

# Desktop Development 2.1 User manual

## Development Desktop 2.1 User Manual

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Notes Data and descriptions in this document are subject to change without notice. Product photos and pictures are for illustration purposes only and may differ from the real product appearance.

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# 1 About this user manual

This manual describes the installation and usage of the *Development Desktop 2.1* (DD2.1) User Interface; 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 for users who want to design and implement robust sensor functionality into their applications.

## 1.2 DD2.1 Overview

DD2.1 is a PC based software used to read, capture, and display sensor data. To display the sensor data of BMI090L on DD2.1, 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 automatically detects the sensor that has been plugged in and starts the corresponding software application.

## 1.3 Sensor Communication:

DD2.1 software supports both SPI and I<sup>2</sup>C 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 offers data logging of the sensor data

## 2 Development Desktop 2.1

### 2.1 Overview

The Bosch Sensortec Application/ Development board is a universal demonstration and development environment for Bosch Sensortec sensor products. Based on a powerful ARM7 microcontroller, the Application/ Development board is used to configure all sensor parameters using a PC based software. Sensor data can be read, displayed, and captured on the attached PC.

The Application/ Development board uses a flexible universal shuttle board concept. 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/Development board's shuttle board socket. The PC software automatically detects the sensor that has been plugged in and starts the corresponding software application.

Graphical display:

The *DD2.1* UI displays the sensor signals and interrupt signals in three different graphical formats.

Data logging:

The *DD2.1* offers data logging of the measured sensor and field strength signals.

Configuration of the sensor:

Sensor parameters is configured using the *DD2.1* Development Desktop.

For communication with the sensor, the *DD2.1* software supports both SPI and I<sup>2</sup>C.

### 2.2 Key Features

- Real time sensor signal monitoring
- Interface to Bosch Sensortec sensor shuttle boards
- USB 2.0 full speed interface
- RS 232 interface
- Bluetooth Interface (Application Board Only)
- Sensor data acquisition
- Sensor configuration and register access
- Interrupt configuration and monitoring
- Firmware upgrade via micro-SD/SDHC card, USB, UART
- On the fly change of SPI/I<sup>2</sup>C Interface of the sensors
- Windows 7, 8, 10 compatibles
- Installer supports 32- and 64-bit versions.

## 3 Installation

The procedure to install *DD2.1* is described in this section.

### 3.1 System requirements

- **Operating system:** Windows 10, Windows 8 and Windows 7(32/ 64 bit)
- **Required software:** Microsoft .NET Framework 4.0 or higher
- **Memory:** 1 GB
- **Processor:** 1 GHz or higher (Recommended)
- **Host controllers:** USB 2.0

### 3.2 Installing the software

Follow the steps below to install DD2.1:

1. Insert the software installation disc in the computer's CD/DVD drive.
2. Double-click the **DevelopmentDesktop20\_VX.X.exe** icon to install the files.
3. Follow the instructions on the screen. In **DevelopmentDesktop20\_VX.X**, XX is the current UI version.
4. Read the text in the introduction window and click **Next**

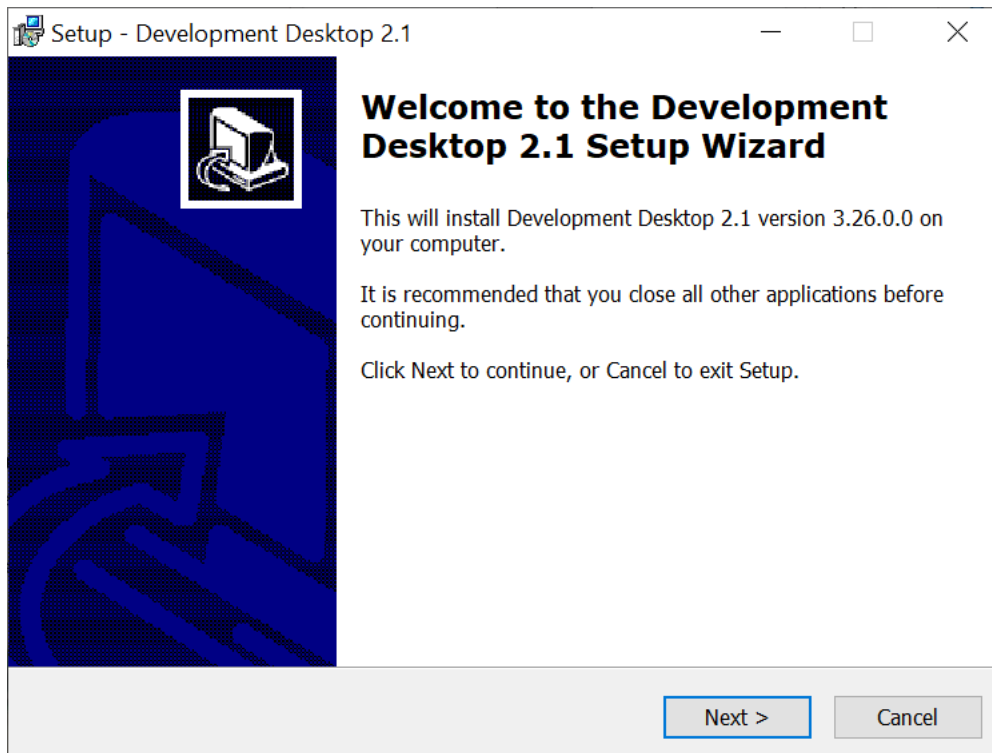


Figure 1. Installation setup window

5. The **License Agreement** dialog appears. If you agree with the Software Licence Agreement, then select **I accept the agreement.**
6. Click **Next**
7. By default, DD2.1 is installed in <C:\Program Files\Bosch Sensortec\Development Desktop 2.1>. Click **Browse** to change the destination directory.
8. Click **Next**.

