

Bosch Sensortec

Quickstart Guide Using the BHA250 / BHA250B shuttle board

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Index of Contents

1 GENERAL DESCRIPTION	3
2 PC CONNECTION	3
3 DOWNLOADING THE RAM FIRMWARE IMAGE	5
4 CONFIGURING THE SENSOR	9
5 STREAMING THE DATA1	2
6 ACTIVATING MORE THAN ONE VIRTUAL SENSOR1	.3
7 DOCUMENT HISTORY AND MODIFICATION1	L6

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1 General Description

This guide will lead you step by step, and explain how to connect the BHA250 shuttleboard to a Windows computer using the Application board 2.0, configuring it and streaming data.

2 PC Connection

Make sure that the rightmost 2 DIP switches are in the "ON" position.



Document number BST-BHA250-AN002-01 | Revision 1.1 | Jan 2017 Sensortec

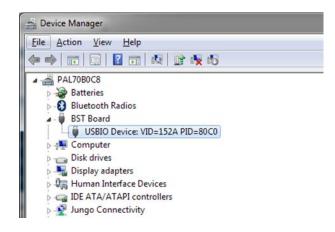


Open the "Development Desktop 2.0" windows application. You will be prompted with the following dialog:

Communication Interface	allow a first of
Communication Channel	USB
Communication Status	•
Connect	Application exit UI Ver: 3.2.4.0
No response from the board.	

UI version should be greater or equal than 3.1.2.1

Connect the Application board 2.0 to one of the USB ports and turn is on via the sliding switch. Make sure it is connected to the computer in the device manager. It should show up under the "BST Board" category.



Document number BST-BHA250-AN002-01 | Revision 1.1 | Jan 2017 Sensortec



3 Downloading the RAM firmware image

Click connect. Development Desktop will start, recognize the BHA250 and you will be prompted to download the RAM patch.

🐻 Download RAN	firmware image for BHY			— X
Hardware versi Product ID :		Revision ID :	0x0001	
Firmware version ROM Version :		RAM Version :	0x0000	
Select .fw file :				
Downloa	d			

Click on the "..." and select the "Bosch_PCB_7183_di01_BMA2x2_BMM150-7183_di01.2.1.xxxxx" located in the "C:\Program Files\Bosch Sensortec\Development Desktop 2.0\Firmware\BHA" folder on your computer.

🐷 Download RAM firmware image for BHY				×
Hardware versi Product ID :		Revision ID :	0x0001	
Firmware versi ROM Version :		RAM Version :	0x0000	
Select .fw file :	PCB_7183_di01_	BMA2x2_BMM150-7183_di	01.2.1.10258.fw	
Downloa	ıd			
		\mathbf{i}		

Next, click on download. You should see the text "BHY firmware is updated.

Document number BST-BHA250-AN002-01 | Revision 1.1 | Jan 2017 Sensortec



🐻 Download RAN	A firmware image for E	ЗНҮ		x
Hardware versi Product ID :		Revision ID :	0x0001	
Firmware versi ROM Version :		RAM Version :	0x2812	
Select .fw file :	PCB_7183_di01_B	MA2x2_BMM150-7183_di	01.2.1.10258.fw	
Downloa	ıd			
BHY firmware is	updated successfully			

Close this dialog.

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Then, click on the refresh button on the bottom right corner:

	BOSCH
- 🛛 🗶 General Setting	
	al Sensor
▼ Plot1	Accelerometer(Non-Wakeup)
I Plot2	Accelerometer(Non-Wakeup)
Plot3	Accelerometer(Non-Wakeup)
Active Virtual S	ensors No Active sensor found
BHI Working S	tatus
FIFO Wakeup	
Watermark	0 Size bytes
FIFO Non Wake Watermark	eup 0 🔹 Size bytes
	processor suspended
	processor suspended
BSX Library ODR	
	sor working status
Accelerome	ter Magnetometer Gyroscope
Sampling	g Rate
Range	
Power Me	ode
Interrupt	Enable 🔘
	r
Orientation	
Roll	Degree Pitch Degree
Heading	Degree
Calibration sta	itus
Acceleromet	ter
Gyroscope	
Disable Interr	rupt Reset System Refresh

This will poll the sensor to refresh all the statuses.

Document number BST-BHA250-AN002-01 | Revision 1.1 | Jan 2017 Sensortec



You should then see that all the sensors are in the "Power Down" state, with a sampling rate of 0Hz. This means that everythin is working normally.

Accelerometer	Ма	gnetometer	Gyroscope		
Sampling Ra	ate	0 Hz			
Range		0 g			
Power Mode	Mode	Power Mode F	Power Dow	Power Down	
Interrupt Ena	ble	•			
Accelerometer	Ма	gnetometer	Gyroscope]	
Sampling R	ate	0 Hz			
Range		2000 µT			
Power Mode	•	Power Dov	vn		
Interrupt Ena	able	0			
Accelerometer	Ма	gnetometer	Gyroscope]	
Sampling Ra	ate	0 Hz			

0 °/s

0

Power Down

Range

Power Mode

Interrupt Enable

Document number BST-BHA250-AN002-01 | Revision 1.1 | Jan 2017 Sensortec



4 Configuring the sensor

Next step is to enable a virtual sensor. Click on the "Virtual Sensor" tab on the top right.

