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RITRON®

WIRELESS SOLUTIONS

DMR HD-SERIES

OWNER'S MANUAL

MADE IN THE USA

Ritron Pub. 14500095B UPDATED VERSION 06/09/2025

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THANK YOU FOR CHOOSING RITRON

Congratulations on your purchase of the RQX DMR HD-Series Callbox. Your new radio is the culmination of RITRON's 45 years of designing, manufacturing, and supplying reliable, professional wireless communication products. Ritron wireless products will improve the operation, safety, and profitability of any organization by providing instant voice communications between employees throughout the workplace.

DMR HD-Series Callbox Models

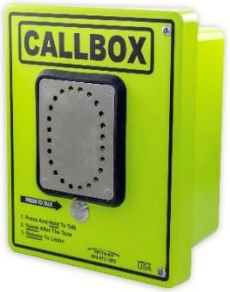
DMR HD-Series Models

RQX-417DMR-HD .....UHF DMR HD-Series Digital Callbox

RQX-417DMR-HD-KP .....UHF DMR HD-Series Digital Callbox with keypad

RQX-417DMR-HD-CANADA .....Canadian model UHF DMR HD-Series Digital Callbox

RQX-417DMR-HD-CANADA-KP .....Canadian model UHF DMR HD-Series Digital Callbox with keypad



DMR HD-Series Callbox

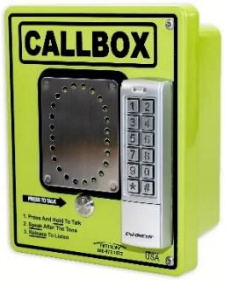
The DMR HD-Series callbox can be programmed to operate as a DMR digital voice two way radio. The DMR capability is contained in a piggy back board that connects perpendicular to the main board. The DMR HD-Series callbox is available in a standard model high visibility green enclosure.

The model number appears on the serial label located on the bottom of the DMR HD-Series Callbox enclosure.

UHF radios are designed to operate within the 20 MHz band between factory standard 450 to 470 MHz.

Advanced Features available with the DMR HD-Series models include DMR Decode, Voice Messages, Sensor Input, and a Relay Switch Closure.

DMR Digital Features are based on Color Codes and ID codes and perform similar functions as the analog addressing modes. The Ritron® PC Programmer will aid in set up of these features. Limited Field Programming of these features that does not require the use of the PC Programmer are detailed in the DMR HD-Series Field Programming section of this manual.



DMR HD-Series Callbox with Keypad

The Power supply to the DMR HD-Series callbox can be three internal D-cells batteries, an external 8 to 12 VDC input, or both**.** See the APPLYING POWER TO THE DMR HD-SERIES CALLBOX section of this manual for details on powering the DMR HD-Series callbox**.**

Optional Accessory Equipment

Several options are available for the Ritron® DMR HD-Series Callbox. These options, individually, or in combination with one another can greatly enhance the functionality of the callbox as well as the overall communication system. Available options include:

- **RPS-EXPO** - External Power kit for the DMR HD-Series Callbox. Requires use of the Ritron® 60101000 accessory cable included with the callbox.
- **RSS-100 -** The RSS-100 is a complete solar power supply system consisting of a 10-watt solar panel, charge controller and 8 AH rechargeable battery all housed in a rugged, ready-to-mount enclosure.
- **R-STROBE-DC -** The R-STROBE-DC is a powerful strobe light, giving a visual indication of a callbox in use. If used the DMR callbox must be externally powered.
- **RQX-PCPK-1 -** PC Programming kit, Software CD and radio-to-PC cable (5 pin USB to mini-USB, pn 60201119)
- **RQX-HDMK -** Mounting Plate, for Gooseneck Post or flat surface, stainless steel.
- **60201125 -** Cable, SMB to BNC connector. Cable permits retrofit use of external antenna. Does not include antenna.
- **RAM-45 -** Magnetic Mount Antenna 12 ft coaxial cable, BNC connector (requires cable # 60201125)
- **60101000 -** Cable, 6-conductor with Heyco strain relief. Brings connection points out of the callbox for the following: external power, relay control/activation, switch input features. This cable is included with the DMR-HD-Series callbox.
- **25107400 -** Torx Bit (hollow Point type), Replacement T-25 for DMR HD-Series tamper resistant fasteners.

For additional information and pictures of these items go to http://www.ritron.com/DMR HD-Series-callbox-dmr-digital and download pdf of the product brochure.

About the DMR HD-Series Callbox

The DMR HD-Series Callbox is a 2-way radio transceiver used to communicate directly with portable, mobile and stationary DMR digital radios; or through radio repeaters if programmed using the Ritron® PC Programming software. Each callbox is equipped with the following features or capabilities.

- **Field Programming.** Field programming allows you to quickly program your radio in the field without the need for a PC programmer. Each radio can be field programmed to one of 114 UHF channel table frequencies. DMR ID and Color Codes can also be field programmed.
- **Volume Level.** Field programmable or PC programmable to 20 – 100% volume level.
- **Normal or High Microphone Gain.** Field and PC programmable to Fixed or AGC microphone gain.
- **Battery Powered.** The DMR HD-Series Callbox can be powered by 3 D-cell Alkaline or Ni-MH batteries for 700mW transmit power. D-cell batteries can operate the radio for up to one year or 8,000 three second transmissions. When the callbox is used in a battery only application, the Auto Turn-Off feature should be enabled – this is a factory default setting.

- **Low Battery Alert.** The callbox will transmit an Alert Tone or voice message at the end of each transmission when the batteries approach end-of-life. This allows sufficient time for you to replace the batteries and assure uninterrupted service.
- **External Power 8 to 12 VDC Capable.** The DMR HD-Series Callbox can be powered by an external 8 to 12 VDC source. This method of powering the callbox allows the radio to remain **ON** at all times, like an intercom. Automatic Turn Off must be **DISABLED** via Field or PC programming for Intercom operation.
- **External Power Fail Alert.** This feature can be enabled via Field or PC programming. The callbox will transmit an Alert Tone or voice message if it detects loss of external DC power. The radio automatically continues to transmit an Alert Tone once every hour (unless programmed for Automatic Turn Off) until external DC is restored or the batteries are depleted.
- **High/Low Power Output.** When powered by External 8 to 12 VDC the DMR HD-Series callboxes will be transmitting at high power output (2W). When battery powered by 3 D-cells the DMR HD-Series callbox operates in Low power (700mW) mode exclusively.
- **"Automatic Turn-Off" or "Intercom" Operation.** The DMR HD-Series Callbox can operate in the standard "Automatic Turn-Off" mode (Factory Default), where the radio is normally **OFF** until the Call Button is pressed, or can be Field or PC programmed for "Intercom" operation where the radio is always **ON**. See "External Power 8 to 12 VDC Capable" feature above.
- **Voice Messages.** You can record custom voice messages that are played back during normal Callbox operation. Messages include Greeting, Voice Alert, Sensor status, Battery status, and External DC Power Fail.
- **Listen In.** Allows remote activation of the transmitter when a unique DMR ID code is received.
- **Sensor Turn-On.** When operating the Callbox with Automatic Turn-Off enabled, the unit can be configured to turn itself **ON** any time the Sensor Input is pulled **LOW** (ground). This allows an external switch closure to activate the Callbox. The callbox will remain on as long as the switch is closed.
- **Relay Switch Output.** The switch output is a simple 3-Amp relay contact closure that can be used to **OPEN** and **CLOSE** a gate, switch on a light, sound an alarm or any other application where remote control of an ON/OFF switch is required. The callbox can be programmed to **OPEN** and **CLOSE** the Switch Output with a DMR ID code.
- **Sensor Input.** The Callbox can be configured to send a warning tone or a pre-recorded voice message when a change in the Sensor Input is detected. The Sensor Input will respond to an **OPEN** or **CLOSED** switch. The unit must already be on to respond to a switch opening.

Operating the DMR HD-Series Callbox with Factory Default Settings

The DMR HD-Series Callbox Factory Default setting is with Automatic Turn-Off **ENABLED**. This means the callbox is **OFF** and will not receive a call until the callbox first initiates a call. When the callbox is used in a battery only application, the Auto Turn-Off feature should be Enabled.

In Automatic Turn Off mode the callbox automatically shuts off whenever there is "no activity" for a programmed number of seconds (10 second default). Activity keeping it awake is either the **ON/PTT** button activation or a received call.

To Initiate a Call

Press and hold the **ON/PTT** Button. Listen for the "beep", then, begin speaking. For best communication, the caller should be 3 feet or less from the callbox. The callbox can be programmed to send a unique **CALL TONE** to alert radio equipped personnel. This CALL TONE will also be heard at the callbox.

To Receive a Call

1. When you have finished speaking, release the **ON/PTT** Button.
2. Any reply will be heard through the callbox speaker. If a call is not received within 10 seconds of releasing the **ON/PTT** Button and there is no activity on the channel, the callbox will sound a low double tone and turn-off automatically. This automatic turn-off feature is designed to conserve battery life.

Operation Notes

The DMR HD-Series Callbox must be powered internally with Alkaline or Ni-MH batteries **ONLY.** The standard unit comes with a 3 D-cell holder. Ni-MH low self discharge (LSD) batteries are available online which offer a great rechargeable option. Alternatively, an external 8 to 12 VDC power supply can be used, order Ritron® model **RPS-EXPO** 110 VAC to 12 VDC cube power supply with ferrite clamp. When using an external supply, the internal D-cell batteries can be used as back-up. The unit will work with external voltages down to about 6 VDC but the power output will shift to the low power 700mW level when the voltage is too low.

Low Battery Alert

The callbox will transmit an Alert Tone at the end of each transmission when the batteries approach end-of-life. This allows sufficient time for you to replace the batteries and assure uninterrupted service. On DMR HD-Series Callboxes the LOW battery alert tone can be re-placed by a LOW battery voice message.

EXPOSURE TO RADIO FREQUENCY ENERGY

PLEASE NOTE THE FOLLOWING WITH REGARD TO RF EXPOSURE FOR THIS PRODUCT:

This product generates radio frequency (RF) energy when the PTT button on the front of the unit is depressed. This product has been evaluated for compliance with the maximum permissible exposure limits for RF energy at the maximum power rating of the unit. At the minimum expected separation distance and greater, the maximum RF exposure is at or below the General Population/Uncontrolled limits. This minimum separation distance is 20 cm in the US and 23 cm in Canada. Operator should stay at least that distance away from call box. External antennas have not been tested for compliance and may or may not meet the exposure limits at the distances given. Higher gain antennas are capable of generating higher fields in the strongest part of their field and would, therefore, require a greater separation from the antenna. They can be mounted higher than the call box which will increase the operator's separation from the antenna. This product is not to be used by the general public in an uncontrolled environment unless compliance with the Uncontrolled/General Population limits for RF exposure can be assured.

To limit exposure to RF energy to levels below the limit, please observe the following:

- DO NOT activate the transmitter when not actually wishing to transmit.
- When transmitting, make certain that the distance limits for the particular model in use are observed.
- DO NOT allow children to operate the radio.

When used as directed, this series of radios is designed to comply with the FCC's RF exposure limits for "Uncontrolled/General Population". In addition, they are designed to comply with the following Standards and Guidelines:

- United States Federal Communications Commission, Code of Federal Regulations; 47 CFR §§ 2 sub-part J.
- American National Standards Institute (ANSI) / Institute of Electrical and Electronic Engineers (IEEE) C95. 1-1992.
- Institute of Electrical and Electronic Engineers (IEEE) C95.1-1999 Edition.

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VEUILLEZ NOTER CE QUI SUIT CONCERNANT L'EXPOSITION AUX RF POUR CE PRODUIT:

Ce produit génère de l'énergie radiofréquence (RF) lorsque le bouton PTT situé à l'avant de l'appareil est enfoncé. Ce produit a été évalué pour vérifier sa conformité aux limites d'exposition maximales autorisées pour l'énergie RF à la puissance nominale maximale de l'appareil. À la distance de séparation minimale prévue et au-delà, l'exposition maximale aux RF est égale ou inférieure aux limites de la population générale/non contrôlée. Cette distance minimale est de 20 cm aux États-Unis et de 23 cm au Canada. L'opérateur doit se tenir à une distance minimale de cette distance de la cabine téléphonique. Les antennes externes n'ont pas été testées pour leur conformité et peuvent ou non respecter les limites d'exposition aux distances indiquées. Les antennes à gain plus élevé sont capables de générer des champs plus élevés dans la partie la plus forte de leur champ et nécessiteraient donc une plus grande séparation de l'antenne. Ils peuvent être montés plus haut que la cabine d'appel, ce qui augmentera la distance entre l'opérateur et l'antenne. Ce produit ne doit pas être utilisé par le grand public dans un environnement non contrôlé, à moins que le respect des limites d'exposition aux RF pour la population générale/non contrôlée puisse être assuré.

Pour limiter l'exposition à l'énergie RF à des niveaux inférieurs à la limite, veuillez respecter les points suivants:

- N'activez PAS l'émetteur lorsque vous ne souhaitez pas réellement transmettre.
- Lors de la transmission, assurez-vous que les limites de distance du modèle particulier utilisé sont respectées.
- NE PAS laisser les enfants utiliser la radio.

Utilisée conformément aux instructions, cette série de radios est conçue pour respecter les limites d'exposition aux radiofréquences de la FCC pour la population générale. De plus, elle est conçue pour respecter les normes et directives suivantes:

- Commission fédérale des communications des États-Unis, Code of Federal Regulations ; 47 CFR §§ 2 sous-partie J.
- Institut national américain de normalisation (ANSI) / Institut des ingénieurs électriciens et électroniciens (IEEE) C95. 1-1992.
- Institut des ingénieurs électriciens et électroniciens (IEEE) Édition C95.1-1999.

Association de l'industrie des télécommunications

APPLYING POWER TO THE DMR HD-SERIES CALLBOX

The DMR HD-Series Callbox may be powered by:

1. 3 internal D-cell batteries for 700mW operation.
   - Powering the callbox with batteries will allow for an installation that does not require wiring to an external source of power.
   - When the callbox is used in a battery only application, the Auto Turn-Off feature should be Enabled – this is the Factory Default setting.
2. An external 8 to 12 VDC (Use Ritron® pn RPS-EXPO) source for 2W operation.
   - Powering the callbox by an external source will allow the unit to remain in **Always-ON mode**, like an intercom*. Be advised that battery only operation is not suitable for Always-On mode.
   - Internal batteries can be installed as back-up in the event that external power is lost.

To extend battery life, one of two battery saver options may also be used. See **"**POWER MANAGEMENT OPTIONS".

* Automatic Turn Off must be **DISABLED** via Field or PC Programming.

Using Internal Batteries

Batteries may be installed in the internal battery holder for a no trenching, no wires required installation. If internal batteries are used, a LOW battery alert tone will be transmitted when the battery voltage drops below a programmed value. The LOW battery tone notifies personnel that the batteries should be replaced. On DMR HD-Series Callboxes the LOW battery alert tone can be replaced by a LOW battery voice message.

IMPORTANT! When installing D-cell batteries be sure all are the same, and are all new cells. DO NOT mix new and used batteries.

Alkaline D-cells are readily available in department stores. Alternatively, low self-discharge (LSD) nickel-metal hydride rechargeable can be ordered online. The advantage of the LSD NiMH is they can be reused, have a lower internal resistance and sustain good voltage over the battery life. If operating at very cold temperatures NiMH may be considered. A smart charger will also be needed with the rechargeable. The DMR HD-Series callbox can draw about 0.7 Amp when transmitting so battery health is important.

