CHAPTER: 8 ACCELEROMETER

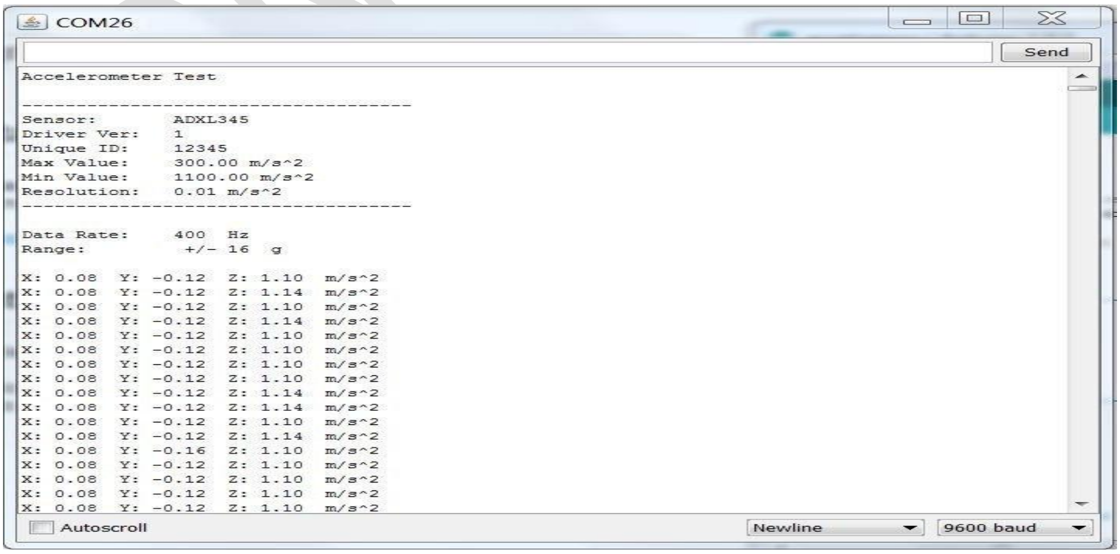
PRACTICAL: 8A

AIM: To interface Accelerometer – ADXL335 using Arduino.

ARDUINO CODE :

```
/**********************
 * Author: Shreejicharan
 * Title: To interface Accelerometer – ADXL335 using Arduino.
* Email: shreejicharanelectronics@gmail.com
 **********************/

//connect 3.3v to AREF

const int ap1 = A5;
const int ap2 = A4;
const int ap3 = A3;

int sv1 = 0;
int ov1 = 0;
int sv2 = 0;
int ov2= 0;
int sv3 = 0;
int ov3= 0;

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

}

void loop()
{
        analogReference(EXTERNAL);    //connect 3.3v to AREF
        // read the analog in value:
        sv1 = analogRead(ap1);
        // map it to the range of the analog out:
        ov1 = map(sv1, 0, 1023, 0, 255);
        // change the analog out value:
        delay(2);
        sv2 = analogRead(ap2);
        ov2 = map(sv2, 0, 1023, 0, 255);
        delay(2);

        sv3 = analogRead(ap3);
        ov3 = map(sv3, 0, 1023, 0, 255);

        // print the results to the serial monitor:
        Serial.print("Xsensor1 = " );
        Serial.print(sv1);
        Serial.print("\t output1 = ");
        Serial.println(ov1);

        Serial.print("Ysensor2 = " );
        Serial.print(sv2);
        Serial.print("\t output2 = ");
        Serial.println(ov2);

        Serial.print("Zsensor3 = " );
        Serial.print(sv3);
        Serial.print("\t output3 = ");
        Serial.println(ov3);

        delay(3000);

}
```

