

Quickstart Guide Using the BHI160 / BHI160B shuttle board

Арр	lication	Note
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Document revision

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1.1

Technical reference code(s)

Notes

0 273 141 230 0 273 141 309

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1 General description

This guide will guide you step by step and explain how to connect the BHI160 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.



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

Communication Interface	
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.



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3 Downloading the RAM firmware image

Click connect. Development Desktop will start, recognize the BHI160 and you will be prompted to download the RAM patch.

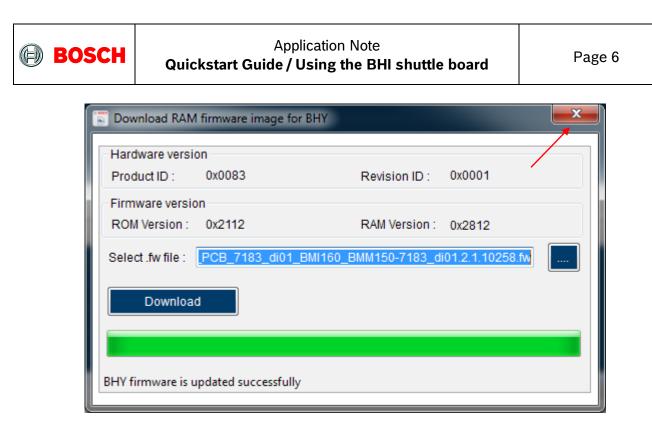
🐻 Download RAM	firmware image for BHY			×
-Hardware versio		Devision ID :	0-0004	
Product ID :		Revision ID :	0x0001	
-Firmware versio				
ROM Version :	0x2112	RAM Version :	0x0000	
Select .fw file :				
Download	d			
Download	<u> </u>			

Click on the "..." and select the "Bosch_PCB_7183_dixx_BMI160_BMM150-7183_dixx.x.x.xxxx" located in the "C:\Program Files\Bosch Sensortec\Development Desktop 2.0\Firmware\BHI" folder on your computer.

🐷 Download RAM firmware image for BHY				
Hardware versi Product ID :		Revision ID :	0x0001	
Firmware version :		RAM Version :	0x2812	
Select .fw file :	PCB_7183_di01_BI	MI160_BMM150-7183_di	01.2.1.10258.fw	
Downloa	d 🐙			

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

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Close this dialog.

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Then, Click on the refresh button on the bottom right corner.

	- 0 ×
	BOSCH Invented for life
General Settings	_ ×
System Virtual Sensor	
Plot1 Accelerometer(Non-Wakeup)	-
Plot2 Accelerometer(Non-Wakeup)	•
Plot3 Accelerometer(Non-Wakeup)	-
Active Virtual Sensors No Active sensor found	-
BHI Working Status	
FIFO Wakeup	_
Watermark 0 - Size	bytes
Watermark 0 ÷ Size	bytes
Application processor suspended	
BSX Library	
ODR	
Physical sensor working status	
Accelerometer Magnetometer Gyroscope	
Sampling Rate	
Range	
Power Mode	
Interrupt Enable	
Error Indicator	
Orientation	
Roll Degree Pitch	Degree
Heading Degree	
Calibration status	
Accelerometer	.111
Gyroscope	
Disable Interrupt Reset System Refr	esh
Conne	ction status 🔵

This will poll the sensor to refresh all the statuses.

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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	Мад	gnetometer	Gyroscope	e
Sampling Ra	te	0 Hz		
Range		0 g		
Power Mode		Power Dow	'n	
Interrupt Enal	ble	0		
L				

Accelerometer Ma	gnetometer Gyroscor	e
Sampling Rate	0 Hz	
Range	2000 µT	
Power Mode	Power Down]
Interrupt Enable	0	

Accelerometer M	lagnetometer G	yroscope
Sampling Rate	0 Hz	
Range	0 °/s	
Power Mode	Power Down	
Interrupt Enable	•	

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4 Configuring the sensor

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

		- 0 X
	6	BOSCH Invented for life
General Settings		_ X
System Virtual Senso	ir -	
V Plot1	Accelerometer(Non-Wakeup)	-
Plot2	Accelerometer(Non-Wakeup)	•
Plot3	Accelerometer(Non-Wakeup)	•
Active Virtual Sensors	No Active sensor found	-
BHI Working Status		
FIFO Wakeup		
Watermark	0 🔷 Size	bytes
FIFO No. INC.		

