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DFR0182 Wirless GamePad V2.0

DFR0100 DFRduino Beginner Kit For
Arduino V3

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DFR0296 Bluno Nano

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DFR0351 Romeo BLE mini V2.0

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DFR0321 Wido-WIFI IoT Node

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DFR0343 UHex Low-power Controller

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Controller

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for Raspberry Pi

DFR0494 Raspberry Pi UPS HAT

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LCD KeyPad HAT V1.0DFR0524 5.5 HDMI OLED-Display
with Capacitive Touchscreen V2.0DFR0550 5" TFT-Display with
Touchscreen

Introduction

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Board Overview

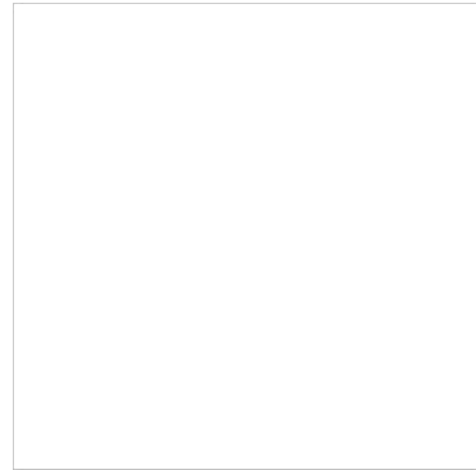
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SKU:SEN0373



Introduction

This compact BMX160 9-axis sensor from Bosch Sensortec is an ideal solution for applications that face strict constraints of board space, power consumption and appearance like wearable fitness trackers, smart remote controls, quadcopters and so on.

This BMX160 sensor is the smallest 9-axis sensor in the industry. It comprises an accelerometer, gyroscope and geomagnetic sensor in a single package, and features less than 1.5mA power consumption.

Due to the compact design, BMX160 can be ideally integrated into wearables like smart watches or glasses for augmented reality. Combined with BSX sensor data fusion software library of Bosch Sensortec, the sensor performance can be further improved.

Features

- BMX160 9-Axis Sensor
 - Integrated Three Sensors:
 - 16-bit Gyroscope
 - 16-bit Accelerometer
 - Geomagnetic Sensor
 - Intelligent Power Management System: normal, low power, sleep

Specification

Dimension

- Operating Voltage: 3.3V-5.5V
- BMX160 Accelerometer:
 - Accelerometer: $\pm 2g/\pm 4g/\pm 8g/\pm 16g$
- BMX160 Gyroscope:
 - Range: $\pm 125^{\circ}/s \sim 2000^{\circ}/s$
- BMX160 Geomagnetic:
 - Range: $\pm 1150\mu T(x,y\text{-axis}); \pm 2500\mu T(z\text{-axis})$
 - Resolution: ~ 0.3
- Outline Dimension: 20 x 12.5mm/0.79 x 0.49"

DFR0591 raspberry pi e-ink display module V1.0

DFR0592 DC Motor Driver HAT

DFR0604 I O Expansion HAT for Pi zero V1.0

DFR0566 IO Expansion HAT for Raspberry Pi

DFR0528 UPS HAT for Raspberry Pi Zero

DFR0331 Romeo for Edison Controller

DFR0453 DFRobot CurieNano - A mini Genuino Arduino 101 Board

TEL0110 CurieCore intel® Curie Neuron Module

DFR0478 FireBeetle ESP32 IOT Microcontroller(V3.0) Supports Wi-Fi & Bluetooth

DFR0483 FireBeetle Covers-Gravity I O Expansion Shield

FireBeetle Covers-24×8 LED Matrix

TEL0121 FireBeetle Covers-LoRa Radio 433MHz

TEL0122 FireBeetle Covers-LoRa Radio 915MHz

TEL0125 FireBeetle Covers LoRa Radio 868MHz

DFR0489 FireBeetle ESP8266 IOT Microcontroller

DFR0492 FireBeetle Board-328P with BLE4.1

DFR0498 FireBeetle Covers-Camera&Audio Media Board

DFR0507 FireBeetle Covers-OLED12864 Display

DFR0508 FireBeetle Covers-DC Motor & Stepper Driver

DFR0511 FireBeetle Covers-ePaper Black&White Display Module

DFR0531 FireBeetle Covers-ePaper Black&White&Red Display Module

DFR0536 Micro bit Gamepad Expansion Board

DFR0548 Micro bit Driver Expansion Board

ROB0148 micro: Maqueen for micro:bit

ROB0150 Micro bit Circular RGB LED Expansion Board

- Mounting Hole Position: 15mm
- Mounting Hole Size: inner diameter 2mm/outer diameter 3.7mm

