Release Notes

RM024

Version 3.1-0

This document provides release notes for version **3.1-0** of the RM024 firmware as well as previously distributed release notes, if applicable.

Release notes are a summary of new and enhanced features, resolved issues, and known issues that are not resolved in this version. Consult the User's Guide for details on the features of this software release.

SOFTWARE VERSION 3.1-0

Released October 2016

Effectivity

Version 3.1-0 is available as an optional firmware upgrade via binaries posted to the website. Version 2.5-0 continues to ship on the following products:

Product	Description
RM024-S125-C-30	RAMP 2.4 GHz OEM transceiver, SMT, 3.3V TTL Serial, 125 mW, u.FL Jack, firmware v2.5
RM024-S125-M-30	RAMP 2.4 GHz OEM transceiver, SMT, 3.3V TTL Serial, 125 mW, multiple antennas, firmware v2.5
RM024-S10-C-30	RAMP 2.4 GHz OEM transceiver, SMT, 3.3V TTL, 10 mW, u.FL Jack, CE Approved, firmware v2.5
RM024-S10-M-30	RAMP 2.4 GHz OEM transceiver, SMT, 3.3V TTL, 10 mW, multiple antennas, CE Approved, firmware v2.5
RM024-P125-C-30	RAMP 2.4 GHz OEM transceiver, Pluggable, 3.3V TTL, 125 mW, u.FL Jack, firmware v2.5
RM024-P125-M-30	RAMP 2.4 GHz OEM transceiver, Pluggable, 3.3V TTL, 125 mW, multiple antennas, firmware v2.5
RM024-P10-C-30	RAMP 2.4 GHz OEM transceiver, Pluggable, 3.3V TTL, 10 mW, u.FL Jack, CE Approved, fw v2.5
RM024-P10-M-30	RAMP 2.4 GHz OEM transceiver, Pluggable, 3.3V TTL, 10 mW, multiple antennas, CE Approved, firmware v2.5
RM024-X125-C-30	RAMP 2.4 GHz OEM transceiver, Daughter card, 3.3V TTL, 125 mW, U.FL jack, firmware v2.5
DVK-RM024-CE	DVK, 2.4 GHz OEM transceiver, Pluggable, 3.3V TTL, 10 mW, multiple antennas, CE Approved, firmware v2.5
DVK-RM024-FCC	DVK, 2.4 GHz OEM transceiver, Pluggable, 3.3V TTL, 125 mW, Multiple Antenna, firmware v2.5

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New Features

No new features were implemented in this release.

Resolved Issues

The following issues were fixed in the **V3.1** release:

- **RF Packet Received but Not Sent Over Serial Interface –** Though rare, it was possible for a packet to be received over the RF in which an error in the packet existed but was not discovered until post-processing. By this time, an RF acknowledgement had already been queued to be sent over the RF to the sender. The packet was discarded because it was flawed, but the transmitter would not retry and would report successful reception (if Send Data Complete was enabled) because an ack was received. The RF ack message is now modified in its queue when an error is discovered during post-process. The Ack is still sent but is ignored by the recipient, thus prompting transmit retries and maintaining the integrity of the Send Data Complete message (if enabled). This issue has been present since inception.
- **Duplicate Packets in Large Networks –** The radio maintains a database in RAM of the 32 most recent unique radios from which it has received packets. When the database is full and a packet is received from a radio not in the database, the radio with the largest timespan since its last transmitted packet is removed from the database and replaced by the new radio. A bug in the code caused the 32nd radio (located at the top of the RAM allocated to this database) to be dropped from the database whenever the database contained 32 radios and a packet is received from a radio already in the database. If this 32nd radio sends a broadcast packet (with multiple broadcast attempts) or sends a unicast (addressed) packet and misses the RF acknowledgement, a duplicate packet could be seen over the serial interface.
- **Missed Reception of Acknowledgement on Utility Packets –** To conserve power, the RM024 will not enable the RF receiver after transmitting a broadcast packet as there is no expected RF acknowledgement being returned by the recipient(s). The logic utilized to track whether the previous packet sent was broadcast or unicast has always worked properly for data packets. However, when determining whether an acknowledgement is to be expected for utility packets, the logic looked at the last transmitted data packet rather than looking at the last transmitted utility packet. This issue is specific to usage of utility packets. Utility packets are only used for Remote IO and for Bin Analyzer mode. If these modes are not utilized, this bug has no impact on system performance. This bug has been present since v1.3-0.
  - Remote IO: If the previous data packet sent was unicast, this feature will work properly. If the previous packet sent was broadcast, the IO will be properly updated, but the acknowledgment will be missed, thus causing a retry the next utility slot.
  - Bin Analyzer: If the previous data packet sent was unicast, this feature will work properly. If the previous packet sent was broadcast, the bin will be reported as a failure as the acknowledgement containing the RSSI information will be missed.
- **Client Losing Connectivity –** Sometimes, particularly in areas with a high level of RF interference, the Server beacon can get corrupted. The beacon is protected by a 16-bit CRC. In extremely rare situations, the beacon can be corrupted in a such a way that the 16-bit CRC calculation verifies the packet as being true. Odds of this happening are 1 in 65,535. There is one bit in the entire beacon packet that, when set, can cause the Client to fall of the network and be unable to rejoin the network until being reset. If this bit is set (corrupted) in a beacon in which the CRC still calculates as true and all the other authentications in the beacon are valid, the Client would process the bit, exit the network and require a reset before being able to

