EE 308

Homework 13

Due May 1, 2006

1. You are asked to send a character string to another device over the SCI port.

   (a) What is the ASCII code (hex digits) to send the character string `EE 308\r\n` (EE 308 followed by a carriage return and a line feed)?

   (b) What is the ASCII code for the same character string if it is sent using seven data bits and odd parity?

   (c) How long will it to send that character string over the SCI port at 9600 baud?

2. Write some C code to set up the serial port SCI0 to operate in the following mode: eight bits (seven data bits and one parity bit), odd parity, and 9600 baud. Be sure to enable both the transmitter and receiver, and enable interrupts on the receiver.

3. Write a C function `int putchar(int c)` which will write the character `c` to SCI0. The function should return -1 if the character cannot be sent (if the transmitter of SCI0 is not enabled); otherwise, the function should return `c`. Be sure to wait until the transmit data register is empty before writing the character to the transmit data register.

4. Write a C function `int getchar(int c)` which will read and return a character from SCI0. The function should return -1 if the SCI0 receiver is is not enabled; otherwise, the function should return the character it reads from the data register. Be sure to wait until the receive data register is full before reading the character.

5. A wheel on a robot has an encoder which generates 5,000 pulses for one revolution of the wheel. Write a C program which does the following:

   - Enables the pulse accumulator PACA.
   - Enables an RTI interrupt with a 32.768 ms period
   - In the RTI interrupt service routine, determine the number of pulses which have occurred since the last interrupt, and save that value to a 16-bit global variable.
   - In the main program, print out the speed of the wheel in RPM.