Assignment 8
Communication

Embedded Logic Design

October 3, 2015

1 Description

In continuation of assignment 7 (ADC), you have to print the values that you read from the LDR and NTC, on the console of the host machine (that is your computer). To ease the implementation, refer to the skeleton library attached `uartLibrary.h` which you can find in the resources. It is suppose to provide the functions for `uart_init()`, `uart_putchar()` and `uart_getChar()` and it helps you to print out text on a serial terminal such as minicom (Linux) or Hyperterminal (Windows). What the functions are suppose to do, is mentioned in the comments you find above them. It also provides the functionality of taking input from the terminal. Have a look at `example.c` to get to know, how to use `printf()`, `puts()`, `getChar()` in your C code conveniently.

1. As you can see, the functions in `uartLibrary.h` are empty currently and you have to fill them according to your needs (observe the `XXX` in the comments). To reduce the number of bugs you can get `example.c` working first.
2. After having a look at the relevant chapters in the reference manual regarding the UART, examine `setBaud.h`. What does it do?
3. Have a look at `http://wormfood.net/avrbaudcalc.php?postbitrate=9600&postclock=16&u2xmode=1&ubrr8bit=1&hidetables=1`. Why are bit rates in the table, which are not recommended to use due to the error probability?
4. Transmit the values of the LDR and NTC in regular time intervals and make them visible on your terminal.
5. To complete the assignment successfully, the following behavior needs to be implemented: If I press a key on the keyboard (e.g. “a”), the Arduino replies with the state of the LEDs immediately (e.g. “LED NTC: on, LED LDR: off”). Use an ISR for this functionality, hence you cannot use `input = getchar();`. This line is for demonstration purposes only and for the sake of completeness.

2 Deliverables

All files must be submitted to `nanu.iiitd.edu.in` via `git` or `subversion`. Late submissions are not evaluated nor will be submissions through `https://www.usebackpack.com` or mail. Your repository has to contain:

- Source code
- Makefile

2.1 Remarks

If you encounter a problem, ask Google, DuckDuckGo, Bing, etc. first. The TAs will not type the question that you have, into the mask in the search engine for you. Required resources, textbooks, etc. are available on the ELD course website of `https://www.usebackpack.com` or in the Internet (datasheets, AVR library documentation, etc.)