

BNO055

USB Stick user guide

Bosch Sensortec



Application note: BNO055 USB stick user guide

Document revision	1.1
Document release date	June 2016
Document number	BST-BNO055-AN009-01
Technical reference code(s)	0 273 141 209
Notes	Data 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's appearance.

INDEX OF CONTENTS

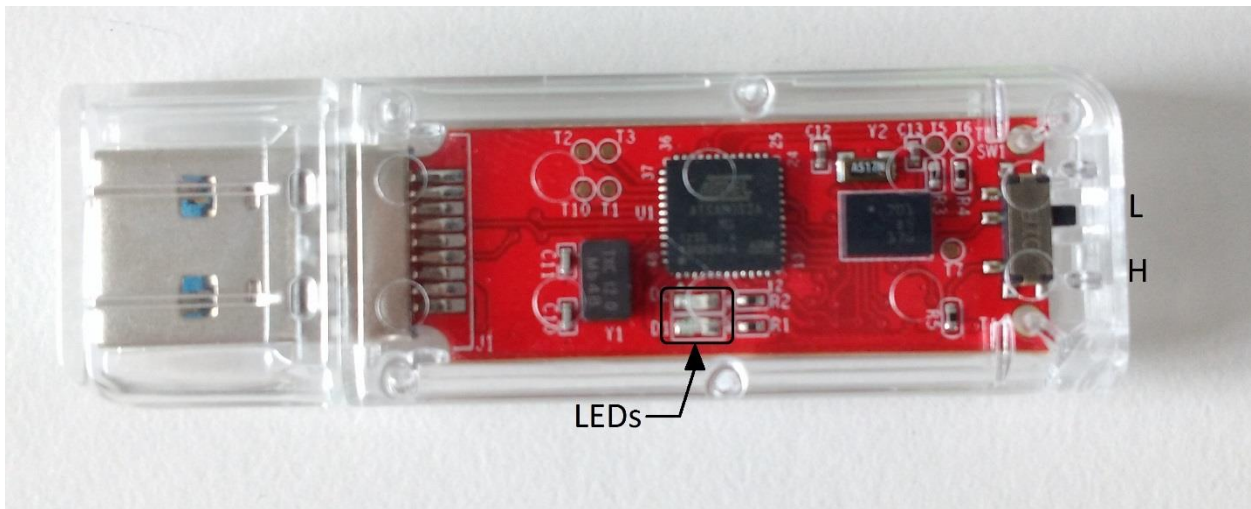
1. INTRODUCTION	3
2. INSTALLATION	4
2.1 REQUIREMENTS	4
2.2 INSTALLATION OF DEVELOPMENT DESKTOP	4
3. USING THE BNO055 USB STICK	5
3.1 SENSOR CALIBRATION	6
4. FLASHING NEW FIRMWARE	7
4.1 FLASHING NEW BNO055 FIRMWARE	7
4.2 FLASHING NEW BNO055 USB STICK FIRMWARE	7
5. MISCELLANEOUS	7
5.1 LED INDICATIONS	7
5.2 SWITCH FUNCTIONS	7
6. LEGAL DISCLAIMER	8
6.1 ENGINEERING SAMPLES	8
6.2 PRODUCT USE	8
6.3 APPLICATION EXAMPLES AND HINTS	8
7. DOCUMENT HISTORY AND MODIFICATIONS	9

1. Introduction

This document is a detailed guide to use the BNO055 USB stick using the sensor evaluation environment, Development Desktop from Bosch Sensortec.

The USB stick contains the BNO055 and an MCU which acts as an interface to the USB port.

Figure 1 : BNO055 USB Stick



You can find 2 LEDs in the middle and a switch at one end. The switch is used to control the modes of operation (see [Chapter 5.2](#)).

