Busan Software Meister High School

MICROPROCESSOR

2309 양유빈

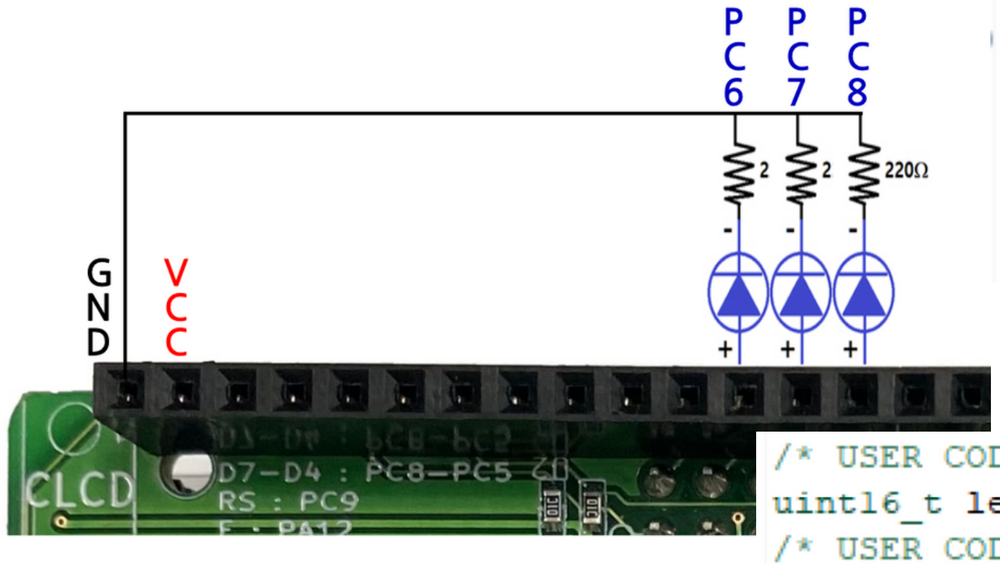
20231116 마이크로프로세서

3개의 LED의 밝기 랜덤 변경

Randomly change the brightness of 3 LEDs

3개의 LED(PC6, PC7, PC8)의 밝기를 1초 간격으로 랜덤하게 변화, 그 때의 ARR, CCR1, CCR2, CCR3의 값을 화면(Tera Term)에 출력

- 초기값 : Clock = 72MHz, PSC = 71(72-1), Counter = 999(1000-1), Pulse = 0
- Counter값(10000미만)과 Pulse값은 rand() 함수 활용

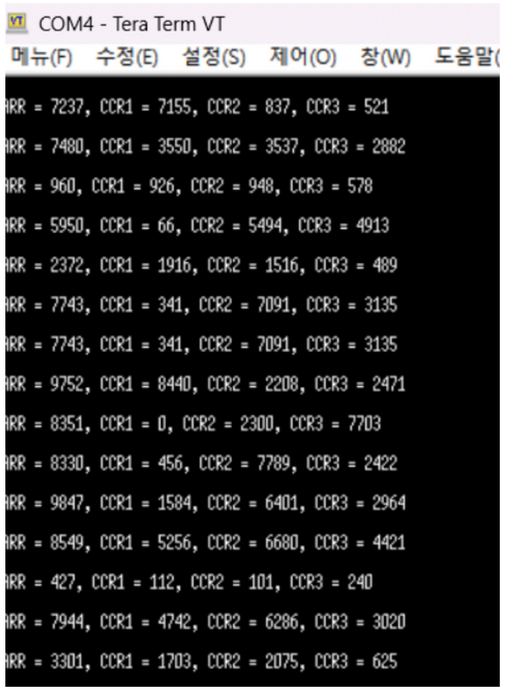



```c
#include "main.h"

/* Private includes ----------
/* USER CODE BEGIN Includes */
#include <stdio.h>
#include <stdlib.h>
/* USER CODE END Includes */
```

```c
/* USER CODE BEGIN PV */
uint16_t led_arr, led_ccr1, led_ccr2, led_ccr3;
/* USER CODE END PV */
```

// 결과



3개의 LED의 밝기 랜덤 변경

Randomly change the brightness of 3 LEDs

```c
/* Private user code ---------------------------------------------------------*/
/* USER CODE BEGIN 0 */
//printf
int __io_putchar(int ch) {
    HAL_UART_Transmit(&huart2, (uint8_t *)&ch, 1, 0xFFFF);  // 0xFFFF는 최대 대기 시간
    if (ch == '\n') {
       HAL_UART_Transmit(&huart2, (uint8_t *)"\r", 1, 0xFFFF);
    }
    return ch;
}
void printf123_pwm() {
     led_arr = __HAL_TIM_GET_AUTORELOAD(&htim3);
     led_ccr1 = __HAL_TIM_GET_COMPARE(&htim3, TIM_CHANNEL_1);
     led_ccr2 = __HAL_TIM_GET_COMPARE(&htim3, TIM_CHANNEL_2);
     led_ccr3 = __HAL_TIM_GET_COMPARE(&htim3, TIM_CHANNEL_3);
     printf("%ARR = %d, CCR1 = %d, CCR2 = %d, CCR3 = %d\n\n", led_arr, led_ccr1, led_ccr2, led_ccr3);
}
/* USER CODE END 0 */
```

```c
  MX_USART2_UART_Init();
  /* USER CODE BEGIN 2 */
HAL_TIM_PWM_Start(&htim3, TIM_CHANNEL_1);
HAL_TIM_PWM_Start(&htim3, TIM_CHANNEL_2);
HAL_TIM_PWM_Start(&htim3, TIM_CHANNEL_3);
setvbuf(stdin, NULL, _IONBF, 0);
  /* USER CODE END 2 */
```

