

Lab 6 Report

Introduction

This lab has tasked us to use the DHT22 to measure the humidity and temperature of the surrounding area and display the values of the MSP430's LCD. We will be using timers heavily in this lab, mainly to read the pulse lengths of the DHT22 which correspond to the temperature and humidity values it has measured. This is done by comparing two timers and the corresponding TBxCCRn and falling edge values. The data will be stored in an array and be decoded according to the DHT22 datasheet. The LCD will oscillate between displaying temperature and humidity at 1s intervals.

Microcontroller Concept

Microcontroller on-ship peripherals used:

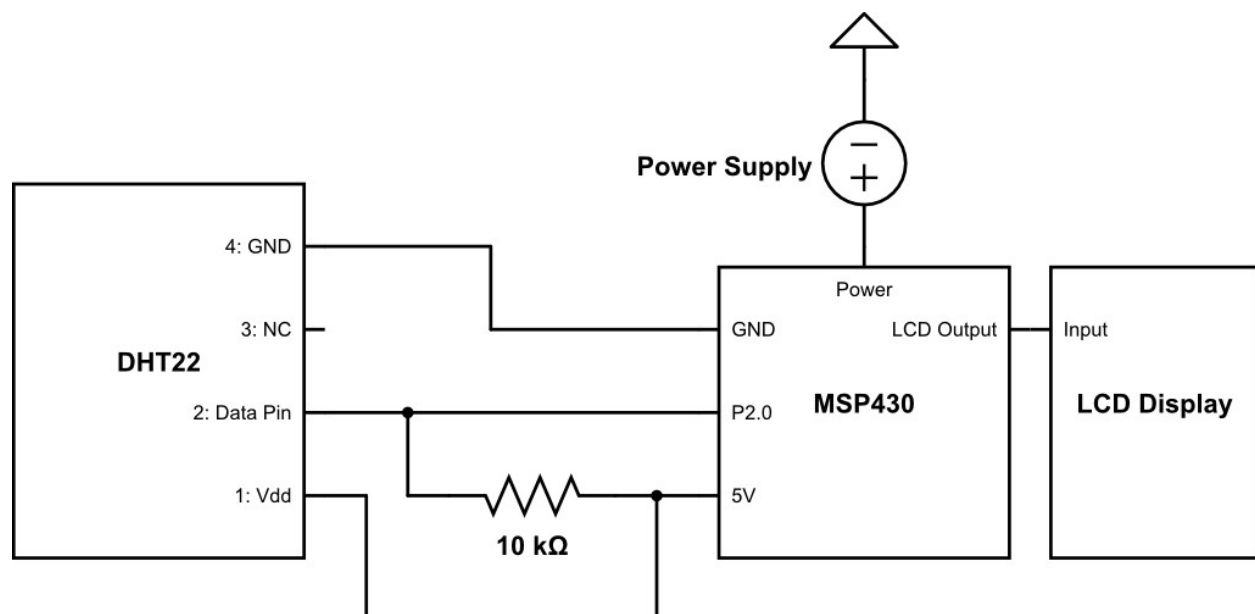
- GPIO pin 2.0
- LCD
- LED 1

GPIO pin 2.0 will be connected to the DHT22. It will also be tied to an interrupt which will allow the MSP430 to count the pulse lengths of the DHT22, which will allow measuring of temperature and humidity. Pin 2.0 is used because it is tied to an interrupt vector and is readily available.

