ECGR4161/5196, Spring 2009: Lab 2
Sensors: Accelerometers

Learning Objectives

This lab will have students examine the Analog Devices ADXL311EB accelerometer evaluation board to measure the acceleration due to gravity. The goal is to build a tilt sensor.

General Information

The general steps for this lab are:

1. Identify the hardware interfacing needed for the accelerometer.

2. Create the connector for the device

3. Build the project and load onto your board. Run the program and observe the operation.

4. Demonstrate for a TA and turn in a lab report.

Laboratory Assignments

You may use the PCs in Woodward 203 or your own PC to do this lab experiment. In this lab you will be utilizing onboard I/O ports of the Renesas board to read an Analog Devices ADXL311EB accelerometer evaluation board and lighting and LED if the tilt is more than 45 degrees.

1. Identify which ports on the Renesas board will serve as your communications pins.
2. Design your connector/circuit and acquire the parts.
3. Write code for the Renesas board which will display the tilt. Verify that the new functionality works as specified.
4. Complete your lab report.
5. Bring the new board to the lab TA and demonstrate the new code. When the TA checks your board, she will also take your lab report. You **will not** need to include a printout or soft copy all of the code – just "snippets".

Requirements

Req. 1 – The code generated is written in C for the QSK62P.
Req. 2 – The code is well commented and easy to follow
Req. 3 – Your lab report should include the final build output from the builder
Req. 4 – The Analog Devices ADXL311EB accelerometer evaluation board will be attached to the Renesas SKP and oriented such that the plane of the Renesas board is parallel to the plane of the ADXL311EB.
Req. 5 – When the angle of the board is 45% or greater towards the left (counter-clockwise) light the left-most LED.
Req. 6 – When the angle of the board is 45% or greater towards the right (clockwise) light the right-most LED.
Req. 7 – When the angle of the board is 45% or greater towards you, light the center LED.
Req. 8 – Use only integer values in the system. Do not use floating point.

Lab Report

Include in the checkout part of your lab report the lines:

1. Red LED displays as specified   _____

2. Yellow LED displays as specified   _____

3. Green LED displays as specified   _____

Include in your lab report observations and procedure like the following:
The general learning objectives of this lab were . . .

The general steps needed to complete this lab were . . .

Some detailed steps to complete this lab were . . . .
1. Step one
2. Step two
3.   . . . .
Code generated or modified to complete this lab...
        No need to include all the files for the lab. Just include the modified code.

Write the process for calibration

Some important observations while completing/testing this lab were . . .
        Here include the memory report given at the end of the compile process.
        Include the screen shot of the communications between the boards

In this lab we learned . . . .