

Step 1 Download and install DD2.0 GUI SW

1. Download the DD2.0 UI 3.20 software online at:

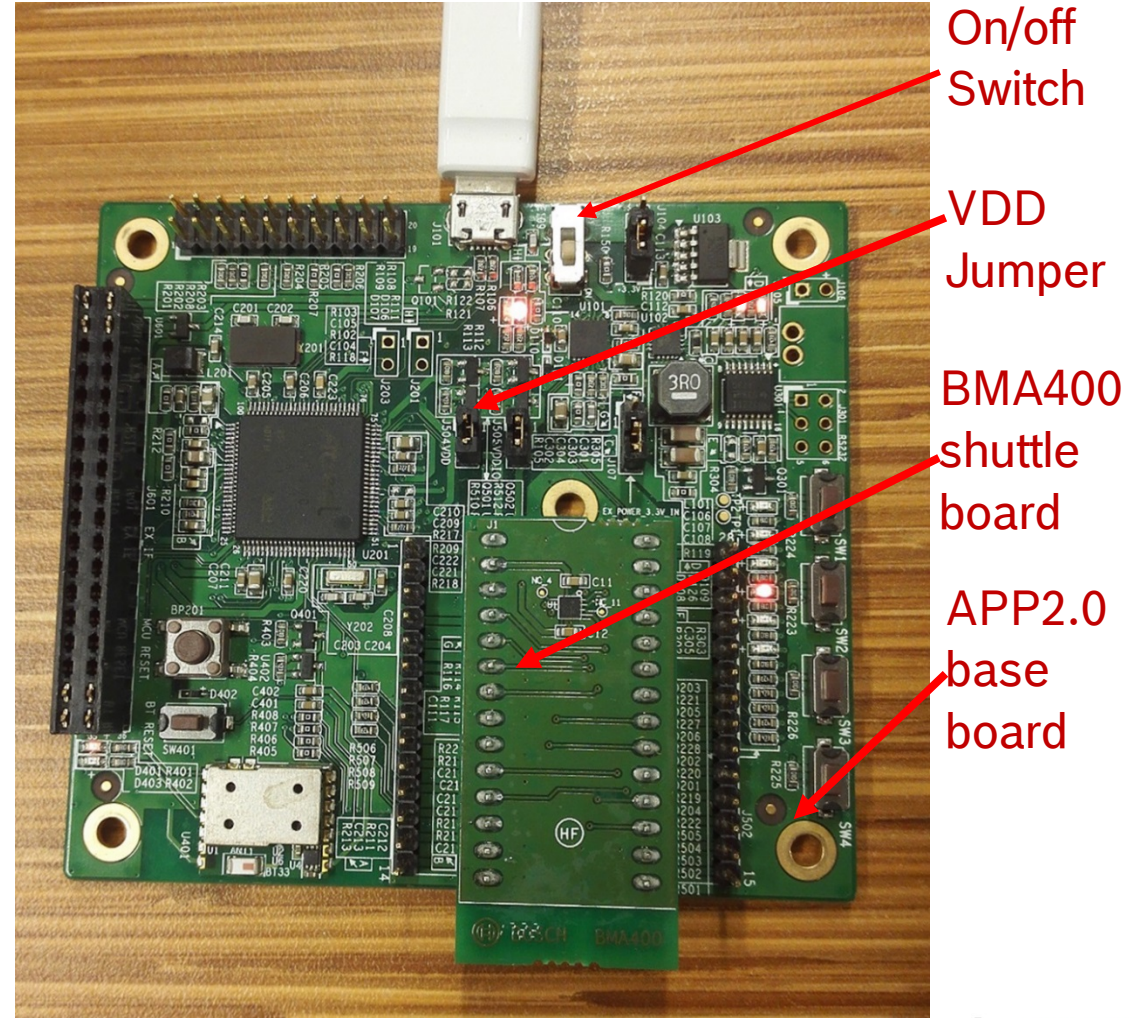
https://www.bosch-sensortec.com/software-tools/tools/development-desktop-software/#development_desktop_software

2. Please refer to the document “How to download and install Development Desktop Software DD2.0_UIx.x_Jan2020.pdf” for more information

