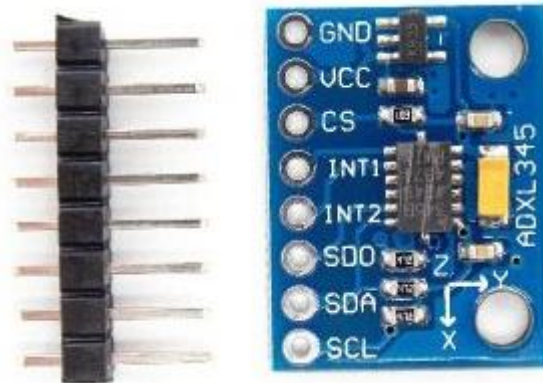


## Interfacing Accelerometer ADXL345 (GY-291) with Arduino UNO

### **Introduction:**

GY-291 ADXL345 3-Axis Accelerometer & Acceleration sensor is a 3-dimensional accelerometer that measures acceleration in 3 dimensions X, Y and Z axis.



### Specification

#### **General Specifications**

- Single tap/double tap detection
- Activity/inactivity monitoring
- Free-fall detection
- 10,000 g shock survival
- SPI (3- and 4-wire) and I2C digital interfaces
- Flexible interrupt modes mappable to either interrupt pin
- Measurement ranges selectable via serial command
- Bandwidth selectable via serial command

#### **Technical Specifications**

- Operating Voltage: 4V to 6V
- I/O Voltage Range: 1.7V to 3.6V
- Communication: SPI and I2C
- Operating Temperature: -40<sup>o</sup>C to 85<sup>o</sup>C
- Size: 3 mm × 5 mm × 1 mm

**Objective:**

In this Tutorial the sensor will send the data about the reading of the acceleration of the sensor in 3-dimension (x, y & z). The Serial Monitor in Arduino IDE will continuously display the data.

