Cat. No. 20-114

PRO-2010 Programmable AM/FM Scanning Receiver

66-88

VHF:30-54/ 108-136/138-174 MHz
UHF:380-512 MHz

PLEASE READ BEFORE USING THIS EQUIPMENT

REALISTIC®

You'll hear all the action with your new *REALISTIC®* PRO-2010 Programmable Scanning Receiver! You'll have direct access to over 23,000 frequencies in nine action radio bands—police, fire, ambulances, aircraft, ham radio operators and transportation services! And you can program your PRO-2010 to scan up to twenty channels so you won't miss any of the excitement.

The secret to the PRO-2010 is a custom-designed microprocessor—a computer on a chip! The front panel keyboard lets you easily enter and change frequencies whenever you wish. The microprocessor also gives you special functions not found on other scanning receivers. Curious about what's on the air in your area? The PRO-2010 will automatically "search" frequency ranges of your choice for active stations— you can locate new stations and services easily! And if there's a frequency you're especially interested in, the PRIORITY key will make sure you never miss a call on it. You can listen or scan other channels and your PRO-2010 will automatically switch to the channel when a call is received on it!

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

FEATURES

66-88 MHz

- Covers 30 – 50 MHz (VHF Lo), 50 – 54 MHz (ham radio 6 m), 108 – 136 MHz (aircraft), 138 – 144 MHz (government), 144 – 148 MHz (ham radio 2 m), 148 – 174 MHz (VHF Hi), 380 – 450 MHz (ham radio and government), 450 – 470 MHz (UHF Lo) and 470 – 512 MHz (UHF Hi) – over 23,000 channels!

- Scans up to 20 channels continuously.

- Search feature scans frequency ranges for new stations.

- Priority function means you'll never miss a call on your favorite channel!

- Large multi-purpose fluorescent display shows which channels and frequencies are being scanned, monitored or programmed as well as the status of the channels.

- Channel lockout function with built-in skipper circuit.

- Two-second scan delay function eliminates missed replies.

- Crystal filter for 1st IF (10.7 MHz) plus ceramic filter for 2nd IF (455 kHz).

Other features you'll appreciate include lockout, to skip over channels during scanning, plus the fast/slow search and scan rates.

