BMA400
Desktop Development 2.1 User Manual

BMA400 User Manual

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1 About user manual

This manual describes the installation and usage of the Development Desktop 2.1 User Interface (DD2.1 UI); a Windows based PC software application and related embedded firmware/software developed by **Bosch Sensortec** for demonstration and evaluation of sensors.

1.1 Who should read this manual

This information is intended to users who wish to use DD2.1 U Ito demonstrate use of the BMA400 acceleration sensor.

1.2 DD2.1 UI Overview

DD2.1 UI is a PC based software used to read, capture, and display sensor data. To display the sensor data of BMA400 on DD2.1 UI, mount the sensor on the **Bosch Sensortec** application board. This is a universal demonstration environment for **Bosch Sensortec** sensor products.

Bosch Sensortec sensors are mounted on sensor specific shuttle boards. All sensors shuttle boards have an identical footprint and can be plugged into the application board's shuttle board socket. DD2.1 UI automatically detects the sensor that has been plugged in and starts the corresponding software application.

1.3 Sensor Communication:

DD2.1 UI software supports both SPI and I^2C to communicate with the sensor.

1.4 Graphical display:

DD2.1 UI displays the sensor data and interrupts in different graphical formats.

1.5 Data logging:

DD2.1 UI offers data logging of the sensor data.

2 About the BMA400

The BMA400 is an acceleration sensor that senses tilt, orientation, tab/double tab, and enables plug 'n' play step counting with activity recognition especially suited for wearable devices, which need a long-lasting battery lifetime.

The technical specifications of the BMA400 sensor are as seen below:

Table 1 Technical Data

Parameter	Technical Data
Measurement range	±2 g, ±4 g, ±8 g, ±16 g
Digital resolution	12 bit
Output Data Rate (ODR)	12.5 Hz to 800 Hz
Low path filter bandwidth	Selectable 0.48xODR or 0.24xODR
Current consumption (independent from ODR due to continuous measurement)	Max. performance: 14.5 µA Typical use case: 5.8 µA Low power use case: 3.5µA
Noise density	Max. performance: 180 µg/√Hz (Z: x 1.45) Typical use case: 300 µg/√Hz (Z: x 1.45) Low power: 415 µg/√Hz (Z: x 1.45)
Ultra low power / Auto-wake-up mode	800 nA @ 25 Hz ODR
Embedded features	Step counter (< 4 µA overall) Activity recognition (walking, running, standing still) Activity change Orientation Tab/Double tab (< 8 µA overall) General interrupt 1 and 2 (programmable via thresholds, timer, logical AND/OR operations) 1 kB FIFO
Offset	±80 mg
TCO	±1 mg/K
Interface	SPI & I²C & 2 Interrupt pins
Supply voltage	1.71 V up to 3.6 V
Package	12 pin LGA 2x2x0.95 m³ Bosch

3 Getting Started

The below sections highlight the procedure to set up connections between BMA400, DD2.1 UI, and the PC.

3.1 Setting Up the board-PC connection

The procedure to connect sensor to PC via USB is as below:

- Install DD2.1 UI.
- Insert the shuttle board and application board.

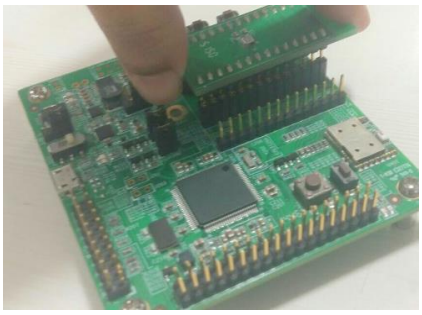


Figure 1 : Insert sensor for APP2.0

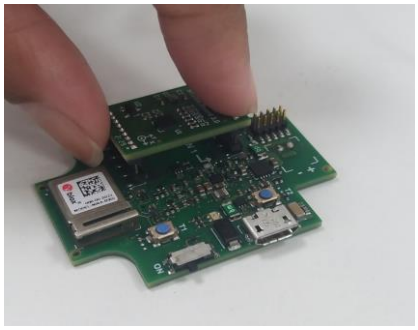


Figure 2 : Insert sensor for APP3.0

- Connect the board and PC using a USB cable/Bluetooth.

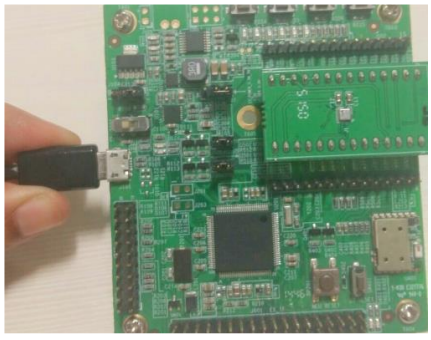


Figure 3 : Connect board and PC for APP2.0

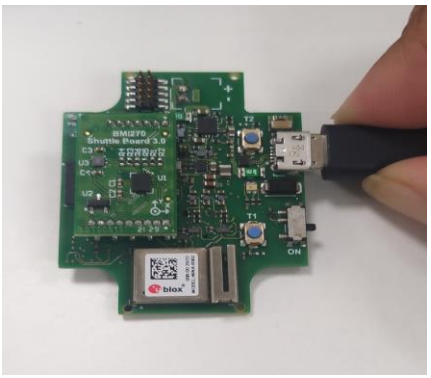


Figure 4 : Connect board and PC for APP3.0

▶ Turn the on/off switch **ON**. The LED glows.

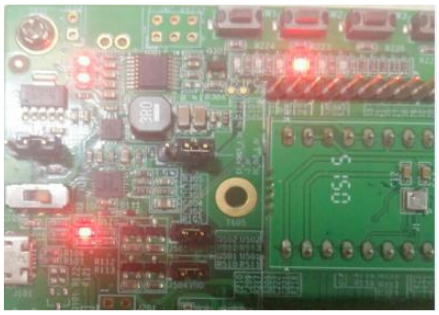


Figure 5 : Connection complete for APP2.0

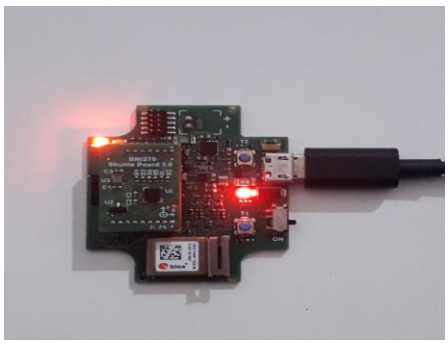


Figure 6 : Connection complete for APP3.0

3.2 Startup View

To start the DD2.1 UI software:
Click **Start -> Programs -> Development Desktop 2.1.**
Or
Double click the DD2.1 UI software icon on the desktop.
The Graphical User Interface (GUI) of the software is as seen below:

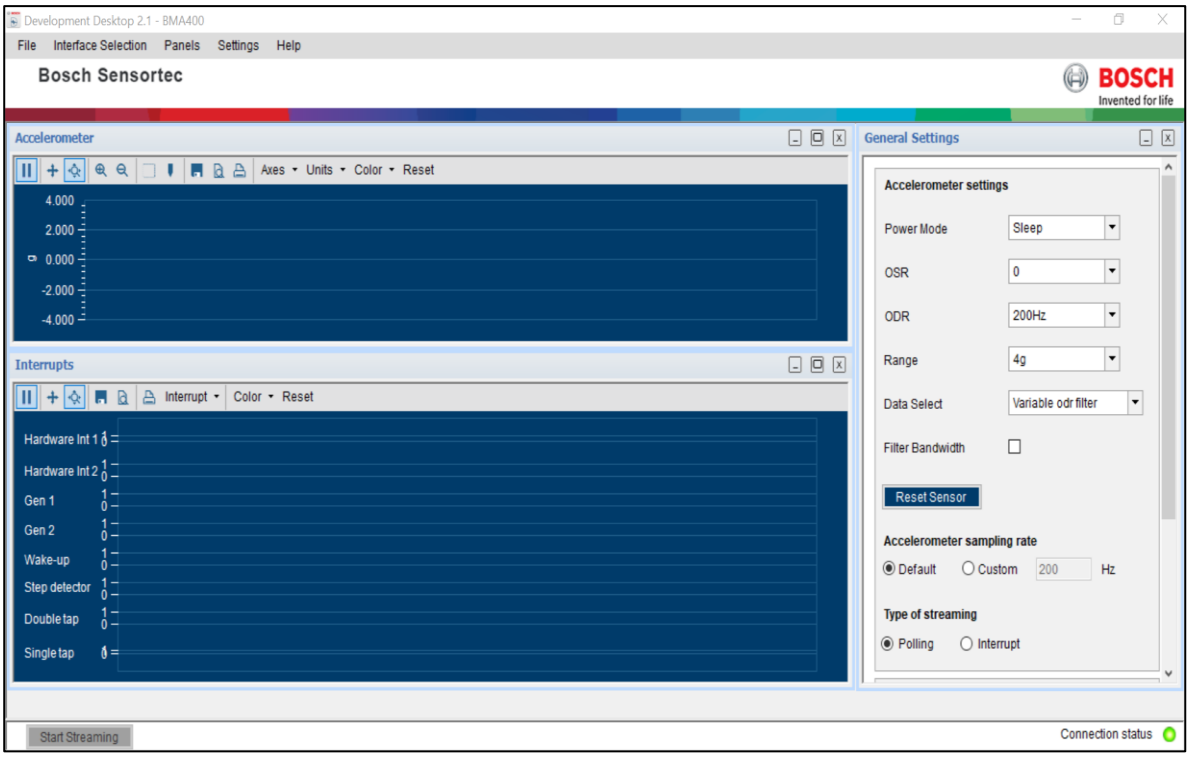


Figure 7 DD2.1 UI Startup View

When the PC and board are connected, the Communication Status glows green as shown below:

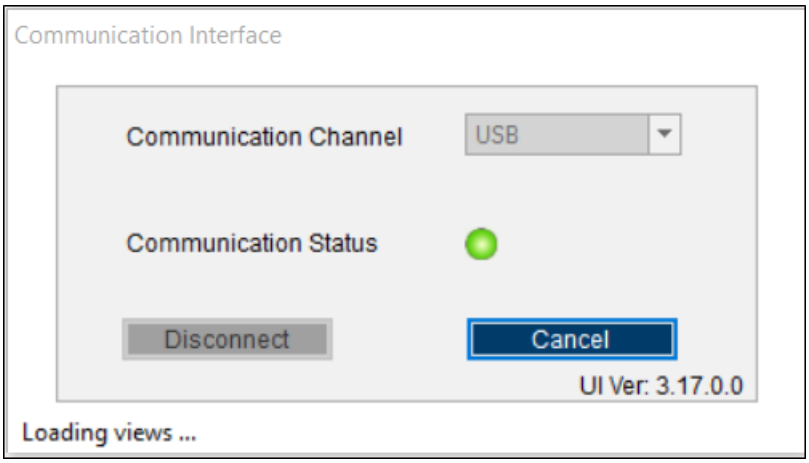
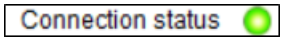


Figure 8 : Communication Status

The communication status is also indicated at the bottom right of the GUI at all times:



Other menu options include:

- File
- Interface Selection
- Panels

- Settings
- Help

These menu options are explained in detail in the following sections.

