

UART Task

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Using the Nucleo STNM32LKC evaluation board realize a simple user interface to control LEDs relying entirely on ASCII characters.

For evaluation you'll need a terminal program (TeraTerm) on your host computer. For the UART interface you will use the integrated virtual COM port of the Nucleo board. Configure both with the same settings!

Task Description

Use the UART to show options on the PC, therefore send fixed strings and display these using a Terminal Program.

Send commands and parameters from the Terminal Program to the Microcontroller. Modify the 3 color LED on the clickshield accordingly.

Go to the Moodle-course, open the Test – “Get assignment 2 parameters” to retrieve your personal parameters.

Part One (2,5 of the 7,5 points)

From the Nucleo board send a string to the PC using a Terminalprogram like TeraTerm. The string should guide the user to several different options:

“Choose an LED to control: (1) red, (2) green, (3) blue”

“press (e) to turn on LED”

“press (a) to turn off LED”

“press (t) to toggle LED”

Read the character from the UART, control the LED accordingly, start the loop again sending the string again!

Go to the Moodle-course, open the Test – “Get assignment 2 parameters” to retrieve the baudrate that should be used and your personal letters to control the LEDs. You will receive an assignment-number (which you should note in the readme section of your main-file) a letter to turn the LED on, a letter to turn the LED off and a letter to toggle the LED.

(Baudrate: 9600, e – on, a – off, t - toggle)

Part Two (2,5 of the 7,5 points)

From the Nucleo board send a string to the PC using a Terminalprogram like TeraTerm. The string should guide the user to several different options:

“Choose an LED to control: (1) red, (2) green, (3) blue”

“press (b) to start blinky (LED)”

“press (s) to stop blinky (LED)”

“enter a number to set the period of the blinky LED as a multiple of 500ms”

“enter a number to set the on-time of the blinky LED as a multiple of 100ms”

Read the character from the UART, control the LED accordingly.

It is only necessary to read the parameters once!

Let the led-blink with these parameters in an infinite loop!

Go to the Moodle-course, open the Test – “Get assignment 2 parameters” to retrieve an assignment-number (which you should note in the readme section of your main-file) the timebase for the period and the timebase for the on-time that should be used.

(Periode: 500ms, On-time 100ms)

Implement and test your code using a layered and structured coding approach (e.g. device, library, and application layer).

Verification (2,5 of the 7,5 points)

Verify the communication by connecting the Nucleo Board via its USB interface to a host PC running a terminal program (e.g. TeraTerm, etc.) and logic analyzer: document your input on the Terminal program capturing a screenshot and the signal generated for the LED with the logic analyzer!

Evaluate the timing of the signal created for the LED GPIO-Pin using a logic analyzer: make a screenshot and measure the on and off time. The time should be +/- 10% of the given timing parameters.

Grading Criteria

The grading criteria are functionality, code quality, modularity, and structuring.