Busan Software Meister High School

MICROPROCESSOR

2309 양유빈

20231109 마이크로프로세서

가변저항값에 따라 LED밝기 변경

Change LED brightness according to variable resistance value

LED(PC6)의 밝기가 가변저항(ADC1_IN10, PC0)에 따라
변화하도록 프로그래밍

- TIM3 설정 : Clock = 72MHz, PSC = 71(72-1),
  Counter = 999(1000-1)
- ADC1 설정 : Clock = 12MHz, Continuous Conversion
  Mode = Enable, Sampling Time = 13.5
- 참고) - CCR1 = (adc_value*1000)/4095

```
47  /* USER CODE BEGIN PV */
48  uint16_t adc_value;
49  uint16_t led_ccr1;
50  /* USER CODE END PV */
```

```
95      MX_TIM3_Init();
96      /* USER CODE BEGIN 2 */
97  HAL_ADCEx_Calibration_Start(&hadc1);
98  HAL_ADC_Start(&hadc1);
99  HAL_TIM_PWM_Start(&htim3, TIM_CHANNEL_1);
100     /* USER CODE END 2 */
101
102     /* Infinite loop */
103     /* USER CODE BEGIN WHILE */
104     while (1)
105     {
106         if(HAL_ADC_PollForConversion(&hadc1, 10) == HAL_OK) {
107             adc_value = HAL_ADC_GetValue(&hadc1);
108             led_ccr1 = (adc_value*1000)/4095;
109             __HAL_TIM_SET_COMPARE(&htim3, TIM_CHANNEL_1, led_ccr1);
110
111         }
112     /* USER CODE END WHILE */
113
114     /* USER CODE BEGIN 3 */
115     }
116     /* USER CODE END 3 */
117  }
```
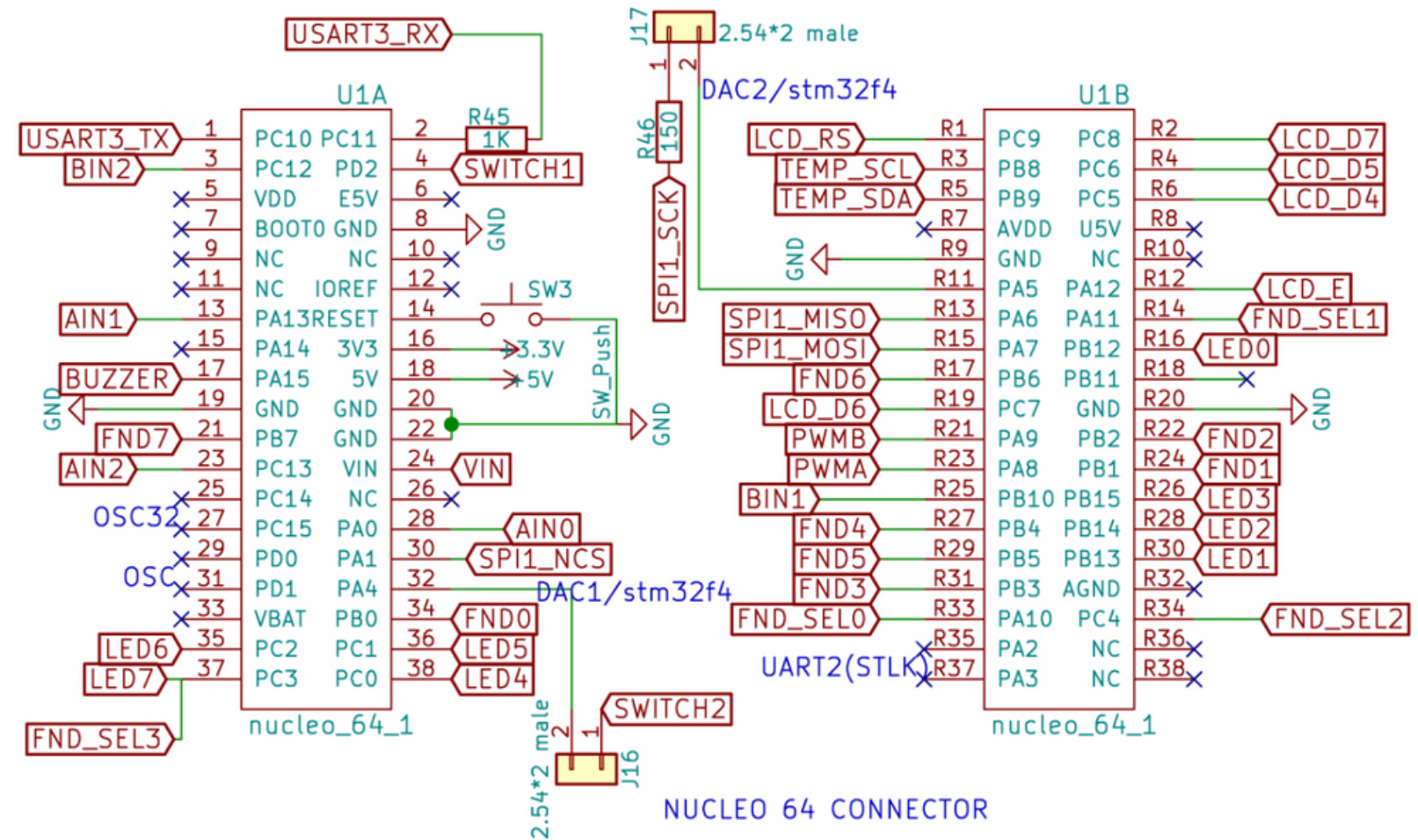
ADC1 IN10~IN13