3.3 Upgrading Firmware

3.3.1 For App 2.0 Board:

To upgrade the firmware of DD2.1 UI to match the current version, follow the steps below:

1. Click **Menu -> Settings**-> **Firmware Upgrade.** The following window appears:

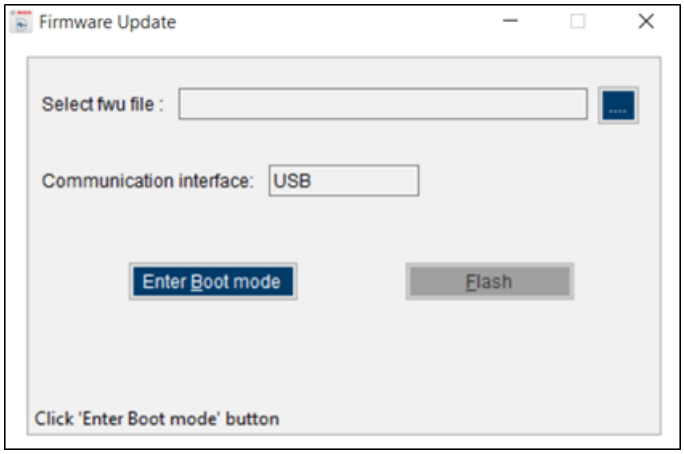


Figure 9 : Firmware upgrade window

2. Click **Enter Boot mode**.

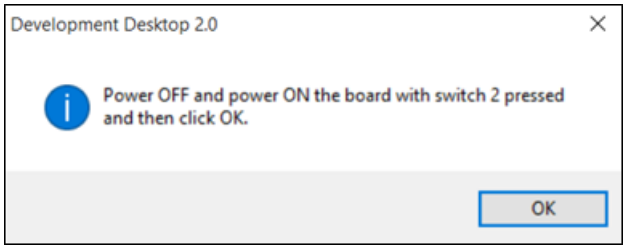


Figure 10 : Application Boot Loader

3. Switch off board, and press **Switch 2**.In Application board, all four LEDs will glow simultaneously.
4. Click **OK**.
5. All four LEDs will glow simultaneously.
6. Press **OK**.

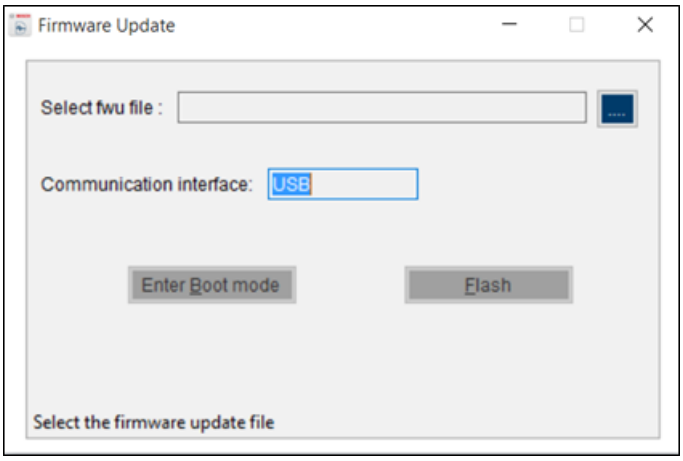


Figure 11 : Boot mode detected

7. Select the default firmware update file (**.fwu2*) from the DD2.1 UI installation directory in the folder **Firmware**.
8. Click **Flash.**

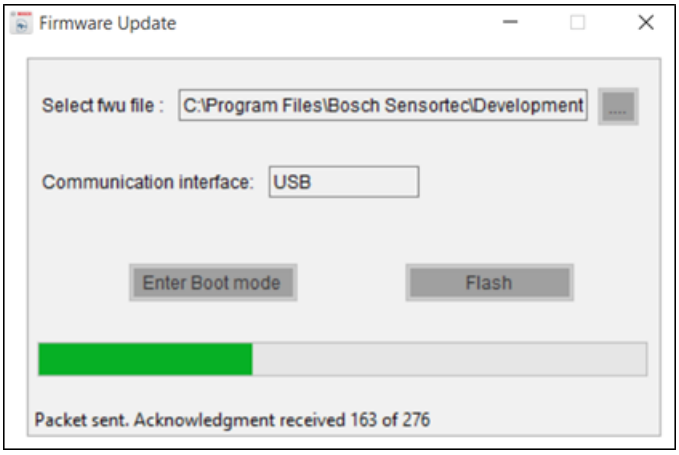


Figure 12 : Firmware upgrade completion

9. Once firmware upgrade is complete, restart the application board, and DD2.1 UI.

3.3.2 For App 3.0 Board:

To upgrade the firmware of DD2.1 UI to match the current version, follow the steps below:

10. Click **Menu -> Settings**-> **Firmware Upgrade.** The following window appears:

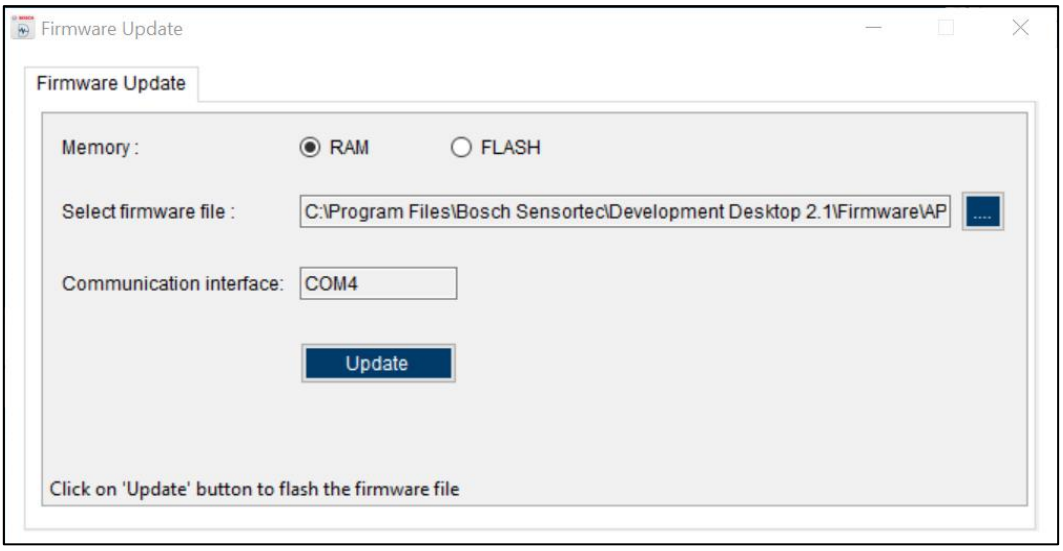


Figure 13 : Firmware upgrade window

Default firmware file (**.bin*) will be automatically chosen from the DD2.1 UI installation directory in the folder **Firmware\App3.0**.

11. Choose RAM or Memory option to flash the latest recommended firmware file.
12. The file path will get automatically chosen/selected in the select firmware file path textbox. User can also select the firmware as required.
13. Click on **Flash**.
14. DD2.1 recommended firmware is COINES_bridge firmware for App3.0 shuttle board. If the user chose to flash DD firmware, a popup message will be shown. User can still choose the DD firmware and proceed.

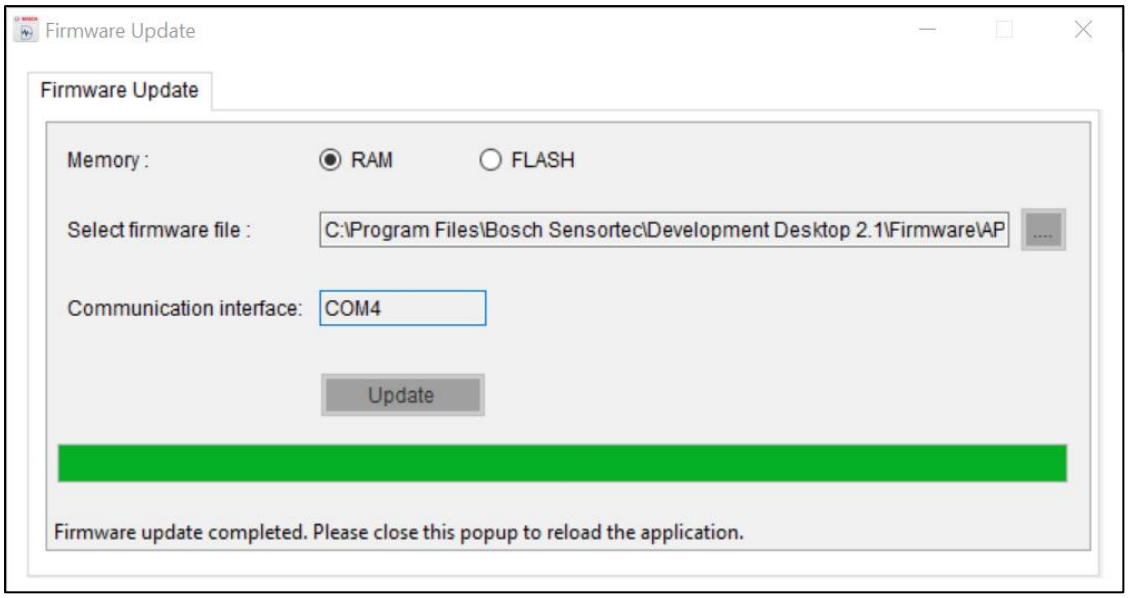


Figure 14 : Firmware upgrade completion

15. Once firmware update is completed, please close the popup and DD 2.1 application will get automatically reloaded.

4 Working with DD2.1 UI

The functions of BMA400 in DD2.1 UI are discussed in the below sections.