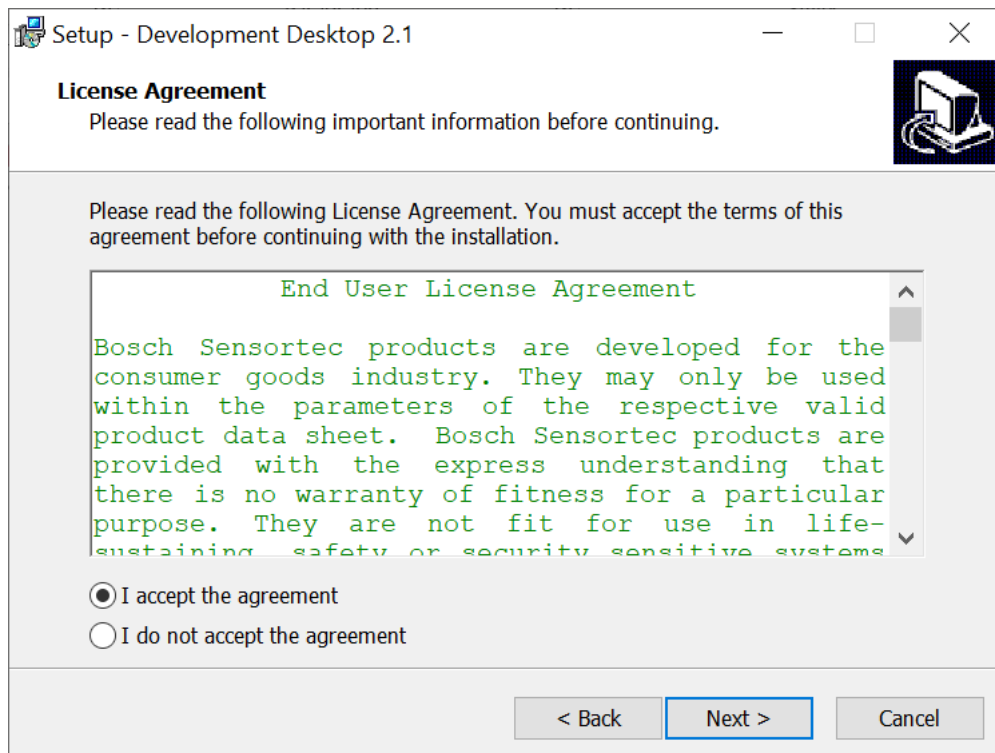


Figure 2. License agreement

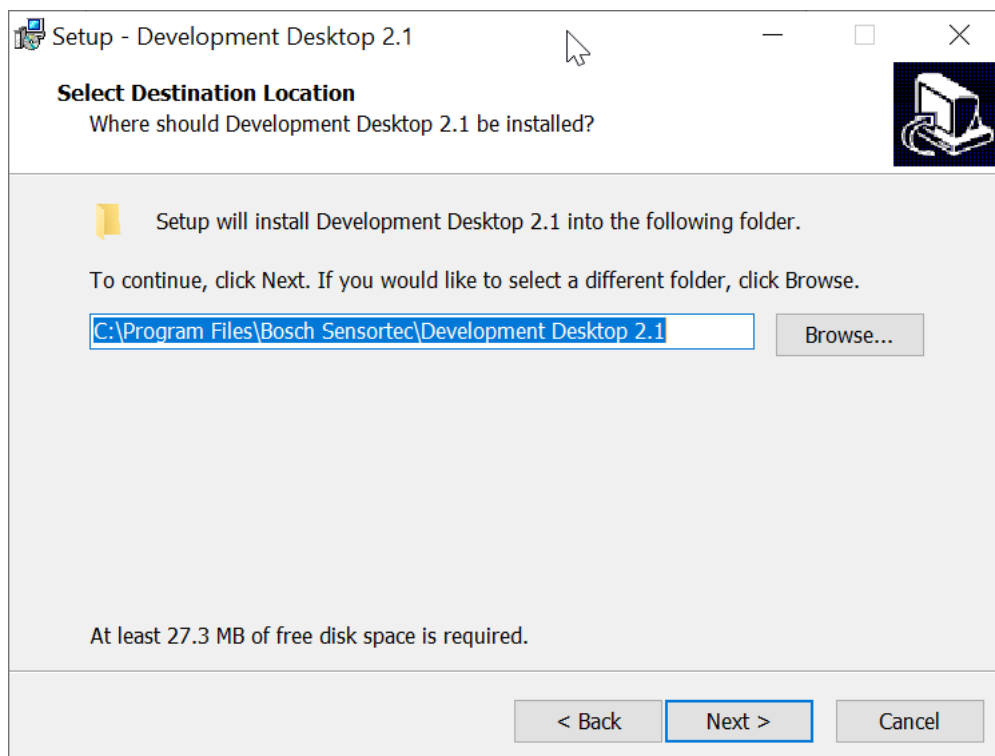


Figure 3. Select destination to save DD2.1 software

9. The **Select Components** dialog box appears. If the patch installer files are in current directory folder, the corresponding check box will be enabled and checked, else it will be disabled. If you do not want those files to be installed, just uncheck the corresponding checkbox.  
By default, **without help** is selected, if **with help** is needed, the corresponding file (Help File) needs to be placed in the current directory folder.



