



User Manual

LM-700DMR Digital

LoudMouth[®] Wireless PA Receiver System

- 1 Channel, Dual Band Receiver, VHF/UHF, Supports:
VHF or UHF Business Band
VHF or UHF Business Band CANADA
- Stored Voice Messages – Up to 4 Messages
- Relay Feature for Optional Strobe Light
- Delay Message Playback Feature
- Repeat Message Playback Feature
- Switch Input w/ pre-recorded message



Strobe light (pn R-STROBE-DC) and relay cable assembly (pn 60201136) are optional accessories, not included as standard.



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1

Getting Started

The DMR Loudmouth® is a radio receiver that allows the use of your VHF or UHF DMR digital portable, base station or mobile 2-way radio to deliver voice messages directly to a PA speaker up to 2 miles away. The receiver and PA speaker is the ideal solution where hard-wired PA installation is simply impossible, too expensive, or temporary.

Your Loudmouth® receiver and PA speaker has been designed so that you can set it up quickly and start using it right away.

1.1 Loudmouth® receiver and PA speaker equipment

Check to be sure you received all the equipment necessary to install the Loudmouth® receiver and PA horn speaker.



List of items included with your Loudmouth® receiver and PA speaker:

- LM-700DMR Loudmouth® Radio Receiver with 5W audio amplifier
- 05500040 Horn Speaker with RCA phono plug and 25 ft. cable
- RPS-1B Power Cube, 1.5A with 2.1mm coaxial DC connector
- AFB-1545 Dual-Band Antenna with BNC connector
- RK-RQX-Q-MB Mounting Brackets
- 25107400 T-25 Torx Security Bit

Optional Items you can use with your Loudmouth® receiver

- RYCONN “Y” Adapter Connect, Allows 2 PA Speakers (#05500040) to be attached to 1 LM Receiver
- BP-LM-Li22 Backup Battery, Rechargeable, 11.1V Li-Ion, 2200mAH

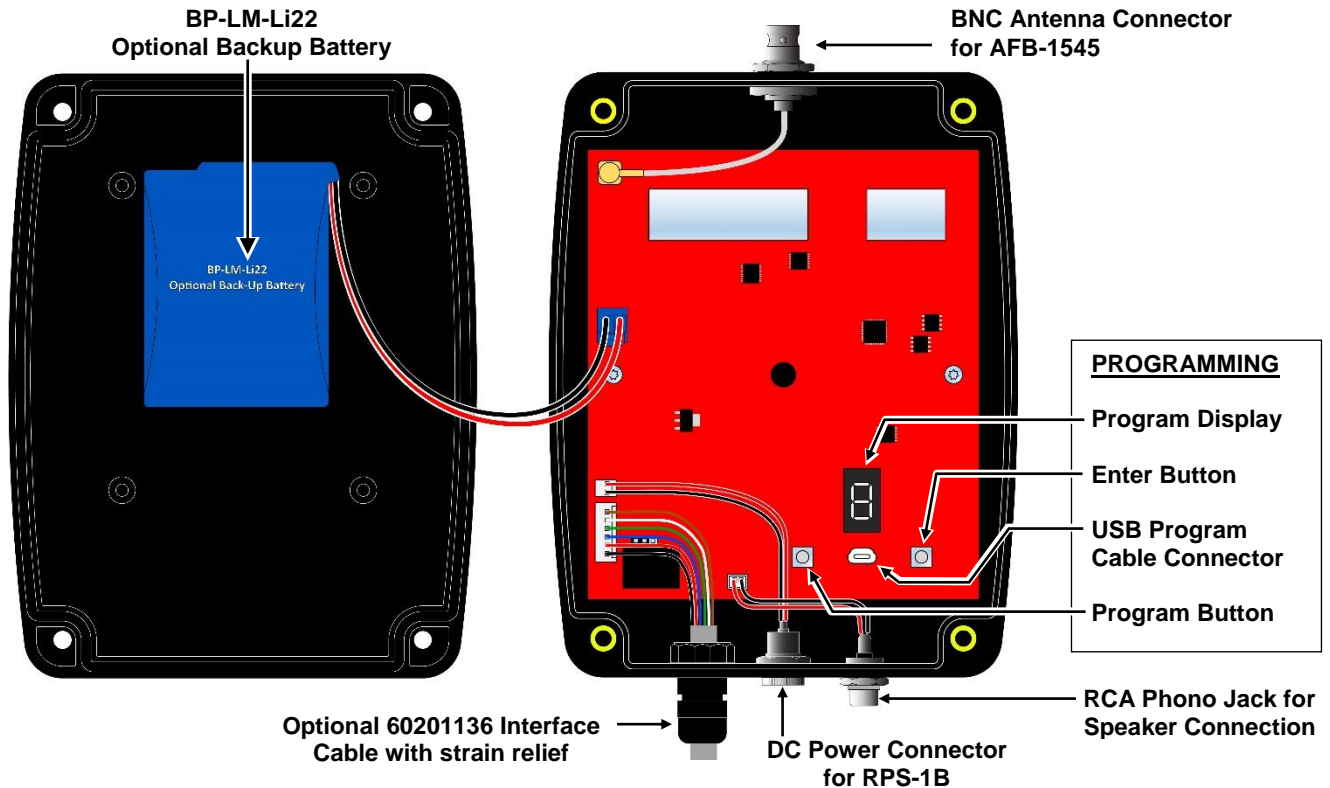
Need replacement items?

Contact your Ritron dealer, or
Ritron directly at
800-872-1872

1.2 Loudmouth® receiver assembly

The Loudmouth® receiver and PA speaker is on any time power is applied to the receiver.

The Loudmouth® receiver must be opened to connect an optional BP-LM-Li22 battery or to program the Loudmouth®.



1. Loosen the 4 screws in the front corners of the case using the T-25 Torx security bit included with the radio. These screws are retained to the housing with rubber O-rings, **DO NOT** remove the screws from the housing.
2. Separate the case front from the case back.
3. **Connect an optional BP-LM-Li22 backup battery** to the Loudmouth® receiver using the blue mating connectors shown above. The BP-LM-Li22 is secured to the case front with interlocking mushroom-head fastener strips. Press firmly on the battery to interlock the strips, snapping it into position as shown.
4. **Program the Loudmouth® receiver** per the instructions in the Programming section of this manual, leaving the RPS-1B power supply or BP-LM-Li22 backup battery connected to the radio. Press the **Enter** button twice before re-assembling the case to be sure the Loudmouth® is reset and ready for operation.
5. Carefully position the case front onto the case back. Secure the case halves by tightening the 4 screws in the front corners of the case.



Install the Mounting Brackets

Install the RK-RQX-Q-MB mounting brackets included with the product to the Loudmouth® case back. The recommended installation is with the brackets on each side as shown, installing the brackets top and bottom may reduce radio range.

1.3 Determine the volume setting

Selecting the correct volume level is critical to the performance of the Loudmouth® receiver and PA speaker. Carefully consider the following before deciding on the appropriate volume setting. Refer to the Programming section of this manual for specific instructions on programming the Volume Level.

Ambient noise level should be considered first when selecting the volume level.

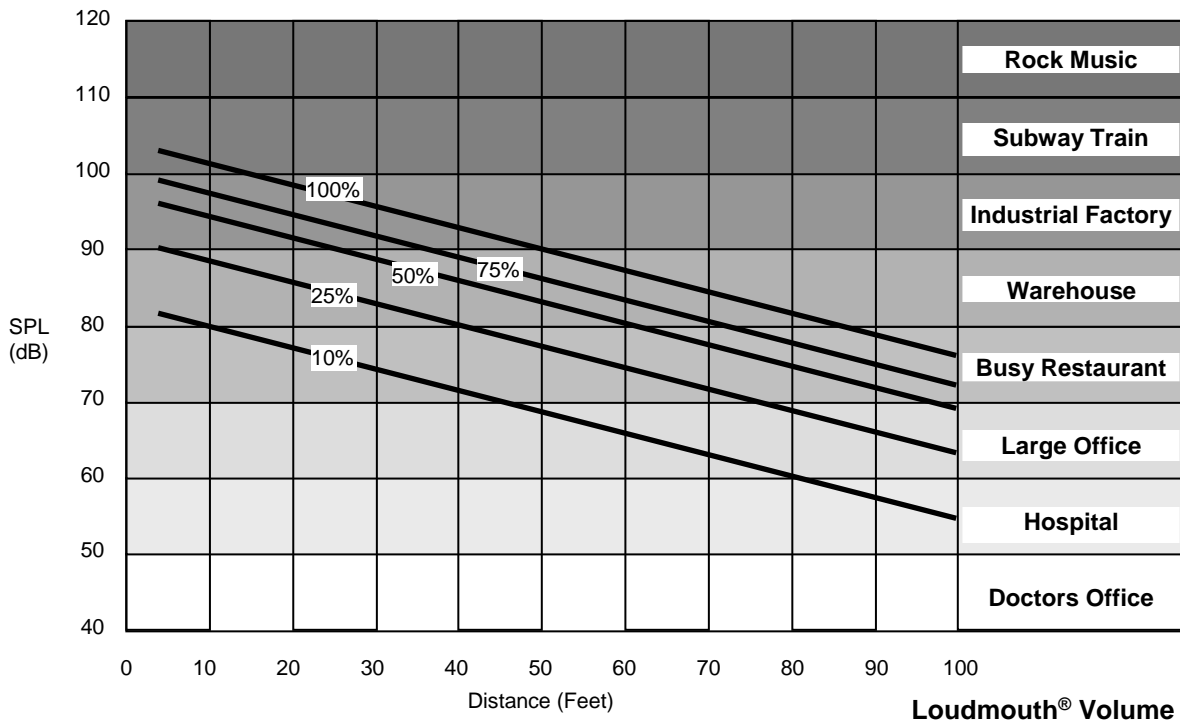
Increasing the volume level in an effort to cover a wider area will result in:

- Undesirably high volume when near the speaker.
- Low volume at the outer edges of the coverage area.
- A calling radio must be a greater distance from the Loudmouth® speaker to prevent feedback. (Feedback is the result of Loudmouth® speaker audio getting into the calling radio's microphone.)

When coverage of a large area is required, additional Loudmouth® speakers may be necessary for satisfactory performance. See the Installation section of this manual for details on how to install 2 speakers using a single Loudmouth® receiver, or multiple receivers and speakers.

1. Refer to the horizontal shaded bars on the chart below to determine the sound level that best represents your location. This should be the ambient, or average sound level. We will consider the maximum sound level when we locate the speaker.
2. Estimate the maximum distance (in feet) that the loudspeaker must be heard. Locate that distance on the chart below and follow it up to find the line that is in the middle of your shaded bar. This line indicates the optimum Loudmouth® volume level setting.

EXAMPLE: In the Ritron factory we need to cover a maximum distance of 50 feet on the factory floor with an ambient sound level similar to a warehouse. I find the vertical line at the bottom indicating 50 feet, and follow it up to the shaded bar indicating Warehouse. The 50% and 75% lines are in the middle of the Warehouse bar, indicating a required Loudmouth® volume setting between 50 - 75%.



1.4 Paging the DMR Loudmouth® receiver and PA speaker

The LM-700DMR Loudmouth® receiver and PA speaker can be used with virtually any other brand of DMR Digital 2-way radios, operating in VHF or UHF frequency band.

Ritron recommends the use of a dedicated channel frequency and Color Codes for Loudmouth® receiver operation.

When operating on unique frequencies dedicated to loudspeaker operation:

- Your 2-way radios must be programmed for a channel dedicated to loudspeaker operation.
- Loudspeaker operation is limited to radios programmed with the dedicated Loudmouth® channel.
- You may need to license additional frequencies for your 2-way radios.

