

PATRIOT[®]

TWO-WAY RADIO BY RITRON

RPM SERIES FM MOBILE RADIO USER MANUAL



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Please read these sections first - FCC REGULATIONS, SAFETY PRECAUTIONS.

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INTRODUCTION

The RITRON RPM mobile is a programmable, track-tuned two-way radio that can transmit and receive on any one of up to 16 channels in a professional FM communications band (UHF or VHF available). This radio features channel select and monitor push-buttons, and a single digit display. Each channel can be "dealer or factory" programmed to contain a unique set of operating frequencies and options. These options include communications industry standard signaling formats: Quiet Call, Digital Quiet Call and Paging Quiet Call.

INSPECTION

Make sure the radio package includes a RITRON mobile transceiver and two boxes. One box contains the microphone and attached cord. The other box holds radio and microphone brackets, a DC power cable, an in-line fuse assembly and installation hardware. See the installation instructions in the hardware box for a complete list of parts included. Examine the equipment immediately after delivery and report any damages to the shipping company.

MODEL IDENTIFICATION

RPM-150 AND RPM-450

A label attached to the back of the mobile includes the FCC identification and radio serial numbers. The radio model is the last six characters of the FCC ID number. For example, look at the label below. The model number is RPM-450. This means that the radio is designed to operate in the UHF FM band, on frequencies from 450 to 470 MHz. A FCC label that says "RPM-150" identifies the radio as VHF, for use on frequencies from 150 to 165 MHz. (Models that operate in other sub-bands within the UHF and VHF bands are available.)

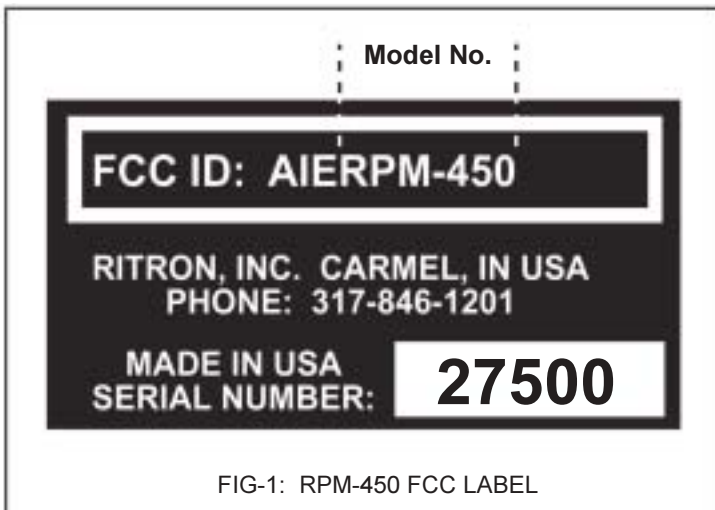


FIG-1: RPM-450 FCC LABEL

INTRODUCTION/OWNER INFORMATION

RPM-050

Refer to FIG-2. For RPM-050 units, the model number appears below the FCC identification number. There are two separate RPM-050 models available. One is RPM-050-M, designed for operation in the 30 to 38 MHz sub-band. The other is RPM-050-N, for use on frequencies from 38 to 50 MHz.



FIG-2: RPM-050 FCC LABEL

FCC REGULATIONS

LICENSING

The FCC requires you to obtain a station license for your radios before using the equipment to transmit, but does not require an operating license or permit. The station licensee is responsible for ensuring that transmitter power, frequency and deviation are within the limits specified by the station license.

The station licensee is also responsible for proper operation and maintenance of his radio equipment. This includes checking the transmitter frequency and deviation periodically, using appropriate methods.

Your RITRON dealer can help you obtain a FCC license. To receive a FCC license for VHF or UHF frequencies, you must submit FCC application Form 574.

SAFETY STANDARDS

The FCC (with its action in General Docket 79-144, March 13, 1986) has adopted a safety standard for human exposure to radio frequency electromagnetic energy emitted by FCC regulated equipment.

OWNER INFORMATION

RITRON follows these safety standards, and recommends that you observe the following guidelines:

- DO NOT operate a mobile radio transmitter when someone outside the vehicle is within two feet of the antenna.
- DO NOT transmit with a fixed radio (base station, microwave, rural telephone RF equipment) or marine radio when someone is within two feet of the antenna.
- DO NOT operate any radio transmitter unless all RF connectors are secure and any open connectors are properly terminated.
- DO NOT operate radio equipment near electrical blasting caps or in an explosive atmosphere.
- GROUND ALL RADIO EQUIPMENT according to RITRON's installation sheet.
- RITRON products should be repaired only by RITRON authorized personnel.

SAFETY PRECAUTIONS

RADIO MOUNTING LOCATION

Consider driver and passenger safety when you choose a location for the radio. Do not mount the unit overhead or on a sidewall unless you take special precautions, such as securing the radio with a retaining strap.

Improper installation increases the possibility that a car accident could dislodge the radio and make it a dangerous projectile.

VEHICLE OPERATION

- **ELECTRONIC SYSTEMS**

Check the vehicle's manual for possible warnings about operating a two-way radio in a vehicle equipped with an electronic ignition or anti-skid braking system.