Your PRO-2010 achieves its superior performance through the use of the very latest in solid-state technology. In addition to the microprocessor, the PRO-2010 includes a phase-locked loop (PLL) IC, 2 C-MOS ICs, 6 integrated circuits, 30 transistors, 44 diodes and a fluorescent display.

```
 ⚡   ┌─────────────────────────┐   ⚠
 /!\  │        CAUTION          │  /!\
      │ RISK OF ELECTRIC SHOCK  │
      │       DO NOT OPEN       │
      ├─────────────────────────┤
      │ CAUTION:                │
      │ TO REDUCE THE RISK OF ELECTRIC SHOCK,│
      │ DO NOT REMOVE COVER (OR BACK).│
      │ NO USER-SERVICEABLE PARTS INSIDE.│
      │ REFER SERVICING TO QUALIFIED SERVICE│
      │ PERSONNEL.              │
      └─────────────────────────┘
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⚡ The lightning flash with arrowhead within the triangle is intended to alert the user to dangerous voltage inside this unit that can cause shock. Do not open enclosure.
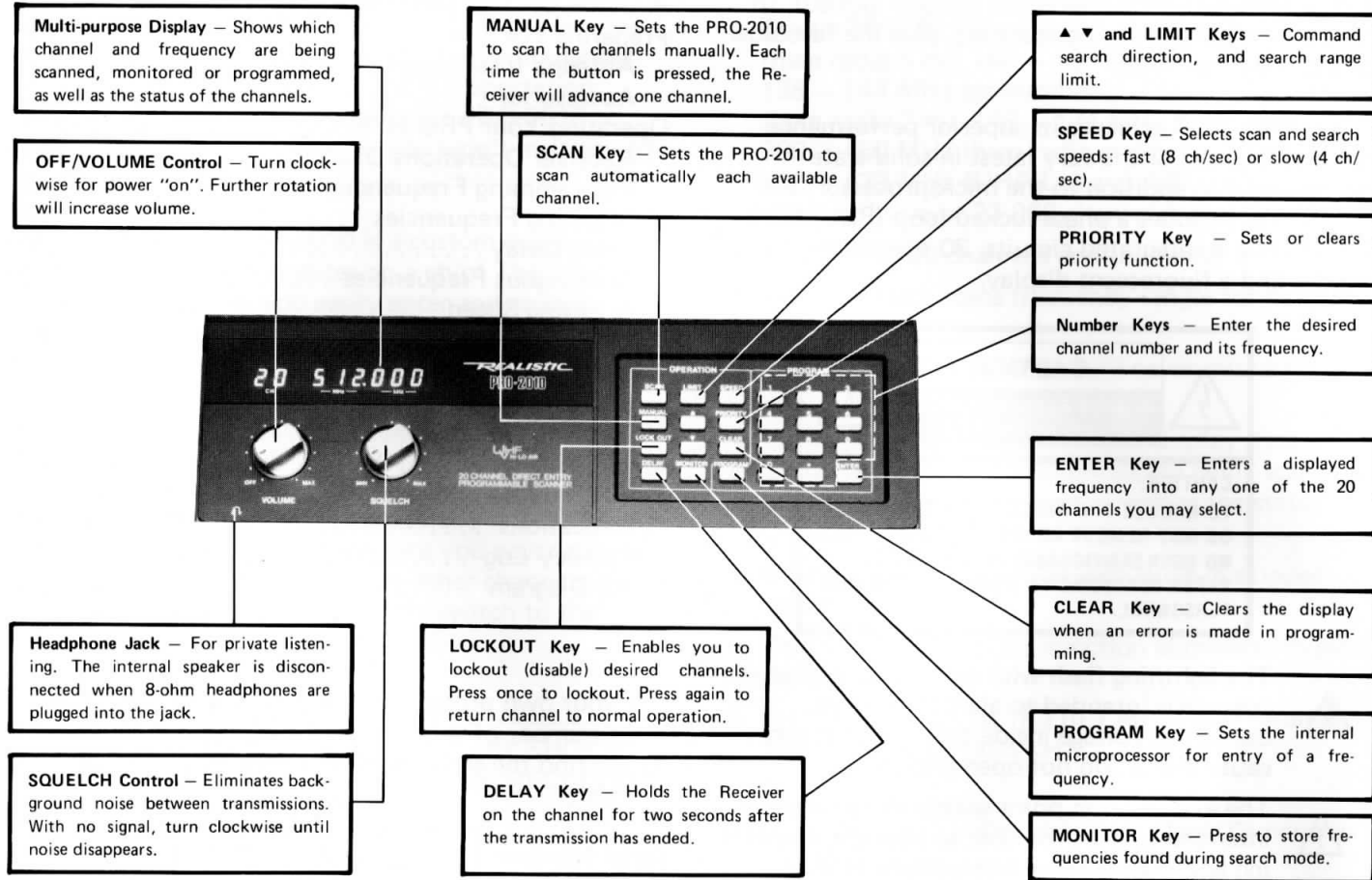
⚠ The exclamation point within the triangle is intended to alert the user to important operating and maintenance instructions in this owner's manual.

CONTENTS

For your own protection, we urge you to record the serial number of this unit in the space provided. You'll find the serial number on the rear panel of this unit.
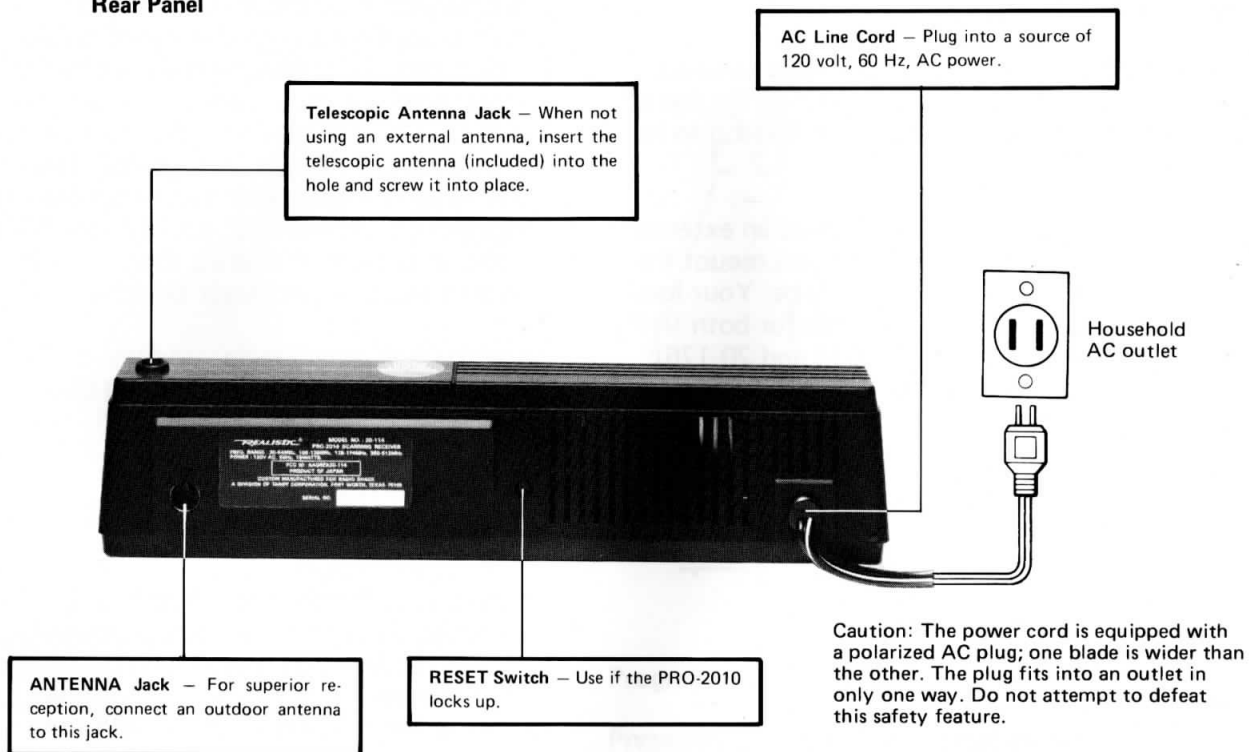
Serial Number   `623895`

— 3 —

A QUICK LOOK AT YOUR PRO-2010

Multi-purpose Display — Shows which channel and frequency are being scanned, monitored or programmed, as well as the status of the channels.

OFF/VOLUME Control — Turn clockwise for power "on". Further rotation will increase volume.

MANUAL Key — Sets the PRO-2010 to scan the channels manually. Each time the button is pressed, the Receiver will advance one channel.

SCAN Key — Sets the PRO-2010 to scan automatically each available channel.

▲ ▼ and LIMIT Keys — Command search direction, and search range limit.

SPEED Key — Selects scan and search speeds: fast (8 ch/sec) or slow (4 ch/sec).

PRIORITY Key — Sets or clears priority function.

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

ENTER Key — Enters a displayed frequency into any one of the 20 channels you may select.

CLEAR Key — Clears the display when an error is made in programming.

Headphone Jack — For private listening. The internal speaker is disconnected when 8-ohm headphones are plugged into the jack.

LOCKOUT Key — Enables you to lockout (disable) desired channels. Press once to lockout. Press again to return channel to normal operation.

SQUELCH Control — Eliminates background noise between transmissions. With no signal, turn clockwise until noise disappears.

DELAY Key — Holds the Receiver on the channel for two seconds after the transmission has ended.

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

MONITOR Key — Press to store frequencies found during search mode.

