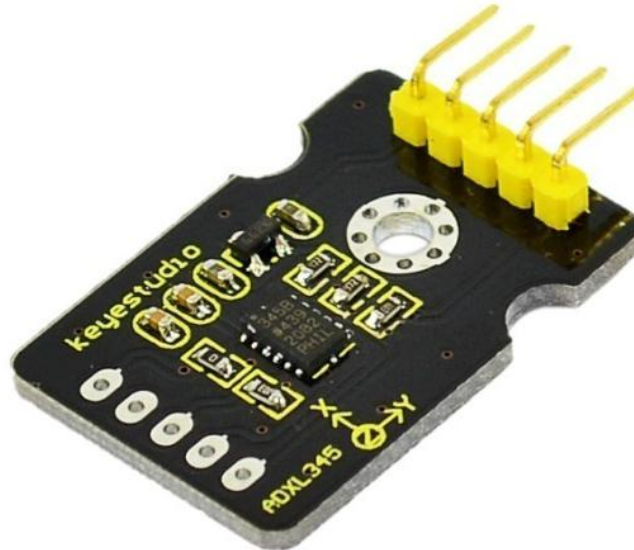


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ADXL345 Three Axis Acceleration Module



Introduction

The ADXL345 is a small, thin, low power, 3-axis MEMS accelerometer with high resolution (13-bit) measurement at up to ± 16 g. Digital output data is formatted as 16-bit two's complement and is accessible through either a SPI (3- or 4-wire) or I2C digital interface.

The ADXL345 is well suited to measure the static acceleration of gravity in tilt-sensing applications, as well as dynamic acceleration resulting from motion or shock. Its high resolution (4 mg/LSB) enables measurement of inclination changes less than 1.0 degrees.

Specification

2.0-3.6VDC Supply Voltage

Ultra Low Power: 40 μ A in measurement mode, 0.1 μ A in standby@ 2.5V

Tap/Double Tap Detection

Free-Fall Detection

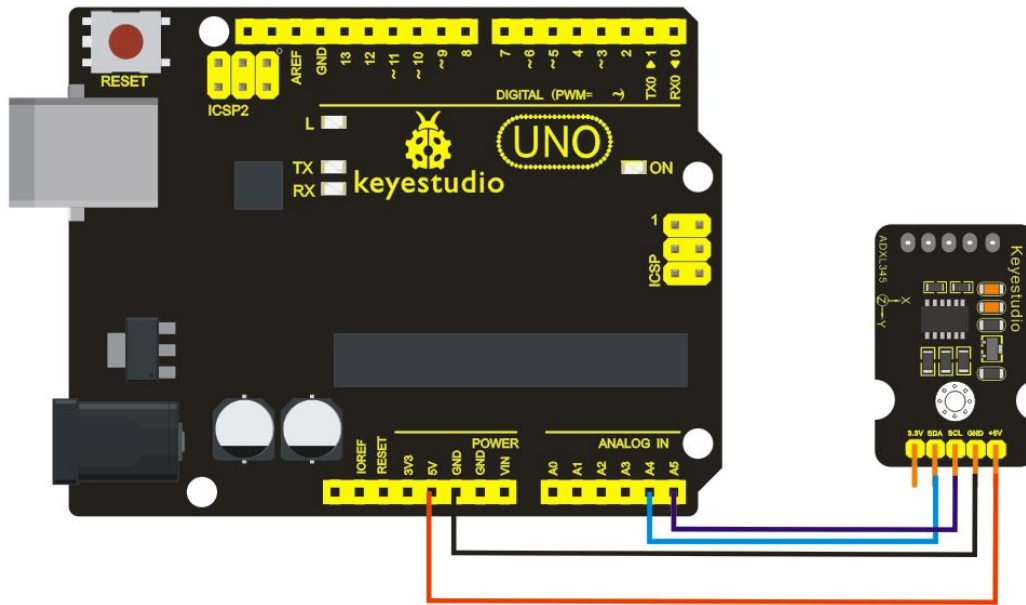
SPI and I2C interfaces

Size: 30*20mm

Weight: 3g

Connection Diagram

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Sample Code

/*

The circuit:

VCC: 5V

GND: ground

SCL: UNO SCL

SDA: UNO SDA

This example code is in the public domain.

*/

```
#include <Wire.h>
```

```
// Registers for ADXL345
```

```
#define ADXL345_ADDRESS (0xA6 >> 1) // address for device is 8 bit but shift to the  
// right by 1 bit to make it 7 bit because the  
// wire library only takes in 7 bit addresses
```

```
#define ADXL345_REGISTER_XLSB (0x32)
```

```
int accelerometer_data[3];
```

```
// void because this only tells the cip to send data to its output register
```

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```
// writes data to the slave's buffer
void i2c_write(int address, byte reg, byte data) {

    // Send output register address
    Wire.beginTransmission(address);
    // Connect to device
    Wire.write(reg);
    // Send data
    Wire.write(data); //low byte
    Wire.endTransmission();
}

// void because using pointers
// microcontroller reads data from the sensor's input register
void i2c_read(int address, byte reg, int count, byte* data) {
    // Used to read the number of data received
    int i = 0;
    // Send input register address
    Wire.beginTransmission(address);
    // Connect to device
    Wire.write(reg);
    Wire.endTransmission();

    // Connect to device
    Wire.beginTransmission(address);
    // Request data from slave
    // Count stands for number of bytes to request
    Wire.requestFrom(address, count);
    while(Wire.available()) // slave may send less than requested
    {
        char c = Wire.read(); // receive a byte as character
        data[i] = c;
        i++;
    }
    Wire.endTransmission();
}

void init_adxl345() {
    byte data = 0;

    i2c_write(ADXL345_ADDRESS, 0x31, 0x0B); // 13-bit mode +_ 16g
```

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```
i2c_write(ADXL345_ADDRESS, 0x2D, 0x08); // Power register

i2c_write(ADXL345_ADDRESS, 0x1E, 0x00); // X
i2c_write(ADXL345_ADDRESS, 0x1F, 0x00); // Y
i2c_write(ADXL345_ADDRESS, 0x20, 0x05); // Z

// Check to see if it worked!
i2c_read(ADXL345_ADDRESS, 0x00, 1, &data);
if(data==0xE5)
    Serial.println("it work Success");
else
    Serial.println("it work Fail");
}

void read_adxl345() {
    byte bytes[6];
    memset(bytes,0,6);

    // Read 6 bytes from the ADXL345
    i2c_read(ADXL345_ADDRESS, ADXL345_REGISTER_XLSB, 6, bytes);
    // Unpack data
    for (int i=0;i<3;++i) {
        accelerometer_data[i] = (int)bytes[2*i] + (((int)bytes[2*i + 1]) << 8);
    }
}

// initialise and start everything
void setup() {
    Wire.begin();
    Serial.begin(9600);
    for(int i=0; i<3; ++i) {
        accelerometer_data[i] = 0;
    }
    init_adxl345();
}

void loop() {
    read_adxl345();
    Serial.print("ACCEL: ");
    Serial.print(float(accelerometer_data[0])*3.9/1000);//3.9mg/LSB scale factor in 13-bit mode
```

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```
Serial.print("\t");  
Serial.print(float(accelerometer_data[1])*3.9/1000);  
  
Serial.print("\t");  
Serial.print(float(accelerometer_data[2])*3.9/1000);  
Serial.print("\n");  
delay(100);  
}
```