CSE 433 Embedded Systems STM HW #2

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In this assignment it was required to use a timer to calculate the time as in seconds, minutes and hours and use the UART communication to print them on the Tera Term terminal.

For this purpose first timer prescalar and preload values have to be calculated. The clock for this project has setted to 100 mHz which means it has a 10ns period. Also since our counter is 16-bits we can count up to a maximum of 65535. So with no prescalar setting the overflow period would be 655.35 microseconds. Since we need to calculate 1s for this timer this overflow period is not enough.

The prescalar value is calculated as:

$$\frac{1s}{655.35\mu s} = 1525{,}90219 \approx 1526$$

The new period with the new settings will be 15260 ns. Now it is required to find the maximum count value which will result in 1s. Maximum count value is calculated as:

$$\frac{1s}{15260ns} = 65530.7995 \approx 65531$$

So with these values we can calculate 1.00000306 seconds. Which we can assume as 1 seconds. After these values are setted in CubeMX perspective in the TIM_3 timer of the STM32 card. Also UART2 is enabled in CubeMX perspective for the UART transmitting.

Then in while (1) loop of the program another while is added to stall until the maximum value is achieved in the counter to figure out if 1 seconds have passed or not. Then the global variable seconds is increased by 1. And then hour, minute and remaining second calculations are made. After the calculations all values are collected in a string. Then by using HAL_UART_Transmit function this string is transmitted.

Screenshots