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Gravity: I2C Triple Axis Accelerometer - LIS2DH

SKU:SEN0224

Introduction

DFRobot presents the ultra low-power Arduino triple axis accelerometer! This device is based around a MEMS LIS2DH chip solution and has high-performance ultra-low power mode. The module is fitted with a Gravity I2C interface for easy plug and play integration in to your projects. The build in LDO power management chip gives you a wide range of input voltages, from 3.3 – 5V. The on-board I2C level conversion also makes it compatible with 3.3 and 5V devices.
Compared to traditional ADXL345, The LIS2DH accelerometer has advantages such as extra stability and more efficient power consumption. Low power mode requires only 2μA, while normal mode requires 11μA. At maximum the module supports an output frequency of 5.3KHz. Sensitivity levels are adjustable to either +-2g, +-4g, +-8g or +-16g and the module supports 16-bit data outputs. There are 2 independent programmable interrupt generators for free-fall and motion detection, that will activate interrupt wake-up. This module has many potential applications including wearable tech, display orientation and impact recognition.

Application

- Motion-activated
- Display orientation
- Shake control
- Pedometer
- Gaming and virtual reality input devices
- Impact recognition and logging

Features

- Gravity plug and play interface
- Ultra-low power (2uA)
- Fast response rate (up to 400KHz)
- Low price
- Compact and easy to install

Specification

- Operating Voltage: 3.3V ~ 5V
- Operating Current: 2uA (low-power mode 50Hz ODR) / 11uA (normal mode 50Hz ODR)
- Interface: Gravity-I2C interface
- Adjustable Sensitivity: ± 2g / ± 4g / ± 8g / ± 16g
- Frequency: 1Hz ~ 5.3KHz
- 16-bit data output
- 2 independent programmable interrupt generators for free-fall and motion detection
- 6D/4D orientation detection
- Embedded Temperature Sensor
- Embedded FIFO
- 1 million grams of high impact resistance
- Operating Temperature: -40 ℃ ~ +85 ℃
- Module Size: 26.2 × 26.2 (mm) /1.03 x 1.03 (inches)
- Weight: 12 g

Tutorial

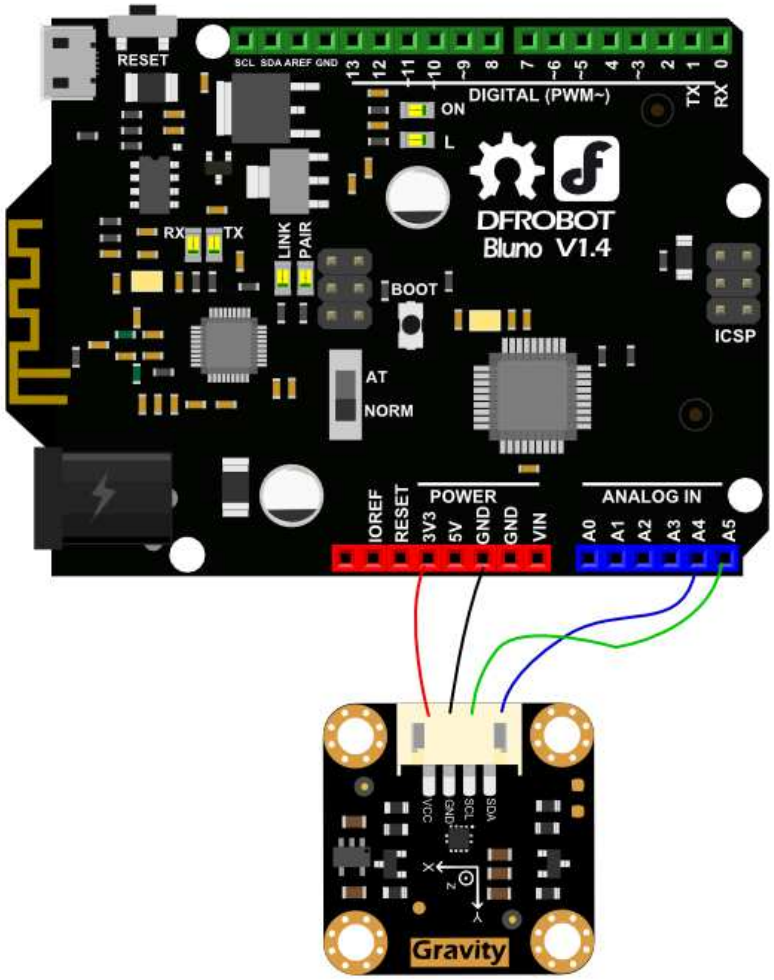
In this tutorial, we'll show you how does the sensor work.