—4—

Rear Panel

Telescopic Antenna Jack — When not using an external antenna, insert the telescopic antenna (included) into the hole and screw it into place.

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

Household AC outlet

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

RESET Switch — Use if the PRO-2010 locks up.

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.

PREPARING FOR USE

Antenna Installation

Your PRO-2010 comes with a telescopic antenna. Insert into the telescopic antenna jack on the top of your PRO-2010 and screw into place. Extend to its full length.

For the very best reception, you'll need an external antenna. You'll find that the higher you mount the antenna, the better the reception will be. Your local Radio Shack has an excellent antenna for both VHF and UHF reception (Cat. No. 20-014 and 20-176). You can also find mounting hardware, cables and connectors from Radio Shack, too.

20-014   20-176

Accessories

A pair of headphones can be a very useful accessory. In areas where a high noise is present, or when you want to listen privately, use headphones. Your Radio Shack store has a selection for your PRO-2010. Just plug them into the front panel headphone jack.

WARNING WARNING WARNING WHEN INSTALLING OR REMOVING BASE STATION ANTENNAS, 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.

Memory Backup

Connect your Receiver to a standard 120-volt AC wall outlet. Then in a few minutes memory backup will begin to function. Even when the power switch is OFF, the memory backup will continue functioning so long as the AC plug is connected to the outlet.

When the plug is disconnected from the outlet or during power failure, the memory will be retained for approximately one hour.

OPERATING YOUR PRO-2010

Turn on your PRO-2010 by rotating VOLUME clockwise. When first turned on, your PRO-2010 may start scanning — press MANUAL to stop scanning.
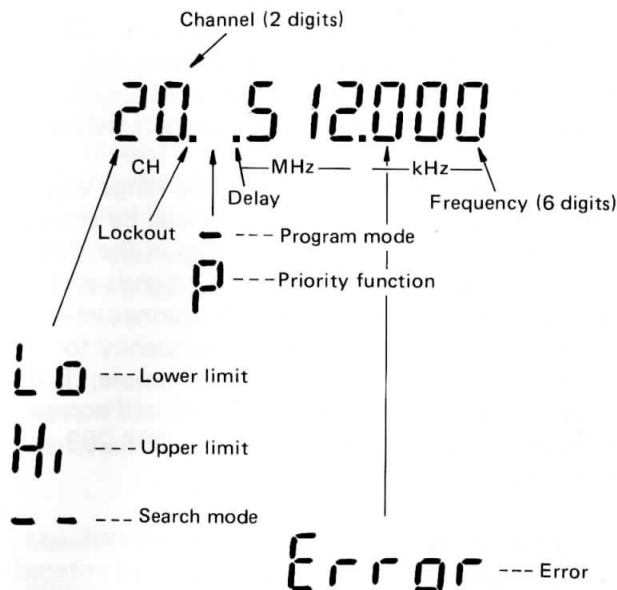
Rotate SQUELCH fully counterclockwise. You'll hear a rushing noise from the speaker. Slowly rotate SQUELCH clockwise until the noise just stops. You're now ready to start entering frequencies!

Note: If the display shows meaningless characters or no display at all, press RESET on rear panel with a ball-point pen. This re-initialize the PRO-2010. However, all the stored frequencies will be lost.

Understanding the Display

The fluorescent display on your PRO-2010 can display the channel number, the frequency being received and special symbols to indicate different channel status. Here's a brief rundown on what those symbols mean when receiving stations.

RECEIVER OPERATIONS DISPLAY

Channel (2 digits)

20.512.000

CH — MHz — kHz — Delay — Frequency (6 digits)

Lockout ■ --- Program mode

P --- Priority function

Lo --- Lower limit

Hi --- Upper limit

_ _ --- Search mode

Error --- Error

Programming Frequencies

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