4.1 General Settings

The **General Settings** panel is present in the right side of the DD2.1 UI screen. The various general settings available in BMA400 are discussed through this document.

4.1.1 Accelerometer Settings

The accelerometer settings panel is as seen below:

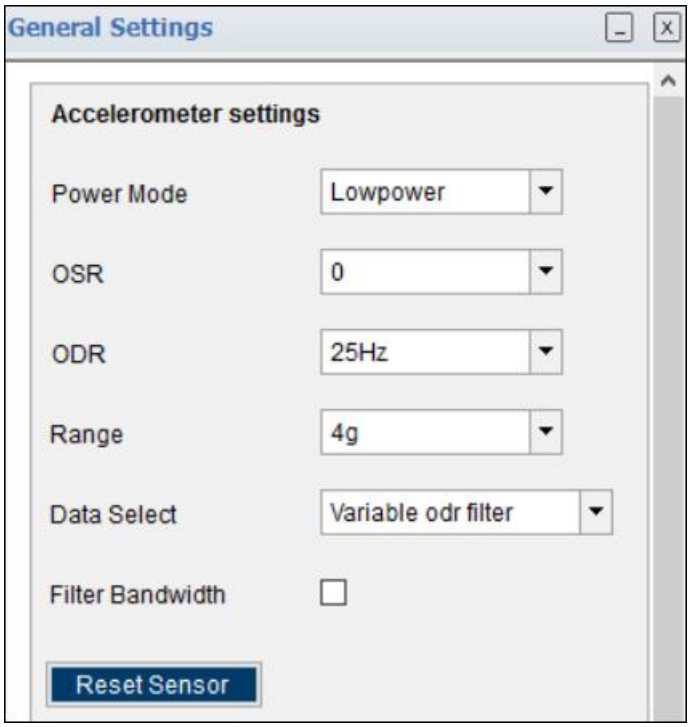


Figure 15 : Accelerometer settings

- Power Mode: To choose the operating mode for streaming, select the power mode from the drop-down list. The different power modes available are:
  - Sleep mode
  - Normal Mode
  - Lowpower Mode (to enable lesser power consumption)
- OSR: To choose the value to be written into the sensor, select the Over Sampling Rate (OSR) from the drop-down list. The different OSR values are:
  - 0
  - 1
  - 2
  - 3
- ODR: To choose the Output Data Rate (ODR), select the relevant values from the drop-down list.
  - In **Normal** power mode, the possible ODR values are:
    - 12.5 Hz
    - 25 Hz
    - 50 Hz
    - 100 Hz
    - 200 Hz
    - 400 Hz
    - 800 Hz
  - In **Lowpower** power modes, ODR is always 25 Hz.
- Range: To choose the g-range, select the relevant value from the drop-down list. In all power modes, the g-range values available are:
  - 2g
  - 4g
  - 8g
  - 16g
- Data select: To choose the ODR filter, elect the relevant value from the drop-down list.
- The different filters available in different modes are:

- Normal mode
  - Variable odr filter
  - Constant odr filter
  - Constant odr filter_Lp
- In Low power mode
  - Constant odr
- In all power modes, the **Data Select** values available are:
- Variable odr filter
- Constant odr filter
- Constant odr filter_Lp

- To enable **Filter Bandwidth,** select the relevant checkbox next to the option.
- To reset all values to its default state, click Reset Sensor

4.1.2 Accelerometer Sampling Rate

The sampling rate settings offered by DD2.1 UI for BMA400 are:

- Default: A pre- defined sampling rate value supported by the sensor.
- Custom: User-defined sampling rate value. Custom sampling rate can only be a value between 12.5 Hz and 2000 Hz.

Select relevant value by clicking the radio button next to the options as seen in below figure:

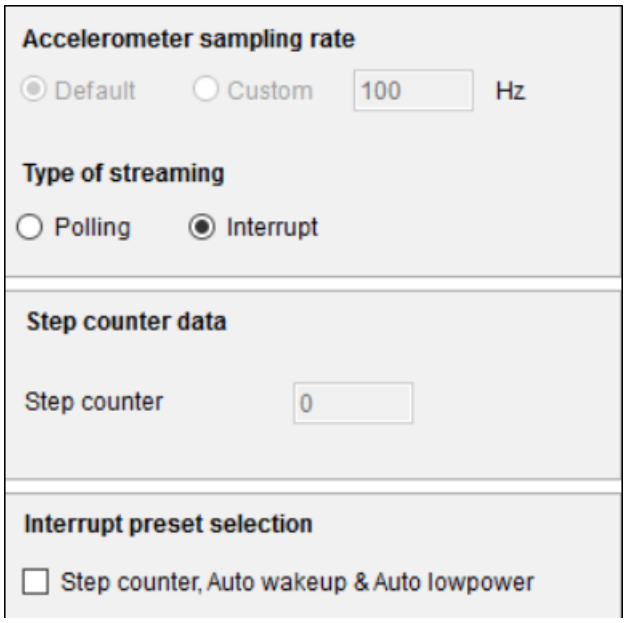


Figure 16 : Other general settings

Note when the DD2.1 UI is launched, sampling rate will at Default. When you wish to input a custom sampling rate, please enter the value next to the corresponding option.

4.1.3 Type of streaming

DD2.1 UI offers two kinds of data streaming for BMA400. They are:

- Polling: In **Polling**, data is polled/ streamed at periodic time intervals. These time intervals are defined by the sampling rate. .
- Interrupt: In **Interrupt**, data is streamed as and when data is ready. Hence, when type of streaming is set at **Interrupt, Accelerometer Sampling Rate** is automatically disabled.

Select relevant value by clicking the radio button next to the options.

4.1.4 Step Counter Data

Step counter data is the accumulated value measured by the Step detector during streaming. The data is automatically updated during streaming in the box next to **Step counter**.

4.1.5 Interrupt preset selection

- **Interrupt preset selection** is used to select a pre-defined set of parameters for interrupt generation.
- To select the option, check the checkbox next to the option name. The two available options are:
  - Step counter, Auto wakeup, & Auto Lowpower
  - Orientation & Tap
- When the appropriate checkboxes are checked, the corresponding interrupts and their trigger settings are automatically enabled.

Refer Interrupt View for more information on generation of interrupts.

Note: When Interrupt preset is selected, the type of streaming automatically switches to **interrupt**.

4.2 Interface Selection

Interface Selection has two menu options as seen:

4.2.1 Board Communication

- To check communication between board and DD2.1 UI, go to **Menu -> Interface Selection -> Board Communication**, or click **Ctrl+Shift+B.**
- If the board and application are connected, **Communication Status** will be green as seen:

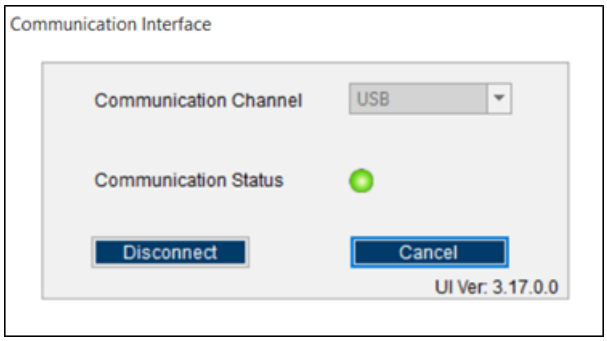


Figure 17 : Communication status green

- Click **Disconnect** to break the communication.
- Click **Cancel** to exit the window.
- If the board and application are not connected, the **Communication Status** will be red as seen:

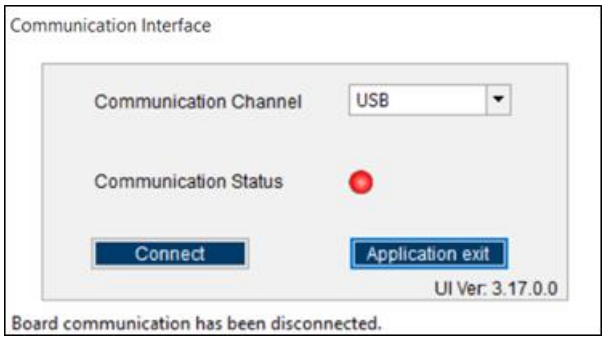


Figure 18 : Communication status red

- Click **Connect** to establish connection
- Click **Application exit** to close DD2.1 UI.