Requirements

- **Hardware**
  DFRduino UNO (or similar) x 1
  Gravity: I2C Triple Axis Accelerometer - LIS2DH x1
  M-M/F-M/F-F Jumper wires

- **Software**
  Arduino IDE, Click to Download Arduino IDE from Arduino®
  https://www.arduino.cc/en/Main/Software%7C

Connection Diagram



LIS2DH	Arduino
VCC	5V / 3V3
GND	GND
SDA	A4(SDA)
SCL	A5(SCL)

Sample Code

Click to download Arduino LIS2DH Library https://github.com/DFRobot/DFRobot_LIS2DH12/archive/master.zip
How to install Libraries in Arduino IDE https://www.arduino.cc/en/Guide/Libraries#.UxU8mdzF9H0%7C

```
/*!
 * @file testLIS2DH12.ino
 * @brief DFRobot's Read LIS2DH12 data
 * @n This example is in order to achieve the serial port to receive LIS2DH12
back to the data
 *
 * @copyright   [DFRobot](http://www.dfrobot.com), 2016
 * @copyright   GNU Lesser General Public License
 * @author [Wuxiao](xiao.wu@dfrobot.com)
 * @version  V1.0
 * @date  2016-10-13
 * @https://github.com/DFRobot/DFRobot_LIS2DH12
 */

#include <Wire.h>
#include <DFRobot_LIS2DH12.h>



DFRobot_LIS2DH12 LIS; //Accelerometer

void setup(){
  Wire.begin();
  Serial.begin(115200);
  while(!Serial);
  delay(100);

  // Set measurement range
  // Ga: LIS2DH12_RANGE_2GA
  // Ga: LIS2DH12_RANGE_4GA
  // Ga: LIS2DH12_RANGE_8GA
```

```
  // Ga: LIS2DH12_RANGE_16GA
  while(LIS.init(LIS2DH12_RANGE_16GA) == -1){  //Equipment connection excepti
on or I2C address error
    Serial.println("No I2C devices found");
    delay(1000);
  }
}

void loop(){
  acceleration();
}

/*!
 *  @brief Print the position result.
 */
void acceleration(void)
{
  int16_t x, y, z;

  delay(100);
  LIS.readXYZ(x, y, z);
  LIS.mgScale(x, y, z);
  Serial.print("Acceleration x: "); //print acceleration
  Serial.print(x);
  Serial.print(" mg \ty: ");
  Serial.print(y);
  Serial.print(" mg \tz: ");
  Serial.print(z);
  Serial.println(" mg");
}
```

Expected Results

Open the Serial monitor, you'll get the following data.

```
Acceleration x: -62 mg  y: 0 mg         z: 1015 mg
Acceleration x: -46 mg  y: 0 mg         z: 1031 mg
Acceleration x: -62 mg  y: 0 mg         z: 1031 mg
Acceleration x: -62 mg  y: 0 mg         z: 1015 mg
Acceleration x: -62 mg  y: 15 mg        z: 1031 mg
Acceleration x: -62 mg  y: 0 mg         z: 1015 mg
Acceleration x: -46 mg  y: 0 mg         z: 1015 mg
Acceleration x: -78 mg  y: 0 mg         z: 1031 mg
Acceleration x: -62 mg  y: 0 mg         z: 1031 mg
Acceleration x: -62 mg  y: 0 mg         z: 1031 mg
Acceleration x: -62 mg  y: 0 mg         z: 1031 mg
Acceleration x: -62 mg  y: 15 mg        z: 1031 mg
Acceleration x: -62 mg  y: 0 mg         z: 1015 mg
Acceleration x: -62 mg  y: 15 mg        z: 1031 mg
Acceleration x: -62 mg  y: 15 mg        z: 1000 mg
Acceleration x: -62 mg  y: -15 mg       z: 1031 mg
Acceleration x: -62 mg  y: 0 mg         z: 1015 mg
```