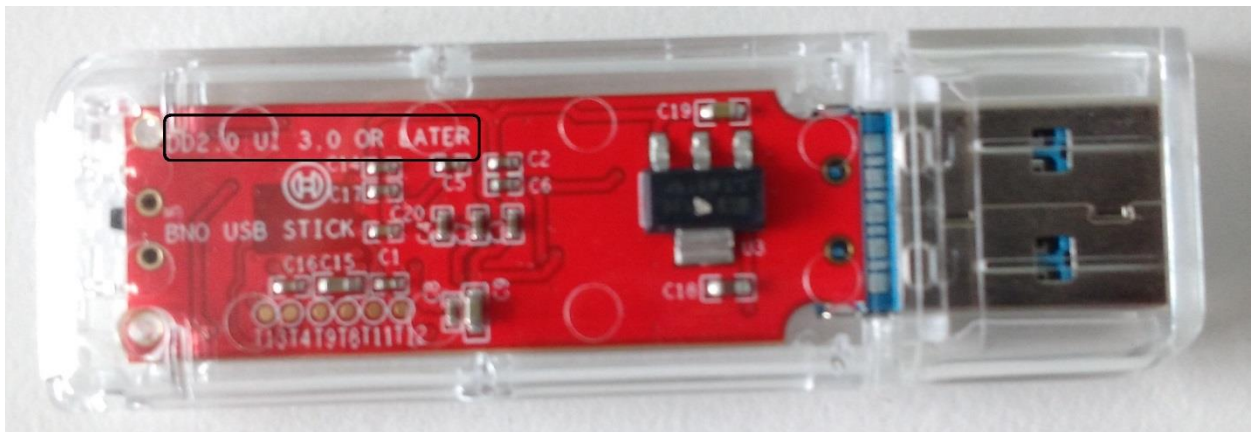
2. Installation

2.1 Requirements

Following are the minimum requirements for a successful installation:

- Windows 7
- Installer for Development Desktop 2.0 (UI version 2.8 or higher), which can be downloaded from this [link](#).
- BNO055 USB Stick

Figure 2 : DD 2.0 UI Version printed on the USB Stick



Note: The first version of the BNO055 USB stick (which has a green colored PCB) is not compatible with USB 3.0 ports. Hence the user could connect the stick over a USB2.0 port.

For usage with USB 3.0 ports, you need to have the updated version of the hardware (red colored PCB) and the latest version of DD2.0. The working combination of the stick and Development Desktop's version will be printed on the PCB as shown above in Figure 2 "DD2.0 UI 3.0 or later".

2.2 Installation of Development Desktop

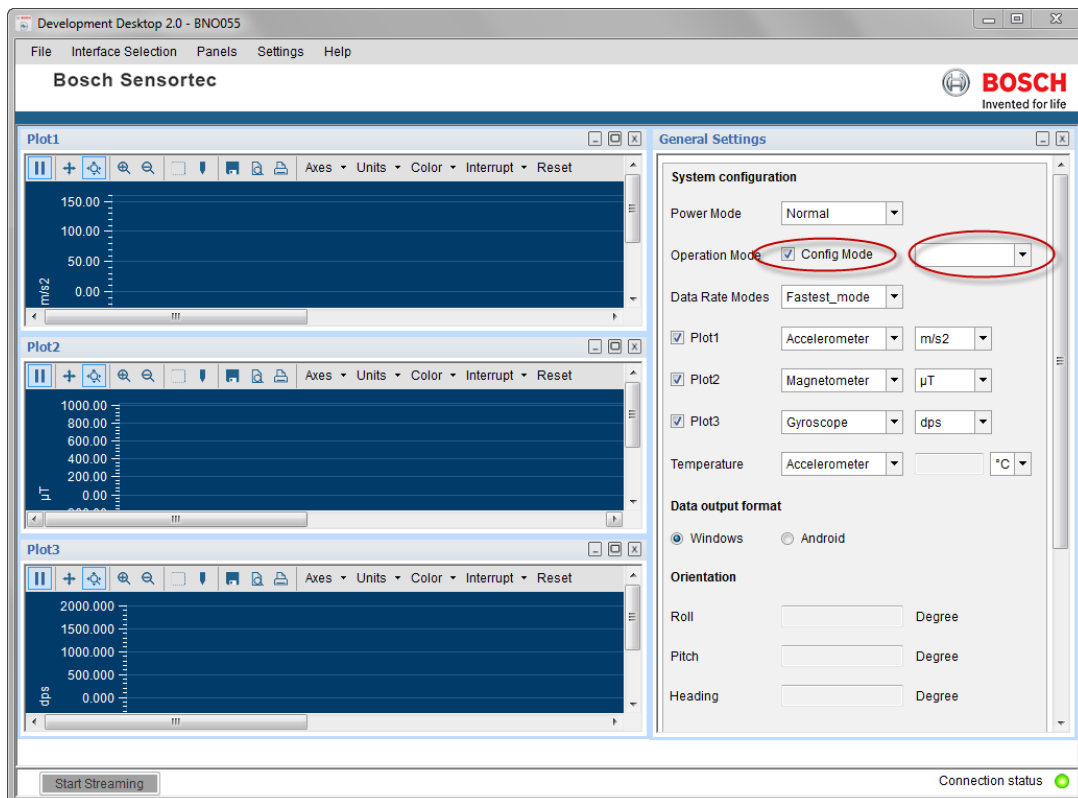
Please follow the instructions from the [User manual](#) of Development Desktop.

Note: Also ensure that the USB driver is installed (i.e. follow the installation process carefully).

