



RN4020 PICtail Demonstration using the Android Example App

1. Overview

The 'RN4020 Demo' is a proof-of-concept example app running on an Android device which supports Bluetooth Low Energy. As a Bluetooth Smart GATT client the 'RN4020 Demo' running on the Android device subscribes to the following standard GATT services enabled on a RN4020 configured as a GATT server:

- Heart Rate Service (UUID: 0x180D)
- Health Thermometer Service (UUID: 0x1809)
- Device Information Service (UUID: 0x180A)
- Battery Service (UUID: 0x180F)

Using this example the user will be able configure the RN4020 as a GATT server to enable above standard GATT services and send relevant data to the GATT client which is a Android device running the 'RN4020 Demo' app which subscribes to the GATT services enabled on the RN4020. The 'RN4020 Demo' app then shows the retrieved data.

Section 2. Requirements of the readme document lists the tool and Android device required to try the example app. *Section 3. Android App Installation* provides the steps needed to successfully install the Android app. *Section 4. RN4020 Demonstration using the Android App* section provides the steps needed to successfully configure the RN4020 to try the 'RN4020 Demo' app example.

The web-links for the standard Bluetooth 4.1 specifications, GATT definitions for profiles, services and characteristics and the RN4020 documentation are available in *Section 5. References*.



2. Requirements

RN4020 Development Tool:

- RN4020 PICtail™/PICtail Plus Board (Part Number: RN-4020-PICtail)

Android Device:

- Android version: 4.3 or higher
- Bluetooth 4.0 or higher

3. Android App Installation

Step 1: Download the 'rn4020_demo.apk' on to your Android Device. Download the .apk file via email on to the Android device or use a USB thumb drive to copy the .apk file if supported by Android device.

Step 2: Open 'Settings->More->Security' and enable 'Unknown Sources'.

Step 3: Click and open the apk file to start installation on the Android device.

Step 4: Follow the installer instructions on the Android device to complete the installation.



4. RN4020 PICtail Demonstration

Step 1: Remove the jumper from JP1.

Step 2: Connect USB mini-B J5 to PC using the USB cable.

Step 3: The PC will automatically install the required serial drivers. In case the drivers are not automatically installed and the driver installer prompts a dialog window to browse and select the driver then download and use the drivers in the download section available in the below link:

<http://www.microchip.com/DevelopmentTools/ProductDetails.aspx?PartNO=rn-4020-pictail>

Step 4: A serial COM port will be associated with the PICtail board.

Step 5: Open the COM port on a serial emulator terminal with following serial port settings: 115200bps; 8 data bits; 1 stop bit; parity none; rts/cts flow control

Step 6: Issue the commands to configure Heart Rate, Health Thermometer, Battery, Device Information Services.

```
SF,1          // Performs factory reset on RN4020
SS,F0000000   // Enables standard GATT server services on RN4020
SR,22000000   // Enables auto-advertise and UART flow control on RN4020
R,1           // RN4020 device reboot for the configuration to take effect
```

Step 7: Open the 'RN4020 Demo' app on the Android device.

Note:

- Detailed information on the GATT profiles and services and the associated standard 16-bit service UUIDs used are available in the definition links in *Bluetooth 4.1 GATT Definitions Browser* web-link available in *Section 5. References*.
- Description of the GATT characteristics and format types and the associated standard 16-bit characteristic UUIDs used are available in the characteristics definitions link in the *Bluetooth 4.1 GATT Definitions Browser* web-link available in *Section 5. References*.
- Description of RN4020 commands used in this example and other available commands can be found in the *RN4020 Bluetooth Low Energy Module Data Sheet* available in *Section 5. References*.
- To get started with the RN4020 PICtail™/PICtail Plus Board refer RN4020 PICtail™/PICtail Plus Board User's Guide available in *Section 5. References*.



Step 8: Click 'Scan' button to scan for RN4020. RN4020 module will appear in the list.



Step 9: Select the RN4020 to connect to the module.

Step 10: Format and send the heart rate measurement value to the client from the RN4020 server using the command.

SUW,2A37,<heart_rate_measurement>

Eg,

SUW,2A37,1F5300BB00EE00 //83BPM,187KJ,238ticks

Step 11: Format and send the body sensor location value to the client from the RN4020 server using the command.

SUW,2A38,<body_sensor_location>

Eg,

SUW,2A38,01 //CHEST

Disconnect and reconnect as this characteristic is static while in a connection and will not be updated during an active connection.

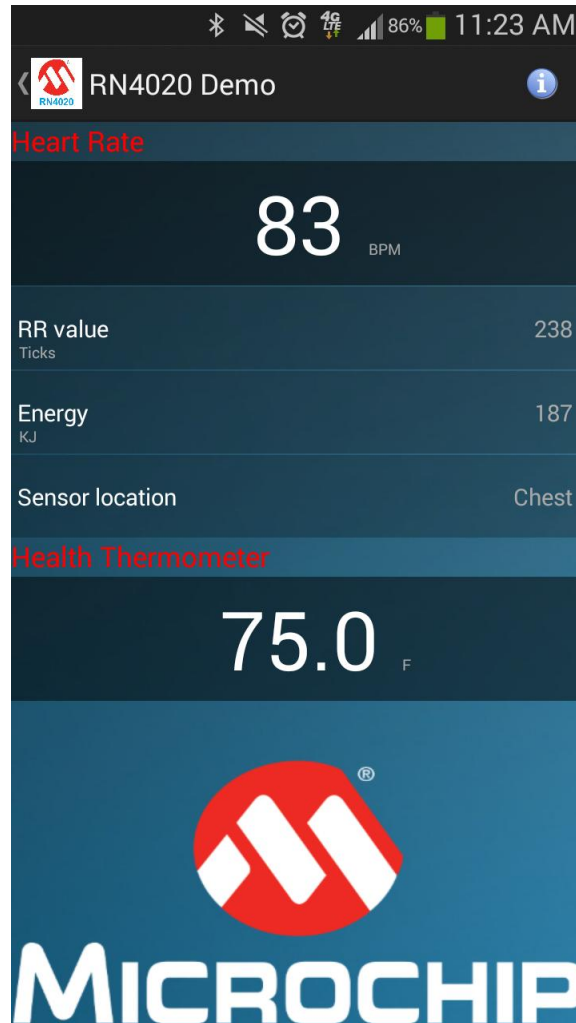


Step 12: Format and send the temperature measurement value to the client from the RN4020 server using the command.

SUW,2A1C,<temperature_measurement>

Eg,

SUW,2A1C,014B000000 //75.0F



Step 13: Format and send the battery level value to the client from the RN4020 server using the command.

SUW,2A19,<battery_level>

Eg,

SUW,2A19,5C //92%

Step 14: Observe the main screen of the 'RN4020 Demo'.

Step 15: Format and send the device information values to the client from the RN4020 server using the command.

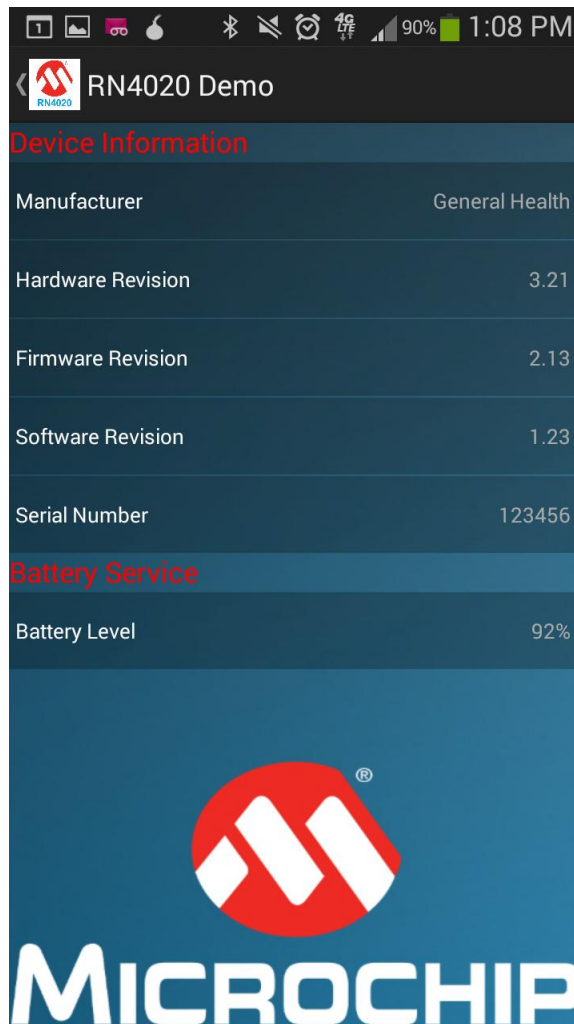


SUW,2A29,<manufacturer_name>
SUW,2A28,<software_revision>
SUW,2A27,<hardware_revision>
SUW,2A26,<firmware_revision>
SUW,2A25,<serial_number>

Eg,

SUW,2A29,47656e6572616c204865616c7468	//General Health
SUW,2A28,312e3233	//v1.23
SUW,2A27,332e3231	//v3.21
SUW,2A26,322e3133	//v2.13
SUW,2A25,313233343536	//123456

Disconnect and reconnect as this characteristic is static while in a connection and will not be updated during an active connection.



Step 16: Click on the device information button 'i' on the top right corner on the main screen of the demo app to open the device information screen.



5. References

- 1.) Bluetooth Core Specification 4.1 Adopted Documents:
<https://www.bluetooth.org/en-us/specification/adopted-specifications>
- 2.) Bluetooth 4.1 GATT Definitions Browser:
<https://developer.bluetooth.org/gatt/Pages/Definition-Browser.aspx>
- 3.) RN4020 Bluetooth Low Energy Module Data Sheet and User's Guide:
<http://www.microchip.com/wwwproducts/Devices.aspx?product=RN4020>
- 4.) RN4020 PICtail™/PICtail Plus Board:
<http://www.microchip.com/DevelopmentTools/ProductDetails.aspx?PartNO=rn-4020-pictail>