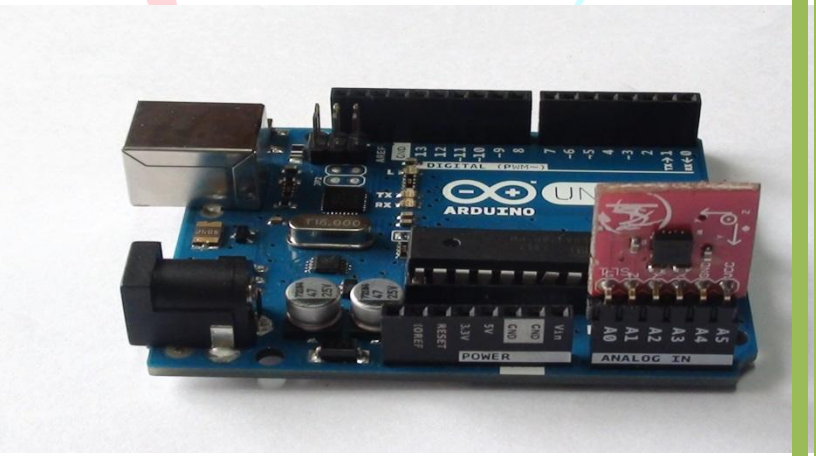
TENET TECHNETRONICS

2014

Interfacing Accelerometer Sensor with Arduino UNO



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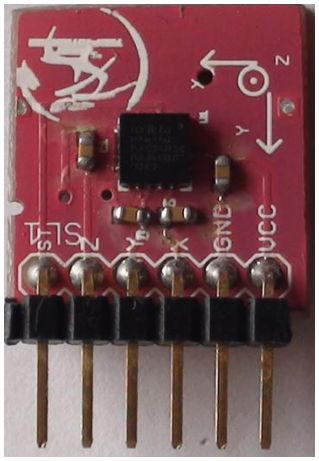
Introduction

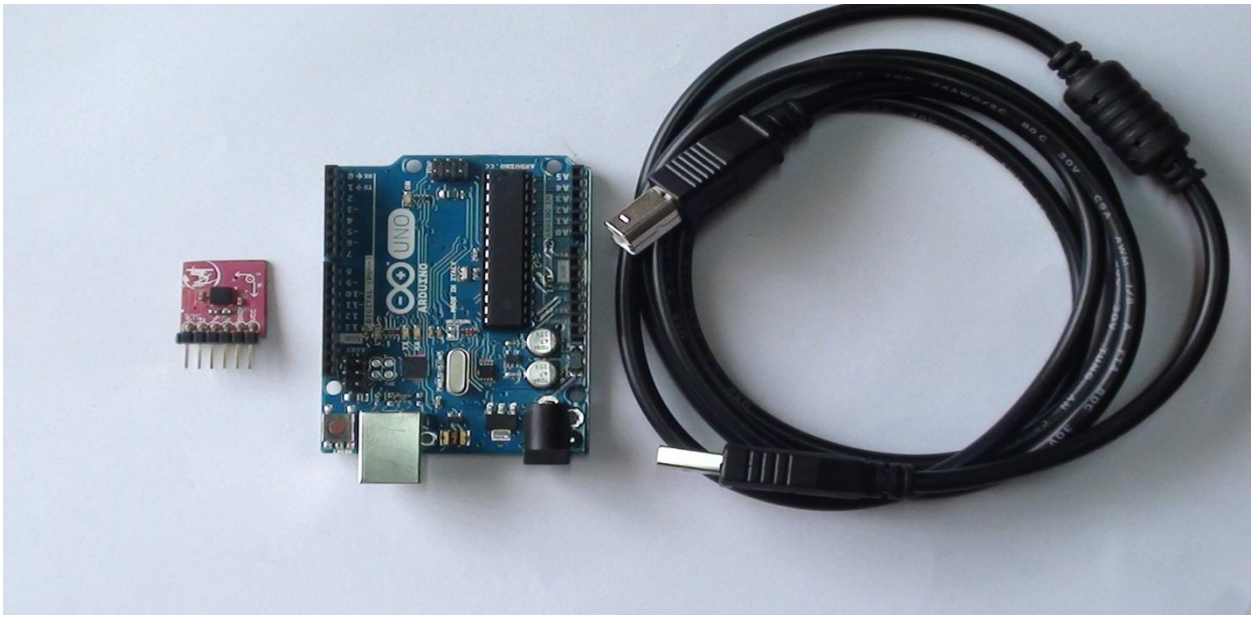
This is the simple breakout board for 3 axis ADXL335 Accelerometer sensor. This is the latest in a long, proven line of analog sensors. The ADXL335 is a triple axis accelerometer with extremely low noise and power consumption of only 320uA! The sensor has a full sensing range of +/- 3g.Board comes fully assembled and tested with external components installed. The included 0.1uF capacitors set the bandwidth of each axis to 50Hz.