rejoin the network. This bit is no longer processed in the beacon. This bit was first processed in the beacon in v1.6-0.

- **Random Backoff –** The random number generator utilized by the Random Backoff function was not generating much entropy. Entropy was improved in the random number generator used by Random Backoff. This change has no effect if Random Backoff is left at default (1 packet time or 0x00).

Known Issues

No known issues at this time.

SOFTWARE VERSION 2.9-0

Released July 2016

Effectivity

Version 2.9-0 is available as an optional firmware upgrade via binaries posted to the website. Version 2.5-0 continues to ship on the following products:

Product	Description
RM024-S125-C-30	RAMP 2.4 GHz OEM transceiver, SMT, 3.3V TTL Serial, 125 mW, u.FL Jack, firmware v2.5
RM024-S125-M-30	RAMP 2.4 GHz OEM transceiver, SMT, 3.3V TTL Serial, 125 mW, multiple antennas, firmware v2.5
RM024-S10-C-30	RAMP 2.4 GHz OEM transceiver, SMT, 3.3V TTL, 10 mW, u.FL Jack, CE Approved, firmware v2.5
RM024-S10-M-30	RAMP 2.4 GHz OEM transceiver, SMT, 3.3V TTL, 10 mW, multiple antennas, CE Approved, firmware v2.5
RM024-P125-C-30	RAMP 2.4 GHz OEM transceiver, Pluggable, 3.3V TTL, 125 mW, u.FL Jack, firmware v2.5
RM024-P125-M-30	RAMP 2.4 GHz OEM transceiver, Pluggable, 3.3V TTL, 125 mW, multiple antennas, firmware v2.5
RM024-P10-C-30	RAMP 2.4 GHz OEM transceiver, Pluggable, 3.3V TTL, 10 mW, u.FL Jack, CE Approved, fw v2.5
RM024-P10-M-30	RAMP 2.4 GHz OEM transceiver, Pluggable, 3.3V TTL, 10 mW, multiple antennas, CE Approved, firmware v2.5
RM024-X125-C-30	RAMP 2.4 GHz OEM transceiver, Daughter card, 3.3V TTL, 125 mW, U.FL jack, firmware v2.5
DVK-RM024-CE	DVK, 2.4 GHz OEM transceiver, Pluggable, 3.3V TTL, 10 mW, multiple antennas, CE Approved, firmware v2.5
DVK-RM024-FCC	DVK, 2.4 GHz OEM transceiver, Pluggable, 3.3V TTL, 125 mW, Multiple Antenna, firmware v2.5

New Features

No new features were implemented in this release.

Resolved Issues

The following issues were fixed in the **V2.9** release:

- **Long Delays in Sending Packets –** Very rarely, the internal Random Backoff counter could get errantly set to 0. This was treated internally as a 256 slot delay. Thus, a queued packet would be delayed by roughly 1.5 seconds to 3.5 seconds depending on configuration. This has been corrected.
- **Missed Reception on Large Packets -** Incorrect logic caused a timer event to be missed in rare situations. This is most prevalent when sending larger blocks of serial data than the maximum RF packet size based on the RF Profile selected. This timer triggers the start of the beacon. Due to the beacon getting delayed, the beacon would actually conflict with the immediate next transmit slot, thus conflicting with any packets sent during that slot. The end result is a missed RF packet in the rare instances that this timer event gets missed, thus, a higher incidence of retries.

Known Issues

No known issues at this time.

