

Sensor Evaluation Kit

SensorShield-EVK-003 Manual

SensorShield-EVK-003 is a Kit, which are included the 8 kinds of Sensor and Shield-EVK-001 which connects Arduino and ROHM Sensor Boards. Shield-EVK-001 will be referred to as "SensorShield" on this manual.

Board Information

No.	Sensor	Type Name
1	Accelerometer	KX224-I2C
2	Pressure Sensor	BM1383AGLV
3	Magnetometer	BM1422AGMV
4	ALS/PS Sensor	RPR-0521RS
5	Color Sensor	BH1749NUC
6	Optical Sensor for Heart Rate Monitor	BH1790GLC
7	Hall Sensor	BD7411G
8	Temperature Sensor	BD1020HFV

Table 1. Sensor lineup

SensorShield Detail

- Connection Board between Arduino and ROHM Sensor Board (Figure 1)
- Size: 88mm x 63mm
- Five I2C Sensors, One I/O Sensor and Two Analog Sensors can be controlled
- 5V-3.0/1.8V Level Shifter
 - GPIO : FAIRCHILD FXMA108
 - I2C : NXP PCA9306
 - I2C pull-up register is implemented

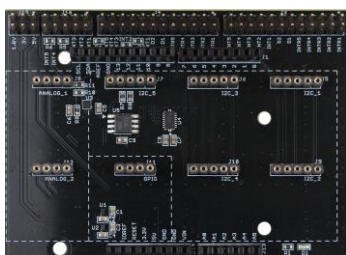


Figure 1. SensorShield

Preparation

- Arduino Uno 1pc
- Personal Computer installed Arduino IDE 1pc
 - Requirement : Arduino 1.6.7 or higher
 - Please use Arduino IDE which can be downloaded from the link below:
<http://www.arduino.cc/>
- USB cable for connecting Arduino and PC 1pc
- SensorShield-EVK-003 1pc

Setting for Board and Software

The following explanation is about a connection method of BM1422AGMV-EVK-001 which is I2C connection sensor.

1. Connect the SensorShield to the Arduino (Figure 2)

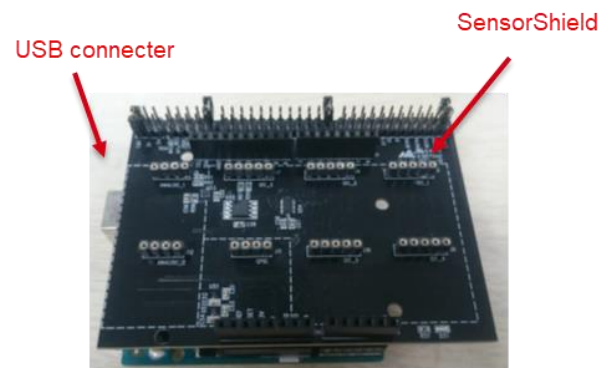


Figure 2. Connection between the Arduino and the SensorShield

2. Connect BM1422AGMV-EVK-001 to the socket of I2C_1 on the SensorShield (Figure 3)

- Set Voltage of the SensorShield to 1.8V or 3.0V (Figure 3)
- Set Interrupt of the SensorShield to INTR1 (Figure 3)

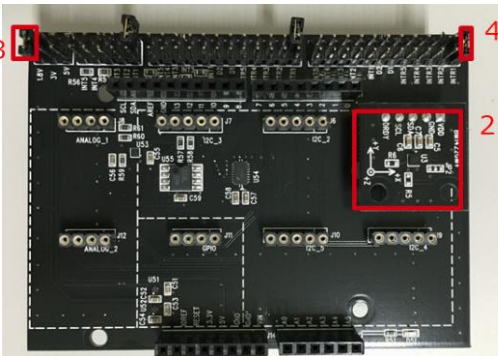


Figure 3. Connection between BM1422AGMV-EVK-001 and the SensorShield

- Wait for the message "Done uploading" (Figure 5)