DMR HD-Series Battery Installation

1. Using the T-25 Torx bit included with the radio, loosen the two corner screws on the case front and open the hinged case.
2. Disconnect the power cable connecting the battery holder to the radio.
3. Install 3 new D-cell batteries into the battery holder. Be sure to observe polarity as indicated.
4. Re-connect the power cable.
5. Close the hinged case front and secure with the two corner screws. Be sure power cable is in the area below the battery holder and is not pinched between the case halves.

Using External +12 VDC Power with Battery Back-up

Note: An additional hole, strain relief, and conduit will need to be installed into the callbox. Refer to the CONNECTING TO THE HD ACCESSORY CABLE section of this manual for details.

The unit may be powered by an external source of 8 to 12 VDC. This source should be filtered, with minimum noise and hum, and capable of supplying at least 1 Ampere.

Factory Default programming of the callbox is optimized for battery power operation. The External 8 to 12 VDC Power Fail Alert option is **NOT ENABLED**.

It is recommended that if an external source of power is used, that the internal batteries be installed as a back-up against loss of power. If this option is chosen, we recommend that the "External Power Fail Alert" feature be **ENABLED** via Field or PC programming.

For External +12 VDC power, order Ritron model **RPS-EXPO** 110 VAC to 12 VDC cube supply.

How the Callbox will operate:

If External 8 to 12 VDC Power Fail Alert Feature is NOT ENABLED:

- LOW battery detection can only occur when the external voltage is removed or failed.
- Radio will only check for LOW battery or DEAD battery condition when the radio is **ON**.
- If LOW battery is detected, a single LOW battery alert tone will be transmitted at the end of the transmission.
- Radio does **NOT** automatically transmit a LOW battery alert tone. The callbox must be **ON** and the Alert tone is only sent at the end of a transmission.
- If DEAD battery is detected, the radio ceases all operation. A DEAD battery tone is heard on the callbox speaker and the radio will turn **OFF**.
- On DMR HD-Series callboxes the LOW battery alert tone can be replaced with a LOW battery voice message.

If External 8 to 12 VDC Power Fail Alert Feature is ENABLED:

- Radio always checks for External voltage when the radio is **ON**. If loss of external voltage is detected while the radio is in standby: *a single Alert Tone will be transmitted immediately.*
- If loss of external voltage is detected while the radio is in receive: *a single Alert Tone will be transmitted after the received message is complete*.
- If loss of external voltage is detected while the radio is in transmit: *a single Alert Tone will be transmitted at the end of the transmission.*
- Once loss of external voltage is detected and the Alert Tone is transmitted, the radio will automatically send the Alert Tone once every hour until external voltage is restored or the batteries are exhausted. If radio is set for Automatic Turn-Off (default setting) this hourly alert will **NOT** occur.
- If Dead battery is detected the radio ceases all operation, a DEAD battery tone is heard on the callbox speaker and the radio will turn **OFF**.
- On DMR HD-Series callboxes the loss of External +12 VDC alert tone can be replaced by a Power Fail voice message.

Using External 8 to 12 VDC Power without Battery Back-up

The Ritron® DMR HD-Series callbox can be programmed for always-on operation by disabling the Automatic Turn-Off option. This is accomplished using the RQX PC Programmer, or through Field Programming. Once Automatic Turn-Off is disabled, the user simply turns on the callbox by pressing the front panel PTT button and it will remain on as long as power is applied. If power to the callbox is lost then restored, the user must press the front panel PTT to restart the radio. For externally powered callboxes, battery backup is one method of keeping the radio on if the primary external power is lost.

For users that do not want to rely on battery backup, and do not want to "restart" the callbox after a power loss, the callbox can be modified to automatically restart after a power loss.

For details or questions about this modification contact Ritron® at 1-800-872-1872.

Important considerations before applying this modification:

- The Automatic Turn-Off option must be disabled.
- When Automatic Turn-Off is disabled the unit will consume the largest amount of current, but is always ready to instantly receive messages. This mode should only be considered if an external source of power is available.
- The callbox receiver will always be on. All radio communication on the programmed frequency will be heard over the RQX callbox.

Power Management Options .....

There are three power management options available to the DMR HD-Series Callbox:

Automatic Turn-Off (In battery only application Auto Turn-Off must be Enabled) .....(Field or PC Programmable)

If Enabled (factory default), the callbox will automatically turn itself off after a programmed period of no activity **(no transmissions made and no calls received)** has elapsed. Once the unit has turned itself off, it can only be turned back on by depressing the **ON/PTT** Button. The programmed period of no activity necessary before the unit turns itself off is called the **RQX Reset Time**. RQX Reset Time and Automatic Turn-Off can both be Field programmed, or PC programmed by the factory or your Ritron® dealer via the Ritron® RQX Series PC Programmer. Automatic Turn-Off mode is the factory default mode for power management with an RQX Reset Time of 10 seconds. Battery only operation is not suitable for Always-On mode.

"Automatic Turn-Off" Disabled .....(Field or PC Programmable)

If Automatic Turn-Off is disabled the unit will consume the largest amount of current, about 90 mA, but is always ready to instantly receive messages. This mode should only be considered if an external source of power is available (see "Using External 8 to 12 VDC Power with Battery Back-up").

DMR Mode Radio Power Consumption ..... (Automatic)

"ON with sync": When the DMR radio is actively looking for a sync word in receive mode it consumes about 80 mA. The digital receiver IC is looking for the DMR preamble and sync word and once found will wake up the DMR processing board. Once awake while decoding voice the radio draws about 270 mA with a low audio volume setting. When the received signal disappears the unit's consumption goes back to about 80 mA. Battery only operation not suitable for Always-On mode.

"Always ON": DMR board is always ON consuming about 250 mA in RX mode.

If Automatic Turn-Off is enable the current will drop to zero at the expiration of the reset timer. If Automatic Turn-Off is not enabled the unit will continue drawing 80 mA in "ON with sync" or 250 mA in "Always ON" mode.

Sensor Turn-On .....

When operating a DMR HD-Series Callbox with Automatic Turn-Off enabled, the unit can be configured to turn itself **ON** any time the Sensor Input is pulled **LOW** (ground). This allows an external switch closure to activate the Callbox. When the switch closure is detected the Callbox will turn on and automatically transmit the Sensor On alert or Sensor ON voice message. The Callbox is then in normal operating mode and will automatically turn itself off after a programmed period of no activity as described in the Automatic Turn-Off topic in this section. For Sensor Turn-On operation the Sensor Turn-On jumper must be placed into the "Turn-On" position. Refer to FIG-1 below for correct placement of the jumper. If the Sensor Input is not used the jumper placement has no effect on Callbox operation.

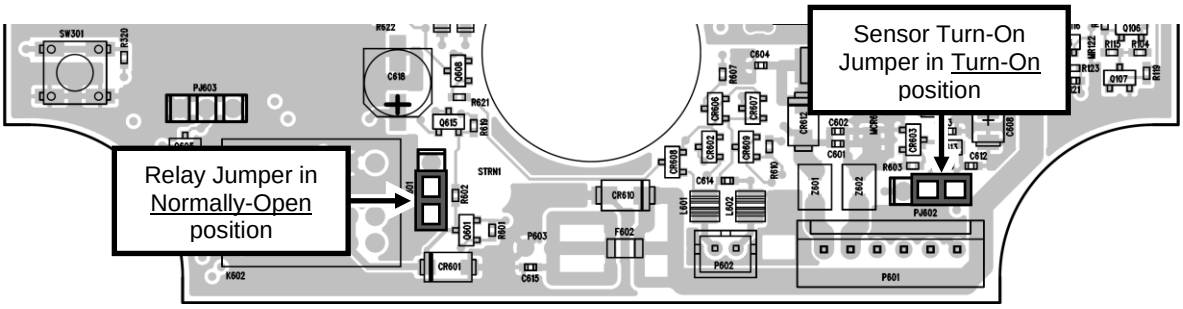


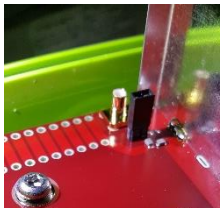
FIG-1: Sensor Turn-On Jumper Shown in Turn-On Position

EXTERNAL ANTENNA CONNECTOR AND ANTENNA JUMPER SETTING .....

The DMR HD-Series Callbox is equipped with an Antenna Jumper that will route all incoming and outgoing radio signals to the built-in internal antenna. The jumper must be removed when connecting to the SMB RF Test / External Antenna connector. The PJ201 jumper and the J201 SMB RF connector are located just above the large vertical shield on the main PC board.

The DMR HD-Series Callbox comes from the factory with the Antenna Jumper installed for operation with the built-in internal antenna.

Important - For testing through the SMB RF connector, OR for connection to an optional external antenna (optional cable also required), you must **REMOVE** the Antenna Jumper PJ201.



Antenna Jumper installed for use with built-in antenna

Remove Antenna Jumper for use with optional external antenna

Antenna Jumper removed for use with optional external antenna

For mounting an external antenna the Ritron® PN 60201125 can be used. 60201125 is a six inch coaxial adapter connecting the SMB RF Test / External Antenna connector to a panel mounted BNC connector. A xx" hole must be drilled into the DMR HD-Series case top to install the panel mounted BNC connector. All precautions detailed in the CONNECTING TO THE DMR HD-SERIES ACCESSORY CABLE section of this manual must be observed when drilling the hole for the BNC connector.

Callbox Controls and Connectors

SMB RF Connector
SMB style RF connector for external antennas. The Antenna Jumper must be removed when using the SMB RF connector.

Internal Antenna
An internal antenna is etched and/or secured to the PCB. When used, the Antenna Jumper must be installed and there can be no connection to the SMB RF connector.

Antenna Jumper
The Antenna Jumper connects either the internal antenna or the SMB RF connector. See the External Antenna Connector and Antenna Jumper Setting section of this manual for details.

Sensor Turn-On Jumper
The Sensor Turn-On jumper can be set to turn-on the radio whenever the Sensor Input is pulled low. (See FIG-1)

Relay Polarity Jumper
The Relay Polarity jumper can set the relay output to normally open or normally closed. (See FIG-1)

Case Screws
A T-25 Torx screw is located in two corners of the case front. These 2 screws are used to secure the hinged case front containing the radio, to the case back that contains the batteries.

Input/Output Connector
The 6-pin, polarized connector is used to connect external input/output devices. This allows connection of an external 8 to 12 VDC input, an external DC level sensor input, and a 3A contact switch closure output.

Microphone
The microphone is installed on the PCB back side.

Speaker Connector
The internal speaker is connected to the radio printed circuit board with a polarized connector.

On/PTT Connector
The On/PTT switch is connected to the radio printed circuit board with a polarized connector.

USB Programming Connector
A Mini-USB style connector is used to connect the cable from the PC programmer to the radio.

Program Button
A small, momentary pushbutton is used for field programming the DMR HD-Series Callbox.

Program Display
A single digit LED display is used during field programming of the radio.

Battery Holder
The battery holder inside the case back is used for the installation of 3 D-cell alkaline batteries. Refer to the labels beneath the cells for correct installation of the batteries.

Battery Mating Connectors
Polarized, 2-pin mating connectors are used to connect the batteries to the radio circuit board.

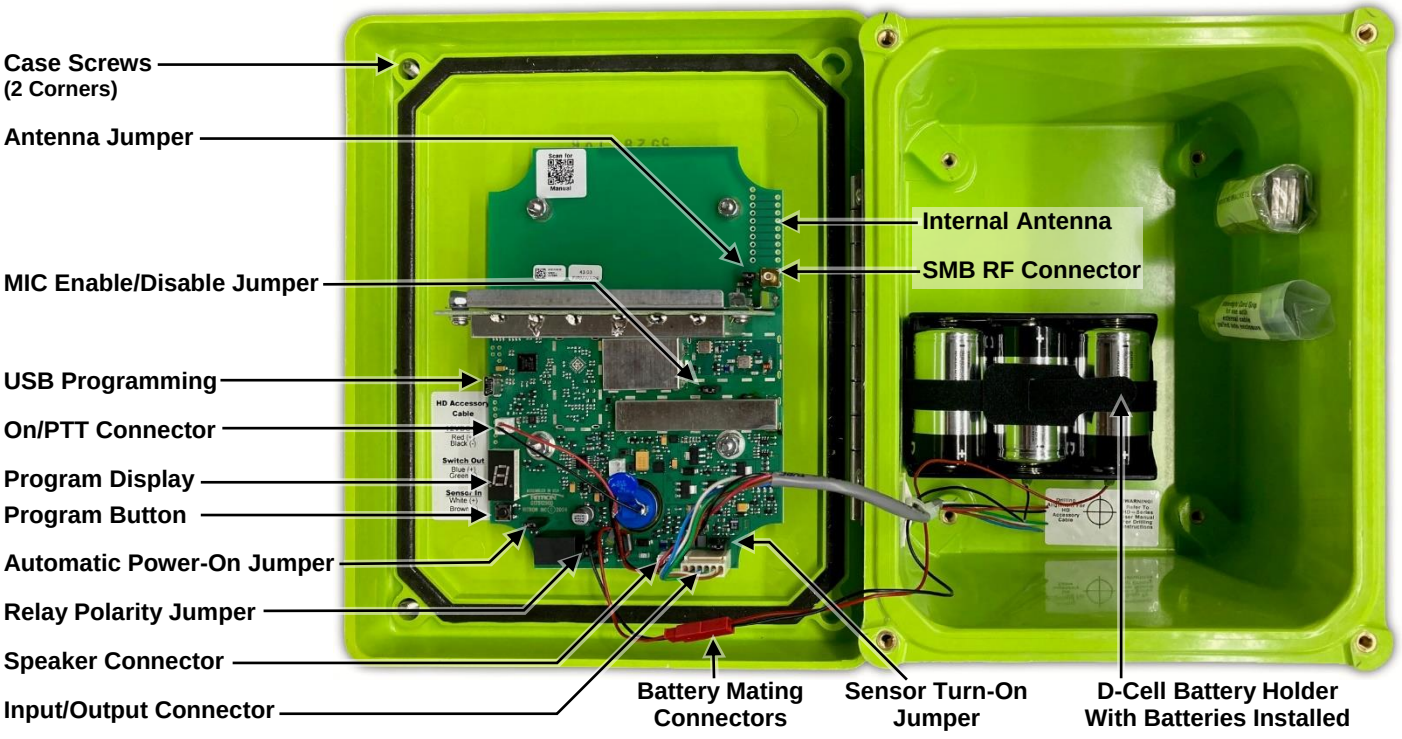


FIG-2: Callbox Assembly, Controls and Connectors

PJ301 MIC Enable/Disable configuration:

- **Right Side (Pin 2-Pin 1):** In this position, the microphone (MIC) operates normally.
- **Left Side (Pin 3-Pin 2):** In this position, the microphone is disabled. This setting is useful when recording voice alert messages, as it helps reduce external noise.

Important: After recording, ensure the jumper is restored to its default position (Pin 2-Pin 1) for proper microphone operation.

PJ603 Automatic Power-On Configuration:

- **Right Side (Pin 2-Pin 1):** In this position, the callbox operates in **default mode**. The **Automatic Turn-Off** feature can be either enabled or disabled.
- **Left Side (Pin 3-Pin 2):** In this position, the callbox automatically powers on when an external +12V AC/DC adapter is connected. This mode is intended for special cases, such as when the callbox needs to automatically power on after AC power is restored following a failure.
  Important: Use this mode only when the **Automatic Turn-Off** feature is disabled (uncheck "**Automatic Turn-Off**" in the PC programmer). Otherwise, the callbox will not respond to the PTT button.