3. Install DD2.0 SW onto your computer. After installation, select “yes” for installing the USB driver

Step 2 Connect APP2.0 to your PC

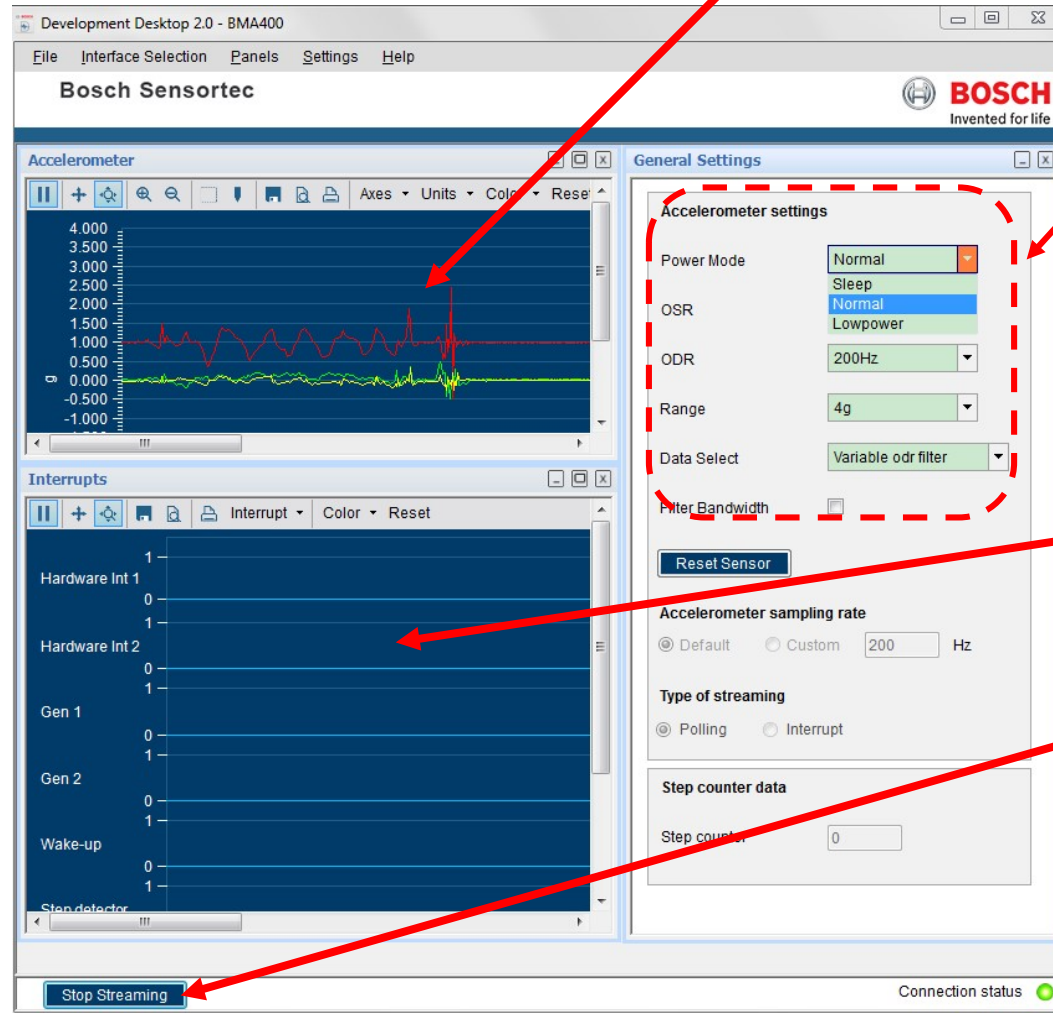
4. Connect APP2.0 base board with BMA400 shuttle board plugged in to a USB port of your PC
5. If you are interested in measuring the current consumption of BMA400, then you can remove the jumper and hook a multimeter in series at uA DC setting as shown below
6. Switch on the power. BMA400 should show 0.1uA below for sleep mode after power on



Step 3 Launch DD2.0 GUI SW

7. Launch DD2.0, you will find the basic settings. By default the sensor is in sleep mode with $\pm 4g$ full scale range and 200Hz output data rate (ODR). You can enable the sensor to normal mode

8. Click “Start Streaming” button, you will see the sensor data being plotted



Data plotting

Basic settings

Interrupt signal plotting (if enabled)

Click “Start Streaming”