			- 0 ×
		0	BOSCH Invented for life
)	General Settings		_ X
	System Virtual Senso	or 🚩	
	Plot1	Accelerometer(Non-Wakeup)	•
	Plot2	Accelerometer(Non-Wakeup)	•
	V Plot3	Accelerometer(Non-Wakeup)	•
	Active Virtual Sensors	No Active sensor found	•
	BHI Working Status		
	FIFO Wakeup		
	Watermark	0 🚖 Size	bytes
	FIFO Nee Welsow		

Click on the "Write Info" tab

General Settings	_ X
System Virtual Sensor	1
Virtual Sensor	Accelerometer(Non-Wakeup)
Read Info Write Int	io 🖛
SensorType	1
DriverID	48
DriverVersion	1
Power	1
Max Range	16
Resolution	16
Max Rate	200
FIFO Reserved	0
FIFO Max	782
Event size	8
Min Rate	1
Read	

Document number BST-BHA250-AN002-01 | Revision 1.1 | Jan 2017 Sensortec



From the drop-down list, select the sensor "Geomagnetic Rotation Vector (Non-Wakeup)". Set the sample rate to 50Hz, and the latency to 250ms. This means that the BHA250 will buffer the data for 250ms before sending it to the Host. Then click "Write".

General Settings		_ ×
System Virtual Sensor]
Virtual Sensor	Geomagnetic Ro	tation Vector(Non-W 🔻
Read Info Write Info		
Sample Rate	50 Hz (Game Mod	le) 🔻 Hz
Max Latency 2	250	ms
Sensitivity 0)	for windows
Range 2	2 🔻	g
Enable the raw d	lata output	
Write		

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If you go back to the "System" tab again and click refresh, you should see that the accelerometer and gyroscope are now enabled and sampling. You should also now see "Geomagnetic Rotation Vector (Non-Wakeup)" in the list of active virtual sensors.

General Settings
System Virtual Sensor
Plot1 Accelerometer(Non-Wakeup)
Plot2 Accelerometer(Non-Wakeup)
Plot3 Accelerometer(Non-Wakeup)
Active Virtual Sensors Geomagnetic Rotation Vector(Non-W -
BHI Working Status Normal
FIFO Wakeup
Watermark 0 😴 Size 7188 bytes
FIFO Non Wakeup Watermark 0 V Size 7188 bytes
Application processor suspended
BSX Library
ODR 50 Hz
Physical sensor working status
Accelerometer Magnetometer Gyroscope
Sampling Rate 64 Hz
Range 4 g
Power Mode Active
Interrupt Enable
Error Indicator No Error
Orientation
Roll Degree Pitch Degree
Heading Degree
Calibration status
Accelerometer
Gyroscope
Disable Interrupt Reset System Refresh

Document number BST-BHA250-AN002-01 | Revision 1.1 | Jan 2017 Sensortec



5 Streaming the data

In order to see the data output, you need to select the right sensor to plot in the graphs. Pick "Geomagnetic Rotation Vector (Non-Wakeup)" from the drop-down list.

virtual Senso	r
V Plot1	Accelerometer(Non-Wakeup)
Plot2	Humidity(Wakeup) Ambient Temperature(Non-Wakeup) Ambient Temperature(Wakeup)
Plot3	Uncalibrated Magnetometer(Non-Wa Uncalibrated Magnetometer(Wakeur
Active Virtual Sensors	Game Rotation Vector(Non-Wakeup)
BHI Working Status	Game Rotation Vector(Wakeup) Uncalibrated Gyroscope(Non-Wakeu 👻

Last step is to click the "Start streaming button"

s Development Desktop 2.0 - 8HY	
Elle Interface Selection Panelis Settings Help	
Bosch Sensortec	BOSCH Invented for life
	Invented for life
Game Rotation Vector(Non-Wakeup)	General Settings
11 + 🐼 0, 0, 🗋 1 🖪 2. Axes - Color - Reset	System Virtual Sensor
1000 -	Plot1 Game Rotation Vector(Non-Wakeup)
0 8000 -	Plot2 Accelerometer/Non-Wakeup)
9 6600	
02000	
0 0000	Active Virtual Sensors Game Rotation Vector(Non-Wakeup)
- 4400 -	BHI Working Status Normal
4 6000	FIFO Wakeup
- 0.8000 - - 1.0000 -	Watermark 0 🔅 Size 6258 bytes FIFO Non Wakeup
	Watermark 0 - Size 6258 bytes
Accelerometer(Nor-Wakeup)	Application processor suspended
II + 🚱 0, 0, 🗌 I 🖪 🖻 🛆 Assa - Cotor - Reset	BSX Library
20.00	ODR 211 Hz
15.00	
1980 - 500 -	Physical sensor working status
	Accelerometer Magnetometer Gyroscope
500 -	Sampling Rate 200 Hz
10 00	Range 4.g
-15.00	Power Mode Active
-20 00	Interrupt Enable
Accelerometer(Non-Walkeup)	Error Indicator No Error
11 + ☆ @ @ . I ■ @ Ares - Color - Reset	Orientation
20.00 -	Roll Degree Pitch Degree
15.00	Heading Degree
10.00	Calibration status
s 500	Accelerometer
- 500	Gyroscope
1500 -	Disable Interrupt Reset System Retresh
2000 -	
	Connection status