Click on the "Write Info" tab

General Settings		_ X
System Virtual Sensor		
Virtual Sensor	Accelerometer(Non-Wakeup)	•
Read Info Write Info	0	
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		

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From the drop-down list, select the sensor "Game Rotation Vector(Non-Wakeup)". Set the sample rate to 200Hz, and the latency to 250ms. This means that the BHI160 will buffer the data for 250ms before sending it to the Host. Then click Write.

General Settings
System Virtual Sensor
Virtual Sensor Game Rotation Vector(Non-Wakeup) -
Read Info Write Info
Sample Rate 200 Hz (Fastest Mode) ▼ Hz
Max Latency 250 ms
Sensitivity 0 for windows
Range 2 💌 g
Enable the raw data 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 "Game 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 Game Rotation Vector(Non-Wakeup) -						
BHI Working Status Normal						
FIFO Wakeup						
Watermark 0 🚔 Size 6258 bytes						
FIFO Non Wakeup Watermark 0 Size 6258 bytes						
Application processor suspended						
BSX Library						
ODR 211 Hz						
Diversional and the status						
Physical sensor working status						
Accelerometer Magnetometer Gyroscope						
Sampling Rate 200 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						

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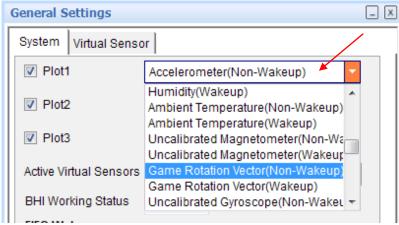
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5 Streaming the data

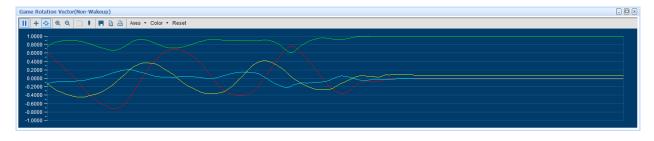
In order to see the data output, you need to select the right sensor to plot in the graphs. Pick "Game Rotation Vector (Non-Wakeup)" from the drop-down list.



Last step is to click the "Start streaming button"