Be Advised! When operating on your normal 2-way communication frequencies:

- Messages broadcast on the LM-700DMR receiver Loudmouth® may also be heard on your 2-way radios.
- Loudspeaker messages are not possible when the channel is being used for 2-way communications.
- Any user on your 2-way channel can broadcast over the loudspeaker if it has same configurations as the LM-700DMR receiver, such as Color Code and address.
- There is no need to license additional receive frequencies.

1.5 Operating Conditions and Limitations

FCC Part 15

The LM-700DMR receiver is certified under FCC Part 15 Subpart B Unintentional Radiator. Changes or modifications not expressly approved by Ritron, Inc. could void the user's authority to operate the equipment.

Supplier's Declaration of Conformity 47 CFR § 2.1077 Compliance Information

Unique Identifier: Ritron Model LM-700DMR

Responsible Party – U.S. Manufacturer

Ritron, Inc.
505 W. Carmel Dr.
Carmel, IN 46032
(317) 846-1201
www.ritron.com

FCC Compliance Statement



This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) This device must accept any interference received, including interference that may cause undesired operation.

CAN RSS-Gen/CNR-Gen

Ritron model LM-700DMR is stand-alone receiver that operates in the bands 150-170MHz and 450-470MHz. The LM-700DMR complies with the limits for receiver–spurious emissions and AC power-line emissions set out in RSS-GEN section 7, therefore equipment certification is not required. Each unit shall bear the label “CAN RSS-Gen/CNR-Gen”.

This device contains license-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's license-exempt RSS(s). Operation is subject to the following two conditions:

- (1) This device may not cause interference.
- (2) This device must accept any interference, including interference that may cause undesired operation of the device.

2

Installation

Proper installation of the Loudmouth® wireless PA speaker is critical to the performance and overall satisfaction with your system. With careful consideration and planning Loudmouth® will cover up to 100 feet with a single speaker, and can cover an even wider range with multiple speakers and receivers. This section will help you plan an installation that is best suited for your environment.

2.1 Selecting the PA speaker location

Speaker location is critical to the performance of the Loudmouth® receiver and PA speaker. Consider the following factors before selecting a speaker location.

- The speaker can be installed either indoors or outdoors.
- Be sure there is a convenient source of 110VAC power for the RPS-1B power cube and that the radio receiver box can be located inside, out of the elements. The speaker has a 25 ft. cable, if you need a longer cable length, standard RCA phono cable extension can be used (i.e. [Radio Shack Catalog #: 4202362](#)).
- The speaker should not be in an area where the 2-way radio user addressing the speaker will typically be located. If the radio user is too close to the Loudmouth® speaker, feedback can occur due to loudspeaker audio getting into the radio microphone. This is a problem related to the 2-way radio, not the Loudmouth® speaker. The use of the [Record & Play](#) feature will eliminate this problem.

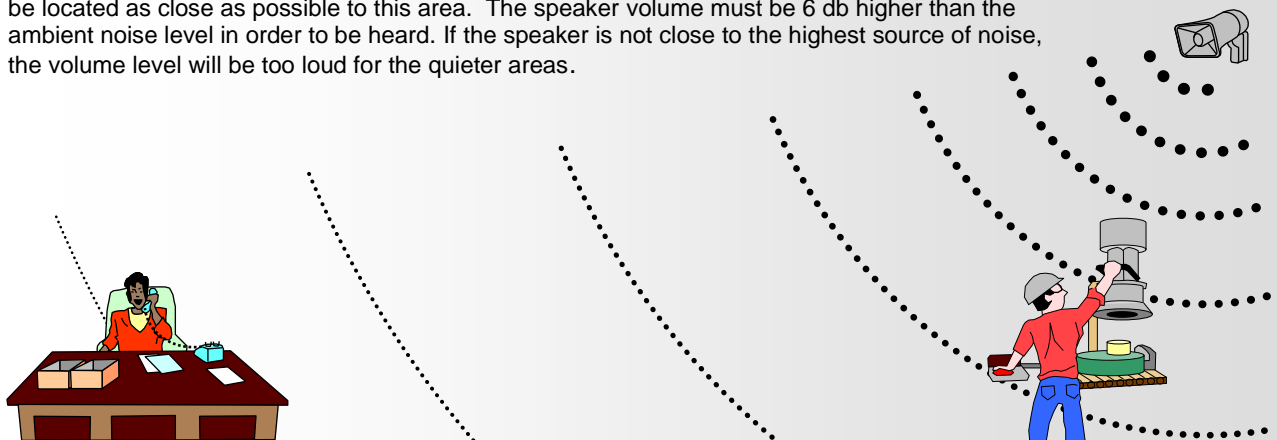


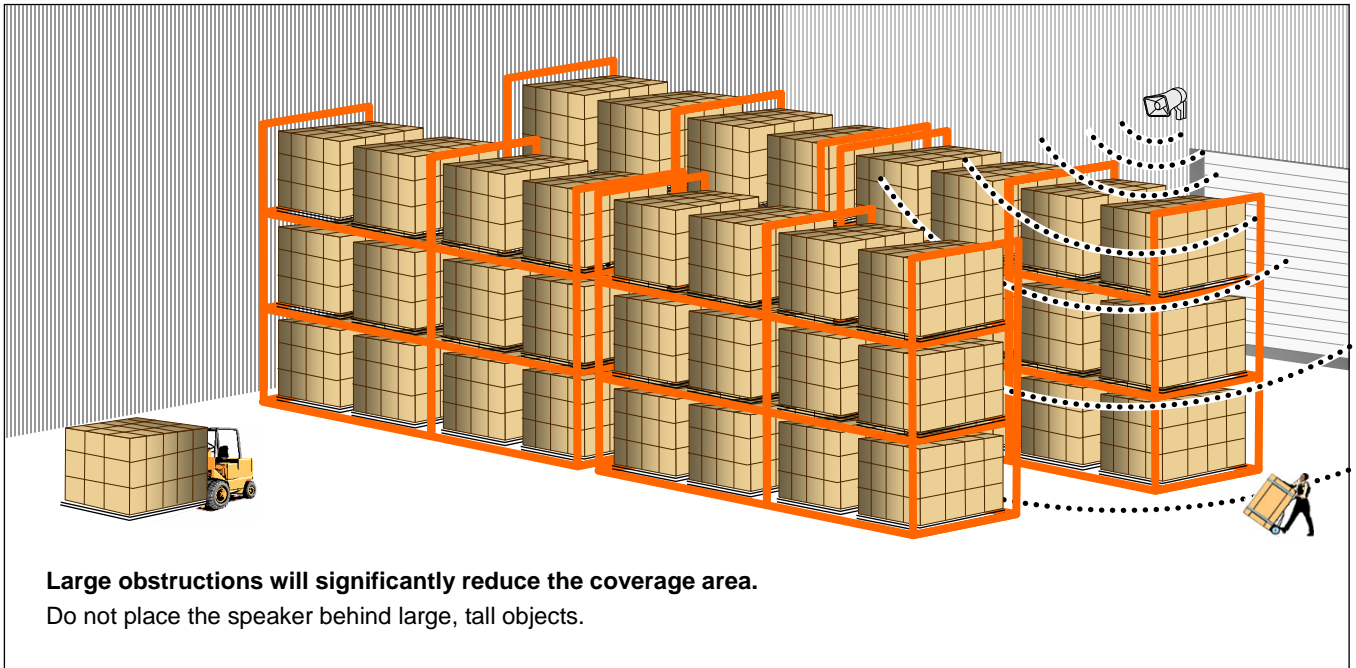
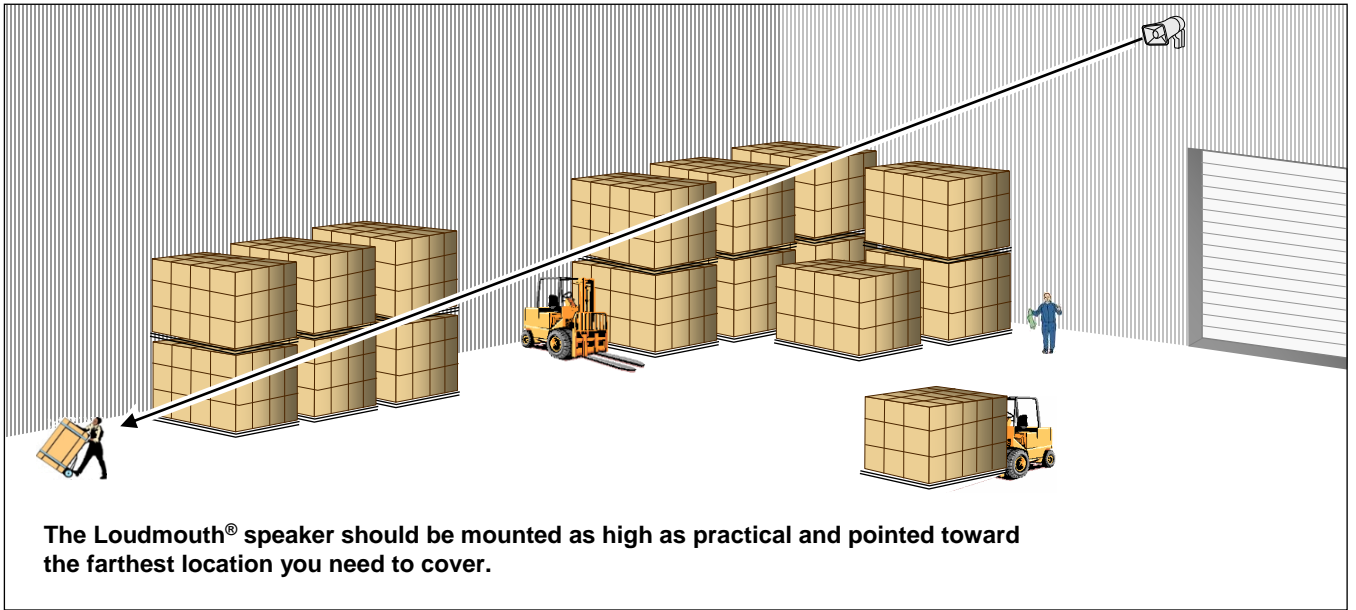
The speaker must be located at least 10 feet above head level.

At near range the Loudmouth® speaker is capable of sound levels that can cause permanent hearing loss and should never be installed in a location where a person could be directly in front of the speaker.

Install the Loudmouth® speaker close to the noisiest area you plan to cover.

If there is an area with a significantly higher ambient noise level, the Loudmouth® speaker should be located as close as possible to this area. The speaker volume must be 6 db higher than the ambient noise level in order to be heard. If the speaker is not close to the highest source of noise, the volume level will be too loud for the quieter areas.





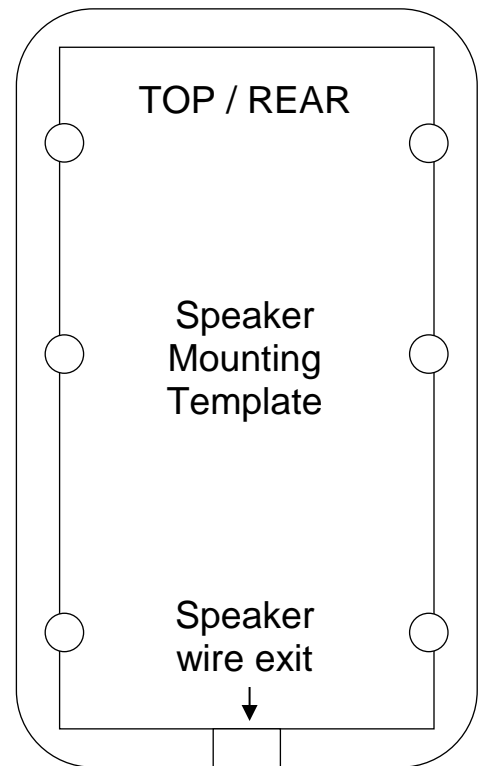
2.2 PA Speaker installation

The speaker mount can be installed vertically on a wall, flat post or support column; or can be mounted horizontally from a ceiling or rafter beam.