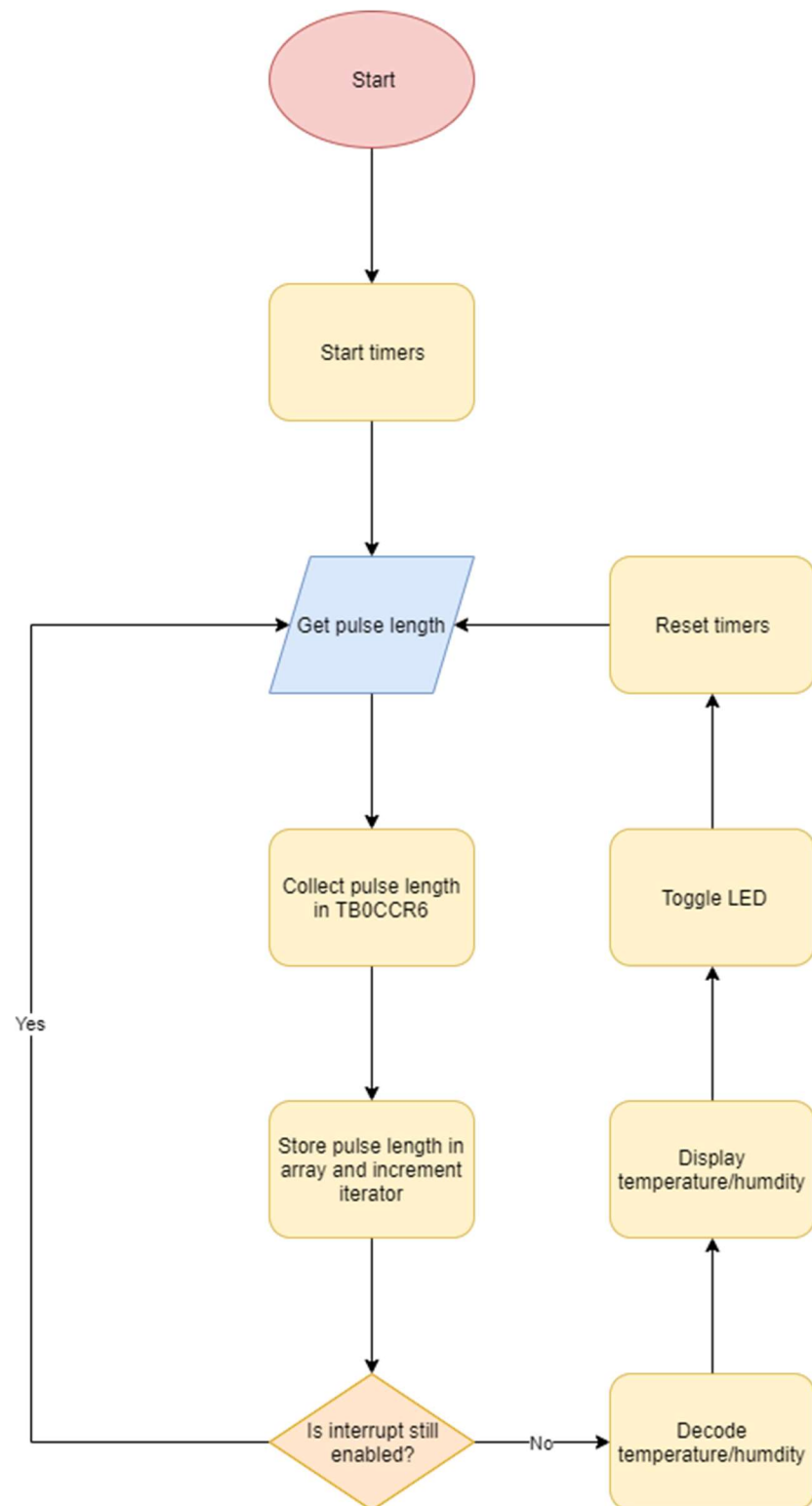
The LCD is used to display the numeric value of the temperature and humidity that the DHT22 will provide. The LCD is used because it is the best way to display numeric data to the user.

LED 1 is used to display which value (temperature or humidity) is currently being displayed on the LCD; LED on means humidity and LED off means temperature. LED 1 is used because it is the most readily available LED to use.

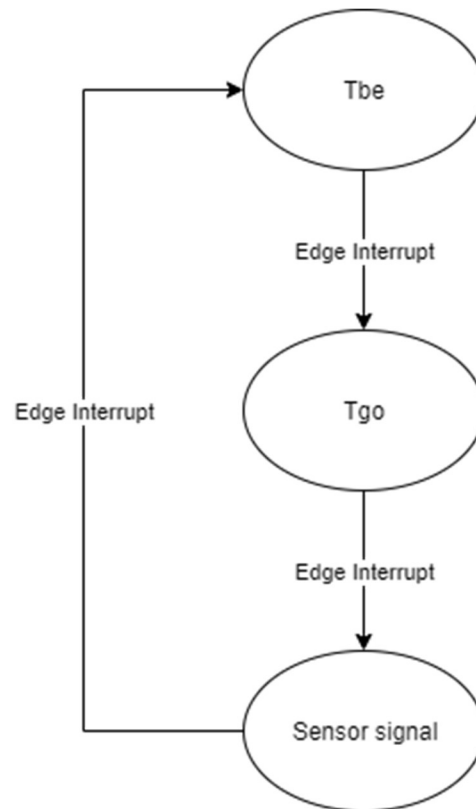
Hardware Design



Software Design



State Machine



Conclusion

I successfully implemented the DHT22 into the MSP430. The LCD displays temperature and humidity at 1s intervals between the two. There were a few errors while getting the timer comparator to work at first, but they were dealt with. All functionalities are implemented including part 1 of the extra credit.