0 0000	Tele Interface Section Panels Settings Help	
Accorder/for Wakega) Anse - Cotr - Read Anse - Cotr - Read <td< th=""><th>Bosch Sensortec</th><th>BOSCH</th></td<>	Bosch Sensortec	BOSCH
Image: Control - Reset Image: Control - Reset <th></th> <th></th>		
PODO		
0 0000 0 0000 <th>III + ☆ ♥ ♥ ↓ ■ Q A Ares - Color - Reset</th> <th>System Virtual Sensor</th>	III + ☆ ♥ ♥ ↓ ■ Q A Ares - Color - Reset	System Virtual Sensor
0 0000 0 0000 <th>1.0000 -</th> <th>Plot1 Game Rotation Vector(Non-Wakeup) -</th>	1.0000 -	Plot1 Game Rotation Vector(Non-Wakeup) -
2000 0000	0.8000	Plat2 Accelerometer/Map.Wakeup)
2000 2000		
Adv: vicual Sensor Adv: v		Plot3 Accelerometer(Non-Wakeup)
2000 0000	0000	Active Virtual Sensors Game Rotation Vector/Non-Wakeup
000000000000000000000000000000000000	02000	
2000 1000		
1000000000000000000000000000000000000		
statementer (Non Wakeup) Image: State State Image: State State Image: State </th <th>1000</th> <th></th>	1000	
Image: Color + Reset 2000 1000 <th></th> <th>Watermark 0 👘 Size 6258 bytes</th>		Watermark 0 👘 Size 6258 bytes
2000 1500 500 500 500 500 500 500		Application processor suspended
2000 OCR 211H2 1000 South 500	II + ☆ ● ← □ I ■ △ Aus - Color - Reset	BSX Library
15.00		
S00		
0.01		Physical sensor working status
500-1 Calculation (Note: Statistics) 1000-1 Calculation (Note: Statistics) 2000-1 Calculation (Note: Statis) 2000-1	N 500	Accelerometer Magnetometer Gyroscope
1000- 1500- 2000- Image: Age: base - Color - Reset 1000- Image: Color - Reset </th <th></th> <th>Sampling Rate 200 Hz</th>		Sampling Rate 200 Hz
1000-1 1000-1		Range 4 g
the multiplication the multiplicati		
Selection Wakeup) Image: Color - Reset 2000 - Image: Color - Reset 2000 - Image: Color - Reset 500 - Imag		
Image: Contract of the sector of the sect	-2000 -	Interrupt Enable
Image: Control of the sector of the secto	Accelerometer(Non-Wakeup)	Error Indicator No Error
15.00 Heading Degree 15.00 Calibration status 0.00 Accelerometer 0.00 Gitter status	🔢 + 🗞 🔍 🖓 📄 I 📕 🖻 🛆 Asss - Color - Reset	Orientation
15.00 Heading Degree 15.00 Caleration status 5.00 Acceleranter , 5.00 Gresscope , 5.00 Gresscope , 5.00 Caleration status 5.00 Gresscope , 5.00 Caleration status 5.00 Gresscope , 5.00 Caleration status	20.00 -	Roll Degree Pitch Degree
1000- Calibration status 500- Accelerometer 500- Option		Heading Degree
500 Accelerometer ,1 Magnetioneter ,1 500		
3.60 Gyroscope	500	
5 60		Accelerometer Magnetometer
-10.00 - -15.00 - Disable Internutt Reset System Retenh	-500	Giroscope
2000		Disable Interrupt Reset System Refresh
	-20.00	
Stret directional	Start Okeanny	Connection status

You should now see quaternion data with 200Hz Output data rate, 4Hz Refresh rate (1/250ms = 4Hz).



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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 data output	
Write	

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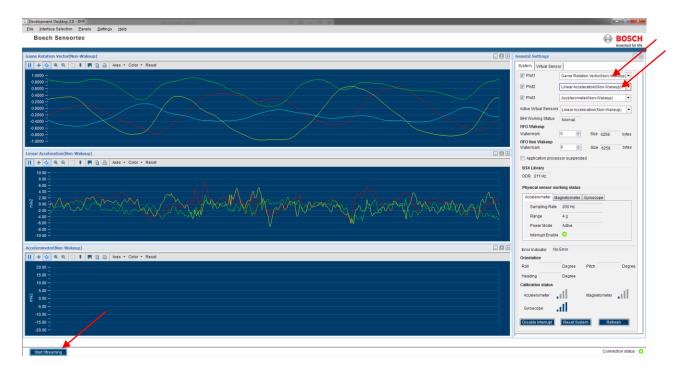
Back to the System tab and clicking refresh, you should now see two active virtual sensor. Note that the Accelerometer hardware is still running at 200Hz, even if the Linear acceleration is running at 100Hz.

neral Settings	
virtual Sens	or
V Plot1	Accelerometer(Non-Wakeup)
Plot2	Accelerometer(Non-Wakeup)
Plot3	Accelerometer(Non-Wakeup)
Active Virtual Sensors	Linear Acceleration(Non-Wakeup)
BHI Working Status	Linear Acceleration(Non-Wakeup) Game Rotation Vector(Non-Wakeup)
FIFO Wakeup	Game (Colaron Vector(Non-Wakeup)
Watermark	0 Size 6258 bytes
FIFO Non Wakeup Watermark	0 Size 6258 bytes
Application proces	ssor suspended
BSX Library	
ODR 211 Hz	
Physical sensor wo	rking status
Accelerometer Ma	agnetometer Syroscope
Sampling Rate	200 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	

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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 200Hz Output data rate, Linear acceleration with 100Hz Output data rate, both at 100Hz Refresh rate.

Now it is worth noting that both game 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

Rev. No	Chapter	Description of modification/changes	Date
0.1	all	Document creation	Mar. 02, 2016
1.0	all	Release	Jul. 25, 2016
1.1		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-BHy1-AN002-01

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