SOFTWARE VERSION 2.5-0

Released June 2015

Effectivity

Version 2.5-0 applies to the following RM024 products:

RM024-S125-C-30	RAMP 2.4GHz OEM Transceiver, SMT, 3.3V TTL Serial, 125mW, u.FL Jack, firmware v2.5
RM024-S125-M-30	RAMP 2.4GHz OEM Transceiver, SMT, 3.3V TTL Serial, 125mW, Multiple Antenna, firmware v2.5
RM024-S10-C-30	RAMP 2.4GHz OEM Transceiver, SMT, 3.3V TTL, 10mW, u.FL Jack, CE Approved, firmware v2.5
RM024-S10-M-30	RAMP 2.4GHz OEM Transceiver, SMT, 3.3V TTL, 10mW, Multiple Antenna, CE Approved, fw v2.5
RM024-P125-C-30	RAMP 2.4GHz OEM Transceiver, Pluggable, 3.3V TTL, 125mW, u.FL Jack, firmware v2.5
RM024-P125-M-30	RAMP 2.4GHz OEM Transceiver, Pluggable, 3.3V TTL, 125mW, Multiple Antenna, firmware v2.5
RM024-P10-C-30	RAMP 2.4GHz OEM Transceiver, Pluggable, 3.3V TTL, 10mW, u.FL Jack, CE Approved, fw v2.5
RM024-P10-M-30	RAMP 2.4GHz OEM Transceiver, Pluggable, 3.3V TTL, 10mW, Multiple Ant, CE Approved, fw v2.5
RM024-X125-C-30	RAMP 2.4GHz OEM Transceiver, Daughter card, 3.3V TTL, 125mW, U.FL jack, firmware v2.5

New Features

No new features were implemented in this release.

Resolved Issues

The following issues were fixed in the **V2.5** release:

- **Send Data Complete –** A regression was introduced in firmware v2.3-0 in which the fourth byte of the Send Data Complete response, which should normally report 0x01 (success) or 0x00 (failure), reported 0x67 regardless of the result of the transmitted packet that prompted the Send Data Complete. This is a result of a pointer getting corrupted. This issue is specific to the Send Data Complete command, therefore, if this command is not used in an application, there is no need to update to v2.5.

Known Issues

No known issues at this time.

SOFTWARE VERSION 2.3-0

Released December 2014

Laird Technologies is pleased to announce the release of FW v2.3-0 for the RM024 platform. This is release note details changes introduced between 2.0-0 and 2.3-0.

Effectivity

Version 2.3-0 applies to the following RM024 products:

RM024-S125-C-30	RAMP 2.4GHz OEM Transceiver, SMT, 3.3V TTL Serial, 125mW, u.FL Jack v2.3

RM024-S125-M-30	RAMP 2.4GHz OEM Transceiver, SMT, 3.3V TTL Serial, 125mW, Multiple Antenna v2.3
RM024-S10-C-30	RAMP 2.4GHz OEM Transceiver, SMT, 3.3V TTL, 10mW, u.FL Jack, CE Approved v2.3
RM024-S10-M-30	RAMP 2.4GHz OEM Transceiver, SMT, 3.3V TTL, 10mW, Multiple Antenna, CE Approved v2.3
RM024-P125-C-30	RAMP 2.4GHz OEM Transceiver, Pluggable, 3.3V TTL, 125mW, u.FL Jack v2.3
RM024-P125-M-30	RAMP 2.4GHz OEM Transceiver, Pluggable, 3.3V TTL, 125mW, Multiple Antenna v2.3
RM024-P10-C-30	RAMP 2.4GHz OEM Transceiver, Pluggable, 3.3V TTL, 10mW, u.FL Jack, CE Approved v2.3
RM024-P10-M-30	RAMP 2.4GHz OEM Transceiver, Pluggable, 3.3V TTL, 10mW, Multiple Ant, CE Approved v2.3
RM024-X125-C-30	RAMP 2.4GHz OEM Transceiver, Daughter card, 3.3V TTL, 125mW, U.FL jack, v2.3

New Features

No new features were implemented in this release.