You should now see quaternion data with 50Hz Output data rate, 4Hz Refresh rate (1/250ms = 4Hz).



Document number BST-BHA250-AN002-01 | Revision 1.1 | Jan 2017 Sensortec



6 Activating more than one virtual sensor

Go back to the Virtual sensor tab, but this time enable "Linear Acceleration (Non-Wakup)". Use a sample rate of 100Hz and a latency of 0ms.

General Settings	_	X
System Virtual Sensor	/	
Virtual Sensor	Linear Acceleration (Non-Wakeup)]
Read Info Write Info		
Sample Rate	100 Hz (Fastest Mode) 🔻 Hz	
Max Latency (0 ms	
Sensitivity	0 for windows	
Range ,	4 🔻 g	
Enable the raw of Write	data output	

Document number BST-BHA250-AN002-01 | Revision 1.1 | Jan 2017 Sensortec



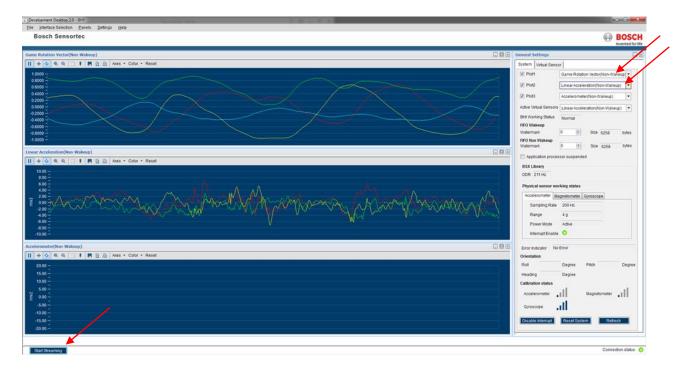
Back to the System tab and clicking refresh, you should now see two active virtual sensor. Note that the Accelerometer hardware is running at 126Hz, even if the Linear acceleration is running at 100Hz.

neral Settings	
System Virtual Senso	or
Plot1	Geomagnetic Rotation Vector(Non-W 🔻
Plot2	Linear Acceleration(Non-Wakeup)
Plot3	Accelerometer(Non-Wakeup)
Active Virtual Sensors	Linear Acceleration(Non-Wakeup)
BHI Working Status	Linear Acceleration(Non-Wakeup)
FIFO Wakeup	Geomagnetic Rotation vector(Non-wak
Watermark	0 🚔 Size 7188 bytes
FIFO Non Wakeup Watermark	0 Size 7188 bytes
Application proces	sor suspended
BSX Library	
ODR 100 Hz	
	agnetometer Øyroscope
Sampling Rate	126 Hz
Range	4 g
Power Mode	Active
Interrupt Enable	0
Error Indicator No	Error
Orientation	
Roll	Degree Pitch Degree
Heading	Degree
Calibration status	
Accelerometer	Magnetometer
Gyroscope	ull 🔪 🔰
Disable Interrupt	Reset System Refresh
Disable interrupt	Reliesi

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Configure the plots to see both virtual sensor, click start streaming again and you should now see both outputs simultaneously.



You should now see quaternion data with 50Hz Output data rate, Linear acceleration with 100Hz Output data rate, both at 100Hz Refresh rate.

Now it is worth noting that both geomagnetic rotation vector AND linear acceleration outputs are refreshed at 100Hz since interrupt rate is dictated by the lower latency enabled sensor, in this case the linear acceleration.

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7 Document history and modification

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0.1		Document creation	Mar. 02, 2016
1.0	all	Release	Jun. 29, 2016
1.1	Cover sheet	Added 2 new tech. ref. codes: - 0.273.141.309 (BHI160B) - 0.273.141.310 (BHA250B)	Jan. 04, 2017

Bosch Sensortec GmbH Gerhard-Kindler-Strasse 9 72770 Reutlingen / Germany Contact@bosch-sensortec.com www.bosch-sensortec.com Modifications reserved Specifications subject to change without notice Document number: BST-BHA250-AN002-01

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