ADXL345 Three Axis Acceleration Module

Introduction

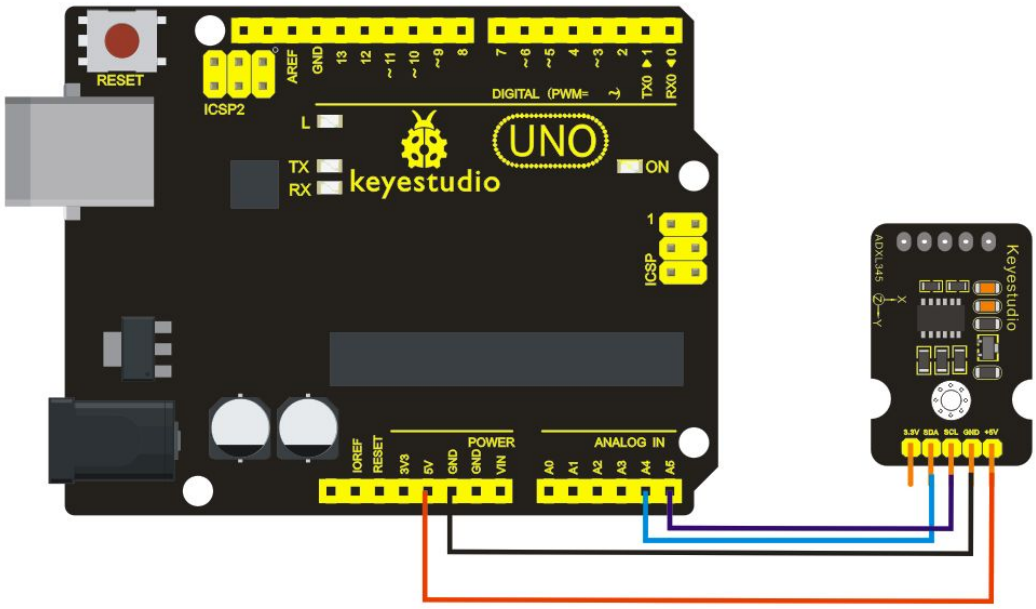
The ADXL345 is a small, thin, low power, 3-axis MEMS accelerometer with high resolution (13-bit) measurement at up to +-16 g. Digital output data is formatted as 16-bit twos complement and is accessible through either a SPI (3- or 4-wire) or I2C digital interface.

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: 40uA in measurement mode, 0.1uA in standby@ 2.5V
Tap/Double Tap Detection
Free-Fall Detection
SPI and I2C interfaces
Size: 30*20mm
Weight: 3g

Connection Diagram



Sample Code

```
/*
The circuit:
  VCC: 5V
  GND: ground
  SCL: UNO SLC
  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
// 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
    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
  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);
}
```