SIMULATION:



```
Accelerometer Test

------------------------------------
Sensor:        ADXL345
Driver Ver:    1
Unique ID:     12345
Max Value:     300.00 m/s^2
Min Value:     1100.00 m/s^2
Resolution:    0.01 m/s^2
------------------------------------

Data Rate:     400  Hz
Range:          +/- 16  g

X: 0.08  Y: -0.12  Z: 1.10  m/s^2
X: 0.08  Y: -0.12  Z: 1.14  m/s^2
X: 0.08  Y: -0.12  Z: 1.10  m/s^2
X: 0.08  Y: -0.12  Z: 1.14  m/s^2
X: 0.08  Y: -0.12  Z: 1.10  m/s^2
X: 0.08  Y: -0.12  Z: 1.10  m/s^2
X: 0.08  Y: -0.12  Z: 1.10  m/s^2
X: 0.08  Y: -0.12  Z: 1.10  m/s^2
X: 0.08  Y: -0.12  Z: 1.14  m/s^2
X: 0.08  Y: -0.12  Z: 1.14  m/s^2
X: 0.08  Y: -0.12  Z: 1.10  m/s^2
X: 0.08  Y: -0.12  Z: 1.14  m/s^2
X: 0.08  Y: -0.16  Z: 1.10  m/s^2
X: 0.08  Y: -0.12  Z: 1.10  m/s^2
X: 0.08  Y: -0.12  Z: 1.10  m/s^2
X: 0.08  Y: -0.12  Z: 1.10  m/s^2
X: 0.08  Y: -0.12  Z: 1.10  m/s^2
```

PRACTICAL: 8B

AIM: To interface Accelerometer using Arduino.

ARDUINO CODE :

```
/**********************
 * Author: Shreejicharan
 * Title: To interface Accelerometer – ADXL345 using Arduino.
 * Email: shreejicharanelectronics@gmail.com
 **********************/


#include<Wire.h>
// ADXL345 I2C address is 0x53(83)
#define Addr 0x53
void setup()
{
        // Initialise I2C communication as MASTER
        Wire.begin();
        // Initialise serial communication, set baud rate = 9600
        Serial.begin(9600);
        // Start I2C Transmission
        Wire.beginTransmission(Addr);
        // Select bandwidth rate register
        Wire.write(0x2C);
        // Normal mode, Output data rate = 100 Hz
        Wire.write(0x0A);
        // Stop I2C transmission
        Wire.endTransmission();
        // Start I2C Transmission
        Wire.beginTransmission(Addr);
        // Select power control register
        Wire.write(0x2D);
        // Auto-sleep disable
        Wire.write(0x08);
        // Stop I2C transmission
        Wire.endTransmission();
        // Start I2C Transmission
        Wire.beginTransmission(Addr);
        // Select data format register
        Wire.write(0x31);
        // Self test disabled, 4-wire interface, Full resolution, Range = +/-2g
        Wire.write(0x08);
        // Stop I2C transmission
        Wire.endTransmission();
        delay(300);
        }

void loop()
{
unsigned int data[6];
        for(int i = 0; i < 6; i++)
        {
                // Start I2C Transmission
                Wire.beginTransmission(Addr);
                // Select data register
                Wire.write((50 + i));
                // Stop I2C transmission
                Wire.endTransmission();
                // Request 1 byte of data
                Wire.requestFrom(Addr, 1);
                // Read 6 bytes of data
                // xAccl lsb, xAccl msb, yAccl lsb, yAccl msb, zAccl lsb, zAccl msb
                if(Wire.available() == 1)
                {
                data[i] = Wire.read();
                }
        }
// Convert the data to 10-bits
        int xAccl = (((data[1] & 0x03) * 256) + data[0]);
                if(xAccl > 511)
                {
                xAccl -= 1024;
                }
        int yAccl = (((data[3] & 0x03) * 256) + data[2]);
                if(yAccl > 511)
                {
                yAccl -= 1024;
                }
        int zAccl = (((data[5] & 0x03) * 256) + data[4]);
                if(zAccl > 511)
                {
                zAccl -= 1024;
                }

        // Output data to serial monitor
        Serial.print("Acceleration in X-Axis is : ");
        Serial.println(xAccl);
        Serial.print("Acceleration in Y-Axis is : ");
        Serial.println(yAccl);
        Serial.print("Acceleration in Z-Axis is : ");
        Serial.println(zAccl);
        delay(300);
}
```