10. After selecting the check boxes of the required files, click Next.

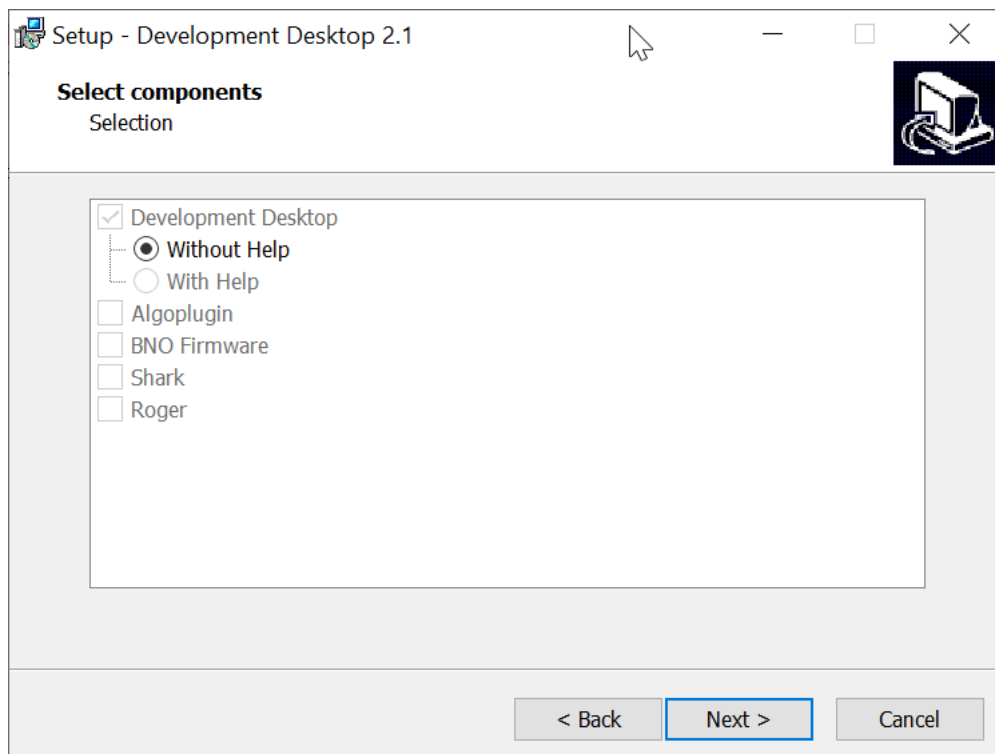


Figure 4. DD2.1 Setup

11. Select folder name, and click **Next**.

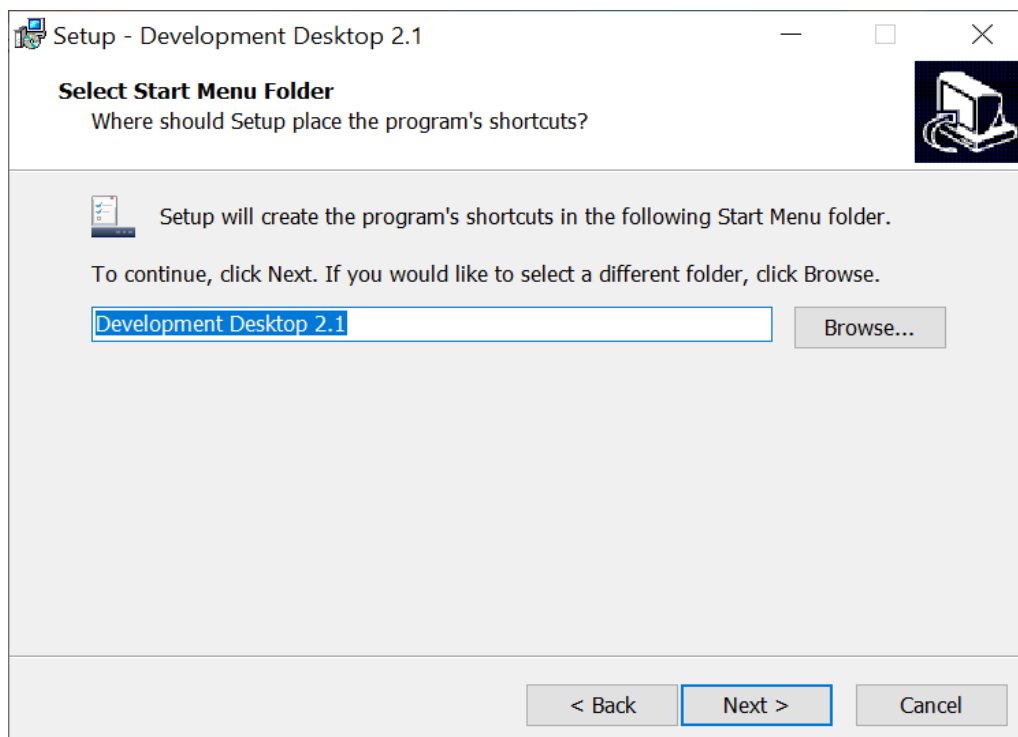


Figure 5. Select start menu folder

12. The **Ready to install** dialog box appears. Click **Install**

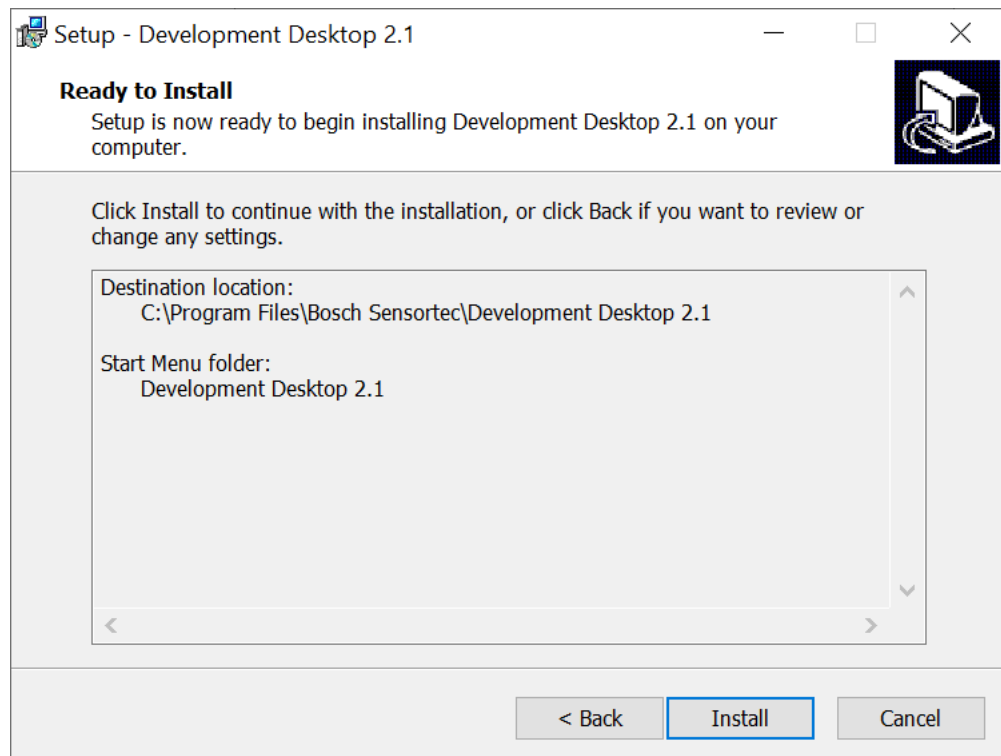


Figure 6. Confirm Installation

13. When the software installation is complete, the following information related to USB driver pops up. Click **Next**.

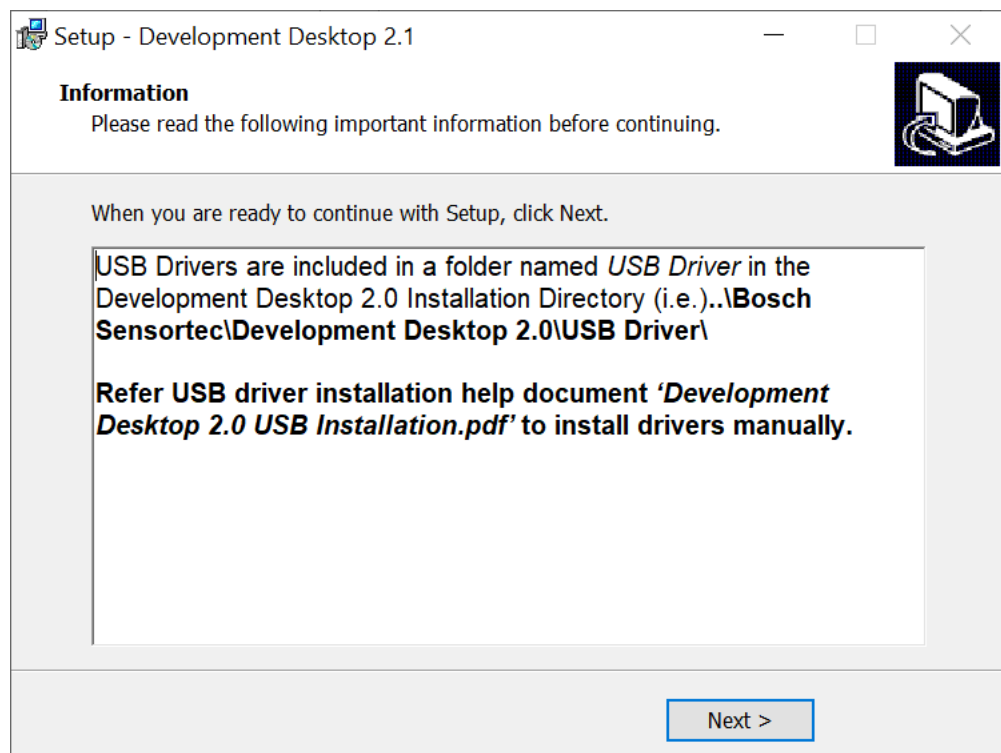


Figure 7. USB driver setup

14. After successful installation of DD2.1, click **Finish**

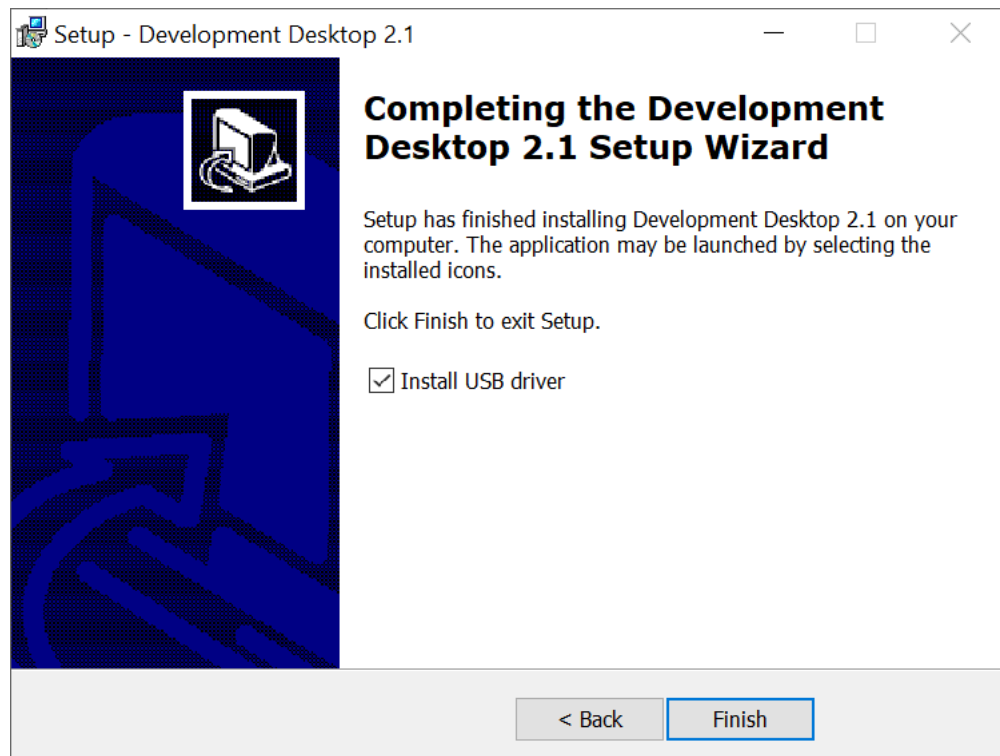


Figure 8. Installation completion window

### 3.3 Installing USB Drivers

For details on USB driver installation, refer to USB Driver Installation Guide under USB Driver folder in the Development Desktop 2.1 installation directory.

### 3.4 Uninstalling DD2.1

The uninstall program removes all the DD2.1 components from the system. This includes DD2.1 software files, directories, folders, and registry key items.

Execute the following procedure to uninstall the DD2.1 software:

1. Close DD2.1.
2. Click **Start > Development Desktop 2.1 > Uninstall Development Desktop 2.1**.
3. The uninstaller dialog box appears. Click **Yes**

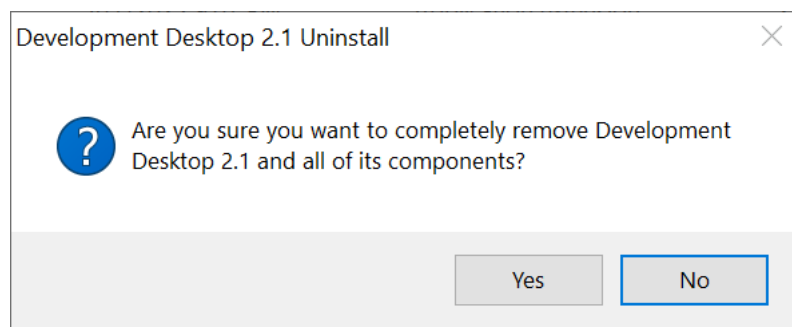


Figure 9. Uninstall DD2.1

## 4 Getting started

### 4.1 Setting up the Board-PC connection

Follow below procedure to connect board to the PC via USB.

