PRO-31 PORTABLE SCANNER
FM Monitor Receiver
VHF: 30 – 54 MHz / 138 – 174 MHz
UHF: 380 – 512 MHz

PLEASE READ BEFORE USING THIS EQUIPMENT
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You'll hear all the action with your new PRO-31 Programmable Scanning Receiver! You have direct access to over 22,300 frequencies in nine action radio bands including police, ham radio and emergency transportation services! And your PRO-31 scans up to 10 channels of your choice so you won't miss any of your favorite transmissions.

The secret to PRO-31's versatility and high performance is a custom-designed microprocessor. This tiny computer is built into a micro-chip in the heart of your scanner. Using the keyboard the microprocessor lets you easily enter and change frequencies whenever you wish. The microprocessor also gives you special functions not found on other portable scanning receivers, like channel lockout and scan delay.

Your PRO-31 achieves superior performance with the very latest in solid-state technology including a phase-locked loop (PLL) IC, 2 C-MOS ICs including micro-processors, 2 integrated circuits, 30 transistors, 40 diodes and a Liquid Crystal Display.

For your protection, please record your scanner's serial number in the box below. You'll find the serial number on the back of the unit.

Serial Number
FEATURES

Your PRO-31 Portable Scanner:

- Covers 30 - 50 MHz (VHF Lo), 50 - 54 MHz (ham radio 6m), 138 - 144 MHz (government), 144 - 148 MHz (ham radio 2m), 148 - 174 MHz (VHF Hi), 380 - 450 MHz (ham radio and government), 450 - 470 MHz (UHF Lo) and 470 - 512 MHz (UHF Hi) - over 22,300 channels!
- Scans up to 10 channels continuously.
- Displays channel status and frequencies being scanned, monitored or programmed on a Multi-purpose Liquid Crystal Display (LCD).
- Includes channel Lockout with built-in skipper circuit.
- Provides an optional two-second scan delay to eliminate missed replies.
- Sharpens reception with a crystal filter for 1st IF (10.7 MHz) and a ceramic filter for 2nd IF (455 kHz).
- Holds memorized frequencies with battery backup.
MULTIPURPOSE DISPLAY — Shows channel and frequency being scanned, monitored, or programmed, and the status of the channels.

SPEAKER — For listening.

PROGRAMMER Key — Sets the internal microprocessor for entry of a frequency.

CLEAR Key — Clears the display when a keypad entry error is made.

SCAN Key — Sets the PRO-31 to automatically scan all available channels.

DELAY Key — Holds the PRO-31 on channel until two seconds after a transition period.

ENTER Key — Enters a displayed frequency into any one of the 18 channels you may select.
Channel 18 is displayed as channel 1.

NUMBER Keys — Enter the desired channel number and its frequency.

MANUAL Key — Operate PRO-31 to manually scan the channels. The receiver advances one channel each time the button is pressed.

LOCKSET Key — Enables you to lockout desired programmed channels. Press once to lockout. Press again to restore channel to normal operation.

KEY-LOCK Key — Preserves the accidental use of all programming keys, even when SCAN and MANUAL.

LIGHT Keys — Lights of the display for reading in the dark.
The Battery Compartment holds 6 AA type batteries.

The External power Jack (PWR) lets you connect an external 9-volt DC power source (negative ground) for operation without batteries. Use Radio Shack no. 273-1455 for 120V AC, or no. 1-48440 for 12V Car operation. (Mobile use of scanners may be unlawful or require a permit in some areas. Check with local authorities.)

The PWR jack may be used at any time, with or without batteries installed.

To recharge nickel cadmium batteries in the receiver, simply plug an external 9A volt DC power source (Radio Shack 273-1455) into the recharge (CHG) jack. To fully charge nickel cadmiums, leave the external power connected for 10-18 hours.