Board Overview

Front View

Back View

Silkscreen	Function Description
VCC	+
GND	-
SCL	I2C Clock
SDA	I2C Data
CSB	BMX160 Protocol Select Pin
INIT1	BMX160 External Interrupt 1
INIT2	BMX160 External Interrupt 2
ADDR	I2C Address Select

API Functions

```
class DFRobot_BMX160 {
/*
 * @function Gyroscope enum range, unit: G
 */
typedef enum{
    eGyroRange_2000DPS, /*Gyroscope sensitivity at 2000
    eGyroRange_1000DPS, /*Gyroscope sensitivity at 1000
    eGyroRange_500DPS, /*Gyroscope sensitivity at 500
    eGyroRange_250DPS, /*Gyroscope sensitivity at 250
    eGyroRange_125DPS /*Gyroscope sensitivity at 125
}eGyroRange_t;

/*
 * @function Accelerometer enum range, unit, m/s^2
 */
typedef enum{
    eAccelRange_2G, /* Macro for mg per LSB at +/- 2g
    eAccelRange_4G, /* Macro for mg per LSB at +/- 4g
    eAccelRange_8G, /* Macro for mg per LSB at +/- 8g
    eAccelRange_16G /* Macro for mg per LSB at +/- 16g
}eAccelRange_t;

/*
 * @function reset sensor
 * @Return true if it succeeds
 */
bool softReset();

/*
 * @function init sensor
 * @Return true if it succeeds
 */
bool begin();

/*
 * @function set gyroscope range, unit: G
 * @Parameter One variable from eGyroRange_t
 */
void setGyroRange(eGyroRange_t bits);
```

MBT0005 micro IO-BOX

SEN0159 CO2 Sensor

DFR0049 DFRobot Gas Sensor

TOY0058 Barometric Pressure Sensor

SEN0220 Infrared CO2 Sensor 0-50000ppm

SEN0219 Gravity Analog Infrared CO2 Sensor For Arduino

SEN0226 Gravity I2C BMP280 Barometer Sensor

SEN0231 Gravity HCHO Sensor

SEN0251 Gravity BMP280 Barometric Pressure Sensors

SEN0132 Carbon Monoxide Gas Sensor MQ7

SEN0032 Triple Axis Accelerometer Breakout - ADXL345

DFR0143 Triple Axis Accelerometer MMA7361

Triple Axis Accelerometer FXLN83XX Series

SEN0072 CMPS09 - Tilt Compensated Magnetic Compass

SEN0073 9 Degrees of Freedom - Razor IMU

DFR0188 Flymaple V1.1

SEN0224 Gravity I2C Triple Axis Accelerometer - LIS2DH

SEN0140 10 DOF Mems IMU Sensor V2.0

SEN0250 Gravity BMI160 6-Axis Inertial Motion Sensor

SEN0253 Gravity BNO055 + BMP280 intelligent 10DOF AHRS

SEN0001 URM37 V5.0 Ultrasonic Sensor

SEN0002 URM04 V2.0

SEN0004 SRF01 Ultrasonic sensor

SEN0005 SRF02 Ultrasonic sensor

SEN0006 SRF05 Ultrasonic sensor

SEN0007 SRF08 Ultrasonic Sensor

SEN0008 SRF10 Ultrasonic sensor

SEN0149 URM06-RS485 Ultrasonic

Ultrasonic

```
/*
 * @function set accelerometer range, unit: m/s^2
 * @Parameter One variable from eAccelRange_t
 */
void setAccelRange(eAccelRange_t bits);

/*
 * @function Get data of accelerometer, gyroscope,
 * @Parameter Store the address of all data
 */
void getAllData(struct bmx160SensorData *magn, struct bmx160SensorData *gyro, struct bmx160SensorData *mag);

/*
 * @function Turn off geomagnetic sensor, gyroscope
 */
void setLowPower();

/*
 * @function Turn on geomagnetic sensor, gyroscope
 */
void wakeUp();
```

Tutorial

Visit the I2C address of BMX160 via I2C interface to get the related position data.

Requirements

- Hardware
 - [DFRduino UNO R3](#) (or similar) x 1
 - BMX160 9-axis Sensor Module x1
 - Jumper wires
- Software
 - [Arduino IDE](#)
 - Download and install the [BMX160 Library](#) ([About how to install the library?](#))

Connection Diagram

Connection Diagram

BMX160 Tutorial

Function: read data of accelerometer, gyroscope and geomagnetic sensor of BMX160 via I2C interface, and print the readings through serial port.

```
/*!
 * file readAllData.ino
 *
 * Through the example, you can get the sensor data
 * get all data of magnetometer, gyroscope, accelerometer
 *
 * With the rotation of the sensor, data changes accordingly
 *
 * Copyright [DFRobot](http://www.dfrobot.com),
 * Copyright GNU Lesser General Public License
 *
 * version V0.1
 * date 2019-6-25
 */
```

