CPE 301 Embedded Systems Design LAB 6

Topic: UARTS

Objective

To understand the four UART functions and to perform simple character manipulation in ANSI C.

Before the Lab

Download the Atmel datasheet for the 2560 from WebCampus or from here.

Review the following sections of the datasheet to get generally familiar with the operations and registers that will be needed for the lab.

- Register Summary – page 399
- Data Register – page 218
- Control Registers – page 219
- Baud Rate Register – page 222

Procedure

You are given the file `echo2c.ino` as a starting point. It gives you the basic outline of the project. Your goal is to fill in the following functions:

- `U0kbhit(void)`
    - Check the RDA status bit, and return True if the bit is set, return False if the bit is clear.
- `U0getchar(void)`
    - Return the character which has been received by the UART.
- `U0putchar(unsigned char U0pdata)`

    - Wait until the serial port TBE status bit is high, then take the character `U0pdata` and write the character to the transmit buffer

1. Write, compile, download to the Arduino and test the keyboard program starting with the `echo2c.ino` file, adding code you write for the three functions described above. Thoroughly test this portion of your code before moving onto step 2.

2. Copy your tested and working `echo2c.ino` to a new sketch `echo3c.ino` and implement the following functionality:

    - When a key is pressed, the program will send back a string representing the ASCII code for the key. The format for the string is "0xYY\n", where `YY` represents the two-digit hexadecimal code for the key. For example, if the user presses enters the character “1” the program will send back “0x31\n”. In all, the program will be sending back 5 characters for every key pressed.

What to Turn In

- During the lab session, demonstrate your code to the TA.
- Add your name and your lab partner's name to the top of each of your ino files as comments.
- In WebCampus, turn in `echo2c.ino` and `echo3c.ino` files. *Both lab partners must turn in the assignment to WebCampus to get credit for the lab*.