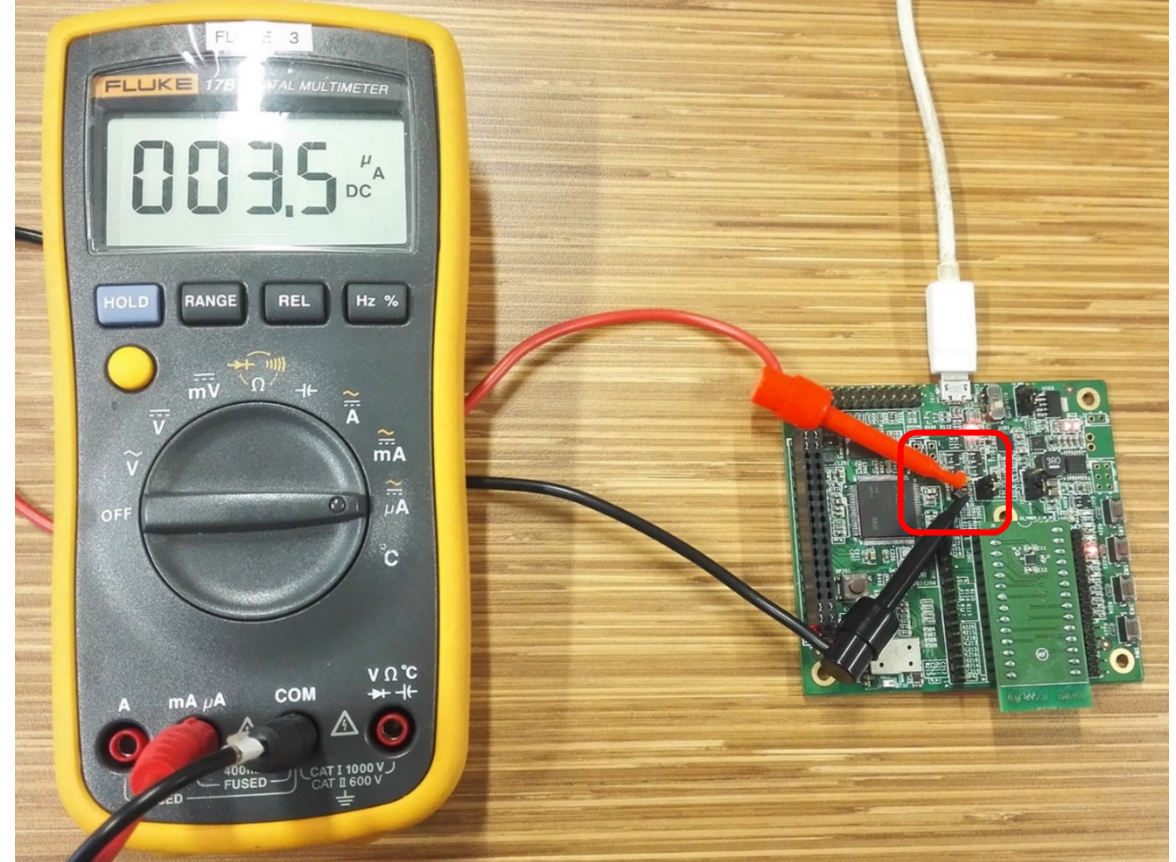
Then it will turn to “Stop Streaming”

