Final Project Report for the Universal Remote Control

Title Page

Provide a title page that conforms to the standard outlined in the Final Project Guide posted on the class web page – look in the Writeup section.

Level 1

Provide a level 1 diagram. Make sure to annotate the PIC processor with the pins that you used in your code. Make sure to labeled the signals and subsystems in a manner consistent with the discussion that you will use in later sections.

Transmission Subsystem

Provide a description of the software and hardware used to generate the IR waveform. Work your way from a high-level description of the IR data (data structures in your program), interrupt or foreground routines, and the CCP subsystem.

TX hardware

Put together a coherent explanation of the relationship between the voltage waveform produced by the PIC and the operation of the IR LED. You may find the information covered in (and your solutions to) inLab 7 to be useful. Touch on the following ideas.

- Provide an annotated image of the hardware associated with illuminating the IR LED.
- Annotate the signal names and values (when RC1 output is 3.3V)
- Annotate component names and values
- The role of the RED LED.
- The role of the 2.2Ω resistor
- Explain the signal values (current and voltage) in the different components when the RC1 is 3.3V. Make sure to include principles of operation as appropriate.

ECCP2 and TMR2 subsystem

Put together a coherent explanation of the relationship between the ECCP2 (when configured in PWM mode) configuration registers, TMR2 subsystem configuration, registers and the waveform generated on the RC1 pin. Cite material, figure, equations from the PIC18(L)F2X/4XK22 Data Sheet as appropriate. Make sure to credit images copied in your report. Consider touching on the following ideas.

- Explain what ECCP2 register sets the period of the PWM waveform. Show the calculation of the period in terms of the TRM2 configuration used in your program.
- Explain what PIC registers the MCC function that sets the duty cycle of the PWM waveform works with.
- Explain the relationship between the value provided to the “duty cycle” register corresponds to the waveform produced by the RC1 pin.
- How the ISR converts the stored data into generated IR waveform.

Receive Subsystem

The receive subsystem is almost all software driven. I would like you to discuss the

- PIC subsystem that you used
- The registers that this subsystem relies
    - Their names
    - Their function
    - The bits that you needed to manipulate directly or indirectly through the MCC interface
- How the ISR converts the stored donor remote information into the

Milestones

Provide the tests that you have submitted during the Milestone check on April 23rd.

Final Implementation

Describe the state of your final implementation.

- How reliable is the transmission?
- What lessons did you learn?
- What would you have done differently?

Software Architecture

The software architecture consists of the data structures and function used to learn and transmit the IR data packets.

- Describe the process you code goes through to learn the bit durations.
- What assumptions did you make about the packet structure (start bit, # databit, etc.)?
- One your code understood the bit durations, how did it use this information to interpret the incoming IR wave?
- How are the learned data bits stores?