Once the speaker location has been determined the Speaker Mounting Template may be used to mark the mounting surface. When using the Speaker Mounting Template keep in mind that the speaker wire exit is toward the floor on a wall mounted installation, and toward the front of the speaker in a ceiling mounted installation.

The Loudmouth® speaker may be secured to a variety of surfaces, with each installation presenting unique requirements for mounting hardware. With this in mind, mounting screws or hardware are not included with the Loudmouth®.



Guidelines for mounting the Loudmouth® speaker:

- The Loudmouth® speaker can be safely mounted to concrete, metal or wood surfaces. Other surfaces are possible provided they can support the weight of the speaker. If mounting to a drywall or concrete surface the use of expansion anchors is recommended.
- Secure the speaker tightly to the mounting surface, using all 6 mounting holes if possible. At high audio output levels the speaker can generate significant vibration and must be rigidly secured. This is particularly critical with drywall surfaces, which are highly susceptible to vibration damage.
- Be sure the speaker wire exits cleanly from under the speaker mounting bracket through the wire exit tunnel provided. Pinching the speaker wires could cause a short that will destroy the Loudmouth® receiver audio amplifier.
- Route the speaker wire closely against a wall or support beam. Speaker wire hanging in free space is easily snagged and could be pulled from the Loudmouth® receiver or worse yet, pulled from the speaker itself causing permanent damage.
- 1 inch long, #8 or #10 round-head screws should be used to mount the speaker. Wood screws, sheet metal screws, machine screws with nuts, or drywall anchors and screws will all work well depending on your specific requirements. Pan-head screws should not be used to prevent damage to the mounting bracket due to over-tightening.



Wood Screw



Sheet Metal Screw



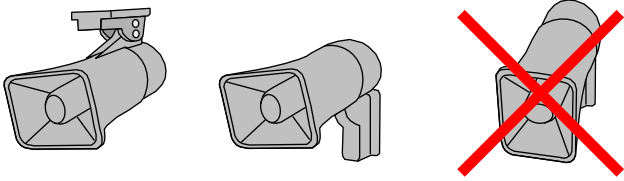
Machine Screw with Nut



Drywall Anchor and Screw

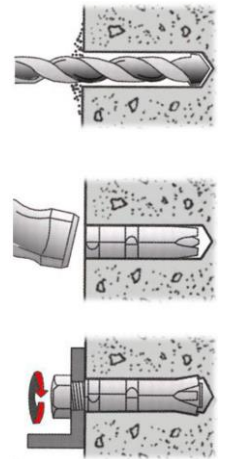
The Loudmouth® speaker should be mounted horizontally for the widest coverage

When mounted horizontally the Loudmouth® speaker will provide 90° horizontal and 60° vertical coverage without significant loss of sound level. Refer to the [SPL chart](#) on page 29 for typical sound levels at full volume.



Installing Concrete Expansion Anchors

1. Drill hole of recommended diameter, see chart below, into the base material to a depth equal to, or slightly deeper than the length of the expansion shield. Clean out the hole of all dust and cuttings.
2. Place the Single Expansion anchor, nut end first, into the hole. The top end of the anchor should be flush or slightly below the base material surface.
3. Place the object to be fastened over the anchor in the base material and bolt into place. The bolt should engage 2/3 of the threads of the anchor.



2.3 Loudmouth® radio receiver installation

Installation of the Loudmouth® receiver is critical to the effective radio coverage of the radio loudspeaker system. Without proper installation the maximum possible distance between the calling radio and the Loudmouth® receiver will be significantly reduced.

Guidelines for installing the Loudmouth® receiver:

- The radio receiver box must be located inside, out of the elements.
- Be sure there is a convenient source of 110VAC power for the RPS-1B power cube.
- The Loudmouth® receiver should be installed in a central location and as high up as possible for best radio coverage.
- For maximum radio coverage the antenna should be in a vertical orientation and should not be touching or surrounded by large metal objects. The receiver box can be mounted horizontally as long as the antenna is in a vertical position.
- Do not install the Loudmouth® receiver in a high traffic location with the possibility that the receiver box would be struck, become unplugged, or the speaker be disconnected.
- Do not wind, loop or otherwise allow the power cord from the RPS-1B power cube to contact the antenna. The power cord should be routed away from the antenna.



Radio range can be extended with the use of an external antenna.

The antenna can be installed at a higher elevation than is possible with the attached antenna.

The Ritron [RAM-1545](#) VHF/UHF magnet-mount antenna has a 25 ft. cable to allow optimum antenna location.



2.4 Installing two PA speakers with a single Loudmouth® receiver

Many locations may require the installation of two speakers with a single Loudmouth® receiver. Two speakers are used when:

- Coverage is required over a large area.
- Large obstructions limit the effective range of a single speaker.
- A wall separates two coverage areas.
- The ambient noise level is low and individual speaker volume must be reduced (i.e. Hospital).
- The calling radio is in the area where the speakers are located and speaker volume must be reduced to prevent feedback.

You can connect 2 speakers to a single Loudmouth® receiver using the Ritron model **RYCONN** RCA Male to 2 RCA Female Y-Adapter.



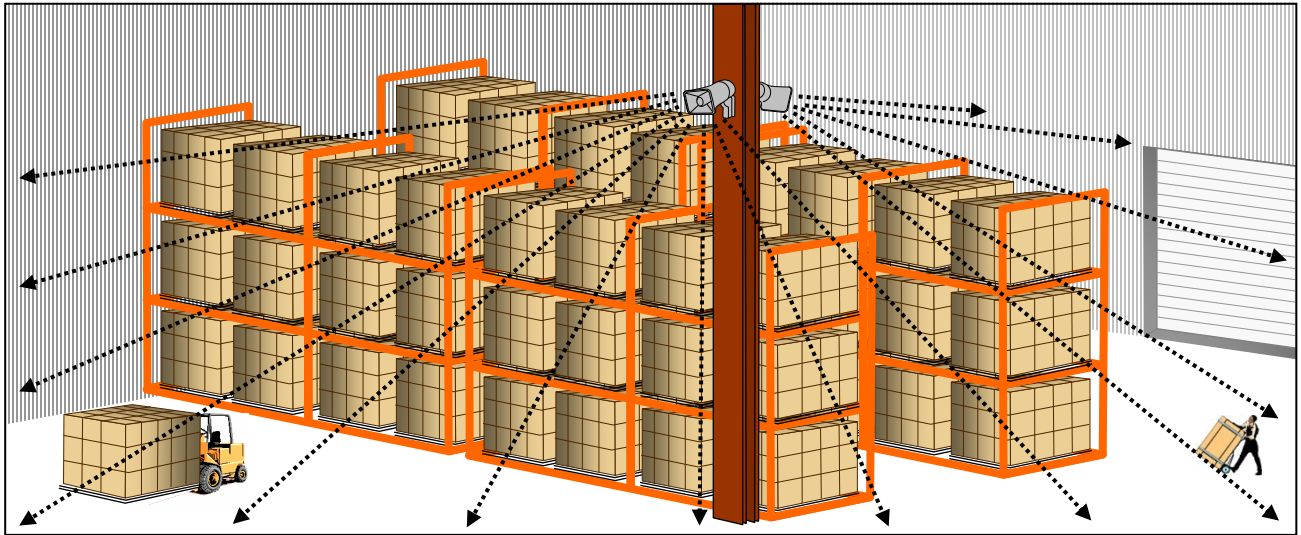
Optional 2nd PA speaker with 25 ft. cord and RCA phono connector. (Ritron PN# 05500040)



In some installations a single Loudmouth® receiver can be used to drive two speakers, while others will require a separate receiver for each speaker.

To cover a large area, or an area with large obstructions, place 2 speakers back-to-back in a central location.

- The speakers should be mounted as high as possible and pointing away from each other.
- The 2 speakers can be driven by a single Loudmouth® receiver.
- Volume level may be reduced compared to a single speaker, making the system less susceptible to feedback.
-



Use 2 Speakers to reduce volume level

Surprisingly, the use of 2 speakers powered by a single Loudmouth® receiver can allow you to reduce the volume level in a quiet environment. By covering an area with 2 centrally located speakers, installed back-to-back, the volume level can be cut in half.



2.5 Installing multiple Loudmouth® receivers and PA speakers

Many locations may require the installation of multiple Loudmouth® receivers and PA speakers. Multiple receivers and PA speakers are used when:

- Paging separate buildings is required.
- The coverage area is too large for a single receiver and PA speaker.
- Zone paging is required.
- Paging is required in more than one location.

Zone paging, or paging in more than one location requires a separate Loudmouth® receiver for each area.

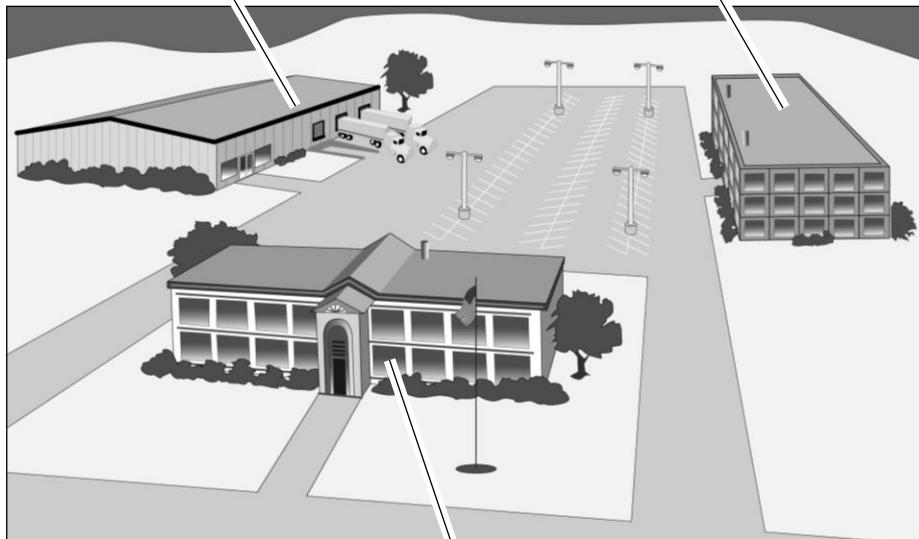
- With zone paging all radios can operate on the same Loudmouth® radio frequency.
- Each Loudmouth® receiver can be programmed for a unique paging code, allowing selective paging to each zone.
- The Loudmouth® receivers can be programmed for an All Call* code that allows paging of all zones at once, or Group Call* to page more than one zone.
- Zone paging allows for volume levels that are programmed to the specific needs of that area.
- If zone paging is not necessary, all Loudmouth® receivers can be programmed for the same paging code.

Zone 1 – Warehouse and loading dock

- Single Loudmouth® receiver with 2 speakers.
- One speaker is located inside the warehouse and the other is located outside for the loading dock.
- Speaker volume is set to 50% for the warehouse environment.

Zone 2 – Cafeteria

- Single Loudmouth® receiver with 1 speaker.
- The speaker is located inside the cafeteria area.
- Speaker volume is set to 25% for the restaurant environment.



Zone 3 – Sales office

- Single Loudmouth® receiver with 1 speaker.
- The speaker is located inside the Sales office.
- Speaker volume is set to 10% for the office environment.

Example of Zone paging

2.6 Vehicular installation

The Loudmouth® receiver can be powered with an optional Ritron model CCL-M cigarette lighter adapter for use in mobile applications.