Step 4 Check BMA400 current at different modes

9. Then set sensor to normal mode, OSR (over sampling rate) = 0, current = 3.5uA

10. Enable sensor to Low power mode, OSR = 0, current = 0.85uA

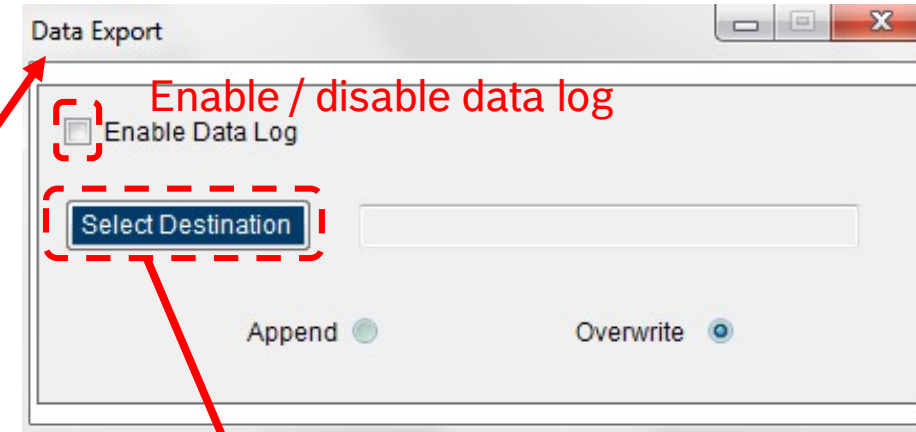
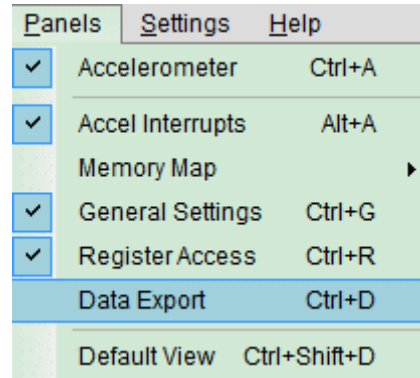
11. When OSR is higher, data will be cleaner and the current consumption will be higher



BMA400 Data logging

To log sensor data into a CSV file,

1. Enable BMA400 to normal or low power mode
2. Select destination log file on your local computer
3. Check the “Enable Data Log” checkbox
4. Click “Start Streaming” button to start logging data
5. Click “Stop Streaming” button to stop logging data



Select log file location & type(.txt or .csv). Normally .csv is recommended since it can be easily opened by Excel

Enable streaming



Logged data can be used for further analysis

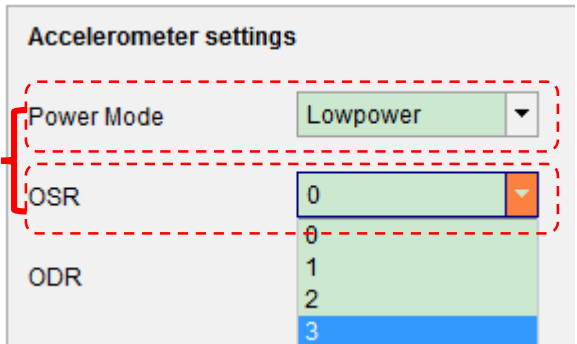
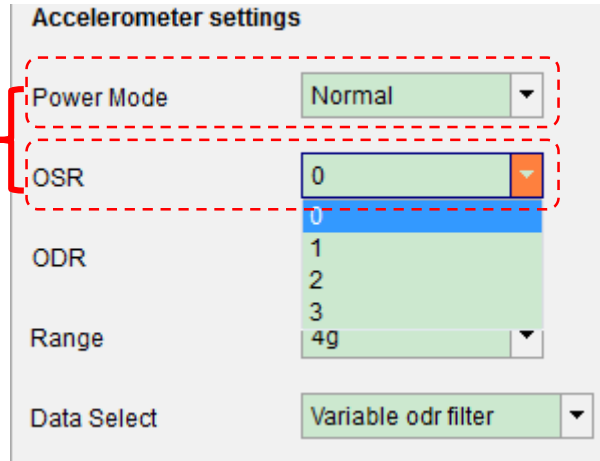
BMA400 Current consumption table in datasheet

Current consumption table from datasheet

Current consumption (uA) in normal mode and low-power mode				
	ACC_CONFIG1.osr / ACC_CONFIG0.osr_lp			
	11	10	01	00
Normal mode ACC_CONFIG0. power_mode<1:0> = b10	14.5	9.5	5.8	3.5
Low-power mode ACC_CONFIG0. power_mode<1:0> = b01	1.35	1.1	0.93	0.85

BMA400 max current consumption is 14uA at normal mode with OSR = 3. The current consumption is not related to ODR change and full scale range change

Since BMA400 normal mode is always on without duty-cycling, it doesn't have aliasing issue

