanner's back panel.              |

If none of these suggested remedies solves the problem, return your scanner to your local Radio Shack store for assistance.



## CARE AND MAINTENANCE

Your PRO-2024 is an example of superior design and craftsmanship. The following suggestions will help you care for the PRO-2024 so that you can enjoy it for years.



Keep the PRO-2024 dry. If it does get wet, wipe it dry immediately. Liquids can contain minerals that can corrode the electronic circuits.



Handle the PRO-2024 gently and carefully. Dropping it can damage circuit boards and cases and can cause the product to work improperly.



Use and store the PRO-2024 only on normal temperature environments. Extreme temperatures can shorten the life of electronic devices, damage batteries and distort or melt plastic parts.



Keep the PRO-2024 away from dust and dirt, which can cause premature wear of parts.



Wipe the PRO-2024 with a dampened cloth occasionally to keep it looking new. Do not use harsh chemicals, cleaning solvents, or strong detergents to clean the PRO-2024.

Modifying or tampering with the PRO-2024's internal components can cause a malfunction and might invalidate the PRO-2024's warranty. If your PRO-2024 is not performing as it should, take it to your local Radio Shack store. Our personnel can assist you and arrange for service if needed.

## SPECIFICATIONS

### Frequency Coverage:

|                        |   |
|------------------------|---|
| VHF-Lo                 | 30-50 MHz (in 5 kHz steps)  |
| Ham                    | 50-54 MHz (in 5 kHz steps)  |
| Aircraft               | 118-136 MHz (in 25 kHz steps)   |
| Government             | 138-144 MHz (in 5 kHz steps)  |
| Ham                    | 144-148 MHz (in 5 kHz steps)  |
| VHF-Hi                 | 148-174 MHz (in 5 kHz steps)  |
| Ham/Government         | 380-450 MHz (in 12.5 kHz steps)   |
| UHF-Lo                 | 450-470 MHz (in 12.5 kHz steps)   |
| UHF-TV                 | 470-512 MHz (in 12.5 kHz steps)   |
| Channels of Operation: | Any 60 channels in any band combinations<br>(10 channels x 6 banks) and 6 monitor channels. |

### Signal-to-Noise Ratio:

|             |                  |
|-------------|------------------|
| 30-54 MHz   | 45 dB at 40 MHz  |
| 118-136 MHz | 40 dB at 126 MHz |
| 138-174 MHz | 40 dB at 156 MHz |
| 380-512 MHz | 35 dB at 450 MHz |

### Sensitivity:

|             |             |
|-------------|-------------|
| 30-54 MHz   | 0.5 $\mu$ V |
| 118-136 MHz | 2.0 $\mu$ V |
| 138-174 MHz | 1.0 $\mu$ V |
| 380-512 MHz | 1.0 $\mu$ V |

### Spurious Rejection:

|             |                  |
|-------------|------------------|
| 30-54 MHz   | 50 dB at 40 MHz  |
| 118-136 MHz | 50 dB at 126 MHz |
| 138-174 MHz | 50 dB at 156 MHz |
| 380-512 MHz | Not Specified    |

### Selectivity:

|              |        |
|--------------|--------|
| $\pm$ 9 kHz  | -6 dB  |
| $\pm$ 15 kHz | -50 dB |

### IF Rejection:

|          |                  |
|----------|------------------|
| 10.7 MHz | 70 dB at 156 MHz |
|----------|------------------|





