

Assume that you are using a microcontroller with a 24 MHz bus clock speed with an 8 MHz oscillator clock.

(20) 5.1. The prescaler bits of the TSCR2 register are set to PR2:0 = 101. The first time the TCNT register is read the value is 0xCDEF. The next time the TCNT register is read, the value is 0x1234. Assuming that the time between reads was less than the overflow period of the counter, how much time (in seconds) passed between the two reads?

(20) 2.2. Write some C code which will enable the timer subsystem, set the timer overflow rate to 175 ms, and enable the timer overflow interrupt.

(20) 5.3. Below are the values of some timer registers in the HC12:

| TSCR1 | TSCR2 | TCTL1 | TCTL2 | TCTL3 | TCTL4 | TFLG1 | TFLG2 |
|-------|-------|-------|-------|-------|-------|-------|-------|
| 0x80 | 0x05 | 0xA4 | 0xC2 | 0x5F | 0x76 | 0x21 | 0x80 |

(a) Is the Timer enabled?

(b) Is the Timer Overflow Interrupt enabled?

(c) Is the Timer Overflow Flag set?

(20) 5.4. Write some assembly language code which will enable the timer subsystem, set the timer overflow rate to 350 ms, and use interrupts.

(20) 5.5. Write some C code which will enable the Real Time Interrupt (RTI) subsystem, set the real time interrupt rate to 1 ms, and enable the real time interrupt.