Here is a quick demo on how to use 3 axis ADXL335 from Analog Devices using Arduino.

Apparatus required:

- Arduino board.
- Arduino cable.
- Accelerometer breakout board.

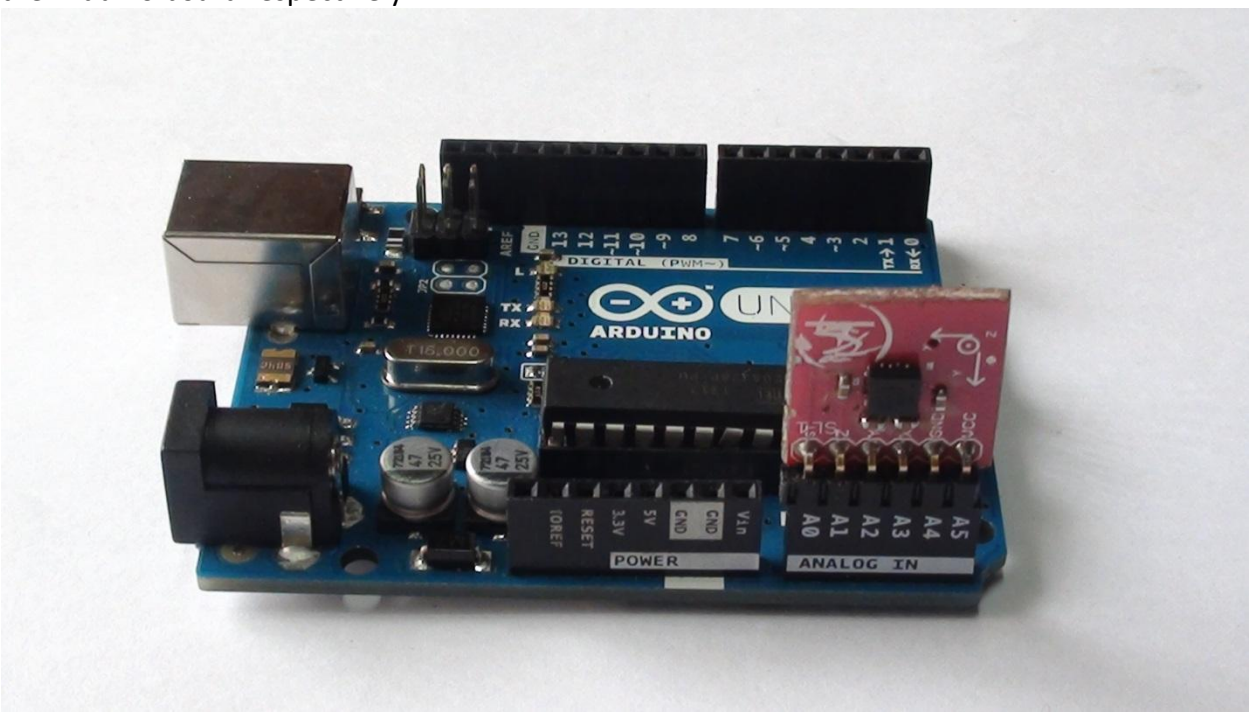


Step one:

Place/ connect the Accelerometer breakout board using jumper cables to the Arduino board as shown below.

