WIMOTO – BLE SMART DEVICE
USER GUIDE – VER 0.2.0

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1 Introduction

Wimoto is developing a smart device which integrates many sensors for BLE climate profile (temperature, humidity, light level), Grow profile (light, temperature, soil moisture) and Sentry profile (passive infrared, accelerometer), etc on Nordic semiconductor nrf51822 based hardware platform. This device can be configured and managed by corresponding app on mobile devices like iPhone, Android and a proprietary gateway.

This release contains both the Climate profile and Grow profile and the driver codes for TMP102, TMP006, ISL29023, HTU21D, MMA7660FC sensor module driver codes

This document provides details on how to get the source code working on the target hardware. This also provides details on how the source code is organized and what is to be done in case of any problems.

2 Initial Setup

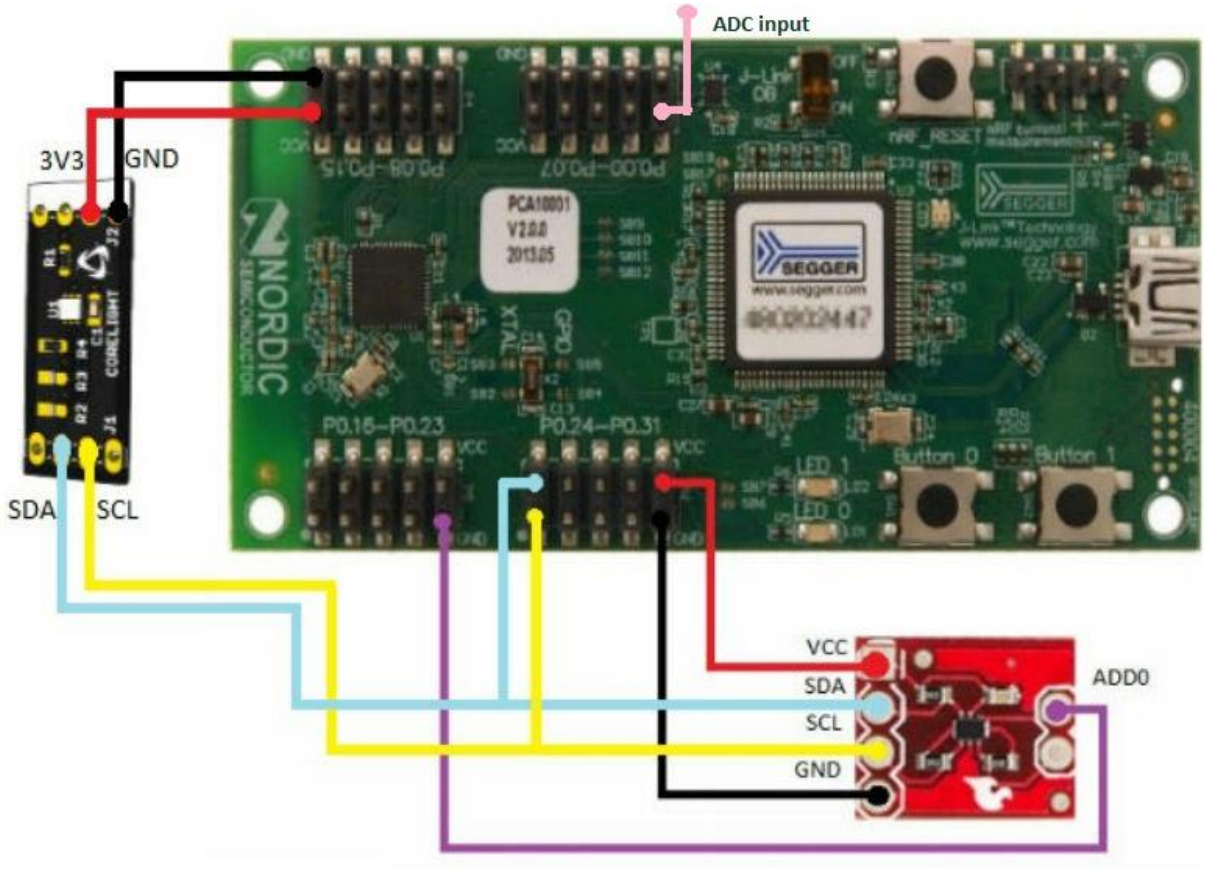
- Download the code from "wimoto-ble-release-ver 0.1.0" on Github
- Install the required software
    - Keil uVision
    - J-Link drivers for JTAG interface.
    - nRF51822 software
        - nRFgo Studio
        - nRF51 Software Development Kit (SDK)
        - S110 nRF51822 Soft Device
        - Master Control Panel
- Copy the folder ble_wimoto_temp_app to the nrf51822\Board\pca10001\ble folder in the nrf51_sdk directory
- Open the project in Keil uVision
- Build the project.

3 Hardware Setup

3.1 Climate Profile

Note: *Since the HTU21D temperature and humidity sensor was not available, grow profile was not tested with sensors. However the embedded code was tested using hard coded values and the results were as expected and found to be working properly*

3.2 Grow Profile



- Interface the TMP102 module, ISL29023 module and analogue Soil Moisture sensor with nRF51822 Evaluation Kit board as shown below
- Power up the board from USB attached to Windows PC.
- Do-not connect nRF51822 Development Dongle while programming nRF51822 Evaluation Kit board
- Download the hex file created to the evaluation board.

