


From BNO055 datasheet, there are two registers to define axis remapping 0x41 for axis\_map\_config and 0x42 for axis\_map\_sign as shown below. Basically BNO055 axes x/y/z are fixed in any system. Axis remapping is to align BNO055 x/y/z axes to the product body axes X/Y/Z.

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### 3.4 Axis remap

The device mounting position should not limit the data output of the BNO055 device. The axis of the device can be re-configured to the new reference axis.

Axis configuration byte: Register Address: **AXIS\_MAP\_CONFIG**

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Reserved		Remapped Z axis value		Remapped Y axis value		Remapped X axis value	

There are two bits are used to configure the axis remap which will define in the following way,

Value	Axis Representation
00	X - Axis
01	Y - Axis
10	Z- Axis
11	Invalid

Also, when user try to configure the same axis to two or more then BNO055 will take this as invalid condition and previous configuration will be restored in the register map. The default value is: X Axis = X, Y Axis = Y and Z Axis = Z (AXIS\_REMAP\_CONFIG = 0x24).

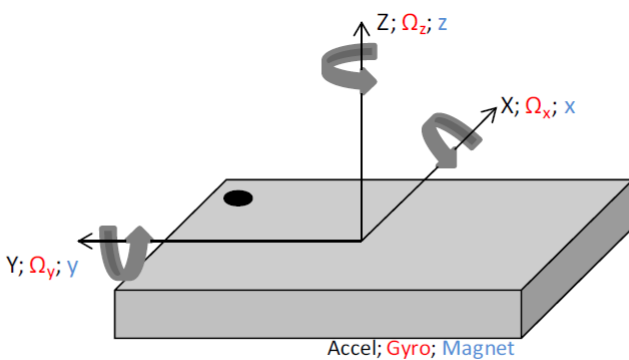
Axis sign configuration byte: Register Address: **AXIS\_MAP\_SIGN**

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Reserved					Remapped X axis sign	Remapped Y axis sign	Remapped Z axis sign

Value	Sign
0	Positive
1	Negative

The default value is 0x00.

The default values correspond to the following coordinate system



Accel; Gyro; Magnet

42	AXIS_MAP_SIGN	0x00		Remapped X axis sign	Remapped Y axis sign	Remapped Z axis sign
41	AXIS_MAP_CONFIG	0x24		Remapped Z axis value	Remapped Y axis value	Remapped X axis value

For example, at P0 position as shown below,

For the above described placements, following would be the axis configuration parameters.

Placement	AXIS_REMAP_CONFIG	AXIS_REMAP_SIGN
P0	0x21	0x04
P1 (default)	0x24	0x00
P2	0x24	0x06

BNO055 x = Body Y

BNO055 y = -Body X

BNO055 z = Body Z

Therefore,

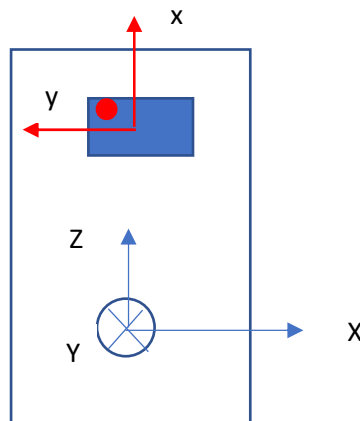
Register axis\_map\_config 0x41 = 0b0010 0001 = 0x21

Register axis\_map\_sign 0x42 = 0b0000 0100 = 0x04

This matches the datasheet values as shown above in red color circle.

Now in your case the board is vertical. So the body X/Y/Z axes are changed. You need to redo the axis remapping.

For example,



BNO055 x/y/z are fixed with z axis pointing out from the paper. The body X/Y/Z axes are as shown above with Y axis pointing towards the paper.

Then,

BNO055 x = Body Z

BNO055 y = -Body X

BNO055 z = -Body Y

Therefore,

Register axis\_map\_config 0x41 = 0b0000 1001 = 0x09

Register axis\_map\_sign 0x42 = 0b0000 0110 = 0x06

Please try these two values above in BNO055 breakout board.

Inside BNO055 the BSX is Full version. But it works the same way as BSX Lite except it has extra magnetometer calibration feature.