3개의 LED의 밝기 랜덤 변경

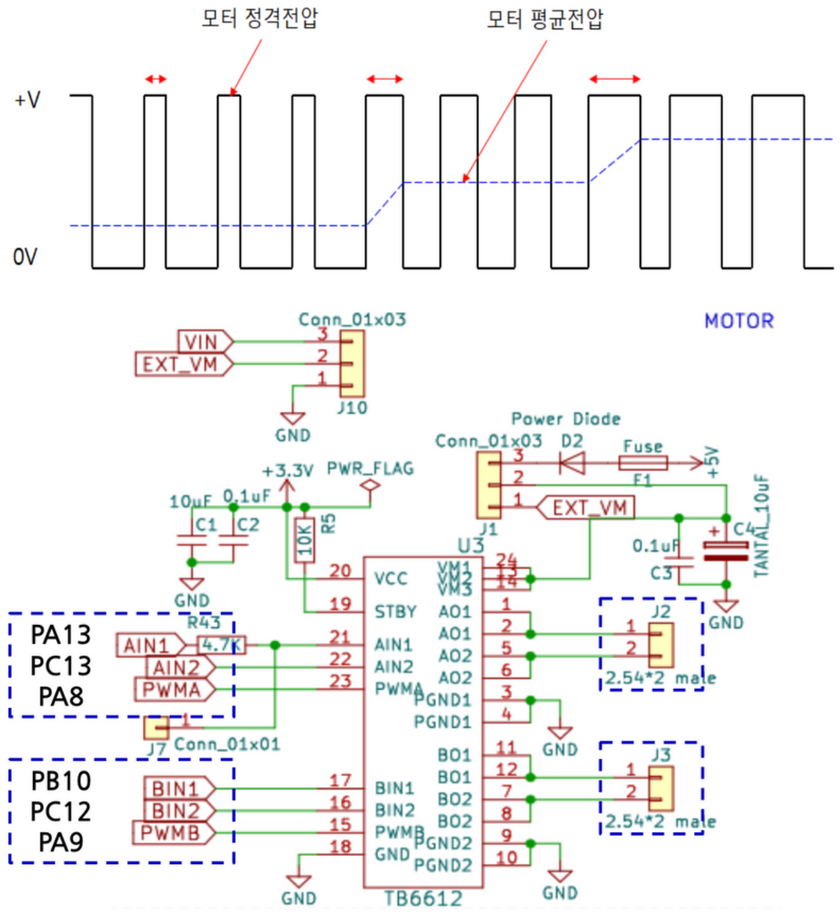
Randomly change the brightness of 3 LEDs

```
/* Infinite loop */
/* USER CODE BEGIN WHILE */
while (1)
{
    rand();
    led_arr = rand() % 10000;
    __HAL_TIM_SET_AUTORELOAD(&htim3, led_arr);
    uint16_t ccr[] = {rand()%led_arr, rand()%led_arr, rand()%led_arr};
    uint16_t ch[] = {TIM_CHANNEL_1, TIM_CHANNEL_2, TIM_CHANNEL_3};
    for(int i=0; i<3; i++) {
        __HAL_TIM_SET_COMPARE(&htim3, ch[i], ccr[i]);
    }
    printfl23_pwm(); // 함수 호출
    HAL_Delay(500);
  /* USER CODE END WHILE */

  /* USER CODE BEGIN 3 */
```

모터 회전 방향 제어

Motor, motor rotation direction control




```
/* USER CODE BEGIN 2 */
HAL_TIM_PWM_Start(&htim1, TIM_CHANNEL_2);
/* USER CODE END 2 */

/* Infinite loop */
/* USER CODE BEGIN WHILE */
while (1)
{
    HAL_GPIO_WritePin(GPIOB, GPIO_PIN_10, 1);
    HAL_GPIO_WritePin(GPIOC, GPIO_PIN_12, 0);
    HAL_Delay(1000);
    HAL_GPIO_WritePin(GPIOB, GPIO_PIN_10, 0);
    HAL_GPIO_WritePin(GPIOC, GPIO_PIN_12, 1);
    HAL_Delay(1000);
  /* USER CODE END WHILE */
```