- **LIQUEFIED PETROLEUM (LP) GAS FUEL SYSTEM**

Radio installation in a vehicle fueled by liquefied petroleum (LP) gas (with the LP gas container stored in a sealed-off space, such as the trunk) must conform to NFPA (National Fire Protection Association) standard 58.

- **BATTERY POWER**

Avoid leaving the radio turned on for long periods when the engine is off, which could run down the vehicle's battery.

OWNER INFORMATION

RADIO CARE

GENERAL

- **MOISTURE**

The mobile is not waterproof and should not be exposed to rain, or immersed.

- **EXTREME HEAT**

Like all electronic equipment, the mobile should not be subjected to extreme heat, such as being left to absorb direct sunlight in a closed vehicle.

- **VIBRATIONS/SHOCKS**

Although your RITRON mobile radio is designed to be rugged, it cannot be expected to survive abuse. Avoid dropping the radio.

- **CHEMICALS**

Detergents, alcohol, aerosol sprays and/or petroleum products might damage the radio front panel and/or case. Clean the mobile's exterior using a soft cloth moistened with water.

SERVICE

Federal law prohibits you from making any internal adjustments to the transmitter, and from changing transmit frequencies unless you are specifically designated by the licensee.

If your radio equipment fails to operate properly, or you wish to have your mobile programmed, contact your authorized dealer or RITRON's Repair Department.

RITRON, INC.

Repair Department
505 West Carmel Drive
Carmel, IN 46032 USA
Phone: 317-846-1201
FAX: 317-846-4978
Email: ritron@ritron.com

STANDARD FEATURES

- 16 RECEIVE/TRANSMIT CHANNELS
- FEATURES PROGRAMMABLE ON A PER CHANNEL BASIS (BY YOUR DEALER OR THE FACTORY):
 - Channel Scanning (Normal/Priority)
 - Tone Coded Squelch (Quiet Call)
 - Digital Coded Squelch (Digital Quiet Call)
 - Paging Decode (Paging Quiet Call)
 - Transmitter Time-out Timer
 - Special Features (including TX Busy and Monitor Lock Out)
- HIGH PERFORMANCE RECEIVER
- LONG RANGE TRANSMITTER
- EASY-TO-READ DIGITAL DISPLAY
- TRANSMIT/CHANNEL BUSY INDICATOR
- ON-HOOK PUSH-BUTTON MONITORING
- PUSH-BUTTON CHANNEL SELECTOR
- ROTARY ON-OFF/VOLUME CONTROL
- COMPACT SIZE (2 1/8" H X 5 3/4" W X 7 3/8" L)
- RUGGED "UNI-BODY" ALUMINUM CASE
- LOW DISTORTION MICROPHONE WITH COIL CORD
- MODULAR MICROPHONE CONNECTOR
- HIGH VOLUME FRONT-FACING SPEAKER
- EXTERNAL SPEAKER JACK
- RADIO MOUNTING BRACKET AND HARDWARE
- MICROPHONE HANG-UP CLIP AND HARDWARE
- +12 VDC POWER CABLE WITH IN-LINE FUSE
- LIMITED ONE YEAR FACTORY WARRANTY

ACCESSORIES

Several accessories appear below. Contact your dealer or RITRON for other available items.

<u>ITEM NO.</u>	<u>DESCRIPTION</u>
RM-5TT	Hand Microphone with 12-button Touch Tone Keypad
RM-4	Hand Microphone, replacement
RM-6	Desktop microphone
RSP-5	External Speaker with 10 ft. cord, 3.5 mm plug
OPT-TIR	Trunking Interface Ready Option
RPM-150-M	VHF Mobile Radio, 12.5 KHz synthesizer spacing
RPM-450-A	UHF Mobile Radio, operates on optional 470 to 490 MHz sub-band
RPM-450-B	UHF Mobile Radio, operates on optional 490 to 512 MHz sub-band
RPMK-12	Installation Kit for RPM radio, Includes: 1) 1 - Mobile radio mounting bracket 2) 1 - 12 VDC power cable with in-line fuse 3) 1 - Microphone hang-up clip 4) Hardware and installation instructions
RPM-MRM-A	RPM-150/450 Maintenance/Repair/Operating Manual
RPM-MRM-050	RPM-050 Maintenance/Repair/Operating Manual

Factory programming of channels, codes and features is also available.

