# BMD-3xx-EVAL

**Evaluation kit for BMD-30/33/35/36 modules**

User guide



## Abstract

This document describes how to set up the EVK-BMD-30/33/35/ 36 evaluation kits to evaluate BMD-30/33/35/36 modules. It also describes the different options for debugging and the development capabilities included in the evaluation board.

# Document information

| | |
|---|---|
| **Title** | **BMD-3xx-EVAL User Guide** |
| **Subtitle** | Evaluation kit for BMD-30/33/35/36 modules |
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This document applies to the following products:

| Product name |
|---|
| BMD-300-Eval |
| BMD-301-Eval |
| BMD-330-Eval |
| BMD-350-Eval |
| BMD-360-Eval |

# Contents

# 1   Product description

The BMD-3xx-EVAL kits from u-blox allow for stand-alone use of the BMD-300, BMD-301, and BMD-350 modules featuring the Nordic nRF52832 RF System on Chip (SoC), the BMD-330 module featuring the Nordic nRF52810 RF SoC, and the BMD-360 module featuring the Nordic nRF52811 RF SoC. Other u-blox modules have evaluation kits covered by other documents.

These evaluation kits provide a great starting point for almost any Bluetooth 5 Low Energy project. All features of the BMD-3xx are easily accessed from the evaluation board. A simple USB connection provides power, programming, and a virtual COM port. Four user buttons are available, as well as four LEDs and a reset button. All 32 GPIO are available on headers that are compatible with the Arduino form factor. This allows easy use of any existing Arduino shields. Current sense resistors allow for measuring current into the BMD-3xx module and into the shield.

This guide provides setup instructions for starting development and describes the hardware functionality of the BMD-3xx-evaluation boards.

## 1.1   Key features

- BMD-3xx series module
- On-board programming and debug (SEGGER J-Link-OB)
- Able to program external modules
- Virtual COM port over USB
- Full GPIO of the module
- Buttons and LEDs for user interaction
- NFC antenna connector
- 32.768 kHz crystal
- CR2032 battery holder



**Figure 1: BMD-3xx-EVAL User Guide evaluation board (top view)**

## 1.2   Kit includes

**BMD-300 evaluation kit includes:**

- BMD-300 evaluation board
- Micro-USB cable
- NFC antenna

**BMD-301 evaluation kit includes:**

- BMD-301 evaluation board
- Micro-USB cable
- NFC antenna
- 2.4 GHz antenna kit

**BMD-330 or BMD-360 evaluation kit includes:**

- BMD-330 or BMD-360 evaluation board
- Micro-USB cable

**BMD-350 evaluation kit includes:**

- BMD-350 evaluation board
- Micro-USB cable
- NFC antenna

## 1.3   Development tools

Table 1 shows the tools available for development with the BMD-3xx series Bluetooth modules. Not all tools will be required depending on which software suite is used.

| Tool | Description |
| --- | --- |
| SEGGER J-Link Software and Documentation Pack | J-Link Commander (JLink.exe) is a command line-based utility that can be used for verifying the proper functionality of J-Link as well as for simple analysis of the target system. It supports some simple commands, such as memory dump, halt, step, and go, to verify the target connection. Available for Windows, macOS, and Linux. |
| Nordic Semiconductor SDK | The Zephyr based nRF Connect SDK is the primary choice for developing applications with nRF based chipsets. It offers developers a wealth of varied modules and examples right across the spectrum including numerous Bluetooth Low Energy profiles, Device Firmware Upgrade (DFU), GATT, and driver support for all peripherals on all nRF5 series devices.<br>SDKs for Bluetooth Mesh, Thread, Zigbee and other protocols are also available.<br>The older nRF5 SDK is an alternative for legacy applications with the nRF52 and nRF51 series. |
| Nordic Semiconductor nRF Connect for Desktop | nRF Connect is a cross-platform tool that enables testing and development with Bluetooth® Low Energy (previously called Bluetooth Smart). It allows easy setup of connections with other devices and uses these connections to read and write the external nodes. Available for Windows, macOS, and Linux. |
| Visual Studio Code | Visual Studio Code is a versatile development environment that in combination with the nRF Connect for VS Code plugin integrates seamlessly with the nRF Connect SDK. |
| SEGGER Embedded Studio | SEGGER Embedded Studio is an easy-to-use integrated development environment with project management tools, editor and debugger supporting ARM Cortex devices. Full debug support including Real Time Terminal (RTT) output is also available.<br>Available for Windows, macOS, and Linux. Free license for use with the Nordic nRF5 ICs and modules: http://license.segger.com/Nordic.cgi<br>Segger Embedded Studio is primarily used with the older nRF5 SDK. |

| Tool | Description |
|------|-------------|
| Nordic Semiconductor nRF Connect for Mobile | nRF Connect for Mobile, previously known as nRF Master Control Panel, is a powerful generic tool that allows you to scan and explore your Bluetooth Low Energy devices and communicate with them. nRF Connect for Mobile supports several Bluetooth SIG adopted profiles, as well as the Device Firmware Update profile (DFU) from Nordic Semiconductor or Eddystone from Google. Available for iOS and Android. |
| Nordic Semiconductor Mobile Apps | Additional mobile utilities for your application development. Available for iOS and Android. |