1. Use the Installer to install DD2.1. Insert the shuttle board to the Application /Development Board.

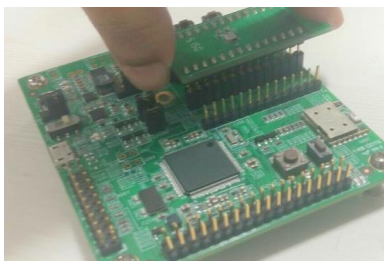


Figure 10. Insert sensor

2. Connect the board to the PC using the USB cable.

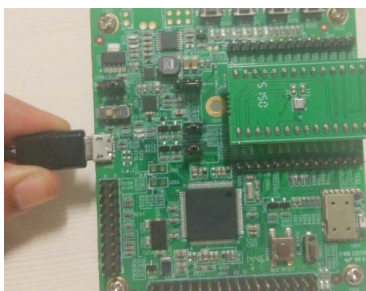


Figure 11. Connect board and PC

3. Switch on the board by turning the switch to ON. On the board, you can start DD2.1 once the LED glows green.

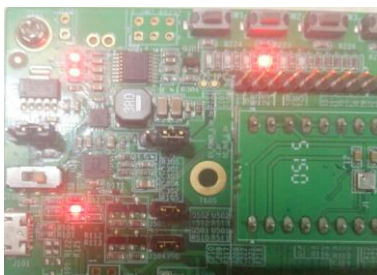


Figure 12. Connection complete

4. On the development board, the VDD setting should be as shown in the below image. Jumper J4 is connected to Ref and Jumper J3 is connected to 3.63 V.



Figure 13. VDD Setting

## 4.2 Start-up window

To start the DD2.1 software:

- Click **Start > Programs > Development Desktop 2.1**.

Or

- Double click the DD2.1 software icon  on the desktop.

The Graphical User Interface (GUI) appears as seen below. Based on the type of sensor connected, the default view is loaded

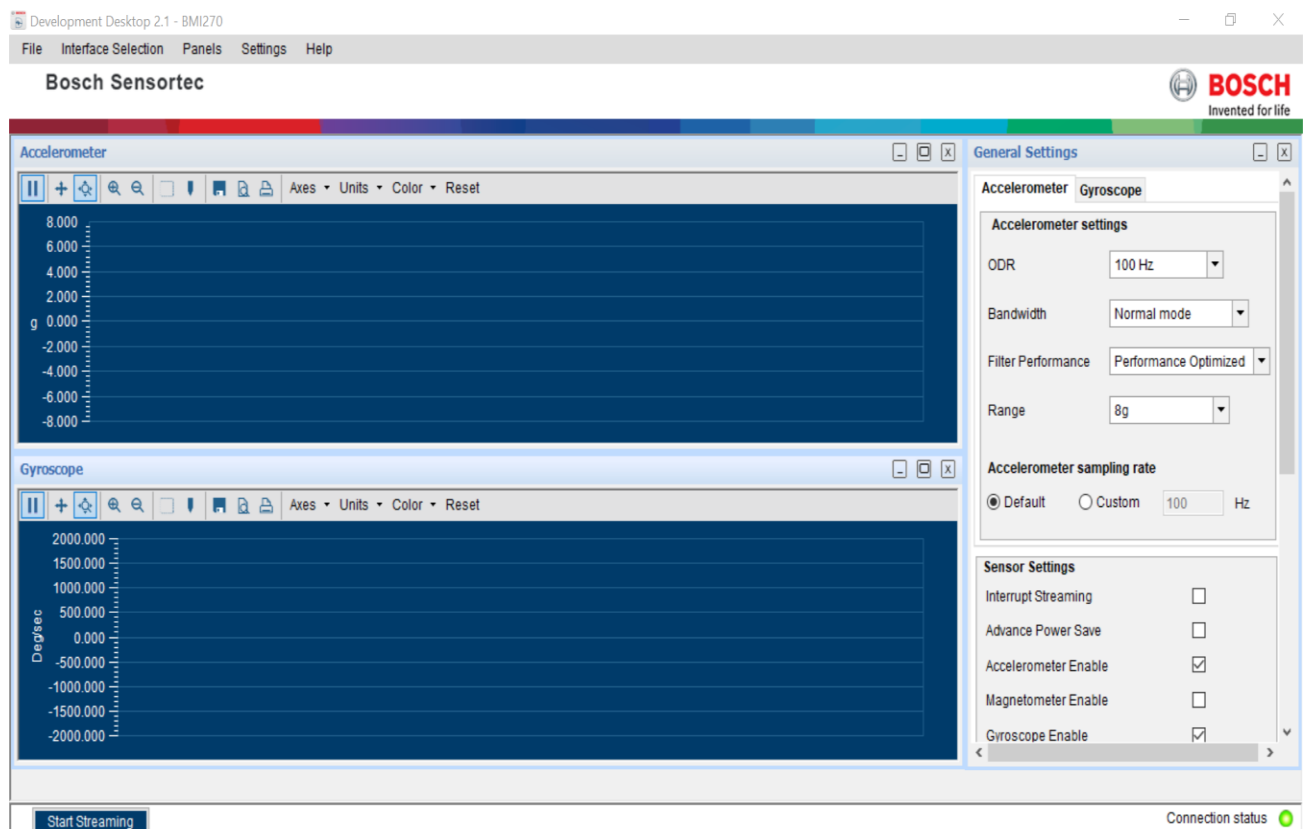


Figure 14. DD2.1 Graphical User Interface (GUI)

When the board and PC are connected, the status indicator glows green.

- To plot the sensor signals on the graph, click **Start**.
- To end plotting, click **Stop**.

## 5 Working with DD2.1

### 5.1 Checking the connection status of the board



When the Application/ Development Board is connected to the PC, Connection Status glows green. If there is any error, Connection Status will not glow.

**Note:**

If there is an error in connection, check the connection between Application/ Development board and PC again.

### 5.2 Changing the graph settings

This section describes the different graph settings options in the DD2.1.

#### 5.2.1 Selecting the data channel

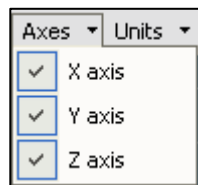


Figure 15. Selecting data channel

To select the signals (x, y and z) shown on the graph, perform **Channel Selection**. By default, all channels are displayed. To show or hide a channel, check or uncheck the respective checkbox.

#### 5.2.2 Selecting the sensor data representation unit

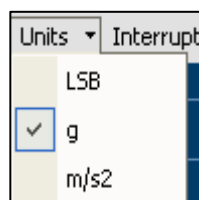


Figure 16. Selecting data representation unit.

Select any of the units for your sensor.

### 5.2.3 Selecting interrupt data

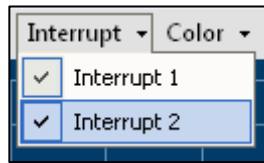


Figure 17. Selecting interrupt data

The sensor interrupt lines can be monitored on the data graph by enabling the respective interrupts from the interrupt menu on the graph.

### 5.2.4 Selecting color

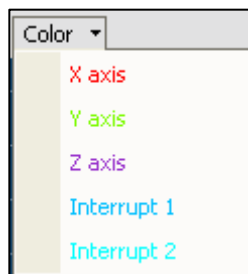


Figure 18. Selecting color

Different colours are used to distinguish between the three axes' signals in the plotted graph. These colors, along with background color of the graph can be modified using **Channel Selection**.

### 5.2.5 Graph Utilities

The graph utilities as seen below are used for enhanced user experience.

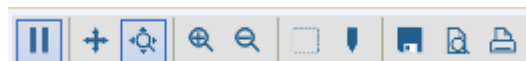


Figure 19. Graph Utilities

|  |  |
|--|--|
|  | Sensor data is paused. Click this button to start viewing the selected sensor data |
|  | Sensor data is plotted on the graph. Click this button to pause the sensor data    |
|  | Scroll the graph to view history   |
|  | Zoom in/out X-axis to control the speed of data plot                               |
|  | Zoom in  |
|  | Zoom out   |
|  | Zoom in a particular area of the graph   |
|  | View the X and Y values on the graph   |
|  | Save the current instance of the graph   |
|  | Print preview the current instance of the graph                                    |
|  | Print the current instance of the graph  |

## 5.2.6 Reset

It will reset the Graph Utilities and bring back the UI to its default settings.