RADIO CONTROLS - GENERAL

ON-OFF/VOLUME CONTROL

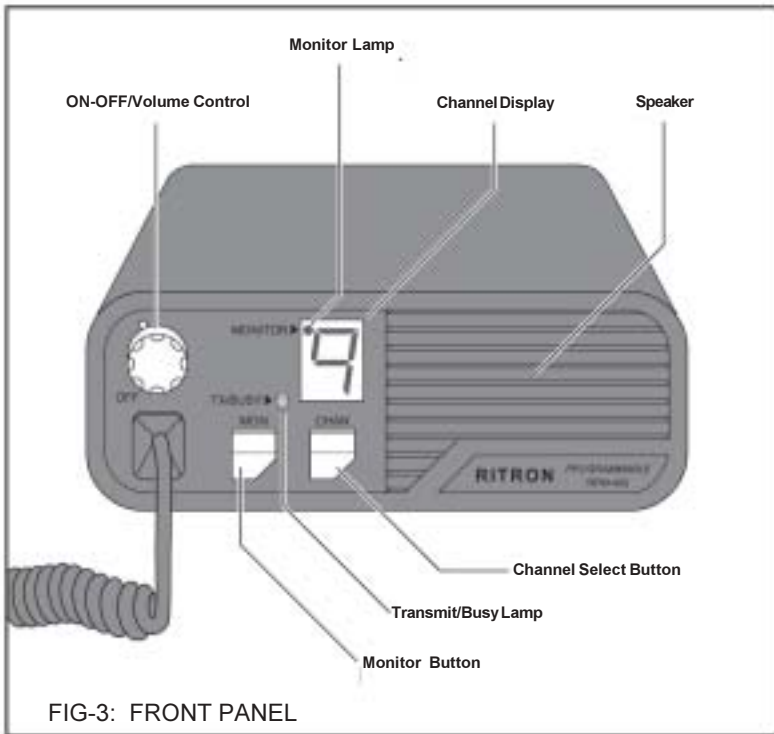
The on-off/volume control knob switches the unit on and off, and adjusts volume.

CHANNEL DISPLAY

This digital display indicates the channel number or scan list.

CHANNEL SELECT BUTTON

With the radio in operating mode, pressing and releasing the channel button advances the display to the next programmed channel. Holding down the channel button while toggling the monitor button moves the channel display backward.



SPEAKER

An internal speaker is mounted behind the front panel. An external speaker may be plugged into the rear panel jack, which disconnects audio to the front speaker.

RADIO CONTROLS - GENERAL

MONITOR BUTTON

For channels programmed with Quiet Call, pressing and releasing the monitor button toggles monitoring on and off. (The microphone must be on-hook.) Monitoring lets you hear all radio traffic on the channel. With monitoring off, you hear only radios that transmit your Quiet Call code. (If the monitor button does not work as described here, refer to the monitor section on page 13.)

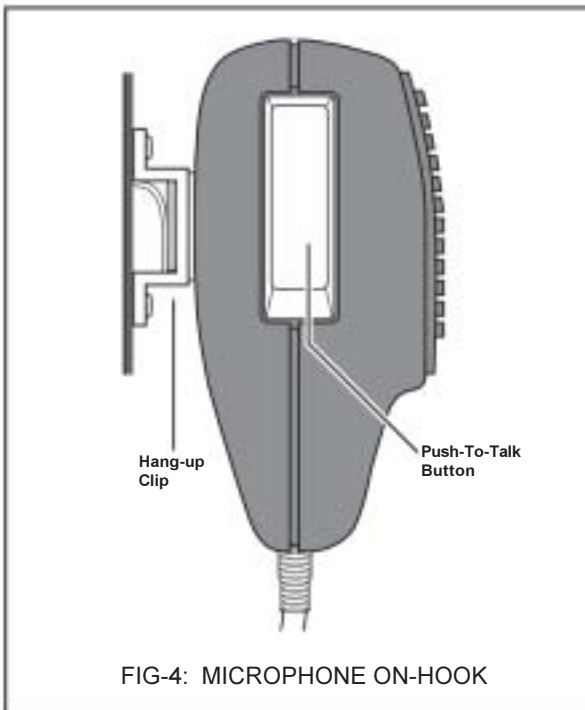
Pressing and holding the monitor button for about two seconds turns off all squelch. Then ALL signals on the channel AND the noise between broadcasts is heard.

MONITOR LAMP (GREEN)

The monitor lamp (see FIG-3 at left) lights when the unit is in monitor mode.

MICROPHONE HANG-UP

The microphone hang-up controls squelch and monitor functions, through a hook-switch circuit inside of the microphone. The microphone is ON-HOOK when it is in its hang-up clip, as shown below. The microphone is OFF-HOOK when it is out of its hang-up clip.



RADIO CONTROLS - GENERAL

PUSH-TO-TALK

Pressing the microphone Push-To-Talk (PTT) activates the radio transmitter. Refer to FIG-4, page 9. Talk into the microphone while holding down the PTT.

TX/BUSY LAMP (RED)

The transmit/busy lamp flashes if the channel is in use, and stays lighted while the transmitter is on.

MICROPHONE PLUG-IN

The microphone cord is connected to the radio front panel via a modular plug. When you insert the plug, align it as shown below. The cord may be removed by pressing up on the underside of the rubber cover to unseat the plug's lock-tab. The cover is attached to the plug and should not be pulled off.