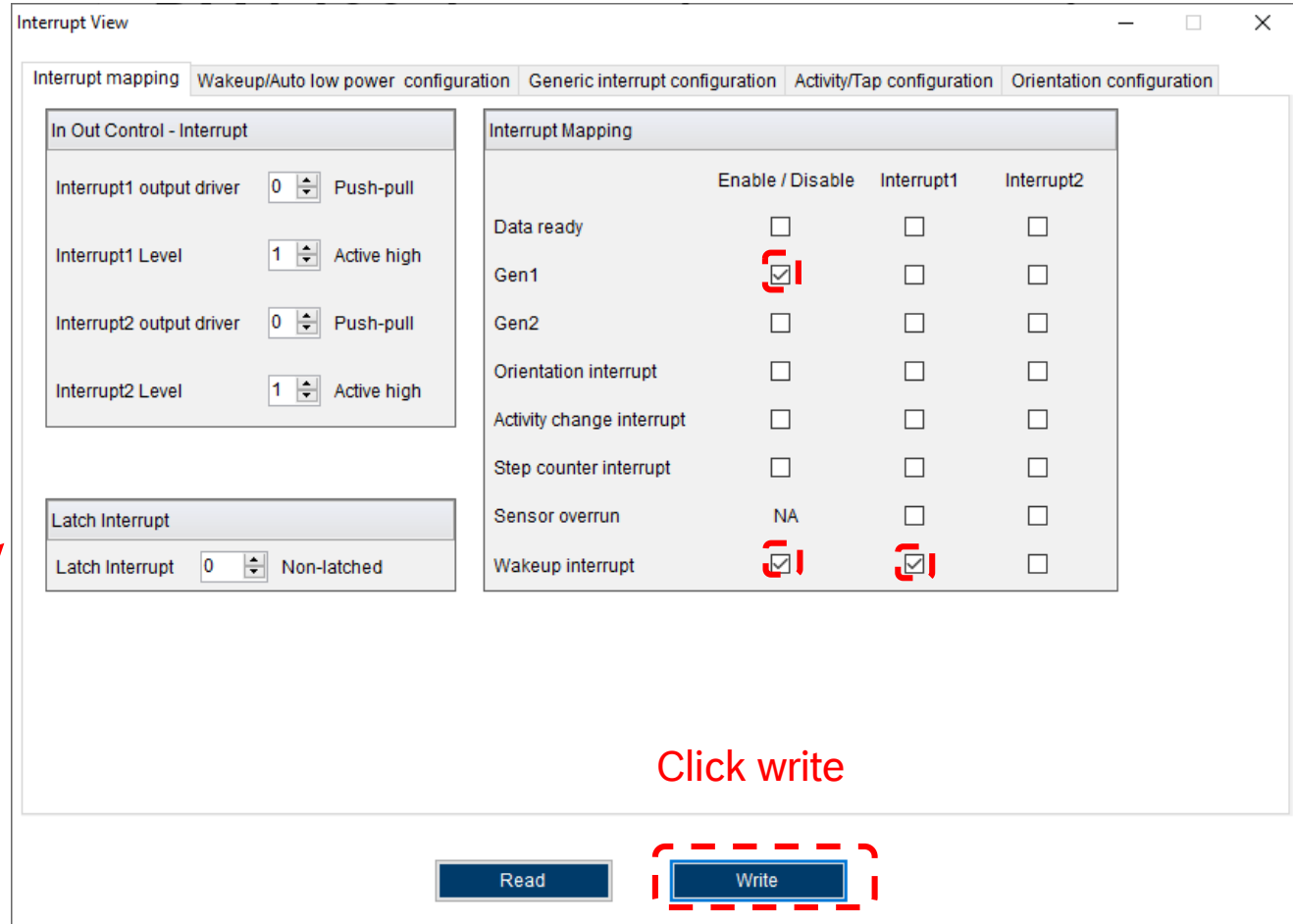
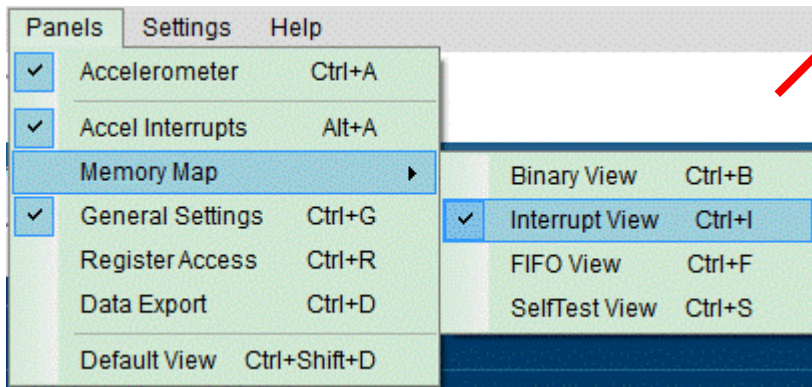