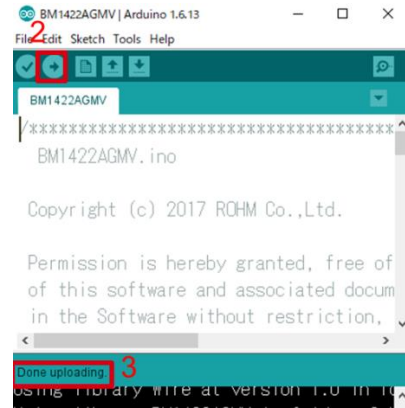


Figure 5. Uploading

- Connect the Arduino to the PC using a USB cable
- Download BM1422AGMV.zip from the link below: <http://www.rohm.com/web/global/sensor-shield-support>
- Launch Arduino IDE
- Select [Sketch]->[Include Library]->[Add.ZIP library...], install BM1422AGMV.zip
- Select [File]->[Examples]->[BM1422AGMV]->[example]->[BM1422AGMV]

- Select [Tools]->[Serial Monitor] (Figure 6)

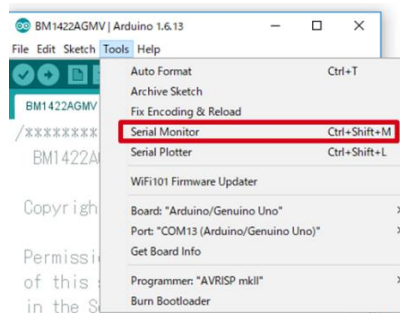


Figure 6. Tools Setting

Measurement

- Select [Tools] and check the contents enclosed in the red frame. (Figure 4) Board should be "Arduino/Genuino Uno" and Port should be COMxx (Arduino/Genuino Uno). COM port number is different in each environment.

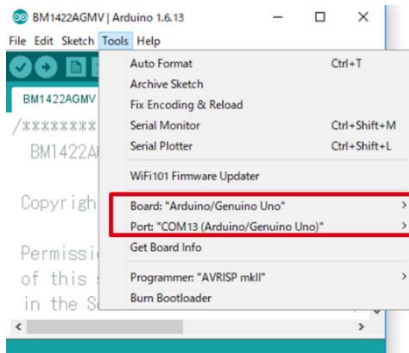


Figure 4. COM Port setting

- Check log of Serial Monitor (Figure 7)

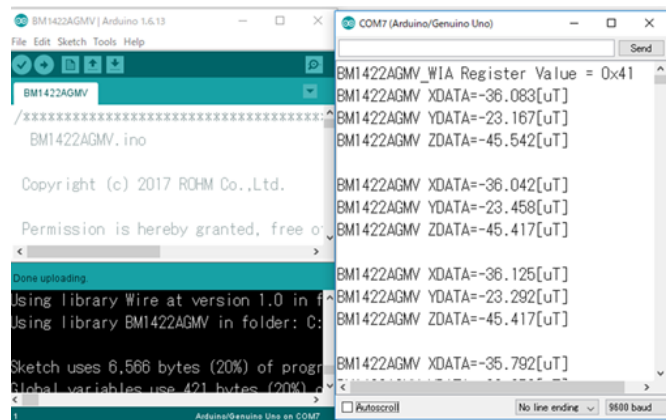


Figure 7. Serial Monitor

- Write the program by pressing right arrow button for upload (Figure 5)

Three kinds of connection method

The following explanation is about three kinds of connection methods of I2C Sensor, I/O Sensor and Analog Sensor.

1. I2C Sensor (Example: KX224-I2C)

[Setting for Program]

Select [File]->[Examples]->[KX224-I2C]->[example]->[KX224-I2C]

Check log of Serial Monitor according to measurement method

[Measurement]

Get the data of each X, Y, Z axis of KX224-I2C every 500ms and display it.(Figure 8)

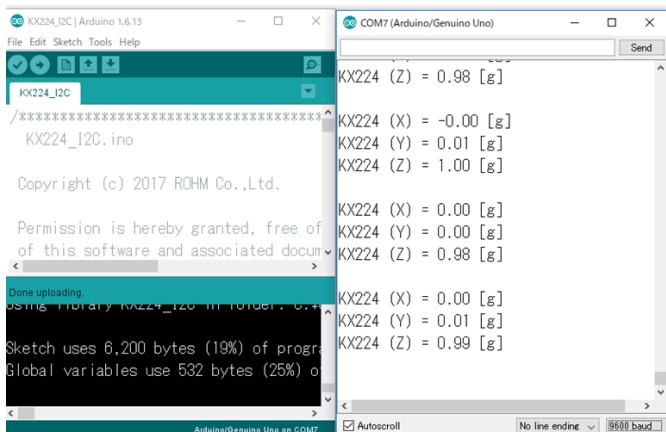


Figure 8. Serial Monitor (KX224-I2C)

2. I/O Sensor (Example: BD7411G)

[Setting for Program]

Select [File]->[Examples]->[BD7411G]->[example]->[BD7411G]

Check log of Serial Monitor according to measurement method

[Measurement]

Check the output of BD7411G every 500ms, and when the output is low, display a message (Figure 9)

*Notice : When a program of BD7411G is written, please remove BD7411G-EVK-001.