## 5.3 Menus

The following menus are available in DD2.1.

### 5.3.1 File

The **File** menu includes the following options:

- **Save settings**

To save sensor configuration as a text file.

- **Load settings**

To load saved configuration from text file.

- **Exit**

To close Development Desktop 2.1.

## Interface selection

### 5.3.2.1 Board communication

You can choose the communication mode between the board and PC to establish a USB or COM interface. You can access the COM interface via a RS232 cable or through Bluetooth virtual COM connection.

Follow these steps to change the communication Interface:

1. Click **Interface Selection -> Board communication**. The Communication Interface dialog appears. Here, **Interface** displays the current mode of communication. If **Communication Status** is green, the connection is active.
2. Here, **Interface** displays the current mode of communication. If **Communication Status** is green, the connection is active.

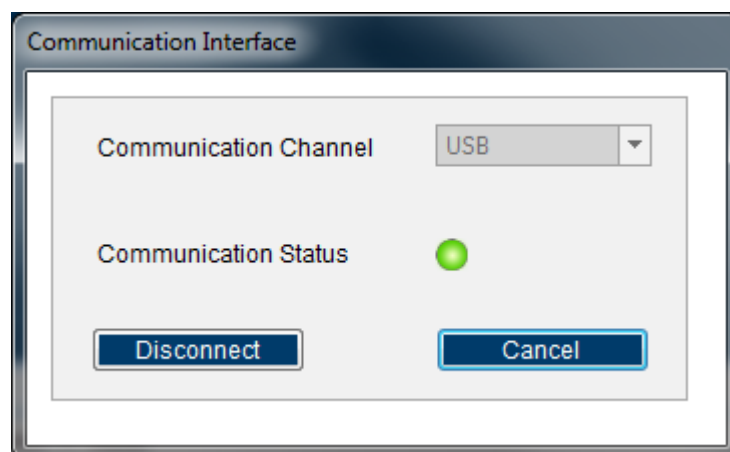


Figure 20. Communication Channel

3. To change the Interface, click **Disconnect**. **Communication Status** turns red. Click **Interface** to select the desired interface. **Communication Status** turns green implying that the connection has been established. If you select Bluetooth, you will be prompted to enter the 4-digit pass code. "0000".



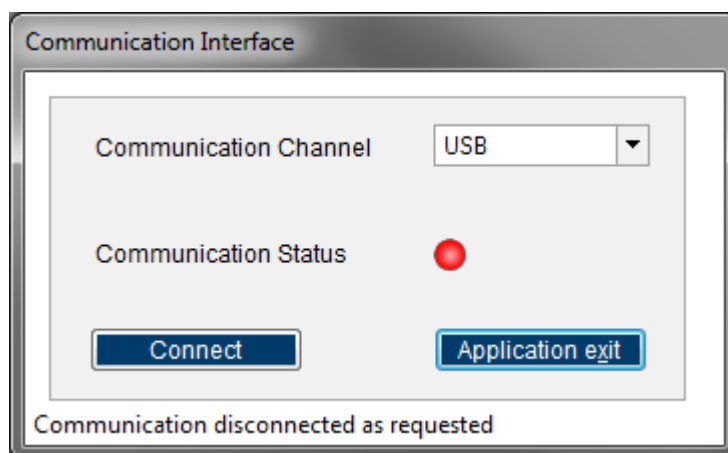


Figure 21. Communication status

### 5.3.2.2 Sensor Interface

This specifies the communication protocol for sensor interface. Bosch Sensortec provides SPI and I2C protocols to read or write data from sensor. The interfaces are completely configurable

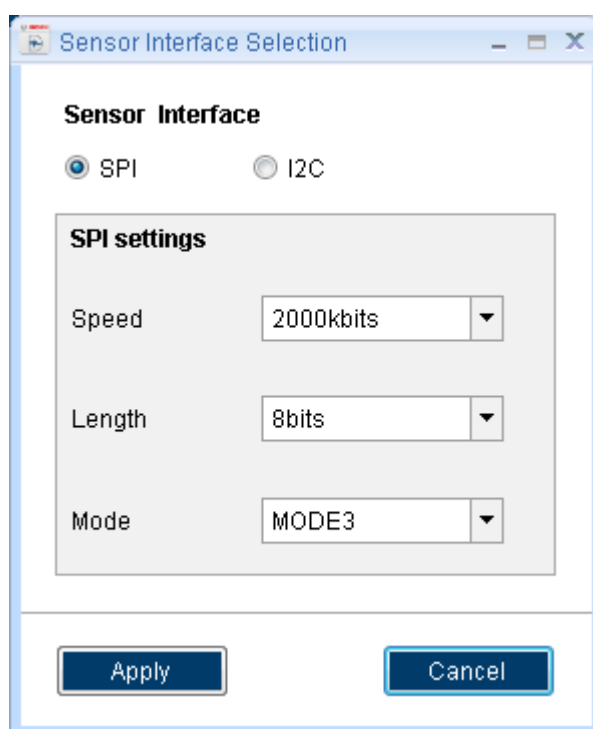


Figure 22. Sensor Interface Selection SPI

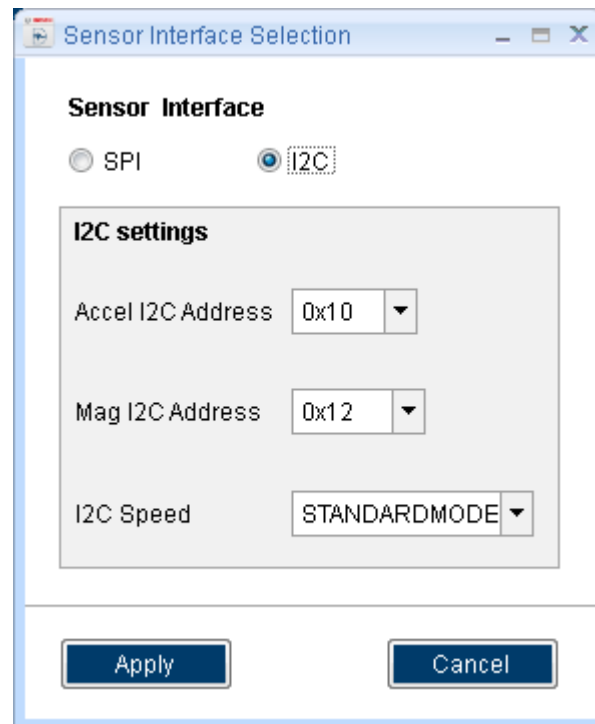


Figure 23. Sensor Interface selection I2C

### 5.3.3 Panels

Panels are the views to monitor and configure sensor data. The number of views can vary from sensor to sensor

- To open any view, click on the respective panel.
- To rearrange the views to the default setting, click the **Default View**.

### 5.3.4 Settings

#### 5.3.4.1 VDD / VDDIO

These are the sensor voltage levels. The **VDD** value represents the supply voltage for the sensor and ranges from 1800 mV to 3600 mV. The value of **VDDIO** ranges from 1200 mV to 3600 mV. For proper functioning of sensor, please take extra care while setting up voltage levels.

By default, the optimum voltage levels are set.

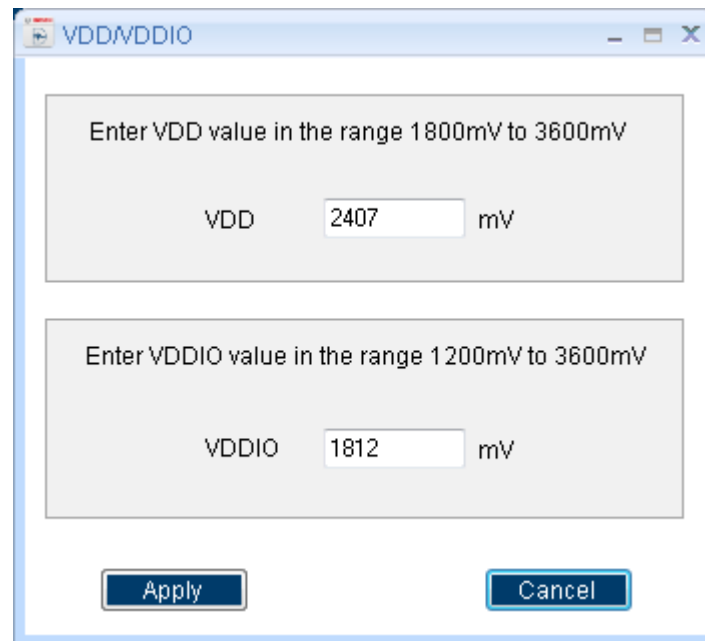


Figure 24. VDD/VDDIO

### 5.3.4.2. Firmware Upgrade

#### 5.3.4.2.1 For App 2.0 Board

DD2.1 supports firmware upgrade to re-flash the Application/ Development board . It is recommended to flash the firmware that comes along with the Installer. The corresponding firmware for the respective version of DD2.1 can be found under **Firmware** in the DD2.1 installation directory.