4.2.2 Sensor Interface

- To select between the two available interfaces (SPI and I^2C), go to **Menu -> Interface Selection -> Sensor Interface**, or click **Ctrl+Shift+I.** The following window appears:

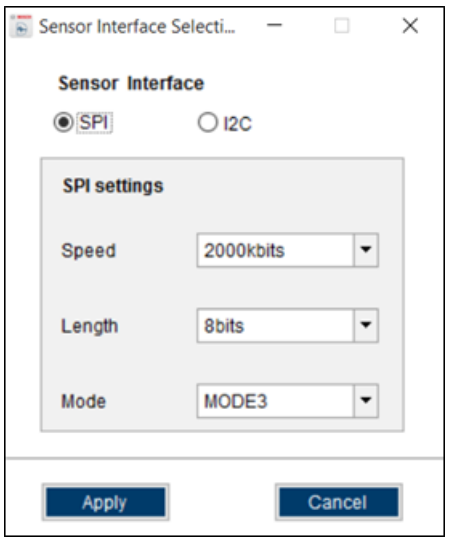


Figure 19 : SPI interface settings

Note: By default, the sensor interface opens at SPI.

- Select the relevant **SPI Address. SPI speed and SPI Mode.**
- Click **Apply**.
- To select **I^2C,** click the appropriate radio button. The following window appears:

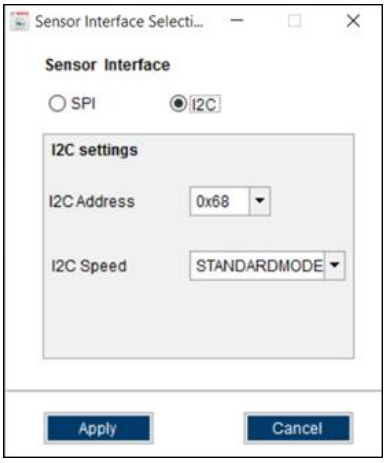


Figure 20 : Sensor Interface Settings

- Select the relevant **I²C Address** and **I²C speed.**
- Click **Apply**.

Note: Interface Selection is disabled when the sensor is streaming data.

4.3 Panels

To choose the panels for which you wish to view data, go to **Menu -> Panels.**
The different panels available for BMA400 are:

4.3.1 Accelerometer

- To view Accelerometer data streaming, go to **Menu -> Panels -> Accelerometer,** or click **Ctrl+A.**
- This panel plots real time sensor data from the accelerometer on the graph. The sensor data can be analyzed by using graph features like Play/Pause, view history, graph speed, Zoom In/Out, Zoom particular area in the graph, save, and print current instance.
- The accelerometer data is represented in following units:
  - LSB: Raw acceleration data read from sensors Data x, Data y and Data z registers.
  - m/s^2: Acceleration data from sensor converted to meter per second square.
  - g: Acceleration data from sensor.

4.3.2 Accel Interrupts

- To view the Interrupts plotter, **Menu -> Panels -> Accel Interrupts,** or click **Alt+A.**
- When an interrupt occurs, the changes can be seen in the interrupt plotter.

4.3.3 Memory Map

To view **Memory Map** options, go to **Menu -> Panels -> Memory Map**. A drop down- appears as seen below:

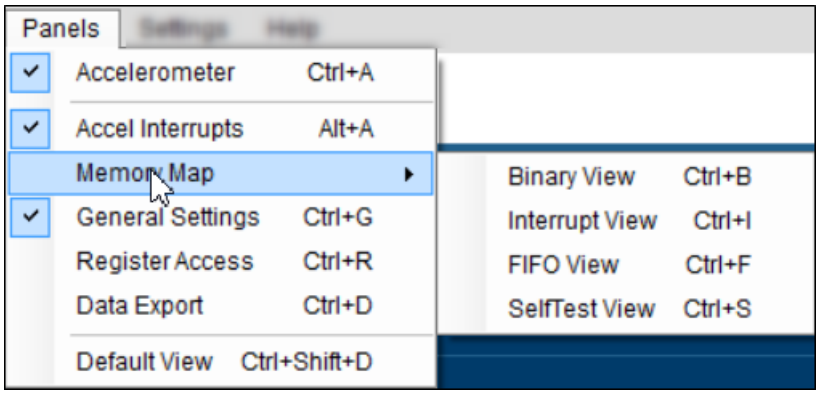


Figure 21 : Memory Map

The different options within **Memory Map** are described in the below sections:

Binary View

To view the data in binary format, go to **Menu -> Panels -> Memory Map -> Binary View**, or click **Ctrl+B**. The following window appears:

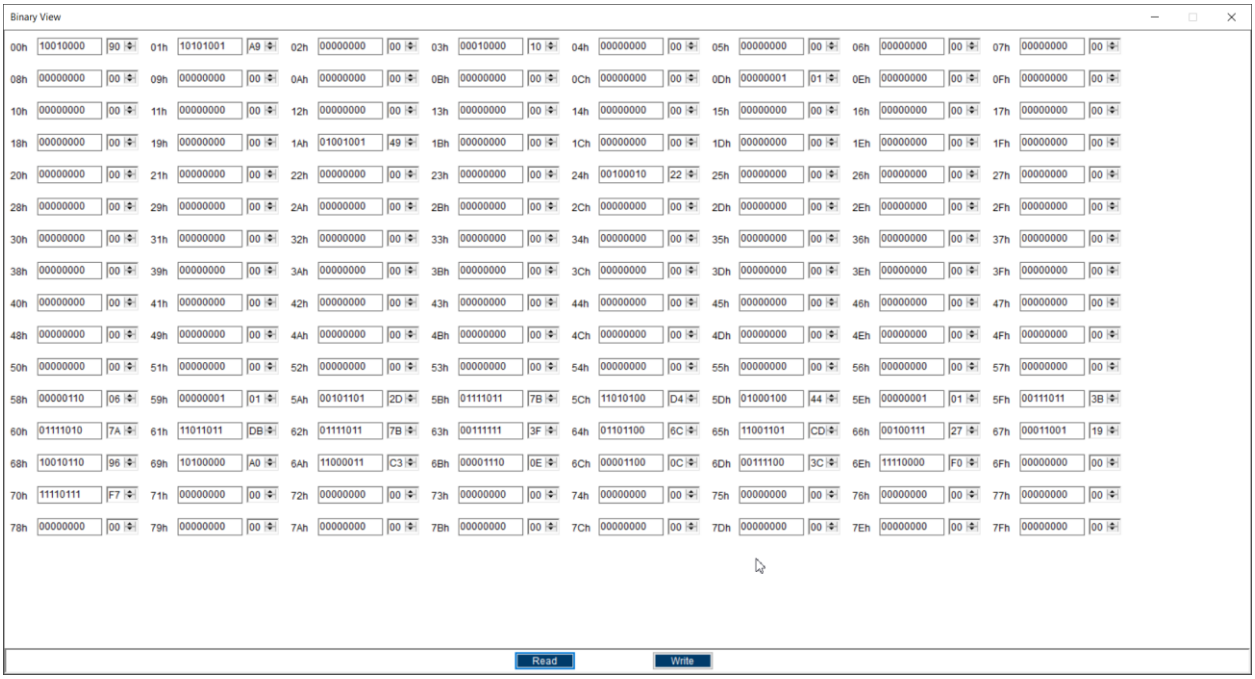


Figure 22 : Binary View

Binary View is used to read or write values into multiple registers in one view. To implement this, follow the below steps:

- Enter the value in the box alongside the register name.
- As per requirement, click **Read/Write**.

Interrupt View

To configure and map interrupts for BMA400 in DD2.1 UI, go to **Menu -> Panels -> Memory Map -> Interrupt View**, or click **Ctrl+I.** The different tabs within Interrupt view are discussed in the below sections.

Interrupt Mapping:

- The different interrupts that can be configured within **Interrupt View** are:
  - Wakeup interrupts
  - Generic interrupts
  - Activity interrupts
  - Tap interrupts
  - Orientation interrupt
- Once the interrupts are configured, they are mapped in the **Interrupt mapping.**
- The **Interrupt mapping** window is as seen below:

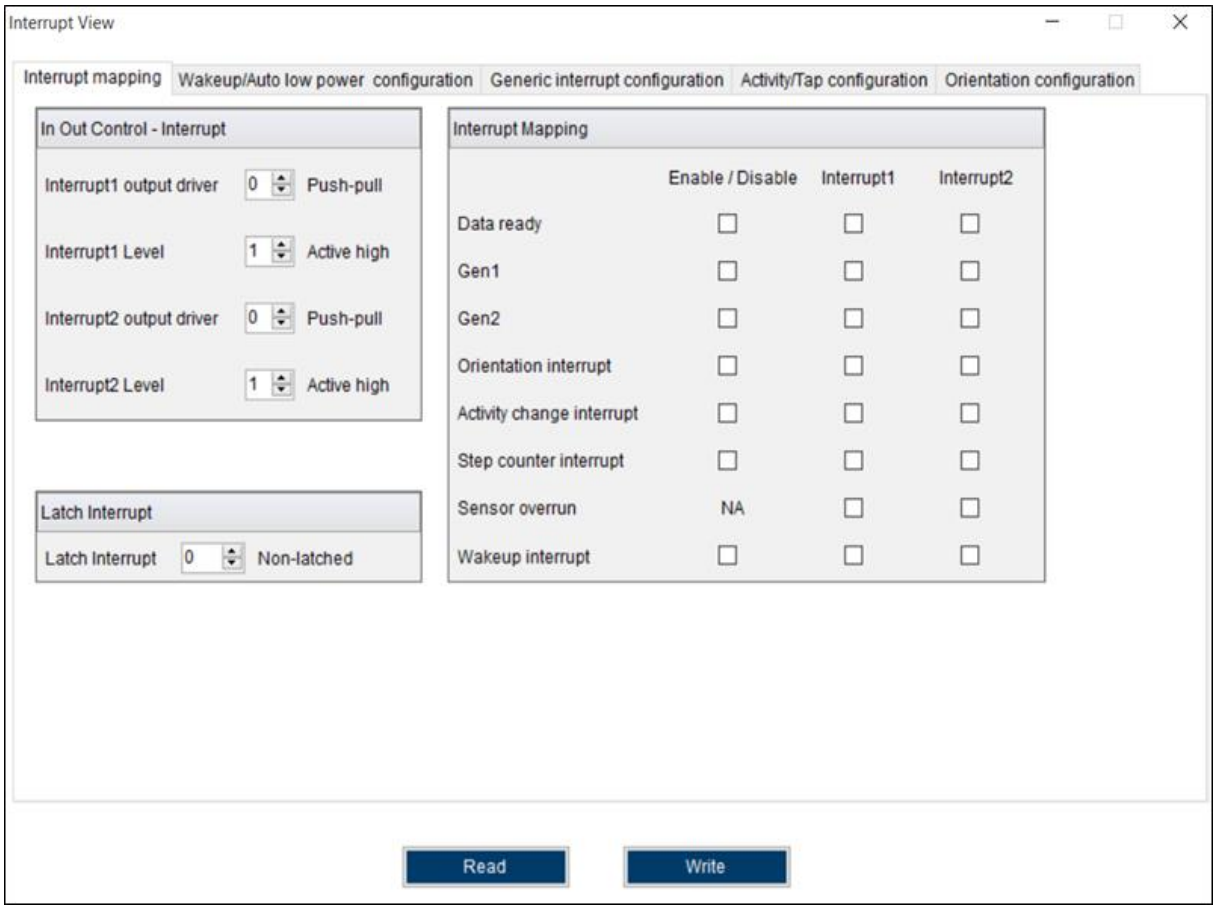


Figure 23 : Interrupt mapping

To map an interrupt, follow the below steps:

- In **Interrupt Mapping**, enable the interrupt that has been configured.
- Select the interrupt for which you wish to see the plots. (It can be either Interrupt 1, Interrupt 2, or both)
- Click **Write**.

Wakeup/ Auto Lowpower Configuration

- **Wakeup/ Auto Lowpower Configuration** tab is used for the following:
  - Configure wakeup interrupts.
  - Configure auto wakeup from lowpower mode to normal mode.
  - Configure auto Lowpower Configuration

- **The Wakeup/ Auto Lowpower Configuration** window is as seen below:

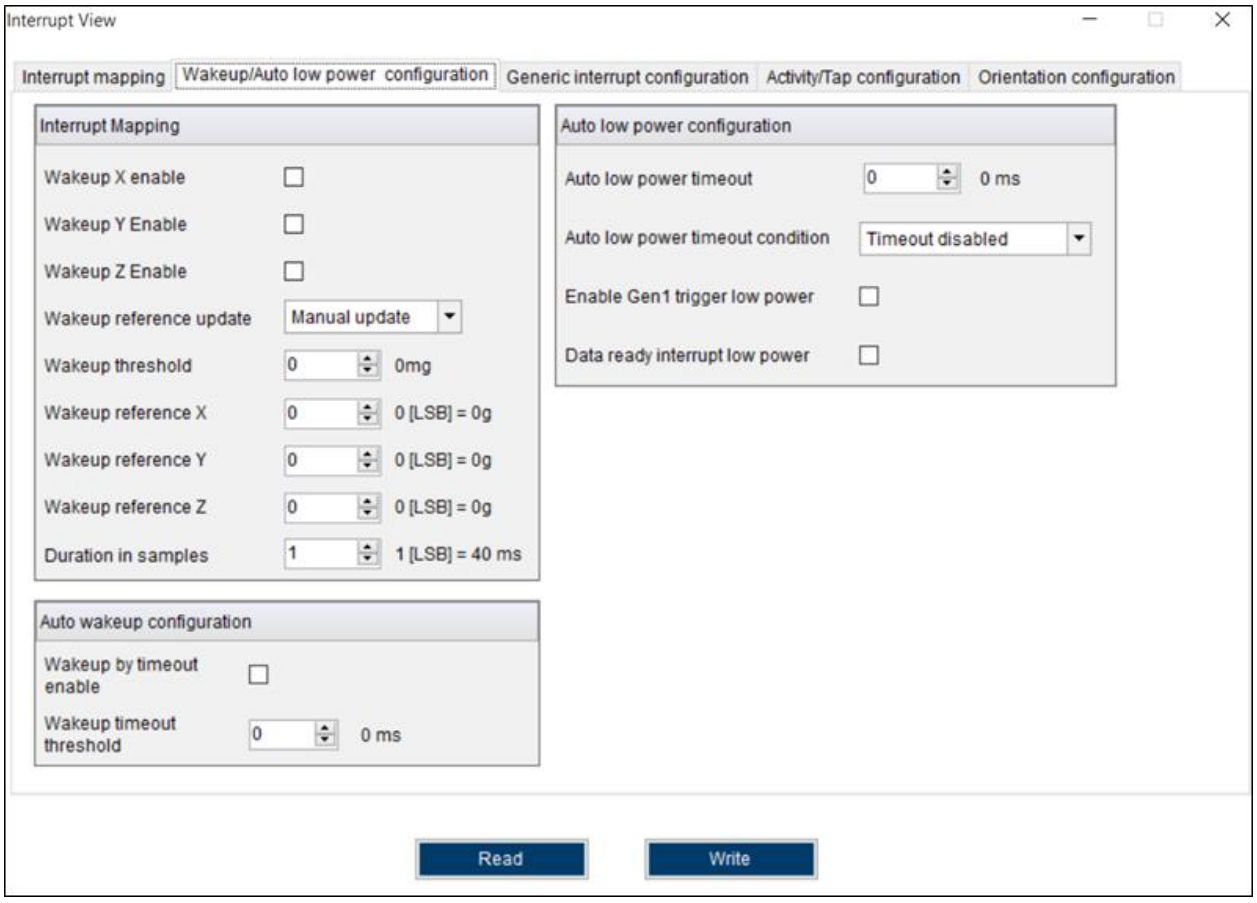


Figure 24 : Wake interrupt/Auto low power configuration

- To configure wakeup interrupt, follow the below steps:
    - Enable the Axes required by clicking the checkbox next to the option.
    - Set **Wakeup Threshold** value.
    - It can be set to a value between 0 and 255 LSB.
    - **Wakeup Threshold** will be set at 0 by default.
    - Set **Duration in samples**.
    - It can be set to a value between 1 and 8 LSB.
    - **Duration in samples** will be set at 1 LSB by default.

Note: Whenever an LSB value is set, it is automatically converted into mg and displayed next to the option name.

- To write the configuration of the interrupt into the sensor, click **Write**.
- Enable the interrupt and map it into the corresponding hardware interrupt lines in **Interrupt Mapping.**
- To view the interrupts in the Interrupt plotter, click **Start Streaming.**

Refer to Interrupt Mapping for more information.

- To configure **Autowakeup configuration**, follow the below steps:
    - Check the checkbox Wakeup by time out enable
    - Set the **Wakeup timeout threshold value**
    - It can be set to a value between 0 and 255 LSB.
    - **Wakeup timeout threshold** will be set at 0 by default.
    - Click **Write.**
    - Click **Start Streaming.**
- To configure **Auto Low power configuration,** follow the below steps:
    - **Set Auto low power timeout value.**
    - It can be set to a value between 0 and 10237.5 ms.
    - **Auto low power timeout** will be set at 0 by default.
    - Set **Auto low power timeout condition.**
    - Click **Write**.
    - Click **Start Streaming**.
- To view interrupts when Gen1 is enabled, follow the steps below:
    - Enable the checkbox **Enable Gen1 trigger low power**.
    - Click **Write**.
    - Set the power mode to **Normal**.
    - Set **ODR** value.
    - Set **OSR** value.
    - Click **Start Streaming**.
- To view interrupt every time power mode is **Lowpower,** follow the steps below:
    - Enable the checkbox **Data ready interrupt low power.**
    - Click **Write**.
    - Set the power mode to **Normal**.
    - Set **ODR** value.
    - Set **OSR** value.
    - Click **Start Streaming**.

Generic Interrupt Configuration

The **Generic interrupt configuration** tab is used to configure generic interrupts.

The tab is as seen below:

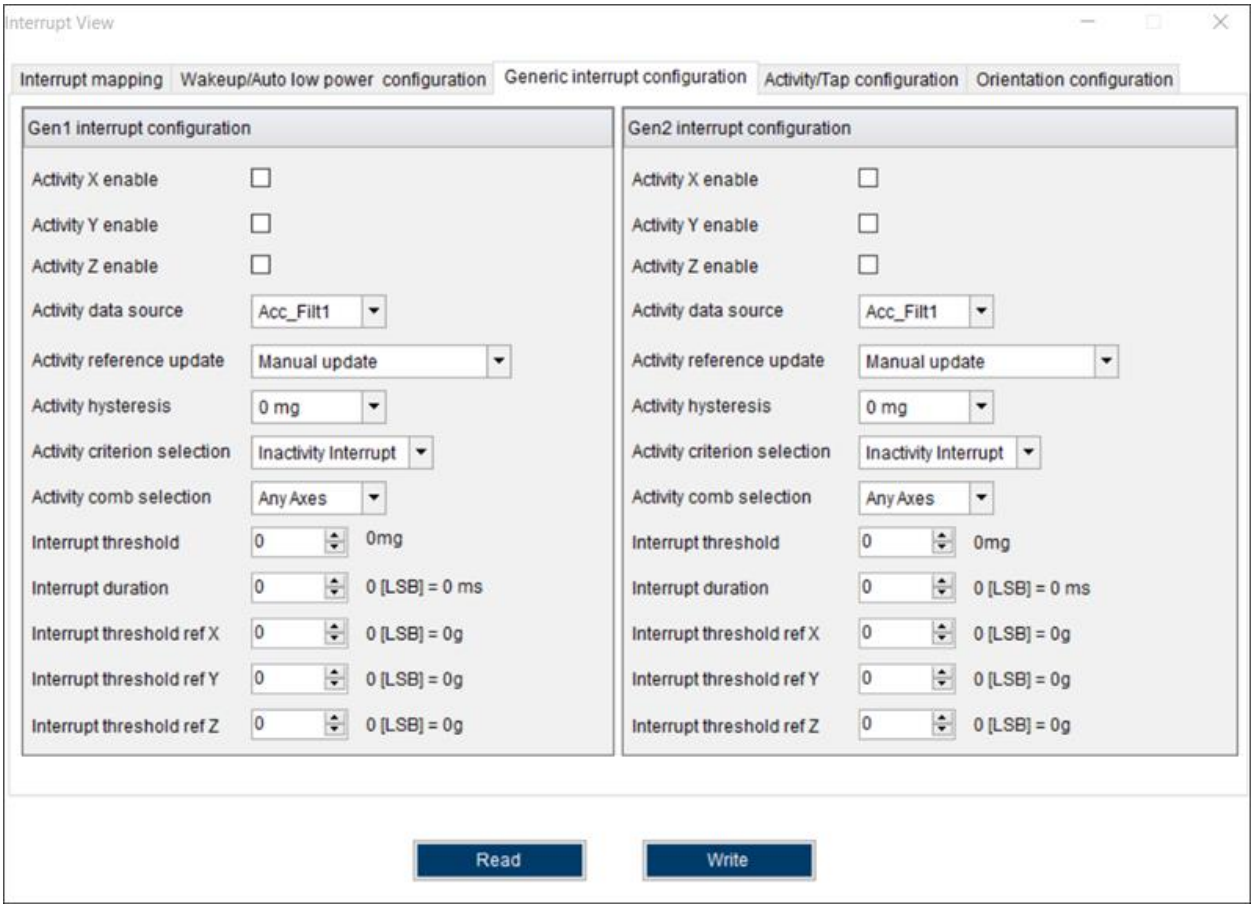


Figure 25 : Generic interrupt configuration

- To configure generic interrupts, follow the below steps:
  - Enable the axes required by clicking the checkbox next to the option.
  - Select the required **Activity data source**.
  - Select the required Activity reference update.
  - Select the required **Activity Hysteresis**.
  - Select the Activity Criterion Selection.
  - When **Activity**, the interrupt will be generated when there is sensor activity. This can be seen on the plotter when the value moves from 0 to 1.
  - When **Inactivity**, the interrupt will be generated when there is no sensor activity. This can be seen on the plotter when the value moves from 1 to 0.
- Set the Interrupt Threshold value
  - It can be set to a value between 0 and 255 LSB
  - **Interrupt Threshold** will be set at 0 by default.

Note: Whenever an LSB value is set, it is automatically converted into mg and displayed next to the option name.

- To write the configuration of the interrupt into the sensor, click **Write**.
- Enable the interrupt and map it into the corresponding hardware interrupt lines in **Interrupt Mapping.**
- Set power mode to **Normal**.
- To view the interrupts in the Interrupt plotter, click **Start Streaming.**

Refer to Interrupt Mapping for more information.

Note: Both Gen1 and Gen 2 can be configured at the same time to view both interrupts simultaneously.

Activity/ Tap Interrupt

The **Activity/ Tap interrupt configuration** tab is used to configure interrupts that are generated on activity around the sensor.

The tab is as seen below:

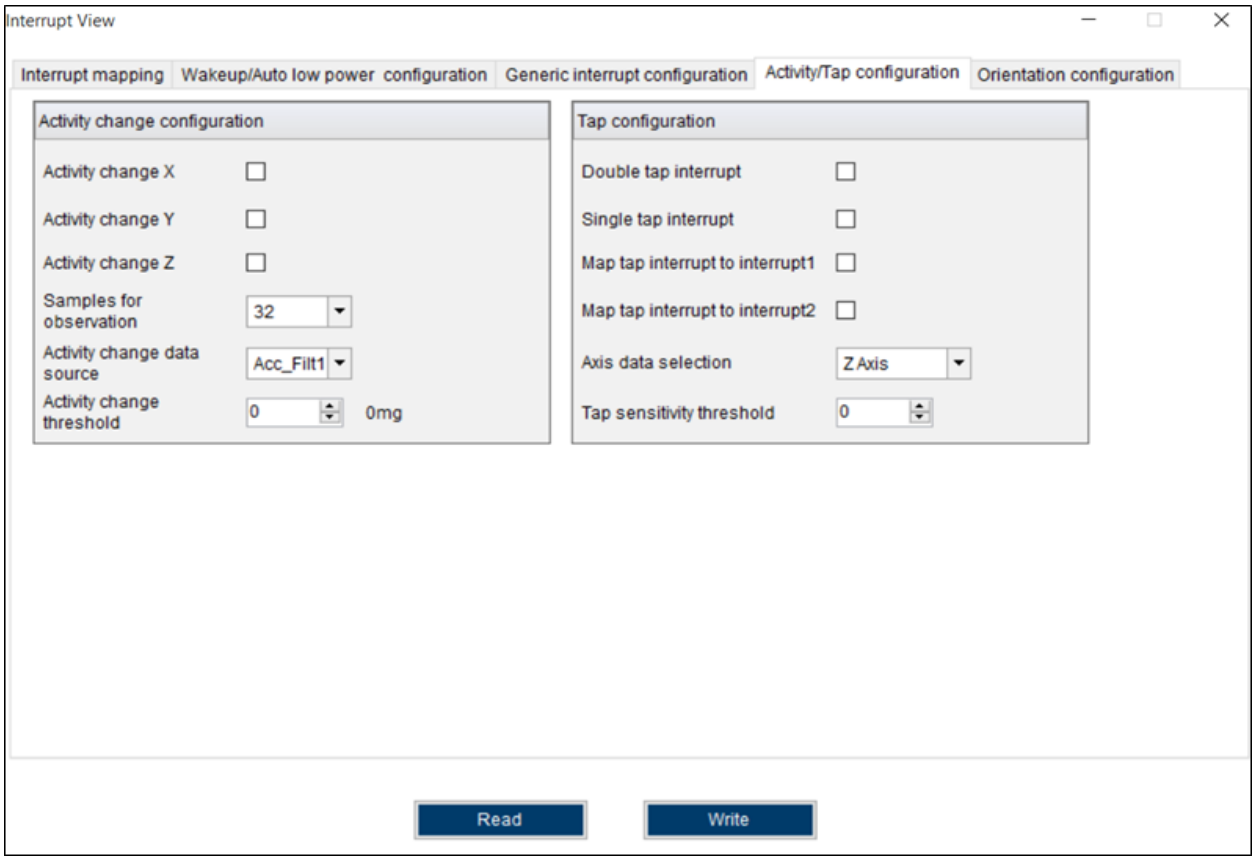


Figure 26 : Activity/ Tap interrupt configuration

To configure activity interrupts, follow the below steps:

- Enable the axes required by clicking the checkbox next to the option.
- Set the Activity change threshold value
- It can be set to a value between 0 and 255 LSB
- **Activity change threshold** will be set at 0 by default.

Note: Whenever an LSB value is set, it is automatically converted into mg and displayed next to the option name.

- To write the configuration of the interrupt into the sensor, click **Write**.
- Enable the interrupt and map it into the corresponding hardware interrupt lines in **Interrupt Mapping.**
- To view the interrupts in the Interrupt plotter, click **Start Streaming.**

Refer to Interrupt Mapping for more information.

- To configure tap interrupts, follow the below steps:
  - Select whether to enable interrupts on single tap or double tap.
  - Select whether to map the interrupts to interrupt 1 or interrupt 2.
  - Select the axis from the drop-down list next to the option name.
  - To write the configuration of the interrupt into the sensor, click **Write**.
  - Enable the interrupt and map it into the corresponding hardware interrupt lines in **Interrupt Mapping.**
  - To view the interrupts in the Interrupt plotter, click **Start Streaming.**

Refer to Interrupt Mapping for more information.

Orientation Configuration

The **Orientation configuration** tab is used to configure interrupts that are generated based on sensor orientation. The tab is as seen below:

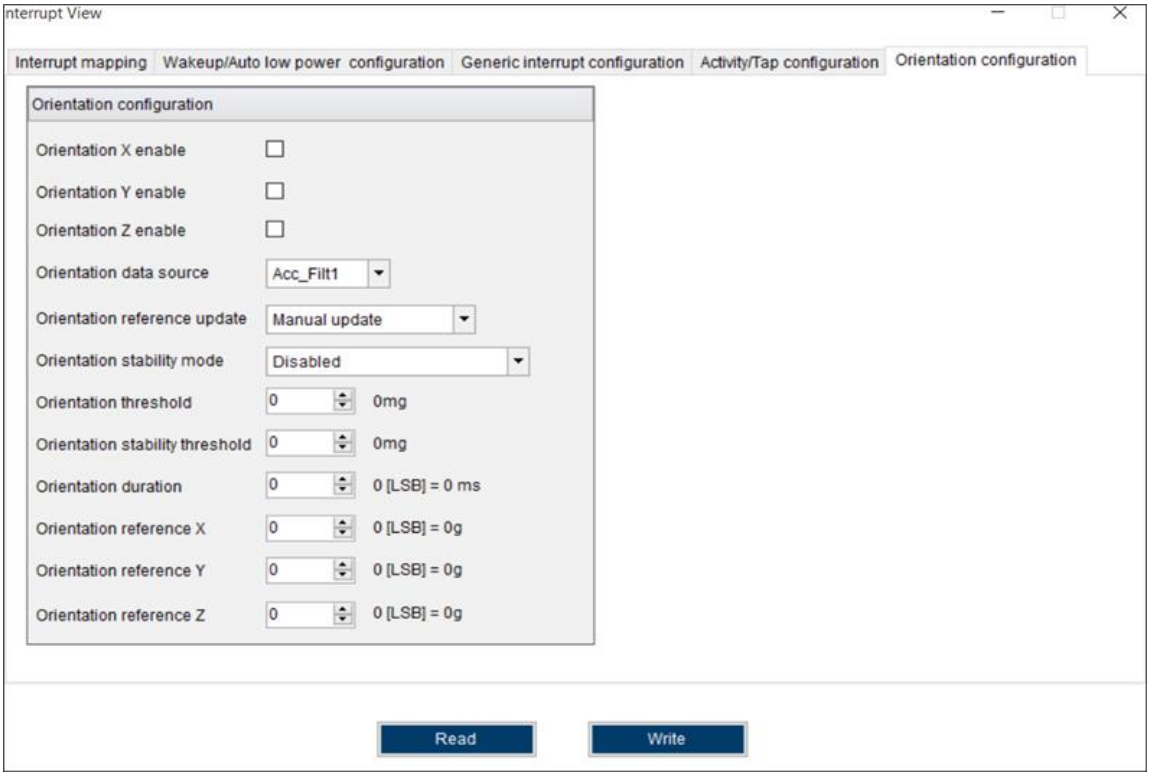


Figure 27 : Orientation configuration

- To configure orientation interrupts, follow the below steps:
  - Enable the axes required by clicking the checkbox next to the option.
  - Set the **Orientation data source** by using the drop-down list next to the option name.
  - Set the **Orientation reference update** by using the drop-down list next to the option name.
  - Enable the Orientation stability mode.
  - Set the Orientation threshold value
  - It can be set to a value between 0 and 255 LSB
  - **Orientation threshold** will be set at 0 by default.