Resolved Issues

The following issues were fixed in the **V2.3** release:

- **Firmware Upgrades –** Firmware upgrades prior to v2.3-0 were susceptible to being “bricked” when undergoing a firmware upgrade in the field, thus requiring the units to be returned to Laird for recovery. This susceptibility has been addressed. Therefore, any firmware version can be upgraded to v2.3-0, however, any downgrade to a version prior to v2.3-0 will have this susceptibility and be prone to lockup.
- **Sleep Wakeup –** The expectation when waking from sleep is that the Client has been able to maintain frequency/time synchronization with the Server and be able to send data very soon after a wakeup event. The timer was occasionally getting corrupted on the wakeup event, causing the Client to lose synchronization with the Server. This corruption has been addressed.
- **API Transmit Mode –** Previously, “Auto Destination” and “Auto Destination on Beacons Only” functioned when “API Transmit” mode was enabled. This operation doesn’t make sense as destination is specified by the host on a packet-by-packet basis. Therefore, both of the Auto Destination settings are now ignored when API Transmit Mode is enabled.
- **9600 Boot Option –** When enabled, “9600 Boot Option” causes the 9600 pin to be ignored on cold boot (power-up), command boot (0xCC 0xFF) and brown-out conditions. Therefore, the 9600 pin is only observed on warm boots (reset pin toggled). This can be helpful so that brown-out conditions don't cause the baud rate to change if the 9600 pin happens to be low at the time. It was determined that the “Interface Timeout” was not being set properly for 9600 baud rate when “9600 Boot Option” was enabled and the reset pin was toggled. Interface Timeout is now being set properly in that situation.
- **Packet Queueing –** Fixed issues in which packets were not being sent in the first available transmit slot and/or an extra retry was occasionally occurring. Systems experiencing these issues would take longer to transmit queued data (increased latency).
- **AT Command –** A command that was not intended to be released was included in the released code. When “^^^” or “!!!” were detected in the serial transmit stream sent to the radio, the radio would enter a test mode. A reset would exit this mode. This command has been removed and is not intended to be supported in the future.

Known Issues

No known issues at this time.

SOFTWARE VERSION 2.0-0

Released January 2014

Laird Technologies is pleased to announce the release of FW v2.0-0 for the RM024 platform. This is release note details changes introduced between 1.3-0 and 2.0-0.

Effectivity

Version 2.0-0 applies to the following RM024 products:

RM024-S125-C-20	RAMP 2.4GHz OEM Transceiver, SMT, 3.3V TTL Serial, 125mW, u.FL Jack v2.0
RM024-S125-M-20	RAMP 2.4GHz OEM Transceiver, SMT, 3.3V TTL Serial, 125mW, Multiple Antenna v2.0
RM024-S10-C-20	RAMP 2.4GHz OEM Transceiver, SMT, 3.3V TTL, 10mW, u.FL Jack, CE Approved v2.0
RM024-S10-M-20	RAMP 2.4GHz OEM Transceiver, SMT, 3.3V TTL, 10mW, Multiple Antenna, CE Approved v2.0
RM024-P125-C-20	RAMP 2.4GHz OEM Transceiver, Pluggable, 3.3V TTL, 125mW, u.FL Jack v2.0
RM024-P125-M-20	RAMP 2.4GHz OEM Transceiver, Pluggable, 3.3V TTL, 125mW, Multiple Antenna v2.0
RM024-P10-C-20	RAMP 2.4GHz OEM Transceiver, Pluggable, 3.3V TTL, 10mW, u.FL Jack, CE Approved v2.0
RM024-P10-M-20	RAMP 2.4GHz OEM Transceiver, Pluggable, 3.3V TTL, 10mW, Multiple Ant, CE Approved v2.0

New Features

- **Forward Error Correction (FEC):** FEC is enabled by selecting an RF profile that supports FEC mode. All profiles are listed below.

  RF Profiles for RM024:
  - 0x00: 500kbps RF (1.5MHz steps), 43 hops, 2.4GHz
  - 0x01: 280kbps RF (900kHz steps), 79 hops, 2.4GHz (FCC Only)
  - 0x02: 280kbps RF (900kHz steps), 43 hops, 2.4GHz (FCC Only)
  - 0x03: 280kbps RF (1.5MHz steps), 43 hops, 2.4GHz
  - 0x0D: 500kbps RF (1.5MHz steps) + FEC, 43 hops, 2.4GHz
  - 0x0E: 280kbps RF (900kHz steps) + FEC, 79 hops, 2.4GHz (FCC Only)
  - 0x0F: 280kbps RF (900kHz steps) + FEC, 43 hops, 2.4GHz (FCC Only)
  - 0x10: 280kbps RF (1.5MHz steps) + FEC, 43 hops, 2.4GHz

  Enabling FEC mode affects the number of data slots per hop. The Number of data slots is based on the RF Packet Size and whether FEC is enabled.