Caution: Do not use this mode if the callbox is powered by batteries, as it may drain the battery.

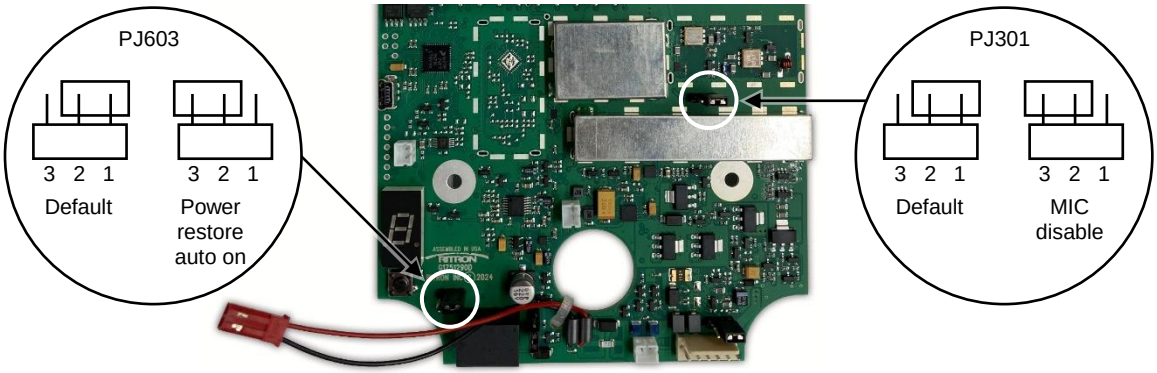


FIG-3: Power-On Restore and MIC Disable Jumpers

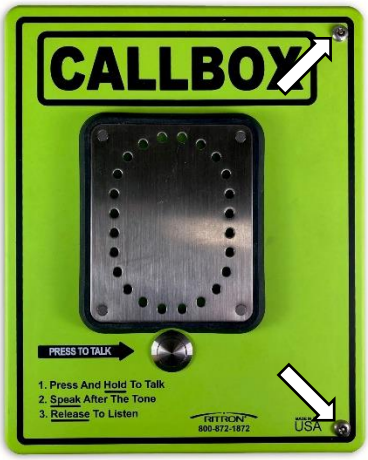
Connecting to the DMR HD-Series Accessory Cable

The HD Accessory Cable (PN 60101000) included with the radio allows connection of an external +12 VDC input, an external DC level sensor input, and a 3A contact switch closure output. This requires a hole drilled through the green HD case for routing a cable to the external devices used.

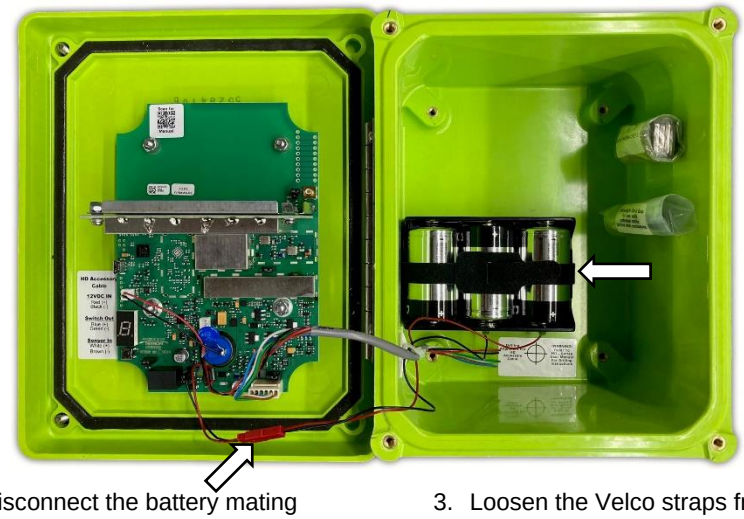
Drilling Instructions:

Utilizing the HD Accessory Cable requires a hole drilled through the DMR HD-Series case. The fiberglass construction of the DMR HD-Series case requires special consideration.

WARNING: Forcing a hole through the case will result in splintering the surface gelcoat, which could compromise the water seal ability of the Heyco® Series-35 Liquid Tight Cordgrip included with the HD Accessory Cable.

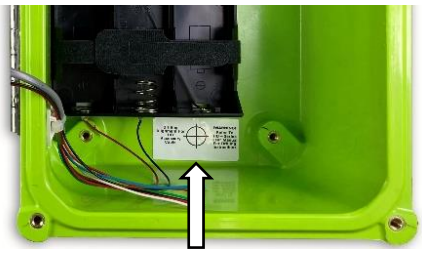


1. Using the T-25 Torx bit included with the radio, loosen the two captured screws on the front of the hinged HD case and open.

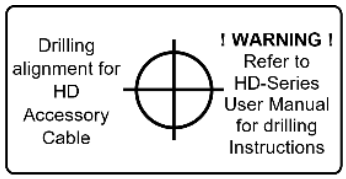


2. Disconnect the battery mating connectors.

3. Loosen the Velco straps from around the D-cell Alkaline batteries and remove all 3 batteries from the battery holder.



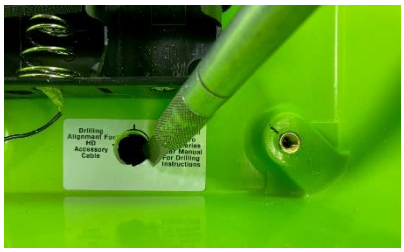
4. Locate the drilling target on the inside of the HD case.



5. Move all wires away from the drilling target.

6. Drill a 1/4” pilot hole at the center of the target from the inside of the case.

7. Drill a 1/2” hole from the inside of the case using the pilot hole as a guide. To avoid splintering, use a 1/2" drill bit to chamfer both sides of the hole before drilling the hole all the way through.



8. Remove all debris from the drilling operation.

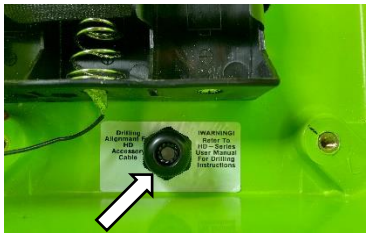
9. Using a sharp razor knife, clear the hole and labels of all flash and debris. Leaving a flat, clean surface on both sides of the case.

Instructions for Wiring to the HD Accessory Cable:

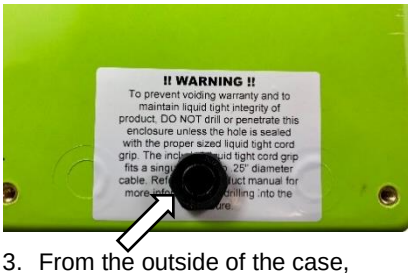
the Heyco® Series-35 Liquid Tight Cordgrip included with the HD Accessory Cable will accept a sleeved, multi strand cable with an outside diameter of 0.115" to 0.25".

If your cable diameter is larger than this the Cordgrip included with the HD Accessory Cable will not work. Go to: https://www.heyco.com/Liquid_Tight_Cordgrips/product.cfm?product=Series-35-PG&section=Liquid_Tight_Cordgrips to find a Heyco® Series-35 Liquid Tight Cordgrip suitable for your cable size.

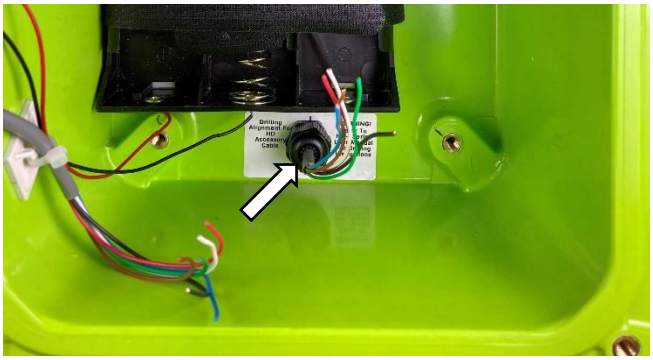
1. Remove the bottom nut from the Heyco® Cordgrip and loosen the domed sealing nut.



2. Insert the threaded Heyco® Cordgrip through the 1/2" hole.



3. From the outside of the case, thread the bottom nut onto the Heyco® Cordgrip and tighten.



4. From outside the case, feed the sleeved, multi strand cable from your external device through the Heyco® Cordgrip. The sleeve must extend past the Cordgrip as shown. Be sure to leave enough length for connection to the HD Accessory Cable.

5. Tighten the domed sealing nut to secure the cable.

6. Strip off 1/4" of insulation from the the wires you intend to use and use wirenuts to make connections from the HD-Series Callbox to your external device.

HD Accessory Cable Wire Colors

Red	+12VDC External Power Supply
Black	External Power Supply Ground
Blue	Relay Switch Output Connection (+)
Green	Relay Switch Output Connection (-)
White	Sensor Input
Brown	Sensor Input Ground

Re-assemble the DMR HD-Series Callbox:

7. Reconnect the battery mating connectors.
8. Re-Install the 3 D-cell Alkaline batteries into the battery holder (if used in your application) and secure with the Velcro straps.
   NOTE: In +12VDC externally powered installations it is recommended that batteries are not installed unless battery backup is required.
9. Test for the desired radio operation for your installation.
10. Close the DMR HD-Series callbox front, being careful to not pinch any of the wires between the case front and case back.
11. With a hand tool, tighten the two captured screws on the front of the HD case using the T-25 Torx bit included with the radio. Do not overtighten.

R-STROBE-DC INSTALLATION FOR THE DMR HD-SERIES CALLBOX .....

The RQX DMR HD-Series Callbox includes a built-in relay that can be used to operate a strobe light in a number of configurations. This is accomplished using the HD Accessory Cable installed in all DMR HD-Series callboxes. Refer to the CONNECTING TO THE DMR HD-SERIES ACCESSORY CABLE section of this manual for detailed instructions.

The HD Accessory Cable can provide:

- A normally open relay switch that closes when a programmed event occurs. The relay switch can handle up to 3A when used to connect power to a strobe light.
- A normally closed relay switch that opens when a programmed event occurs.
- Provisions for an external +12VDC input supply that can be used to power the RQX Callbox and an LED strobe light rated at 400mA or less.
- A ground connection that can be used to provide a switch closure to ground.

The Callbox must be programmed for the desired Relay operation:

- Refer to TABLE 3: RELAY AND LISTEN IN OPERATION CODES for programming options and instructions.

If the strobe light is to be powered through the Callbox an external +12VDC supply is required:

- Order Ritron RPS-EXPO (PWR SUPPLY FOR CALLBOX, 110VAC/12VDC@1.5A)

HD Accessory Cable Connections:

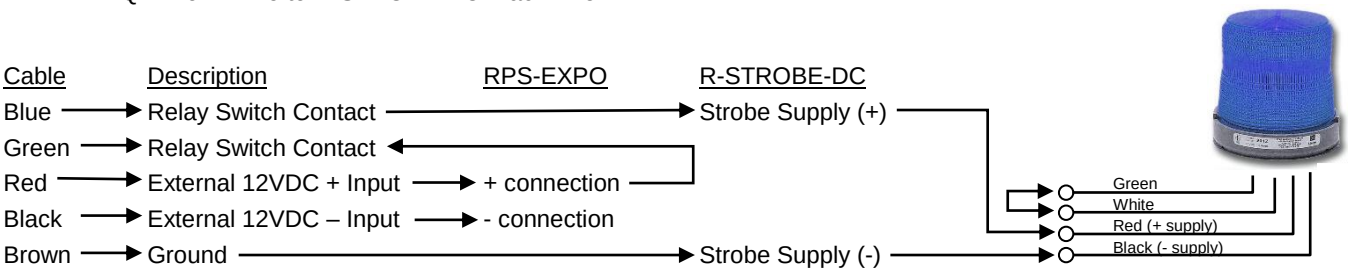
Pin #	Wire Color	Description	
6	Red	External 12 VDC input	+ connection
5	Black	External 12 VDC input	- connection
4	Blue	Relay Switch Output	+ connection
3	Green	Relay Switch Output	- connection
2	White	Sensor Input	+ connection
1	Brown	Ground	- ground

Note: The Relay Polarity Jumper is placed in the Normally-Open position as shown in FIG-1 (factory default). If Normally-Closed Relay operation is required, move the jumper up one position.

Using the relay to connect External 12VDC from the HD-Series callbox to the R-STROBE-DC

- *The strobe light is activated when the relay closes.*
- *The Relay Polarity Jumper is in the Normally-Open position as shown in FIG-1.*
- *The R-STROBE-DC operates on +12VDC, and requires 400mA or less.*
- *Short the Green and White wires together on the R-STROBE-DC for strobe operation, leave both wires unterminated for constant on operation.*

1. RQX Blue wire to R-STROBE-DC Red wire
2. RQX Red and Green wires to RPS-EXPO (+) connection
3. RQX Black wire to RPS-EXPO (–) connection
4. RQX Brown wire to R-STROBE-DC Black wire



DMR HD-Series Callbox Installation Instructions

Before Installing the DMR HD-Series Callbox

1. Using the T-25 Torx bit included with the radio, loosen the two captured Torx screws on the front of the hinged HD case and open.
2. Remove the "Mounting Bracket" kit secured to the inside of the HD Callbox case.
3. Install 3 D-cell alkaline batteries into the battery holder. Refer to FIG-2, or the graphics beneath the cells, for correct installation of the batteries.
4. If required, program the radio. Refer to the programming section of this manual for details.
5. Close the DMR HD-Series callbox front, being careful to not pinch any of the wires between the case front and case back. Tighten the two captured screws on the front of the HD case using the T-25 Torx bit included with the radio.

CAUTION Do not drill or penetrate the DMR HD-Series Callbox case with any additional mounting holes. Use only the mounting brackets included with the product, or optional Ritron mounting kit RQX-HDMK

DMR HD-Series Callbox with 4 Mounting Brackets included with the radio

Mounting the DMR HD-Series Callbox using 4 brackets included with the radio

The DMR HD-Series callbox can be mounted to virtually any surface with four (4) ¼" diameter fasteners, not included. Choose a type of screw thread and screw length which will hold firmly in the surface to which the unit will be mounted.

1. Install the 4 mounting brackets to the back of the DMR HD-Series Callbox case as shown with the #10-32 bolts provided. The mounting brackets can be installed vertically, as shown, or horizontally.
2. Position the DMR HD-Series Callbox in the chosen installation location and secure it in place with four screws through the mounting brackets.

Mounting the DMR HD-Series Callbox using the optional RQX-HDMK

The DMR HD-Series Callbox can be mounted to a gooseneck pedestal or a post using the optional RQX-HDMK mounting bracket. The RQX-HDMK includes hardware necessary to attach the bracket to the DMR HD-Series Callbox, but does not include hardware for attaching to a gooseneck pedestal or a post.

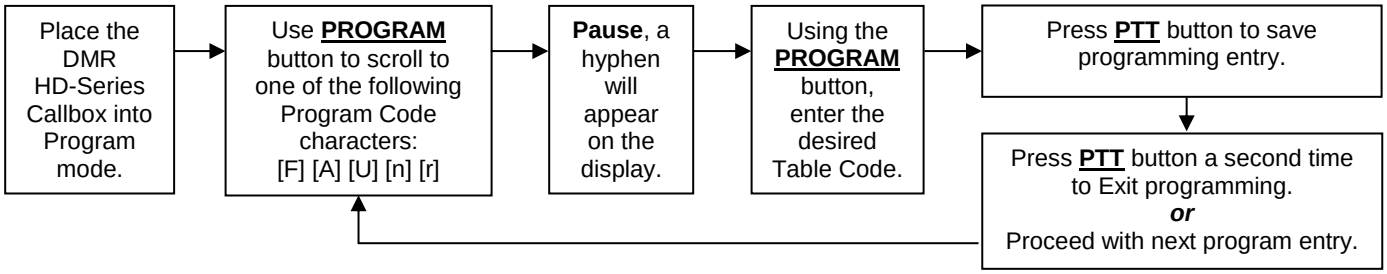
1. Install the optional RQX-HDMK mounting bracket onto the gooseneck pedestal with 4 screws (not included in kit) through the angled slots.
2. Mate the DMR HD-Series Callbox to the bracket on the gooseneck pedestal or a post and secure with the four (4) T-25 Torx screws included with the RQX-HDMK.
3. If a cable to the DMR HD-Series Callbox is required, route though the center hole in the RQX-HDMK bracket.