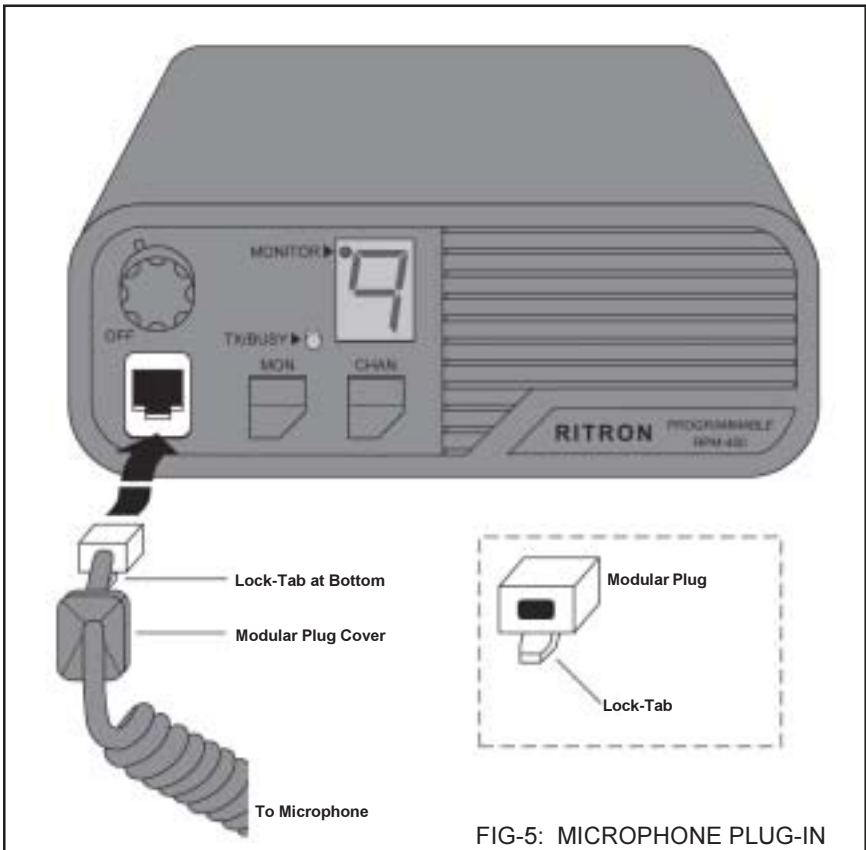


FIG-5: MICROPHONE PLUG-IN

OPERATION

WHAT THE RADIO TONES MEAN

The RITRON RPM mobile responds to certain instructions by sounding a tone or series of tones. These tones can tell you whether the radio is working as you expect.

POWER ON/SELF CHECK "OK"

Switch on the radio by rotating the on-off/volume knob clockwise out of the "click" position. The mobile then runs a quick "self test." When the internal system checks verify basic operation, a brief tone sounds that means the radio is ready to use.

ERROR TONES

However, if the self test detects a diagnostic error, an error tone sounds. One low-pitched tone means that the radio microcontroller is not working as it should. Alternating tones (the second is lower pitched) indicate that the radio frequency synthesizer is malfunctioning. If you get one of these messages, turn off the radio and try again. If the problem continues, consult an authorized RITRON service facility or the RITRON Repair Department.

Repeating error tones occur if you press the microphone Push-To-Talk button while a "Receive Only" channel is selected. The radio will not transmit because a "Receive Only" channel does not contain a transmit frequency. The error tone repeats until you release the PTT.

One low tone sounds and the transmitter automatically shuts off if you hold the PTT down continuously for a specified time (normally, 3 minutes). This transmitter time-out feature may be turned off or adjusted by authorized service personnel.

CHANNEL SELECTION

The RPM mobile provides 16 channels, each of which may be "dealer or factory" programmed. The first ten channels appear on the channel display as 0 through 9. The next six channels are A through F (with b, c and d shown as lowercase letters).

You can move forward or backward through the channels. Pressing and releasing the channel button advances the digital display to the next programmed channel (any empty channels are skipped). Pressing and holding the channel button while toggling the monitor button decreases the channel number. Each time you select a channel, the radio emits a short tone, providing an audible marker. Additionally, when the channel number "rolls-over" from the highest to the lowest programmed channel number, a "double tone" sounds. This allows you to select channels without looking at the radio (useful if the mobile is installed under the driver's seat).

OPERATION

OPERATING MODES

You can hear calls with the RPM mobile in receive mode, and broadcast your voice with the radio in transmit mode.

RECEIVE

The radio can receive broadcasts while the microphone Push-To-Talk button is not being pressed. Whether or not you hear these broadcasts depends upon the volume and squelch settings.

You can set the volume as follows. Press and release the channel select or monitor button while adjusting the volume, using the tones as a reference.

- SQUELCH
-

HOW TO:

SQUELCH NOISE - the mobile automatically squelches noise.

SQUELCH ALL ON-CHANNEL TRANSMISSIONS EXCEPT THOSE CARRYING YOUR QUIET CALL CODE - hang up the microphone.

Squelch mutes the speaker so that interference from licensees outside of your network or background noise does not bother the user.

There are two types of squelch used in RITRON mobiles. First is carrier squelch, which quiets the speaker if no on-channel transmissions strong enough for the radio to detect are present. This eliminates noise. Second is Quiet Call (coded) squelch. This silences the speaker unless the unit detects an incoming message that carries the same Quiet Call code as programmed for the channel.

When a radio frequency is shared by several licensees in an area, coded squelch keeps other licensees' transmissions from disturbing the users in your network. When any user lifts his microphone from its hang-up clip, coded squelch is turned off and he can hear all radio traffic on the channel, similar to a telephone "partyline." (This is true unless the channel is programmed with the Channel Monitor Lock Out feature; for more information, see page 18.)