4 Execution

4.1 Climate Profile

- Connect the nRF51822 Development Dongle to USB of the PC. Power up the evaluation board.
- Open the Master Control Panel in PC.
- From the option 'Master Emulator', select the segger serial number of the development dongle and click 'Start Discovery'.
- Master control panel will show the grow profile alarm service continuously
- To connect to the alarm service, select the device Wimoto_Clim and click 'Select device'.
- Click 'Service discovery'. All the characteristics in the service will be displayed. Click 'Enable services'.
- In the first primary service will Uuid 1523, six characteristic fields will be displayed.
  - Uuid 1524 - Current Temperature
  - Uuid 1525 - Temperature low value(for the alarm)
  - Uuid 1526 - Temperature high value
  - Uuid 1527 - Temperature Alarm set
  - Uuid 1528 - Temperature Alarm
  - Uuid 1555 - Mode Switch set
- In the second primary service will Uuid 1529, five characteristic fields will be displayed.
  - Uuid 1530 - Current Light level
  - Uuid 1531 - Light level low value (for the alarm)
  - Uuid 1532 - Light level high value
  - Uuid 1533 - Light level Alarm set
  - Uuid 1534 - Light level Alarm
- In the third primary service will Uuid 1535, five characteristic fields will be displayed.
  - Uuid 1536 - Current Humidity level
  - Uuid 1537 - Humidity low value (for the alarm)
  - Uuid 1538 - Humidity high value
  - Uuid 1539 - Humidity Alarm set
  - Uuid 1540 - Humidity Alarm

- The High and Low values for checking alarm condition in Temperature low/high, Light level low/high and Humidity low/high values can be set by, clicking on the corresponding characteristic field (UUID), enter a new value in the "**value box"** shown below the characteristics and click on 'Send update'
- To set alarm, change the Alarm set value (UUID 1527-temperature/1533-light level/1539-humidity) to 01. If the current value read from the sensor is less that the low value, the Alarm field to the corresponding sevice (UUID 1528-temperature/1534-light

level/1540-humidity) will show 0x01. If the value read from the sensor is greater than the high value, the alarm field will show 0x02.

- To turn off the alarm, update the Alarm set field to 0x00 of the corresponding services.
- To go to the Broadcast mode, set Mode Switch set value to 0x01 (UUID 1555) and click 'disconnect', click 'back' and start discovery by clicking 'start discovery' .
- In the temperature broadcast, the service data with UUID 1523 shows the current temperature and UUID 1529 shows the current light level and UUID 1535 shows current humidity value.
- The embedded application code stays in the Broadcast mode until a power on reset or software reset in incurred

4.2 Grow Profile

- Connect the nRF51822 Development Dongle to USB of the PC. Power up the evaluation board.
- Open the Master Control Panel in PC.
- From the option 'Master Emulator', select the segger serial number of the development dongle and click 'Start Discovery'.
- Master control panel will show the grow profile alarm service continuously
- To connect to the alarm service, select the device Wimoto_Clim and click 'Select device'.
- Click 'Service discovery'. All the characteristics in the service will be displayed. Click 'Enable services'.
- In the first primary service will Uuid 1523, six characteristic fields will be displayed.
  - Uuid 1524 - Current Temperature
  - Uuid 1525 - Temperature low value(for the alarm)
  - Uuid 1526 - Temperature high value
  - Uuid 1527 - Temperature Alarm set
  - Uuid 1528 - Temperature Alarm
  - Uuid 1555 - Mode Switch set
- In the second primary service will Uuid 1529, five characteristic fields will be displayed.
  - Uuid 1530 - Current Light level
  - Uuid 1531 - Light level low value (for the alarm)
  - Uuid 1532 - Light level high value
  - Uuid 1533 - Light level Alarm set
  - Uuid 1534 - Light level Alarm
- In the third primary service will Uuid 1550, five characteristic fields will be displayed.
  - Uuid 1551 - Current soil moisture level
  - Uuid 1552 - Soil moisture low value (for the alarm)

Uuid 1553 - Soil moisture high value
Uuid 1554 - Soil moisture Alarm set
Uuid 1555 - Soil moisture Alarm

- The High and Low values for checking alarm condition in Temperature low/high, Light level low/high and Soil moisture low/high values can be set by, clicking on the corresponding characteristic field (UUID), enter a new value in the "**value box"** shown below the characteristics and click on 'Send update'
- To set alarm, change the Alarm set value (UUID 1527-temperature/1533-light level/1554-soil moisture) to 01. If the current value read from the sensor is less that the low value, the Alarm field to the corresponding service (UUID 1528-temperature/1534-light level/1555-soil moisture) will show 0x01. If the value read from the sensor is greater than the high value, the alarm field will show 0x02.

- To turn off the alarm, update the Alarm set field to 0x00 of the corresponding services.

- To go to the Broadcast mode, set Mode Switch set value to 0x01 (UUID 1555) and click 'disconnect', click 'back' and start discovery by clicking 'start discovery' .

- In the temperature broadcast, the service data with UUID 1523 shows the current temperature and UUID 1529 shows the current light level and UUID 1550 shows current humidity value.

- The embedded application code stays in the Broadcast mode until a power on reset or software reset in incurred

5 Known Issues

1MHz square is not included in this release as there was some issues related to the GPIO and PPI.

6 Debugging

If the Master Control panel (MCP) is not detecting the development dongle when both the dongle and evaluation board are connected to the PC, close the Master Control panel first. Then unplug both the boards. Then plug only the development dongle and open MCP. The MCP will now detect the dongle.