  FEC Mode Disabled

RF Data Rate	RF Packet Size	Number of Data Slots
280 kbps	0x01 – 0x09	4 slots
280 kbps	0x0A – 0x25	3 slots
280 kbps	0x26 – 0x60	2 slots
500 kbps	0x01 – 0x0C	6 slots
500 kbps	0x0D – 0x25	5 slots
500 kbps	0x026 – 0x47	4 slots

RF Data Rate	RF Packet Size	Number of Data Slots
500 kbps	0x48 – 0x7D	3 slots
500 kbps	0x7E – 0xEF	2 slots

FEC Mode Enabled

RF Data Rate	RF Packet Size	Number of Data Slots
280 kbps	0x01 – 0x06	2 slots
280 kbps	0x07 – 0x4A	1 slot
500 kbps	0x01 – 0x02	4 slots
500 kbps	0x03 – 0x1A	3 slots
500 kbps	0x1B – 0x4B	2 slots
500 kbps	0x4C – 0xE2	1 slot

Note: For RF Packet Sizes less than 0x07, the Enter AT Command String cannot be used, Force 9600 must be used to enter Command mode

For RF Packet Sizes where there is only one data slot per hop, the client and server will alternate use of the data slot in Full Duplex mode.

- **Reduced sleep currents:**

Current measurements in v1.3-0:

Server beaconing (average)	13.1 mA
Client inrange (average)	10 mA
125 mW TX 100% (19.6 dBm)	135.2 mA
50 mW TX 100% (17.1 dBm)	104.6 mA
RX 100%	36 mA
PM2 (sleep walk)	50 uA to 360 uA float
PM3 (deep sleep)	50 uA to 360 uA float

Measured current consumption in v2.0:

Server beaconing (average)	9.7 mA
Client inrange (average)	9.5 mA
125 mW TX 100% (19.6 dBm)	136.2 mA
50 mW TX 100% (17.1 dBm)	105.9 mA
RX 100%	33.6 mA
PM2 (sleep walk)	0.99 uA
PM3 (deep sleep)	uA

- **Extend Command Timeout (0x61, bit 1)** – 0==disabled, 1==enabled. Default==0. This is primarily to be used during firmware upgrades. Causes interface timeout to be multiplied by 4 when in command mode. This is

because some windows machines have random delays between bytes and can cause the RF upgrade procedure to fail.

- **Disable Utility (0xC1, bit 4)** – 0==disabled, 1==enabled. Default==0. Enabling this mode eliminates the utility (status) slot, reserved in each hop, to save ~1mA of current in idle mode. This has the side effect of disallowing modem modes (remote IO) and bin analyzer.

Resolved Issues

The following issues were fixed in the **V2.0** release:

- **Firmware Upgrades –** Firmware upgrades in all previous versions were prone to failure when in forced 9600 mode and also when 9-bit mode was enabled. Fixed both such that new firmware upgrades are protected by the new changes. However, downgrading to code prior to v2.0-0 is not protected by the changes and can fail during the downgrade, thus requiring a reset by Laird manufacturing.
- **Sleep Wakeup Pin –** The sleep timer was getting overwritten on wake via the sleep wake pin (forced 9600 pin) and sync with the Server was lost. This has been corrected.
- **Delays in transmitting data –** Server in Full Duplex would delay one hop before transmitting data over the RF. Delays were also present in clients. These issues have now been corrected so the radio sends RF packets once they have been queued to be sent and a transmit slot is encountered.
- **Idle current reduction –** Reduced idle current by disabling receiver after receiving any packet. RF receiver chip was remaining enabled.
- **Receiver on immediately upon waking –** Turning receiver on immediately upon waking from sleep rather than waiting one hop. This permits packet transmission/reception up to 13.2 ms earlier.
- **Antenna select override fixed** – This was reported as a known issue for CE units in v1.3-0.
- **Enter AT Command issue –** Enter AT Command sometimes was transmitted over RF. This has been corrected.
- **Sleep/9600 pin issue –** Radio will not go to sleep if 9600 pin is low. Formerly, the radio didn't look at 9600 pin (wake pin) to determine if it should go to sleep. It should not sleep when the pin is holding it awake. This issue has been fixed.
- **RTS mode –** Disabling RTS mode when in forced 9600. RTS pin is now disregarded when forced 9600 mode is active.
- **Receiver chip disabled –** Disabling receiver chip when in AT Command Mode. Formerly was drawing full receive current the entire time in AT Command Mode. Now, it draws same current as standard mode.
- **RS485 delay timer settings –** Properly setting RS485 delay timer when in forced 9600 baud mode. This timer is used to ensure RS485 driver pin control is released at the proper time and this timing was incorrect in forced 9600 baud mode.
- **Idle mode issue –** When in idle mode, serial data would not pull the micro out of idle and the incoming packet would not be processed until the conclusion of the idle period (on the order of a few ms). Now, idle is exited immediately upon seeing incoming serial data.