- Route the CCL-M power cord away from the antenna and speaker wires.



When the speaker is mounted on the roof of a vehicle at head level the volume level should be reduced to 50% or less to prevent hearing damage.



CCL-M

2.7 Temporary outdoor installation

The Loudmouth® receiver can be temporarily installed outdoor with the use of weatherproof enclosures.



LMH-100

The Ritron model LMH-100 is a weatherproof, fiberglass reinforced polyester enclosure designed to house the Loudmouth® receiver and antenna. Speaker and power connections are routed from the bottom of the enclosure through electrical conduit.

The LMH-100 includes:

- Dual stainless steel, pad lockable latches
- Nema 3 weatherproof, fiberglass reinforced polyester enclosure
- Mounting flanges for flat surface
- Dimensions: 13"H x 10.5"W x 5.5"D Weight: 8 lbs.



RSS-200

Ritron model RSS-200 20W solar panel kit can be used to power the Loudmouth® receiver without the need for the RPS-1B power supply in locations where AC power is not available.

The RSS-200 includes:

- 20-Watt solar panel with mounting bracket
- 35AH sealed rechargeable battery
- Solar charge controller
- Nema 3 weatherproof, fiberglass enclosure
- Mounting flanges for flat surface
- Dimensions: 12"H x 10.25"W x 6.25"D Weight: 10 lbs.



MM420

The RPS-1B power cube can be temporarily plugged into an outdoor outlet with a large in-use weatherproof cover such as the TayMac model MM420 (available in Lowe's Hardware stores nationwide).

2.8 Installation of Optional Interface Cable Assembly 60201136

Interface Cable Assembly 60201136

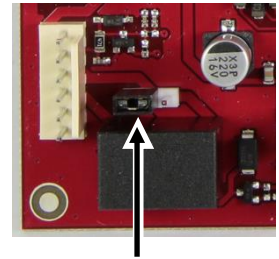
Optional Ritron cable assembly 60201136 (6-Conductor Cable, Loudmouth® Interface) is used to connect the Loudmouth® relay switch to an optional strobe light, or any other device where a simple switch closure is desired. The cable assembly also provides input for the Switch Input closure.

The 60201136 cable assembly includes:

- 6-conductor cable with a mating connector to the Loudmouth® for easy installation.
- Heyco strain relief used to retain the 6-conductor cable to the Loudmouth® case and provide a weather seal.

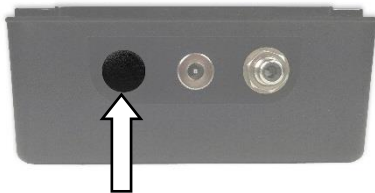
The 6-conductor cable assembly connections provide:

- Black Ground connection for 10.5VDC
- Red 10.5VDC (400mA MAX) output used to power an external device such as a strobe light
- Blue Relay Switch Output provides a normally-open switch that closes whenever a valid message is received. The relay switch output can be configured as a normally-closed switch that opens whenever a valid message is received (see Relay Polarity Jumper at right)
- Green Relay Switch Output second switch connection used with Blue wire
- White Switch Input connection will cause the Loudmouth® to play a pre-recorded “Switch On” message when pulled to ground (closed) and “Switch Off” message when released from ground
- Brown Switch Input ground connection

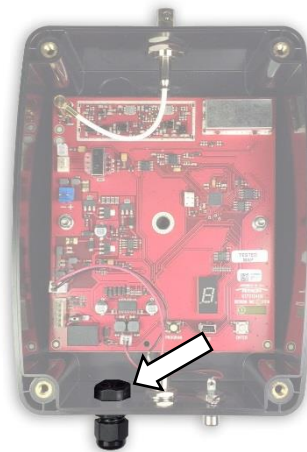


Relay Polarity Jumper shown in the normally-open position

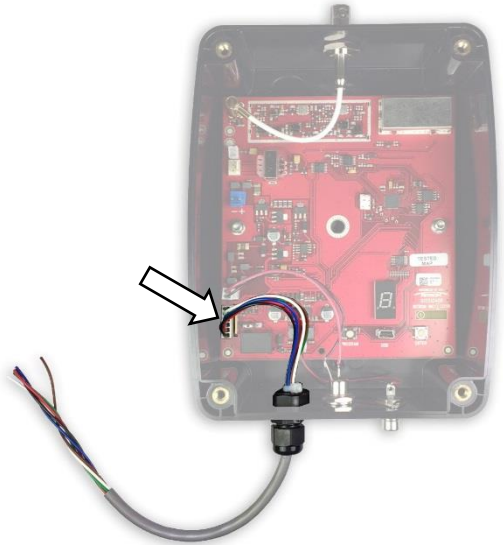
1. Loosen the 4 screws in the front corners of the case. These screws are retained to the housing with rubber O-rings, DO NOT remove the screws from the housing.
2. Separate the case front from the case back.
3. Disconnect the RPS-1B power supply and BP-LM-Li22 backup battery connected to the radio.



4. Remove the plug from the case bottom to expose the 1/2” hole used for the Heyco strain relief.



5. Install the Heyco strain relief included with cable assembly 60201136. Do not tighten the sealing nut at this time.



6. Pull cable assembly 60201136 through the strain relief from the inside as shown. Plug the cable assembly into the PCB connector and tighten the sealing nut.

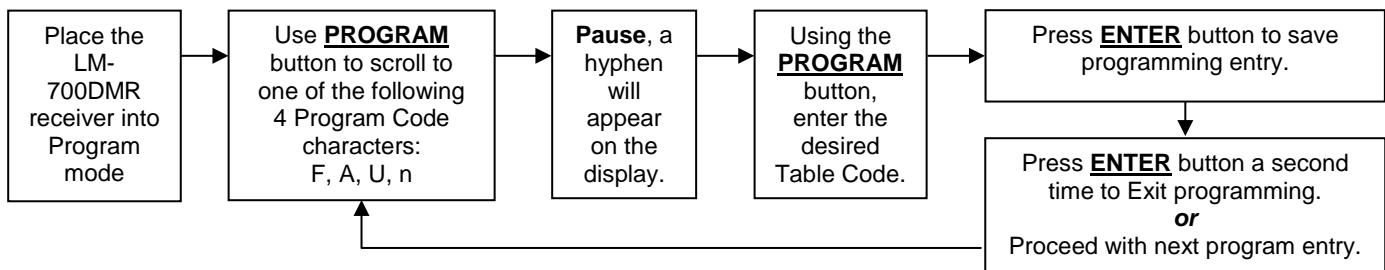
3 Programming

For most installations the LM-700DMR can be programmed in the field without the need for the Ritron PC Programmer LM-DMR-PCPS (LM-DMR-PCPK-USB kit with cable). Field programming is accomplished in 3 easy steps. First, the radio frequency is entered. Second, the ID code and Color code are entered (if used). Third, the LM-700DMR options and audio level setting are entered. If you intend to use the Stored Message features, Stored Message operation must first be “enabled” using the PC Programming Software.

3.1 PC Programming Software LM-DMR-PCPS

While most LM-700DMR programming can be accomplished via Field Programming, the Ritron PC Programming Software (LM-DMR-PCPS) can also be used. The PC Programmer allows viewing of all programmed attributes at once. It also permits you to save a programming profile you can use to easily program or clone other LM-700DMR radios to the same settings. Ritron PC Programming kit LM-DMR-PCPK-USB includes the LM-DMR-PCPS programming software and a USB Programming cable.

3.2 LM-700DMR Field Programming Overview



Program Codes

Table Codes



Readout Frequency programming *or*
Enter a Frequency code from **TABLE F: PROGRAMMABLE FREQUENCY TABLE** *or*
Enter any valid frequency from 150-170 MHz, or from 450-470 MHz



Enter a 2-digit or 3-digit LM-700DMR Feature code from **TABLE A: ADVANCED FEATURE CODES** to:

- Enable or disable a Pre-Announce Tone
- Set a Record and Play delay time
- Set to repeat a Record and Play message
- Enable or disable Relay operation
- Set a minimum Relay activation time
- Reset LM-700DMR to Factory default programming
- Set the LM-700DMR to play a pre-recorded Switch ON and/or Switch OFF message on switch detection



Readout the programmed Audio level *or*
Enter the desired Audio Level as a 2-digit number from 05-99%.



Enter 1 to 9 to write the desired DMR function then the 1 to 8 digit ID code from **Table n**

3.3 Readout and Field Program Frequency Codes

To match other radios, the owner can select Frequency Codes from [Table F](#) or can program the radio frequency directly. [Table F](#) is divided into sections 2-6 to correspond with the frequency tables of other Ritron radios. Table frequency codes set both frequency and bandwidth.

Section	Ritron Table
2	VHF Business Band for USA
4	UHF Business Band for USA
5	UHF Business Band for CANADA
6	VHF Business band for CANADA

For direct frequency entry a section number of 1 is entered, followed by the 9-digit frequency. The LM-700DMR can be programmed for frequencies of 150-170MHz and 450-470MHz.

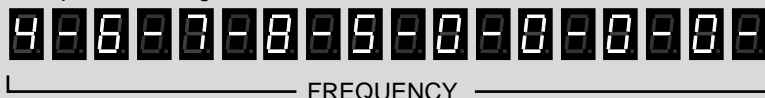
In the following examples, the LM-700DMR is programmed to operate on the Section 4 "Silver Star" frequency of 467.8500 MHz.

To enter a Frequency Code from the Programmable Frequency Table:

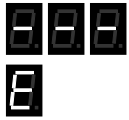
1. Refer to [Table F - Section 4](#) to determine the 2 or 3-digit frequency code and write it down.
2. **Place the radio into Program / Readout Mode** by pressing and holding the **PROGRAM** button. A "P" will appear on the display. Release the **PROGRAM** button when a hyphen appears, and the radio is ready to accept the first digit of your program entry.
3. Click the **PROGRAM** button until the program display shows the Program Code "F". Pause—the radio will show a hyphen across the center of the display to indicate that it is ready to accept the Frequency code from [Table F](#).
4. Enter the desired Section number from [Table F](#) by clicking the **PROGRAM** button until the program display shows the desired number. Pause—the radio will show a hyphen across the center of the display to indicate that it is ready to accept the next digit.
5. 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 show a hyphen across the center of the display to indicate that it is ready to accept the next digit.
6. Enter the 2nd digit of the frequency code by clicking the **PROGRAM** button until the program display shows the desired number. Pause—the radio will show a hyphen across the center of the display to indicate that it is ready to accept the next digit.
7. 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 will show a hyphen across the center of the display to indicate that it is ready to accept the next digit.
8. Press and release the **ENTER** button to save your programming. A hyphen will flash 3 times on the program display to indicate that programming was successful. The radio is now ready for another program entry.
NOTE: 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.
9. Press the **PROGRAM** button to continue programming, or press the **ENTER** button to exit program mode.

To enter the frequency directly:

1. With the radio in program mode, click the **PROGRAM** button until the program display shows the Program Code "F". Pause—the radio will show a hyphen across the center of the display to indicate that it is ready to accept the Frequency programming.
2. Enter Section number 1 by clicking the **PROGRAM** button until the program display shows the desired number. Pause—the radio will show a hyphen across the center of the display to indicate that it is ready to accept the next digit.
3. Enter the 9-digit frequency by clicking the **PROGRAM** button until the program display shows the desired number. Pause—the radio will show a hyphen across the center of the display to indicate that it is ready to accept the next digit.



- NOTES:**
- Trailing zeros (0) do not have to be entered.
 - The frequency entered has to be a multiple of 3.125kHz for UHF, and a multiple of 2.5kHz or 3.125kHz for VHF



4. Press and release the **ENTER** button to save your programming. A hyphen will flash 3 times on the program display to indicate that programming was successful. The radio is now ready for another program entry.
NOTE: 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.
5. Press the **PROGRAM** button to continue programming, or press the **ENTER** button to exit program mode.