Arduino board	Accelerometer breakout board
Analog 0	Accelerometer self-test(ST) optional
Analog 1	Z-axis
Analog 2	Y-axis
Analog 3	X-axis
Analog 4	Gnd
Analog 5	Vcc

Note: Gnd and Vcc pins of accelerometer can be directly connected to the Gnd and 3.3v pins of the Arduino board respectively.



Step two:

Connect the Arduino board to the computer using ArduinoUSB cable. Launch the Arduino IDE and select the appropriate serial port and board.

Now write the sensor program and upload the code to the Arduino board.

Program:

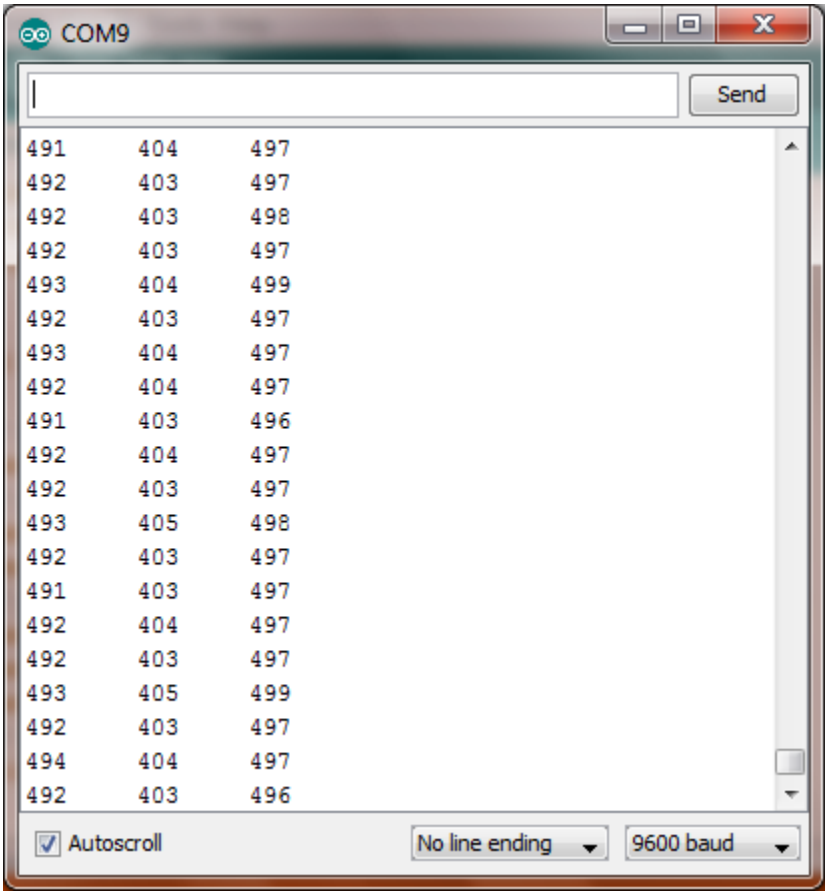
```
constintgroundpin = 18;          // analog input pin 4 -- ground

constintpowerpin = 19;           // analog input pin 5 -- voltage
```

```
constintxpin = A3;              // x-axis of the accelerometer
constintypin = A2;              // y-axis
constintzpin = A1;              // z-axis (only on 3-axis models)


void setup()
{
 // initialize the serial communications:
Serial.begin(9600);


 // Provide ground and power by using the analog inputs as normal
 // digital pins.  This makes it possible to directly connect the
 // breakout board to the Arduino.  If you use the normal 5V and
 // GND pins on the Arduino, you can remove these lines.
pinMode(groundpin, OUTPUT);
pinMode(powerpin, OUTPUT);
digitalWrite(groundpin, LOW);
digitalWrite(powerpin, HIGH);
}

void loop()
{
 // print the sensor values:
Serial.print(analogRead(xpin));
 // print a tab between values:
Serial.print("\t");
```

```
Serial.print(analogRead(ypin));

 // print a tab between values:

Serial.print("\t");

Serial.print(analogRead(zpin));

Serial.println();

 // delay before next reading:

delay(100);

}
```