Hints and Tips for Programming

If you enter a frequency that is outside a PRO-2010 band range, you will see ERROR on the display. Or you may have put the decimal in the wrong place. Check your mistake. Then enter the correct frequency.

Any frequency within a PRO-2010 band range will be accepted. However, the frequency that can be stored into PRO-2010 memory is in 5 kHz step in the VHF LOW/HI bands, 25 kHz step in the AIR bands and 12.5 kHz step in the UHF bands. The scanner will automatically round off the entered frequency to the closest lower valid frequency. For example, if you enter 125.2345 MHz, the PRO-2010 will accept this entry as 125.225 MHz. Or the entry 398.263 MHz will be treated as 398.262 MHz.

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

$$1- \quad 125.234$$

CH   —MHz— —kHz—

$$\Downarrow$$

$$1- \quad 125.225$$

CH   —MHz— —kHz—

The tuning range of your PRO-2010 is permanently stored in the microprocessor chip. There's no way it can be extended or altered — not even by a skilled electronics technician. So if you try to enter a frequency not in the PRO-2010's tuning range, you'll get an error message every time.

If you want to change the frequency on a specific channel, enter the new frequency over the old one, following the steps under **Programming Frequencies.**

Operating Modes

There are four separate operating modes on the PRO-2010 . . . **programming · manual operation · scanning · searching**

Programming Frequencies

Before programming frequencies, be sure your PRO-2010 is turned on and the SQUELCH is adjusted as described earlier.

1. Select the desired channel.
2. Press PROGRAM to enter programming mode.
3. Type the numbers for the desired frequency and press ENTER.

Note: If you are uncertain about specific frequencies in your locale, Radio Shack's "Police Call Directory Including Fire & Emergency Services" is an excellent reference.

Example for Programming a Frequency
(frequency 162.55 MHz into channel 1)

1. Press MANUAL and select channel 1.
    You can do this in two ways: press MANUAL continuously until the Display indicates channel 1 and then press PROGRAM , or by pressing 1 then MANUAL and PROGRAM .

2. Press PROGRAM key.
3. Press the 1 6 2 • 5 5 keys.
    Check the Display to make sure the frequency it shows is the one you meant to program. If it is, press ENTER.
4. To add more frequencies, just press PROGRAM to advance to the next channel and follow the steps above.
5. If you ever want to change the frequency entered for a specific channel, enter the new frequency "over" the old frequency using steps 1, 2 and 3.

You'll hear a "beep" sound as you press the various keys. This lets you know the key has been properly "entered" into your PRO-2010.

Manual Mode

