

Lab6 description



Lab 6

System A

- For safety, please, remember and make sure to unplug your Launchpad from the USB port before making any hardware changes.
- Connect jumper wires as shown in Figure 1.

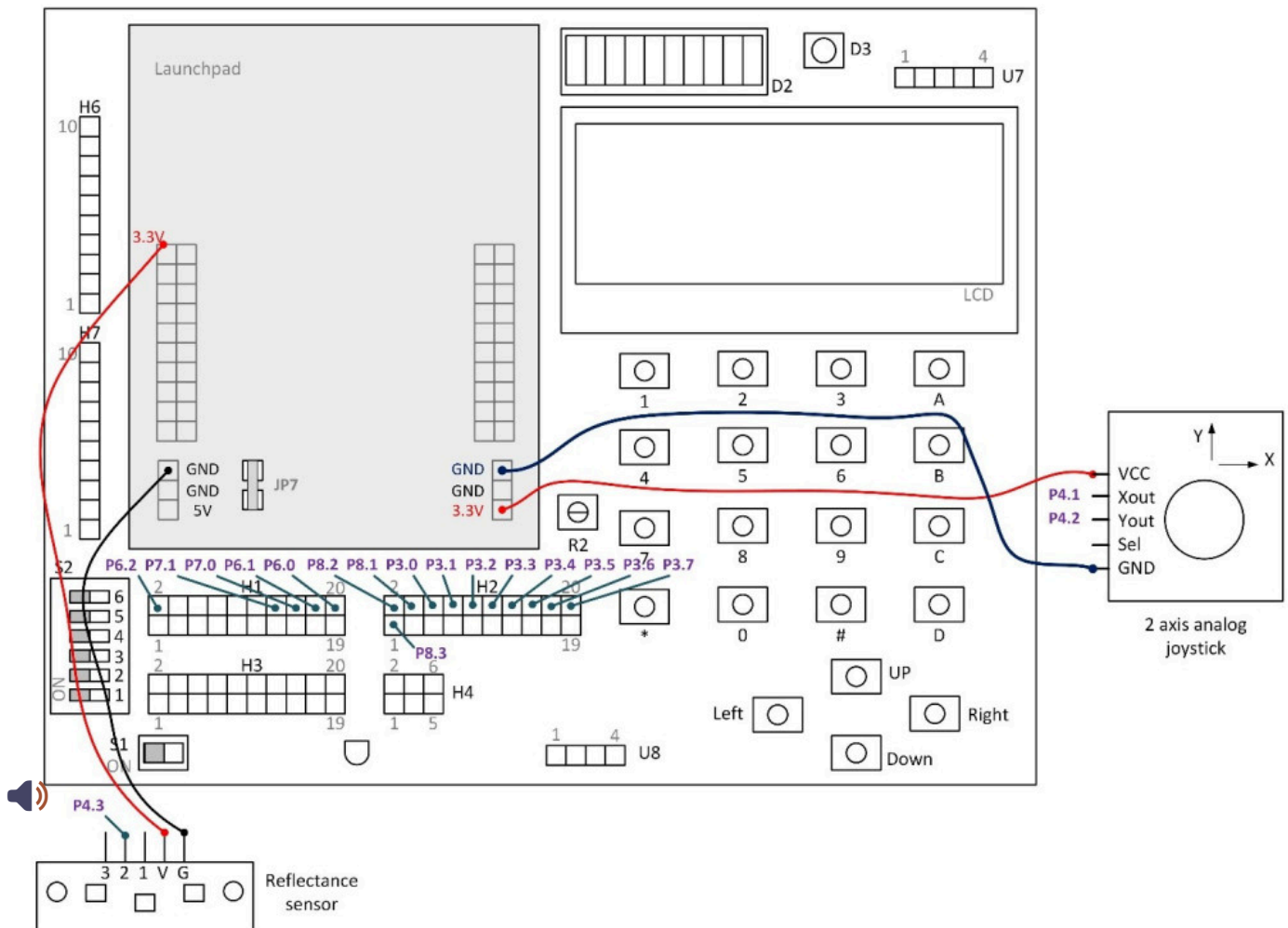


Figure 1. Connection diagram

- You will use a reflectance sensor. This sensor is a QTR-3A Reflectance Sensor Array from Pololu.
- You can find the white paper with the black rectangle shape on it. You can test the sensor for the following two cases.
 - (Case A) The reflectance sensor is close to the black portion of the test paper with the distance of 0.5 inches or less.
 - (Case B) The reflectance sensor is close to the white portion of the test paper with the distance of 0.5 inches or less.
- Write a program to display the corresponding multiple converted voltages from three given ADC channels for the analog joystick and reflectance sensor.

