

FM Scanning Monitor Receiver

VHF:30-50/144-174 MHz UHF:450-470/470-512 MHz



PRO-54

**OWNER'S
MANUAL**

**PLEASE READ BEFORE
USING THIS EQUIPMENT**

REALISTIC®

**CAT. NO.
20-123**

CUSTOM MANUFACTURED FOR RADIO SHACK, A DIVISION OF TANDY CORPORATION

Your PATROLMAN PRO-54 scanning receiver is a completely solid-state VHF/UHF superheterodyne receiver using dual-conversion on the VHF bands and the UHF band. It is capable of automatically scanning eight crystal controlled channels. Some special features are: crystal filter, ceramic filter, channel lockout circuit, skipper circuit, scan delay circuit and AC operation.

It is designed for use in the narrow-band FM channels of public service communications: VHF and UHF band police, fire, civil defense, radio telephone, forestry and weather service, plus many other industrial radio services and the 2-meter "HAM" radio band. These and many other services share this band of frequencies from 30 to 50 MHz, 144 to 174 MHz and 450 to 512 MHz.

The PRO-54 features both high sensitivity and selectivity and a sophisticated circuit which includes a 10.7 MHz Crystal Filter and a 455 kHz Ceramic Filter to reduce or eliminate adjacent-channel or strong-signal interference. Such interference is often experienced when operating in urban and metropolitan areas or where very strong and closely placed signals are present.

An important engineering achievement, designed for practical applications, the PRO-54 is remarkably easy to use, yet its up-to-date, complex circuit consists of 19 separate transistors (two of which are Field Effect Transistors), five integrated circuits (which incorporate the equivalent of hundreds of components), 23 diodes and 8 LEDs.

This Monitor Receiver is designed to operate from 120-volts AC.



WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS RECEIVER TO RAIN OR MOISTURE.

SPECIFICATIONS

SEMICONDUCTOR COMPLEMENT:	19 transistors, 5 integrated circuits, 23 diodes, and 8 LEDs
FREQUENCY RANGE:	30 ~ 50 MHz/144 ~ 174 MHz / 450 ~ 470 MHz and 470 ~ 512 MHz
CHANNELS OF OPERATION:	Eight — as determined by any one of 8 crystals operating in the frequency range
FREQUENCY COVERAGE (VHF):	6 or 8 MHz for maximum sensitivity (40 MHz \pm 3 MHz) (153 MHz \pm 4 MHz)
(UHF):	30 MHz for maximum sensitivity (480 MHz \pm 15 MHz)
SENSITIVITY:	Better than 1 μ V for (S+N)/N: 20 dB
SELECTIVITY:	\pm 9 kHz, -6 dB \pm 15 kHz, -50 dB
SPURIOUS REJECTION (VHF):	Greater than 50 dB
IMAGE RATIO (VHF Low):	40 dB at 40 MHz
(VHF Hi):	35 dB at 153 MHz
SCANNING SPEED:	10 channels/second
DELAY TIME:	2 seconds
MODULATION ACCEPTANCE:	\pm 7 kHz
I.F. FREQUENCIES:	10.7 MHz and 455 kHz
FILTER:	Crystal filter for 10.7 MHz Ceramic filter for 455 kHz
SQUELCH SENSITIVITY:	Variable from less than 1 microvolt
AUDIO POWER:	1.2 watts maximum
CRYSTAL REQUIREMENTS:	Standard HC-25/U, 3rd overtone
BUILT-IN SPEAKER:	8 ohms, 3" (77 mm), dynamic type
POWER REQUIREMENTS:	AC: 120 volts, 60 Hz, 11 watts

PREPARING FOR USE

To use your PRO-54, you must do three things:

- Connect power

- Install from 1 to 8 crystals

- Connect an antenna (a telescopic Antenna is provided with your Scanner—screw it into the hole in the top of the Case).