Known Issues

No known issues at this time.

SOFTWARE VERSION 1.3-0

Released December 2012

Laird Technologies is pleased to announce the release of FW v1.3-0 for the RM024 platform. Version 1.3-0 is the first full production release for the RM024. While this is the first production release of the RM024, several issues were found and corrected with the sample version (v1.0-1). It is strongly recommended that all devices with v1.0-1 be upgraded to 1.3-0. Although key information is provided in the notice for each issue/feature, this is really an abridged version of the information presented in the User's Manual.

Effectivity

Version 1.3-0 will begin shipping on all RM024 products immediately.

New Features:

- Antenna Select: Address 0xC1, bit 5. 0==Chip Antenna, 1==u.FL. Default varies by product. The RM024 modules are available with two antenna configurations: chip antenna and u.FL. This mode permits the user to select which port is to be used. Note that, while the software allows this mode to be used on any RM024 product, it does not verify that the selected antenna option is present on the hardware platform.
- Antenna Select Override: Address 0x5B. 0xE3==enabled, all other values are disabled. Default==0x00. Product ID's containing a "M" (RM024-S125-M-01, RM024-P125-M-01, RM024-S50-M-01 and RM024-P50-M-01) have both antennas installed (chip antenna and u.FL). However, products containing a "C" (RM024-S125-C-01, RM024-P125-C-01, RM024-S50-C-01 and RM024-P50-C-01) only have the u.FL installed. Therefore, selecting chip antenna on a "C" product results in no RF link. To prevent this from happening, Antenna Select Override can be enabled to cause "C" products to ignore the Antenna Select setting and automatically select the u.FL connector.
- Cyclic Sleep: Address 0x61, bit 0. 0==disabled, 1==enabled. Default==0. To assist products in maximizing battery life, cyclic sleep was developed. This causes the radio to sleep for a programmable period of time and wake for a programmer period of time. The radio can be awakened from sleep before its sleep cycle completes using the Force 9600 pin. Additionally, the wake time is, technically, an inactivity counter. Therefore, the device will stay awake indefinitely so long as the device continues sending packets over the RF interface.

Resolved Issues

- **TX Broadcast:** Present in all former versions of RM024 and LT2510, if the radio was in TX Broadcast mode, the 0xCC 0x10 (Write Destination Address on-the-fly) was unable to shift the device out of broadcast and into addressed mode. This has been corrected and the command now has to ability to switch between broadcast and addressed modes.
- **Firmware Corruption:** v1.0-1 introduced a memory leak that presented the opportunity for the module to get into an unrecoverable and inoperative state. While there could be multiple paths to this state, it has been successfully demonstrated by enabling Transmit API and sending 20 byte packets repeatedly. At around 7500 runs, the radio would start exhibiting major problems due to a lack of memory. This has been corrected.
- **RF Performance:** v1.0-1 was found to have protocol inefficiencies that resulted in a higher number of missed RF acknowledgements and shorter packets to be sent per RF packet. This would probably only affect

products requiring large packet transfer or low latency links. Most users would not have noticed this. Nonetheless, it has been improved.

- **Vendor ID:** Vendor ID was found to not be functional in v1.0-1. This has been corrected.

Known Issues:

- Antenna Select Override: This feature does not work properly in the current release. Enabling this feature in the affected products has no negative affect other than the mode not working. The bug has been corrected and will be made available in a future release. Contact tech support for details. The following products are affected by this bug:
  - RM024-S50-C-01
  - RM024-S50-M-01
  - RM024-P50-C-01
  - RM024-P50-M-01
- Sleep (PM2): In PM2, the intent is that the Client should be able to sleep for tens of minutes and maintain frequency hop synchronization with the Server when it wakes. Currently, PM2 is using a static calibration that permits the Client to maintain synchronization with the Server for roughly 2 minutes. Future releases will include a dynamic, unobtrusive calibration algorithm to permit much longer PM2 times while successfully maintaining synchronization. Sleeping for longer than 2 minutes using the current release of firmware could result in the Client losing sync with the Server upon waking; thus requiring the Client to sync with the Server again (it takes 500ms for this to occur on average).