When you want to stay on a frequency, either in scan mode or search mode, press MANUAL. In the manual mode, you can manually advance through the memory channels by pressing MANUAL repeatedly. Or enter the channel number and press MANUAL to reach the desired channel directly. Also note that in manual mode you can access locked out channel(s).

Scanning Frequencies

Your PRO-2010 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, and you can select specific channels you want to listen to.

Important! Your PRO-2010 won't scan unless SQUELCH is set to the point where no sound is heard between transmissions, that is no "hiss" sound.

Using Delay

When your PRO-2010 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. Press DELAY when you wish to hold a channel you are listening to so as not to miss any replies. Your PRO-2010 will then hold the channel at least two seconds after each transmission, giving you time to hear replies. The delay indicator will light to show that the delay function is engaged. To release the delay function, press DELAY again.

Locking Out Frequencies

You might want your PRO-2010 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 to the channel you want to lock out.
3. Press LOCKOUT . The display will show "●" indicating this channel will be skipped during scanning. You can still access the locked out channel in the manual mode.

To release the lockout function:

1. Press MANUAL to stop scanning.
2. Advance to the channel that is locked out.
3. Press LOCKOUT again. "●" will disappear from the display.

You can lock out up to 18 channels.

Selecting Speed

Your PRO-2010 will normally scan channels at a rate of four channels per second. If you press SPEED, channels will be scanned at a rate of eight per second. Press SPEED again to return to a rate of four channels per second.

Using Priority

You might want to scan other channels yet not miss a call on a channel of particular interest to you (police, fire, ambulance, etc.). The priority function will let you scan other channels — but if a call is received on the priority channel, your PRO-2010 will automatically switch to the priority channel!

1. Only channel 1 can be used as priority channel: key in the desired priority frequency into channel 1.

2. Priority function works only when the unit is in scan or manual mode.

3. Press PRIORITY to start priority function. a ℙ will appear on the display.

4. Press MANUAL or SCAN to listen to other channels. Your PRO-2010 will check the priority channel and switch to it if a signal is received on it.

5. To cancel priority function, press PRIORITY again. The ℙ will disappear from the display.

Searching with Your PRO-2010

One great feature of your PRO-2010 is its ability to "search" for frequencies being used. This means you can hear all the action on the airwaves in your area! To use this great feature, just follow these steps:

1. Press PROGRAM key.

2. Press LIMIT key. The display shows Lo. Enter the lower limit of the frequency range to be searched, such as 45.000 MHz. Press ENTER.