**Table 1: Useful tools**

# 2 Hardware description

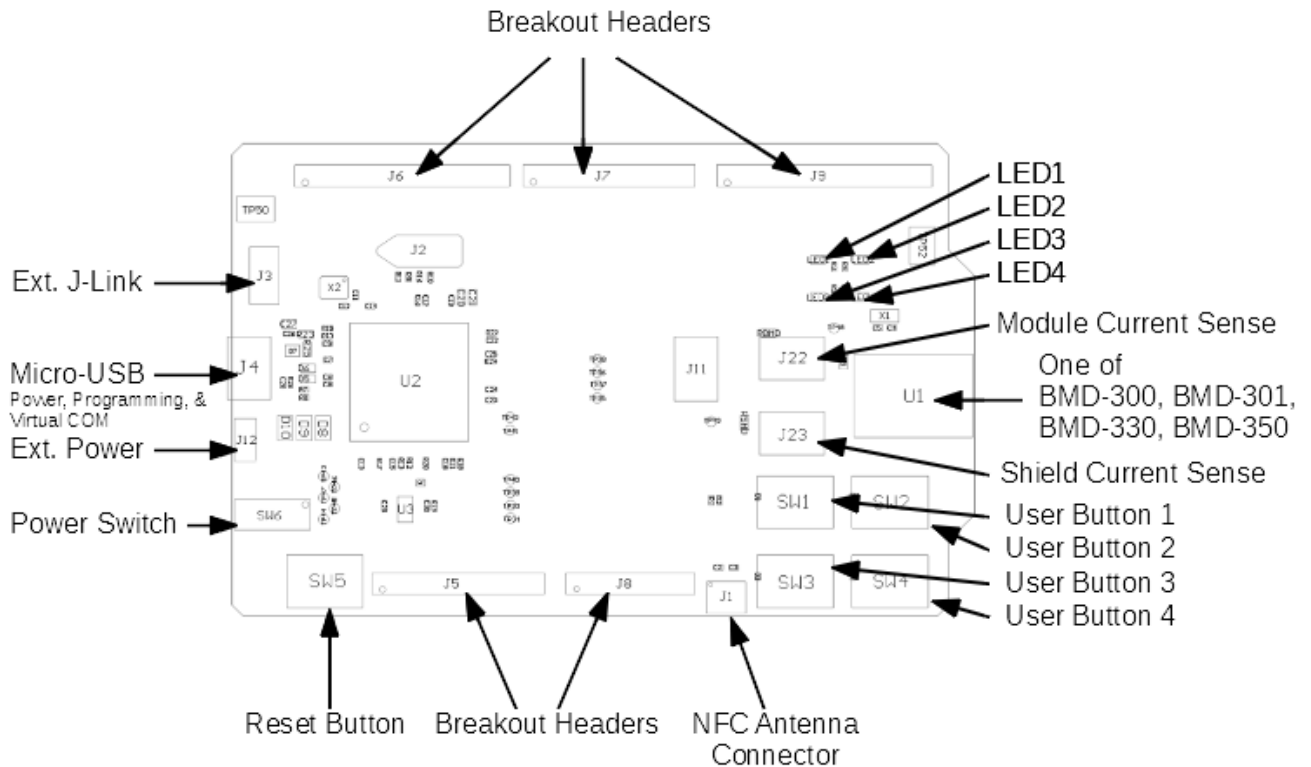Design files for each of the BMD-3xx evaluation boards may be requested from the u-blox support team.



**Figure 2: Assembly drawing (top view)**

## 2.1 Power

The BMD-3xx evaluation board has three possible power sources as listed below:

- USB
- CR2032 coin cell battery
- 2.54 mm through-hole connector

These power sources use protection diodes to prevent reverse voltage to any supply. This allows them to be used simultaneously. Solder jumpers are provided to allow by-passing any of the protection diodes eliminating the voltage drop across them.

⚠ Care should be taken to not damage the supplies when the protection is bypassed.

### 2.1.1 Powering the board

Typically, power will be provided by USB through **VBUS**, which will supply 5 V to the 3.3 V LDO regulator and to the shield connector. The 3.3 V LDO regulator will then power the **VIO**, **VSHLD**, and **VBMD**.

When powering the board from the CR2032 coin cell (**3VDC**) or the external power header, USB can be left disconnected. In this configuration, the interface IC is held in reset to conserve power.

☞ Only if the power protection diodes are left intact can the USB be safely connected at the same time as the coin cell or external power is still applied, which allows for easy programming of the module.
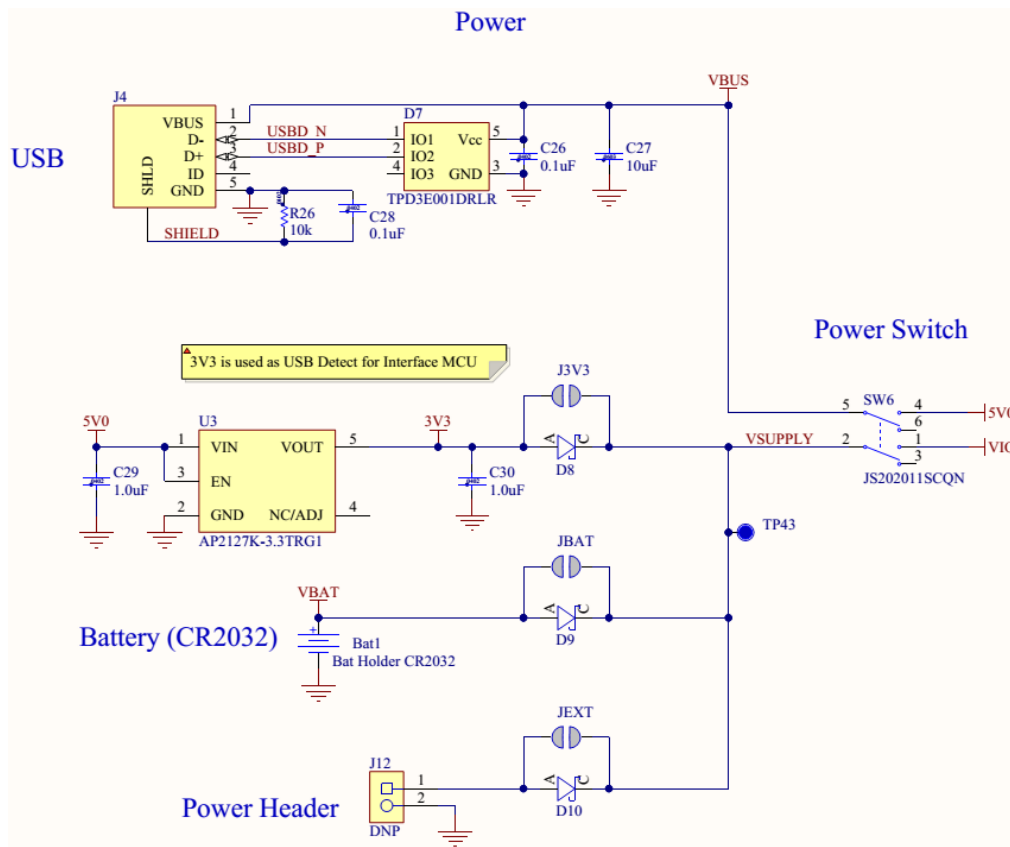
**Figure 3: Schematic – power supply**

## 2.2 Reset

The BMD-3xx modules have a configurable hardware reset. However, P0.21 is assumed to be used as the reset pin for all u-blox BMD and Nordic example projects, and thus the evaluation board hardware is configured to use P0.21 as a reset. The Reset button can be configured to connect to an input on the interface IC or to directly connect to P0.21.

The reset button is connected to the IC used for the J-Link interface by default. Pressing reset while the interface IC is powered causes a momentary reset signal on the **RESET_N** output of the interface IC, which is connected via solder jumper to P0.21 of the BMD-3xx series modules. If the reset button is held down during power on, it causes the interface IC to enter its bootloader mode, allowing either SEGGER J-Link or mbed programmer firmware to be programmed.

When the reset button is directly connected to P0.21, it can be used as a fifth user button or as a reset button directly connected to the BMD module.

