RN4870/71 Firmware 1.40 Release Note

July 2019

1 Overview

Version 1.40 is a firmware release for RN4870/71 modules. 1.40 adds new feature and addresses some issues that were identified in 1.30. This firmware is also made available on Microchip's web site for existing RN4870/71 modules.

2 New Features

- Module can be set to non-discoverable/ not advertising on power-on using 'SR,0008'.
  Action command 'A' can be used to start advertising.
  Action command 'Y' can be used to stop advertising.
  If non-discoverable bit is set the module will not advertise when in stand-by state. On factory default, the module will be discoverable/advertising on power-on.
- Module can be set to non-connectable on power-on using 'SR,0004'. On factory default, the module will be connectable on power-on.
- Action command 'E,<option>' can be used for connectable, non-connectable modes and to query the current setting.

E,0	Enter non-connectable mode.
E,1	Enter connectable mode.
E,?	Query current connect mode set.

- Added support for GATT service change indication. In GATT Server mode, a service change indication can be indicated to the GATT Client after changing service table and rebooting and after getting connected to GATT Client using the action command 'SI'.
  In GATT Client mode, a service change indication from the GATT Server will be notified by "%RE_DISCV%" status message at which point the GATT Client can redo the service discovery of the GATT Service using 'CI' action command.
- Added commands to configure the following indication parameters:
  - Battery level indication
    - Set battery level indication
      SIB,<high_level>,<normal_level>,<low_level>,<danger_level>,<detection_interval>,<shutdown_interval>
    - Get battery level indication
      GIB
  - Link quality indication

        - Set link quality indication
          SIL,<enable/disable>,<normal_rssi>,<weak_rssi>
        - Get link quality indication
          GIL
    - RF active indication
        - Set RF active indication
          SIR,<only RF active/ MCU and RF active>
        - Get RF active indication
          GIR
- Added support for minor version in Software Revision String for Device Information service.
- Added R,2 command which will disable UART after command is issued and quickly reboots the module. The status string 'Rebooting' is not printed after R,2 is executed to allow for quick reboot with UART disabled.

3 Resolved Issues

- Addressed a reported issue where if the module is re-configured using commands which write NVM like paired device list clear (U,<1-8,Z>) or any set commands and rebooted and the application hardware is unable to meet the power requirements of the module then the BLE configuration is restored to defaults as the NVM write triggered by the commands issued fails. The workaround tries to re-write the NVM when the NVM write fails providing enough time for the application hardware to soon satisfy the power requirements of the module to successfully complete the NVM write operation.
- Fixed an issue with unresponsive UART that occurs when getting asynchronous connection events while the module is in command mode sending commands.
- When a smartphone with random private addressing which has already paired and bonded initiates a new pairing and bonding event after deleting the previous bonding information then a new entry is created in the RN4870/71 PDL and previous bonding information on the RN4870/71 will be stale. In this case the user is expected to use to delete the stale bonding information on RN4870/71. To avoid this the fix replaces the previous bonding material with the new bonding material.
- Fixed an issue with NA and IA command where the total advertisement data size was limited to 30 bytes instead of 31 bytes.
- Fixed issue with list service table commands LS and LC when the service table is large.

4 Recommendations

4.1 Hardware Flow Control

When using Transparent UART for streaming data application, it is important to include the RTS/CTS hardware lines and enable the hardware control feature. Without hardware flow control, it is possible for host to cause buffer overflow on RN4870 UART, which can result in instability.
When issuing frequent RN4870/71 GATT access commands (SHW, SHR, SUW, SUR, CHW, CHR, CUW, CUR), higher command throughput is achieved by disabling flow control. The host MCU issuing the GATT commands must wait for a response, such as "AOK" before issuing the next command.

4.2 Connectable advertisements on Android devices

When using NA or IA commands to create custom connectable advertisements, the connectable FLAGS field must be included in order for Android devices to connect. This is done by preceding flags advertisement payload with the "NA,01,06" command. See the example below.

```
NA,Z
NA,01,06
NA,FF,CD00F014AD11CF40063F11E5BE3E0002A5D5C51B00BC00BD
```

4.3 Handle enumeration after clearing GATT services

If clearing or updating the GATT service and characteristic tables ensure that they remain same and not changed when using static characteristic handle values in a script or by a remote BLE Client. If the characteristic handle values change please ensure to update the script or remote BLE client with the new handle values.

5 Firmware Update Instructions for RN4870/BM70 PICtail & CDB

The instructions and tools used to update firmware on evaluation boards such as the RN4871 PICtail, and RN4870 PICtail SNSR board, are in appendix A of the user guide for of these boards. The links to the user guide is:

RN4870/71 PICtail/PICtail Plus Daughter Board User's Guide