To make a quick check, you must connect the Line Cord to a source of 120 volts, 60 Hz, AC power. With an antenna connected (use the telescopic Antenna provided) and a crystal installed, turn the Receiver on by rotating **VOLUME** clockwise. Rotate **SQUELCH** maximum counterclockwise. You should hear a "rushing" sound in the speaker.

Crystals are not included with your PRO-54 because the frequencies are so numerous. The frequencies used in your part of the country will be different from those used in other areas. Order the crystals you want from your Radio Shack store—specify the model number of this unit and the frequency you want to receive.

Disconnect the Line Cord. Remove the 6 screws on the Bottom Cover. Inside the Scanner you'll see the crystal sockets and Band Selector switches. Provision is made to install 8 crystals; the Band Selector switch position can be used to obtain either VHF Low, VHF Hi or UHF.

CAUTION: When you open the Scanner, **Do Not Touch Any Parts** (other than the Crystal Sockets and Switches). All the parts have been precision aligned at the factory and must not be tampered with. **Never open the Scanner without first disconnecting the AC line cord.**

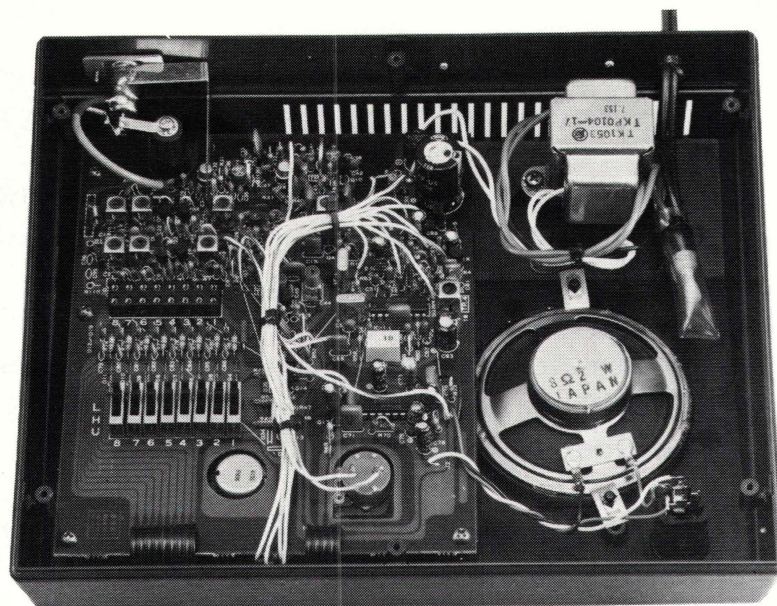
For UHF crystals, position the Band Selector switch to U (marked "U" on printed circuit board).

For VHF Hi, set the Band Selector switch to H (marked "H" on printed circuit board).

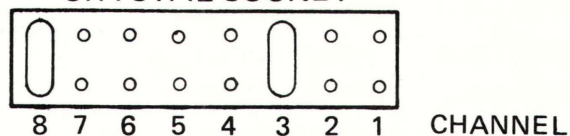
For VHF Low, set the Band Selector switch to L (marked "L" on printed circuit board).

In the example shown, channel 3 will have a UHF crystal and channel 8 will have a VHF Hi crystal.

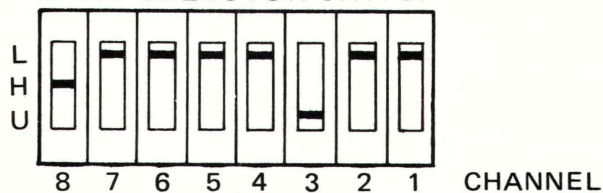
Ask the manager of your Radio Shack store what the most popular and active channels are in your area. He will be glad to advise you.



CRYSTAL SOCKET



BAND SELECTOR SWITCH



L: VHF Low Band
H: VHF High Band
U: UHF Band

Since crystal frequencies must be extremely accurate and crystals should be matched for specific units, we recommend you obtain crystals for your Receiver only from Radio Shack. We can not be responsible for the poor or improper operation of crystals from another manufacturer(s).

CONTROL LOCATIONS AND FUNCTIONS

OFF/VOLUME is the power switch and Volume control. When not in use, rotate this control to the left to turn it off.

SQUELCH Control is to eliminate annoying background noise between signal transmissions. When properly set, Squelch will keep the PRO-54 silent until a signal comes in on the channel(s) you are listening to—then, the Squelch circuit will “open” and you hear the signal.

SCAN-MANUAL Selector Switch is for determining the function of the scanning feature. In the **SCAN** position, each channel will be scanned automatically. In the center (stop) position, the PRO-54 will not scan, but will remain tuned to the channel indicated by the LED. To advance the receiver to the next channel in sequence, press to the **MANUAL** position momentarily; each time you do so, the Receiver will advance one channel.

Channel PROGRAM Switches—in the “up” position (button next to the LED), that channel is active. When you press the switch down, that channel is automatically “locked out” and will not function.

LED Channel Indicators—these Light Emitting Diodes show which channel(s) is active. During scanning, these lights light up in sequence; when the receiver is operative on one of the channels, the light for that channel will go on. When the Channel **PROGRAM** switch for that channel is in the down (lock-out) position, that LED will not light.

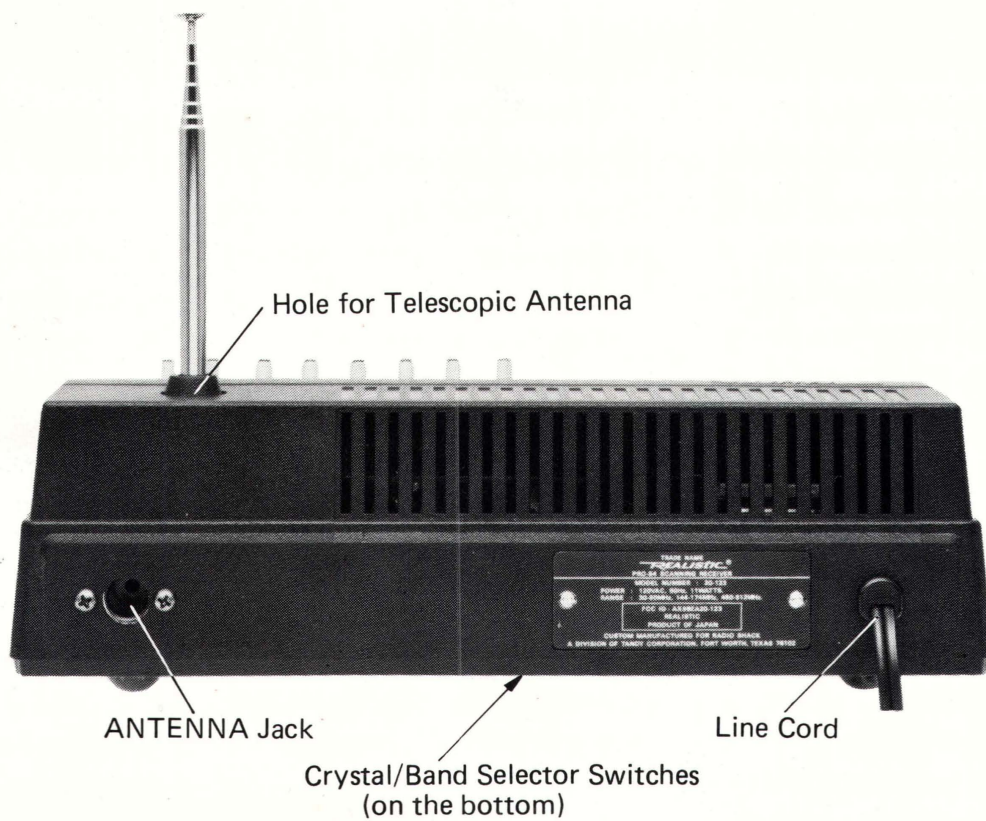
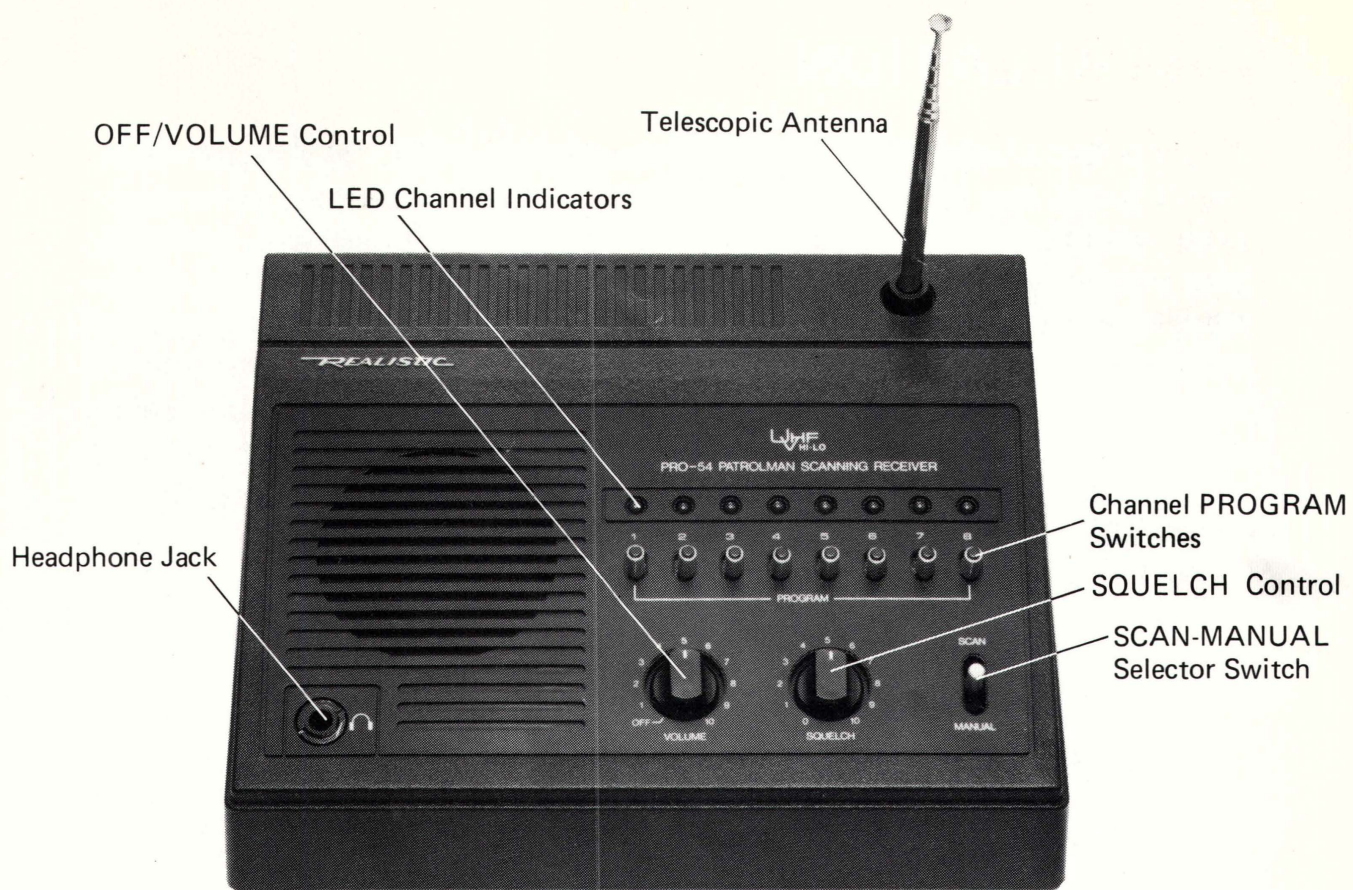
Headphone Jack—is for private listening. Plug a pair of 8 ohm Headphones into this jack and the built-in speaker will be disconnected. Especially helpful for listening in high-noise areas.