Solder jumper J21 is used to connect P0.21 of the BMD module to the **RESET_N** net, as shown **nRESET** in Figure 4. **RESET_N** is connected to the interface IC and to the reset connections on the Arduino headers.
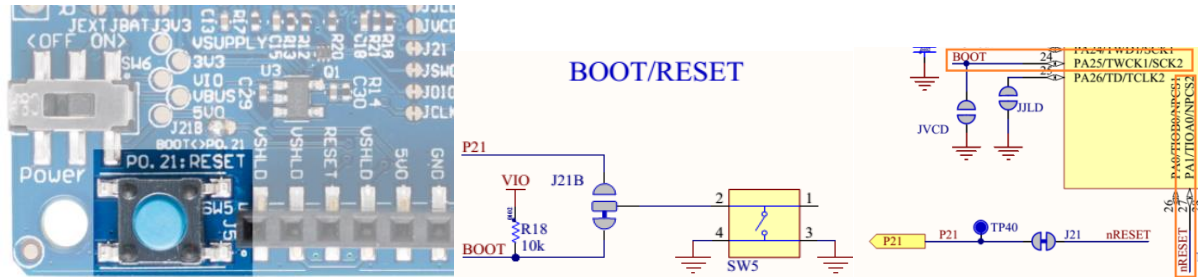


**Figure 4: Schematic – Reset**

## 2.3 Buttons

The evaluation board has four user buttons: Button 1, Button 2, Button 3, and Button 4. All buttons are active low; they will connect to ground when pressed. The button GPIO pins must be configured with internal pull-up resistors for proper operation when using the user buttons. The buttons and ESD protection can be completely removed from the circuit by breaking the associated jumper.
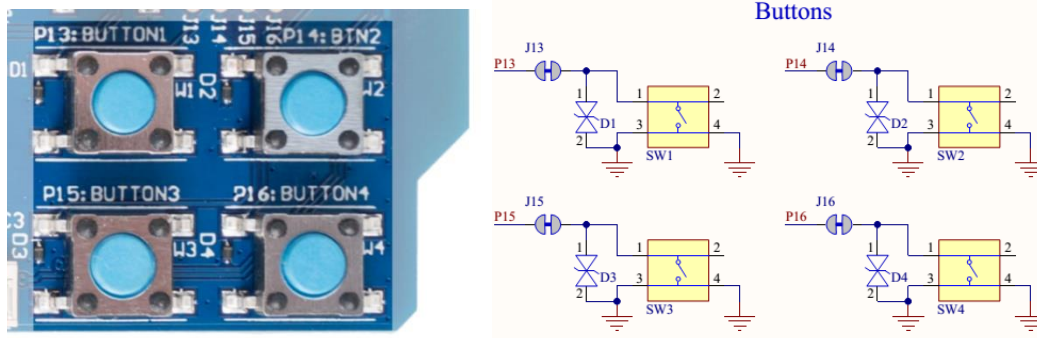


**Figure 5: Schematic – user buttons**

## 2.4 LEDs

Four User LEDs are provided on the evaluation board: two red and two green. LEDs are powered by **VIO** and are active low. The GPIO should be enabled for high drive when sinking current for the LEDs. The LEDs can be completely removed from the circuit by breaking the associated jumper.
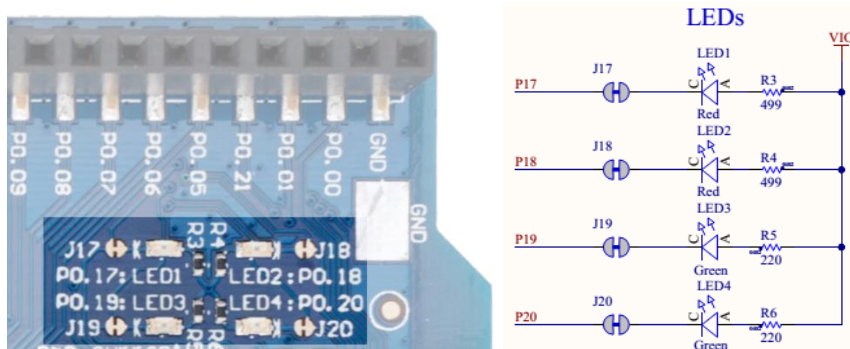


**Figure 6: Schematic – user LEDs**

## 2.5 Virtual COM port

The evaluation board allows for easy serial communication with the BMD-3xx series modules and a connected computer. The Interface IC provides a virtual COM USB device that connects to four GPIO pins on the module, allowing for UART communication with or without hardware flow control. The UART lines can be completely removed from the circuit by breaking the associated jumpers.

| BMD-3xx pin name | BMD-3xx function | Jumper | Interface IC function |
|---|---|---|---|
| P0.05 | RTS | J05 | CTS |
| P0.06 | TXD | J06 | RXD |
| P0.07 | CTS | J07 | RTS |
| P0.08 | RXD | J08 | TXD |

Table 2: Virtual COM port

## 2.6 32 kHz crystal oscillator

The evaluation board has a 32.768 kHz crystal oscillator connected to the BMD-3xx module by default. This allows the module to use any of the three available low frequency (LF) clock sources: an internal calibrated RC oscillator, an internal synthesized clock (derived from the 32 MHz clock), or an external crystal oscillator. The external crystal oscillator is the most accurate and lowest power LF clock option. For applications without strict time-keeping requirements, the internal calibrated RC oscillator is often suitable. The crystal is connected to the module through a solder select jumper, allowing either the crystal or the IO header to be connected to the module's GPIO pins.
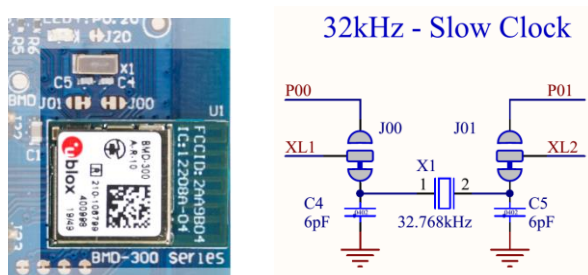


Figure 7: Schematic – 32 kHz crystal

## 2.7 NFC connector

Connection to an external NFC antenna is provided through a Molex flat-flex connector, part number 051281-0594. Capacitors "C2" and "C3" provide tuning of the NFC antenna for resonance at 15.56 MHz.

☞ NFC is not supported on the BMD-330 or BMD-360. These components are not populated on the BMD_330-EVAL or BMD-360-EVAL.
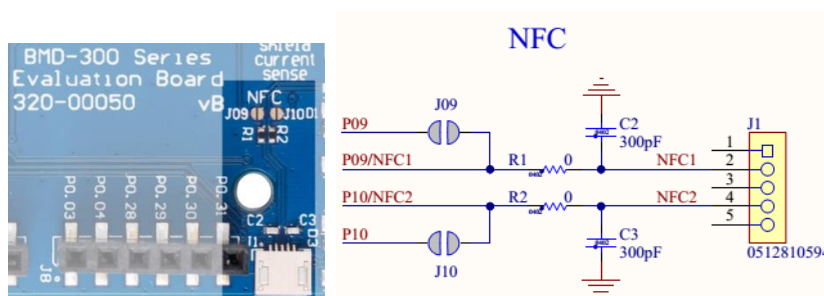


Figure 8: NFC connector

## 2.8 Current sensing headers

The evaluation board provides two current sensing headers. "JBMD" allows for power consumption measurement of the BMD-3xx series module and "JSHD" allows for power consumption measurement of shields connected to the Arduino-style headers ("**VSHLD**" power only).

Each 3-pin 2.54 mm header has two pins connected across a 1Ω current-sense resistor powering the module or the shield, and the third pin to ground. To measure current consumption, use a multimeter or other precision voltage measurement device to measure voltage drop across pins one and two. Current can also be measured directly by removing "RBMD" / "RSHD" and using a current meter in series with the two voltage pins. The default hardware configuration does not require any modification of the current sense headers for the BMD-3xx-EVAL to perform properly.

☞ Only current flowing through "**VBMD**" into the module is measured; current sunk through GPIO pins is not measured.
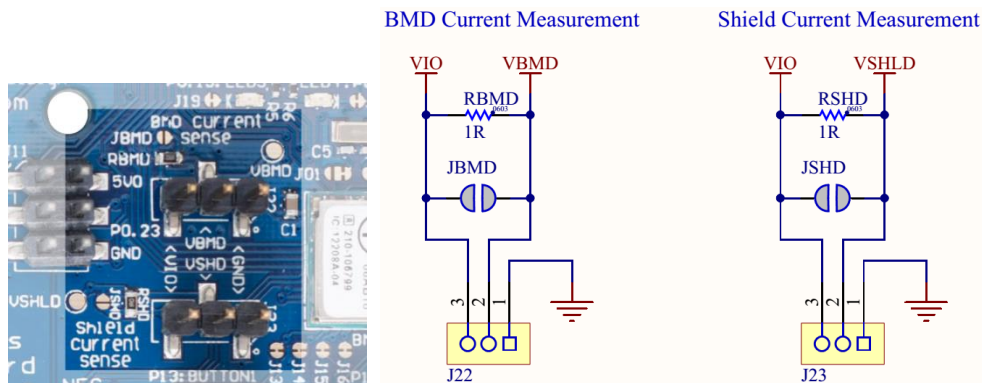


**Figure 9: Current sensing header layout**

## 2.9 External SEGGER J-Link™ Debug Interface

External target hardware can be connected to J3 for firmware programming and debug. The SEGGER debug interface is implemented as shown in Figure 10. J3 is implemented with a 2x5 10-pin header on 1.27 mm centers.
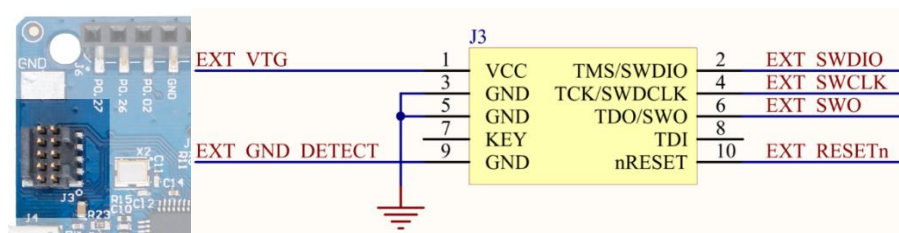


**Figure 10: External J-Link debug interface**

To enable the external J-Link connection, ensure the following connections must be implemented on the target hardware:

* **EXT_VTG** is used by the debug interface as an input to sense power applied to the external circuit. Only voltages of 3.0 V to 3.3 V are supported. Other operating voltages require the use of an external J-Link Debug Probe. Connect **EXT_VTG** to the BMD-3xx series power supply (VCC) on the target hardware.
* **EXT_GND_DETECT** is used by the debug interface to detect the presence of external target hardware. Connect **EXT_GND_DETECT** to GND on the target hardware.

- Connect **EXT_SWDIO** and **EXT_SWCLK** to **SWDIO** and S**WDCLK** on the target BMD-3xx, respectively.
- (Optional) Connect **EXT_SWO** and/or **EXT_RESETn** to P0.18 and P0.21 on the target BMD-3xx, respectively.
- Connect external power to the target hardware, then connect the BMD-3xx series evaluation Board to USB.

☞ At this point, the debug interface interacts with the target hardware instead of the on-board BMD-3xx module.

## 2.10 GPIO jumpers

There are many solder bridge jumpers on the board available to allow for configurability of the GPIO. Most solder jumpers are used to remove on-board components from the module's GPIO nets, should they interfere with external circuitry added on the I/O headers. All GPIOs are directly connected to the I/O Headers by default, except P0.00 & P0.01 (32 kHz crystal) and P0.09 & P0.10 (NFC antenna). These are disconnected from the I/O headers as they would interfere with the default functions.
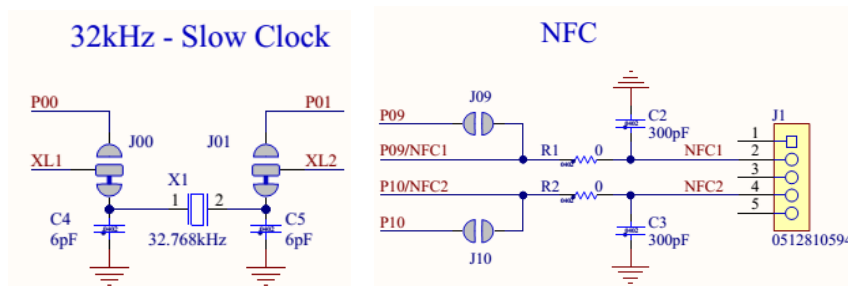


**Figure 11: GPIOs disconnected from I/O headers**

The GPIO jumpers are shown on the bottom side of the BMD-3xx series evaluation board:



**Figure 12: GPIO Jumper summary**

## 2.11 Header pin-out

Headers J5 - J9 and J11 break-out the IO signals from the BMD-3xx on 2.54 mm pitch headers.
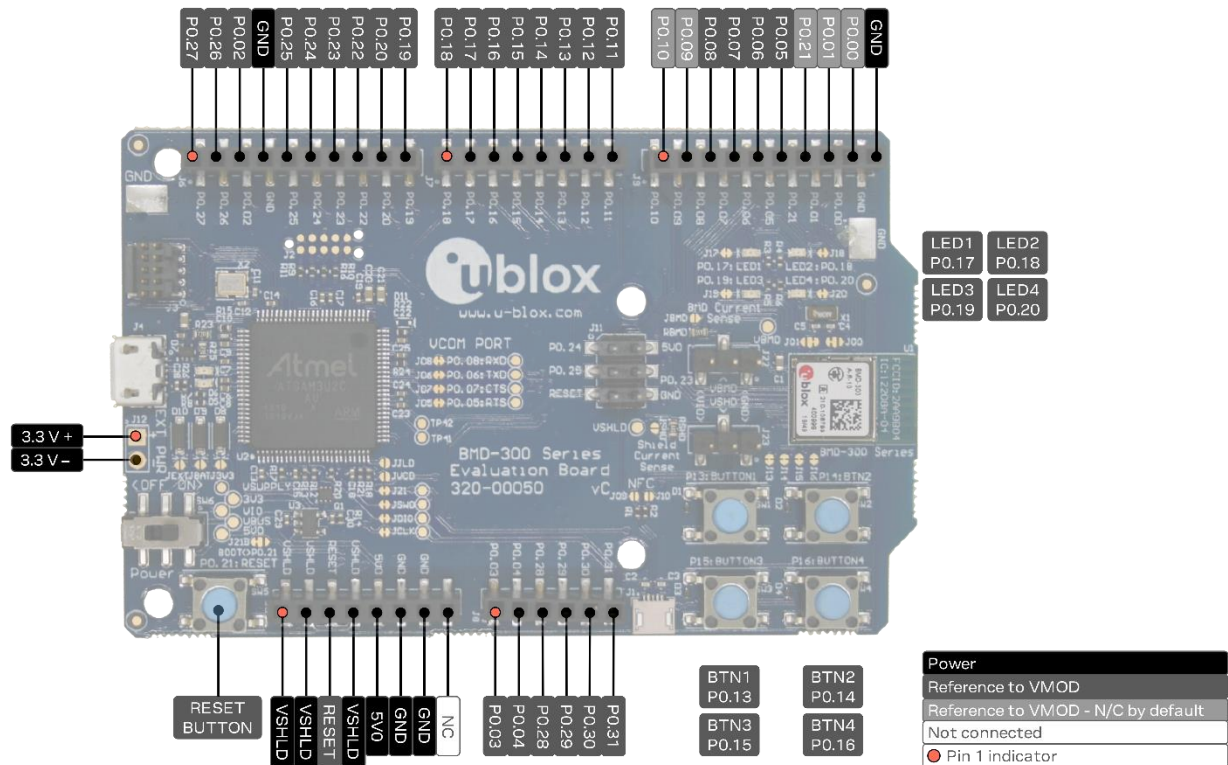


**Figure 13: BMD-3xx series evaluation board pin-out**

⚠ The I/O pins of the BMD-30/33/ 5 /36 EVK are not 5 V tolerant. Arduino Uno® style shields shall be configured to use +3.3 V DC (**VSHLD**) as the I/O voltage reference.

| Header pin | Pin name | nRF52 port | Function |
|---|---|---|---|
| 1 | P0.24 | P0.24 | GPIO |
| 2 | 5V0 | - | +5.0 V USB Power |
| 3 | P0.25 | P0.25 | GPIO |
| 4 | P0.23 | P0.23 | GPIO |
| 5 | RESET | P0.21 | RESET_N |
| 6 | GND | | Ground |

**Table 3: Header J11**

| Header pin | Pin name | nRF52 port | Function |
|---|---|---|---|
| 10 | GND | | Ground |
| 9 | P0.00 | P0.00 | OPEN / GPIO |
| 8 | P0.01 | P0.01 | OPEN / GPIO |
| 7 | P0.21 | P0.21 | RESET_N / GPIO |
| 6 | P0.05 | P0.05 | GPIO / AIN3 |
| 5 | P0.06 | P0.06 | GPIO |
| 4 | P0.07 | P0.07 | GPIO |
| 3 | P0.08 | P0.08 | GPIO |
| 2 | P0.09 | P0.09 | OPEN / GPIO |
| 1 | P0.10 | P0.10 | OPEN / GPIO |

**Table 4: Header J9**

| Header pin | Pin name | nRF52 port | Function |
|---|---|---|---|
| 6 | P0.31 | P0.31 | GPIO / AIN7 |
| 5 | P0.30 | P0.30 | GPIO / AIN6 |
| 4 | P0.29 | P0.29 | GPIO / AIN5 |
| 3 | P0.28 | P0.28 | GPIO / AIN4 |
| 2 | P0.04 | P0.04 | GPIO / AIN2 |
| 1 | P0.03 | P0.03 | GPIO / AIN1 |

**Table 5: Header J8**

| Header pin | Pin name | nRF52 port | Function |
|---|---|---|---|
| 8 | P0.11 | P0.11 | GPIO |
| 7 | P0.12 | P0.12 | GPIO |
| 6 | P0.13 | P0.13 | GPIO |
| 5 | P0.14 | P0.14 | GPIO / TRACED[3] |
| 4 | P0.15 | P0.15 | GPIO / TRACED[2] |
| 3 | P0.16 | P0.16 | GPIO / TRACED[1] |
| 2 | P0.17 | P0.17 | GPIO |
| 1 | P0.18 | P0.18 | GPIO / TRACED[0] |

**Table 6: Header J7**

| Header pin | Pin name | nRF52 port | Function |
|---|---|---|---|
| 10 | P0.19 | P0.19 | GPIO |
| 9 | P0.20 | P0.20 | GPIO / TRACECLK |
| 8 | P0.22 | P0.22 | GPIO |
| 7 | P0.23 | P0.23 | GPIO |
| 6 | P0.24 | P0.24 | GPIO |
| 5 | P0.25 | P0.25 | GPIO |
| 4 | GND | GND | Ground |
| 3 | P0.02 | P0.02 | GPIO / AIN0 |
| 2 | P0.26 | P0.26 | GPIO |
| 1 | P0.27 | P0.27 | GPIO |

**Table 7: Header J6**

| Header pin | Pin name | nRF52 port | Function |
|---|---|---|---|
| 8 | - | - | |
| 7 | GND | - | Ground |
| 6 | GND | - | Ground |
| 5 | 5V0 | - | +5.0 V USB Power |
| 4 | VSHLD | - | +3.3 V Shield Power |
| 3 | RESET | P0.21 | RESET_N |
| 2 | VSHLD | - | +3.3 V Shield Power |
| 1 | VSHLD | - | +3.3 V Shield Power |

**Table 8: Header J5**

# 3 Setting up the evaluation board

This section provides information on how to set up and program the BMD-3xx series evaluation kit with an example application. The nRF Connect toolchain is recommended for new projects.

## 3.1 Set up the nRF Connect tool chain

1. Install Visual Studio Code if an IDE is desired.
2. Install the nRF Command Line Tools
3. Install nRF Connect on desktop PC and from there install the Toolchain Manager.
4. From the Toolchain Manager install the latest version of the nRF Connect SDK, including the Visual Studio Code plugin.

## 3.2 Set up the legacy nRF5 tool chain

1. Install SEGGER Embedded Studio and request a license.
2. Download the latest nRF5 SDK. Unzip it to a convenient working directory.

☞ Do not alter the directory trees. The examples are configured for relative path positions. Do not use spaces in the directory path.

3. Install nRF Connect on desktop PC and optionally one of the mobile versions. nRF Connect can be used directly with the Device Under Test (DUT) evaluation board for programming and other features.

☞ If using nRF Connect on a desktop, a second evaluation board or a nRF52 USB Dongle will be needed to make Bluetooth LE connections with your DUT.

4. Install the SEGGER J-Link Commander. If presented with a screen to select different IDEs, ensure at least the "SEGGER Embedded Studio ARM" line is selected.
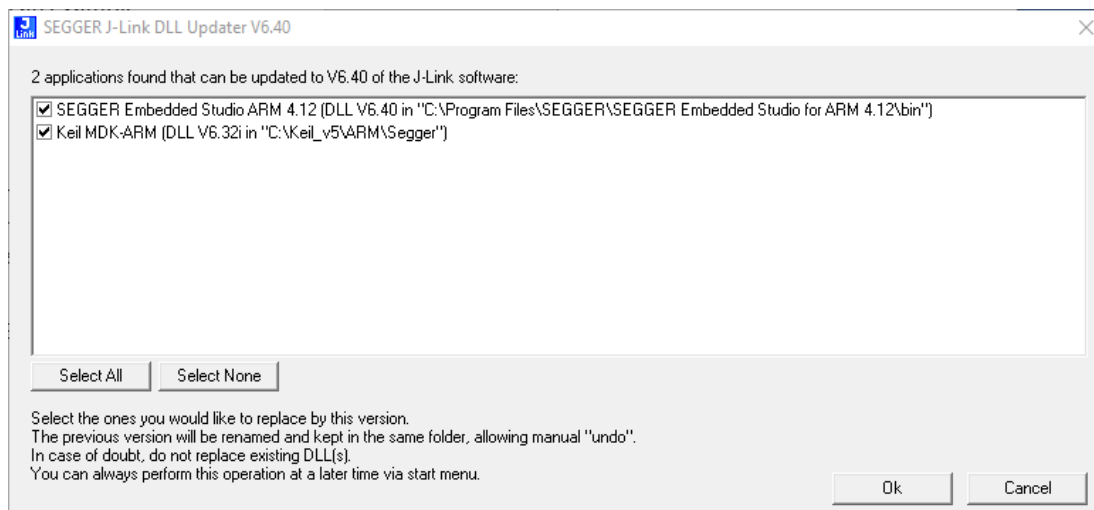


**Figure 14: SEGGER J-Link Commander Install**

5. You may need to add the install location to the system PATH. The default location for the J-Link commander is, "`C:\Program Files (x86)\SEGGER\JLink_Vnnn`", where "nnn" is the version number.
6. Install nRF Toolbox for your mobile device. This is used with the examples in Open a legacy nRF5 SDK example project.

## 3.3 Connect BMD-3xx evaluation kit to a computer

The evaluation board is provided with an on-board SEGGER J-Link programmer/debugger.

1. If using the BMD-301-EVAL, connect one of the 2.4GHz antennas from the kit to the module.

⚠ Note that the U.FL connector is intended for limited connect / disconnect cycles.

2. Connect the board to a computer using the USB cable provided.

☞ The status LED, D5, flash and then turn solid once the USB device is enumerated. Some flickering is normal.

3. After a few seconds, the computer recognizes the evaluation board as a J-Link device and installs the USB-Virtual COM Port device driver.
4. Run the J-Link Commander:
    4.1. `JLink` on Windows
    4.2. `JLinkExe` on macOS and Linux

☞ If prompted to update the J-Link firmware, accept and perform the update.

5. Type "`connect`" at the `J-Link>` prompt
6. Enter the device type at the `Device>` prompt
    6.1. Type `nRF52832_XXAA` for the BMD-300, BMD-301, or BMD-350
    6.2. Type `nRF52810_XXAA` for the BMD-330
    6.3. Type `nRF52811_XXAA` for the BMD-360
7. Enter `S` to select the SWD interface and accept the default for the speed.
8. J-Link responds with several items. A sample output is shown in Figure 15.
9. This confirms that the evaluation board is properly recognized.
10. While still in the J-Link Commander session, save the pre-programmed public Bluetooth address by typing: `savebin mac_addr.bin 0x10001080 8`
11. Save the file `mac_addr.bin` to a convenient location for future use.
12. Exit the J-Link session by typing: `exit`

At this point, the file `mac_addr.bin` is saved in the current directory. The file contents contain the Bluetooth device (MAC) address in little-endian format:

```
33 22 11 C3 09 60 FF FF
```

This corresponds to the address `60:09:C3:11:22:33`. The last two `FF` values are fillers to complete the 8-byte read.

☞ This binary file may be used to restore the Bluetooth device address after performing an erase or recover with the J-Link command: `loadbin mac_address.bin 0x10001080`

☞ The Bluetooth device address is also printed on the module label. See the module data sheet for details.

A J-Link sample output is shown in Figure 15



**Figure 15: J-Link Commander output**

## 3.4 Prepare the module for programming

The BMD-300, BMD-301 and BMD-350 modules are shipped from the factory with factory firmware to support legacy designs. This firmware must be erased prior to programming new code. Run the following at the command prompt:

```
nrfjprog -f nrf52 --recover
```

The BMD-330 and BMD-360 modules do not have factory firmware and do not require erasure.

## 3.5 Using an nRF Connect SDK example project

Board definitions for the u-blox evaluation boards are submitted to the Zephyr project and can be used as build targets with no further effort.

| u-blox evaluation board | Nordic SoC | Compatible Zephyr board definition |
|---|---|---|
| BMD-300-EVAL | nRF52832 | ubx_bmd300eval |
| BMD-301-EVAL | nRF52832 | ubx_bmd300eval |
| BMD-350-EVAL | nRF52832 | ubx_bmd300eval |
| BMD-330-EVAL | nRF52810 | ubx_bmd330eval |
| BMD-360-EVAL | nRF52811 | ubx_bmd360eval |

**Table 9: BMD evaluation boards with Zephyr SDK board definitions**

# 3.6 Open a legacy nRF5 SDK example project

☞ When selecting examples from the SDK, note the following cross references:

| u-blox evaluation board | Nordic SoC | Preferred SoftDevice | Compatible Nordic DK |
|---|---|---|---|
| BMD-300-EVAL | nRF52832 | S132 | PCA10040 / nRF52 DK |
| BMD-301-EVAL | nRF52832 | S132 | PCA10040 / nRF52 DK |
| BMD-350-EVAL | nRF52832 | S132 | PCA10040 / nRF52 DK |
| BMD-330-EVAL | nRF52810 | S112 | PCA10040e / nRF52 DK (If PCA10040e is not available, select PCA10040) |
| BMD-360-EVAL | nRF52811 | S113 | PCA10056e / nRF52840 DK(If PCA10056e is not available, select PCA10056). Refer to the Appendix for example settings. |

**Table 10: BMD evaluation boards with Nordic DK cross reference**

For this guide, the nRF SDK v16.0.0 Heart Rate Service example for the BMD-300-EVAL is used.

☞ Whenever possible, use the latest SDK version. The "`nRF5_SDK_xx.x.x_yyyyyyy`" directory may change. The folders under usually remain the same from version to version.

1. Navigate to the location of the heart rate example from the SDK, typically:
   `<unzipped_location>\nRF5_SDK_16.0.0_98a08e2\examples\ble_peripheral\ble_app_hrs`
2. Select the DK Board, SoftDevice and IDE directories. Here is the full path:
   `<unzipped location>\nRF5_SDK_16.0.0_98a08e2\examples\ble_peripheral\ble_app_hrs\pca10040\s132\ses`
3. Open the project file (`ble_app_hrs_pca10040_s132.emProject`) to start the SEGGER Embedded Studio IDE
4. Build the project (`<F7>`)
5. Once the build is successful, you can download the application code onto the module Board (`Target | Download ble_app_hrs_pca10040_s132`)

☞ The first time the board is programmed, both the SoftDevice and the application will be downloaded to the module. Once the SoftDevice is loaded, subsequent downloads will only transfer the application. If you need to change SoftDevice versions, erase the board through the IDE: (`Target | Erase All`)

6. On a mobile device, open the nRF Toolbox application. Select the Heart Rate Monitor.
7. Tap Connect. You should see the evaluation board advertising as "Nordic_HRM".
8. Select this device to see the simulated heart rate being transmitted from the BMD-3xx.

Additional training videos for SEGGER Embedded Studio can be viewed here.

# Appendix

# A   Legacy nRF5 SDK example configuration

The BMD-360-Eval follows the PCA10040 board pin-out from Nordic Semiconductor.

To assign the correct GPIO and reset pins, two small changes are required in the project options. To make these changes, follow the directions below.

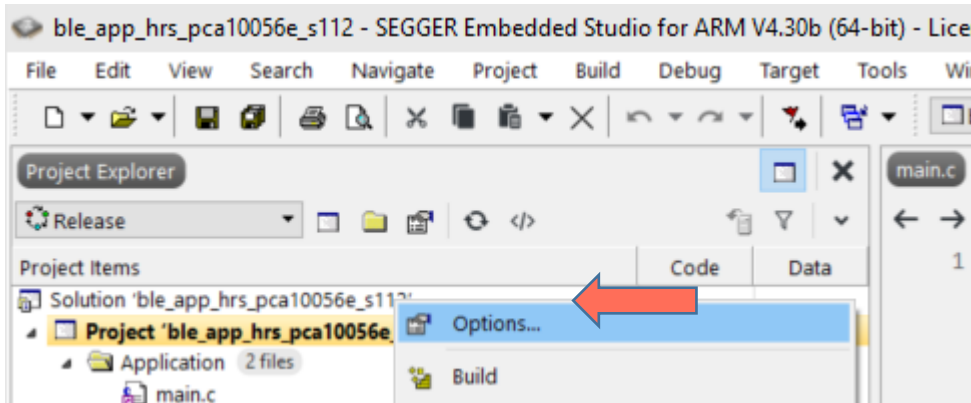1.   Find the project options by right-clicking on the project name.



**Figure 16: Project options**
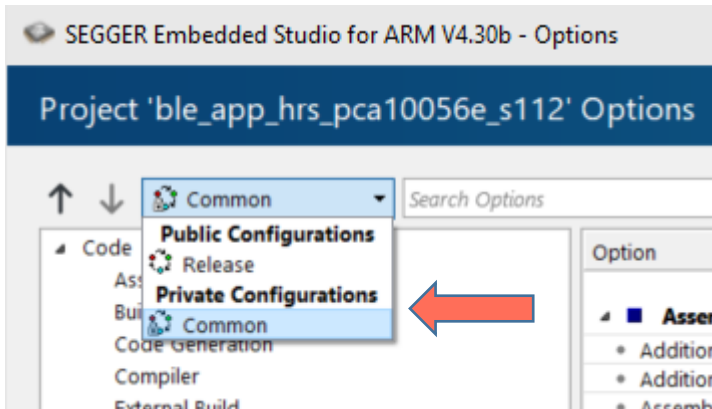
2.   Select the "Common" configuration.



**Figure 17: Common configuration**

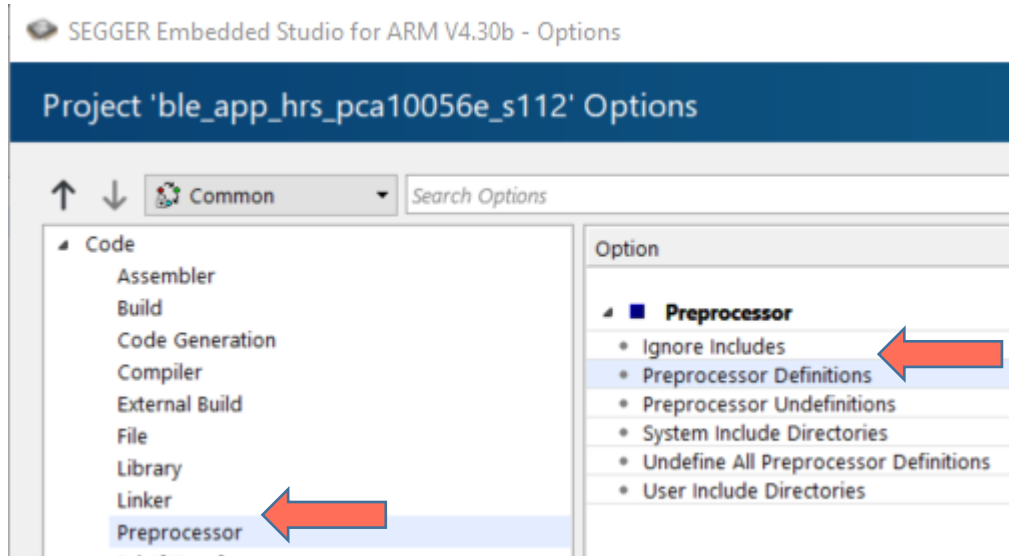3. Select the "Preprocessor" item under the "Code list".



**Figure 18: Preprocessor options**

4. Double-click on "Preprocessor Definitions" to display the options in an editable dialog box.
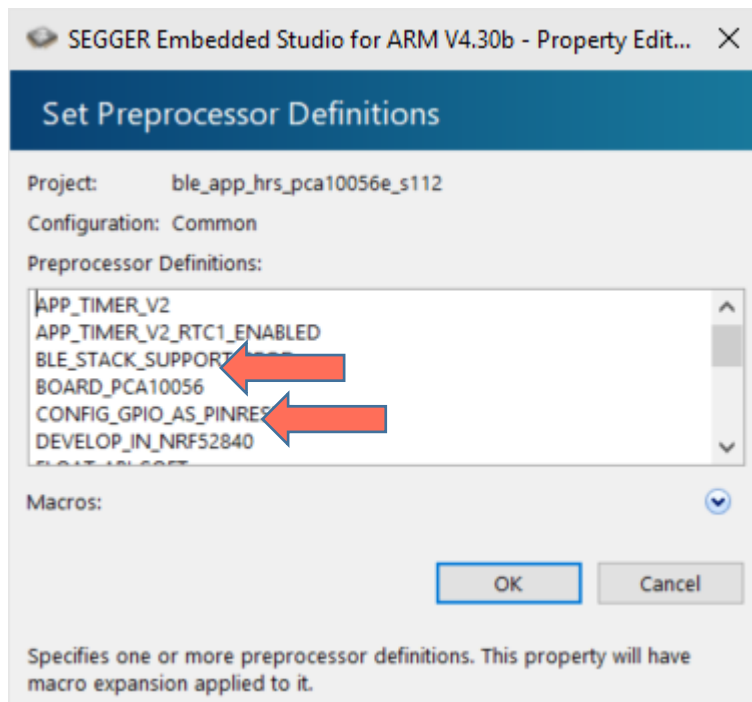


**Figure 19: Preprocessor definitions to modify**

5. Modify the directive "BOARD_PCA10056" to "BOARD_PCA10040".

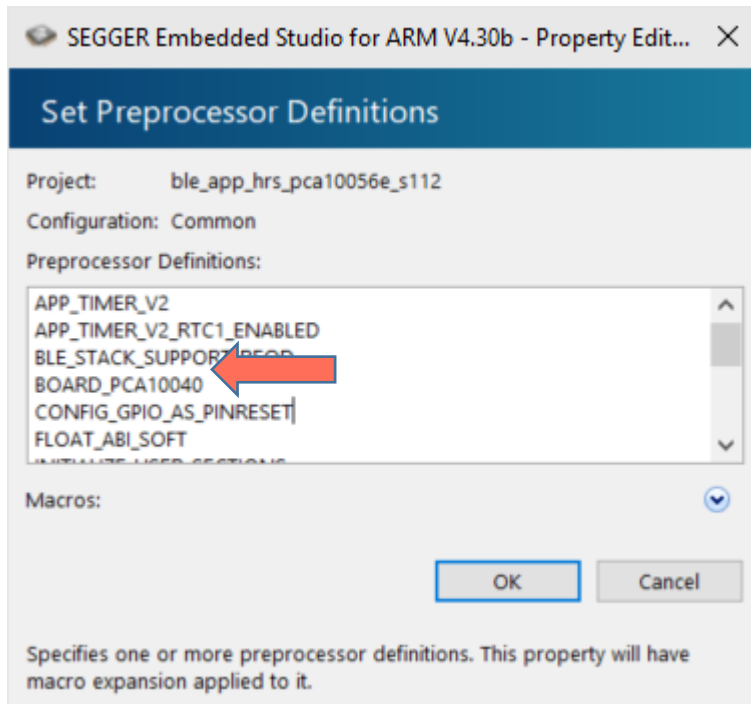6. Remove the directive "DEVELOP_IN_NRF52840".



**Figure 20: Resulting preprocessor definitions**

7. Click OK to close each dialog box and save the settings.

# Related documents

[1] BMD-300 data sheet, UBX-19033350
[2] BMD-301 data sheet, UBX-19033351
[3] BMD-350 data sheet, UBX-19033354
[4] BMD-330 data sheet, UBX-19033352
[5] BMD-360 data sheet, UBX-19039466
[6] Using public IEEE address from UICR application note, UBX-19055303
[7] Add Nordic Semiconductor DFU to SDK example app note, UBX-19050198
[8] Nordic nRF52810 product specification
[9] Nordic nRF52811 product specification
[10] Nordic nRF52832 product specification
[11] S112 SoftDevice specification
[12] S113 SoftDevice Specification
[13] S132 SoftDevice specification
[14] u-blox package information guide, UBX-14001652

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# Revision history

| Revision | Date | Comments |
|----------|------|----------|
| 1.0 | 04-May-2016 | Initial release. |
| 1.0.1 | 06-May-2016 | Added link to reference design files in Section 4, updated logo |
| 1.1 | 28-Jul-2016 | Updated images, Added section on External J-Link connector, corrected section numbering |
| 1.2 | 09-Sep-2016 | Added BMD-350 evaluation kit information, document links |
| 1.3 | 09-May-2017 | Corrected BMD-350 hardware kit list |
| 2.0 | 14-Dec-2018 | Updated to new document format<br>Changed tools to recent Nordic Semiconductor versions |
| 2.1 | 05-Jun-2019 | Added BMD-360-EVAL kit information, document links<br>Updated Nordic Semiconductor links |
| R08 | 24-Oct-2019 | Document converted from Rigado BMD-3xx user guide to u-blox BMD-3xx EVK user guide |
| R09 | 05-Dec-2019 | Updated filename and title to BMD-30 / 33 / 35 / 36 EVK |
| R10 | 17-Jan-2020 | Added Appendix A to show BMD-360 example settings, updated table 9 to include reference to Appendix A, added new app note references in related documents list, updated Bluetooth device address details in section 3.2, added note regarding BMD-300, BMD-301, and BMD-350 factory firmware, removed type number from product list as it applies to all type numbers |
| R11 | 28-Jan-2021 | Updated images to reflect u-blox branding. Corrected command in section 3.4.<br>Added warning for I/O pin voltage levels by Figure 13. Removed type number from product list as document applies to all type numbers. |
| R12 | 16-Apr-2021 | Updated Figure 13. |
| R13 | 05-Dec-2024 | Updated software-related sections with references to nRF Connect SDK. |

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