SEN0151 URM06-PULSE Ultrasonic

SEN0152 URM06-ANALOG
Ultrasonic

SEN0153 URM07-UART Ultrasonic
Sensor

SEN0246 URM08-RS485 Waterproof
Sonar Range Finder

SEN0304 URM09 Ultrasonic Sensor
(Gravity-I2C) (V1.0)

SEN0304 URM09 Ultrasonic Sensor
(Gravity-I2C) (V1.0)

SEN0300 Water-proof Ultrasonic
Sensor ULS

SEN0301 Water-proof Ultrasonic
Sensor ULA

SEN0307 URM09 Ultrasonic Sensor
Gravity Analog

SEN0311 A02YYUW Waterproof
Ultrasonic Sensor

SEN0312 ME007YS Waterproof
Ultrasonic Sensor

SEN0313 A01NYUB Waterproof
Ultrasonic Sensor

DFR0066 SHT1x Humidity and
Temperature Sensor

DFR0067 DHT11 Temperature and
Humidity Sensor

SEN0137 DHT22 Temperature and
humidity module

DFR0023 DFRobot LM35 Linear
Temperature Sensor

DFR0024 Gravity DS18B20
Temperature Sensor Arduino
Compatible V2

DFR0024 Gravity DS18B20
Temperature Sensor Arduino
Compatible V2

SEN0114 Moisture Sensor

TOY0045 TMP100 Temperature
Sensor

TOY0054 SI7021 Temperature and
humidity sensor

SEN0206 IR Thermometer Sensor
MLX90614

SEN0227 SHT20 I2C Temperature &
Humidity Sensor Waterproof Probe

SEN0236 Gravity I2C BME280

```
#include <DFRobot_BMX160.h>

DFRobot_BMX160 bmx160;
void setup(){
  Serial.begin(115200);
  delay(100);

  //init the hardware bmx160
  if (bmx160.begin() != true){
    Serial.println("init false");
    while(1);
  }
  //bmx160.setLowPower(); //disable the gyroscope
  //bmx160.wakeUp();      //enable the gyroscope
  //bmx160.softReset();   //reset the sensor

  /** @typedef enum{eGyroRange_2000DPS,
   *                  eGyroRange_1000DPS,
   *                  eGyroRange_500DPS,
   *                  eGyroRange_250DPS,
   *                  eGyroRange_125DPS
   *                  }eGyroRange_t;
   **/
  //bmx160.setGyroRange(eGyroRange_500DPS);

  /** @typedef enum{eAccelRange_2G,
   *                  eAccelRange_4G,
   *                  eAccelRange_8G,
   *                  eAccelRange_16G
   *                  }eAccelRange_t;
   */
  //bmx160.setAccelRange(eAccelRange_4G);
  delay(100);
}

void loop(){
  bmx160SensorData Omagn, Ogyro, Oaccel;

  /* Get a new sensor event */
  bmx160.getAllData(&Omagn, &Ogyro, &Oaccel);

  /* Display the magnetometer results (magn is magn
  Serial.print("M ");
  Serial.print("X: "); Serial.print(Omagn.x); Serial
  Serial.print("Y: "); Serial.print(Omagn.y); Serial
  Serial.print("Z: "); Serial.print(Omagn.z); Serial
  Serial.println("uT");

  /* Display the gyroscope results (gyroscope data
  Serial.print("G ");
  Serial.print("X: "); Serial.print(Ogyro.x); Serial
  Serial.print("Y: "); Serial.print(Ogyro.y); Serial
  Serial.print("Z: "); Serial.print(Ogyro.z); Serial
  Serial.println("g");

  /* Display the accelerometer results (acceleromet
  Serial.print("A ");
  Serial.print("X: "); Serial.print(Oaccel.x );
  Serial.print("Y: "); Serial.print(Oaccel.y );
  Serial.print("Z: "); Serial.print(Oaccel.z );
  Serial.println("m/s^2");

  Serial.println("");

  delay(500);
}
```

Expected Results

Environmental Sensor Temperature,
Humidity, Barometer

SEN0248 Gravity I2C BME680
Environmental Sensor VOC,
Temperature, Humidity, Barometer

DFR0558 Gravity Digital High
Temperature Sensor K-type

SEN0308 Waterproof Capacitive Soil
Moisture Sensor

SEN0019 Adjustable Infrared Sensor
Switch

SEN0042 DFRobot Infrared sensor
breakout

SEN0143 SHARP GP2Y0A41SK0F
IR non-contact sensor 4-20cm

Result

FAQ

For any questions, advice or cool ideas to share, please visit
the [DFRobot Forum](#).

More Documents

- [Schematics Diagram](#)
- [BMX160 Datasheet](#)



Get [BMX160 9-axis Sensor Module](#) from DFRobot
Store or [DFRobot Distributor](#).

[Turn to the Top](#)