3. Using the BNO055 USB stick

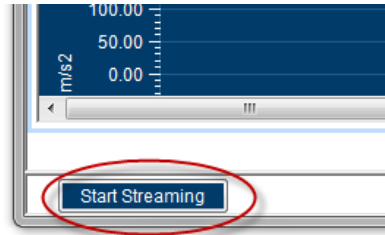
1. Make sure the switch at the end of the USB stick is in position **H** (see Figure 1 : BNO055 USB Stick) or in 'lock' position.
2. Plug the USB stick into the USB port of your PC. The red LED on the stick should glow.
3. Open Development Desktop. You should see the main window as below:

Figure 3 : Main window of Development Desktop



4. On startup, the BNO055 is in CONFIG_MODE. Select an operation mode in the dropdown to the right of Config Mode or simply disable CONFIG_MODE (refer figure).
5. Once CONFIG_MODE is disabled, you can start streaming as shown below in Figure 4.

Figure 4 : Streaming option in Development Desktop



6. Check the BNO055 data sheet and the Development Desktop documentation for more options.

The help file outlining BNO055 use in Development Desktop environment is under :
Help->User Manuals->BNO055 User Manual

7. If you go to Panels and activate 3D Compass a new window opens and displays a 3D object whose motion is controlled according to the motion of the BNO055.

Please note:

Before you start the 3D Compass, the BNO055 must be set to one of the following fusion modes:

eCompass (accelerometer + magnetometer)

IMU (accelerometer + gyroscope)

9Dof (accelerometer + gyroscope + magnetometer)

3.1 Sensor calibration

The BNO055 must be calibrated before use. Un-calibrated BNO055 stick will deliver data of lower accuracy. Calibration of magnetometer and gyroscope is crucial.

Calibration procedure:

- **Gyroscope:** Requires a steady state for short moment in order to calibrate itself. Place sensor on a flat surface for a few seconds.
- **Magnetometer:** The stick must be moved a few times in a figure of **8** or **∞** pattern. You can have a look at the video [here](#).
- **Accelerometer:** To calibrate the sensor stick must be placed in six different steady positions. This step can be omitted, since the offsets of the accelerometer channels are small and have no negative impact on the data accuracy of the fused data.



4. Flashing new firmware

4.1 Flashing new BNO055 firmware

A new BNO055 USB stick firmware will be released with every new release of Development Desktop 2.0 version. Please follow the appropriate documentation of Development Desktop 2.0 for more details.

4.2 Flashing new BNO055 USB stick firmware

Please follow the instructions carefully given in the Development Desktop 2.0 help files to flash the new firmware. The firmware file is “BNOinUSBStick.fwu3”. **DO NOT flash anything other than files having “.fwu3” format!**

5. Miscellaneous

5.1 LED indications

- MCU is in bootloader mode → D1 and D2 both glow together three times.
- MCU is power on and is in application mode → only D1 glows continuously.
- Flashing BNO055 firmware → D2 glows

5.2 Switch functions

- During power on:
 - If switch is at ‘unlock’ position → MCU will be in boot loader mode
 - If switch is at ‘lock’ position → MCU will be in Application mode

6. Legal disclaimer

6.1 Engineering samples

Engineering Samples are marked with an asterisk (*) or (e) 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.

6.2 Product use

Bosch Sensortec products are developed for the consumer goods industry. They may only be used within the parameters of this product data sheet. They are not fit for use in life-sustaining or security sensitive systems. Security sensitive systems are those for which a malfunction is expected to lead to bodily harm or significant property damage. In addition, they are not fit for use in products which interact with motor vehicle systems.

The resale and/or use of products are at the purchaser's own risk and his own responsibility. The examination of fitness for the intended use is the sole responsibility of the Purchaser.

The purchaser shall indemnify Bosch Sensortec from all third party claims arising from any product use not covered by the parameters of this product data sheet or not approved by Bosch Sensortec and reimburse Bosch Sensortec for all costs in connection with such claims.

The purchaser must monitor the market for the purchased products, particularly with regard to product safety, and inform Bosch Sensortec without delay of all security relevant incidents.

6.3 Application examples and hints

With respect to any examples or hints given herein, any typical values stated herein and/or any information regarding the application of the device, Bosch Sensortec hereby disclaims any and all warranties and liabilities of any kind, including without limitation warranties of non-infringement of intellectual property rights or copyrights of any third party. The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics. They are provided for illustrative purposes only and no evaluation regarding infringement of intellectual property rights or copyrights or regarding functionality, performance or error has been made.



7. Document history and modifications

Rev. No	Chapter	Description of modification/changes	Date
1.0	n/a	Document creation	2014-07-25
1.1	all	Updated for newer version of the hardware	2016-06-08

Bosch Sensortec GmbH
Gerhard-Kindler-Strasse 9
72770 Reutlingen / Germany

contact@bosch-sensortec.com
www.bosch-sensortec.com

Modifications reserved | Printed in Germany
Specifications subject to change without notice
Document number: BST-BNO055-AN009-01
Revision_1.1_062016