ECE 4175
Project Seven
Fast Stepping Rate

Complete by:
Wednesday February 22nd for an A+

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References:
Figure 16-4   CCP1/Timer1 counter
Section 9.4   High-priority interrupts

Overview

For this project, continue to check the potentiometer and obtain a one-byte output, **ADRESH**, ranging from 0 to 0xff every second. Now however, instead of immediately scaling this value, do the following:

If the value ranges between 0 and 7, don't step the stepper motor. Instead, use the LCD to display the ASCII codes, just as for Project Six.

If the value is larger than this, then display this value as a three-digit number in the lower left corner of the LCD and use a non-zero value of **NUMSTPSH:NUMSTEPSL** to step the stepper CW or CCW (as before) at a rate of **ADRESH** steps/second. To produce this stepping rate, use the CCP1/Timer1 circuit of Figure 16-4 (with a prescaler value of P=8) to produce high-priority interrupts at this rate.

CCP1/Timer1 Interrupt Generator

Note that **TMR1H:TMR1L** will be clocked every 8 x 0.4 μs. That is, every 3.2 μs. For the minimum stepping rate of 8 steps/second, we want the circuit of Figure 16-4 to produce a high-priority interrupt every 125 milliseconds. This corresponds to every 125000μs/3.2μs counts of the counter; that is, every 39062 counts. In general, the number to be loaded into **CCPR1H:CCPR1L** to produce the desired stepping rate is

$$312500/\text{ADRESH}$$

(This ignores the 1 in the equation of Figure 16-4c as well as the effect of truncating the result to an integer value.)

For this project, use the B1 pin on the QwikFlash header to monitor the stepping rate. If the pin is toggled every time a step is taken, it should produce a frequency equal to half the displayed stepping rate.