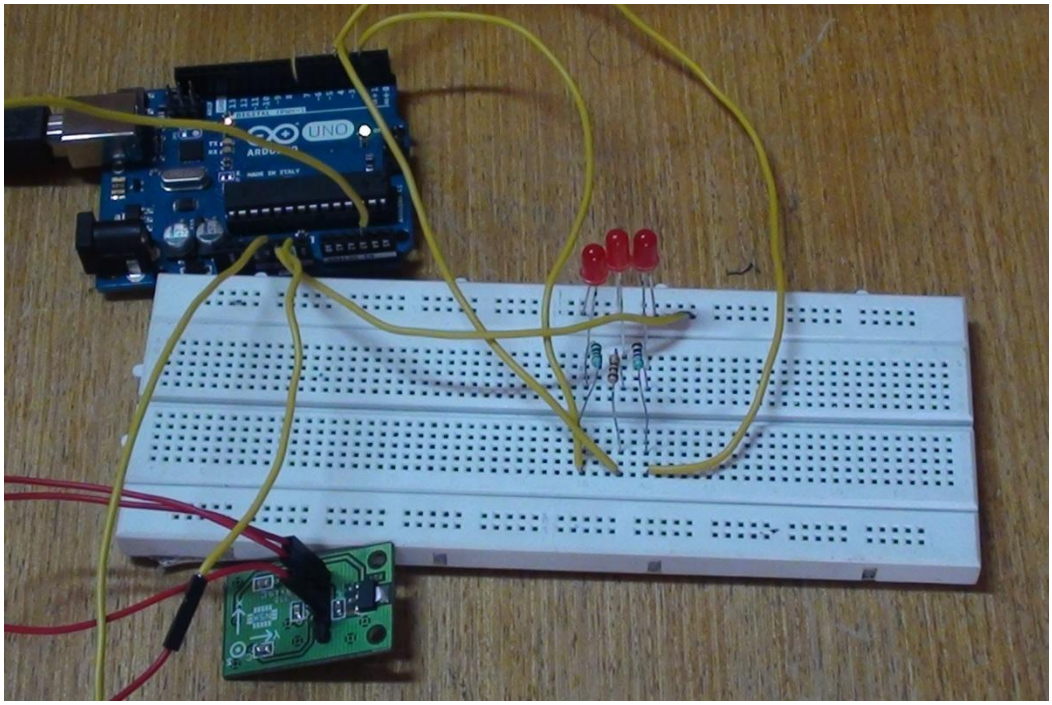
Step three:

Finally to see the sensor output, click the serial monitor icon in the Arduino IDE.



Now we will have a quick anotherexample on how to check the values according to rate of change of velocity using Millis timer.

Step one:
Connect accelerometer to the similar way as in the other example and also take three LED's and connect to Arduino2,3,& 4 pins to check the rate of change of velocity in 3 different condition (slow, medium and fast condition)respectively.



Step two:
Upload the code to the Arduino.

Code:

```
unsignedint x;

unsignedint t = 1;

unsignedint e = 0;

unsigned long start;

unsigned long endT;
```

```
void setup() {
Serial.begin(9600);
pinMode(2, OUTPUT);
pinMode(3, OUTPUT);
pinMode(4, OUTPUT);

}

void loop() {
  x = analogRead(A3);
  //delay(200);
if ((x > 300) && (x < 327 + 4))
  {
    t = 1;
   // Serial.print("in centre..");
  }
else if((x > 327 +5)&&(t ==1))
  {
start = millis();
    t = 0;
```

```
    e = 1;
   // Serial.print("start tilt...");


  }
else if((x > 400) && (e == 1))
  {
endT = millis();
    e = 0;
    //Serial.print("end of tilt");
Serial.print(endT - start);
if((endT - start) < 70)
    {
digitalWrite(2, LOW);
digitalWrite(3, LOW);
digitalWrite(4, HIGH);
Serial.println("fast transition...");
    }
else if(((endT - start) > 70)&& ((endT - start) < 400))
    {
digitalWrite(2, LOW);
digitalWrite(3, HIGH);
```

```
digitalWrite(4, LOW);

Serial.println("medium transition..");

   }

else if((endT - start) > 400)

   {

digitalWrite(2, HIGH);

digitalWrite(3, LOW);

digitalWrite(4, LOW);

Serial.println("slow...");

   }

  }

}
```

Note: This code is written only for x+ axis.

Step three: