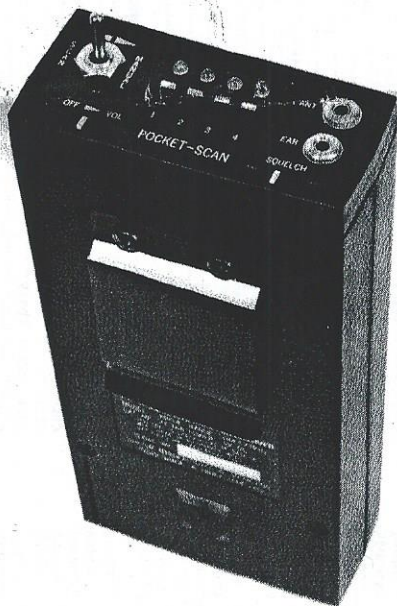


POCKET-SCAN FM Monitor Receiver




PRO-4

OWNER'S MANUAL

PLEASE READ BEFORE
USING THIS EQUIPMENT

REALISTIC[®]

CUSTOM MANUFACTURED FOR RADIO SHACK  A TANDY CORPORATION COMPANY

MODEL

20-168

Your **REALISTIC Pocket-Scan PRO-4 Scanning Receiver** is a completely solid-state VHF FM dual-conversion superheterodyne receiver, capable of automatically scanning 4 crystal-controlled channels. Some special features are: two ceramic filters, channel lock-out circuit, skipper circuit and External DC Power jack for operation from an external source of 9-volts DC. The Pocket-Scan is intended to be used by Civil Defense personnel, professional or part time public servants (police, firemen, etc.), or just anyone interested in listening to the exciting action constantly taking place on the air waves in your city.

It is designed for use in the narrow-band FM channels of Public Service communications: VHF band Police, Fire, Civil Defense, Radio Telephone, Forestry and Weather Service, plus many other Industrial Radio Services and the 2-meter "Ham" Radio Band (upper end). These and many other services share this band of frequencies from 148 to 174 MHz.

The PRO-4 features both high sensitivity and selectivity and a sophisticated circuit which includes 10.7 MHz and 445 kHz ceramic filters 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.

The PRO-4 represents some rather complex engineering and manufacturing achievements, but is designed for very practical applications. And still, it is remarkably easy to use. It can be placed in your pocket, clipped to your belt, or operated in your home, office or vehicle. You'll be amazed to realize that this small package contains densely packaged circuitry composed of 23 transistors, two integrated circuits (which incorporate the equivalent of hundreds of components), 11 diodes and 4 Light Emitting Diodes (LED's) for the scanning indicators.

Your local Radio Shack store has a complete line of accessories for use with the PRO-4—extra batteries, power adapters, cables, crystals, antennas, etc.

GUARANTEE: The RADIO SHACK guarantee is stated on the Guarantee card packed with the unit. It is in effect from coast-to-coast. At any time, RADIO SHACK equipment can be restored to like-new condition with original parts, with **minimum** delay, anywhere in the U.S.A.; normally right in your own neighborhood. In 98% of the cases, it is **not** necessary to return RADIO SHACK equipment to our laboratories.

SPECIFICATIONS

CHANNELS OF OPERATION:	Four—as determined by any one of 4 crystals operating in the frequency range 148 to 174 MHz
FREQUENCY RANGE:	8 MHz for maximum sensitivity (153 MHz, ± 4 MHz)
FREQUENCY COVERAGE:	12 MHz, usable sensitivity Better than 1 microvolt for 20 dB quieting
SENSITIVITY:	
SELECTIVITY:	± 8 kHz, -6 dB ± 25 kHz, -60 dB
SPURIOUS REJECTION:	Greater than 50 dB
IMAGE REJECTION:	Greater than 35 dB
MODULATION ACCEPTANCE:	± 7 kHz
I.F. FREQUENCY:	10.7 MHz and 455 kHz
FILTER:	10.7 MHz and 455 kHz Ceramic Filters
SQUELCH SENSITIVITY:	Variable from less than 1 microvolt to approximately 30 microvolts
SCANNING SPEED:	10 channels/second
DELAY TIME:	0.7 to 1.5 second
AUDIO POWER:	300 milliwatts maximum
POWER REQUIREMENTS:	9 volts DC (negative ground only) Current drain: 40 to 100 ma (no signal/squelched, to full volume)
SEMICONDUCTOR COMPLEMENT:	2 Integrated Circuits 23 Silicon Transistors 11 Diodes 4 Light Emitting Diodes (LED's)
SPEAKER:	2", 16 ohm, Permanent Magnet, dynamic-type
ANTENNA:	Built-in wire loop and external whip-type wire
CRYSTAL REQUIREMENTS:	Standard HC-25/u, 3rd overtone

The PRO-4 is designed to operate from a 9-volt battery or an external source of 9-volts DC, **negative ground**. If it fails to operate, and there is no clear reason for the failure, first check the battery. Before you try connecting the PRO-4 receiver to an external DC power supply, check the voltage polarities. Attempting to operate the negative ground PRO-4 from one of the rare positive ground automotive or boat electrical systems, or from other positive ground sources, may damage it. The Radio Shack warranty does not apply to any damage caused by improper power connections or other damage caused by misuse, damage or neglect.

CONTROL LOCATION AND FUNCTION

OFF-VOL 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-4 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.

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-4 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; each time you do so, the receiver will advance just one channel.

Channel Lock-out 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 Indicator—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 Lock-out Switch for that channel is down, that LED will not light.

EARphone jack is for plugging in the earphone. Use it for private listening, or in areas where background noise is excessive (in factories, at the scene of an accident or fire, in a vehicle, etc.).

ANTenna jack is for connecting an external antenna to the PRO-4. You can use either the wire antenna provided or an outside VHF antenna.

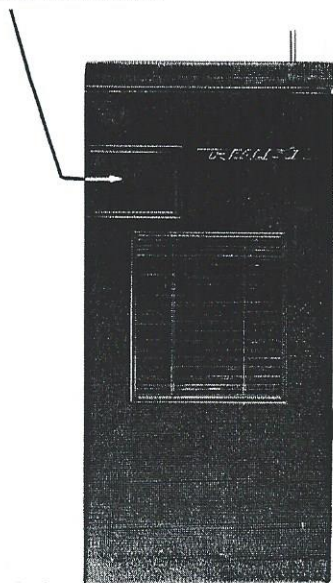
Belt Clip is provided so you can attach the PRO-4 to your belt or other convenient place.

Battery Compartment—press down in the direction of the arrow to install or replace the battery.

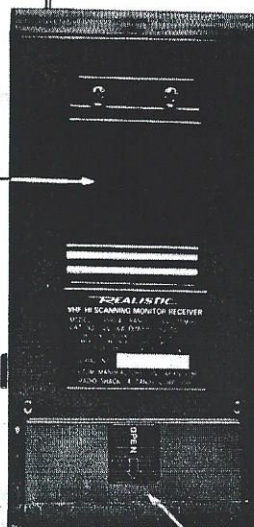
Crystal Compartment—press toward the side to open up the case to install or replace crystals.

9 V DC NEGative Ground jack is for connecting an external source of 9-volts DC, negative ground. RADIO SHACK has a number of adapters which provide the necessary 9 volts.

Crystal Compartment



Belt Clip



9 V DC
NEG GND
Jack

Battery Compartment

Selector Switch
SCAN/Stop/MANUAL

LED Channel Indicator

ANTenna Jack



EARphone Jack

Power/VOLUME Control

Channel Lock-out Switches

SQUELCH Control

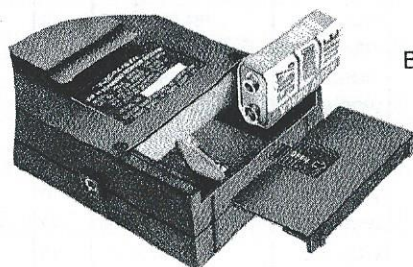
PREPARING FOR USE

To use your POCKET-SCAN, you must do two things:

Install the battery

Install 1, 2, 3 or 4 crystals

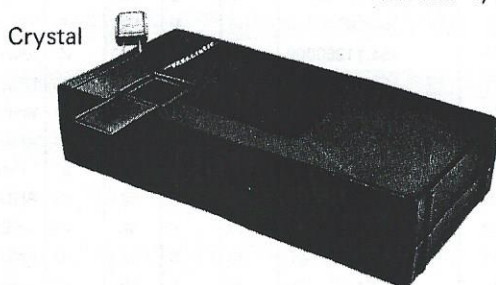
To install the battery, press the Battery Compartment cover down, in the direction of the arrow. Snap the battery connector over a 9-volt battery and place the battery in the compartment. Be sure to use an "extra life" battery, such as Radio Shack Catalog Number 23-151. For extra long-life, we recommend 23-553. Slide the Battery Compartment cover back to snap into place.



Battery

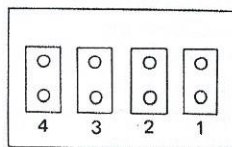
Crystals are not included with your POCKET-SCAN because the frequencies are so numerous. The frequencies used in your part of the country will be different from those used in other areas. Order the crystals you want from your Radio Shack store—specify the model number of this unit and the frequency you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

Slide off the Crystal Compartment cover and insert crystals into the crystal sockets. The socket marked 1 is for Channel 1, etc. Replace the cover.



Crystal

Crystal socket



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.

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

OPERATION

After a battery and a crystal (or crystals) have been installed, your PRO-4 is ready to use.

Turn VOLUME "on", by rotating to the right. Rotate SQUELCH to the minimum position by rotating to the left. Set all the Channel Lock-out Switches "on" (in the up position, toward the LED indicators). You should hear a rushing sound from the speaker. Now adjust SQUELCH to the right until you no longer hear the rushing background noise (further explanation of SQUELCH adjustment is noted below).

If you want the PRO-4 to continuously scan the channels for which you have crystals installed, you must adjust SQUELCH as instructed above, then set the Selector Switch to the SCAN position. The PRO-4 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, switch their Channel Lock-out Switches "off" (down or 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" or "unsquelched", for AUTOMATIC scanning, SQUELCH must be set to eliminate the background noise.

To eliminate the annoying background noise, rotate SQUELCH toward the right 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-4 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.

The PRO-4 has a built-in loop antenna and in high-level signal areas you may not need another antenna. However, in most cases, you will want to use the wire antenna provided; just plug it into the ANTenna Jack and extend the antenna vertically. For the very best reception, you will want to use an outside antenna—see the ANTENNAS section below.

NOTES ON OPERATION

You will notice that the minimum setting of VOLUME does not turn the sound level to "zero". This assures that you won't miss important calls even when VOLUME is set at minimum. Of course if you are not going to listen to your PRO-4, just turn it "off".

Set SQUELCH only to the point where background noise just disappears. Further rotation to the right will just increase the Squelch level, which means it takes a stronger signal to override Squelch and you may miss weaker signals.

The PRO-4 has a built-in 2 second delay feature which keeps you from missing replies. This circuit holds the PRO-4 "on channel" for 2 seconds after the signal ceases, before resuming automatic scanning. During this 2 second delay period, if a reply is made, the receiver is still tuned to that channel. If the reply takes more than 2 seconds, the scanning circuit will lock in on that channel the next time the circuit comes to that channel.

Your POCKET-SCAN has a built-in Skipper circuit which is activated by the lock-out switches. This feature makes the receiver skip over a channel(s) that is locked out.

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-4 will automatically scan the air waves to bring you that action—your police force at work, a fire truck on a mission, local air traffic control towers, the National Weather Service, Civil Air Patrol, aircraft distress, 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-4, 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. You will find one of our books to be very interesting and helpful in this area: **REALISTIC GUIDE TO POLICE, FIRE AND AIRCRAFT RADIO.**

National Weather Service Reception

Continuous weather broadcasts are transmitted 24-hours-a-day in many parts of the country. If you are using a crystal set to one of the two channels assigned (162.55 or 162.40 MHz), your PRO-4 will automatically lock-in on that channel, since the broadcasts are continuous. To prevent automatic locking, set the channel lock-out switch for that channel to the "off" position (down). When you want a weather report, set the Lock-Out Switch to the "on" position for that channel. In areas where two stations are close to each other, one will use 162.55 and the other will use 162.40 MHz. Check with your local FCC office or the Weather Bureau for the frequency used in your area.

Frequency Coverage

For maximum sensitivity, the channel frequencies you choose should be within 4 MHz of 153 MHz; that is, in the spread of 149 to 157 MHz. The PRO-4 will function very adequately down to 148 and up to 176, but with reduced sensitivity. The superior reception spread of 8 MHz (± 4 MHz) can be moved up or down in this band of frequencies by special realignment of the front end circuitry of the PRO-4 (which should be attempted only by qualified Electronics Service Technicians who have adequately calibrated, precision test equipment).

ACCESSORIES

Your PRO-4 can be powered from any source of 9 volts DC, **negative ground**. Using an AC Adapter will save on batteries; so, if you intend to use the PRO-4 in a location where 120 volts is readily available, and it does not need to be moved around, consider an adapter. Radio Shack has two power adapters which you might be interested in. Catalog Number 270-1531 is a universal adapter for 120 Volts AC, to provide 4.5/6/7.5/9 volts DC (positive or negative). Catalog Number 270-1532 is a power adapter for plugging into a cigarette lighter in your vehicle and providing either 6 or 9 volts DC (positive or negative). This will permit you to use the PRO-4 in your car or truck without wearing down your batteries.

MAINTENANCE

The PRO-4 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 find it will give you long life if kept free from dirt and excessive humidity.

If the sound becomes weak and distorted, it is time for a new battery. We recommend Radio Shack Alkaline batteries, Catalog Number 23-553. If you do not intend to use the PRO-4 for a few weeks, it is best to remove the battery. Also, **never** leave a weak or dead battery in the unit.

ANTENNAS

For superior reception, you will want to use an external antenna such as Radio Shack Catalog Number 20-176. This antenna is designed for base station operation. If you intend to use your POCKET-SCAN in a vehicle, we recommend Catalog Number 20-177 or 21-930. You will need coaxial cable to connect between the base station antenna and the POCKET-SCAN—use Catalog Number 278-970 (50 feet of RG-8/U). At the POCKET-SCAN, use a sub-miniature phone plug on the end of the coax cable (274-289), or a combination of adapters which will mate into a male sub-miniature plug.

For mobile use, you can mount the POCKET-SCAN permanently or temporarily. In either case, be sure it is positioned (along with its cables) in a safe and convenient location. When you mount a mobile antenna, keep the following points in mind:

1. Mount the antenna as high as possible—the center of the roof is best.
2. It should be rigid, so it will be vertical when in motion.
3. Keep it as far as possible from the engine compartment (the engine is a source of noise, which will interfere with reception).

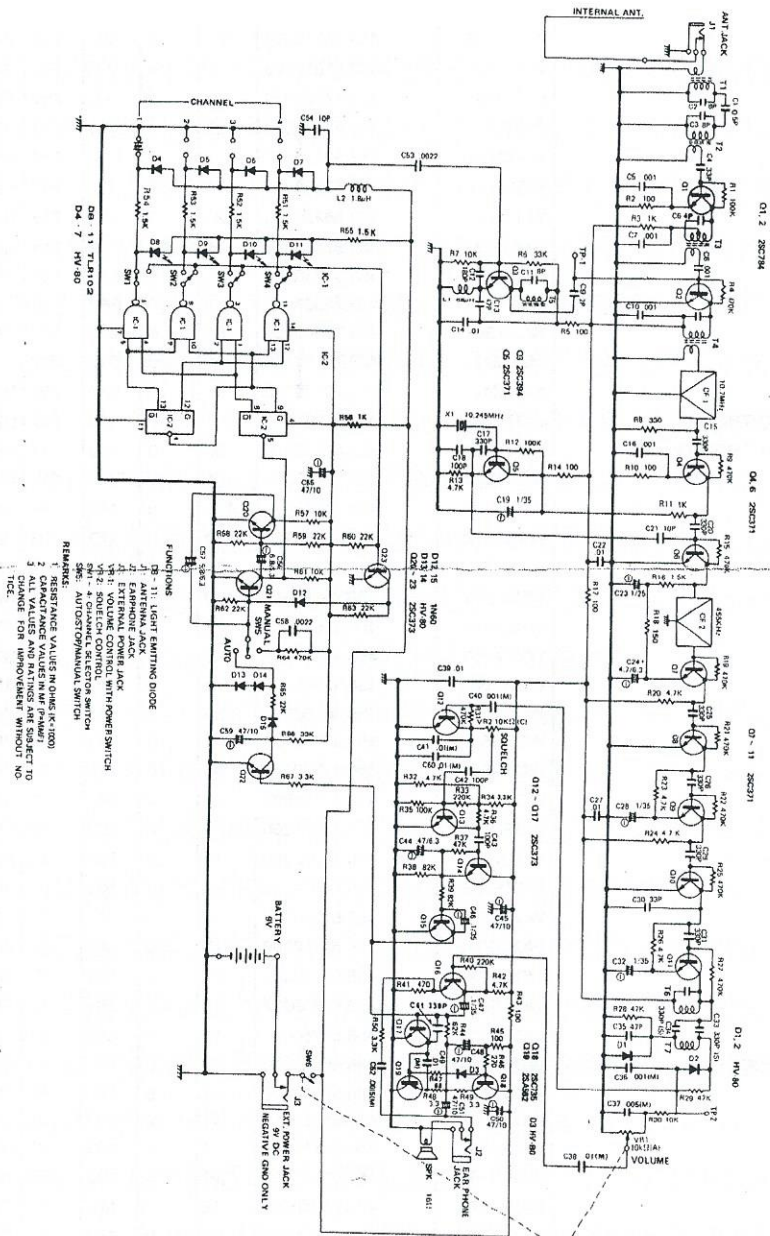



VHF Mobile Mount
Complete with cutting chart. Covers 139-174 MHz. Snap-grip mounting. Fits top or side of trunk lid. Omni-directional capability avoids fading as vehicle changes direction. Waterproof. Specific frequency adjustment. 17-7PH stainless steel whip. 17' cable. Catalog Number 20-177



CB/VHF Cowl-Mount
For mobile use. Chrome telescopic whip (50" extended, 28" collapsed), mounted on swivel base. Weatherproof loading coil. 22' RG-58/U cable. Terminates with PL-259 and pintype plug connectors. Catalog Number 21-930

SCHEMATIC DIAGRAM



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