OPERATION

- MONITOR
-

HOW TO:

*HEAR ALL ON-CHANNEL TRANSMISSIONS WITHIN RANGE -
take the microphone off-hook OR press the monitor button.*

Monitoring lets you hear all communications on the channel. If the channel is programmed with coded squelch, you can monitor by taking the microphone out of its hang-up clip (off-hook). Or, leave the microphone in its clip (on-hook) and use the monitor button.

The monitor button can be factory or dealer programmed to operate in different ways. To determine which operating option is programmed for your radio, perform this test (the microphone must be on-hook): 1) Select a standard transmit and receive channel that is not programmed with Paging Quiet Call or Channel Monitoring Lock Out, 2) Press and release the monitor button, 3) Press and release again.

If each time you pressed the monitor button you heard two tones, the RPM mobile is programmed for Momentary monitor operation. If you heard one tone and then two tones, or vice versa, the radio is programmed for Toggle monitor operation. (This completes the test.)

Momentary operation means that you must press and hold the monitor button to hear all broadcasts on the channel. Release this button to stop monitoring.

With Toggle operation, press and release the monitor button to alternate between coded squelch and monitoring.

Monitoring A Quiet Call Equipped Channel

TOGGLE MONITOR OPERATION - To monitor a channel programmed with QC (Quiet Call) squelch, press and release the monitor button until you hear two beeps. Then, you can hear all radio traffic on the channel until you press the monitor button again (one beep sounds) to resume Quiet Call squelch.

MOMENTARY MONITOR OPERATION - To monitor a channel programmed with QC squelch, press and hold the monitor button. You will hear two beeps, followed by all transmissions on the channel. Release this button to stop monitoring.

Monitoring A Paging Quiet Call Equipped Channel

TOGGLE MONITOR OPERATION - To monitor a channel programmed with QC and PQC (Paging Quiet Call), press and release the monitor button until you hear three beeps. Then, you will hear all broadcasts on the channel.

OPERATION

If you press the monitor button again, one beep sounds. The radio will stay quiet unless paged, and will not detect incoming messages coded with the channel's assigned QC code unless you press the PTT. This allows you to answer a page and carry on a two-way conversation with the caller who transmits your QC code.

After being paged, the radio must be reset to receive another page. To do this, press and release the monitor button until one beep sounds.

Pressing the monitor button again causes the radio to sound two beeps. Then, QC coded calls meant for you will be heard. If the radio receives a page, it will sound an alert tone. You will be able to hear and reply to QC messages without missing a page.

MOMENTARY MONITOR OPERATION - To monitor a channel programmed with PQC, press and hold the monitor button. Three beeps will sound. You will hear any broadcasts on the channel until you release the monitor button. Then, only QC coded calls meant for you will be heard.

The radio will sound alert tones if paged, regardless of the squelch status. However, anytime you press the monitor or PTT button, or receive a page, PQC squelch is disabled. In order to quiet the radio until it is paged, switch to another channel and then back, or turn the radio off and then on.

When you push the monitor button and two beeps sound, you will not hear pages, but will hear calls that carry your QC code.

NOTE: Earlier model RPM radios do not sound multiple beeps when you change the monitor mode. Also, Quiet Call squelch is automatically turned on when a channel is selected.

TRANSMIT

Before transmitting, make sure that someone is not already talking on the channel. Check the transmit/busy lamp, which flashes if the channel is busy. This occurs regardless of any code signaling programmed. Normally, you should not transmit until the channel is clear.

To transmit, take the microphone off-hook. Then press and hold the microphone PTT (Push-To-Talk) button and talk, with the microphone two or three inches away. Speak in a normal tone, since talking louder will not improve the listener's reception. Pressing the PTT button activates the transmitter and lights the transmit/busy lamp.

However, pressing the PTT does not activate the transmitter, but produces error tones instead if: 1) the channel is "Receive Only" (does not contain a transmit frequency), or 2) the channel is programmed with the Busy Channel Transmit Inhibit feature and an incoming broadcast is present on the channel.

OPERATION

PROGRAMMABLE OPTIONS

IMPORTANT: If you want to have any programming changes made, contact your RITRON dealer. Only authorized service personnel can program your RPM mobile radio.

RITRON's mobile radio may be operated with options that are programmed on a per channel basis, including Quiet Call signaling, scanning and special features.

QUIET-CALL CODE SIGNALING

HOW TO:

TURN ON QUIET CALL SQUELCH - hang up the microphone.

TURN OFF QUIET CALL SQUELCH - take the microphone off-hook or, press and release the monitor button.

TURN OFF QUIET CALL TRANSMIT - program the channel accordingly.

Code signaling allows radios to screen out transmissions from other systems on the channel. RITRON's mobile comes from the factory capable of operation with three communications industry standard signaling formats, including Quiet Call (QC), Digital Quiet Call (DQC) and Paging Quiet Call (PQC). Throughout this manual, "Quiet Call" refers to the entire family of RITRON signaling formats (QC, DQC and PQC), unless specified otherwise.

- QUIET-CALL (QC)

Quiet Call is RITRON's tradename for what the communications industry calls sub-audible tone, tone squelch or CTCSS (Continuous Tone Coded Squelch System).

Your group can use a unique Quiet Call code to avoid the bother of "radio traffic" from other licensees. Units with Quiet Call squelch turned on stay quiet unless they detect the appropriate code on a broadcast.