To readout frequency programming:



1. With the radio in program mode, click the **PROGRAM** button until the program display shows the Program Code "F". Pause—the radio will show a hyphen across the center of the display to indicate that it is ready to readout the Frequency programming.
2. Press and release the **ENTER** button. The display will show the Section number of [Table F](#), followed by the 2 or 3-digit frequency code. Each digit is separated by a hyphen.



SECTION FREQUENCY CODE


If the radio frequency has been entered without using the Programmable Frequency Table, the display will show Section number 1 followed by the 9-digit frequency.





SECTION FREQUENCY (Example 467.850000MHz)

3. Press the **PROGRAM** button to continue programming, or press the **ENTER** button to exit program mode.

Table F - Programmable Frequency Table

Section 2: VHF Business Band 		
Section - Code	Frequency	Color Dot
2-03	151.6250	Red Dot
2-04	151.9550	Purple Dot
2-05	151.9250	
2-06	154.5400	
2-07	154.5150	
2-08	154.6550	
2-09	151.6850	
2-10	151.7150	
2-11	151.7750	
2-12	151.8050	
2-13	151.8350	
2-14	151.8950	
2-15	154.4900	
2-16	151.6550	
2-17	151.7450	
2-18	151.8650	
2-24	151.7000	
2-25	151.7600	
2-26	152.7000	
2-27	152.8850	
2-28	152.9150	
2-29	152.9450	
2-30	151.5125	
2-31	154.5275	
2-32	153.0050	
2-33	158.4000	
2-34	158.4075	


Section 5: Canada UHF Business Band 		
Section - Code	Frequency	Color Dot
5-01	458.6625	
5-02	469.2625	

Section 6: Canada VHF Business Band 		
Section - Code	Frequency	Color Dot
6-01	151.055	
6-02	151.115	

Notes

- BW is the bandwidth in kHz.
- For DMR, BW is 12.5 kHz for all Table Frequencies

Section 4: UHF Business Band 		
Section - Code	Frequency	Color Dot
4-09	469.2625	
4-10	462.5750	White Dot
4-11	462.6250	Black Dot
4-12	462.6750	Orange Dot
4-13	464.3250	
4-14	464.8250	
4-15	469.5000	
4-16	469.5500	
4-17	463.2625	
4-18	464.9125	
4-19	464.6000	
4-20	464.7000	
4-21	462.7250	
4-22	464.5000	Brown Dot
4-23	464.5500	Yellow Dot
4-24	467.7625	J
4-25	467.8125	K
4-26	467.8500	Silver Star
4-27	467.8750	Gold Star
4-28	467.9000	Red Star
4-29	467.9250	Blue Star
4-30	461.0375	
4-31	461.0625	
4-32	461.0875	
4-33	461.1125	
4-34	461.1375	
4-35	461.1625	
4-36	461.1875	
4-37	461.2125	
4-38	461.2375	
4-39	461.2625	
4-40	461.2875	
4-41	461.3125	
4-42	461.3375	
4-43	461.3625	
4-44	462.7625	
4-45	462.7875	
4-46	462.8125	
4-47	462.8375	
4-48	462.8625	
4-49	462.8875	
4-50	462.9125	
4-51	464.4875	
4-52	464.5125	
4-53	464.5375	
4-54	464.5625	
4-55	466.0375	
4-56	466.0625	
4-57	466.0875	
4-58	466.1125	
4-59	466.1375	
4-60	466.1625	
4-61	466.1875	
4-62	466.2125	
4-63	466.2375	
4-64	466.2625	
4-65	466.2875	
4-66	466.3125	

Section 4: UHF Business Band 		
Section - Code	Frequency	Color Dot
4-67	466.3375	
4-68	466.3625	
4-69	467.7875	
4-70	467.8375	
4-71	467.8625	
4-72	467.8875	
4-73	467.9125	
4-74	469.4875	
4-75	469.5125	
4-76	469.5375	
4-77	469.5625	
4-78	462.1875	
4-79	462.4625	
4-80	462.4875	
4-81	462.5125	
4-82	467.1875	
4-83	467.4625	
4-84	467.4875	
4-85	467.5125	
4-86	451.1875	
4-87	451.2375	
4-88	451.2875	
4-89	451.3375	
4-90	451.4375	
4-91	451.5375	
4-92	451.6375	
4-93	452.3125	
4-94	452.5375	
4-95	452.4125	
4-96	452.5125	
4-97	452.7625	
4-98	452.8625	
4-99	456.1875	
4-100	456.2375	
4-101	456.2875	
4-102	468.2125	
4-103	468.2625	
4-104	468.3125	
4-105	468.3625	
4-106	468.4125	
4-107	468.4625	
4-108	468.5125	
4-109	468.5625	
4-110	468.6125	
4-111	468.6625	
4-112	456.3375	
4-113	456.4375	
4-114	456.5375	
4-115	456.6375	
4-116	457.3125	
4-117	457.4125	
4-118	457.5125	
4-119	457.7625	
4-120	457.8625	
4-121	461.3175	
4-122	464.8375	

3.4 Field Program Advanced Feature Codes

The LM-700DMR can be field programmed for a variety of additional features. Refer to [Table A](#) for the 2 or 3-digit codes available for field programming. In our example we will program the radio for Record and Play delay operation of 2 seconds. The LM-700DMR is set from the factory with these \checkmark options **enabled**.

To enter an Advanced Feature Code:

- 622**
1. Refer to [Table A](#) to determine the 3-digit feature code and write it down.
 2. **Place the radio into Program / Readout Mode** by pressing and holding the **PROGRAM** button. A "P" will appear on the LED display. Release the **PROGRAM** button when a hyphen appears and the radio is ready to accept the first digit of your program entry.
 3. Scroll to the character "A" by clicking the **PROGRAM** button until the program display shows the correct character. **Pause**—the radio will show a hyphen across the center of the display to indicate that it is ready to accept the first digit of the Feature code.
 4. 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 show a hyphen across the center of the display to indicate that it is ready to accept the next digit.
 5. Enter the 2nd digit of the feature code by clicking the **PROGRAM** button until the program display shows the desired number. **Pause**—the radio will show a hyphen across the center of the display to indicate that it is ready to accept the next digit.
 6. If necessary, enter the 3rd digit of the feature code by clicking the **PROGRAM** button until the program display shows the desired number. **Pause**—the radio will 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 **ENTER** button to save your programming. A hyphen will flash 3 times on the program display to indicate that programming was successful. The radio is now ready for another program entry.

NOTE: 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.
 8. Press the **PROGRAM** button to continue programming, or press the **ENTER** button to exit program mode.

Table A - Advanced Feature Codes

Code	Feature	Default	Description
Special Features			
21	Reset to Factory Defaults		Resets LM-700DMR to Factory default programming.
22	Display Radio Revision		LM-700DMR will display a sequence of 6 digits to identify operating code revision. This is helpful when troubleshooting the radio.
Pre-Announce Tone			
231	Pre-Announce Tone – On	\checkmark	Enable this feature to play a short tone from the LM-700DMR whenever it receives a signal.
232	Pre-Announce Tone – Off		Disable Pre-Announce Tone
23xx	Pre-Announce Tone Audio Level	25	Enter the 2-digit Pre-Announce Tone Audio Level between 03-99%
Interrupt Mode			
241	Interrupt Mode enable		Enable this feature to allow new incoming messages to interrupt playback of recorded messages. NOTE: If the LM-700DMR is in the process of <u>receiving</u> a message it cannot be interrupted.
242	Interrupt Mode disable	\checkmark	Disable Interrupt Mode

Table A - Advanced Feature Codes









Switch and Stored Message operation		
291	Switch On Only	Radio will play the pre-recorded Switch On message when the switch input is pulled to ground.
292	Switch Off Only	Radio will play the pre-recorded Switch Off message when the switch input is released from ground.
293	Switch On and Switch Off	Radio will play the pre-recorded Switch On message when the switch input is pulled to ground, and will play the pre-recorded Switch Off message when the switch input is released from ground
294	Switch Disable	√ Disable all Switch operation
31	Record Switch On Message	After entering the code the radio will record the next received message (45 seconds max). The recorded message will playback after recording to allow review of the message.
32	Record Switch Off Message	After entering the code the radio will record the next received message (45 seconds max). The recorded message will playback after recording to allow review of the message.
33	Record Stored Message 1	After entering the code the radio will record the next received message (45 seconds max). The recorded message will playback after recording to allow review of the message.
34	Record Stored Message 2	After entering the code the radio will record the next received message (45 seconds max). The recorded message will playback after recording to allow review of the message.
35	Record Stored Message 3	After entering the code the radio will record the next received message (45 seconds max). The recorded message will playback after recording to allow review of the message.
36	Record Stored Message 4	After entering the code the radio will record the next received message (45 seconds max). The recorded message will playback after recording to allow review of the message.
41	Play Switch On Message	Plays the recorded Switch On message
42	Play Switch Off Message	Plays the recorded Switch Off message
43	Play Stored Message 1	Plays the recorded message 1
44	Play Stored Message 2	Plays the recorded message 2
45	Play Stored Message 3	Plays the recorded message 3
46	Play Stored Message 4	Plays the recorded message 4
Relay Operation		
511	Relay operation – Disable	√ Disable relay operation.
512	Relay operation – Enable	Set this option for relay closure when the LM-700DMR receives a valid signal or on Switch detection. The relay will remain closed as long as a signal is received. If Record and Play is enabled, the relay will close as soon as a signal is received and remain closed throughout any Record and Play Delay and Recorded Message Replay.
52xxx	Minimum Relay time –sec.	√ Once the relay is activated on a valid received signal, this sets a minimum time it will remain active. (Relay must be enabled with code 512) Minimum Relay time can be set between 0-255 seconds. Seconds can be entered as a 1, 2 or 3 digit entry.
Record and Play Operation		
61	Recorded Message Replay – 0 times	√ Recorded messages are repeated concurrently for the number of times programmed, with 3 seconds between each repeat. The number of replays can be 1-9.
61x	Recorded Message Replay – # times	
62	Record and Play Disable	√ Record and Play operation is disabled.
62xxx	Record and Play Delay – Sec.	Playback of a recorded received message is delayed for the programmed time whenever a valid incoming message is received. Seconds can be entered as a 1, 2 or 3-digit entry.
631	Playback while Receiving Enable	Allows playback of Recorded messages at programmed Delay time, even if radio is still receiving.
632	Playback while Receiving Disable	√ Playback of Recoded messages can only occur after radio has finished receiving.

3.5 Readout and Field Program LM-700DMR Audio Level

The LM-700DMR can be field programmed for any audio level between 05-99% by entering the audio level as a 2-digit code.



In our example we will program the radio for 25% Audio Level. The LM-700DMR is set from the factory with a 50% audio level setting.

To enter the Audio Level setting:

1. Write down the desired audio level.

2. **Place the radio into Program / Readout Mode** by pressing and holding the **PROGRAM** button. A "P" will appear on the display. Release the **PROGRAM** button when a hyphen appears and the radio is ready to accept the first digit of your program entry.

3. Scroll to the character "U" by clicking the **PROGRAM** button until the program display shows the correct character. **Pause**—the radio will show a hyphen across the center of the display to indicate that it is ready to accept the first digit of the audio level setting.

4. Enter the 1st digit of the audio level setting by clicking the **PROGRAM** button until the program display shows the desired number. **Pause**—the radio will show a hyphen across the center of the display to indicate that it is ready to accept the next digit.


5. Enter the 2nd digit of the audio level setting by clicking the **PROGRAM** button until the program display shows the desired number. **Pause**—the radio will show a hyphen across the center of the display to indicate that it is ready to accept the next digit.

6. Press and release the **ENTER** button to save your programming. A hyphen will flash 3 times on the program display to indicate that programming was successful. The radio is now ready for another program entry.


NOTE: 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.
7. Press the **PROGRAM** button to continue programming, or press the **ENTER** button to exit program mode.

IMPORTANT NOTE: Audio level setting below 10% are entered as a 2-digit code with a first digit "0".

To readout the Audio Level setting:

1. With the radio in program mode, click the **PROGRAM** button until the program display shows the Program Code "U". **Pause**—the radio will show a hyphen across the center of the display to indicate that it is ready to readout the Audio Level setting.

2. Press and release the **ENTER** button. The display will show the 2-digit Audio Level setting, followed by a hyphen.

AUDIO LEVEL SETTING 25%
3. Press the **PROGRAM** button to continue programming, or press the **ENTER** button to exit program mode.

3.6 DMR ID and Color Codes Overview

DMR ID and Color Codes

Communication between any two DMR digital radios will include the following three codes (combined with Squelch Type):

Color Code	A Color Code from 0 to 15. Color Codes work much like QC/DQC codes in Analog mode. A Color Code is often used in conjunction with a Unit ID or Group ID code to screen-out other unwanted calls on the same radio frequency and to uniquely identify the transmitting radio. Default Color Code is set to 10.
SUID	The Subscriber Unit ID Code is the individual ID for the LM-700DMR receiver, and can be set to any unique number from 1 to 16,776,415. This can be used to selectively call the LM-700DMR receiver only. When a transmitting radio on the same frequency as the LM-700DMR sends an Individual Destination ID message that matches the SUID, the message will be received. By default, the SUID of an LM-700DMR receiver is set to 1.
Group ID	A Group ID code determines which call-group the LM-700DMR receiver belongs to, and can be set to a number from 1 to 16,776,415. By default, Group ID is disabled by setting it to a Group ID of 0. The LM-700DMR can be set to an All-Call Group ID (16,777,215) and will accept all Group ID messages transmitted on the same radio frequency.

Receive Operation with Squelch Types

The LM-700DMR Loudmouth can be set to one of four Squelch Types using the Ritron® PC programmer:

OFF	Not recommended	The LM-700DMR receiver will receive all valid on-frequency DMR voice 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	Good	The LM-700DMR receiver will receive all calls with the programmed Color Code. Squelch Type Color Code is similar to using QC/DQC codes in an analog radio.
ID	Better	The LM-700DMR receiver will only receive calls with its programmed SUID code, programmed Group Call code, or the All Call code. Squelch Type ID is similar to using 2-Tone, DTMF or Selcall to selectively call the radio in an analog radio.
Color Code + ID	Best	The LM-700DMR receiver will only receive calls with the programmed Color Code <u>AND</u> with its programmed SUID code, programmed Group Call code, or the All Call code. 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.

3.7 How to Field Program DMR ID and Color Code

It is strongly recommended that you do not use the OFF squelch type in the LM-700DMR receiver. Each Loudmouth LM-700DMR receiver can be programmed with Color Codes, and Group ID code. Refer to Table n for DMR ID and Color Codes. Each LM-700DMR Loudmouth can be uniquely identified by programming a DMR 1-8 digit SUID code using the digits from 1 to 16,776,415.

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

- | | | |
|-------------------------|-----|--|
| | 1. | Write down the desired SUID code, Color Code, and Group code. |
| | 2. | Place the radio into Program / Readout Mode by pressing and holding the PROGRAM button. A "P" will appear on the LED display. Release the PROGRAM button when a hyphen appears and the radio is ready to accept the first digit of your program entry. |
| | 3. | Click the Program button until the program display shows the Program Code "n". Pause—the radio will show a hyphen across the center of the display to indicate that it is ready for DMR ID code programming. |
| | 4. | Click the Program button until the program display shows the Table Code "4". Pause—the radio will 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 | 5. | Enter the 1 st digit of the SUID code by clicking the Program button until the program display shows the desired number. Pause—the radio will show a hyphen across the center of the display to indicate that it is ready to accept the next digit. |
| | 6. | Enter the 2 nd digit of the SUID code by clicking the Program button until the program display shows the desired number. Pause—the radio will show a hyphen across the center of the display to indicate that it is ready to accept the next digit. |
| | 7. | Enter the 3 rd digit of the SUID sequence by clicking the Program button until the program display shows the desired number. Pause—the radio 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. |
| | 8. | Press and release the ENTER button to save your programming. A hyphen will flash 3 times on the program display to indicate that programming was successful. The radio is now ready for another program entry. |
| | | NOTE: 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. |
| | 9. | Click the Program button until the program display shows the Program Code "n". Pause—the radio will show a hyphen across the center of the display to indicate that it is ready for DMR ID code programming. |
| | 10. | 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 2-digit Color Code. |
| 2-Digit Color Code | 11. | Enter the 1 st digit of the Color Code by clicking the Program button until the program display shows the desired number. Pause—the radio will show a hyphen across the center of the display to indicate that it is ready to accept the next digit. |
| | 12. | Enter the 2 nd digit of the Color Code by clicking the Program button until the program display shows the desired number. Pause—the radio will show a hyphen across the center of the display to indicate that it is ready to accept the next digit. |
| | 13. | Press and release the ENTER button to save your programming. A hyphen will flash 3 times on the program display to indicate that programming was successful. The radio is now ready for another program entry. |
| | | NOTE: 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. |
| | 14. | Click the Program button until the program display shows the Program Code "n". Pause—the radio will show a hyphen across the center of the display to indicate that it is ready to accept DMR ID code programming. |
| | 15. | Click the Program button until the program display shows the Table Code "5". Pause—the radio shows a hyphen across the center of the display to indicate that it is ready to accept a 1 to 8 digit Group ID code |
| 1-8 Digit Group ID Code | 16. | Enter the 1 st digit of the Group ID code by clicking the Program button until the program display shows the desired number. Pause—the radio will show a hyphen across the center of the display to indicate that it is ready to accept the next digit. |
| | 17. | Enter the 2 nd digit of the Group ID code by clicking the Program button until the program display shows the desired number. Pause—the radio will show a hyphen across the center of the display to indicate that it is ready to accept the next digit. |
| | 18. | Enter the 3 rd digit of the Group ID sequence by clicking the Program button until the program display shows the desired number. Pause—the radio 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. |



19. Press and release the **ENTER** button to save your programming. A hyphen will flash 3 times on the program display to indicate that programming was successful. The radio is now ready for another program entry.

NOTE: 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.

20. Press the **PROGRAM** button to continue programming, or press the **ENTER** button to exit program mode.

To readout DMR ID and Color Codes:



1. With the radio in program mode, click the **PROGRAM** button until the program display shows the Program Code "n". Pause—the radio will show a hyphen across the center of the display to indicate that it is ready to accept the first digit of the DMR code to be readout.



2. Click the Program button until the program display shows the first digit of the DMR code to be readout. Pause—the radio will show a hyphen across the center of the display to indicate that it is ready to readout the DMR ID or Color Code. (Refer to Table n for the first digit of the DMR code)

3. Press and release the **ENTER** button. In this example the display will show the 3-digit SUID code, followed by a hyphen.



3-Digit SUID Code

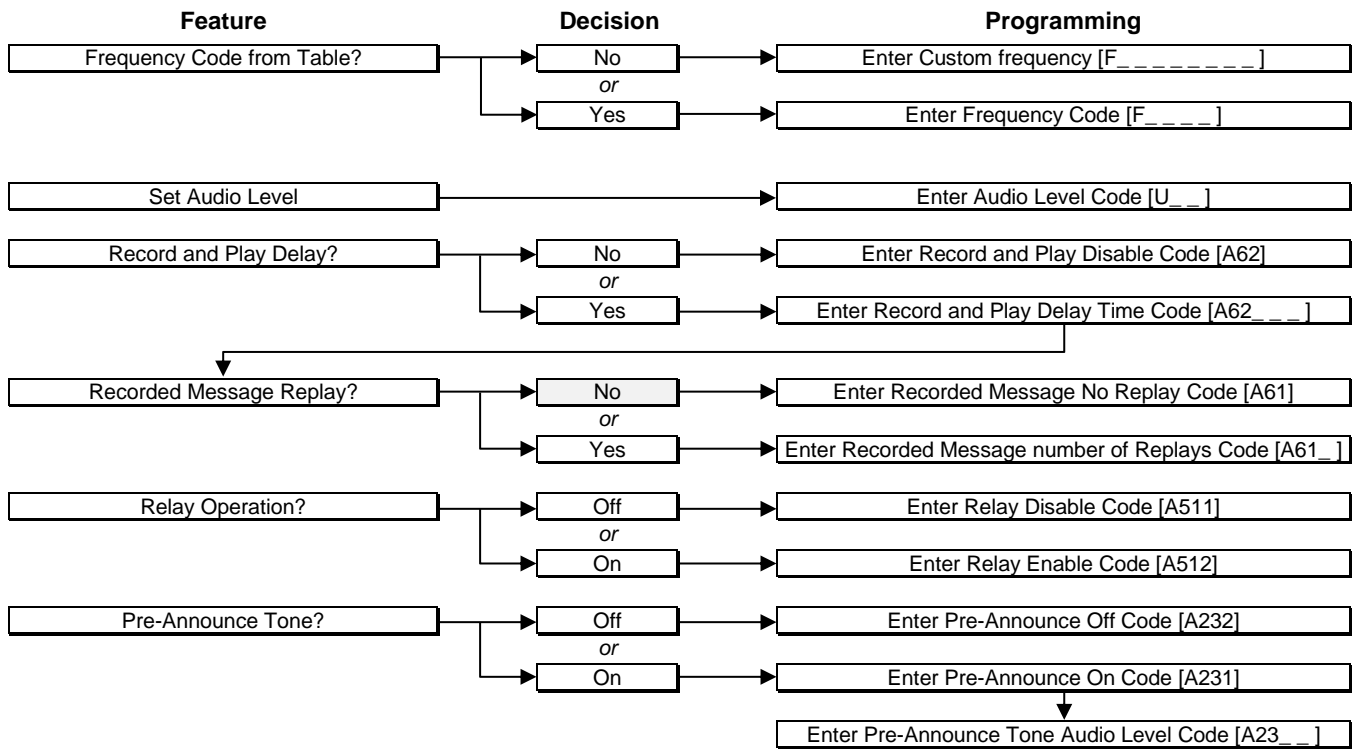
4. Press the **PROGRAM** button to continue programming, or press the **ENTER** button to exit program mode.

Table n - DMR ID AND COLOR CODES

Table Code	Feature	Description
Other DMR Codes		
0x	Response to All-call ID	0= Enabled 1=Disabled
1x	Squelch type	1=off 2=Color Code 3=ID 4=ID + Color Code
2x	Repeater Slot	1 or 2 (Only applicable when used with a repeater)
3xx	Color Code	The Loudmouth can be set for Color Code of 00-15. Programming Color Code will have no effect without first setting squelch type for Color Code or ID + Color Code.
DMR ID Codes		
4xxxxxxx	Subscriber Unit ID (SUID) code	The Loudmouth can be programmed for a 1-8 digit SUID code for unique identification.
5xxxxxxx	RX Group ID code	The Loudmouth can be programmed for a 1-8 digit Group ID code. Programming an Group ID code will have no effect without first setting squelch type for ID or ID + Color Code.

NOTES: 8-digit ID codes must be in the 1 to 16,776,415 range. If the Loudmouth is to only receive messages targeted for it, the Squelch Type must be set for "ID" or "ID + Color Code". If Squelch Type is set to "off" all traffic will be heard.

3.8 Field Programming Flow Chart



4 Operation

Once installed, operating the LM-700DMR radio receiver requires no human contact. Portable, base station or mobile 2-way radios can deliver voice messages directly to a PA system with a simple press of the PTT button for either live or recorded playback. This section describes the subtle differences in operation for various LM-700DMR options and installations.

4.1 Basic Operation

Basic operation is defined as a LM-700DMR receiver programmed on a dedicated radio frequency using DMR protocol. The receiver is also programmed for 50% Audio Level and a pre-announce tone.

1. Move to an area that is away from any PA system speaker to prevent feedback.
2. Be sure the microphone on the calling radio is pointed away from any PA system speaker.
3. Set the portable, base station, or mobile radio to the LM-700DMR channel.
4. Monitor the channel before transmitting to be sure there are no other radio users on the LM-700DMR frequency.
5. Press and hold the PTT button and pause for about 1 second, allowing the pre-announce tone to be heard.
6. Speak into the radio microphone to broadcast your message over the PA system speakers. If other radios are operating on the LM-700DMR channel they will also hear your message.
7. Release the PTT button when your message is complete.
8. Return the portable, base station, or mobile radio to the normal operating channel.

4.2 Record and Play

When 2-way radios are used in the same area as the PA system speakers, feedback may result that can render the system unusable. For those applications the LM-700DMR receiver can be programmed to record the incoming messages and play them back over the PA system speakers. Set the portable, base station, or mobile radio to the LM-700DMR channel.

1. Monitor the channel before transmitting to be sure there are no other radio users on the LM-700DMR frequency.
2. Press and hold the PTT button on your 2-way radio.
3. Speak into the radio microphone to record your message into the LM-700DMR receiver. If other radios are operating on the LM-700DMR channel they will hear your message as you record it.
4. Release the PTT button when your message is complete.
5. The pre-announce tone will be heard and the PA system speakers will begin playing your recorded message.
6. When finished, return the portable, base station, or mobile radio to the normal operating channel.

With Record and Play operation:

- Recorded messages are limited to a maximum of 70 seconds.
- The LM-700DMR can be programmed to delay the playback of a recorded message. This is useful when using the Relay option for activation a strobe light to indicate that a speaker message is imminent.
- The LM-700DMR can be programmed to repeat a recorded message concurrently for the number of times programmed with 3 seconds between each repeat. The pre-announce tone will only be heard once, before the start of the recorded message playback.

4.3 Battery Powered Operation

The Loudmouth® receiver can be equipped with an optional BP-LM-Li22 emergency backup battery that will temporarily power the radio if primary power from the RPS-1B is interrupted. The BP-LM-Li22 is a 2200mAH rechargeable battery pack that is charged by the Loudmouth® receiver and is not intended to operate the radio for an extended period of time. For applications where AC power for the RPS-1B is not available, the Loudmouth® receiver must be powered by an external +12 VDC battery.

Low Battery Alert Tone

Whenever the Loudmouth® is battery powered, a short tone will be heard at the end of each broadcast to indicate that the batteries need replacement or recharging.

- When using the BP-LM-Li22 battery back-up the Low Battery Alert Tone will not be heard when the external +12 VDC is present, regardless of the battery condition.

4.4 LM-700DMR Options

Certain LM-700DMR options affect operation as follows:

Pre-Announce Tone

With this feature enabled the LM-700DMR will sound a short tone prior to each broadcast to notify listeners that a page is forthcoming.

Relay Enable

Set this option for relay closure when the LM-700DMR receives a valid signal. The relay will remain closed as long as a signal is received. If Record and Play is enabled, the relay will close as soon as a signal is received and remain closed throughout any Record and Play Delay and Recorded Message Replay.

Record and Play Delay

The playback of a received recorded message is delayed for the Record and Play Delay time whenever a valid incoming message is received. Record and Play is enabled any time a Record and Play Delay is programmed. The LM-700DMR can also be set to start playback as soon as the received incoming message is complete.

Recorded Message Replay

Recorded messages are repeated concurrently for the number of times programmed with 3 seconds between each playback.

Field Programming Enable

With this feature enabled the radio can be programmed via the display and buttons on the radio, without the need for the PC programmer software. Disable this feature to prevent programming in the field and allow only PC programming.

4.5 How to Minimize Feedback

Feedback is the result of the PA system speaker audio getting back into the microphone of the radio being used to access the LM-700DMR receiver. This is a problem with the calling radio, not the LM-700DMR receiver. Although the LM-700DMR receiver is not intended to be used in the same area as the calling radio, steps can be taken to minimize the feedback effect.

Reduce LM-700DMR receiver audio level

Do not set the LM-700DMR receiver audio level any higher than is necessary to clearly hear the PA messages.

Maintain distance between the calling radio and the PA system speakers

In general, the calling radio should be at least 50 feet away from the speaker when the LM-700DMR receiver is set for 50% volume. The necessary distance increases if the volume is turned up and decreases if the volume is turned down.

Make sure the radio microphone is turned away from the speaker

You do not want the speaker pointing directly into the microphone. Using your hand to shield the microphone can also reduce feedback.

Use a noise canceling microphone

Equip your calling radio with an optional noise-canceling microphone.

Record and Play feature eliminates feedback



The Record and Play feature completely eliminates feedback by recording your message and playing it back immediately after you have finished sending it to the LM-700DMR receiver. See Section 3.4 Field Program Advanced Feature Codes to enable the Record and Play operation.

The calling radio is not transmitting while the message is broadcast, so speaker audio cannot get into the calling radio microphone.

4.6 Switch Input Operation

The Loudmouth® will play a pre-recorded voice message when a change in the Switch Input is detected. Optional Ritron cable assembly 60201136 (6-Conductor Cable, Loudmouth® Interface) is used to connect the Loudmouth® Switch Input to a door switch, or any other device where switch closure detection is desired. The cable assembly also provides connection to the Relay Switch closure output.

Using the Switch Input to Test your System

The Ritron model RPB-1AG pushbutton is available for use with Switch Input Operation. When programmed for “Switch On Only” operation, simply press the pushbutton to play the pre-recorded Switch On message over your Loudmouth® speaker to test for activation, volume, or any other programmed attribute. A separate test should also be performed using a radio to transmit to the LM-700DMR receiver.



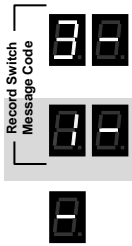
Switch Message Operation

- The Switch Detect On Message is automatically played when the Switch Input is pulled low.
- The Switch Detect Off Message is automatically played when the Switch Input is released from ground.
- Switch Messages will ONLY played over the LM-700DMR receiver/speaker that the switch is directly connected to, there is no wireless connection to other Loudmouth® receivers. If a switch is directly connected to two different Loudmouth receivers, the Switch Message will then play over both receivers.
- Switch messages will not be played if the radio channel is busy, but instead will wait for the channel to clear before playing.
- Switch messages are played after the Pre-announce tone if the radio is programmed for this feature.
- Switch messages can be programmed for Play Delay or Repeats.
- Switch messages can be up to 45 seconds long.

To record a Switch Input Message:

In the following example we will program the LM-700DMR to operate with a Switch On message only.

- | | |
|----------------------------|---|
| 291 | 1. Refer to Table A – Switch Operation and write down the code to enable the Switch On Message Only. |
| 31 | 2. Refer to Table A – Switch Operation and write down the code to record the Switch On message. |
| | 3. Place the radio into Program / Readout Mode by pressing and holding the PROGRAM button. A “P” will appear on the display. Release the PROGRAM button when a hyphen appears and the radio is ready to accept the first digit of your program entry. |
| | 4. Scroll to the character “A” by clicking the PROGRAM button until the program display shows the correct character. Pause —the radio will show a hyphen across the center of the display to indicate that it is ready to accept the first digit of the Enable Switch On Message Only code. |
| Enable Switch Message Code | 5. Enter the 1 st digit of the Enable Switch On Message Only code by clicking the PROGRAM button until the program display shows the desired number. Pause —the radio will show a hyphen across the center of the display to indicate that it is ready to accept the next digit. |
| | 6. Enter the 2 nd digit of the Enable Switch On Message Only code by clicking the PROGRAM button until the program display shows the desired number. Pause —the radio will show a hyphen across the center of the display to indicate that it is ready to accept the next digit. |
| | 7. Enter the 3 rd digit of the Enable Switch On Message Only code by clicking the PROGRAM button until the program display shows the desired number. Pause —the radio will show a hyphen across the center of the display to indicate that it is ready to accept the next digit. |
| | 8. Press and release the ENTER button to save your programming. A hyphen will flash 3 times on the program display to indicate that programming was successful. The radio is now ready for another program entry. |
| | NOTE: 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. |
| | 9. Scroll to the character “A” by clicking the PROGRAM button until the program display shows the correct character. Pause —the radio will show a hyphen across the center of the display to indicate that it is ready to accept the first digit of the Record Switch On Message code. |



10. Enter the 1st digit of the Record Switch On Message code by clicking the **PROGRAM** button until the program display shows the desired number. **Pause**—the radio will show a hyphen across the center of the display to indicate that it is ready to accept the next digit.
11. Enter the 2nd digit of the Record Switch On Message code by clicking the **PROGRAM** button until the program display shows the desired number. **Pause**—the radio will show a hyphen across the center of the display to indicate that it is ready to accept the next digit.
12. Press and release the **ENTER** button to place the radio into record mode. A hyphen will appear on the program display.
13. Using your portable or base radio, transmit the Switch On Message to the LM-700DMR. When the PTT is released the LM-700DMR will playback the recorded Switch On Message for review.
14. Press the **PROGRAM** button to continue programming or press the **ENTER** button to exit program mode.

4.7 Relay Operation

Radios are equipped with a relay that can be set for relay switch closure when the LM-700DMR receives a valid signal. The relay can be used to enable an optional strobe light for visual indication that a LM-700DMR speaker message is in process. The LM-700DMR Interface cable is used to connect the LM-700DMR relay.

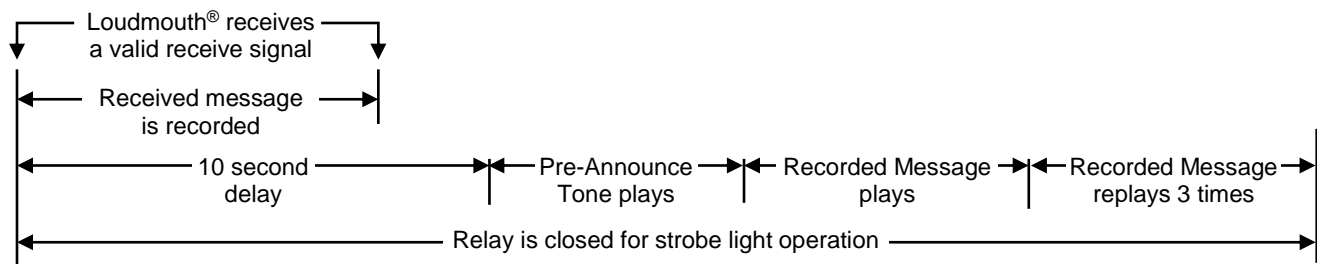
With the Relay Option enabled:

If Record and Play is disabled	The relay switch will close as soon as a valid signal is received, and will remain closed as long as the signal is present.
If Record and Play is enabled	The relay switch will close as soon as a valid signal is received and will remain closed until the recorded message has finished playing.
If Record and Play Delay is programmed	The relay switch will close as soon as a valid signal is received, and will remain closed for the delay time and until the recorded message has finished playing.
If Recorded Message Replay is programmed	The relay switch will close as soon as a valid signal is received, will remain closed for any Record and Play Delay time and until the recorded message has been repeated in it's entirety.