- The converted voltage values are from the X-axis and Y-axis of the analog joystick in the first line. The converted voltage values from the reflectance sensor must be shown in the second line.
- Make sure to add "X:" for the voltage from the X-axis, "Y:" for the voltage from the Y-axis, and "R:" for the voltage from the potentiometer. The corresponding converted voltages should be followed respectively.
- The ADC should work in a 12-bit mode. You should be able to see the value changes reasonably fast. The decimal places should be two. For instance, 1.23
- For the joystick, leave it as the joystick is at the center position and measure the voltages. For the reflectance sensor, test two cases of Case A and Case B. Fill out the following table when measured. Make sure to include this table in your lab report.

	Value
Voltage (X-axis)	
Voltage (Y-axis)	
Voltage (Case A, Reflectance sensor)	
Voltage (Case B, Reflectance sensor)	

*Note) "Value" means the number generated from your device.

System B

- For System B, you can use the same connection diagram shown in Figure 1
- You can implement the following functions:
 - The bar LED must be operated depending on the measured voltage levels from the joystick and the reflectance sensor as shown in Figure 2.

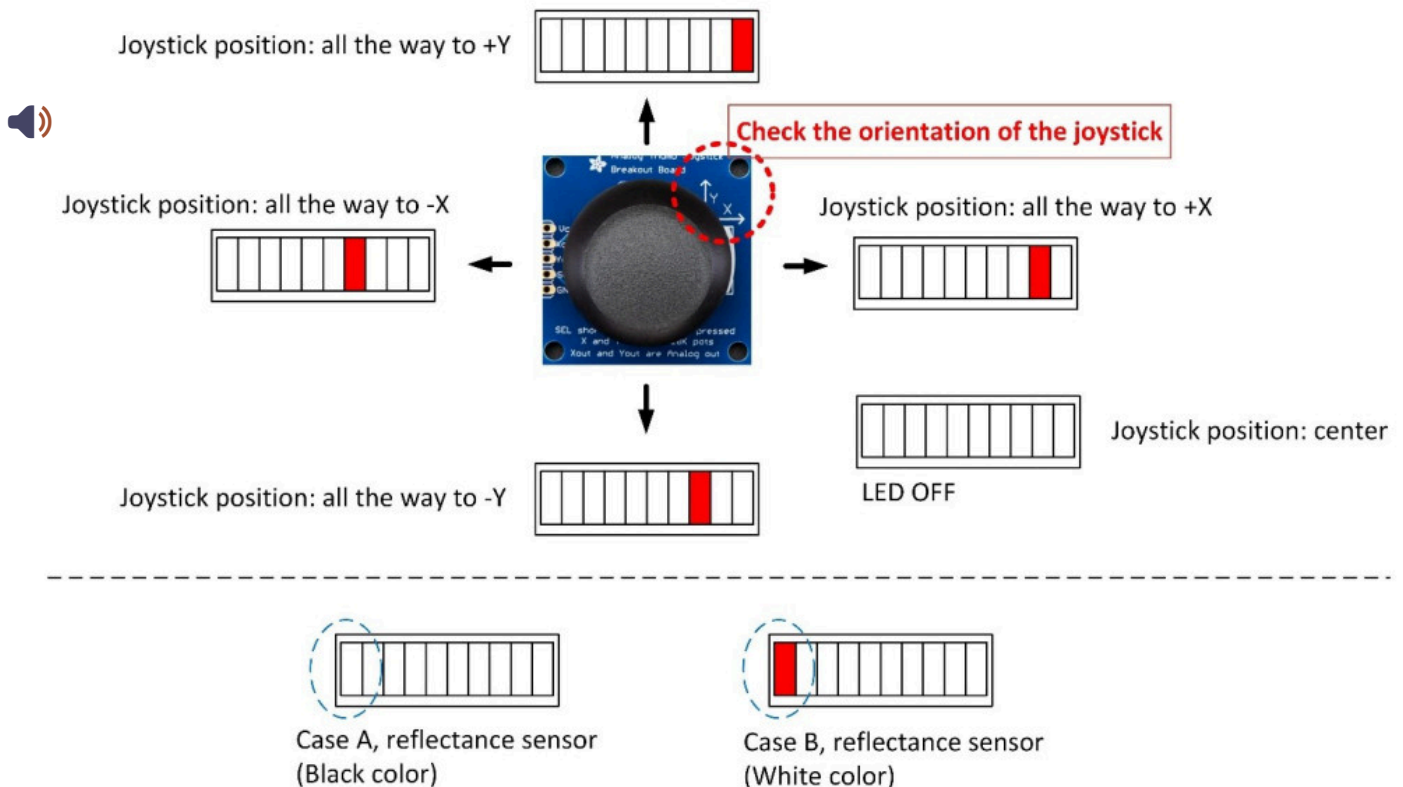


Figure 2. Functions

- Make sure to complete the lab check-off assignment (Lab6-50X) posted on CANVAS before the given deadline. The code files should be submitted as a part of the lab check-off assignment. Laboratory assignment deadlines are 15 minutes before the end of your registered laboratory session.

Reference

- B. Hur, "Learning Embedded Systems with MSP430 FRAM microcontrollers", 2nd ed. 2023.