QC (Quiet Call) channels automatically transmit a code with your voice when you press the microphone PTT. This allows users in your QC group whose radios are set for coded squelch to hear your messages. Note that other nearby licensees on your channel can also hear your calls, unless they are using another code.

OPERATION

- DIGITAL QUIET CALL

Digital Quiet Call is RITRON's tradename for digital coded squelch. DQC works the same as QC, except that a digital code is applied to the broadcast. Radios programmed with the correct code "recognize" the incoming broadcast and allow the message to be heard.

- PAGING QUIET CALL

General

Paging Quiet Call (PQC) is RITRON's tradename for its selective paging system. Each radio or group of radios may have a unique PQC code. Any channel that contains an operating frequency can be programmed with one of these codes. (A channel programmed with PQC may also contain a QC code.) With a PQC channel selected and coded squelch on, the radio stays quiet until it receives the correct PQC code. A ringing tone announces an incoming call.

Each Paging Quiet Call code is broadcast as a unique pair of audible tones, with the first tone sent for one second, and the second tone for two seconds. PQC codes can be originated by a base station paging encoder, a telephone (via a RITRON RR-454 Repeater Plus/RP-200 system), or a RPM mobile equipped with a Touch Tone hand microphone.

The All-Call Code

Radios operated with PQC respond to a special All-Call code, as well as to their individual codes. This allows one page to be heard by all "PQC units" on the channel. The standard RPM mobile radio can transmit an All-Call page.

HOW TO:

Send An All-Call Page -

- 1) Select a channel programmed with Paging Quiet Call.*
 - 2) Turn off the radio.*
 - 3) Press and hold the microphone PTT button while switching on the radio. Keep holding down the PTT. A continuous tone will sound.*
 - 4) Release the PTT when you hear alternating tones.*
 - 5) Hold down the PTT again and deliver your message.*
-

OPERATION

SCANNING (NORMAL/PRIORITY)

HOW TO:

SCAN - hang up the microphone and select the channel that contains your scan list.

STOP SCANNING - take the microphone off-hook or, change channels.

- GENERAL

Scanning automatically lets you listen to broadcasts on different radio channels (frequencies). The channels to be scanned are kept in a "scan list." This list is stored in a radio channel. **A channel cannot hold both a scan list and a radio frequency.**

- HOW SCANNING WORKS

When you select a channel that contains a scan list (and the microphone is on-hook), the radio displays the channel number, pauses, sounds a tone, and then scans, displaying each channel of the scan list in turn. Channels are scanned in the order that they were programmed into the list. When a broadcast is received on a channel being scanned, scanning stops to let you hear communications on that channel. Scanning resumes when the transmission ends.

The microphone must be in its hang-up clip for scan to work. If you lift the microphone from its hang-up clip OR press the channel button, scanning stops. (Whether scanning stops on the last active channel or on the priority channel is dealer-programmable.) If you select a channel that contains a scan list and the microphone is off-hook, the radio skips to the next channel.

Using the monitor button does not interrupt scanning. Additionally, if you take the microphone off-hook to stop scanning or to transmit, scanning resumes when you return the microphone to its clip.

If the radio is scanning and you want to know which channel received the last broadcast, move the channel selector slowly through the channels. When the last active channel is selected, the radio emits a "triple beep."

- PRIORITY SCANNING

Priority scanning lets you monitor other channels without missing a call on your priority channel, which the radio periodically checks for activity even when scanning has stopped on another channel. Priority scanning works only if the scan list programmed is a Priority Scan List, not a Normal Scan List.

OPERATION

- **BUSY CHANNEL DELETE**

If a channel in the scan list is so busy that you want to temporarily delete that channel from the list, press the monitor button while scanning is stopped on the channel to be deleted. (The priority channel in a Priority Scan List is an exception, and cannot be removed.) The monitor status will not change. The deleted channel will be skipped in the scan list until you switch channels. You may delete more than one channel in the list.

SPECIAL FEATURES

- **RECEIVER SQUELCH TIGHTNER FACTOR**

This feature reduces distant "co-channel" or other interference for channels that are not programmed with Quiet Call. Carrier squelch is set for maximum sensitivity at the factory, but can be adjusted to mute weak radio signals.

- **CHANNEL MONITOR LOCK OUT**

This function can be programmed to prevent a radio user from listening to other licensees on a shared channel. The transmit/busy lamp indicates whether the channel is busy. Quiet Call or Digital Quiet Call must be used with this option.

- **BUSY CHANNEL TRANSMIT INHIBIT**

Busy Channel Transmit Inhibit keeps the radio from broadcasting if the channel is busy, and is often used with Channel Monitor Lock Out. If you press the microphone PTT while the channel is busy with a signal not intended for your radio (not carrying your Quiet Call code), the Busy Channel Transmit Inhibit feature sounds a "busy" tone in the speaker and keeps the transmitter off.

- **REDUCED TRANSMIT POWER**

This feature allows for reduced transmitter power on individual channels, which might be required by some FCC licenses.

- **PAGING QUIET-CALL TRANSPOND**

If you receive a page and do not answer within three seconds, this feature automatically activates your radio's transmitter and sends an acknowledgement tone to the calling party.