NOTE

- The recharge (CHG) jack is to be used only when nickel-cadmium batteries are installed. The unit can operate while nickel-cadmium batteries are being charged.
- Never connect external power to the charge jack when regular or alkaline batteries are installed, because charging can cause these batteries to explode.
- Remove external power from the CHG jack during a power failure.
GETTING STARTED

To install batteries, position the Receiver as illustrated, press the \(\square\) mark and slide the battery compartment cover off. Take out the battery holder.

Put six fresh AA batteries in the battery holder, making sure to match polarity markings inside the holder with markings on the batteries (+ to + and − to −). Replace the battery holder and the battery compartment cover.

We recommend that you use rechargeable nickel-cadmium AA batteries, catalog number 23-125, or AA alkaline ENE R-CELLs, catalog number 23-652.

Low battery indicator appears when the battery is low. Replace or recharge the batteries.

ANTenna

Attach the flexible antenna to ANT connector. Rotate the metal portion clockwise (looking from top) to secure.

MEMORY BACKUP

Memory back-up starts functioning the second you supply power to your PRO-31 (with batteries or external power) and continues even when the power switch is turned "OFF."

Even after removing the batteries or external power, the memory will be backed up for approximately one hour.

When the Batteries are low (low battery indicator on), the memory back-up will operate for up to three months. However, since weak batteries can leak, you should replace them and avoid damage to your scanner.

RESET SWITCH

If the LCD fails to work properly just after you connect new batteries or external power to your PRO-31, use the Reset Switch.
Remove the batteries and all external power. Then use a ball point pen, etc. to push the Reset switch through the hole on the bottom of the Battery compartment.

When the reset switch is pushed, all frequencies will be cleared to “000.000,” requiring you to re-enter your desired frequencies.

Insert the battery holder and return to normal operation.

You can use your PRO-31 with an external mobile antenna or outdoor base antenna by using the BNC connector, after you remove the flexible antenna.

OPERATING YOUR PRO-31

Turn on your PRO-31 by rotating VOLUME clockwise. (When first turned on, your PRO-31 might start scanning.)

Rotate SQUELCH fully counterclockwise. You’ll hear a rushing noise from the speaker. Slowly rotate SQUELCH clockwise until the noise stops. You’re now ready to start entering frequencies!

Understanding the Display

The liquid crystal display (LCD) on your PRO-31 can display the channel number, the frequency being received, and the status of different functions. Here’s a brief rundown on what the LCD symbols mean when receiving stations.
PROGRAMMING FREQUENCIES

Press numeric keys to program the desired frequency, and press ENTER.

Make a mistake while entering a frequency? Just press CLEAR to clear it.

If you enter a frequency that is outside a PRO-31 band range, "E" (Error) will be displayed. Press CLEAR and select another frequency.

Any frequency within a PRO-31 band range will be accepted. When you press ENTER, the scanner will automatically round-off any slightly inaccurate entry to the closest "correct" frequency.

IN CASE YOU'RE WONDERING......

....The tuning range of your PRO-31 is permanently stored in the microprocessor chip. There's no way it can be extended or altered — even by a skilled electronics technician. So if you try to enter a frequency not in the PRO-31's tuning ranges, you'll get an error message every time!
XXX.X60 MHz | XXX.X62 MHz
  5. To add more frequencies, press [PROGRAM] to advance to the next channel and follow the steps above.

XXX.X69 MHz | XXX.X625 MHz

XXX.X70 MHz | XXX.X75 MHz
  6. If you ever want to change the frequency entered for a specific channel, enter the new frequency over the old one, using steps 2, 3, and 4.

XXX.X79 MHz | XXX.X87 MHz

XXX.X80 MHz | XXX.X87 MHz
  (actually

XXX.X89 MHz | XXX.X875 MHz)

Note: Figures below four decimal places are not displayed, but are automatically rounded and entered.

Before programming frequencies, make sure your PRO-31 is turned off.

Suppose you want to program channel 1 to receive 162.55 MHz. Here's how you would do it:

1. Be sure the keylock indicator is off.

2. Press [MANUAL] and select channel 1. You can do this in two ways: press [MANUAL] continuously until the display indicates channel 1, or by pressing [1].