Follow the simple steps to upgrade the firmware.

1. Click on **Settings->Firmware Upgrade**.

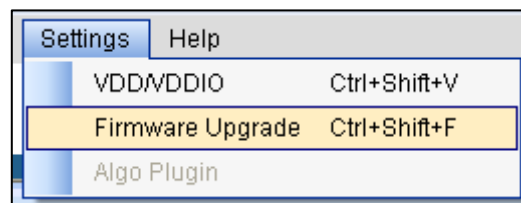


Figure 25. Firmware Upgrade.

2. Click **Enter Boot mode**

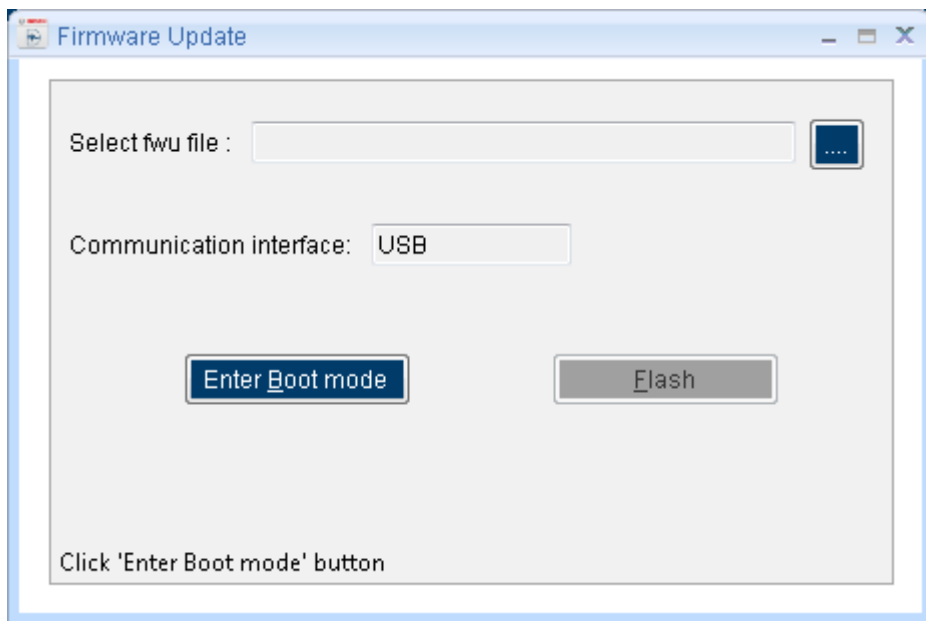


Figure 26. Enter Boot mode

3. Switch off board, and press **Switch 2**.
  - a. In Development board, the LCD will display Application boot loader.
  - b. In Application board, all four LEDs will glow simultaneously.
4. Click **OK**.
5. For development board LCD will show "Application boot loader" and for application board the four LEDs will glow simultaneously. Press Ok button.

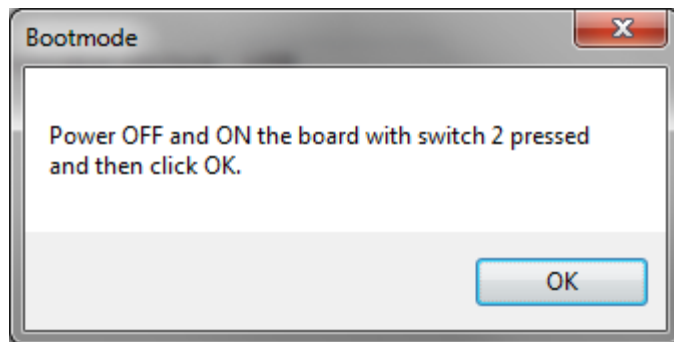


Figure 27. Application Bootloader

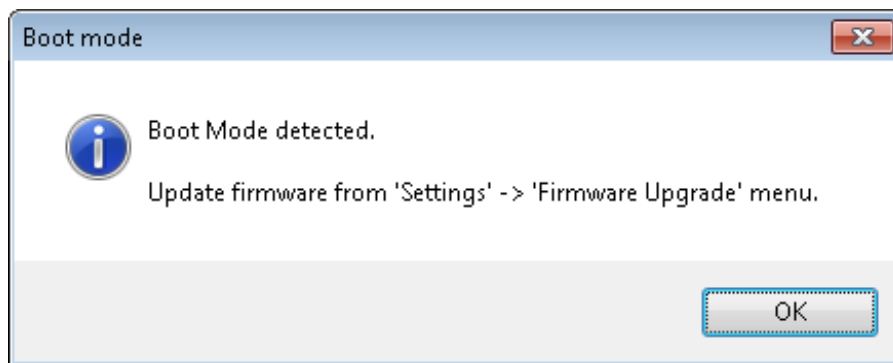


Figure 28. Boot mode Detected

6. Select the firmware update file (\*.fwu). The default file is available in **Firmware**, under the Development Desktop 2.1 installation directory.

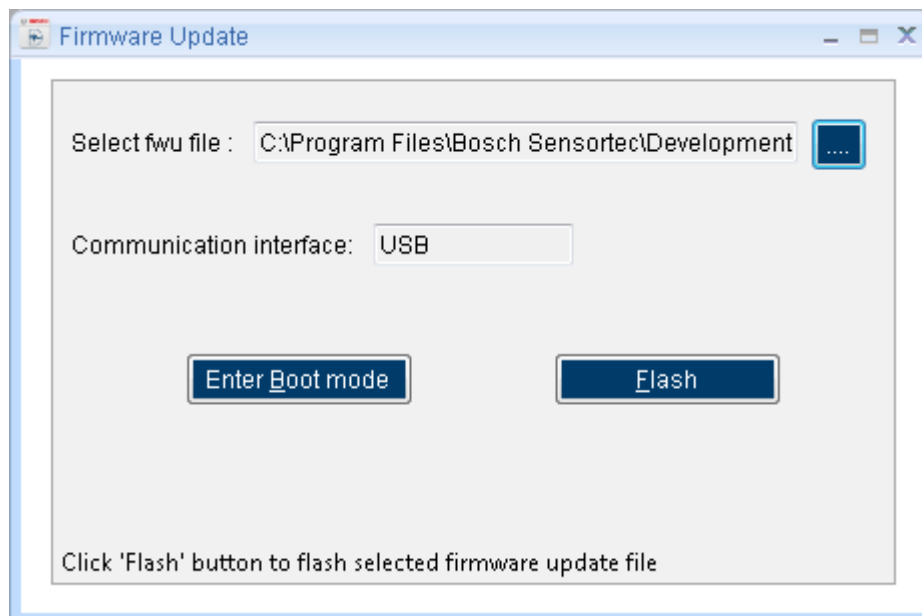


Figure 29. Start Firmware

7. Click **Flash**.
8. After a successful firmware update, close the Firmware Update window and restart the Application/ Development board.
9. Restart the DD2.1.

