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EEDG6302: Microprocessor and Embedded Systems

Wednesday Lab Report

Project 2 Lab 2: MSP432 Accelerometer

Aim:

To write a program for reading and visualizing acceleration values from the 3-Axis accelerometer (Kionix KXTC9-2050) of the Educational Booster Pack MKII, MSP-432 board and display them on the LCD screen. To plot the live acceleration values in 3d on MATLAB via the COM port.

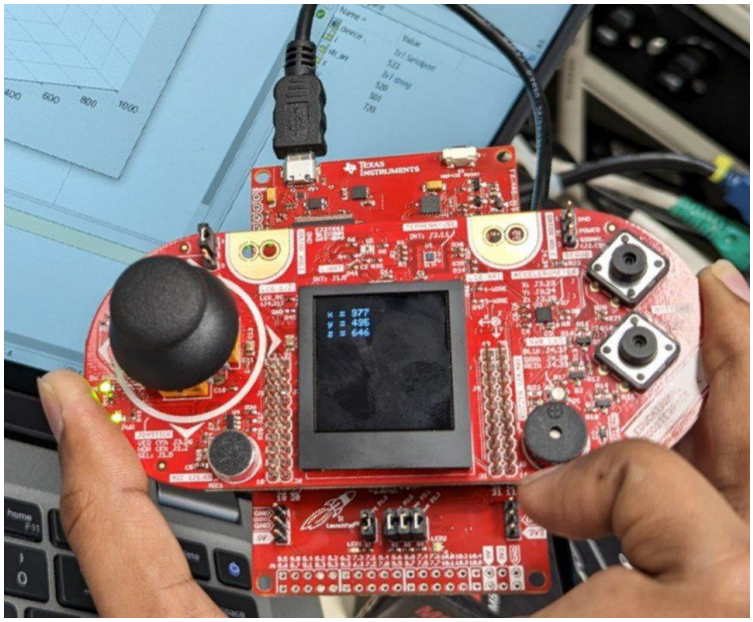
Design Overview:

The acceleration values of the X, Y and Z axis of the accelerometer are input to the board via pins 23, 24 and 25 respectively using the analogRead () function.

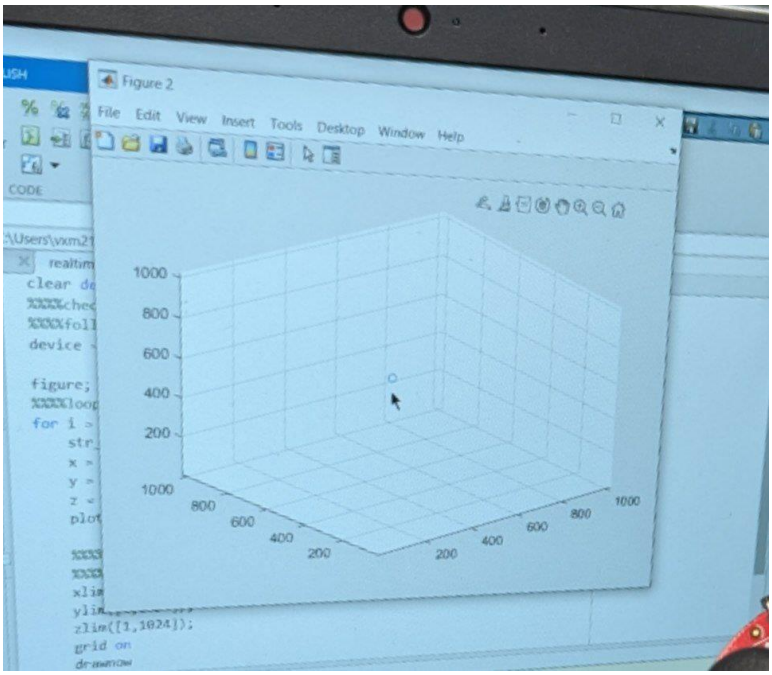
These values are printed to the Serial Monitor for verification and to be later sent to MATLAB.

Using the myScreen.gText () function, the 3-axis acceleration values are displayed in the LCD screen.

The Serial Monitor values are sent live to MATLAB via the COM port and plotted to a 3-d graph.



LCD Display for 3-axis acceleration



Matlab 3-D Graph

Code:

```
// Core library for code-sense
#if defined(ENERGIA) // LaunchPad MSP430, Stellaris and Tiva, Experimeter
//Board FR5739 specific
#include "Energia.h"
#else // error
#error Platform not defined
#endif
// Prototypes
// Include application, user and local libraries
#include <SPI.h>
#include <LCD_screen.h>
```

```
#include <LCD_screen_font.h>
#include <LCD_utilities.h>
#include <Screen_HX8353E.h>
#include <Terminal12e.h>
#include <Terminal6e.h>
#include <Terminal8e.h>
Screen_HX8353E myScreen;

// Define variables and constants
const int xpin = 23; // x-axis of the accelerometer
const int ypin = 24; // y-axis
const int zpin = 25; // z-axis (only on 3-axis models)
uint16_t x, y, x00, y00;
uint16_t colour;
uint32_t z;
// Add setup code
void setup()
{
Serial.begin(9600); // for LCD debug output
// By default MSP432 has analogRead() set to 10 bits.
// This Sketch assumes 12 bits. Uncomment to line below to set
//analogRead()
// to 12 bit resolution for MSP432.
analogReadResolution(10);
myScreen.begin();
x00 = 0;
y00 = 0; }
// add loop code
void loop()
{
int analogValue_x; // CHECK X aXIS
```

```
analogValue_x = analogRead(xpin); // read X axis
int analogValue_y;// CHECK Y AXIS
analogValue_y = analogRead(ypin); // read Y axis ;
int analogValue_z;// CHECK Z AXIS
analogValue_z = analogRead(zpin); // read Z axis
Serial.print(analogValue_x);
Serial.print(" ");
Serial.print(analogValue_y);
Serial.print(" ");
Serial.print(analogValue_z);
Serial.print("\n");
myScreen.gText(10,10, "x = " + i32toa((int16_t)analogValue_x));
myScreen.gText(10,20, "y = " + i32toa((int16_t)analogValue_y));
myScreen.gText(10,30, "z = " + i32toa((int16_t)analogValue_z));
delay(100);
}
```