Note: Whenever an LSB value is set, it is automatically converted into mg and displayed next to the option name.

- To write the configuration of the interrupt into the sensor, click **Write**.
- Enable the interrupt and map it into the corresponding hardware interrupt lines in **Interrupt Mapping.**
- To view the interrupts in the Interrupt plotter, click **Start Streaming.**

Refer to Interrupt Mapping for more information.

- To configure tap interrupts, follow the below steps:
  - Select whether to enable interrupts on single tap or double tap.
  - Select whether to map the interrupts to interrupt 1 or interrupt 2.
  - Select the axis from the drop-down list next to the option name.
  - To write the configuration of the interrupt into the sensor, click **Write**.
  - Enable the interrupt and map it into the corresponding hardware interrupt lines in **Interrupt Mapping.**
  - To view the interrupts in the Interrupt plotter, click **Start Streaming.**

Refer to Interrupt Mapping for more information.

FIFO View

- To launch the FIFO view settings window, go to **Menu -> Panels -> Memory Map -> FIFO View,** or click **Ctrl+F**. The following window appears:

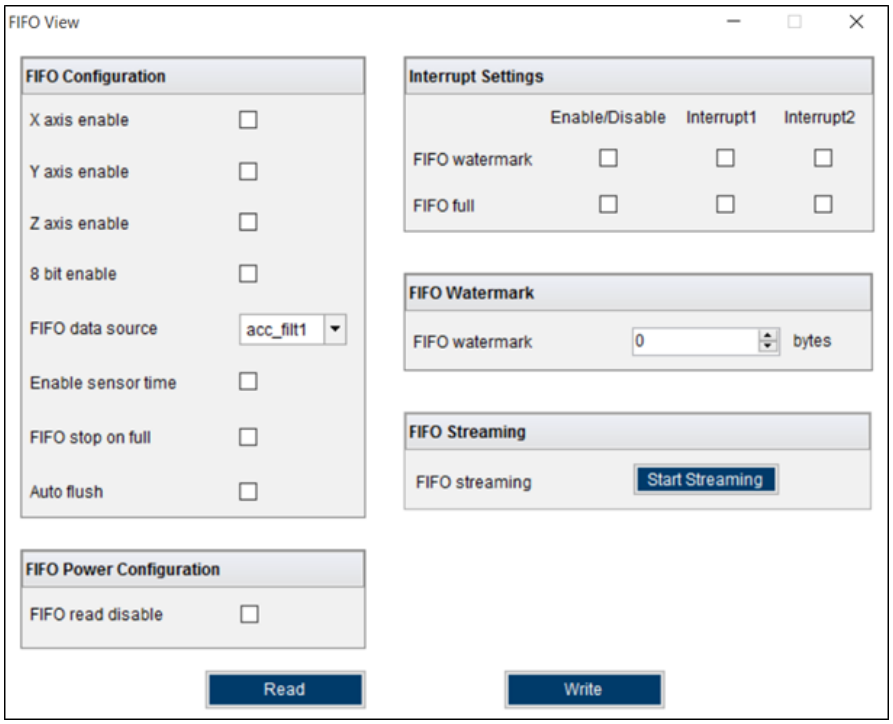


Figure 28 : FIFO View

To enable data streaming with **FIFO View**, follow the steps below:

- In **FIFO Configuration**, enable any one of the three axes. To do this, check the box next to the axis name.
- In **Interrupt Settings**, follow the below steps:
  - Enable **FIFO watermark.** To do this, check the box under Enable/ Disable.
  - Map the enabled **FIFO watermark** to **Interrupt 1.** To do this, check the box under **Interrupt 1**.
- In **FIFO Watermark**, set a positive non-zero watermark value.
  As per requirement, click **Read/Write**.

Self-Test View

- To conduct self-test of the three axes in **Accelerometer**, go to **Menu -> Panels -> Memory Map -> Self-Test View**, or click **Ctrl+S**. The following window appears:

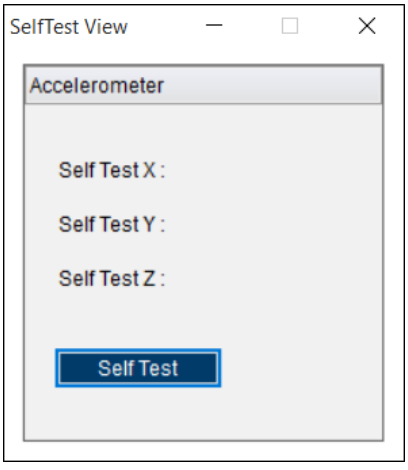


Figure 29 : Self-Test View

- Click **Self-Test.**
- The results of the self-test are displayed in the same window as seen below:

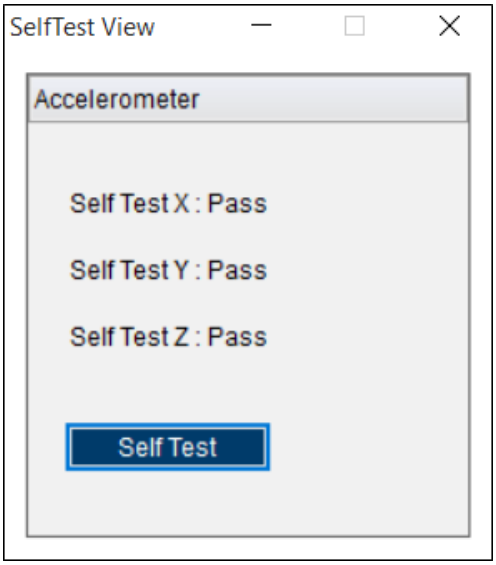


Figure 30 : Self-Text View results

4.3.4 General Settings

To view the General Settings window, go to **Menu -> Panels -> General Settings,** or click **Ctrl+G.**

4.3.5 Register Access

To go to Register Access, go to **Menu -> Panels -> Register Access**, or click **Ctrl+R.**
The following window appears:

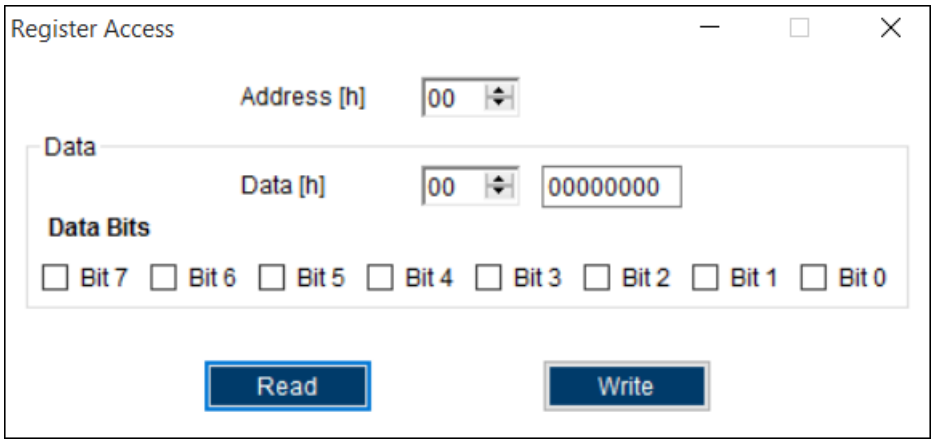


Figure 31 : Register Access

Register Access is used to read or write values into a register. To implement this, follow the below steps:

- Enter the register address in **Address [h]**.
- Enter the data you wish to read/ write in **Data [h]**.
- Select the data bits into which data has to be written, or read from.
- As per requirement, click **Read/Write**.

4.3.6 Data Export

- To save the output values plotted by DD2.1 UI, go to **Menu -> Panels -> Data Export**, or click **Ctrl+D.**
- By default, the data values are logged into a text (*.txt*) file in the destination folder of DD2.1 UI.

► The steps to follow data logging are as seen:

1. Go to **Menu -> Panels-> Data Export**, or click **Ctrl + D.**

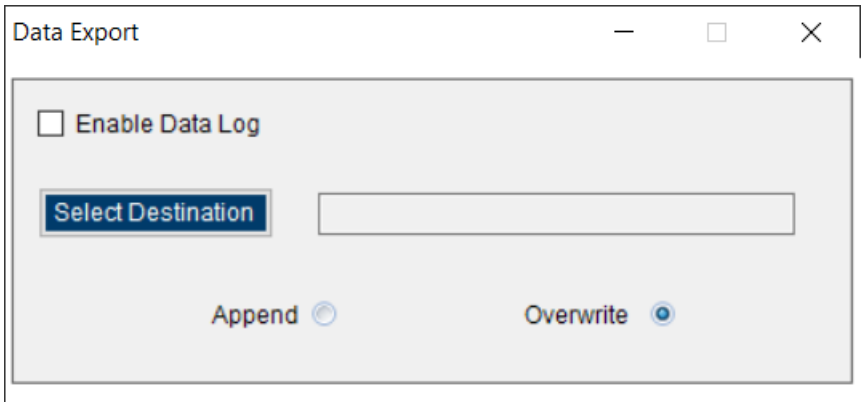


Figure 32 : Data Export

2. Click **Select Destination**, and select required destination folder.

Note: The data log will be stored in the destination folder selected by you.