#### 5.3.4.2.2 For App 3.0 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:

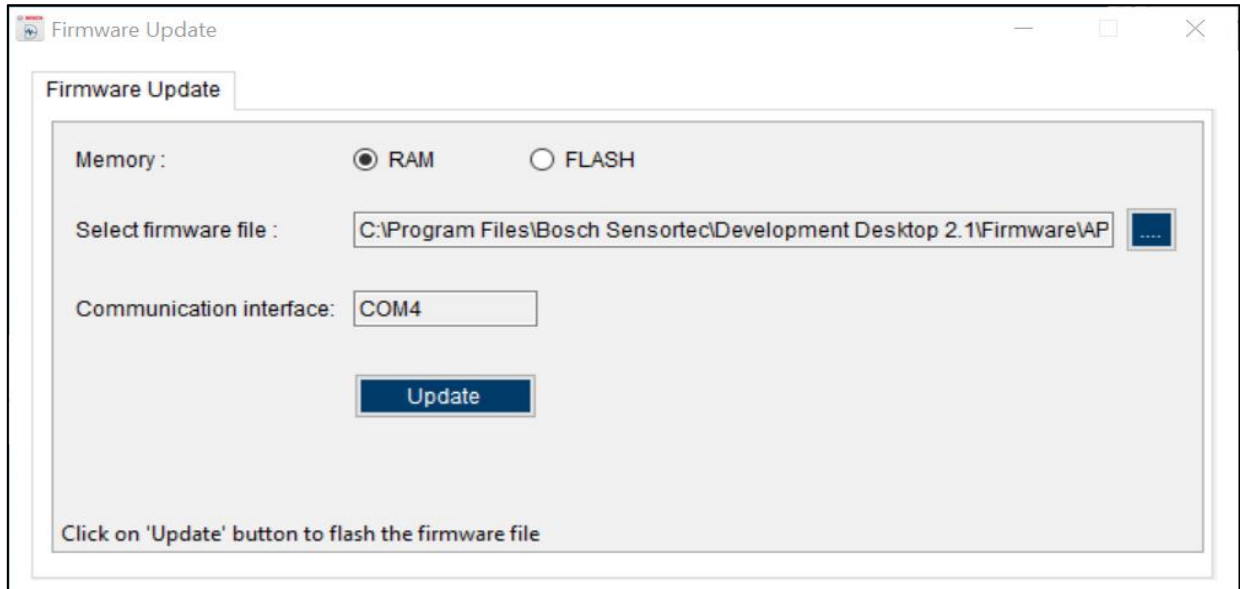


Figure 30 : Firmware upgrade window

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

2. Choose RAM or FLASH option to flash the latest recommended firmware file.
3. The file path will get automatically chosen/selected in the select firmware file path textbox. User can also select the firmware as required.
4. Click on **Flash**.
5. 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.

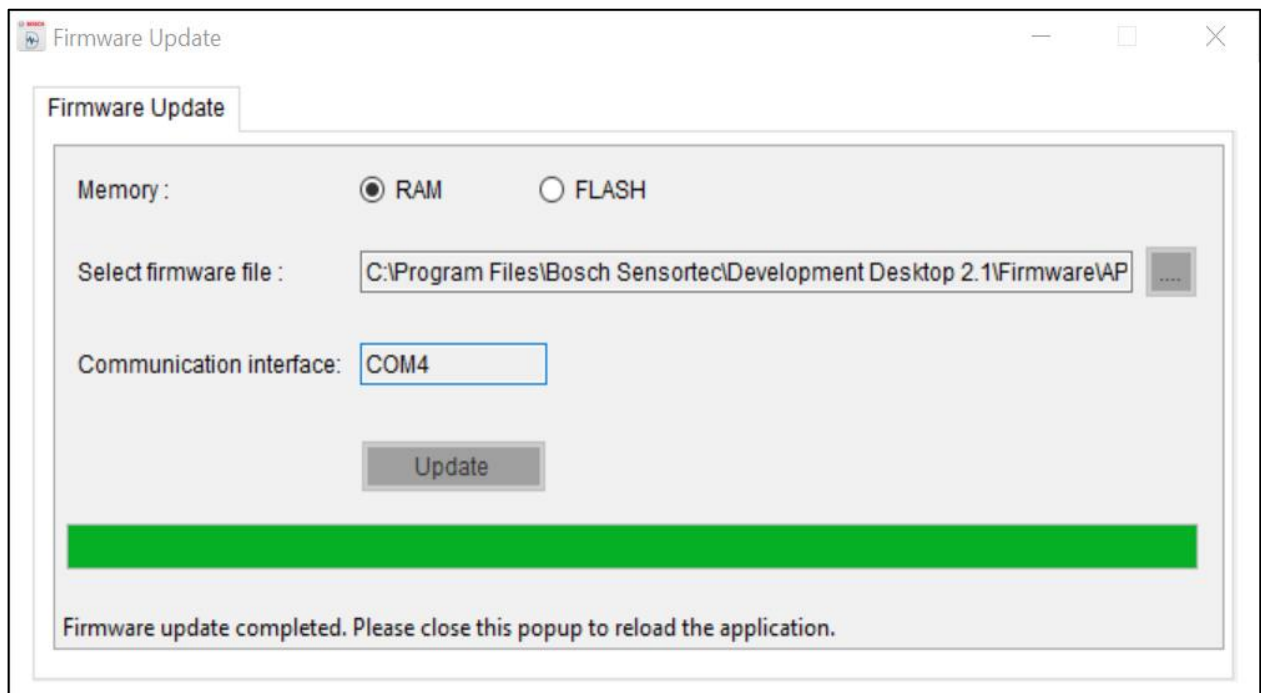


Figure 31 : Firmware upgrade completion

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

***Bosch Sensortec recommends USB or wired UART for firmware update.***

## 5.4 Data Export

The output values of sensor signals are logged to a file using **Data Export**. The file is in the destination path of the application.

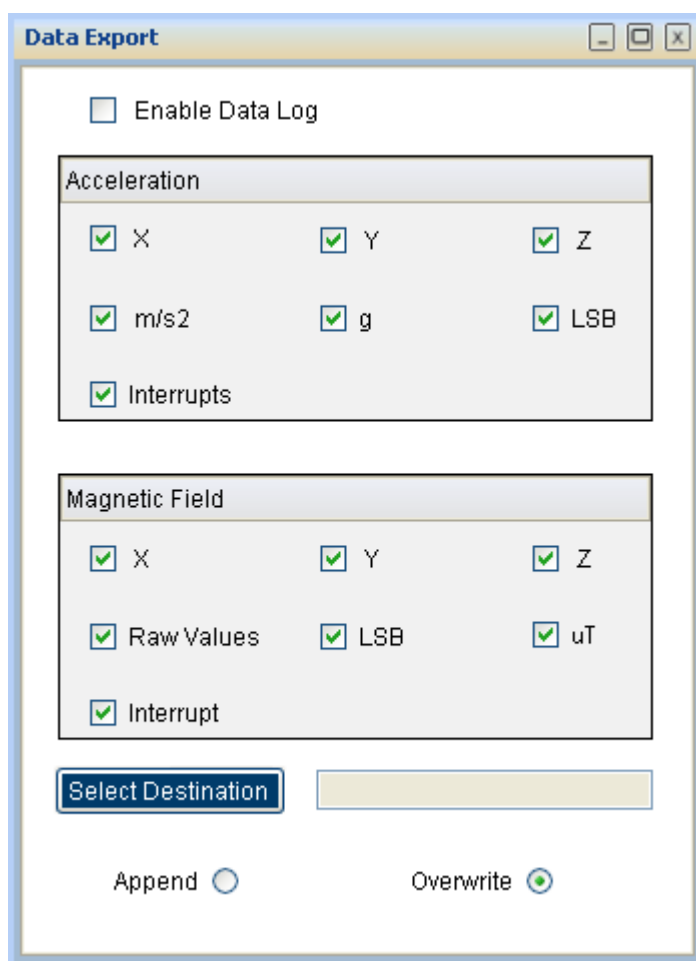


Figure 32. Data Export

Follow these steps to carry out the data export.

1. Click **Data Export (or) ALT + D**
2. Select file for data acquisition, sensor data, and units for logging.
3. Select **Append/ Overwrite** and Check **Enable Data Log**.
4. Click **Start Streaming**.



## 6 General troubleshooting

The following are the general guidelines to be followed while working with the Development Desktop:

- Ensure that the shuttle board with the valid sensor is seated properly in the development board.
- Ensure that the PC-board connection is properly established.
- Close and restart the DD2.1 application when you switch the board off and on during operation.
- Ensure that at least one channel is selected.

Follow these steps to check the USB connection.

1. On the desktop, right click on **My Computer** and select **Manage**. This opens the **Computer Management** window.
2. Under **System Tools**, select **Device Manager**.
3. Click **Human Interface Devices** and check for the USB connection.

When data transfer between PC and Development board does not work despite the USB device being properly enumerated, the cause can be that an older Development board with the same USB PID (Product ID) and VID (Vendor ID) has been used with this computer before. In this case, Windows cannot install the required drivers automatically. Follow these steps to check the USB connection:

1. Right-click on the USB-device corresponding to your Development board (if you are not sure which device corresponds to your Development board, unplug all other USB devices like keyboard and mouse temporarily).
2. From **Action**, select **Scan for hardware changes**. The new USB driver is installed automatically. Thereafter, the device communication will function properly.