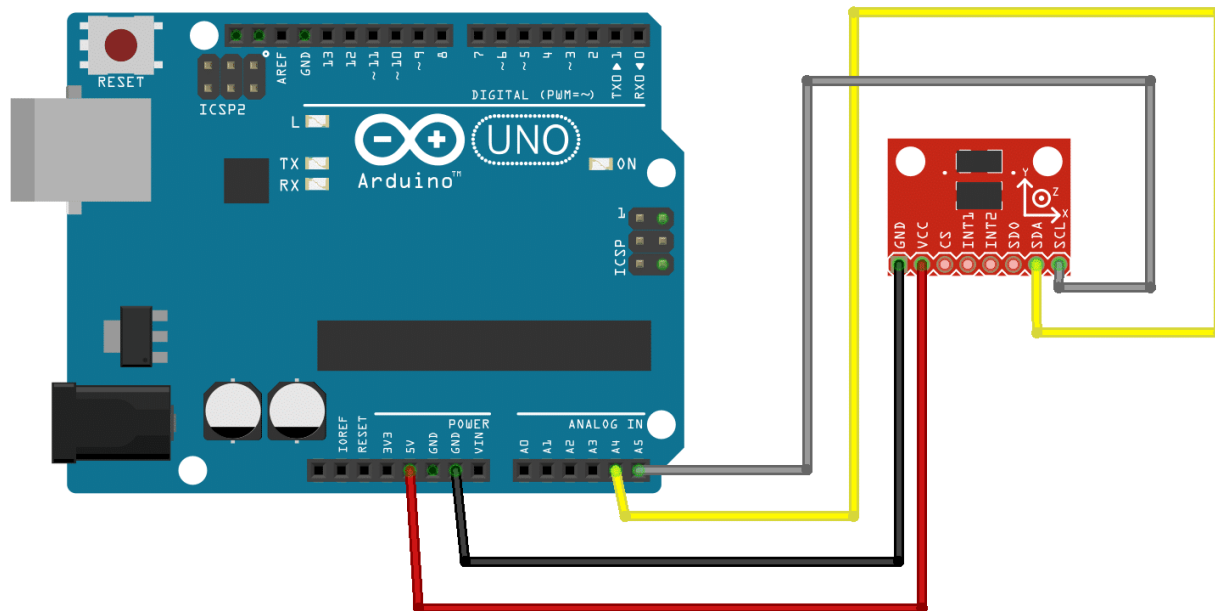
**Components Needed:**

- Accelerometer ADXL345 (GY-291)
- Arduino UNO
- Few Jumper Wires
- Breadboard

**Procedures:**

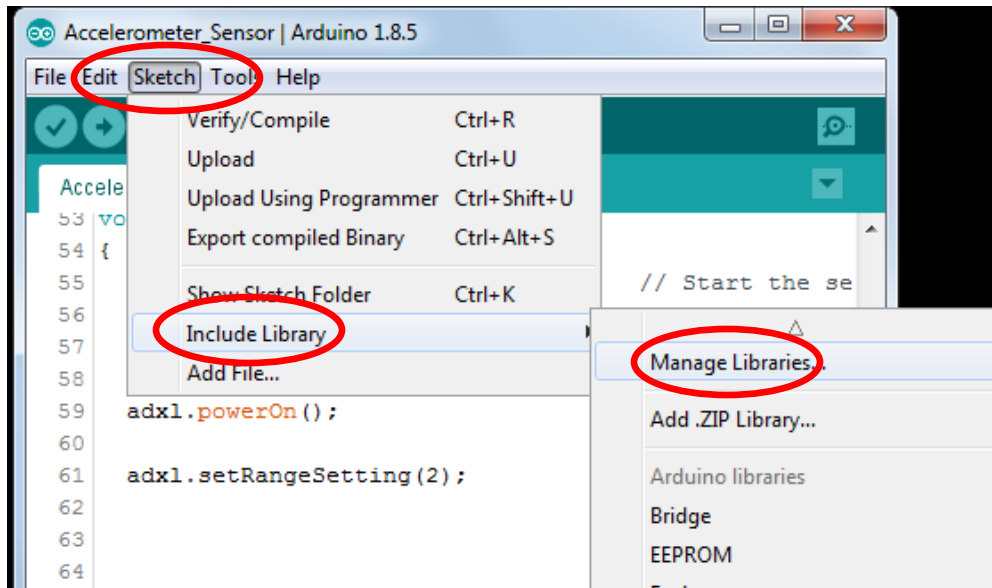
- 1) Connect the jumper based on the given picture and the table below.

