Application note

BNO055
USB stick user guide

Bosch Sensortec

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Application note: BNO055 USB stick user guide

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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.

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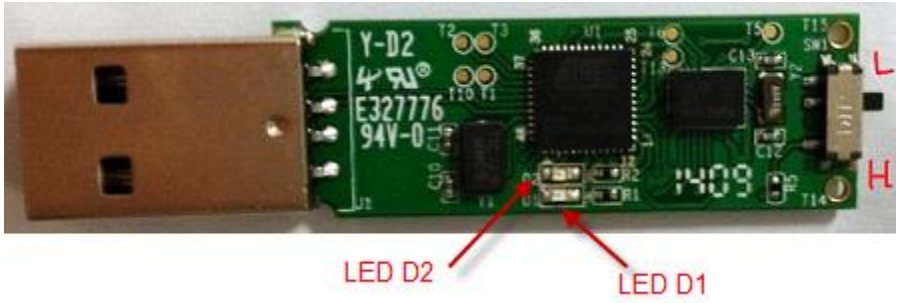
1. Introduction

The given document shows which steps need to be taken to operate the BNO055 USB stick with the sensor evaluation environment Development Desktop from Bosch Sensortec.

The USB stick contains the BNO055 and a MCU dealing as an interface to the USB port.

Figure 1: BNO055 USB stick



There is a switch at the end of the switch to control bootloader mode (see chapter 4.2).

2. Installation

2.1 Requirements

Required is:

- Windows 7/8.x PC
- Installer for Development Desktop 2.0 (UI version 2.8 or higher), can be downloaded from the Bosch Sensortec home page (http://www.bosch-sensortec.com)[1].
- BNO USB Stick

Note: The first version of the BNO USB stick is not compatible with USB 3.0 ports. As a workaround, the user could connect the stick using a USB2.0 hub.
For USB 3.0 ports, make sure you have a newer stick version (pcb color not green) and the latest version of DD2.0. The working combination of stick and DD2.0 version will be printed on the pcb of the stick ("DD2.0 UI 3.0 or later").

2.2 Installation of Development Desktop

Please follow the instructions from the documentation of Development Desktop.

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

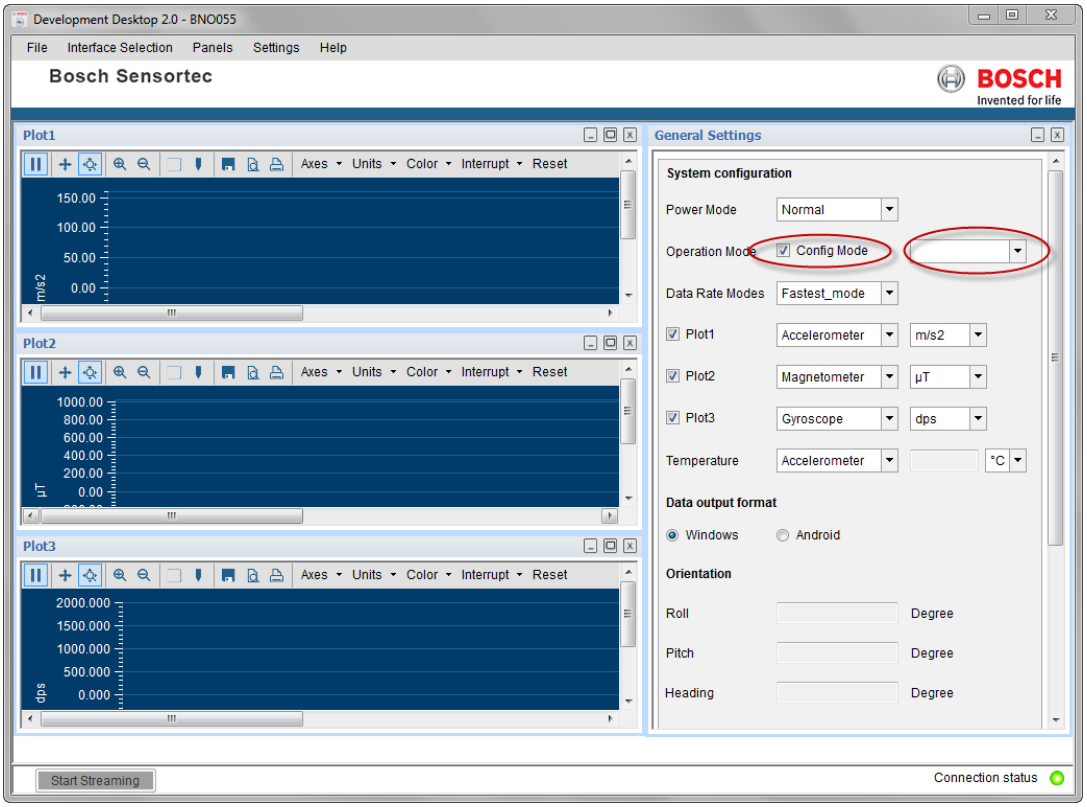
[1] To be able to download the software user has to be registered in first place. In order to create an user account please go to Sign-In button in the top left corner of Bosch-Sensortec page and follow the instructions.
Once signed in, go to the Support → Downloads tab and find the download link at the end of the page.

