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1. Introduction

The SGW1010-EVK is an advanced and highly flexible Bluetooth Low Power (BLE) evaluation platform that allows for developing with SGW1010 module.

The SGW1010-EVK includes 4 programable buttons, one reset button and 4 Green LEDs. The evaluation kit also includes pins that can be used with Arduino Uno-R3 Shield and other different sensor modules. This can minimize the engineering efforts and development costs associated with adding Bluetooth 5.0 to any product, accelerating its time-to-market.

The following provides detailed instruction for how to start using the SGW1010-EVK board.

2. SGW1010-EVK development Kit

![SGW1010-EVK Development Kit](image)

The development kit includes:

- SGW1010_EVK board
- Micro USB Cable
- NFC antenna
Key Features:
  o SGW1010 BLE module
  o 5 Power sources support
  o Easy configuration with external sensor module
  o 4 customized buttons and 4 green LED lights
  o RESET button
  o NFC Connection
  o CR2032 Battery Holder
  o External Crystal Oscillator 32.768kHz
  o Standard 10 pins J-Link connector for download and debug
  o Segger J-Link OB Program/Debug supported
  o Virtual COM port supported over USB interface

3. SGW1010-EVK Software Development Environment

The following software tool will help to develop with SGW1010 module.

  o SEGGER Embedded Studio for ARM
  
  https://www.segger.com/downloads/embedded-studio

  o nRF52 Software Development kit (SDK)
  
  https://www.nordicsemi.com/-/media/Software-and-other-downloads/SDKs/nRF5/Binaries/nRF5SDK153059ac345.zip
Install Procedure:

1. Go to the SEGGER Embedded Studio for ARM, select your PC platform and follow the install procedure.

2. Go to the Nordic Website to download nRF52 SDK SoftDevice S140. Unzip the package to your favored working directory.

3. After installing SEGGER Embedded Studio for ARM, open the software.
4. When building the project ("Build" or "Build and Run"), the license request will pop up, please select “activate your free license”.

5. After filling out the information (as per below), press “Request License”. After a few seconds you should receive an email from SEGGER.

6. Installing the license to SEGGER Embedded Studio:
   a. Install the license to SEGGER Embedded Studio
   b. Go to “Tools” -> “License Manager” and then click on “Activate Embedded Studio”

7. Copy the License Key from the received email and paste into the text box. Then click “Install License”.

The following is the optional application software which will help to develop with the SGW101x module:

- nRF connect to desktop PC (BLE connectivity between Evaluation kit and PC <Must have Bluetooth feature>)

- nRF connect to mobile (BLE connectivity between evaluation kit and mobile)

- nRF Toolbox for your mobile (Nordic BLE example)
4. SGW1010-EVK Hardware

4.1 Power

There are five power sources that can be used for the SGW1010-EVK:

- USB from the programming and debug interface
- USB peripheral of the SGW1010 module
- Lithium Polymer (LiPo) Battery (2.5V-5.0V), BT1
- CR2032 coin cell battery, BT2
- External Power Supply (1.7V-3.6V), 2.54mm header J24

These power sources have protection diodes to prevent reverse power to any power supply. Soldering jumpers are provided to bypass the protection diode if needed.

The red LED (LED5) is the indication of power on/off.
### 4.2 High Voltage and Low Voltage Mode

The SGW1010 BLE module uses integrated two step-down regulators (REG0 & REG1) to transform the supply voltage presented at the VCC & VCCH pins into a stable system voltage. Each regulator can be programmed as a Low-dropout regulator (LDO) or Buck regulator (DC/DC), depending on the operating mode of the module.

There are two operating modes for the module which depends on the VCC and VCCH configuration:

- Normal/Low Voltage (LV) mode (1.7 V – 3.6 V)
- High Voltage (HV) mode (2.5 V – 5.5 V)

### 4.3 Reset

SGW1010 module has a configurable hardware reset. Pin 39 (Module) is assigned as a RESET pin which connects both header P0.18 and a physical reset button (SW7) on the SGW1010-EVK development board.

When you press the reset button, the reset signal is generated and sent to the SGW1010 module through the module Pin 39. The module then will be reset back to the initial firmware state.
4.4 Buttons

There are four user buttons, SW1, SW2, SW3, and SW4, all of which can be configured by the user. By default, all buttons are active low. The button GPIO pins (P0.11, P0.12, P0.24, and P0.25) must configure internal pull-up resistor when using SW1, SW2, SW3, and SW4.