3. Press [PROGRAM].

4. Press [1] [6] [2] [0] [5] [5]. Check the display to make sure the frequency it shows is the one you meant to program. If it is, press [ENTER].

Using the Scanning Function

Your PRO-31 will automatically scan all the channels you've programmed and stop whenever it finds a signal. To scan channels, press [SCAN].

To stop scanning, press [MANUAL]; then you can select specific channels you want to listen to.

Important! Your PRO-31 won't scan unless SQUELCH is set to the point where no sound is heard between transmissions (i.e. no "hiss" sound).
Delay Function
When your PRO-31 is scanning, it will stop whenever it finds a channel with a signal. As soon as the signal ends, it immediately begins scanning other channels. Most transmissions are part of a two-way communication. To make sure you don’t miss any replies, press [DELAY]. Your PRO-31 will then hold the channel at least two seconds after each transmission, giving you time to hear replies. The delay indicator will show on the display when the delay function is used. To release the delay function, press [DELAY] again.

Lockout Function
You might want your PRO-31 to skip certain frequencies while it’s scanning (such as continuously transmitted weather broadcasts). To lock out such channels, follow these steps:
1. Press [MANUAL] to stop scanning.
2. Continue pressing [MANUAL] until you reach the channel you want to lock out.
3. Press [L/OUT]. The display will show "L" indicating this channel will be skipped during scanning.

To release the lockout function:
1. Press [MANUAL] to stop scanning.
2. Advance to channel that is locked out.

You can lockout up to 9 channels.

Display Light
Push [LIGHT] to illuminate the display in the dark.

Low Battery
Low battery indicator: three dots will appear on the right of display when the battery is low. Replace or recharge the batteries.

Birdies:
"Birdies" are the products of internally generated signals that make some frequencies difficult or impossible to receive. If you program one of these, the Scanner locks up and you’ll hear only noise on that frequency.

If the interference is not severe, you might be able to rotate SQUELCH clockwise to cut out the "birdy".
The most common "birdies" to watch out for are listed below.

<table>
<thead>
<tr>
<th>Frequency (MHz)</th>
<th>Bandwidth (MHz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30.740 MHz</td>
<td>46.320 MHz</td>
</tr>
<tr>
<td>31.890 MHz</td>
<td>47.300 MHz</td>
</tr>
<tr>
<td>TO</td>
<td>140.100 MHz</td>
</tr>
<tr>
<td>32.105 MHz</td>
<td>147.200 MHz</td>
</tr>
<tr>
<td>TO</td>
<td>147.500 MHz</td>
</tr>
<tr>
<td>32.800 MHz</td>
<td>TO</td>
</tr>
<tr>
<td>34.940 MHz</td>
<td>147.900 MHz</td>
</tr>
<tr>
<td>TO</td>
<td>149.300 MHz</td>
</tr>
<tr>
<td>35.000 MHz</td>
<td>TO</td>
</tr>
<tr>
<td>38.400 MHz</td>
<td>149.550 MHz</td>
</tr>
<tr>
<td>40.980 MHz</td>
<td>153.000 MHz</td>
</tr>
<tr>
<td>41.950 MHz</td>
<td>160.000 MHz</td>
</tr>
<tr>
<td>TO</td>
<td>168.400 MHz</td>
</tr>
<tr>
<td>42.030 MHz</td>
<td>421.200 MHz</td>
</tr>
<tr>
<td>TO</td>
<td>422.000 MHz</td>
</tr>
</tbody>
</table>

### Earphone Listening

If you're having difficulty hearing in a noisy area or if you don't want your scanner to bother other people, plug an earphone into the Earphone jack (EAR) for private listening. This will automatically disconnect the built-in speaker.

Note: For greater clarity in noisy locations, we suggest using an extension speaker assembly, Cat. No. 21-549. You will also require a subminiature adapter, 274-327, for connection.

