Ritron Model(s):	LM/LPA Loudmouth Series
Current Firmware Revision:	9s102309.s19
Revision Update:	December 3, 2019

Firmware revision 9s102309 is updated as follows:

1. The volume pot was constantly being loaded with 0 while the radio was in the 'MUTE' condition. Now it is only loaded with 0 when the radio first enters the 'MUTE' condition.

2. The sound chip was not recognizing the erase command if it was issued too soon after a stop command i.e. when a signal is still present when a record-and-play sequence ends and it starts the sequence over immediately. Now the sound chip interrupt is reset before issuing a stop command and then a 'done' interrupt is needed before continuing.

3. There was an issue noted with systems having multiple LM/LPAs that the played messages (record-and-play) mode were noticeably sometimes out of sync. This was found to be mainly due to delayed decode of DCS turn-off code. It was being sampled once per bit and was not synchronized with the bit clock. Therefore it could be sampling on the bit transitions which could cause errors. Now it is sampled twice per bit.

4. A feature was added to decode a second DCS code. If this is programmed and decoded, the radio will go into 'Live play' mode. NOTE: This feature was added for a special application and is not supported by Ritron Programming software RPT-PCPS-12, special programming instructions are required to utilize this feature.

LM/LPA Loudmouth firmware revision history:

1. **9S102301   released: 12/22/2006**

   Firmware revision 23.01 was installed on the initial product release of the LM-U450/V150 Loudmouth receiver.

2. **9S102302   released: 08/23/2007**

   a. Firmware revision 23.02 supports LPA models.

   b. For LPA models the AUD_AMP output at U501 pin 29 is active high whenever the LPA successfully receives a signal and low at all other times, regardless of Battery Operation settings.

   c. For LPA models there is no delay when playing the Pre-announce tone or received messages when AUD_AMP output at U501 pin 29 goes active high.

3. **9S102303   released: 03/29/2011**

   All LM/LPA-U450/V150 models should be updated to firmware revision 9s102303 or greater

   a. MC68HC908AP16 internal LVI (Low-Voltage Inhibit) is enabled to monitor the VDD voltage and forces a LVI reset when the VDD voltage falls below the trip voltage, VTRIPF1.

   This is to prevent a customer problem where the Loudmouth backup battery was operating the radio for an extended period of time and the voltage would drop below 2VDC, at which time the uP clock oscillator would stop. When power was restored the radio would be in an indeterminate, non-operational state that required a complete power-down reset to resume operation.

   b. Modify standard Loudmouth "Record and Play" operation so that AUD2 (C0, Pin 22) remains high when recording, but goes low during playback. With revision 23.02 and earlier, AUD2 goes low as soon as 2-tone is decoded and the record operation starts. This is to support 2-tone decode in "Record and Play" mode.

   c. Add provisions for relay operation. When set, the relay output at U501 pin 16 is pulled low whenever there is Loudmouth speaker audio. If the relay components are installed on the Loudmouth pcb, the relay will provide a switch closure whenever there is a message broadcast over the Loudmouth PA horn.

   The relay option is being added per request by Sales department for future consideration. There are currently no models with the relay installed, and the relay flag is not supported by the current PC programmer version 12.0.5.

4. **9S102304   released: 09/07/2011**

   a. Support ISD1730 operation on pcb revisions G1750370J (VHF) and G1750380K (UHF), as well as ISD1420 operation for older pcb revisions. New pcb revisions invert the PS polarity by adding an NPN bias transistor at U501 pin 18. With firmware revision 9s102304, microcontroller U501 pin 18 is configured as an input when power is first applied to determine if the pcb revision uses the ISD1730 (low with bias resistor to ground) or the ISD1420 (high through PS pass-transistor Q502).

   b. DQC decode problem where the Pre-announce tone would sometimes play on DQC turn-off. This was fixed by clearing the DQC decode register any time a turn-off code is detected, causing the unit to receive another full DQC frame before a valid decode is again established.

   c. EE memory locations 0009 and 000A should be programmed as follows for reliable DQC decode:

0009 – WB slicer clamp level	000A - NB slicer clamp level
VHF = 31, UHF = 2B	VHF = 31, UHF = 2E

5. 9S102305   released: 02/29/2016

Update to firmware revision 9s102305 is not necessary

a. All table frequencies are set for narrowband operation except the 2 wideband MURS frequencies (same as all other Part 90 table frequency radios). This is for compatibility with FCC 2013 Narrowband radios.

b. An option is created that, if enabled, overrides table channel bandwidth and force the radio into wideband mode. If the option is disabled, the radio operates wideband/narrowband as defined in the table channel programming. This does not affect a Custom Programmed frequency. Any field programming for table frequency will automatically disable the wideband option, which means the wideband option must be set AFTER frequency programming.

c. Programmable Record and Play Message Delay (sec) is added to delay playback of recorded messages.

d. Programmable Record and Play Message Repeat is added to allow recorded messages to be repeated.

e. Field program is added for Wideband Operation, Relay Operation, Record and Play Delay, Record and Play Repeat.

f. PC programmer version 12.0.8 supports all features added with firmware revision 23.05, as well as support for the relay option.

6. 9S102306   released: 03/28/2017

a. Turn off volume pot U306-G when Loudmouth is not playing a received or recorded message.

With radio programmed for Battery Operation disabled and no incoming RF signal, an intermittent low level static could be heard on the speaker. This was RX noise from the audio circuit jumping around AUD4 audio gate. With the volume pot set to 0 it is eliminated.

When audio path is enabled: AUD4 is closed and volume pot is set to programmed value (either volume or beep volume)

When audio path is disabled: Volume pot U306-G is set to 0 and then AUD4 opens.

Standby condition: AUD4 is open and volume pot U306-G is set to 0.

7. 9S102309   released: 12/03/2019

a. The volume pot was constantly being loaded with 0 while the radio was in the 'MUTE' condition. Now it is only loaded with 0 when the radio first enters the 'MUTE' condition.

b. The sound chip was not recognizing the erase command if it was issued too soon after a stop command i.e. when a signal is still present when a record-and-play sequence ends and it starts the sequence over immediately. Now the sound chip interrupt is reset before issuing a stop command and then a 'done' interrupt is needed before continuing.

c. There was an issue noted with systems having multiple LM/LPAs that the played messages (record-and-play) mode were noticeably sometimes out of sync. This was found to be mainly due to delayed decode of DCS turn-off code. It was being sampled once per bit and was not synchronized with the bit clock. Therefore it could be sampling on the bit transitions which could cause errors. Now it is sampled twice per bit.

d. A feature was added to decode a second DCS code. If this is programmed and decoded, the radio will go into 'Live play' mode. NOTE: This feature was added for a special application and is not supported by Ritron Programming software RPT-PCPS-12, special programming instructions are required to utilize this feature.