BMA400 Auto-wakeup & auto-lowpower interrupt example 1 of 4

Configure interrupt

1. Click menu “Panels -> Memory Map -> Interrupt View” as shown below

2. Configure interrupt mapping & enable Gen1, wakeup interrupt and map wakeup interrupt to INT1 pin as shown on the right side. Then click “Write” button



BMA400 Auto-wakeup & auto-lowpower interrupt example 2 of 4

Configure interrupt

3. Configure wakeup interrupt threshold / duration and enable Auto LowPower triggered by Gen1 as shown on the right side

This means that when the acceleration on any axis is beyond the Wakeup threshold of 94mg for the amount of duration time of 80ms, BMA400 will wake up automatically from low power mode (25Hz) to enter normal mode (200Hz) and generate an interrupt signal on INT1 pin

Interrupt View

Interrupt mapping | **Wakeup/Auto low power configuration** | Generic interrupt configuration | Activity/Tap configuration | Orientation configuration

Interrupt Mapping

Wakeup X enable ☒

Wakeup Y Enable ☒

Wakeup Z Enable ☒

Wakeup reference update Every time

Wakeup threshold 3 = 0.09375g

Wakeup reference X 0 = 0g

Wakeup reference Y 0 = 0g

Wakeup reference Z 0 = 0g

Duration in samples 2 = 80ms

Auto low power configuration

Auto low power timeout 0 = 0ms

Auto low power timeout condition Timeout disabled

Enable Gen1 trigger low power ☒

Data ready interrupt low power ☐

Auto wakeup configuration

Wakeup by timeout enable ☐

Wakeup timeout threshold 0 = 0ms

Read Write

~94mg @4g

40*2=80 (ms)

BMA400 Auto-wakeup & auto-lowpower interrupt example 3 of 4

Configure interrupt

4. Configure Gen1 (generic interrupt 1) for triggering auto-lowpower as shown on the right side

This means that when the acceleration on all axis is within the activity threshold of 16mg for the time of duration of 1s, Gen1 will generate an interrupt and BMA400 will enter low power mode (25Hz) automatically from normal mode of 200Hz. INT1 pin will become low from high

The screenshot shows the 'Interrupt View' window with the 'Wakeup/Auto low power configuration' tab selected. It displays two configuration panels: 'Gen1 interrupt configuration' and 'Gen2 interrupt configuration'.

Gen1 interrupt configuration (highlighted with a red dashed box):

- Activity X enable: ☒
- Activity Y enable: ☒
- Activity Z enable: ☒
- Activity data source: Acc_Filt2
- Activity reference update: Every time by data source
- Activity hysteresis: 0 mg
- Activity criterion selection: Inactivity Interrupt
- Activity comb selection: All Axes
- Interrupt threshold: 2 = 16mg
- Interrupt duration: 100 = 1000ms
- Interrupt threshold ref X: 0 = 0g
- Interrupt threshold ref Y: 0 = 0g
- Interrupt threshold ref Z: 0 = 0g

Gen2 interrupt configuration:

- Activity X enable: ☐
- Activity Y enable: ☐
- Activity Z enable: ☐
- Activity data source: Acc_Filt1
- Activity reference update: Manual update
- Activity hysteresis: 0 mg
- Activity criterion selection: Inactivity Interrupt
- Activity comb selection: Any Axes
- Interrupt threshold: 0 = 0mg
- Interrupt duration: 0 = 0ms
- Interrupt threshold ref X: 0 = 0g
- Interrupt threshold ref Y: 0 = 0g
- Interrupt threshold ref Z: 0 = 0g

At the bottom of the window are 'Read' and 'Write' buttons.