   Route the cable into the callbox though the hole drilled in the green DMR HD-Series case as described in the CONNECTING TO THE DMR HD-SERIES ACCESSORY CABLE section of this manual.

DMR HD-Series Callbox with optional RQX-HDMK Mounting Bracket

COVERAGE Depending on the unit location and installation, the DMR HD-Series Callbox can cover up to 1 mile line of sight. To increase range, use an external antenna that is mounted higher. Contact RITRON for a RAM-1545 Magnet Mounted Antenna.

DMR HD-Series Field Programming Overview .....



Program Codes **Table Codes**

Enter a 2-digit or 3-digit Frequency Code from **Table 1**.

Enter any 2-digit or 3-digit Feature Code from **Table 4** to:

- Enable or disable Call Tone.
- Enable or disable external power loss alert.
- Enable or disable Automatic Turn-Off.
- Enable or disable Busy Channel TX Inhibit.
- Set microphone gain fixed or AGC.
- Set RQX Reset Time.
- Set switch output operation.
- Reset RQX to Factory default programming.
- Record and Playback Voice Messages.
- Readout codes currently programmed into the RQX by pressing display button.

Enter any 3-digit Relay and Listen-In Operation Code from **Table 3**

Enter the desired Speaker Volume Level as a 2–digit number from 20 – 99.

Enter 1 to 7 to write the desired DMR function then the 1 to 8 digit ID code from **Table 2**

Enter 1 to 7 to read out the desired DMR 1 to 8 digit code from **Table 5**

IMPORTANT NOTICE

While the RQX DMR HD-Series callbox offers limited field programming capability, it is recommended that Ritron PC Programmer *RQX-PCPK-1* be used for DMR HD-Series programming.

Contact Ritron Sales Dept. @ 1-800-872-1872 for ordering details.

How to Field Program Frequency Codes.....

To match other radios, the owner can select a Frequency Code from Table 1. The radio will use the programmed code in both transmit and receive. In our example, we will program an RQX-417DMR to operate on the "Brown Dot" frequency of 464.500 MHz.

1. Refer to Table 1 to determine the two-digit frequency code and write it down.
2. Loosen the (2) screws in the front corners of the case.
3. Separate the case front from the case back, leaving the batteries connected to the radio. Make sure the unit has batteries installed.

   NOTE: The voltage of the batteries must be greater than 3.3 VDC to program properly.
4. Press and release the **ON/PTT** button on the front of the unit to turn the radio on.

5. Press and **HOLD** the Program Button (See FIG-2 for location). A "P" will appear on the program display as you enter program mode and the radio will beep rapidly.

6. Release the program button after the beeping has stopped. The radio will emit a triple beep indicating that the radio is in program mode and a hyphen will appear on the program display.

7. Click the Program button until the program display shows the Program Code “F”. Pause—the radio will sound a low tone and show a hyphen across the center of the display to indicate that it is ready to accept the 2 or 3-digit Frequency code from Table 1.

8. Enter the 1st digit of the frequency code by clicking the Program button until the program display shows the desired number. Pause—the radio will sound a low tone and show a hyphen across the center of the display to indicate that it is ready to accept the next digit.

9. Enter the 2nd digit of the frequency code by clicking the Program button until the program display shows the desired number. Pause—the radio sounds a low tone and will show a hyphen across the center of the display to indicate that it is ready to accept the next digit.

FREQUENCY CODE

10. If necessary, enter the 3rd digit of the frequency code by clicking the Program button until the program display shows the desired number. Pause—the radio sounds a low tone and will show a hyphen across the center of the display to indicate that it is ready to accept the next digit

11. Press and release the **ON/PTT** button to save your programming. A triple beep will sound to indicate that programming was successful and a hyphen will appear on the program display. The radio is now ready for another program entry.

    NOTE: An error tone will sound if you attempt to save an incorrect code, an "E" will appear on the display. Check the digits you are attempting to enter, then re-enter. This will also occur if the radio frequency has been PC programmed to something other than one of the table codes from Table 1.
12. Once you have made your final program entry, press the **ON/PTT** button a final time to turn the radio off. Turn the radio back on for normal operation.

Table 1: Programmable Frequency Codes (Program Code F) .....

UHF Business Band Models

Table Code	Frequency	Color Dot	BW
09	469.2625		12.5 †
10	462.5750	White Dot	12.5 †
11	462.6250	Black Dot	12.5 †
12	462.6750	Orange Dot	12.5 †
13	464.3250		12.5 †
14	464.8250		12.5 †
15	469.5000		12.5 †
16	469.5500		12.5 †
17	463.2625		12.5 †
18	464.9125		12.5 †
19	464.6000		12.5 †
20	464.7000		12.5 †
21	462.7250		12.5 †
22	464.5000	Brown Dot	12.5
23	464.5500	Yellow Dot	12.5
24	467.7625	J	12.5
25	467.8125	K	12.5
26	467.8500	Silver Star	12.5
27	467.8750	Gold Star	12.5
28	467.9000	Red Star	12.5
29	467.9250	Blue Star	12.5
30	461.0375		12.5
31	461.0625		12.5
32	461.0875		12.5
33	461.1125		12.5
34	461.1375		12.5
35	461.1625		12.5
36	461.1875		12.5
37	461.2125		12.5
38	461.2375		12.5
39	461.2625		12.5
40	461.2875		12.5
41	461.3125		12.5
42	461.3375		12.5
43	461.3625		12.5
44	462.7625		12.5
45	462.7875		12.5
46	462.8125		12.5
47	462.8375		12.5
48	462.8625		12.5
49	462.8875		12.5
50	462.9125		12.5
51	464.4875		12.5
52	464.5125		12.5
53	464.5375		12.5
54	464.5625		12.5
55	466.0375		12.5
56	466.0625		12.5
57	466.0875		12.5
58	466.1125		12.5
59	466.1375		12.5
60	466.1625		12.5
61	466.1875		12.5
62	466.2125		12.5
63	466.2375		12.5
64	466.2625		12.5
65	466.2875		12.5

UHF Business Band Models

Table Code	Frequency	Color Dot	BW
66	466.3125		12.5
67	466.3375		12.5
68	466.3625		12.5
69	467.7875		12.5
70	467.8375		12.5
71	467.8625		12.5
72	467.8875		12.5
73	467.9125		12.5
74	469.4875		12.5
75	469.5125		12.5
76	469.5375		12.5
77	469.5625		12.5
78	462.1875		12.5
79	462.4625		12.5
80	462.4875		12.5
81	462.5125		12.5
82	467.1875		12.5
83	467.4625		12.5
84	467.4875		12.5
85	467.5125		12.5
86	451.1875		12.5
87	451.2375		12.5
88	451.2875		12.5
89	451.3375		12.5
90	451.4375		12.5
91	451.5375		12.5
92	451.6375		12.5
93	452.3125		12.5
94	452.5375		12.5
95	452.4125		12.5
96	452.5125		12.5
97	452.7625		12.5
98	452.8625		12.5
99	456.1875		12.5
100	456.2375		12.5
101	456.2875		12.5
102	468.2125		12.5
103	468.2625		12.5
104	468.3125		12.5
105	468.3625		12.5
106	468.4125		12.5
107	468.4625		12.5
108	468.5125		12.5
109	468.5625		12.5
110	468.6125		12.5
111	468.6625		12.5
112	456.3375		12.5
113	456.4375		12.5
114	456.5375		12.5
115	456.6375		12.5
116	457.3125		12.5
117	457.4125		12.5
118	457.5125		12.5
119	457.7625		12.5
120	457.8625		12.5
122	464.8375		12.5

Canada Models
UHF Business Band Models

Table Code	Frequency	Color Dot	BW
01	458.6625		25
02	469.2625		25

Notes

† Frequency code was 25 KHz bandwidth prior to the 2013 FCC Narrowband Mandate.

- BW is the bandwidth in kHz.
- 12.5 kHz indicates a narrow band channel, 25 kHz indicates a wide band channel.
- If the callbox has been PC programmed to a non-table frequencies it cannot be changed via field programming. Code 999 will appear when read out.

DMR ID and Color Codes Overview

DMR ID and Color Codes

Communication between any two DMR digital radios will include the following four codes:

Color Code	A 4-bit (0-15) Color Code. Color Codes work much like QC/DQC codes in Analog mode, and are often used in conjunction with an SUID or Group ID code to screen calls when receiving and to uniquely identify the callbox when transmitting.
SUID	A 24-bit (1-16,776,415) Subscriber Unit ID code. Each radio in a DMR system must have a unique SUID.
Destination Type	A 4-bit code used to identify the type of Destination ID code that is transmitted. The DMR HD-Series callbox can be set for either Individual or Group Destination ID.
Destination ID	A 24-bit (1-16,776,415) ID code that is transmitted to determine what radios are to be called. The DMR HD-Series callbox can be set to call an individual radio or a group of radios. An Individual or Group Destination ID code of 16,777,215 is an All Call code that can be used to call all radios.

DMR HD-Series callboxes can be programmed to send and receive these DMR codes. How the callbox responds is determined by the specific programming of the radios within the DMR system.

Receive Operation

The DMR HD-Series callbox can be set to one of four Squelch Types using the Ritron® RQX-PCPS programmer:

OFF	The DMR HD-Series callbox will receive all valid on-frequency DMR calls, with no Color Code, SUID, or Group ID code required. Squelch Type OFF is similar to carrier squelch operation in an analog radio.
Color Code	The DMR HD-Series callbox will receive all calls with the programmed RX Color Code. Squelch Type Color Code is similar to using QC/DQC codes in an analog radio.
ID	The DMR HD-Series callbox will only receive calls with its programmed SUID code, programmed Group Call code, or the All Call code (if enabled). Squelch Type ID is similar to using 2-Tone, DTMF or Selcall to selectively call the radio in an analog radio.
Color Code + ID	The DMR HD-Series callbox will only receive calls with the programmed RX Color Code AND with its programmed SUID code, programmed Group Call code, or the All Call code (if enabled). Squelch Type Color Code + ID is similar to using QC/DQC and 2-Tone, DTMF or Selcall to selectively call the radio in an analog radio.

IMPORTANT NOTE: From the factory, the DMR HD-Series callbox is set to Squelch Type OFF above and cannot be changed via field programming. Changing this requires the Ritron® RQX-PCPS programmer.

Transmitter Operation

The DMR HD-Series callbox sends the programmed TX Color Code, SUID code, Destination Type, and Destination ID code each time it transmits. The combination of these codes determine which radios the callbox will communicate with in the DMR system.

The DMR HD-Series callbox can be set to transmit with one of three Call Types:

OFF	The DMR HD-Series callbox will send the programmed TX Color Code and a Group Destination ID code for All Call (65535).
Individual	The DMR HD-Series callbox will send the programmed TX Color Code and the programmed Individual Destination ID code.
Group	The DMR HD-Series callbox will send the programmed TX Color Code and the programmed Group Destination ID code.

NOTE: DMR “All Call” code (16,777,215) can be programmed as an Individual Destination ID or Group Destination ID code.

Relay and Listen-In Operation

The DMR HD-Series callbox relay can be operated when a Primary or Secondary Control ID code is received, regardless of the programmed Squelch Type listed above. The Primary or Secondary Control ID codes are Individual ID codes, and as such the sending radio must transmit these as an Individual Destination ID code. The callbox can also be placed into Listen-In mode when a Secondary Control ID code is received, regardless of the programmed Squelch Type listed above. See Table 3 “Relay and Listen-In Operation Codes” to program how the radio will respond to the Primary or Secondary Control ID code.

NOTE: If Squelch Type requires an RX Color Code the Relay and Listen-In operation will also require the RX Color Code.

How to Field Program DMR ID and Color Codes

Each DMR HD-Series callbox is uniquely identified by programming a DMR 1-8 digit SUID code (1-16,776,415). The radio will transmit the SUID ID code in each transmission. The callbox can also be programmed with RX and TX Color Codes, RX Group ID code, Control Codes, and both Individual and Group Destination codes. Refer to Table 2 for DMR ID and Color Codes.

In our example we will program an RQX-417DMR to operate with an SUID Code 547, a TX Color Code 12, and a Group Destination ID code 631.

		1. Write down the desired SUID code, TX Color Code, and Group Destination code.
		2. Loosen the (2) captive screws in the front corners of the case. These screws are captive to the housing; to prevent damaging them, **DO NOT** remove the screws from the housing.
		3. Separate the case front from the case back, leaving the batteries connected to the radio. Make sure the unit has batteries installed. **NOTE:** The voltage of the batteries must be greater than 3.3 VDC to program properly.
		4. Press and release the **ON/PTT** button on the front of the unit to turn the radio on.
		5. Press and **HOLD** the Program Button (See FIG-2 for location). A "P" will appear on the program display as you enter program mode and the radio will beep rapidly.
		6. Release the program button after the beeping has stopped. The radio will emit a triple beep indicating that the radio is in program mode and a hyphen will appear on the program display.
		7. Click the Program button until the program display shows the Program Code "n". Pause—the radio will sound a low tone and show a hyphen across the center of the display to indicate that it is ready for DMR ID code programming.
		8. Click the Program button until the program display shows the Table Code "3". Pause—the radio will sound a low tone and show a hyphen across the center of the display to indicate that it is ready to accept a 1 to 8-digit SUID code.
1-8 Digit SUID Code		9. Enter the 1st digit of the SUID code by clicking the Program button until the program display shows the desired number. Pause—the radio will sound a low tone and show a hyphen across the center of the display to indicate that it is ready to accept the next digit.
		10. Enter the 2nd digit of the SUID code by clicking the Program button until the program display shows the desired number. Pause—the radio sounds a low tone and will show a hyphen across the center of the display to indicate that it is ready to accept the next digit.
		11. Enter the 3rd digit of the SUID sequence by clicking the Program button until the program display shows the desired number. Pause—the radio sounds a low tone and will show a hyphen across the center of the display to indicate that it is ready to accept the next digit. Continue entering up to eight digits.
	 	12. Press and release the **ON/PTT** button to save your programming. A triple beep will sound to indicate that programming was successful and a hyphen will appear on the program display. The radio is now ready for another program entry. **NOTE:** An error tone will sound if you attempt to save an incorrect code, an "E" will appear on the display. Check the digits you are attempting to enter, then re-enter.
		13. Click the Program button until the program display shows the Program Code "n". Pause—the radio will sound a low tone and show a hyphen across the center of the display to indicate that it is ready for DMR ID code programming.
		14. Click the Program button until the program display shows the Table Code "2". Pause—the radio will sound a low tone and show a hyphen across the center of the display to indicate that it is ready to accept a 2-digit Color Code.
2 Digit TX Color Code		15. Enter the 1st digit of the TX Color Code by clicking the Program button until the program display shows the desired number. Pause—the radio will sound a low tone and show a hyphen across the center of the display to indicate that it is ready to accept the next digit.
		16. Enter the 2nd digit of the TX Color Code by clicking the Program button until the program display shows the desired number. Pause—the radio sounds a low tone and will show a hyphen across the center of the display to indicate that it is ready to accept the next digit.
	 	17. Press and release the **ON/PTT** button to save your programming. A triple beep will sound to indicate that programming was successful and a hyphen will appear on the program display. The radio is now ready for another program entry. **NOTE:** An error tone will sound if you attempt to save an incorrect code, an "E" will appear on the display. Check the digits you are attempting to enter, then re-enter.
		18. Click the Program button until the program display shows the Program Code "n". Pause—the radio will sound a low tone and show a hyphen across the center of the display to indicate that it is ready to accept DMR ID code programming.

