

Zachary Sharp  
ECE 460  
Project 3 Report

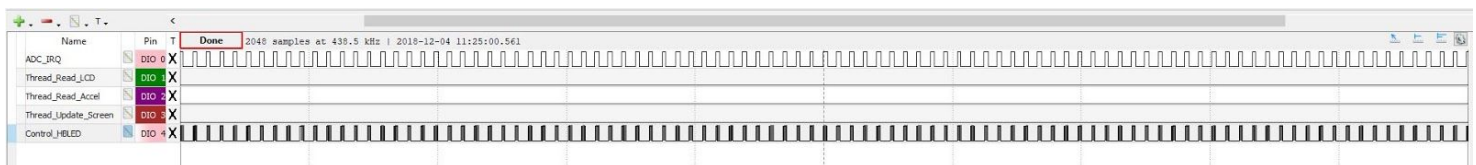
The overall goals of the system were to create a code base that allowed the touch screen to be used for various purposes, without completely halting other processes. The base code functions as such - when the upper part of the LCD screen is used to draw, the HBLEd stops flashing.

With the project complete, the LCD can be drawn on while allowing the HBLEd to continue to flash. In addition to this, the brightness of the flash can be altered by adjusting where the screen is touched on the lower end near the "Dim / Bright" display string.

Below are a series of screenshots showing various different processes of the system. It views the:

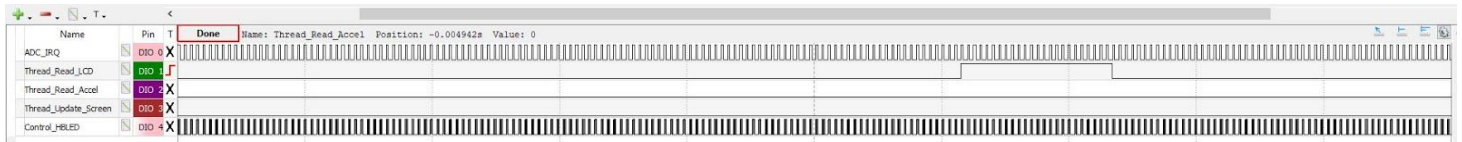
1. ADC Interrupt
2. Thread\_Read\_LCD
3. Thread\_Read\_Accelerometer
4. Thread\_Update\_LCD
5. Control\_HBLEd

Note - There are no screenshots showing the HBLEd brightness change; however, this can be easily observed by running the code on the appropriate hardware.



**Figure 1: The system running with no events triggering it**

This screenshot depicts the system when nothing is happening. Here, the board is perfectly still and the LCD is not being touched. The only thing occurring is the HBLEd flashing, which can be seen by all the debug signals being low except for the ADC Interrupt and Control\_HBLEds. This is expected because the default state of the ADC ISR is to trigger the HBLEd (through Control\_HBLEds) on a hardware trigger. With nothing changing, this should be the only behavior seen.



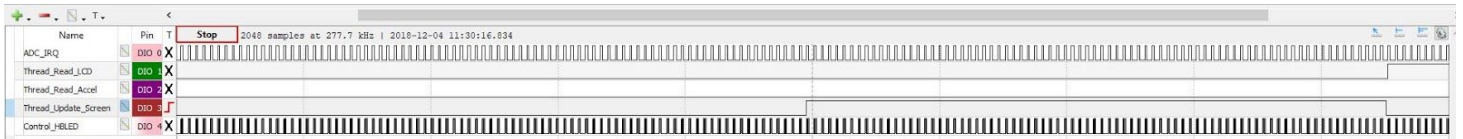
**Figure 2: The system running when LCD is being touched**

You can see in figure 2 where the Thread\_Read\_LCD gets triggered. This happens when the LCD is being interacted with. Upon sensing the touch trigger, the thread activates and begins processing the LCD touch. Because this is meant to act in accordance with a message queue, you see the the thread trigger seemingly multiple times in accordance with control HBLEED. Both are seemingly able to happen at the same time because the system is able to bounce back and forth between processing the events... allowing the screen to be interacted with while continuing to allow the HBLEED to flash.



**Figure 3: The system running with the accelerometer being activated**

Though there wasn't anything to change with the accelerometer in this project, this screenshot shows that it still behaves correctly, and updates to the LCD screen accordingly.



**Figure 4: The system updating the LCD Screen**

This picture shows that the LCD screen updates. Though it is apparent that the screen updates by just observing it, this waveform shows that this thread actually does occur in operation.