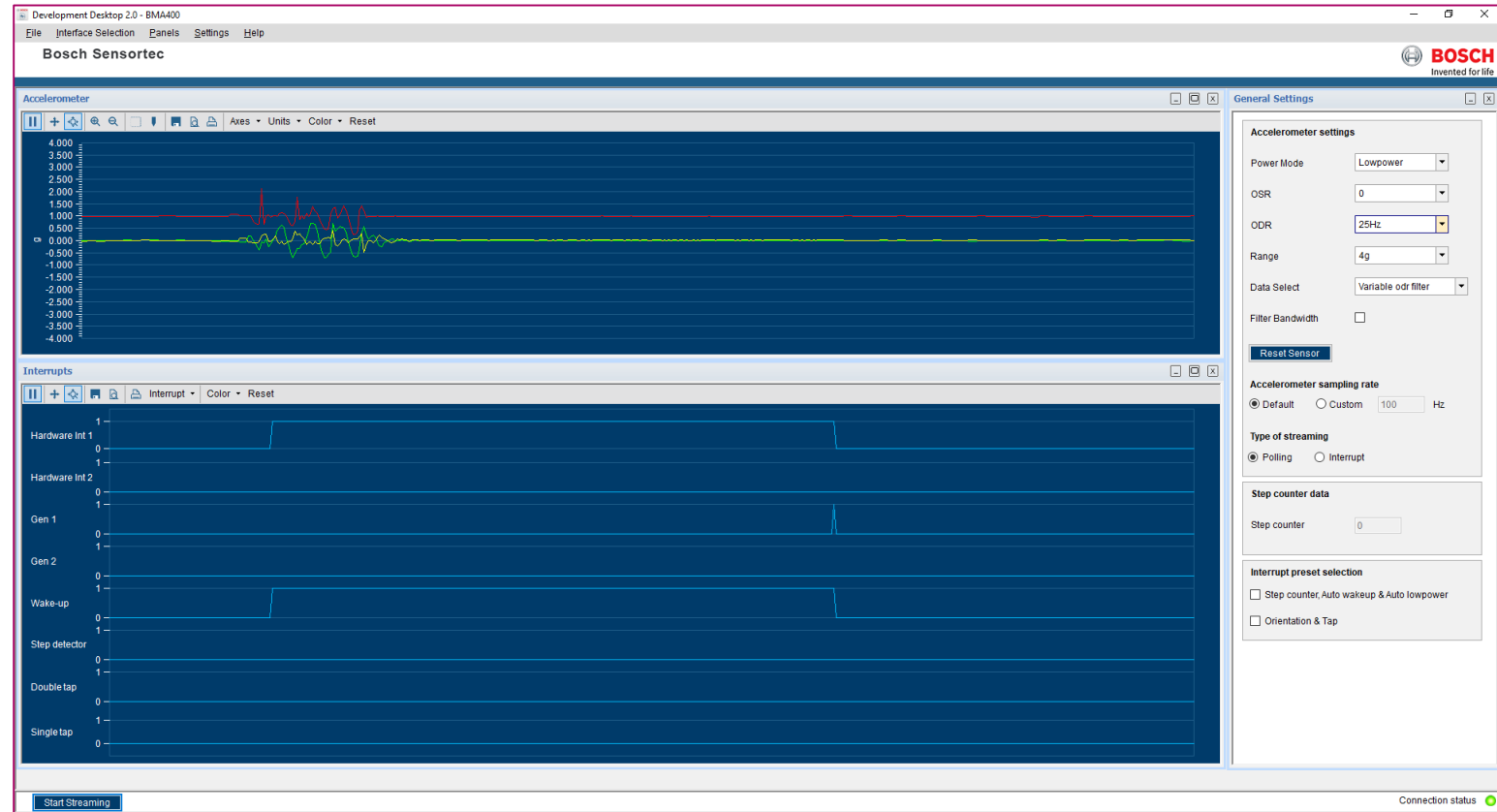
BMA400 Auto-wakeup & auto-lowpower interrupt example 4 of 4

Test the interrupt

5. Moving the board and checking the interrupt

As it can be seen, at the beginning BMA400 is in low power mode. When the motion is detected, it goes to normal mode. Wakeup interrupt and INT1 pin go high

After 1s with no motion (inactivity) BMA400 enters low power mode automatically. Gen1 interrupt generates a pulse. Wakeup interrupt and INT1 pin become low



This also means that whenever INT1 pin is high BMA400 is in normal mode at 200Hz or other ODRs that you select. Whenever INT1 pin is low BMA400 is in low power mode at fixed 25Hz sampling rate