Telescopic Antenna—Insert the antenna through the hole in the cabinet top and screw in place.

ANTENNA Jack—For superior reception, connect an outdoor antenna to this jack.

Crystal/Band Selector Switch—Remove the Bottom Cover and install or replace crystals.

Line Cord—Plug into a source of 120 volts, 60 Hz, AC power.



INSTALLATION

A good installation will make the most of the PRO-54's capabilities. Don't lose any of the tiny signals by using an inadequate antenna or poor quality lead in. The telescopic antenna supplied will probably give you very good results. However, to obtain the best possible reception, use an outdoor antenna and use a high-quality foam coaxial antenna cable. Your local Radio Shack store has a fine selection of antennas, cable and accessories. Stop by and talk with your salesperson—who will be able to advise you on the best antennas and accessories (they also know the most popular frequencies in use in your area).

OPERATION

After power and antenna are connected and a crystal (or crystals) has been installed, your PRO-54 is ready to use.

Turn **VOLUME** "on" by rotating to the right. Rotate **SQUELCH** fully counterclockwise. Set all the Channel **PROGRAM** Switches "on" (button up, next to LED). You should hear a rushing sound from the speaker. Now adjust **SQUELCH** clockwise until you no longer hear the rushing background noise (further explanation of **SQUELCH** adjustment is noted below).

If you want your PRO-54 to continuously scan the channels for which you have crystals installed, you must adjust **SQUELCH** as previously instructed, then set the Selector Switch to the **SCAN** position. The PRO-54 will constantly scan each channel in sequence; when a signal appears on one of the channels the receiver will lock onto that channel and you will hear the signal.

If you do not want automatic scanning on one or more channels, set their Channel **PROGRAM** Switches to the "off" position (button down, away from the LED indicator).

If you want to stay tuned to one channel only, set the Selector Switch to the center position (stop scanning) and then press to the **MANUAL** position to advance to the channel you want to listen to (as indicated by the LED above that channel switch). For Manual scanning, the receiver can be either "squelched" (adjusted as previously indicated) or "unsquelched" (**SQUELCH** control set to extreme left). For Automatic scanning, **SQUELCH** must be set to eliminate the background noise.

To eliminate the annoying background noise, rotate **SQUELCH** clockwise until the background noise just stops. You can't adjust **SQUELCH** properly while listening to a station, so wait till signals cease. If you set **SQUELCH** as noted above, the PRO-54 will appear "dead" until a signal comes in; when a signal comes in, the Squelch circuit "opens up" and you hear the signal. When the signal ceases, the Squelch circuit "closes" and cuts out all sound until the next signal comes in.

SKIPPER CIRCUIT:

Your scanner has a built-in skipper circuit which is fully automatic and cannot be disabled. It works in both the **SCAN** and **MANUAL** modes of operation. This feature causes the unit to skip over a locked out channel(s) so that there is no possibility of the Receiver stopping on a locked out channel(s).

SCAN DELAY:

The PRO-54 has a built-in 2 second delay feature which virtually eliminates missed replies. This circuit holds the Receiver on the channel you are monitoring for a period of 2 seconds after the carrier has gone off the air, before it resumes normal scanning function.

ACCESSORIES

A pair of headphones can be a very useful accessory. In areas where a high noise level is present (in a factory, at the scene of a fire or accident, etc.), or when you want to listen privately, use headphones. Your Radio Shack store has a couple of very fine selections for your PRO-54. Just plug them into the front panel Headphone jack.