Even with the SQUELCH control set to maximum (fully clockwise), scanning may stop on or around some of these frequencies. If the signal is strong enough (above 10 µV in technical terms) you can listen for transmissions on the channel. But the receiver will have to be MANUALLY moved off the troublesome frequency.
BEFORE YOU CALL FOR HELP

The PRO-31 is ruggedly built with all parts conservatively rated. However, you should treat it with care. For long life, don’t subject it to excessively rough handling, and keep it free from dirt and excessive humidity.

If you Have Problems . . . .

We hope you don’t — but here are some suggestions:

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCANNER is totally inoperative</td>
<td>No power</td>
<td>Check to see that batteries are good and are properly installed.</td>
</tr>
<tr>
<td>Scanner is on, but will not scan</td>
<td>1) Channels are locked out. 2) Squelch control is not adjusted correctly.</td>
<td>1) Press Manual, then release each channel from lockout one-by-one. 2) Adjust SQUELCH clockwise.</td>
</tr>
<tr>
<td>Scan locks on frequencies having no clear transmissions.</td>
<td>“Birdies”</td>
<td>Avoid programming frequencies listed on page 11, or only listen to them manually.</td>
</tr>
<tr>
<td>Your PRO-31 locks up or you want to completely clear all memories.</td>
<td></td>
<td>Remove battery holder and external power, and press the reset button with a pen or pencil.</td>
</tr>
</tbody>
</table>

If none of these suggested remedies solves the problem, return your set to your nearby Radio Shack for repair by a qualified technician.
## SPECIFICATIONS

**FREQUENCY COVERAGE:**
- **VHF-Lo**
  - 30 – 54 MHz (in 5 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/Gov**
  - 380 – 450 MHz (in 12.5 kHz steps)
- **UHF-Lo**
  - 450 – 470 MHz (in 12.5 kHz steps)
- **UHF-Hi ("T")**
  - 470 – 512 MHz (in 12.5 kHz steps)

**CHANNELS OF OPERATION:**
Any 10 channels in any band combinations.

**SENSITIVITY:**
- 20 dB Signal-to-Noise ratio at 3 kHz Deviation:
  - 30 – 54 MHz: 0.6 μV
  - 138 – 174 MHz: 1.0 μV
  - 380 – 512 MHz: 1.0 μV

**SPURIOUS REJECTION:**
- 30 – 54 MHz: 50 dB at 40 MHz
- 138 – 174 MHz: 50 dB at 150 MHz
- 380 – 512 MHz: Not specified.

**SELECTIVITY:**
- ±9 kHz: -6 dB
- ±15 kHz: -50 dB

**IF REJECTION:**
- 10.7 MHz: 50 dB at 154 MHz

**SCANNING RATE:**
- 8 channels/sec.

**DELAY TIME:**
- 2 seconds

**MODULATION ACCEPTANCE:**
- ±5 kHz

**IF FREQUENCIES:**
- 10.7 MHz and 455 kHz

**FILTERS:**
- 1 crystal filter, 1 ceramic filter

**SQUELCH SENSITIVITY:**
- Threshold: Less than 1.0 μV
- Tight: (S+N)/N: 15 dB

**ANTENNA IMPEDANCE:**
- 50 ohms

**AUDIO POWER:**
- 300 mW nominal

**BUILT-IN SPEAKER:**
- 2" (5cm) 8 ohm, dynamic type

**POWER REQUIREMENTS:**
- +9V DC, 6 AA batteries, or a suitable adapter (negative ground only)
- Current drain:
  - 60 mA (Squelched)
  - 160 mA (full volume unsquelched)

**DIMENSIONS:**
- 187 (7 3/8") x 74 (2 15/16") x 42 (1 10/16") mm HWD

**WEIGHT:**
- 1.1 lbs (500g)
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.

EXCEPT AS PROVIDED HEREIN, RADIO SHACK MAKES NO WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Some states do not permit limitation or exclusion of implied warranties; therefore, the aforesaid limitation(s) or exclusion(s) may not apply to the purchaser.

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

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3,801,914
3,961,261
3,962,644
4,027,251
4,092,594
4,123,715
4,245,348

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