Radio Operation Timeline

The following timeline explains operation for Loudmouth[®] radios. In this example the Loudmouth[®] is programmed for:

- Record and Play
- Delay Message Playback of 10 seconds
- Repeat Message Playback 3 times
- Relay Operation Enabled
- Pre-Announce Tone Enabled



Strobe Light Operation

The Loudmouth[®] relay can be used to operate a strobe light in a number of configurations with the addition of the optional Ritron cable assembly 60201136 (6-Conductor Cable, Loudmouth[®] Interface). The cable can provide:

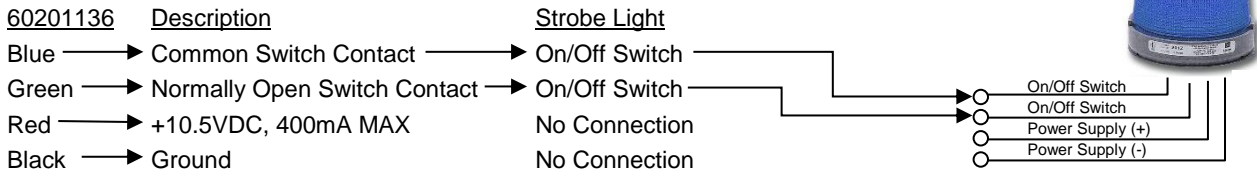
- A normally open relay switch that closes on a received signal. The relay switch can handle up to 3A when used to connect power to a strobe light.
- A normally closed relay switch that opens on a received signal.
- A +10.5VDC supply that can be used to power an LED strobe light rated at 400mA or less.
- A ground connection that can be used to provide a switch closure to ground.

Refer to section [2.8 Installation of Optional Interface Cable Assembly 60201136](#) for cable installation instruction.

Connecting the Relay Switch to a Strobe Light

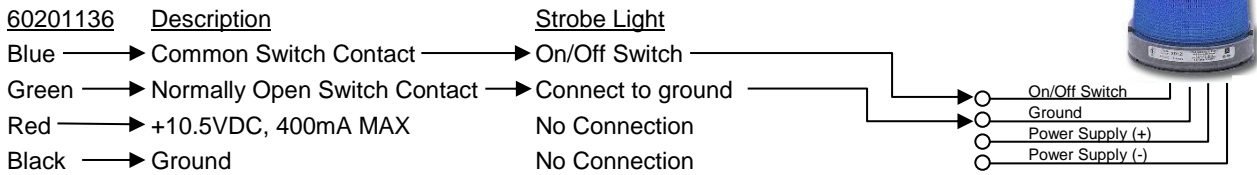
1. A simple switch closure capable of handling 3A current.

- The strobe light is activated when two On/Off inputs are connected.
- The strobe light requires its own external power, either AC or DC.



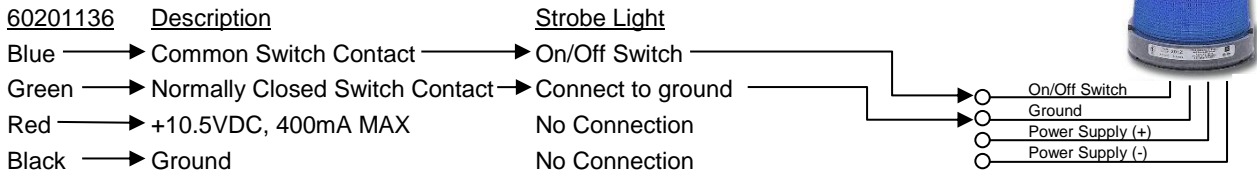
2. A switch closure to ground to activate.

- The strobe light is activated when a single On/Off input is pulled to ground.
- The strobe light requires its own external power, either AC or DC.



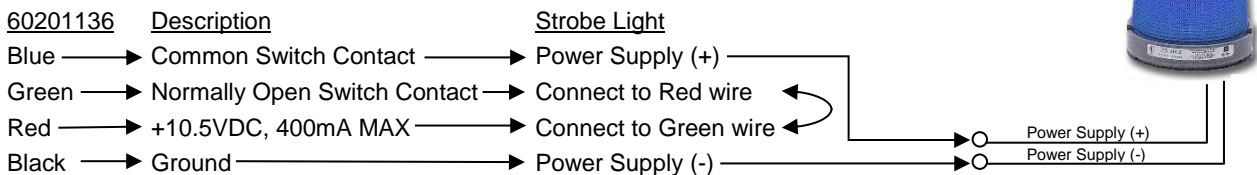
3. A switch opens to release from ground to activate.

- The strobe light is activated when a single On/Off input is released from ground.
- The Loudmouth relay must be configured for normally-closed operation. Refer to section 2.8 Installation of Optional Interface Cable Assembly 60201136.
- The strobe light requires its own external power, either AC or DC.



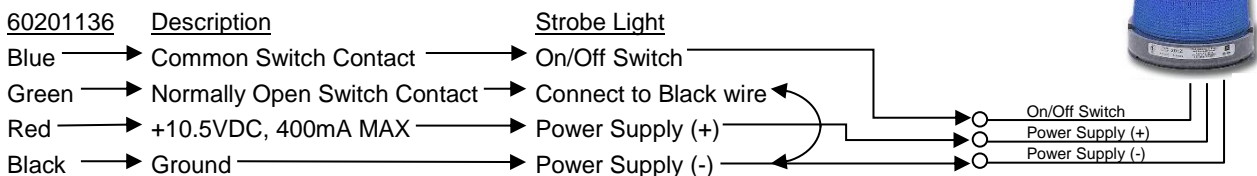
4. Using the switch to connect 10.5 VDC from the Loudmouth®.

- This allows a strobe light to be DC powered by the Loudmouth® when the relay is closed.
- The strobe light must be able to operate on +10.5VDC, and requires 400mA or less.



5. A switch closure to ground to activate, with 10.5 VDC from the Loudmouth® to power the strobe.

- The strobe light is activated when a single On/Off input is pulled to ground.
- The strobe light must be able to operate on +10.5VDC, and requires 400mA or less.



4.8 Stored Message Operation

Note: To enable and configure the Stored Message feature you will need the LM-DMR-PCPS PC Programming Software.

The LM-700DMR receiver can be programmed to selectively play up to 4 different pre-recorded voice messages. Each pre-recorded message is activated when the Loudmouth® receives an identical matching signal transmitted from a companion DMR 2-way radio (i.e. a portable radio).

- Each of the 4 Stored Messages must be programmed with a unique Color Code and/or ID Code, and must be different than normal “Live” operation.
- The 4 Stored Messages will operate on the same radio frequency as normal “Live” operation. The LM-700DMR receiver can only receiving 1 radio frequency.
- The Stored Message is automatically played when the matching DMR signal is received.
- When the matching Stored Message DMR signal is received, incoming voice audio from the companion DMR 2-way radio will not be heard on the Loudmouth® speaker, instead the Stored Message will be played.
- The matching Stored Message transmission from the companion 2-way radio can be brief, just long enough for the Loudmouth® receiver to recognize the signal.
- Each of the 4 Stored Messages can be configured individually with its own Pre-Announce Tone, Message Replay, Message Delay, and Relay Operation.
- Stored Messages can be up to 45 seconds long.
- When recording a Stored Message over-the-air, as long as the DMR 2-way radio frequency matches the LM-700DMR radio frequency the Stored Message can be recorded into the Loudmouth® receiver, regardless of Color Code, SUID, Group ID and Squelch Type.
- The Stored Messages can be recorded using the LM-DMR-PCPS PC Programming software, or via Field Programming. However, the LM-DMR-PCPS PC Programming Software is required to enable and configure the LM-700DMR for the Stored Message feature.
- Using the PC Programmer, the Stored Messages in any LM-700DMR can be saved and then recorded into another LM-700DMR receiver.
- Stored Messages do not necessarily have to be voice, in some applications a “buzzer”, “whistle” or other alert tone may be desirable.

For more details, refer to section 3.6 DMR ID and Color Codes Overview and RITRON LM DMR Series Programmer User Manual.

To record a Stored Message:

In the following example we will record Message 1.

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1. Refer to [Table A](#) and write down the code to Record Stored Message 1.

2. **Place the radio into Program / Readout Mode** by pressing and holding the **PROGRAM** button. A “P” will appear on the display. Release the **PROGRAM** button when a hyphen appears and the radio is ready to accept the first digit of your program entry.

3. Scroll to the character “A” by clicking the **PROGRAM** button until the program display shows the correct character. **Pause**—the radio will show a hyphen across the center of the display to indicate that it is ready to accept the first digit of the Record Stored Message code.

Record Stored Message Code

4. Enter the 1st digit of the Record Stored Message code by clicking the **PROGRAM** button until the program display shows the desired number. **Pause**—the radio will show a hyphen across the center of the display to indicate that it is ready to accept the next digit.

5. Enter the 2nd digit of the Record Stored Message code by clicking the **PROGRAM** button until the program display shows the desired number. **Pause**—the radio will show a hyphen across the center of the display to indicate that it is ready to accept the next digit.

6. Press and release the **ENTER** button to place the radio into record mode. A hyphen will appear on the program display.

7. Using your portable or base radio, transmit the Record Stored Message to the LM-700DMR. When the PTT is released the LM-700DMR will playback the recorded Record Stored Message for review.

8. Press the **PROGRAM** button to continue programming or press the **ENTER** button to exit program mode.

5

Specifications

5.1 General

Receiver physical dimensions	7.125"H x 5.5"W x 3.0"D
Receiver enclosure material	Hi- Impact Polycarbonate Thermoplastic
Receiver color	Black
Receiver weight	1 lb. 15 oz. (with AFB-1545 antenna)
Receiver mounting	2 aluminum brackets to side of radio
Receiver environmental	indoor use only
Relay Switch Output	Connector: Optional Interface Cable Assembly 60201136 (Blue, Green) Output: Switch closure on received signal
Out Audio power	Connector: RCA Phono jack Maximum Output: 60mW – 5.35W RMS (LM-700DMR received audio is adjustable)
DC power connector	2.1mm coaxial DC jack (size M)
Antenna	AFB-1545 dual-band (150-170 MHz, 450-470 MHz)
Antenna connector	50Ω BNC

5.2 RPS-1B Power Cube

RPS-1B physical dimensions	2.93" L (74.5 mm) x 1.97" W (50 mm) x 1.14" H (29 mm)
RPS-1B mounting	Wall-mounted via 120 VAC plug.
RPS-1B connector	2.1mm coaxial DC plug molded to wire, center conductor = positive
RPS-1B environmental	indoor use only
RPS-1B input voltage	120 VAC, 60 Hz
RPS-1B output voltage	12 VDC @ 1.5A

5.3 LM-700DMR Receiver

FCC Qualification	FCC Part 15 SDoC	
IC ID	CAN RSS-Gen/CNR-Gen	
	UHF	VHF
Frequency range	450 - 470 MHz	150 – 170 MHz
Channel steps	3.125 kHz	2.5 and 3.125kHz
Frequency stability	+/-1.5 PPM (-30° to +60° C)	+/-1.5 PPM (-30° to +60° C)
Typical RF Front-End sensitivity (12 dB SINAD)	-120dBm	-120 dBm

NOTE:The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment. Such modifications could void the user's authority to operate the equipment.

6

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, power cubes, and items contained in the programming and programming/service kits.

<u>WHAT IS COVERED</u>	<u>FOR HOW LONG</u>	<u>WHAT RITRON WILL DO</u>
LM-700DMR Radio Receiver	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
Accessories	90 days*	<i>*After date of purchase</i>

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

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

YOUR RIGHTS UNDER STATE LAW: This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

WHERE THIS WARRANTY IS VALID: THIS WARRANTY IS VALID ONLY WITHIN THE UNITED STATES, THE DISTRICT OF COLUMBIA AND PUERTO RICO.