3. Press LIMIT key again. The display shows Hi. Enter the upper limit of the frequency range to be searched, such as 46.000 MHz. Press ENTER.

4. Press either ▲ or ▼ to start search. ▼ will start search from highest frequency and go down while ▲ will start from the lowest frequency and go up. The left side of the display shows ——.

5. You can control the speed of the search by using the SPEED key the same way you use it during scanning.

6. Search will stop when a frequency with a signal is found. Press MONITOR if you want to store the frequency into temporary memory. To restart search, press ▲ or ▼ .

In program mode, the search range will be displayed each time LIMIT is pressed. It is impossible to change the lower frequency only. When the lower frequency is changed, the higher frequency will disappear, and you must key in the higher frequency. The higher frequency can be changed any time.

Note: The delay feature also functions in the search mode. Press DELAY to stay on the found frequency for two seconds.

Storing Frequencies

If you want to enter some of the frequencies found during search, do as follows:

1. Press MONITOR when your PRO-2010 finds a frequency you want to store.

2. Use MANUAL key to select a channel to enter the frequency your PRO-2010 found. The display will show the frequency currently stored on the channel, but don't worry — the old frequency will be erased when you start to enter the new one.

3. Press PROGRAM .
4. Press MONITOR again. The new frequency found during the search will be displayed.
5. Press ENTER to put the new frequency into the channel in place of the old frequency.
6. Press either ▲ or ▼ to resume the search. To return to manual or program operation, press MANUAL or PROGRAM . To resume the search from one of the limit frequencies, press LIMIT and then ▲ or ▼ .

Birdies

Some frequencies may be difficult or impossible to receive. If you program-in one of these, the Scanner may lock up and you hear only noise. These "birdies" are the products of internally generated signals mixing with external signals like TV and FM broadcasts. Telescopic antennas are much more likely to pick up these undesirable signals — that is another good reasons for getting an outdoor, base station type antenna for home installations.

If the interference is not severe, you may be able to use SQUELCH to cut out such annoying birdies.

A few of the most common birdies to watch out for are listed below.

32.000 MHz
38.400 MHz
40.840 MHz
108.800 MHz
115.200 MHz
121.600 MHz
125.725 MHz
128.000 MHz
134.400 MHz
140.800 MHz
147.100 MHz
to
147.700 MHz
160.000 MHz
166.400 MHz
172.800 MHz

Even with the SQUELCH control set to maximum, scanning or searching may stop on or around some of the frequencies listed above. If the signal is strong enough, above 10 μV in technical terms, you can listen to it, but the Receiver will not automatically scan or search.