Terminal / Pin	
Arduino UNO	ADXL345 (GY-291) Sensor
5V	VCC
GND	GND
A4	SDA
A5	SCL

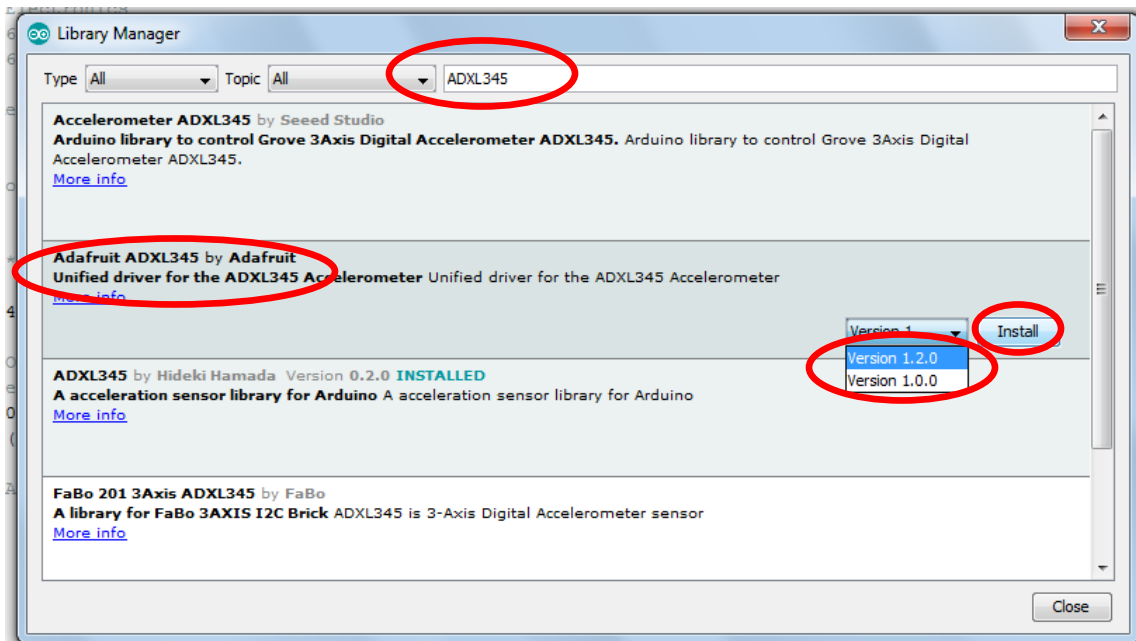


*Circuit connection for Arduino UNO*

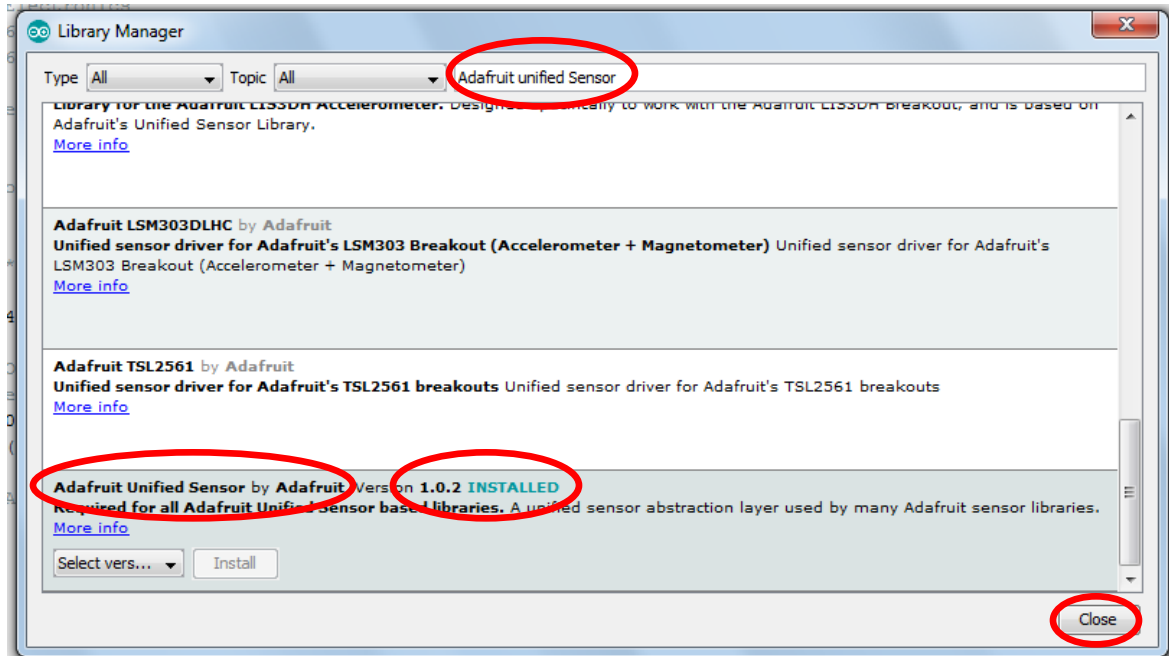
- 2) Download and install the needed Library from **Arduino IDE**. Open the **Library Manager** tab by following picture below.



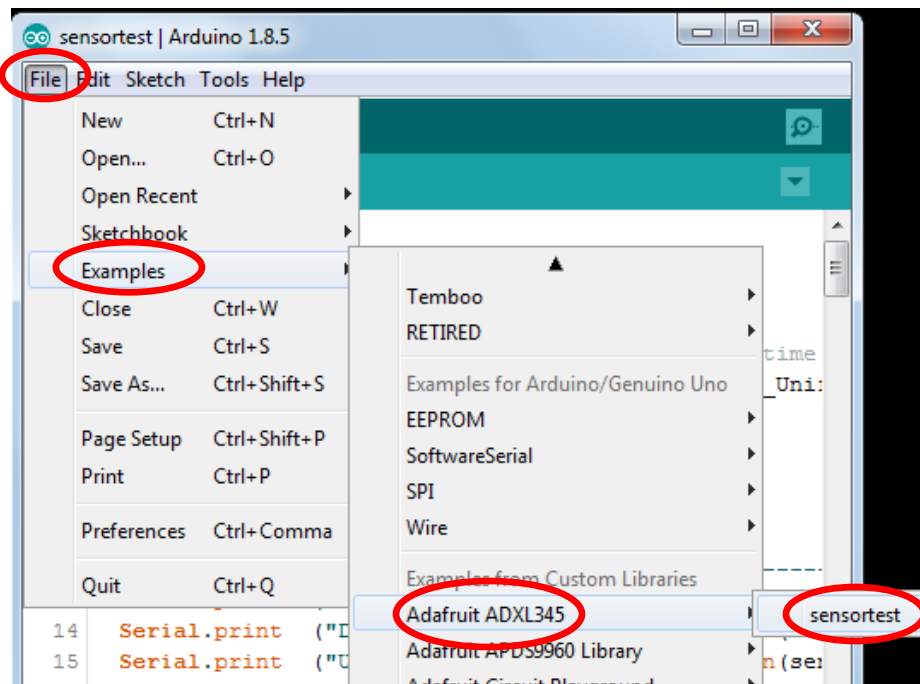
- 3) Search for **ADXL345** in search bar and it will show result. Select **Adafruit ADXL345** by **Adafruit** with the latest version of library and click **Install**.



