

Objective:

To further our conceptual understanding of interrupts and utilizing external interrupts to improve a traffic light controller.

Summary:

In part one, we reused the code from lab 7 with the exception of the pedestrian control switch. We also added an interrupt file and cleared the flag bits and set each interrupt to be triggered by a high-to-low edge logic level. Then we attached three push buttons to each of the three interrupt pins of the PIC18F4620. Next we set the enable bit for each of the individual interrupts as well as the global interrupt. The next step was to set up the interrupt service routine for each of the interrupts and have them clear their flag before returning to the main function. After that we added the code for the LCD screen and connected the logic analyzer to the interrupt pins and ensured the speed was 19200.

In part two, we removed the code related to the pedestrian control switches and added a variable for each that matched variables in the main screen file. We then programmed the LCD screen to display a 1 when a pedestrian control button was pressed and cleared it in the interrupt service routine for both east-west and north-south directions. We also cleared both flags during night mode to stop the pedestrian control functionality during this mode.

In part three, we implemented the third interrupt which set all the LEDs to flash red. To accomplish this we created two variables, status and request, when the third button was pressed, the request variable was set to 1. This would set the status variable to 1 at the beginning of the light cycle and clear the request variable. Once the light cycle restarted, the all four RGB LEDs would be controlled by a for loop that turned them on and off until the interrupt button was pressed again. When the interrupt button was pressed during the flashing stage, the request variable was set to one which triggered a return to either day or night mode.

Data Collected:**Conclusion:**

Interrupts are a great and effective way to interact with a microcontroller's program. Each interrupt will allow you to increase the priority of a service routine in the middle of a running program. This has many real world applications such as a traffic control light's pedestrian

control. Before using interrupts, it is important to understand the INTCON and INTCON3 registers and how each of their bits affect the microcontroller.