19. Click the Program button until the program display shows the 1st digit of Table Code “72”. Pause—the radio will sound a low tone and show a hyphen across the center of the display to indicate that it is ready to accept the 2nd digit of Table Code “72”.

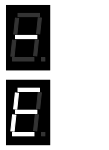
20. Click the Program button until the program display shows the 2nd digit of Table Code “72”. Pause—the radio will sound a low tone and show a hyphen across the center of the display to indicate that it is ready to accept a 1 to 8-digit Group Destination ID code.

1-8 Digit Group Destination ID Code

21. Enter the 1st digit of the Group Destination ID code by clicking the Program button until the program display shows the desired number. Pause—the radio will sound a low tone and show a hyphen across the center of the display to indicate that it is ready to accept the next digit.

22. Enter the 2nd digit of the Group Destination ID code by clicking the Program button until the program display shows the desired number. Pause—the radio sounds a low tone and will show a hyphen across the center of the display to indicate that it is ready to accept the next digit.

23. Enter the 3rd digit of the Group Destination ID sequence by clicking the Program button until the program display shows the desired number. Pause—the radio sounds a low tone and will show a hyphen across the center of the display to indicate that it is ready to accept the next digit. Continue entering up to eight digits.



24. Press and release the **ON/PTT** button to save your programming. A triple beep will sound to indicate that programming was successful and a hyphen will appear on the program display. The radio is now ready for another program entry.

    NOTE: An error tone will sound if you attempt to save an incorrect code, an "E" will appear on the display. Check the digits you are attempting to enter, then re-enter.

25. Once you have made your final program entry, press the **ON/PTT** button a final time to turn the radio off. Turn the radio back on for normal operation.

TABLE 2: DMR ID AND COLOR CODES (PROGRAM CODE n).....

Table Code	Feature	Description
DMR Color Codes		
1 + xx	RX Color Code	The callbox can be set for an RX Color Code of 00-15. Programming an RX Color Code will have no effect without first setting squelch type for Color Code using the PC Programmer.
2 + xx	TX Color Code	The callbox can be set for a TX Color Code of 00-15, which will then be sent on every transmission.
DMR ID Codes		
3 + xxxxxxxx	Subscriber Unit ID (SUID) code	The callbox can be programmed for a 1-8 digit SUID code for unique identification.
4 + xxxxxxxx	RX Group ID code	The callbox can be programmed for a 1-8 digit Group ID code. Programming an RX Group ID code will have no effect without first setting squelch type for ID and enabling RX Group Call using the PC Programmer.
5 + xxxxxxxx	Primary Control ID code	The callbox can be programmed for a 1-8 digit Primary Control ID code used to active the radio’s on board relay. See Table 3 “Relay and Listen In Operation Codes” to program how the radio will respond to the Primary Control ID code.
6 + xxxxxxxx	Secondary Control ID code	The callbox can be programmed for a 1-8 digit Secondary Control ID code used to deactive the radio’s on board relay, or to enable the Listen-In feature. See Table 3 “Relay and Listen In Operation Codes” to program how the radio will respond to the Secondary Control ID code.
71 + xxxxxxxx	Individual Destination ID code	The callbox can be programmed for a 1-8 digit Individual Destination ID code that will be sent each time the radio transmits. If the radio was previously programmed with a Group Destination ID code it will be replaced with the programmed Individual Destination ID code.
72 + xxxxxxxx	Group Destination ID code	The callbox can be programmed for a 1-8 digit Group Destination ID code that will be sent each time the radio transmits. If the radio was previously programmed with an Individual Destination ID code it will be replaced with the programmed Group Destination ID code.

NOTES:

1. 8-digit ID codes must be in the 1 to 16,776,415 range. If the receiving unit wishes only to receive messages targeted for it the *ID* or *Color Code + ID* “squelch type” must be set in the receiver. If “squelch type” is off all traffic will be heard.
2. A Program Code “n” is used to program DMR ID and Color Codes, while a Program Code “r” will read out the codes. To read out a code select Program Code “r” followed by a 1 through 7, press the PTT, and the code will be displayed digit by digit. For example, if a Group Destination ID of 1000 is set, to read out the destination ID key in “r” then “7” and hit PTT. The display will show “2” then “01000”. Here “2” indicates a group and “1” would mean individual ID.

How to Field Program DMR Relay and Listen-In Operation.....

For special applications, it is desirable to program the DMR HD-Series Callbox for a Primary or Secondary Control ID code. These codes are used to operate the DMR HD-Series callboxes relay or to enable Listen-In operation.

Programming the radio for Relay or Listen-In operation MUST BE DONE IN THE FOLLOWING ORDER!

1. Program the desired Relay and Listen-In Operation code (Refer to Table 3). This will delete any previous Primary or Secondary Operation code programming.
2. Program the desired Primary Control ID code (Refer to Table 2). The Primary Control ID code cannot be the same as the Secondary Control ID code or the SUID code.
3. If required, program the desired Secondary Control ID code (Refer to Table 2). The Secondary Control ID code cannot be the same as the Primary Control ID code or the SUID code.
4. Program the desired Features codes as desired (Refer to Table 4).

In the following example we will program an RQX-417DMR for GateGuard – On Code/Off Code operation, with a Primary Control ID code (ON) of 108 and a Secondary Control ID code (OFF) of 208. We will program both the Primary and the Secondary Control ID to transmit a transpond signal.

	1.	Loosen the (2) captive screws in the front corners of the case and separate the case front from the case back, leaving the batteries connected to the radio. Make sure the unit has batteries installed. The voltage of the batteries must be greater than 3.3 VDC to program properly.
	2.	Press and release the **ON/PTT** button on the front of the unit to turn the radio on.
	3.	Press and **HOLD** the Program Button (See FIG-2 for location). A "P" will appear on the program display as you enter program mode and the radio will beep rapidly. Release the program button after the beeping has stopped. The radio will emit a triple beep indicating that the radio is in program mode and a hyphen will appear on the program display.
419	4.	Refer to Table 3 to determine the three-digit Operation code for GateGuard® Switch On/Off code.
	5.	Click the Program button until the program display shows the Program Code "C". Pause—the radio will sound a low tone and show a hyphen across the center of the display to indicate that it is ready to accept the next programming code.
	6.	Enter the 1st digit of the Operation Code by clicking the Program button until the program display shows the desired number. Pause—the radio will sound a low tone and show a hyphen across the center of the display to indicate that it is ready to accept the next digit.
	7.	Enter the 2nd digit of the Operation Code by clicking the Program button until the program display shows the desired number. Pause—the radio sounds a low tone and will show a hyphen across the center of the display to indicate that it is ready to accept the next digit.
	8.	Enter the 3rd digit of the Operation Code by clicking the Program button until the program display shows the desired number. Pause—the radio sounds a low tone and will show a hyphen across the center of the display to indicate that it is ready to accept the next digit.
	9.	Press and release the **ON/PTT** button to save your programming. A triple beep will sound to indicate that programming was successful and a hyphen will appear on the program display. The radio is now ready for another program entry. An error tone will sound if you attempt to save an incorrect code and an "E" will appear on the display. Check the digits you are attempting to enter, then re-enter.
	10.	Click the Program button until the program display shows the Program Code "n". Pause—the radio will sound a low tone and show a hyphen across the center of the display to indicate that it is ready to accept an DMR™ ID code.
5	11.	Refer to Table 2 to determine the Table code for Primary Control ID.
	12.	Click the Program button until the program display shows the Table Code "5". Pause—the radio will sound a low tone and show a hyphen across the center of the display to indicate that it is ready to accept a 1 to 8-digit Primary Control ID code.
	13.	Enter the 1st digit of the Primary Control ID code by clicking the Program button until the program display shows the desired number. Pause—the radio will sound a low tone and show a hyphen across the center of the display to indicate that it is ready to accept the next digit.
	14.	Enter the 2nd digit of the Primary Control ID code by clicking the Program button until the program display shows the desired number. Pause—the radio sounds a low tone and will show a hyphen across the center of the display to indicate that it is ready to accept the next digit.
	15.	Enter the 3rd digit of the Primary Control ID code by clicking the Program button until the program display shows the desired number. Pause—the radio sounds a low tone and will show a hyphen across the center of the display to indicate that it is ready to accept the next digit. Continue entering up to eight digits.
	16.	Press and release the **ON/PTT** button to save your programming. A triple beep will sound to indicate that programming was successful and a hyphen will appear on the program display. The radio is now ready for another program entry. An error tone will sound if you attempt to save an incorrect code and an "E" will appear on the display. Check the digits you are attempting to enter, then re-enter.

OPERATION CODE

1-8 Digit Primary Control ID code

		17. Click the Program button until the program display shows the Program Code “n”. Pause—the radio will sound a low tone and show a hyphen across the center of the display to indicate that it is ready to accept an DMR™ ID code.
	6	18. Refer to Table 2 to determine the Table code for Secondary Control ID.
		19. Click the Program button until the program display shows the Table Code “6”. Pause—the radio will sound a low tone and show a hyphen across the center of the display to indicate that it is ready to accept a 1 to 8-digit Secondary Control ID code.
1-8 Digit Secondary Control ID code		20. Enter the 1st digit of the Secondary Control ID code by clicking the Program button until the program display shows the desired number. Pause—the radio will sound a low tone and show a hyphen across the center of the display to indicate that it is ready to accept the next digit.
		21. Enter the 2nd digit of the Secondary Control ID code by clicking the Program button until the program display shows the desired number. Pause—the radio sounds a low tone and will show a hyphen across the center of the display to indicate that it is ready to accept the next digit.
		22. Enter the 3rd digit of the Secondary Control ID code by clicking the Program button until the program display shows the desired number. Pause—the radio sounds a low tone and will show a hyphen across the center of the display to indicate that it is ready to accept the next digit. Continue entering up to eight digits.
		23. Press and release the **ON/PTT** button to save your programming. A triple beep will sound to indicate that programming was successful and a hyphen will appear on the program display. The radio is now ready for another program entry. An error tone will sound if you attempt to save an incorrect code and an "E" will appear on the display. Check the digits you are attempting to enter, then re-enter.
	521	24. Refer to Table 3 to determine the three-digit Operation code for Primary Transpond ON.
		25. Click the Program button until the program display shows the Program Code “C”. Pause—the radio will sound a low tone and show a hyphen across the center of the display to indicate that it is ready to accept the next programming code.
Primary Transpond ON Code		26. Enter the 1st digit of the Primary Transpond ON code by clicking the Program button until the program display shows the desired number. Pause—the radio will sound a low tone and show a hyphen across the center of the display to indicate that it is ready to accept the next digit.
		27. Enter the 2nd digit of the Primary Transpond ON code by clicking the Program button until the program display shows the desired number. Pause—the radio sounds a low tone and will show a hyphen across the center of the display to indicate that it is ready to accept the next digit.
		28. Enter the 3rd digit of the Primary Transpond ON code by clicking the Program button until the program display shows the desired number. Pause—the radio sounds a low tone and will show a hyphen across the center of the display to indicate that it is ready to accept the next digit.
		29. Press and release the **ON/PTT** button to save your programming. A triple beep will sound to indicate that programming was successful and a hyphen will appear on the program display. The radio is now ready for another program entry. An error tone will sound if you attempt to save an incorrect code and an "E" will appear on the display. Check the digits you are attempting to enter, then re-enter.
	561	24. Refer to Table 3 to determine the three-digit Operation code for Secondary Transpond ON.
		25. Click the Program button until the program display shows the Program Code “C”. Pause—the radio will sound a low tone and show a hyphen across the center of the display to indicate that it is ready to accept the next programming code.
Secondary Transpond ON Code		26. Enter the 1st digit of the Scondary Transpond ON code by clicking the Program button until the program display shows the desired number. Pause—the radio will sound a low tone and show a hyphen across the center of the display to indicate that it is ready to accept the next digit.
		27. Enter the 2nd digit of the Secondary Transpond ON code by clicking the Program button until the program display shows the desired number. Pause—the radio sounds a low tone and will show a hyphen across the center of the display to indicate that it is ready to accept the next digit.
		28. Enter the 3rd digit of the Secondary Transpond ON code by clicking the Program button until the program display shows the desired number. Pause—the radio sounds a low tone and will show a hyphen across the center of the display to indicate that it is ready to accept the next digit.
		29. Press and release the **ON/PTT** button to save your programming. A triple beep will sound to indicate that programming was successful and a hyphen will appear on the program display. The radio is now ready for another program entry. An error tone will sound if you attempt to save an incorrect code and an "E" will appear on the display. Check the digits you are attempting to enter, then re-enter.
		30. Once you have made your final program entry, press the **ON/PTT** button a final time to turn the radio off. Turn the radio back on for normal operation.

IMPORTANT NOTE:

1. Your Ritron® dealer can PC program the callbox to additional features associated with the Primary or Secondary Control ID function. Contact your Ritron® dealer for details.

TABLE 3: RELAY AND LISTEN IN OPERATION CODES (PROGRAM CODE C) .....

Table Code	Feature	Key	Description
Operation Codes			
401	No Switch	√	Disables all switch and Listen In operation. No Primary or Secondary Control ID code required.
403	No Switch, Listen In		Listen In operation uses Secondary Control ID code only.
405	Switch On when called		Switch closes (e.g. strobe light turns on) when Callbox 1st receives a call. Switch opens (e.g. stobe light turns off) as soon as the PTT is pressed, or if the Callbox has not been used (transmit or receive) for a period of time longer than RQX Reset Time. No Primary or Secondary Control ID code required.
407	Switch On when called, Listen In		Switch operation is as described for Operation Code 405. Listen In operation uses Secondary Control ID code only.
409	Switch On when active		Switch is closed (e.g. strobe light turns on) as long as Callbox is in use. Switch opens (e.g. stobe light turns off) when Callbox has not been used (transmit or receive) for a period of time longer than RQX Reset Time. No Primary or Secondary Control ID code required.
411	Switch On when active, Listen In		Switch operation is as described for Operation Code 409. Listen In operation uses Secondary Control ID code only.
413	Switch On when active with Turn Off code		Switch is closed (e.g. strobe light turns on) when the Callbox receives or transmits a message, and will remain on until the correct Secondary Control ID code is received. No Primary Control ID code required.
415	GateGuard® Switch momentary		Switch is closed for 1 second when the correct Primary Control ID code is received. No Secondary Control ID code required.
416	GateGuard® Switch momentary, Listen In		Momentary switch operation uses the Primary Control ID code, Listen In uses the Secondary Control ID code.
417	GateGuard® Switch toggle		Switch alternately closes and opens when the correct Primary Control ID code is received. No Secondary Control ID code required.
418	GateGuard® Switch toggle, Listen In		Toggle switch operation uses the Primary Control ID code, Listen In uses the Secondary Control ID code.
419	GateGuard® Switch On/Off code		Switch is closed when the correct Primary Control ID code is received, and opened when the correct Secondary Control ID code is received.
Primary Control ID Features			
510	Primary Ring Tone OFF		No Ring signal when radio receives the Primary Control ID code.
511	Primary Ring Tone ON	√	Callbox will sound a Ring signal in the speaker upon receiving the Primary Control ID code.
520	Primary Transpond OFF		No Transpond transmission after receiving the Primary Control ID code.
521	Primary Transpond ON	√	Callbox will transmit a Transpond tone to acknowledge receiving the Primary Control ID code.
Secondary Control ID Features			
550	Secondary Ring Tone OFF	√	No Ring signal when radio receives the Secondary Control ID code.
551	Secondary Ring Tone ON		Callbox will sound a Ring signal in the speaker upon receiving the Secondary Control ID code.
560	Secondary Transpond OFF	√	No Transpond transmission after receiving the Secondary Control ID code.
561	Secondary Transpond ON		Callbox will transmit a Transpond tone to acknowledge receiving the Secondary Control ID code.
Listen In Time Features			
581	Listen In 5 seconds	√	The Callbox will automatically transmit for a period of time equal to the Listen In Time when the correct Secondary Control ID code is received.
582	Listen In 10 seconds		
583	Listen In 20 seconds		
584	Listen In 30 seconds		
	KEY:	√	The Callbox is set from the factory with these options **enabled**.