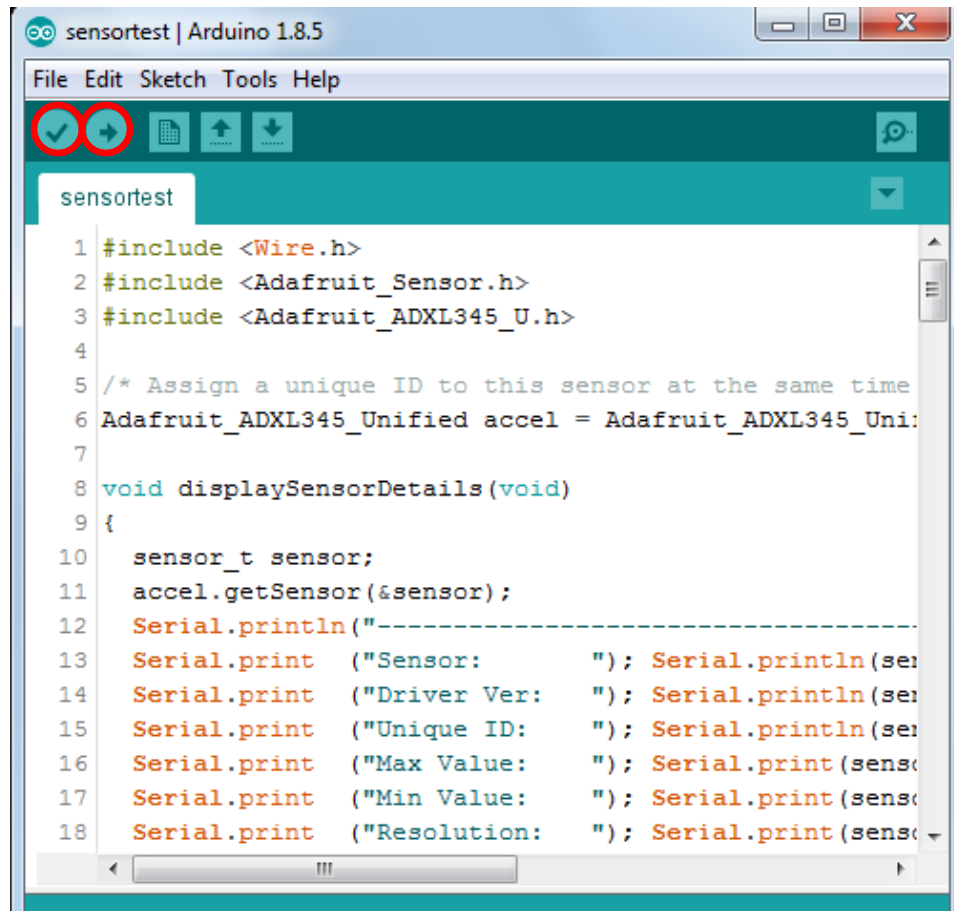
- 4) Repeat step 2 & 3 to install **Adafruit Unified Sensor Library**. Select **Adafruit Unified Sensor by Adfruit** and **Install** the latest version. **Close** the **Library Manager**.



- 5) Still in Arduino IDE click on **File > Examples > Adafruit ADXL345 > sensortest** to open the program coding.



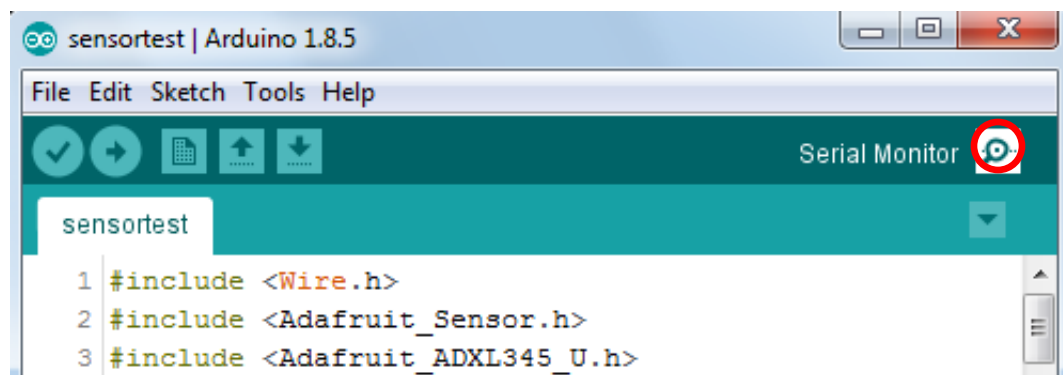
- 6) Connect the Arduino UNO to PC click on **Verify** and **Upload**.



