1 Overview

Firmware version 1.23 is a maintenance release for Microchip’s RN4020 Bluetooth Low Energy Module. This release addresses issues found in the previous 1.20 firmware.

1.1 Resolved Issues

- **GATT UPDATE LOCKUP**
The previous firmware version 1.20 has an issue that would cause the UART to become unresponsive under specific conditions. The only recovery method was rebooting the module. When the RN4020 is sending continuous write commands “SUW” or “SHW” to update GATT characteristics, the UART on the RN4020 may lock up and become unresponsive. This is most likely to occur while updating GATT characteristic values that have notifications enabled. This was caused by a resource contention between Bluetooth RF stack and UART driver in the firmware. The lockup issue has been resolved in firmware 1.23.

- **MLDPv2 STABILITY TO SMARTPHONE**
When streaming MLDPv2 (Write-Cmd/Notification) data at UART baud rates above 115.2Kbps to Smartphone over four second period, the RN4020 would lock up and reboot. In firmware 1.23 this issue has been resolved.

- **NULL CHARACTER LOCK UP**
While in command mode, if null character (zero byte \x00) is sent to UART, the command parser would lock up and not accept any more data as it treated this character as the end of stream. The command parser has been modified to ignore null characters.

- **COMMAND BUFFER OVERFLOW**
The command buffer size is 100 characters. In the previous firmware version 1.20, if more than 100 characters are sent to UART when RN4020 is in command mode, prior to a new line (\x0d) or carriage return (\x0d) character, the command parser would not accept any more characters. In firmware version 1.23, if the command buffer is full, any new character will be inserted at the head of buffer, and previous contents will be flushed. This covers the case when an MCU application erroneously leaks data, such as MLDP, into the UART while RN4020 in is command mode.

1.2 Known Issues

- **MLDPv2** was introduced in firmware 1.20. MLDPv2 uses unacknowledged GATT writes and notifications to improve data transfer rate across the Bluetooth connection. Therefore, any data transfer over MLDPv2 may have lost bytes if the data is not received by other end. It is highly recommended to implement packet retransmission mechanism for critical data transfers, or use MLDPv1.

- **When using server write commands (SHW, SUW) over UART to update GATT characteristics, providing a data payload larger than the defined length may corrupt data. To avoid data corruption, the MCU issuing the write server commands MUST ensure the payload does not exceed the defined GATT characteristic size.**
• In the previous 1.20 firmware, the results of the “F” scan command only reported the payload from Manufacturer Specific Data (0xff) AD packet. Starting in 1.23, “F” now report the ADV (advertising) packet header. A typical response header might consist of the following bytes: [0] flags length, [1] flag field type [2] flag data [3] length of AD data [4] AD packet type. Applications written to parse 1.20 “F” response format should be updated to the latest 1.23 packet format.

• Using the stop advertising “Y” command when connected will disable the terminate connection command “K,1”. Since the RN4020 does not advertise when connected, sending a stop advertising “Y” command is not using the command as it was intended. To avoid the side effect of disabling “K,1”, do not send “Y” when connected.

1.3 New Features

• Unfiltered Scan
   The Unfiltered Scan feature is added to release 1.23. The previous scan command “F” would capture advertisement packets from unique eight (8) unique MAC addresses. The RN4020 would filter out repeated advertisement packets received from same device.
   The new Unfiltered Scan returns all received advertisement packets until the “X” command is entered. The host MCU is responsible for capturing results of the scan and filtering unique addresses, as well as starting and stopping the scan.
   To use the feature, set bit 8 in R register using the command “SR, 00000100”, followed by a reboot “R,1” or power cycle.

1.4 Ordering Information

• At the time of this publication, firmware 1.23 is available as a DFU firmware update for existing RN4020 customers. Customers who need to order RN4020 modules with the 1.23 firmware should contact their Microchip representative.

1.5 Firmware Upgrade

RN4020 devices, such as modules and PICTails, can be updated to firmware 1.23 using the DFU Update Utility which can be downloaded from the www.microchip.com/RN4020 product page. To perform a firmware update on an RN4020 module or PICTail, execute the utility on a Windows PC with a COM port connected to the RN4020 UART interface. Hardware flow control (CTS/RTS) is required to perform a DFU update. Follow the instructions in the DFU Update Utility.