OPERATION

- SPECIAL FEATURES STANDARD SETTINGS

Unless programmed otherwise, special features are as follows:

<u>SPECIAL FEATURE</u>	<u>STANDARD SETTING</u>
Squelch Tightner Factor.	Maximum sensitivity
Channel Monitor Lock Out.	Off
Busy Channel Transmit Inhibit	Off
Reduced Transmit Power.	Off (Full power on)
Paging Quiet Call Transpond	Off

CUSTOMIZED OPERATION

Operating features may have been factory or dealer customized as requested by the radio owner, causing the radio to operate differently than outlined in this manual. Consult your dealer about optional features.

WRITE DOWN YOUR CHANNEL CONTENTS

Use the work sheet on the back page of this manual to keep track of the channel contents (operating frequencies, codes, etc.) programmed for each channel. Only authorized service/maintenance personnel can determine channel contents. Your dealer (or the licensee, if you don't own the radio) can provide this information and explain any special features programmed.

TROUBLESHOOTING

If you have trouble operating the radio, review the radio controls and operation sections. If you think the unit is malfunctioning, check the table below.

<u>Problem</u>	<u>Possible Solutions</u>
GENERAL	
Front panel lamps do not light.	Replace the DC power cable fuse. The DC cable is not properly connected. (Refer to the Mobile Radio Installation Guide: RITRON pub. no. 01454928.)
Reception is poor.	Move to a different location. (See note 1 on page 22.) The antenna is installed incorrectly - see the antenna installation guide. The antenna is damaged.
Noise or "hiss" sounds in the radio.	Press and release the monitor button. (Note 2.)
You cannot hear calls from other radios.	Press and release the monitor button. (Note 2.) Be certain that your radio receives on the same frequency as the caller transmits. (Note 3.)
Your calls cannot be heard in other radios.	Make sure that your radio transmits on the receive frequency of the radio(s) you want to call. (Note 3.)
ERROR TONES	
An error tone sounds when the radio is first switched on.	See page 11, "Error Tones."
Repeating tones occur when you press the PTT button.	The channel is "Receive Only," or the TX Inhibit feature is on. (Note 4.)
An error tone sounds while you are talking (and the transmitter shuts off).	See page 11, "Error Tones."

TROUBLESHOOTING

<u>Problem</u>	<u>Possible Solutions</u>
QUIET CALL (QC, DQC AND PQC)	
You cannot screen out calls from users outside of your Quiet Call group.	Hang up the microphone. Toggle the monitor button to select Quiet Call (coded) squelch. (Note 2.) Make sure that the channel is programmed with Quiet Call.
You cannot hear Quiet Call messages while in Quiet Call (coded) squelch.	Confirm that the channel is programmed to detect the same code as the calling radio(s) transmits. (Note 5.)
Others in your Quiet Call group cannot hear your Quiet Call messages.	Verify that you transmit the same code as the radio(s) you call are programmed to detect. (Note 5.)
You cannot turn off Quiet Call squelch while the microphone is on-hook.	If toggling the monitor button does not work, press and hold this button. The way the monitor button works is dealer-programmable. (Note 2.)
ALL-CALL PAGE (PAGING QUIET CALL)	
You cannot hear a Paging Quiet Call All-Call page while in coded squelch.	Make sure that the channel is programmed with a PQC code.
Other PQC (Paging Quiet Call) units cannot hear your All-Call page.	Confirm that the channel selected when you send a page is programmed with a PQC code. Make sure that you follow the All-Call page instructions on page 16.

TROUBLESHOOTING

Notes

- 1) Reception can often be improved by moving a short distance. The strength of a radio broadcast and therefore its coverage is decreased by distance and obstructions (natural and man-made). This includes hills, valleys, foliage, buildings, basements and other metal or concrete structures. The best range and coverage is obtained across flat terrain, with line-of-sight visibility and no obstructions.
- 2) If the radio speaker makes a continuous rushing noise, press and release the monitor button to activate carrier squelch. Otherwise, this button toggles Quiet-Call (coded) squelch on and off.

If pressing and releasing this button does not toggle Quiet Call squelch on and off, the radio has been dealer or factory programmed for optional monitor operation. In this case, pressing and holding the monitor button will turn off Quiet Call squelch and allow you to monitor the channel. Quiet Call squelch automatically resumes when you release the monitor button.

- 3) If you want to hear a call, you must select a channel that is programmed to receive the caller's transmit frequency. If you want to call another unit, you must select a channel that is programmed to transmit the other radio's receive frequency. However, if you use a repeater, your channel must be programmed to work with the repeater's transmit and receive frequencies. (A channel can hold two separate radio frequencies, one for receive, the other for transmit.)
- 4) If you get repeating error tones when you press the PTT, the channel might be programmed for "Receive Only." If so, the channel does not contain a transmit frequency, and cannot be used to transmit. Repeating tones will sound if the Busy Channel Transmit Inhibit feature is activated and another user's radio signal is present on the channel.
- 5) In order for radios to communicate using Quiet Call, they must be programmed with the same Quiet Call code. Each code is unique, and your radio will respond only to the code programmed for the channel selected. Note that a channel may have been programmed to transmit one code, and receive (detect) another code.