The screenshot shows the Arduino IDE interface for a sketch named 'sensortest'. The 'Verify' (checkmark) and 'Upload' (right arrow) buttons in the top toolbar are circled in red. The sketch code is visible in the main editor area.

```
1 #include <Wire.h>
2 #include <Adafruit_Sensor.h>
3 #include <Adafruit_ADXL345_U.h>
4
5 /* Assign a unique ID to this sensor at the same time
6 Adafruit_ADXL345_Unified accel = Adafruit_ADXL345_Uni
7
8 void displaySensorDetails(void)
9 {
10  sensor_t sensor;
11  accel.getSensor(&sensor);
12  Serial.println("-----");
13  Serial.print ("Sensor:      "); Serial.println(ser
14  Serial.print ("Driver Ver:  "); Serial.println(ser
15  Serial.print ("Unique ID:   "); Serial.println(ser
16  Serial.print ("Max Value:   "); Serial.print (sens
17  Serial.print ("Min Value:   "); Serial.print (sens
18  Serial.print ("Resolution:  "); Serial.print (sens
```

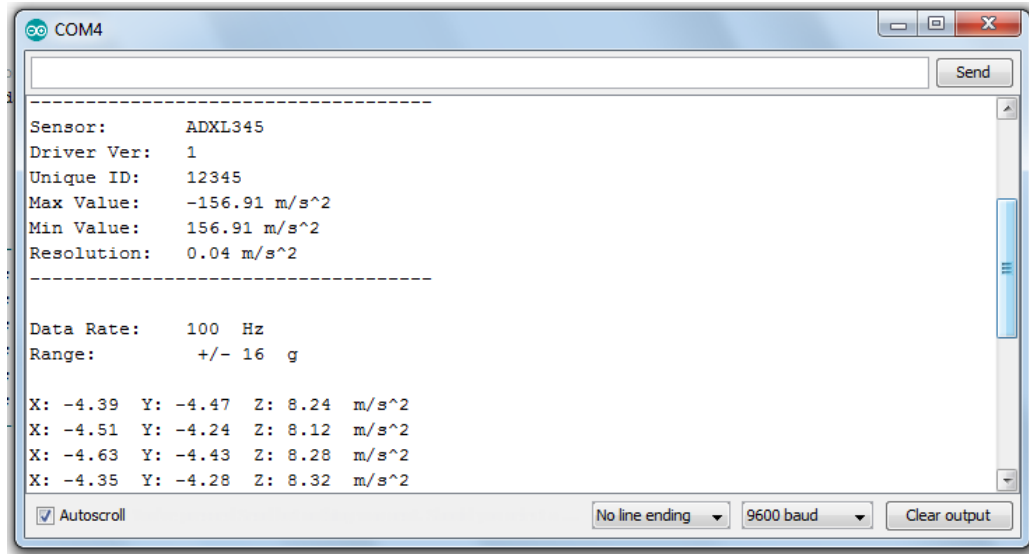
- 7) Done! Open the **Serial Monitor** tab to see the result when changing the sensor position.



The screenshot shows the same Arduino IDE interface, but the 'Serial Monitor' tab is now open and circled in red. The sketch code is partially visible in the editor area.

```
1 #include <Wire.h>
2 #include <Adafruit_Sensor.h>
3 #include <Adafruit_ADXL345_U.h>
```

8) Result data showed in serial monitor tab based on sensor position.



```
COM4
-----
Sensor:      ADXL345
Driver Ver:  1
Unique ID:   12345
Max Value:   -156.91 m/s^2
Min Value:   156.91 m/s^2
Resolution:  0.04 m/s^2
-----

Data Rate:   100 Hz
Range:       +/- 16 g

X: -4.39 Y: -4.47 Z: 8.24 m/s^2
X: -4.51 Y: -4.24 Z: 8.12 m/s^2
X: -4.63 Y: -4.43 Z: 8.28 m/s^2
X: -4.35 Y: -4.28 Z: 8.32 m/s^2

 Autoscroll
No line ending  9600 baud  Clear output
```