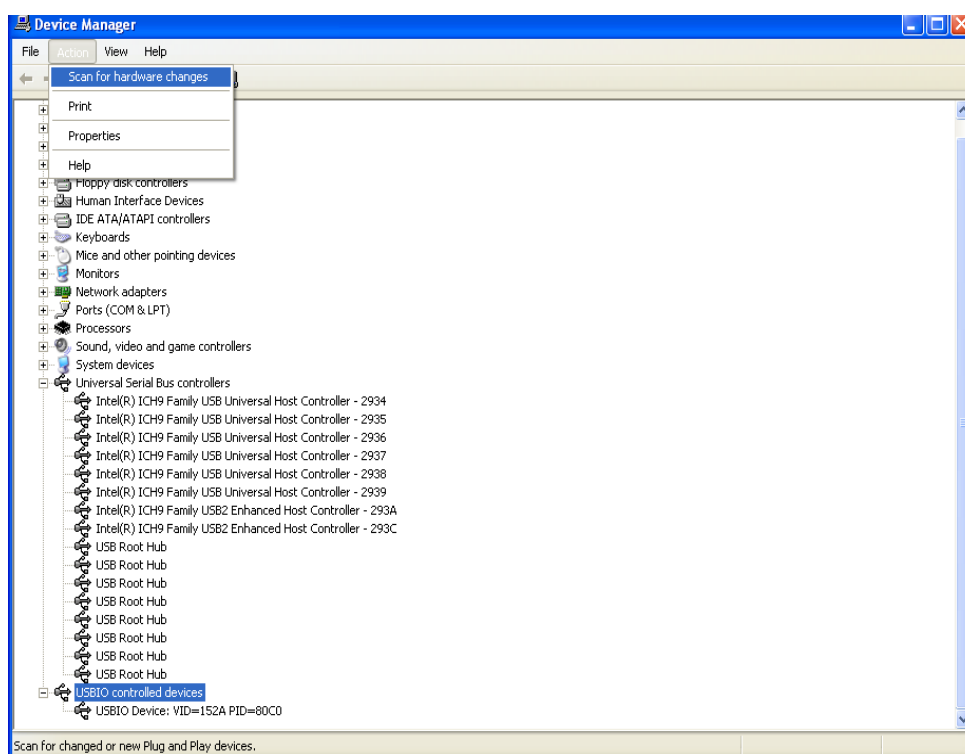


Figure 33. Troubleshooting (1/2)

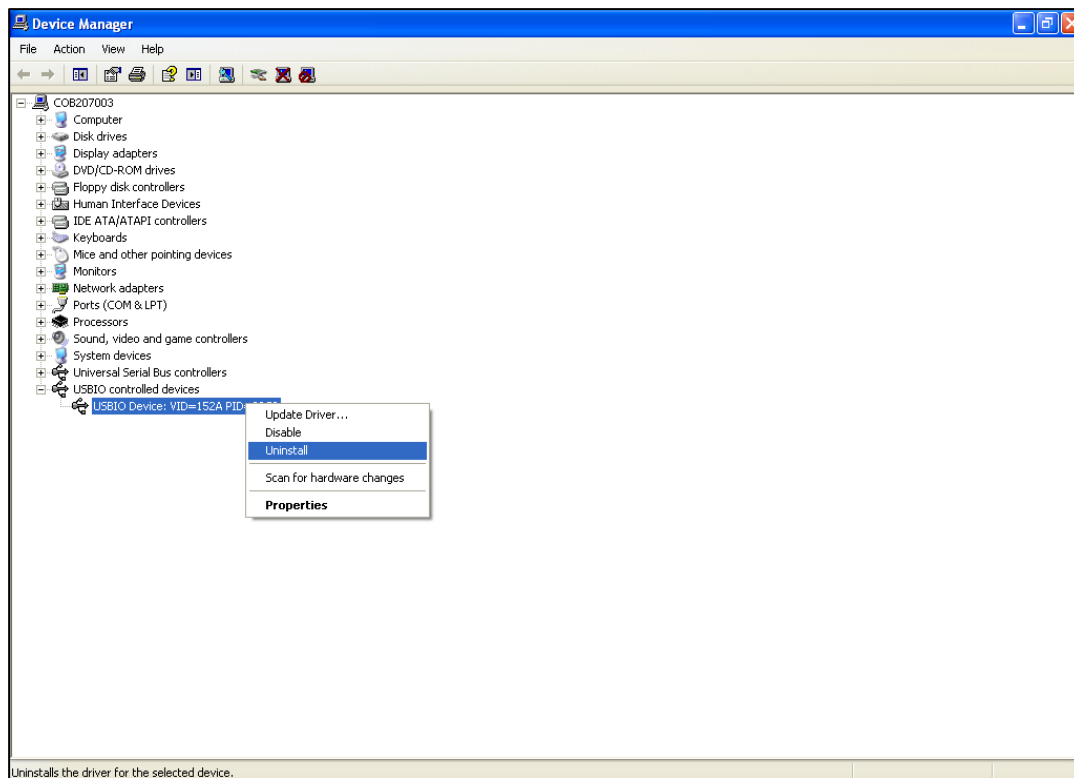


Figure 34. Troubleshooting (2/2)

The following table lists some of the possible faults that you might encounter and the troubleshooting methods to be followed.

| Condition  | Possible cause  | Solution  |
|--|---|---|
| If <b>Communication Status</b> remains red after checking the <b>Start</b> .                             | Development board is turned off.                            | <b>Power on</b> the Development board and restart the 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.  |
| Error message “ <b>Please connect Development board</b> ” is displayed.                                  | Development board is not connected properly.                | Ensure that the PC and development board are connected properly. If the board is powered by rechargeable battery, ensure that the battery is charged.   |
| Error message “ <b>Please connect Shuttle Board</b> ” is displayed.                                      | Shuttle Board is not fixed properly.                        | Ensure that the Shuttle board is correctly fixed in the Development board.  |
| <b>Data Export</b> is disabled.  | The data is read from the sensor.                           | Click <b>Stop. Data Export</b> option will be enabled.  |
| Error message “ <b>Failed to retrieve VDD, please retry</b> ” is displayed.                              | Development board is turned off.                            | <b>Power on</b> the Development board and restart the application.  |
| Error message “ <b>Please select a path or file for logging</b> ” is displayed.                          | Destination path for saving the logged data is not defined. | Select the <b>Data Export</b> option in the file menu and specify the destination path.   |
| Error message “ <b>Please select File from File Menu → Data Export option to proceed</b> ” is displayed. | Destination path not selected.                              | In the file menu, select the <b>Data Export</b> option and select the destination path.   |
| Error message “ <b>Please Connect Valid Sensor</b> ” is displayed.                                       | Wrong sensor fixed on the Development board.                | Ensure that correct sensor is fixed on the Development board.   |
| Graph for x, y, z channel not plotted.   | Channel x, y, z not checked.                                | Ensure that x, y, z channels are checked.   |
| USB driver already installed, but application cannot communicate with the board.                         | USB Driver might have been corrupted.                       | Manually remove the USB driver file and install the driver again.   |

Table 1. Conditions

## 7 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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## 8 Document history and modifications

| Rev. No | Chapter | Description of modification/changes                                    | Date          |
|---------|---------|--|---------------|
| 1.0     |         | Document creation  | 03 July 2012  |
| 1.1     |         | Changed the icon, Added the jumper settings details.                   | 27 Dec 2012   |
| 1.2     |         | Changed according to the single installer for x86 and x64.             | 9 July 2013   |
| 1.3     |         | Updated the trouble shooting table relating to USB driver installation | 23 April 2015 |
| 1.4     |         | Updated the changes in the software installation process               | 22 Nov 2016   |
| 1.5     |         | Updated the Windows support information                                | 09 Mar 2017   |
| 1.6     |         | Adopt to new format  | 21 Aug 2020   |
| 1.7     |         | Updated DD application version   | 08 April 2023 |

Table 2. Document history



**Bosch Sensortec GmbH**

Gerhard-Kindler-Straße 9  
72770 Reutlingen / Germany

[contact@bosch-sensortec.com](mailto:contact@bosch-sensortec.com)  
[www.bosch-sensortec.com](http://www.bosch-sensortec.com)

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