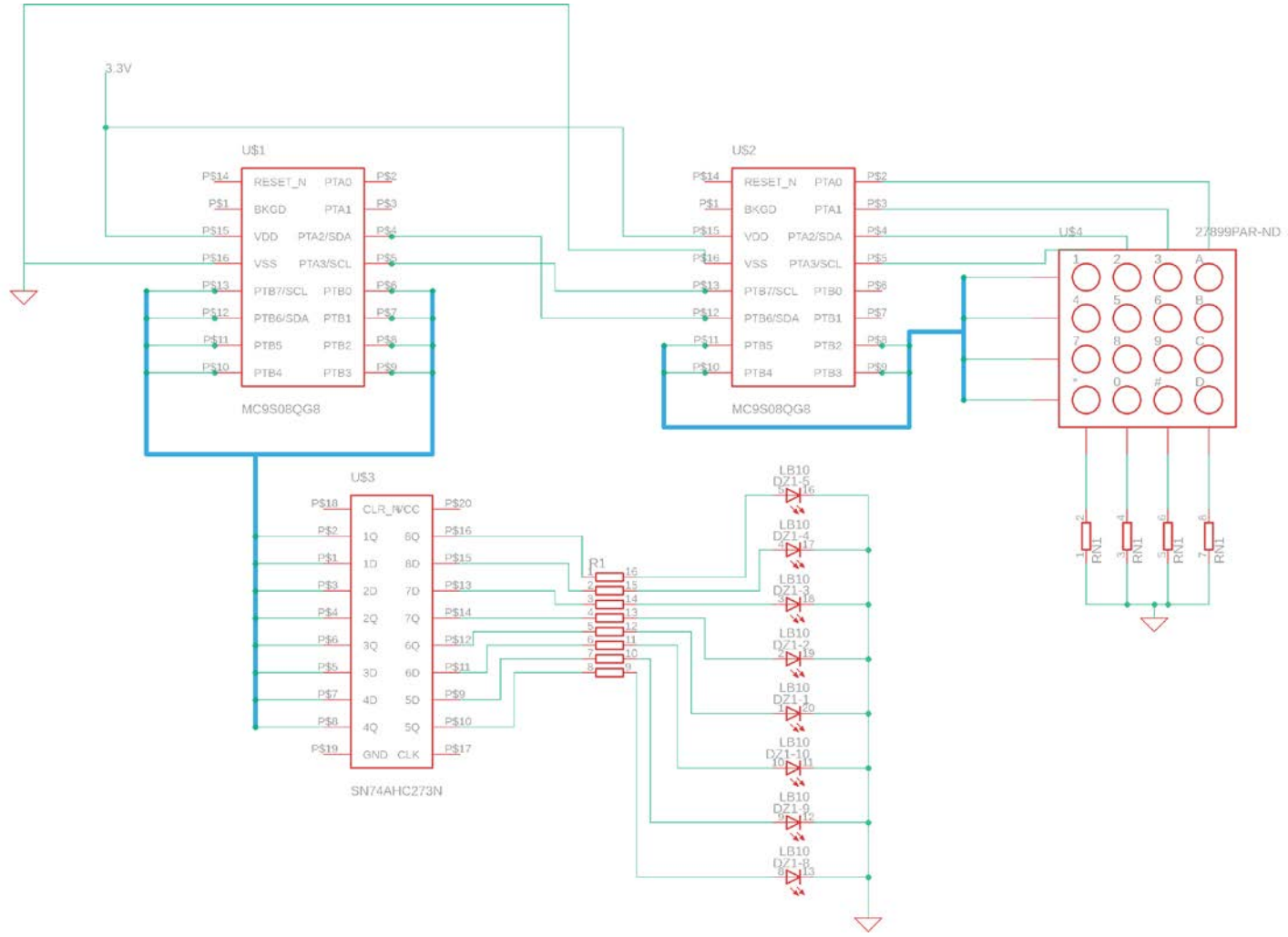
Memo to: Randy Larimer
From: Anthony Louis Rosenblum
Date: February 10, 2019
Regarding: EELE 465, Lab 1 – Heartbeat LED

Summary:

In this lab I designed a system in which pressing one of four keys on a keypad would trigger a specific LED pattern on a set of LEDs. I implemented this with two HCS08 microcontrollers using I2C to communicate between them.

Setup:

Circuit Schematic



Master:

For the master device I had to implement a keyboard interrupt that would trigger whenever a key was pressed. I treated each row of the keypad as an output and alternated them one high at a time. When a button is pressed the row and the column are shorted and the microcontroller can detect the high while reading the column. Because this lab used keys A,B,C, and D (all in the same column) I only had to communicate which row was pressed. When each row was toggled high, that information would be stored in a variable to be sent to the slave if the keyboard interrupt was triggered.

When triggered the master would use I2C to tell the slave which row was pressed.

Slave

Upon receiving the data from the master the slave would use a lookup table to determine which LED pattern to fire. The slave would then enter subroutines to generate the LED patterns on an LED block.

Summary Comments:

This lab introduced me to programming the microcontroller outside of the demo board. This was eye opening but also opened up a lot of hardware debugging issues. Early on it was difficult to pin the microcontroller correctly. After accomplishing that and they keypad interface getting the two HCS08s to talk to each other was the next difficulty. Plugging the SDA and SCL lines together often caused the I2C to crash until it was sorted out. Eventually the I2C was setup correctly after making changes to both hardware and software. Overall this lab got me familiar with using I2C between two S08s and designing a system outside the demoboard.