MAINTENANCE

Your PRO-2010 represents a fine example of electronic engineering and construction. As such it should be treated accordingly. We offer the following suggestions so you will enjoy this product for many years to come.

If at anytime you suspect that your unit is not performing as it should, stop by your local Radio Shack store. Our personnel are there to assist you and arrange for service, if needed.

Keep it dry. If water should get on it, wipe it off immediately. Water contains minerals that can corrode electronic circuits.

Do not store in hot areas. High temperatures can shorten the life of electronic devices and can even distort or melt certain plastics.

Do not drop your product. This will likely result in failure to operate. Circuit boards can crack and cases may not survive the impact. Handling your product roughly will shorten its useful life.

Do not use or store in areas of high levels of dirt or dust. The electronics may be contaminated. Any moving parts will wear prematurely.

Do not use harsh chemicals, cleaning solvents, or strong detergents to keep your unit looking new. You need only wipe it with a dampened cloth from time to time.

BEFORE YOU CALL FOR HELP

If you Have Problems . . . . .

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

Problem	Possible Cause	Remedy
SCANNER is totally inoperative	No power	Check to see that unit is plugged into a working AC outlet.
Scanner is on, but will not scan	1) Channels are locked out. 2) Squelch control is not adjusted correctly.	1) Press MANUAL , then release each channel from lockout one-by-one. 2) Adjust SQUELCH clockwise.
Scan locks on frequencies having no clear transmissions.	"Birdies"	Avoid programming frequencies listed on page 13, or only listen to them manually.

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

TYPES OF SIGNALS YOU WILL BE ABLE TO MONITOR

Your community is alive with action — action which is constantly being reported on the air waves. And your PRO-2010 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 frequencies programmed in your PRO-2010, you can monitor such exciting signals. You'll have to do a little investigation in your community to find out what services are active and on what frequencies. You will find a copy of Radio Shack's "Police Call Radio Directory" most helpful.

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.

You can hear air navigation between 108 — 118 MHz. Communications between aircraft and airport control towers can be found between 118 — 136 MHz.

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-Hi, 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 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 emergency services. Here, most of the activity is in a spread of 453.05 — 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.

NATIONAL WEATHER SERVICE RECEPTION