FREQUENCY COVERAGE

For maximum sensitivity, the channel frequencies you choose should be within 3 MHz of 40 MHz on the VHF Lo band (that is, in the spread of 37 to 43 MHz), and 4 MHz of 153 MHz on the VHF Hi band (from 149 to 157 MHz). For the UHF band, stay within 15 MHz of 480 MHz (from 465 to 495 MHz). The PRO-54 will function very adequately down to 30 and up to 50 MHz, from 144 to 174, and from 450 to 512 MHz, but with reduced sensitivity. The superior reception spread of 6, 8 or 30 MHz (± 3 , 4 or 15 MHz) can be moved up or down in this band of frequencies by special realignment of the front end circuitry of the PRO-54 (which should be attempted only by qualified Electronics Service Technicians who have adequately calibrated, precision test equipment).

TYPES OF SIGNALS YOU'LL BE ABLE TO MONITOR

Your community is alive with action—action which is constantly being reported on the air waves. And your PRO-54 will automatically scan the air waves to bring you that action—your police force at work, a fire truck on a mission, Sheriff's department, State police, the National Weather Service, Ham Radio operators, highway and other emergency-type services, some industrial services, some transportation services (taxi, trucks, railroad), plus some Government services. Lots of things are going on that most of us just are never aware of. But, with the right frequency crystal in your PRO-54, you can monitor such exciting signals. You'll have to do a little investigating in your community to find out what services are active and on what frequencies.

What to listen for and where? That is a little difficult for a specific answer. Each area of the country can and will use different channels. All we can do is give you some general pointers and then let you take it from there.

Find out if there is a local club which monitors these frequencies. Often a local electronics repair shop that does work on the equipment can give you the channel frequencies used by local radio services. A volunteer police or fire employee can also be a good source of this information.

An interesting service is the Mobile Telephone. FCC has assigned this service channels in the range of 152.51 to 152.81 MHz at every 0.030 MHz (channels are 30 kHz apart). Also, 454.375 to 454.95 MHz with

channels 25 kHz apart from 454.375 to 454.625 and then every 50 kHz up to 454.95.

As a general rule on VHF, most activity will be concentrated between 153.785 and 155.98 and then again from 158.73 to 159.46 MHz. Here you'll find local government, police, fire and most such emergency services. If you are near a railroad yard or major railroad tracks, look around 160.0 to 161.9 for them.

In some of the larger cities, there has been a move to the UHF bands for these emergency services. Here, most of the activity is in a spread of 453.025 ~ 453.95 and again at 456.025 ~ 459.95 MHz.

In the UHF band, the overall spread of 456.025 ~ 459.95 and again at 465.025 ~ 469.975 MHz is used by mobile units and control stations associated with base and repeater units which operate 5 MHz lower (that is, 451.025 ~ 454.95 and 460.025 ~ 464.975 MHz). This means that if you find an active channel inside one of these spreads, you can look 5 MHz lower (or higher as the case may be) to find the major base station/repeater for that radio service.

Your local Radio Shack store also has another very useful book—*POLICE CALL Radio Directory*. It gives a very detailed listing of radio services and frequencies used in your region. With this book you'll be able to locate many frequencies used in your own community.

NATIONAL WEATHER SERVICE RECEPTION

Continuous weather broadcasts are transmitted 24 hour-a-day in many parts of the country. If you are using a crystal set to one of the three channels assigned (162.40, 162.475 or 162.55 MHz), your PRO-54 will automatically lock-in on that channel, since the broadcasts are continuous. To prevent automatic locking, set the channel **PROGRAM** Switch for that channel to the "off" position (button down). When you want a weather report, set the **PROGRAM** Switch to the "on" position (button up) for that channel. In areas where two or more stations are close to each other, one will use 162.55 and the other will use 162.40 MHz; a 3rd might use the newer frequency, 162.475 MHz. Check with your local FCC office or the Weather Bureau for the frequency used in your area.

MAINTENANCE

The PRO-54 is a ruggedly built electronic unit, with all parts conservatively rated. However, you should treat it with care; don't subject it to excessively rough handling. You will experience maximum reliability if you keep it free from dirt and excessive humidity.