3. To log new data into the selected file, click **Append.**
   Or
   To erase old data from the selected file and log new data in its place, click **Overwrite.**
4. Check **Enable Data log**.
5. Click **Start streaming** button to plot the sensor data in the plotter.

Click **Stop streaming** to end the plotting of the sensor data. The output of the sensor data is saved in the desired destination path.

4.3.7 Default View

► To view the **Default View,** go to **Menu -> Panels -> Default View,** or click **Ctrl+Shift+D.**

► In default view, the following panels will be visible:

- General Settings
- Accelerometer Panel
- Interrupt Panel

5 General Troubleshooting

Follow below guidelines while working with DD2.1 UI:

- Ensure that the shuttle board (with a valid sensor) is seated properly in the application board.
- Ensure that the PC-board connection is properly established.
- When switching on/ off DD2.1 UI, close and restart DD2.1 UI.
- Ensure that at least one channel is selected.

Follow these steps to check the USB connection:

1. Click **My Computer -> Manage** -> **Computer Management.**
2. Go to **System Tools** -> **Device Manager**.
3. Click on BST board and check for the USB connection.

Sometimes, data transfer between PC and application board does not work despite the USB device being properly enumerated in the Device Manager.
This could be because the application board is older or that the USB PID and VID have been used with that computer before. In this case, Windows is unable to install the required drivers automatically.
Follow these steps to check the USB connection:

1. Right-click on the USB-device corresponding to your application board (if you are not sure which device corresponds to your application Board, unplug all other USB devices like keyboard and mouse temporarily).

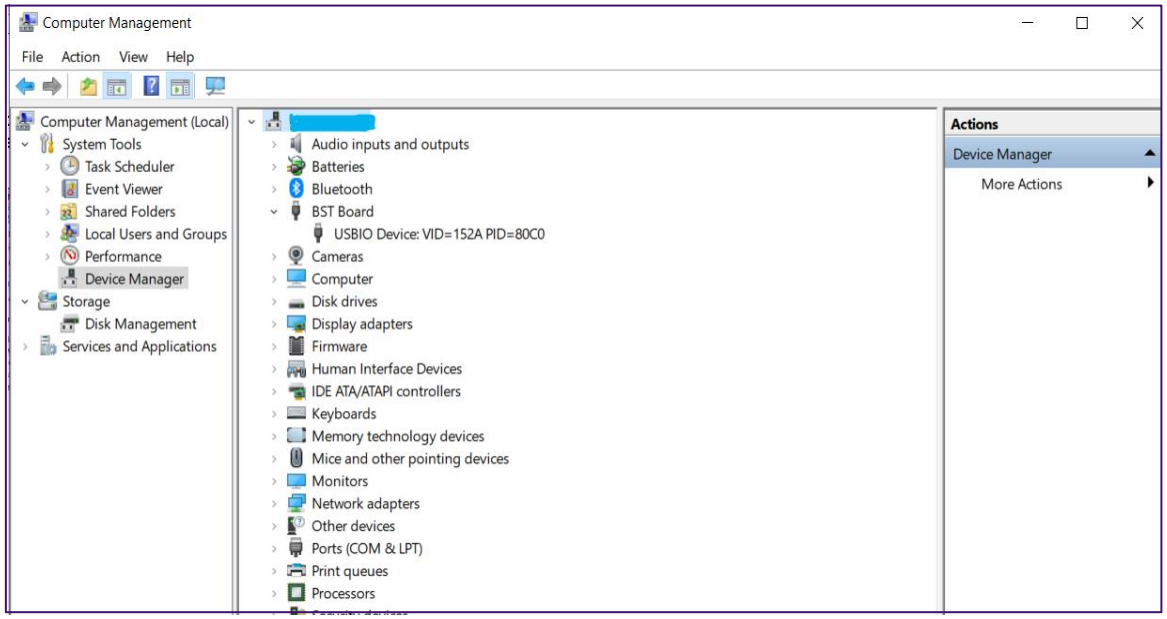


Figure 33 : Selecting USB device corresponding to application board

2. Click **Action** -> **Scan for hardware changes**. The new USB driver is installed automatically. Thereafter, the device communication will function properly.

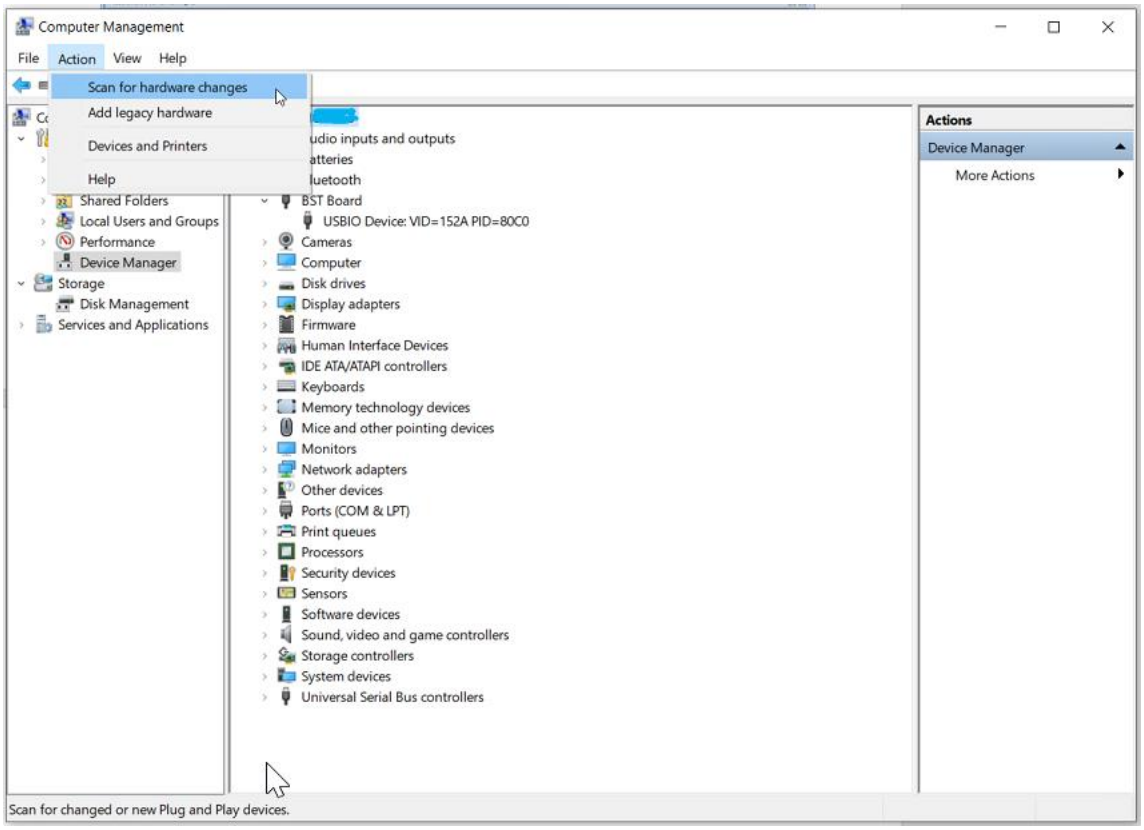


Figure 34 : USB driver installation

The following table lists some of the possible faults that you might encounter and the troubleshooting method.

Condition	Possible cause	Solution
If **Communication Status** remains grey red after checking the **Start** Button.	Application Board is turned off.	**Power on** the application Board and restart the DD2.1 UI application. If the board is powered by rechargeable battery, ensure that the battery is charged.
Unable to locate the data logged file.	Destination path not properly defined.	Locate the file in the setup path of Development Desktop**.**
Error message **Please connect application Board** is displayed.	Application Board is not connected properly.	Ensure that the PC is connected with the application Board properly. If the board is powered by rechargeable battery, ensure that the battery is charged.
Error message **Please connect Shuttle Board** is displayed.	Shuttle Board is not fixed properly.	Ensure that the Shuttle Board is correctly fixed in the Development Board.
Error message **Please select a path or file for logging** is displayed.	Destination path for saving the logged data is not defined.	Select the **Data Export** option in the file menu and specify the destination path.
Error message **Please select File from File Menu → Data Export option to proceed** is displayed.	Destination path not selected.	In the file menu, select the **Data Export** option and select the destination path.

Error message **Please Connect Valid Sensor** is displayed.	Wrong sensor fixed on the application Board.	Ensure that correct sensor is fixed on the application Board.
Graph for x, y, z channel not plotted.	Channel x, y, z not checked.	Ensure that x, y, z channels are checked.

6 Legal disclaimer

i. Engineering samples

Engineering Samples are marked with an asterisk (*) or (e). Samples may vary from the valid technical specifications of the product series contained in this data sheet. They are therefore not intended or fit for resale to third parties or for use in end products. Their sole purpose is internal client testing. The testing of an engineering sample may in no way replace the testing of a product series. Bosch Sensortec assumes no liability for the use of engineering samples. The Purchaser shall indemnify Bosch Sensortec from all claims arising from the use of engineering samples.

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iii. Application examples and hints

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7 Document history and modification

Rev. No	Chapter	Description of modification/changes	Date
1.0	BMA400 User Manual	Initial release	January 2019
1.1	BMA400 User Manual	Adopt New Format	August 2020
1.2	BMA400 User Manual	Updated DD application version	April 2023

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