Continuous weather broadcasts are transmitted 24 hours a day in many parts of the country. Your PRO-2010 will automatically lock in on one of the channels assigned (162.55, 162.40, 162.475 MHz, or 162.425, 162.450, 162.500, 165.252 MHz), because the broadcasts are continuous. To prevent automatic locking, use the channel lockout feature on the weather channel. The first three channels are the most widely used frequencies. The remaining four are in use in some areas. When you want a weather report, access the weather channel in the Manual mode. In areas where stations are close to each other, one will use 162.55, another will use 162.40, and the third might use 162.475 MHz. Check with your local FCC office or the National Weather Service for the frequency used in your area. You can also write to:

National Weather Service Office
Attn: W/OM 15x2
National Oceanic and Atmospheric Administration,
Silver Spring, Md. 20910.

SPECIFICATIONS

FREQUENCY COVERAGE:

VHF-Lo
  30–50 MHz in 5 kHz steps
Ham
  50–54 MHz in 5 kHz steps
Aircraft
  108–136 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-Hi ("T")
  470–512 MHz in 12.5 kHz steps

CHANNELS OF OPERATION:

Any 20 channels in any band combinations.

SENSITIVITY:

AM: 20 dB Signal-to-Noise ratio at 60 % modulation
    108–136 MHz   2.0 μV

FM: 20 dB Signal-to-Noise ratio at 3 kHz deviation
    30– 54 MHz   0.5 μV
    138–174 MHz   1.0 μV
    380–512 MHz   1.0 μV

SPURIOUS REJECTION:

  30– 54 MHz 50 dB at 40 MHz
  108–136 MHz 50 dB at 120 MHz
  138–174 MHz 50 dB at 154 MHz
  380–512 MHz Not specified.

SELECTIVITY:

  ±9 kHz, −6 dB
  ±15 kHz, −50 dB

IF REJECTION:

  10.7 MHz 60 dB at 154 MHz

SCANNING RATE:

Fast   8 channels/sec.
Slow   4 channels/sec.

SEARCH RATE:

Fast   8 steps/sec.
Slow   4 steps/sec.

PRIORITY SAMPLING:

2 seconds

DELAY TIME:

2 seconds

MODULATION ACCEPTANCE:

± 7 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 25 dB

ANTENNA IMPEDANCE:

50 ohms

AUDIO POWER:

1.7 watts maximum, 1.5 watts nominal

BUILT-IN SPEAKER:

3" (77 mm) 8 ohm, dynamic type

POWER REQUIREMENTS:

AC, 120 Volts, 15 watts

DIMENSIONS:

2-3/8" (60) x 10-1/2" (268) x 7-1/2" (190) mm
HWD

WEIGHT:

3.3 lbs (1.5 kg)

BLOCK DIAGRAM
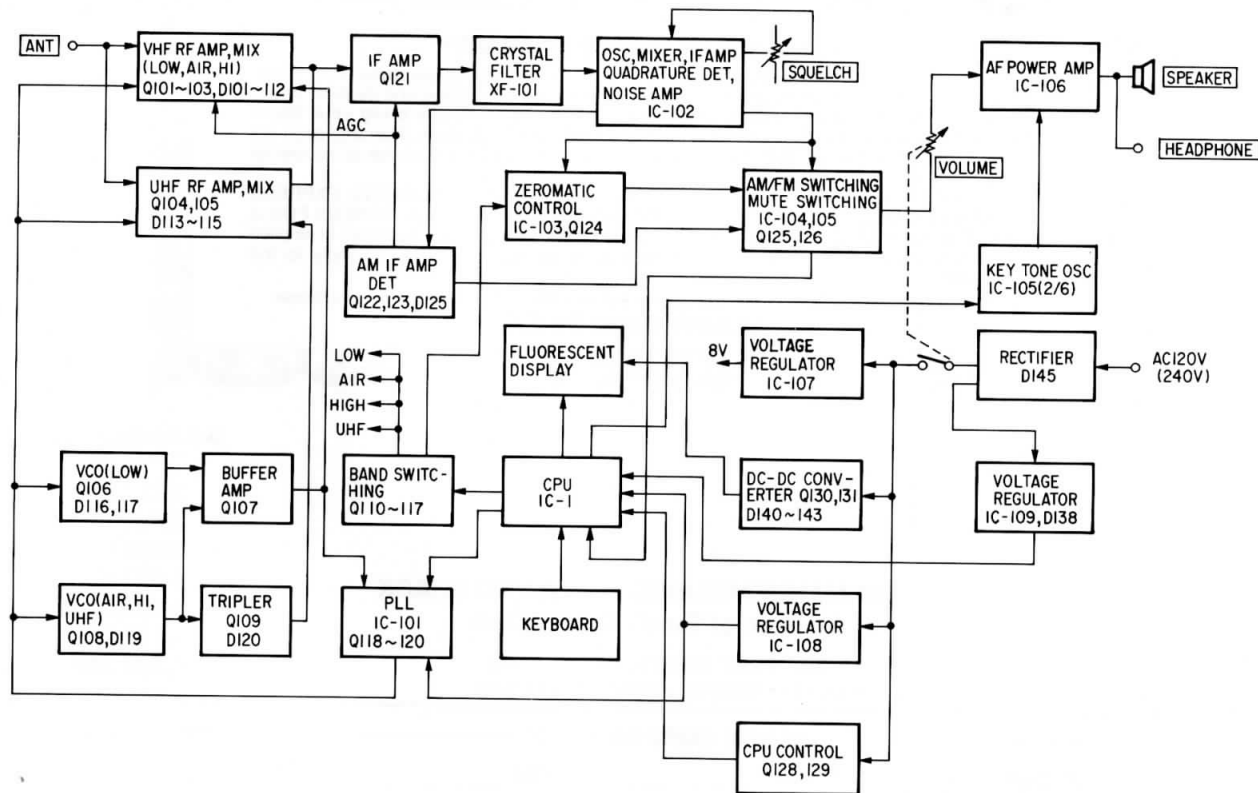
RADIO SHACK LIMITED WARRANTY

U.S. PATENT NOS.
3,794,925
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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A Division of Tandy Corporation

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—— **TANDY CORPORATION** ——

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Printed in Japan

IMPORTANT NOTE (PRO-2010)

For Australian Models, VHF Low band range is set to 68 to 88 MHz. Also the frequency references stated on pages 16 and 17 are for U.S.A. and may not applicable in Australia.

Of course, the power supply should be 240V, 50 Hz AC.

Tandy Australia Limited
91 Kurrajong Avenue
Mount Druitt, N.S.W. 2770

Cat. No. 20-9114