RITRON, INC. LIMITED WARRANTY

WHAT THIS WARRANTY COVERS

RITRON, INC. ("RITRON") provides the following warranty against defects in materials and/or workmanship in **RITRON Brand Mobile Radios and Accessories** under normal use and service during the applicable warranty period (as stated below). "Accessories" means antennas, speakers, microphones, and items contained in the programming and installation kits.

<u>WHAT IS COVERED</u>	<u>FOR HOW LONG</u>	<u>WHAT RITRON WILL DO</u>
PATRIOT Mobile Radios	* 1 year	During the first year after date of purchase, RITRON will repair or replace the defective product, at RITRON's option, parts and labor included at no charge.
Accessories	* 90 days	* After date of purchase

WHAT THIS WARRANTY DOES NOT COVER

- Any technical information provided with the covered product or any other products;
- Installation, maintenance or service of the product, unless this is covered by a separate written agreement with RITRON;
- Any products not furnished by RITRON which are attached or used with the covered product, or defects or damage from the use of the covered product with equipment that is not covered;
- Defects or damage, including broken antennas or microphones, resulting from:
 - misuse, abuse, improper maintenance, alteration, modification, neglect, accident or act of God,
 - the use of covered products other than in normal and customary manner or,
 - improper testing or installation;
- Defects or damages from unauthorized disassembly, repair or modification, or where unauthorized disassembly, repair or modification prevents inspection and testing necessary to validate warranty claims;
- Defects or damages in which the serial number has been removed, altered or defaced.

IMPORTANT: This warranty sets forth the full extent of RITRON's express responsibilities regarding the covered products, and is given in lieu of all other express warranties. What RITRON has agreed to do above is your sole and exclusive remedy. No person is authorized to make any other warranty to you on behalf of RITRON. Warranties implied by state law, such as implied warranties of merchantability and fitness for a particular purpose, are limited to the duration of this limited warranty as it applies to the covered product. Incidental and consequential damages are not recoverable under this warranty (this includes loss of use or time, inconvenience, business interruption, commercial loss, lost profits or savings).

(WARRANTY CONTINUED ON THE NEXT PAGE)

RITRON, INC. LIMITED WARRANTY

(WARRANTY CONTINUED FROM THE PREVIOUS PAGE)

Some states do not allow the exclusion or limitation of incidental or consequential damages, or limitation on how long an implied warranty lasts, so the above limitations or exclusions may not apply to you. Because each covered product system is unique, RITRON disclaims liability for range, coverage, or operation of the system as a whole under this warranty.

WHO IS COVERED BY THIS WARRANTY

This warranty is given only to the purchaser or lessee of covered products when acquired for use, not resale. This warranty is not assignable or transferable.

HOW TO GET WARRANTY SERVICE

To receive warranty service, you **MUST** deliver or send the defective product, delivery costs and insurance prepaid, within the applicable warranty period, to RITRON, INC., 505 West Carmel Drive, Carmel, Indiana 46032, Attention: Warranty Department. Please point out the nature of the defect in as much detail as you can. **You MUST retain your sales or lease receipt (or other written evidence of the date of purchase) and deliver it along with the product.** If RITRON chooses to repair or replace a defective product, RITRON may replace the product or any part or component with reconditioned product, parts or components. Replacements are covered for the balance of the original applicable warranty period. All replaced covered products, parts or components become RITRON's property.

RIGHTS TO SOFTWARE RETAINED

Title and all rights or licenses to patents, copyrights, trademarks and trade secrets in any RITRON software contained in covered products are and shall remain in RITRON. RITRON nevertheless grants you a limited non-exclusive, transferable right to use the RITRON software only in conjunction with covered products. No other license or right to the RITRON software is granted or permitted.

YOUR RIGHTS UNDER STATE LAW

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

WHERE THIS WARRANTY IS VALID

This warranty is valid only within the United States, the District of Columbia and Puerto Rico.

RITRON MODEL: _____ SERIAL NUMBER: _____

CHAN	RECEIVE (RX) FREQUENCY	TRANSMIT (TX) FREQUENCY	QC CODE RX/TX	PQC CODE RX/TX	DQC CODE RX/TX	SCAN LIST (Add a "P" for Priority, "N" for Normal) -OR- SPECIAL FEATURES
0						
1						
2						
3						
4						
5						
6						
7						
8						
9						
A						
b						
c						
d						
E						
F						



WARRANTY REGISTRATION CARD

Company Name _____ Contact Name _____

Street Address _____

City _____ State _____ Zip _____

Phone No. _____ Fax No. _____

Email _____ Radio Model No. _____

Place of Purchase _____ Purchase Price _____

YOUR APPLICATION: Construction Nursery
 Electrical Contractor Warehouse
 Sound/Security School
 Manufacturing Lodging/Hotel
 Farming Apartment/Condo Mgmt
 Wire/Cable Contractor Retail
 Hardware Other _____

Is this your first purchase of FM 2-way radios? Yes No

If no. is this purchase an: Add-on Replacement

If add-on or replacement, please specify existing brand(s); list all: _____

Tear along perforated line and mail your warranty registration card



IMPORTANT



DETACH AND MAIL

Place
1st Class
Stamp
Here

RITRON, INC.
Attn: Warranty Department
P. O. Box 1998
Carmel, IN 46082-1998

Tear along perforated line and mail your warranty registration card



IMPORTANT



DETACH AND MAIL

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