4.5 Configurable LED

There are four green LEDs on the SGW1010-EVK board. When P0.13, P0.14, P0.15, and P0.16 set to active low, LED1 - LED4 will turn on. When P0.13, P0.14, P0.15, and P0.16 are set to high, LED1 - LED4 will turn off.
4.6 NFC Connector

The NFC connector is used for external NFC antenna. Capacitors C16 and C17 are for tuning NFC antenna resonance at 13.56MHz.

4.7 External J-Link Programming and Debug interface

Header J17 and J25 are external J-Link interface for firmware programming and debugging. The interface implements by using 2x5 1.27mm pitch 10-pin header and by using 1x4 2.54mm pitch 4-pin header.
To ensure the proper use of external J-Link connection, the external device must connect to the following pins:

- SWD_IO, SWD_CLK: Connect to SWG1010 device respectively
- P1.00, BLE_RESET: both P1.00 and BLE_RESET connection is optional
- BLE_VDD, GND: connect power pin from SWG1010 device.

4.7 Segger J-Link OB interface for Programming and Debug

External target hardware can be connected to J21 for firmware programming and debugging. The Segger debug interface is implemented in this EVK board. Connector J21 is implemented with a 2x5 10-pin header on 0.05” centers.

4.8 Low Frequency Mode

There are three types of Low Frequency clocks that can be used for the SGW1010 module: External 32.768 kHz crystal oscillator, RC oscillator, and the Low frequency clock generate from internal clock 32MHz by clock divider. In default, an external 32.768 kHz crystal oscillator is used to provide the most accuracy and low power consumption.

4.9 Current Measurement Headers

There are three current measurement headers on the evaluation board. For header J18, connect both SYS_VDD (Pin 1) and EXT_VDD (Pin 2) with multimeter or other voltage measurement equipment to measure external device current. For header J4, connect both SYS_VDD (Pin 1) and
BLE_VDD (Pin 2) to measure SGW1010 module low voltage operation. For header J22, connect both VIN_5V (Pin 1) and VDD_HV (Pin 2) to measure the SGW1010 module high voltage operation.

![Current Measurement Diagram]

4.10 Flash

The SGW1010-EVK includes a 64M-BIT quad NOR flash (MX25R6435FZNIL0) available for additional data storage and can execute in place (XIP) directly from memory. The memory is connected to the chip with following GPIOs:

<table>
<thead>
<tr>
<th>GPIO</th>
<th>Flash Memory Pin</th>
</tr>
</thead>
<tbody>
<tr>
<td>P0.17</td>
<td>SPI_CS#</td>
</tr>
<tr>
<td>P0.19</td>
<td>SPI_CLK</td>
</tr>
<tr>
<td>P0.20</td>
<td>SPI_DIO0</td>
</tr>
<tr>
<td>P0.21</td>
<td>SPI_DIO1</td>
</tr>
<tr>
<td>P0.22</td>
<td>SPI_DIO2</td>
</tr>
<tr>
<td>P0.23</td>
<td>SPI_DIO3</td>
</tr>
</tbody>
</table>

4.11 Connector Interface

The following figure is the connector footprint for SGW1010-EVK board.
Some pins have default setting:

- P0.00 and P0.01 are used for external 32.768kHz crystal oscillator
- P0.09 and P0.10 are used by NFC connection
- P0.11, P0.12, P0.24, and P0.25 are connected to custom configured button
- P0.13, P0.14, P0.15, and P0.15 are connected to LED
- P0.17, P0.19 – P0.23 are connected to external flash
- P0.18 is used by RESET
5. Environment and Support

5.1 Life Support Applications

SG Wireless products may not be used in any life critical equipment, systems or applications where failure of such equipment, system or application would cause serious bodily injury or death. SG Wireless customers will fully indemnify SG Wireless and its representatives against any damages, costs, losses and/or liabilities arising out of customer’s non-compliance.

5.2 RoHS and REACH Statement


6. Related Document & Useful Links

1. SG Wireless SGW1010: www.sgwireless.com

7. Revision History

<table>
<thead>
<tr>
<th>Revision</th>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>Aug 19, 2019</td>
<td>Initial Release</td>
</tr>
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