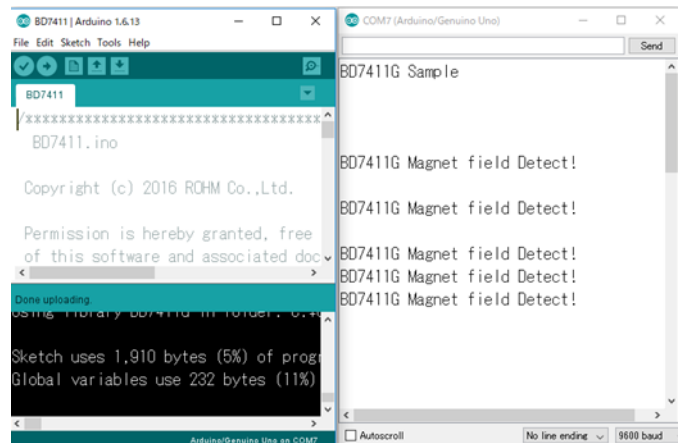


Figure 9. Serial Monitor (BD7411G)

3. Analog Sensor (Example: BD1020HFV)

[Setting for Program]

Select [File]->[Examples]->[BD1020HFV]->[example]->[BD1020HFV]

Check log of Serial Monitor according to measurement method

[Measurement]

Convert the output of BD1020HFV into temperature every 500ms and display a message (Figure 10)

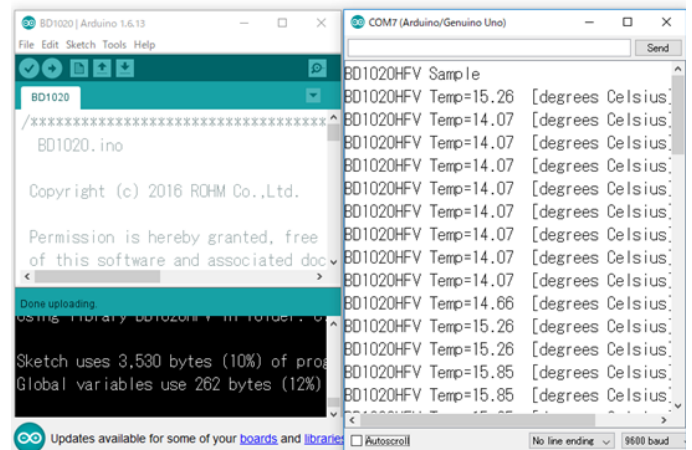


Figure 10. Serial Monitor (BD1020HFV)