3. Using the BNO USB stick

1. Make sure the switch at the end of the USB stick is in position **H** (see figure 1).

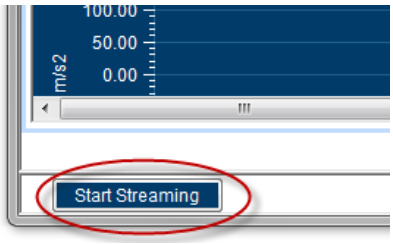
2. Plug USB stick into the USB port of your PC. The red LED on the stick should glow.

3. Start Development Desktop. You should see the main window:



4. On startup, the BNO055 is in CONFIG_MODE. Select an operation mode in the box right to the Config Mode or simply disable CONFIG_MODE (see red indications on image above).

5. Once CONFIG_MODE is disabled, you can start streaming:



6. Check the BNO055 data sheet and the Development Desktop documentation for more options.
   The help file outlining BNO 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 3D object which motion is controlled with the orientation data streamed by BNO.

   Please note:
   Before you start the 3D Compass, BNO must be set to one of the fusion modes, i.e. :
   eCompass (accelerometer + magnetometer)
   IMU(accelerometer + gyroscope)
   9Dof(accelerometer + gyroscope + magnetometer)
   etc.

3.1 Sensor calibration

The BNO should be also calibrated. Calibration status is indicated in the panel right. Un-calibrated BNO stick will deliver data of lower accuracy. Calibration of magnetometer and gyroscope is crucial.

Calibration procedure

- **Gyroscope:** Requites steady state for short moment in order to calibrate itself. For example, place sensor on a flat surface without movement for a short period of time.
- **Magnetometer:** The stick must be moved several times in infinity-sign-like-shaped path ("paint 8's in the air").
- **Accelerometer:** To calibrate the sensor stick must be placed in six different steady positions. This step can also be confidently omitted, since the offsets of the accelerometer channels are small and by that have no negative impact on the data accuracy of the fused data.

4. Flashing new firmware

4.1 Flashing new BNO055 firmware

Any new BNO055 USB stick firmware will be released together with a new release of Development Desktop 2.0 version. Please follow the appropriate documentation of Development Desktop 2.0.

4.2 Flashing new MCU firmware

Please follow the instructions carefully given in the Development Desktop 2.0 help files. The firmware file is called „BNOinUSBStick.fwu3"; **do not flash anything else other than files with ending .fwu3!**

5. Miscellaneous

5.1 LED indications

- D1 and D2 both glows together three times → MCU is in bootloader mode
- D1 alone glows continuously → MCU is power on and is in application mode

- D2 glows → when BNO's FW flash is ongoing.

5.2 Switch functions

- During power on:
  - switch is in **L** → MCU will be in boot load mode
  - switch in **H** → MCU will be in Application mode

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7. Document history and modifications

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