NOTE: Field programming any of the Primary Control ID Features (Ring Tone or Transpond) will not only apply to receiving the Primary Control ID code, but will also apply when receiving an SUID, Group ID or All Call code. If this is not desirable the radio must be PC Programmed.

How to Field Program Feature Codes

The DMR HD-Series Callbox can be field programmed for a number of advanced features. Refer to Table 4 for the two or three digit codes available for field programming. In our example we will program an RQX-417DMR for an RQX Reset Time of 30 seconds.

04		1. Refer to Table 4 to determine the two or three-digit feature code and write it down.
		2. Loosen the (2) screws in the front corners of the case.
		3. Separate the case front from the case back, leaving the batteries connected to the radio. Make sure the unit has batteries installed. **NOTE:** The voltage of the batteries must be greater than 3.3 VDC to program properly.
		4. Press and release the **ON/PTT** button on the front of the unit to turn the radio on.
		5. Press and **HOLD** the Program Button (See FIG-2 for location). A "P" will appear on the program display as you enter program mode and the radio will beep rapidly.
		6. Release the program button after the beeping has stopped. The radio will emit a triple beep indicating that the radio is in program mode and a hyphen will appear on the program display.
		7. Click the Program button until the program display shows the Program Code "A". Pause—the radio will sound a low tone and show a hyphen across the center of the display to indicate that it is ready to accept a 2-digit or a 3-digit Feature code.
FEATURE CODE		8. Enter the 1st digit of the feature code by clicking the Program button until the program display shows the desired number. Pause—the radio will sound a low tone and show a hyphen across the center of the display to indicate that it is ready to accept the next digit.
		9. Enter the 2nd digit of the feature code (if necessary) by clicking the Program button until the program display shows the desired number. Pause—the radio sounds a low tone and will show a hyphen across the center of the display to indicate that it is ready to accept the next digit.
		10. Enter the 3rd digit of the feature code (if necessary) by clicking the Program button until the program display shows the desired number. Pause—the radio sounds a low tone and will show a hyphen across the center of the display to indicate that it is ready to accept the next digit.
	 	11. Press and release the **ON/PTT** button to save your programming. A triple beep will sound to indicate that programming was successful and a hyphen will appear on the program display. The radio is now ready for another program entry. **NOTE:** An error tone will sound if you attempt to save an incorrect code, an "E" will appear on the display. Check the digits you are attempting to enter, then re-enter.
		12. Once you have made your final program entry, press the **ON/PTT** button a final time to turn the radio off. Turn the radio back on for normal operation.

TABLE 4: ADVANCED FEATURE CODES (PROGRAM CODE A) .....

Table Code	Feature	Key	Description
RQX Reset Time			
01	5 seconds		RQX Reset Time is the length of time the RQX Callbox can remain inactive (not receiving or transmitting) before it automatically shuts off.
02	10 seconds	√	
03	20 seconds		
04	30 seconds		
05	45 seconds		
06	1 minute		
07	2 minutes		
08	3 minutes		
09	4 minutes		
Special Features			
21	Reset to Factory Defaults		Resets all Callbox features that can be field programmed to Factory default programming.
22	Display Radio Revision		Callbox will display a sequence of 6 digits to identify operating code revision. The 1st 2 digits are the model type and the last 4 are firmware revision.
230	Disable external power loss alert	√	Disables the External +12 VDC "Loss of power" notification and reverts back to "Low Battery" notification.
231	Enable external power loss alert		Enables the External +12 VDC "Loss of power" notification feature.
240	Disable Auto Turn-Off		Callbox will remain on at all times. This mode of operation is not recommended for battery-powered applications.
241	Enable Auto Turn-Off	√	Callbox will automatically turn off when it has not been used (transmit or receive) for a period of time longer than the RQX Reset Time.
250	Disable Busy Channel TX Inhibit	√	Callbox will transmit whenever the PTT is pressed, regardless of any received signal.
251	Enable Busy Channel TX Inhibit		Callbox cannot transmit when there is a received signal. A "busy signal" will be heard on the Callbox speaker when the PTT is pressed and a received signal is present.
260	Fixed Mic Gain		Places the microphone into a fixed gain mode which can be experientally determined by selection various settings for the input gain from 0 to 255. Lower fixed gains may be desired for high background ambient noise situations. This number can only be programmed via PC.
261	Mic Gain is AGCed	√	Microphone gain adjusts to the loudness of the speaker's voice. Higher background noise will be present compared to fixed gain.
280	Call Tone **OFF**		Disables Call Tone.
281	Call Tone **ON**	√	When PTT button is initially pressed a Call Tone will be transmitted at a low level.
Record Voice Messages			
31	Voice Alert (4 sec. max)		Once recorded, the message is transmitted when the PTT is 1st pressed.
32	Greeting Message (12 sec. max)		Once recorded, the message plays on speaker when the PTT is 1st pressed.
33	Sensor Detect On (4 sec. max)		Once recorded, the messae is transmitted when the Sensor Input is pulled low.
34	Sensor Detect Off (4 sec. max)		Once recorded, the message is transmitted when the Sensor Input is pulled high.
35	Low Battery (4 sec. max)		Once recorded, the message is transmitted when low battery voltage is detected.
36	Power Fail (4 sec. max)		Once recorded, the message is transmitted when a +12VDC power fail is detected.
Play Voice Messages			
41	Voice Alert		Plays the recorded message on the speaker for review.
42	Greeting Message		
43	Sensor Detect On		
44	Sensor Detect Off		
45	Low Battery		
46	Power Fail		

TABLE 4: ADVANCED FEATURE CODES (PROGRAM CODE A) .....

Table Code	Feature	Key	Description
Erase Voice Messages			
51	Voice Alert		Erases the recorded message.
52	Greeting Message		
53	Sensor Detect On		
54	Sensor Detect Off		
55	Low Battery		
56	Power Fail		
Resend Voice Alert Message			
60	0 Re-Sends	√	Number of times the Voice Alert message will be resent. The period of time between resends is the RQX Reset Time. Resend is terminated when the Callbox receives a response transmission.
61	1 Re-Sends		
62	2 Re-Sends		
63	3 Re-Sends		
64	4 Re-Sends		
65	5 Re-Sends		
Programming Readout Codes			
81	Frequency Code		Display will sequentially show the programmed 2 or 3-digit Frequency Code. (1)
84	RQX Reset Time		Display will sequentially show the programmed 2-digit RQX Reset Time Code.(2)
85	Switch Operation		Display will sequentially show the programmed 2-digit Switch Operation Code.
86	Listen In Time		Display will sequentially show the programmed 2-digit Listen In Time Code. (2)
87	Receive Volume Level		Display will sequentially show the programmed 2-digit Receive Volume Level Code.(2)

KEY: √ The Callbox is set from the factory with these options **enabled**.

NOTES:
(1) 999 indicates a non-table frequency or that TX and RX are not the same.
(2) ERROR indication will be displayed if not a Field Programming value (has been PC programmed).

How to Field Program Digital Mode Readout Codes.....

In addition to the Programming Readout Codes available in Table 4, the DMR HD-Series digital mode programming can be read out using the field programming codes in Table 5. In our example we will readout the Destination ID code of an RQX-417DMR that has been programmed for a Group Destination ID of 408.

	1.	Loosen the (2) captive screws in the front corners of the case and separate the case front from the case back, leaving the batteries connected to the radio. Make sure the unit has batteries installed. The voltage of the batteries must be greater than 3.3 VDC to program properly.
	2.	Press and release the **ON/PTT** button on the front of the unit to turn the radio on.
	3.	Press and **HOLD** the Program Button (See FIG-2 for location). A "P" will appear on the program display as you enter program mode and the radio will beep rapidly. Release the program button after the beeping has stopped. The radio will emit a triple beep indicating that the radio is in program mode and a hyphen will appear on the program display.
7	4.	Refer to Table 5 to determine the table code for Destination ID Code readout.
	5.	Click the Program button until the program display shows the Program Code "r". Pause—the radio will sound a low tone and show a hyphen across the center of the display to indicate that it is ready to accept the next programming code.
	6.	Enter the single digit table code for Destination ID Code readout by clicking the Program button until the program display shows the desired number. Pause—the radio will sound a low tone and show a hyphen across the center of the display to indicate that it is ready to accept the next digit.
	7.	Press and release the **ON/PTT** button to initiate the code readout.
	8.	The first digit displayed indicates that the radio is programmed for a Group Destination ID code.
Destination ID Code 	9.	The next eight digits displayed indicates the Destination ID code.
	10.	Once the code readout is complete a triple beep will sound to and a hyphen will appear on the program display. The radio is now ready for another program entry.
	11.	Once you have made your final program entry, press the **ON/PTT** button a final time to turn the radio off. Turn the radio back on for normal operation.

Table 5: Digital Mode Readout Codes (Program Code r) .....

Table Code	Feature	Description
Digital Mode Readout Codes		
1	RX Color Code	Display will sequentially show the programmed 2-digit RX Color Code.
2	TX Color Code	Display will sequentially show the programmed 2-digit TX Color Code.
3	SUID code	Display will sequentially show the programmed 8 digit SUID code.
4	RX Group ID code	Display will sequentially show the programmed 8 digit RX Group ID code.
5	Primary Control ID code	Display will sequentially show the programmed 8 digit Primary Control ID code.
6	Secondary Control ID code	Display will sequentially show the programmed 8 digit Secondary Control ID code.
7	Destination ID code	Display will sequentially show the programmed 8 digit Destination ID code. The first digit will display 1 for an Individual Destination or a 2 for a Group Destination ID. The next 8 digits are the destination ID.

PC Programmable DMR HD-Series Callbox Features

The DMR HD-Series Callbox has a variety of programmable features that determine how your callbox operates. Some of these features can be Field Programmed (FP) by you without using special tools, while other features can only be Programmed (PC) with a PC and RQX Series PC Programmer RQX-PCPS-1.0 or higher. Contact your Ritron® dealer or the factory for details.

Glossary of Terms	
Intercom Mode	The Automatic Turn-Off feature has been disabled and the Callbox is able to receive calls at any time.
No Activity Time	A continuous period of time where the Callbox is not sending or receiving a call.

Table 6: PC Programmable Features

Feature	Key	Description
Field Programming Enable		This option is **ENABLED** as the Factory Default setting. This permits all Field Programmable features (FP) to be field programmed by you. If **DISABLED**, the features can only be programmed using special Ritron® PC Programming software.
Send Call Tone	√	The Factory Default setting has the Call Tone feature **ON** (refer to "How to Field Program Feature Codes"**)**. The callbox can be programmed to transmit a Call Tone if the Reset Time has expired and the **ON/PTT** button is pressed. This will alert system users that the call is originating from the callbox. The duration of the Call Tone can be PC programmed for 0.5-8 seconds (factory default setting is 1.5 seconds).
Speaker Volume	√	The Factory Default setting is medium volume setting of 50%. Field Programming or PC Programming allows any volume level between 20 – 100%. A lower speaker volume reduces audio distortion and provides a more natural sound. For best performance, do not set the volume any higher than is necessary for your application.
Automatic Turn-Off	√	This feature is ENABLED as the Factory Default setting. The callbox will turn **OFF** when the RQX Reset Time has expired. The Reset Time is a pre-programmed amount of time of "no activity" (no calls transmitted, no calls received) before the callbox turns **OFF** in order to conserve battery life. The callbox can be turned back **ON** when the **ON/PTT** button is pressed. This is the recommended mode of operation for all battery only powered applications. If Automatic Turn-OFF is **NOT** selected the callbox does **NOT** completely turn **OFF**, but remains in the Intercom mode, allowing the callbox to receive calls at any time. Operating the callbox with Automatic Turn-Off DISABLED significantly increases battery drain, and is therefore **NOT** recommended for battery only powered applications. Battery life can be increased using the Battery Saver Enable feature detailed in this section.
RQX Reset Time	√	Set from the factory for 10 seconds, the RQX Reset Time can be Field Programmed to 9 different times ranging from 5 seconds to 4 minutes, and PC programmed for 5-255 seconds. A shorter RQX Reset Time will result in increased battery life. In standard Automatic Turn-Off operation a longer RQX Reset Time will allow more time for a response before the Callbox turns off. RQX Reset Time defines the Inactivity Time allowed before the Callbox: • Turns Off if Automatic Turn-Off is ENABLED. • Automatically opens the Switch output.
Power Fail Alert Tone	√	By selecting the +12 VDC Power Fail Alert Tone feature the callbox will look for a loss of the +12 VDC power source. The callbox will immediately transmit an Alert Tone to notify personnel that the +12 VDC source has been lost and is now operating on battery back-up. The callbox will transmit an Alert Tone once every hour until the +12 VDC power source is restored or until the back-up batteries are exhausted. Even if this feature is **NOT** selected, it will always revert to Back-up Battery power.
Microphone Gain	√	The Microphone can be placed in FIXED or AGC gain mode. The AGC mode generally works well for applications where the speakers voice level can vary greatly. However, with quiet periods of speech background noise will rise due to increasing gain. In high background noise applications, using the fixed gain mode with a lower number programmed in the text box will decrease background noise transmitted by the Callbox. The caller will need to get closer to the callbox when speaking but overall background noise will be less. The fixed gain is programmable from 0 to 255.

KEY: √ Feature is Field Programmable.

TABLE 6: PC PROGRAMMABLE FEATURES (CONTINUED) .....

Feature	Key	Description
Listen In	√	Listen In allows remote activation of the Callbox transmitter for a programmed period of time when the correct DMR Secondary Control ID code is decoded. This feature, turned **OFF** by default, can be Field Programmed to 4 different transmit times ranging from 5-30 seconds and PC programmed for 1-255 seconds. The DMR Secondary Control ID code required to activate the feature can be Field or PC Programmed with an 8-digit DMR Secondary Control ID code.
Busy Channel TX Inhibit	√	With this feature enabled the Callbox cannot transmit when there is a received signal. A "busy signal" will be heard on the Callbox speaker when the PTT is pressed and a received signal is present. Busy Channel TX Inhibit is disabled from the factory.
Sensor/Contact Closure Input		The Callbox will send a warning tone when a change in the Sensor Input is detected. The Sensor Input will respond to an **OPEN** or **CLOSED** switch. This is not a programmable feature.
Transmit Beep Enable		This feature is turned on from the factory to provide a short beep in the Callbox speaker any time the **ON/PTT** button is pressed. This assures the Callbox user that the radio has turned on and is ready to transmit their message. With this feature disabled the Callbox will only beep when the radio is first turned on.
RX Courtesy Beep Enable		In high noise environments it is sometimes difficult to determine when a received message has ended. With the RX Courtesy Beep enabled the Callbox will sound a short beep on the speaker at the end of each received transmission.
TX Time Out Time		Set from the factory for 60 seconds, the TX Time Out Time can be PC programmed for 1-255 seconds. This sets the length of time the Callbox can transmit continuously. If the **ON/PTT** button is held down longer then the TX Time Out Time will allow, the radio will stop transmitting and a "Busy Signal" will be heard in the speaker until the button is released.
Call Hang Time		When the DMR HD-Series callbox receives an Individual ID call a 0-30 second Call Hang Time allows the callbox to transmit a return Individual ID call, regardless of TX Destination ID programming. This allows a discreet 2-way call between the callbox and the calling radio.
Repeater Mode		The DMR HD-Series callbox can be set to operate in Repeater Mode when the TX and RX frequencies are programmed to a repeater offset. Repeater Mode cannot be used when using TX/ RX table frequencies.
Base Station (Repeater) Address		The DMR HD-Series callbox can be programmed for a unique Base Station (Repeater) Address that will let the radio make a call to a specific destination through the repeater. It can be left blank, or programmed for 1-16,776,415.
Repeater/Time Slot		Sets the repeater voice operation for TDMA time slot 1 or 2.
Repeater Delay Time		Sets a 0-8 second wait time before the callbox listens for signals after transmitting. The Repeater Delay Time must be greater than the repeater hang time. Thi is used for deciding if voice messages have been acknowledged.
Transpond		When the radio receives a valid individual ID, Group ID, or Control ID call it will transmit an acknowledgement tone back to the caller. This notifies the caller that their message was successfully received.
Ring Tone Enable		With Ring Tone enabled an alert tone will be heard on the callbox speaker, similar to a telephone ring tone, whenever a valid individual ID, Group ID, or Control ID call is received. Responding to the call will temporarily disable the Ring Tone until a a period of inactivity has elapsed that exceeds the programmed RQX Time.
Squelch Tightener		Sets the noise squelch to a value between -2 and 5. The factory default setting of 0 sets noise squelch to approximately -120dBm. Decreasing the value sets the squelch to allow weak, distant signals to be received. Increasing the value will block out all but strong, near range signals.

KEY: √ Feature is Field Programmable.

INTERCOM (ALWAYS ON) PROGRAMMING

The DMR HD-Series Callbox can be Field or PC programmed by the factory or by your Ritron® dealer to operate as a two-way intercom. When operating as an intercom the Automatic Turn-Off must be **DISABLED** so that the radio will remain **ON** in a "intercom" mode. The callbox can receive a call from another radio at any time. The higher current requirements of Intercom operation make it undesirable in battery powered only installations. It is recommended that you power the callbox using +8 to 12 VDC supply.

Required Radio Programming:

Automatic Turn-Off..... **(Field or PC Programmable)**

This feature must be **DISABLED** via Field or PC programming for the callbox to remain **ON** at all times.

Other Programmable Features to Consider:

Busy Channel TX Inhibit..... **(Field or PC Programmable)**

If **ENABLED** this feature prevents you from talking over someone else on the same channel even if they are using a different tone code. The radio will beep a series of long, low tones that sounds like a "busy signal" when you press the **ON/PTT** button.

FEATURES TO USE WITH INTERCOM (ALWAYS ON) PROGRAMMING

Programming for Selective Calling:

DMR Individual ID squelch mode.....**(Field or PC Programmable)**

This allows selective calling to a DMR HD-Series Callbox in a radio system where there is more than one Callbox. When the Callbox is programmed for DMR Individual ID squelch mode in Intercom (Always-On) mode it will sound an alert tone on the Callbox speaker, similar to a telephone ring tone, whenever the DMR Individual ID has been successfully decoded. This will alert any users in the immediate area that there is an incoming call on the Callbox.

Ring Tone.....**(Field or PC Programmable)**

Ring Tone must be set to sound the alert tone on the Callbox speaker when the DMR Individual ID is successfully decoded.

Switch Output Programming:

Switch on When Called.....**(Field or PC Programmable)**

This will close the internal Switch Output whenever the radio receives a call after an Inactivity Time that exceeds the RQX Reset Time. The switch will remain closed until the **ON/PTT** button is pressed or the RQX Reset Time expires. The Switch Output could be used to turn on a light or activate an alarm to notify users in the area that an incoming call was present.

SWITCH OUTPUT OPTIONS (ALLOWS CONTROL OF AN EXTERNAL DEVICE).....

(e.g., a gate controller, a strobe light, or any relay controlled device.)

The DMR HD-Series switch output is a simple 2-Amp relay contact closure that can be used to **OPEN** and **CLOSE** a gate, switch on a light, sound an alarm or any other application where remote control of an ON/OFF switch is required. The DMR HD-Series Callbox can be programmed to **OPEN** and **CLOSE** the Switch Output when one of the following programmed conditions is met.

The DMR HD-Series Callbox can be programmed to **OPEN** and **CLOSE** the switch using a DMR Control ID code.

No Switch.....**(Field or PC Programmable)**

Select this option for no switch operation.

Switch On When Called .....**(Field or PC Programmable)**

With this option selected the switch will **CLOSE** when the Callbox first receives a call. The switch will remain **CLOSED** until the **ON/PTT** button is pressed or the RQX Reset Time expires. This option is not applicable if the Callbox is programmed for Automatic Turn-Off.

Switch On When Callbox in Use .....**(Field or PC Programmable)**

This option will **CLOSE** the switch when the Callbox first sends or receives a call. The switch will remain closed until the RQX Reset Time expires, which also turns the radio off if it is programmed for Automatic Turn-Off.

Switch On When Active with Turn-Off Code .....**(Field or PC Programmable)**

This option operates the same as Switch On When Callbox in Use with the added ability to **OPEN** the switch when a unique DMR Secondary Control ID code is received. Unlike the Switch On When Callbox in Use feature, the switch will not **OPEN** when the RQX Reset Time expires unless the Callbox is programmed for Automatic Turn-Off.

- For programming see "HOW TO FIELD PROGRAM DMR RELAY AND LISTEN-IN OPERATION"

GateGuard® – Momentary for 1 sec. .....**(Field or PC Programmable)**

With this option selected the switch will momentarily **CLOSE** when a unique DMR Primary Control ID code is received. The switch will remain **CLOSED** for the programmed period of time, programmable for 1-255 seconds.

- For programming see "HOW TO FIELD PROGRAM DMR RELAY AND LISTEN-IN OPERATION"

GateGuard® – Toggle .....**(Field or PC Programmable)**

With this option selected the switch will alternately **OPEN** and **CLOSE** when it receives a unique DMR Primary Control ID code is received. After the code is received the Callbox will transmit a **SINGLE BEEP** if the switch has been **OPENED** and a **DOUBLE BEEP** if the switch has been **CLOSED**. The switch will open when the Callbox turns off if it is programmed for Automatic Turn-Off.

- For programming see "HOW TO FIELD PROGRAM DMR RELAY AND LISTEN-IN OPERATION"

GateGuard® – On Code / Off Code .....**(Field or PC Programmable)**

When this option is selected the switch will **CLOSE** when a unique DMR Primary Control ID code is received, and **OPEN** when a DMR Secondary Control ID code is received. The switch will **OPEN** when the Callbox turns off if it is programmed for Automatic Turn-Off.

- For programming see "HOW TO FIELD PROGRAM DMR™ RELAY AND LISTEN-IN OPERATION"

AUTOMATIC VOICE MESSAGES

The DMR HD-Series Callbox is equipped to use pre-recorded voice messages that notify radio system users when specific events occur. These unique voice messages are recorded and stored on the Callbox, and automatically played back when the associated event occurs. The DMR HD-Series Callbox supports 6 different message events and comes from the factory with no messages recorded.

To activate any of the 6 event messages simply record the voice message per the instructions in this manual. The recorded message can be played back for your review and re-recorded if necessary. You can erase any event message individually if you decide not to utilize that message.

Greeting Message

The Greeting Message is played on the DMR HD-Series Callbox speaker when the push-to-talk button is first pressed. This message is used to give the Callbox user instruction on how to proceed. A typical message might be *'Welcome to our facility. An attendant will be with you shortly."*

The Greeting Message:

- Is played on the Callbox speaker only when the push-to-talk button is first pressed.
- Will be re-played every time the push-to-talk button is pressed until the Callbox is answered.
- Is not transmitted.
- Can be up to 12 seconds long.

Voice Alert Message

The Voice Alert Message is transmitted automatically by the Callbox when the push-to-talk button is first pressed. Often used with the Call Tone feature, this message alerts radio system users that the Callbox has been activated. Typical messages might be *"South delivery entrance"*, *"Curbside Lane 4"* or *"Main gate"*.

The Voice Alert Message:

- Is transmitted automatically by the Callbox when the push-to-talk button is first pressed.
- Will be re-transmitted every time the push-to-talk button is pressed until the Callbox is answered.
- Is transmitted after the Greeting Message has played on the speaker. If the Greeting Message is not used, the Voice Alert Message will be heard on the speaker.
- Will not be sent if the radio channel is busy when Busy Channel TX Inhibit feature has been enabled. Instead, it will wait for the channel to clear before transmitting.
- Will be automatically re-transmitted periodically until the Callbox is answered if the Callbox has been programmed with the Automatic ID Re-Send feature.
- Will be sent after the Call Tone if the Call Tone feature is enabled.
- Is automatically sent ahead of Sensor Detect or Low Battery/Power Fail messages.
- Can be up to 4 seconds long.

Power Fail Message

With the "External +12V Power Fail Alert" enabled the Power Fail Message is automatically transmitted when loss of external power is detected on the Callbox.

The Power Fail Message:

- A typical message might be *"Power failure"*
- Will be sent automatically when the loss of the External +V supply voltage is detected.
- Will not be sent if the radio channel is busy, but instead will wait for the channel to clear before transmitting.
- The Voice Alert Message is sent immediately before the Low Battery/Power Fail Message, so a typical transmission might be *"South delivery entrance"* followed by *"Power Failure"*.
- The Call Tone is sent before both messages if the Call Tone feature is enabled.
- Will be sent automatically at the end of any Callbox transmission if a loss of the External +V supply voltage is detected. The message is appended to the existing transmission, and the Call Tone and Voice Alert Message will only be sent if it was a part of the existing transmission.

Low Battery Message

The Low Battery Message is appended to a transmission when low voltage is detected on the 3 D-cell battery pack on the Callbox.

The Low Battery Message:

- A typical message might be *"Low battery"*
- Is NOT sent automatically when the loss of the battery supply voltage is detected.
- Will be sent automatically at the end of any Callbox transmission if low battery voltage is detected. The message is appended to the existing transmission, and the Call Tone and Voice Alert Message will only be sent if it was a part of the existing transmission.

Sensor Detect On Message

The Sensor Detect On Message is automatically transmitted when the Sensor Input is pulled low. Depending on the sensor used, a typical message might be *"Door open"*, *"Motion detected" or "Vehicle present"*. The Voice Alert Message is sent immediately before the Sensor Detect On Message, so a typical transmission might be *"South delivery entrance"* followed by *"Door open"*.

The Sensor Detect On Message:

- Is automatically transmitted when the Sensor Input is pulled low.
- Will not be sent if the radio channel is busy, but instead will wait for the channel to clear before transmitting.
- Is sent after the Call Tone and the Voice Alert Message if the radio is programmed for those features.
- Can be up to 4 seconds long.

Sensor Detect Off Message

The Sensor Detect Off Message is automatically transmitted when the Sensor Input is pulled high. Depending on the sensor used, a typical message might be *"Door closed"*, *"Motion detected" or "Vehicle present"*. The Voice Alert Message is sent immediately before the Sensor Detect Off Message, so a typical transmission might be *"South delivery entrance"* followed by *"Door closed"*.

The Sensor Detect Off Message:

- Is automatically transmitted when the Sensor Input is pulled high.
- Will not be sent if the radio channel is busy, but instead will wait for the channel to clear before transmitting.
- Is sent after the Call Tone and the Voice Alert Message if the radio is programmed for those features.
- Can be up to 4 seconds long.

AUTOMATIC ID RE-SEND

The RQX DMR HD-Series Callbox can automatically re-send the Call Tone, Voice Alert Message, and DTMF or Selcall ANI a programmed number of times when a call is not immediately answered. This allows the Callbox to periodically repeat the Voice Alert Message without further input from the Callbox user. The periodic rate is determined by the RQX Reset Time.

Following is an example of Automatic ID Re-Send programming and its effect:

The Callbox is field programmed for:

- Greeting Message "*Welcome to Ritron, someone will be with you shortly*"
- Voice Alert Message "*Main Entrance*"
- Call Tone ON
- Automatic Turn-Off enabled
- RQX Reset Time of 20 seconds
- Automatic ID Re-Send set to 1

Here is how it will operate:

- A guest presses the Callbox On/PTT button and the Greeting Message "*Welcome to Ritron, someone will be with you shortly*" is heard on the Callbox speaker.
- If the radio channel is not being used the Callbox will transmit the Call Tone, followed by the Voice Alert Message "*Main Entrance*." This will be heard by all system radio users, but not heard on the Callbox speaker.
- If the Callbox is not answered within 20 seconds (RQX Reset Time) the Call Tone and Voice Alert Message will be re-transmitted (Automatic ID Re-Send).
- If the Callbox is again not answered within 20 seconds (RQX Reset Time) it will turn off (if Automatic Turn-Off is enabled).
- If the Callbox On/PTT button is pressed again at any time before it is answered the entire process described above is re-started.
- If the Callbox is answered before it automatically turns off the Callbox operates as normal 2-way radio communication with no messages or Call Tone.

Using Automatic ID Re-Send to Extend RQX Reset Time

A Voice Alert Message does not have to be used to enjoy the benefits of Automatic ID Re-Send. This feature can also be used to extend the RQX Reset Time whenever the Callbox On/PTT button is 1st pressed, providing radio users additional time to respond to the Callbox.

For example, if the Callbox is programmed for an RQX Reset Time of 10 seconds and Automatic ID Re-Send of 5, the Callbox will remain ON for 60 seconds (RQX Reset Time plus RQX Reset Time multiplied by number of Automatic ID Re-Send) after the On/PTT button is 1st pressed instead of 10 seconds (RQX Reset Time). Once the Callbox has been answered it will turn off after 10 seconds (RQX Reset Time) of inactivity.

How to Record a Voice Message

Recite your voice message a number of times before recording to be sure it can be completed in the time allowed. For best results speak directly into the Callbox microphone in a slow, clear voice.

32	1. Refer to Table 4 to determine the two-digit Record Code and write it down.
	2. Loosen the (2) screws in the front corners of the case.
	3. Separate the case front from the case back, leaving the batteries connected to the radio. Make sure the unit has batteries installed. **NOTE:** The voltage of the batteries must be greater than 3.3 VDC to record properly.
	4. Press and release the **ON/PTT** button on the front of the unit to turn the radio on.
	5. Press and **HOLD** the Program Button (See FIG-2 for location). A "P" will appear on the program display as you enter program mode and the radio will beep rapidly.
	6. Release the program button after the beeping has stopped. The radio will emit a triple beep indicating that the radio is in program mode and a hyphen will appear on the program display.
	7. Click the Program button until the program display shows the Program Code “A”. Pause—the radio will sound a low tone and show a hyphen across the center of the display to indicate that it is ready to accept a 2-digit Record Voice Message Code.
Voice Message Code 	8. Enter the 1st digit of the Record Code by clicking the Program button until the program display shows the desired number. Pause—the radio will sound a low tone and show a hyphen across the center of the display to indicate that it is ready to accept the next digit.
	9. Enter the 2nd digit of the Record Code by clicking the Program button until the program display shows the desired number. Pause—the radio sounds a low tone and will show a hyphen across the center of the display to indicate that it is ready to accept the next digit.
	10. Press and release the **ON/PTT** button to save the 2-digit Record Voice Message Code and initiate the voice record process.
	NOTE: An error tone will sound if you attempt to enter an incorrect code, an "E" will appear on the display. Check the digits you are attempting to enter, then re-enter.
	11. Press and hold the **Program** button waiting for beep before recording the message. Speak directly into the microphone.
	12. Release the **Program** button when you have completed the message. The message will be played back and a hyphen will appear on the program display. The radio is now ready to record another message, or for another program entry.
	13. Once you have recorded your final message, press the **ON/PTT** button a final time to turn the radio off. Turn the radio back on for normal operation.

How to Play a Voice Message

Recorded voice messages can be played back on the Callbox speaker for review.

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1. Refer to Table 4 to determine the two-digit Play Code and write it down.
2. Loosen the (2) screws in the front corners of the case.
3. Separate the case front from the case back, leaving the batteries connected to the radio. Make sure the unit has batteries installed.
   NOTE: The voltage of the batteries must be greater than 6 VDC to record properly.
4. Press and release the **ON/PTT** button on the front of the unit to turn the radio on.

5. Press and **HOLD** the Program Button (See FIG-2 for location). A "P" will appear on the program display as you enter program mode and the radio will beep rapidly.

6. Release the program button after the beeping has stopped. The radio will emit a triple beep indicating that the radio is in program mode and a hyphen will appear on the program display.

7. Click the Program button until the program display shows the Program Code "A". Pause—the radio will sound a low tone and show a hyphen across the center of the display to indicate that it is ready to accept a 2-digit Play Recorded Message Code.

Voice Message Code

8. Enter the 1st digit of the Play Code by clicking the Program button until the program display shows the desired number. Pause—the radio will sound a low tone and show a hyphen across the center of the display to indicate that it is ready to accept the next digit.

9. Enter the 2nd digit of the Play Code by clicking the Program button until the program display shows the desired number. Pause—the radio sounds a low tone and will show a hyphen across the center of the display to indicate that it is ready to accept the next digit.
10. Press and release the **ON/PTT** button to begin playback of the message. If the message has not been recorded an error tone will sound and an "E" will appear on the display.

NOTE: An error tone will sound if you attempt to enter an incorrect code, an "E" will appear on the display. Check the digits you are attempting to enter, then re-enter.

11. Once the message playback is complete a triple beep will sound and a hyphen will appear on the program display. The radio is now ready to playback another message, or for another program entry.
12. Once you have played your final message, press the **ON/PTT** button a final time to turn the radio off. Turn the radio back on for normal operation.

How to Erase a Voice Message

If you decide not to use a voice message that is already recorded, it can be easily erased via field programming. Follow the "How to Play a Voice Message" instructions above using the Erase Code specified in Table 4.

Configuring the Callbox for a GateGuard® Application

The DMR HD-Series Callbox can be mounted to virtually any surface with four (4) ¼" panhead screws. Choose a type of screw thread and screw length which will hold firmly in the surface to which the unit will be mounted.

MOUNTING the DMR HD-Series CALLBOX: (Refer to DMR HD-Series Callbox Installation Instructions)

1. **!** Due to the wide variety of installation possibilities, RITRON does not provide the cables or hardware required to bring external connections into the Callbox.
   - When selecting your cable hardware be sure it will adequately seal the cable to the case.
   - Carefully study the internal construction of the Callbox and determine the location on the outside case where the external supply and GateGuard® hook-up will be brought in.
   - Consider clearance with your desired hardware.
2. Loosen the (2) screws on the front corners of the case and open the hinged case.
3. Program the radio, if required. Refer to the programming section of this manual for details. To program the radio you must apply 8 to 12 VDC external power, or alkaline batteries.
4. Disconnect the battery holder from the radio and set the case front aside.
5. Refer to the Connecting to the DMR HD-Series Accessory Cable section of this manual and carefully drill a hole in the DMR HD-Series Callbox case bottom.
6. Install the 4 mounting brackets to the back of the Callbox case. The mounting brackets can be installed vertically, as shown, or horizontally.
7. **CONNECTING THE SWITCH OUTPUTS TO AN EXTERNAL DEVICE**
   a. Refer to the Connecting to the DMR HD-Series Accessory Cable section of this manual and thread your external hookup cable from the external device you wish to control through the sealed Heyco strain relief.
   b. Your external cable will be connected to the Callbox 6-conductor interface cable with wire nuts, dress your external wires accordingly (Refer to Table 7).
   c. Refer to the Connecting to the DMR HD-Series Accessory Cable section of this manual to secure and seal the conduit to ensure moisture and vandal resistant functions to the DMR HD-Series Callbox case.

   - Consult the manufacturer of the external device you are attempting to control for the recommended wire gauge.
   - Confirm that your application will NOT exceed the maximum rating of the on-board relay of 120 VAC @ 3 amp.
   - Make sure all power to the equipment is turned OFF or disconnected.

! **CAUTION:** The interface cable and wire nuts are to be positioned in the lower part of the case, away from the internal antenna.

8. Position the DMR HD-Series Callbox case in the chosen installation location and secure it in place with four screws through the mounting brackets.
9. Reconnect the battery mating connectors between the case front and case back.
10. Secure the case front to the case back with the two (2) corner screws.

Table 7: Callbox 6-Conductor Interface Cable

Pin #	Wire Color	Description		
6	Red	External 12 VDC	+	input
5	Black	External 12 VDC	-	input
4	Blue	Switch Output	+	connection
3	Green	Switch Output	-	connection
2	White	Sensor Input	+	connection
1	Brown	Sensor Input	-	ground

How to Field Program the DMR HD-Series Callbox for GateGuard® Operation

The DMR HD-Series Callbox can be field programmed for basic GateGuard® operation, or PC programmed to suit your unique requirements. **The instructions in this section apply only to Field Programmable features.** If PC programming software has been used to set DMR decode (receive) or other optional GateGuard® features, operation may not be as described here.

Follow these steps to program the DMR HD-Series Callbox for GateGuard® operation:

1. Program the **frequency codes** per the "How to Field Program Frequency Codes".
2. Program the Primary Control ID code per "How to Field Program DMR ID and Color Codes"
3. Program the callbox for **GateGuard® Momentary Operation** per the "How to Field Program DMR Relay and Listen-In Operation" .

The DMR HD-Series Callbox will now operate in GateGuard® mode as follows:

- The Callbox will be in **"Automatic Turn-Off"** mode. The **ON/PTT** button must first be pressed as described in Operating the DMR HD-Series Callbox with Factory Default Settings section before normal two-way communications can be established.
- If the Callbox does not send or receive a signal for more than 10 seconds the Callbox will automatically turn off. The **ON/PTT** button must be pressed to turn the Callbox back on and receive a call.
- When the Callbox receives and decodes the correct DMR Primary Control ID code the Callbox Switch Output will momentarily **CLOSE** the switch for 1 second. The Callbox will also automatically transmit a confirmation tone back to the senders radio notifying them that the correct DMR Primary ID code has been decoded at the DMR HD-Series Callbox.

Optional GateGuard® Setting/Features

The DMR HD-Series Callbox can be Field Programmed, or PC programmed using special software, for customized GateGuard® applications.

Automatic Turn-Off.....**(Field or PC Programmable)**

This is **ENABLED** as the Factory Default setting. The callbox will turn **OFF** when the RQX Reset Time has expired. The Reset Time is a pre-programmed amount of time of "no activity" (no calls transmitted, no calls received) before the callbox turns **OFF** in order to conserve battery life. The callbox can be turned back **ON** when the **ON/PTT** button is pressed. This is the recommended mode of operation for all battery only powered applications.

If Automatic Turn-Off is **NOT** selected the callbox does **NOT** completely turn **OFF**, but remains in the Intercom mode, allowing the callbox to receive calls at any time.

Operating the callbox with Automatic Turn-Off **DISABLED** significantly increases battery drain, and is therefore **NOT** recommended for battery only powered applications. Battery life can be increased using the Battery Saver Enable feature detailed in this section.

RQX Reset Time.....**(Field or PC Programmable)**

This is set from the factory for 10 seconds, but can be Field Programmed to 9 different times ranging from 5 seconds to 4 minutes, and PC programmed for 5-255 seconds. A shorter RQX Reset Time will result in increased battery life. In standard Automatic Turn-Off operation a longer inactivity timer will allow more time for a response before the callbox turns **OFF.**

External +12 VDC Power Fail Alert Tone .....**(PC or Field Programmable)**

By selecting the +12 VDC Power Fail Alert Tone feature the callbox will look for a loss of the +12 VDC power source. The callbox will immediately transmit an Alert Tone to notify personnel that the +12 VDC source has been lost and is now operating on battery back-up. The callbox will transmit an Alert Tone once every hour until the +12 VDC power source is restored or until the back-up batteries are exhausted. Even if this feature is **NOT** selected, it will always revert to Back-up Battery power.

NOTE: In applications where external power is available, we recommend using the RPS-EXPO Cube Power Supply.

OPTIONAL GATEGUARD® SETTING/FEATURES (CONTINUED) .....

Send Call Tone.....**(Field or PC Programmable)**

The Factory Default setting has the Call Tone feature **ON (**refer to "HOW TO FIELD PROGRAM FEATURE CODES")

The callbox can be programmed to transmit a Call Tone if the Reset Time has expired and the **ON/PTT** button is pressed. This will alert system users that the call is originating from the callbox.

Ring Tone.....**(Field or PC Programmable)**

This will sound an alert tone on the callbox speaker, similar to a telephone ring tone, whenever the correct DMR Primary Control ID code has been successfully decoded. This feature is used to alert the Callbox user that the gate is being **opened** or **closed**. Ring Tone is enabled from the factory.

GateGuard® – Toggle .....**(Field or PC Programmable)**

Will alternately open and close the Switch Output when it receives a unique DMR Primary Control ID code. After the Primary Control ID code is received the callbox will transmit a single beep if the switch has been **opened** and a double beep if the switch has been **closed**. The switch will open when the callbox turns off if it is programmed for Automatic Turn-Off.

GateGuard® On Code / Off Code .....**(Field or PC Programmable)**

This operation allows programming of separate **ON** and **OFF** DMR Control ID codes. The DMR HD-Series Callbox will **CLOSE** the Switch Output upon receiving the **ON** code, and **OPEN** the Switch Output upon receiving the **OFF** code.

Relay Polarity

The relay switch output can be set for a normally-open or normally-closed condition depending on the position of the Relay Polarity Jumper. (See FIG-1)

Sensor/Contact Closure Input

The Sensor Input will detect a logic level and transmit an Alert tone when a change in logic level is detected. Separate alert tones are used for **OPEN** (logic level high) tone and **CLOSED** (logic level low) tone. Additionally, the Sensor Input can be used to turn on the RQX Callbox with the Sensor Input Jumper in place.

Busy Channel TX Inhibit .....**(Field or PC Programmable)**

This will not allow you to transmit when another user is already transmitting on your radio frequency, even if they are using a different tone code. The radio will beep a series of long, low tones (like a busy signal) while the **ON/PTT** button is held down.

FCC Licensing

Except for the five (**5**) MURS frequencies, the FCC requires the owners of radios operating on these frequencies to obtain a station license before using them.

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 the radio equipment. This includes checking the transmitter frequency and deviation periodically, using appropriate methods.

To get an FCC license for VHF or UHF frequencies, submit FCC application Form 601. Your Ritron® dealer can help you with this process.

How to Obtain an FCC Radio License

Because your Ritron® radio operates on Private Land Mobile frequencies, it is subject to the Rules and Regulations of the FCC, which requires all operators of these frequencies to obtain a station license before operating their equipment. Make application for your FCC license on FCC Forms 601, Schedules D and H, and Fee Remittance Form 159.

To have forms and instructions faxed to you by the FCC, call the FCC Fax-On-Demand system at **202-418-0177** from your fax machine; request Document numbers 3000159, 3060001, 3060003, and 3060006.

To have Document numbers 3000159, 3060001, 3060003, and 3060006 mailed to you, call the FCC Forms Hotline at **800-418-FORM (800-418-3676).**

For help with questions concerning the license application, contact the FCC at **888-CALL-FCC (888-225-5322) or log on at www.fcc.gov**

You must decide which radio frequency(ies) you can operate on before filling out your application.

For help determining your frequencies, call Ritron® at **800-USA-1-USA (800-872-1872).**

INDUSTRY CANADA Regulations

Industry Canada requires the owners of the radios to obtain a radio license before using them.

Application forms can be obtained from the nearest Industry Canada District office.

1. Fill in the items per the instructions. If you need additional space for any item, use the reverse side of the application.
2. Use a typewriter or print legibly.
3. Make a copy for your files.
4. Prepare a check or money order to “Receiver General for Canada”, for the amount listed at http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf01027.html. (Licenses are renewed annually on April 1st. Refer to the calculation for application fees for each month.)
5. Mail the completed application, along with your check or money order, to the closest Industry Canada District Office.

Notes: Fees are subject to change without notice.

Safety Standards

The FCC (with its action in General Docket 79-144, March 13, 1985) has adopted a safety standard for human exposure to radio frequency electromagnetic energy emitted by FCC regulated equipment. Ritron® observes these guidelines and recommends that you do also:

- DO NOT hold the radio so that the antenna is very close to or touching exposed parts of the body, especially the face or eyes, while transmitting. Keep the radio vertical, eight inches away while talking into the front panel.
- DO NOT press the Push-To-Talk except when you intend to transmit.
- DO NOT operate radio equipment near electrical blasting caps or in an explosive atmosphere.
- DO NOT allow children to play with any radio equipment that contains a transmitting device.
- Repair of Ritron® products should be performed only by Ritron® authorized personnel.

Service

Federal law prohibits you from making any internal adjustments to the transmitter, and / or 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 the radio programmed, contact your local authorized dealer or Ritron®.

U.S. Manufacturer:

RITRON, INC. - Repair Department

505 West Carmel Drive,

Carmel, Indiana 46032 USA

Phone: 317-846-1201

FAX: 317-846-4978

Email: customer_service@ritron.com

RITRON, INC. LIMITED WARRANTY

WHAT THIS WARRANTY COVERS:

RITRON, INC. ("RITRON") provides the following warranty against defects in materials and/or workmanship in **RITRON Radios and Accessories** under normal use and service during the applicable warranty period (as stated below). "Accessories" means antennas, holsters, chargers, ear-phones, speaker/microphones and items contained in the programming and programming/service kits.

WHAT IS COVERED	FOR HOW LONG	WHAT RITRON WILL DO
DMR HD-Series Callbox	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 RITRON 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 (such as defects or damage from the charging or use of batteries other than with covered product);
- Defects or damage, including broken antennas, 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.
- Batteries if any of the seals are not intact.

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 re-coverable under this warranty (this includes loss of use or time, inconvenience, business interruption, commercial loss, lost profits or savings). 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 insur-ance prepaid, within the applicable warranty period, to **RITRON, INC., 505 West Carmel Drive, Carmel, Indiana 46032, Attention: Warranty De-partment.** 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 evi-dence of the date of purchase) and deliver it along with the product. If RITRON chooses to repair or replace a defective product, RITRON may re-place 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.