Notes

- 1) The information contained herein is subject to change without notice.
- 2) Before you use our Products, please contact our sales representative and verify the latest specifications :
- 3) Although ROHM is continuously working to improve product reliability and quality, semiconductors can break down and malfunction due to various factors.
Therefore, in order to prevent personal injury or fire arising from failure, please take safety measures such as complying with the derating characteristics, implementing redundant and fire prevention designs, and utilizing backups and fail-safe procedures. ROHM shall have no responsibility for any damages arising out of the use of our Products beyond the rating specified by ROHM.
- 4) Examples of application circuits, circuit constants and any other information contained herein are provided only to illustrate the standard usage and operations of the Products. The peripheral conditions must be taken into account when designing circuits for mass production.
- 5) The technical information specified herein is intended only to show the typical functions of and examples of application circuits for the Products. ROHM does not grant you, explicitly or implicitly, any license to use or exercise intellectual property or other rights held by ROHM or any other parties. ROHM shall have no responsibility whatsoever for any dispute arising out of the use of such technical information.
- 6) The Products specified in this document are not designed to be radiation tolerant.
- 7) For use of our Products in applications requiring a high degree of reliability (as exemplified below), please contact and consult with a ROHM representative : transportation equipment (i.e. cars, ships, trains), primary communication equipment, traffic lights, fire/crime prevention, safety equipment, medical systems, servers, solar cells, and power transmission systems.
- 8) Do not use our Products in applications requiring extremely high reliability, such as aerospace equipment, nuclear power control systems, and submarine repeaters.
- 9) ROHM shall have no responsibility for any damages or injury arising from non-compliance with the recommended usage conditions and specifications contained herein.
- 10) ROHM has used reasonable care to ensure the accuracy of the information contained in this document. However, ROHM does not warrants that such information is error-free, and ROHM shall have no responsibility for any damages arising from any inaccuracy or misprint of such information.
- 11) Please use the Products in accordance with any applicable environmental laws and regulations, such as the RoHS Directive. For more details, including RoHS compatibility, please contact a ROHM sales office. ROHM shall have no responsibility for any damages or losses resulting non-compliance with any applicable laws or regulations.
- 12) When providing our Products and technologies contained in this document to other countries, you must abide by the procedures and provisions stipulated in all applicable export laws and regulations, including without limitation the US Export Administration Regulations and the Foreign Exchange and Foreign Trade Act.
- 13) This document, in part or in whole, may not be reprinted or reproduced without prior consent of ROHM.



Thank you for your accessing to ROHM product informations.
More detail product informations and catalogs are available, please contact us.

ROHM Customer Support System

<http://www.rohm.com/contact/>

No.	Sensor	Type Name	Connection Area
1	Accelerometer	KX224-I2C	I2C_1,I2C_2,I2C_3,I2C_4,I2C_5
2	Pressure sensor	BM1383AGLV	I2C_1,I2C_2,I2C_3,I2C_4,I2C_5
3	Magnetometer	BM1422AGMV	I2C_1,I2C_2,I2C_3,I2C_4,I2C_5
4	ALS/PS sensor	RPR-0521RS	I2C_1,I2C_2,I2C_3,I2C_4,I2C_5
5	Color sensor	BH1749NUC	I2C_1,I2C_2,I2C_3,I2C_4,I2C_5
6	Optical Sensor for Heart Rate Monitor	BH1790GLC	I2C_1,I2C_2,I2C_3,I2C_4,I2C_5
7	Hall sensor	BD7411G	GPIO
8	Temperature sensor	BD1020HFV	ANALOG_2

Table 2. Connection Area of each sensor

No.	Sensor	Type Name	Supply Power	Recommended Operating Voltage [V]			Selectable Power [V]		
				Min.	Typ.	Max	1.8	3	5
1	Accelerometer	KX224-I2C	VDD	1.71	2.5	3.6	○	○	
			IO_VDD	1.7	-	VDD			
2	Pressure sensor	BM1383AGLV	VDD	1.7	-	3.6	○	○	
3	Magnetometer	BM1422AGMV	AVDD	1.7	-	3.6	○	○	
			DVDD	1.7	-	3.6			
4	ALS/PS sensor	RPR-0521RS	VCC	2.5	3.0	3.6		○	
			VLEDA	2.8	3.0	5.5			
5	Color sensor	BH1749NUC	Vcc	2.3	2.5	3.6		○	
6	Optical Sensor for Heart Rate Monitor	BH1790GLC	VDD	2.5	3.0	3.6		○	
			VLED	3.6		5.5			○
7	Hall sensor	BD7411G	VDD	4.5	5.0	5.5			○
8	Temperature sensor	BD1020HFV	VDD	2.4	3.0	5.5		○	○

Table 3. The Operating Voltage of each sensor

No.	Sensor	Type Name	Device Address(7bit)
1	Accelerometer	KX224-I2C	0x1E/0x1F
2	Pressure sensor	BM1383AGLV	0x5D
3	Magnetometer	BM1422AGMV	0x0E/0x0F
4	ALS/PS sensor	RPR-0521RS	0x38
5	Color sensor	BH1749NUC	0x38/0x39
6	Optical Sensor for Heart Rate Monitor	BH1790GLC	0x5B

Blue character is default device address

Table 4. Device Address of the I2C Sensor

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[ROHM Semiconductor:](#)

[SENSORSHIELD-EVK-003](#)