ADC1 IN10~IN13

- PC0 : ADC1_IN10
- PC1 : ADC1_IN11
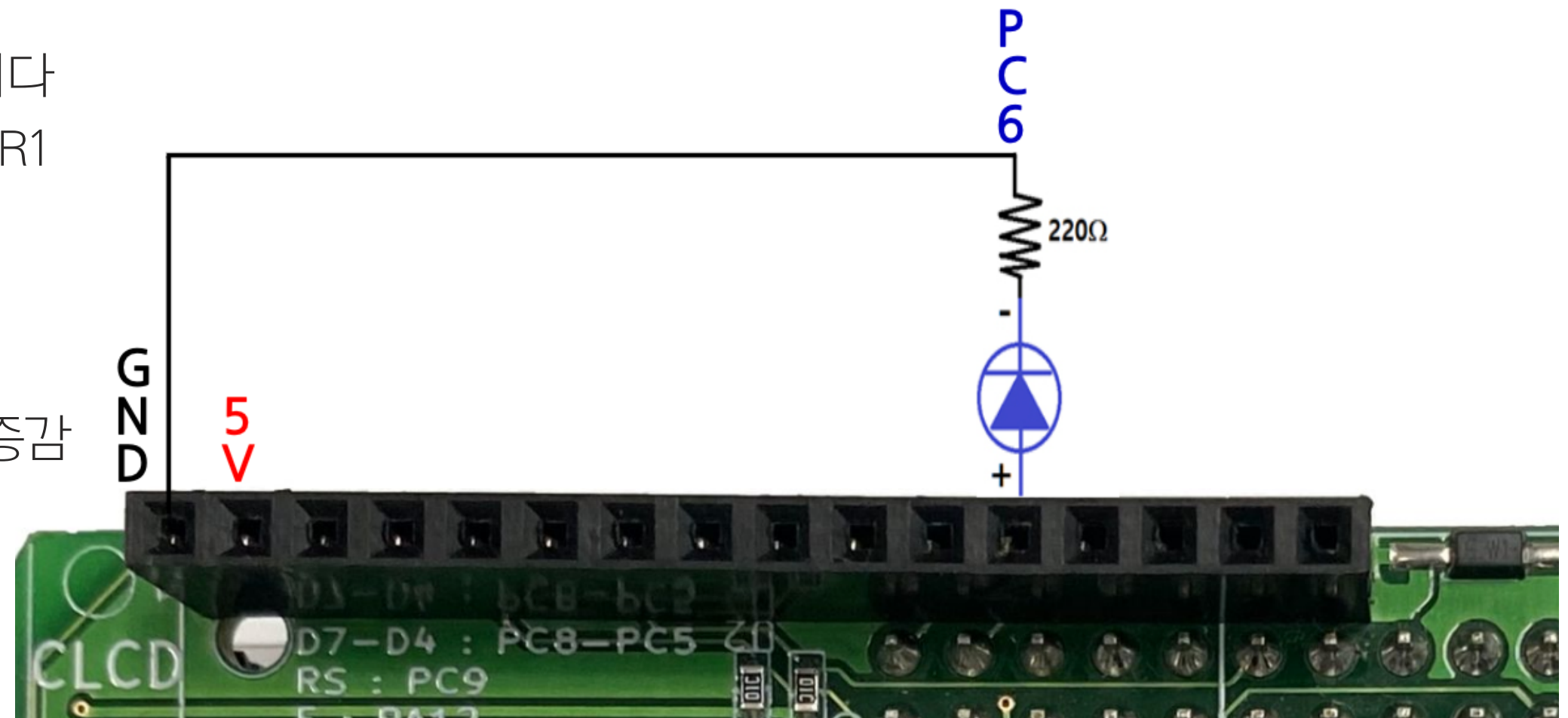- PC2 : ADC1_IN12
- PC3 : ADC1_IN13
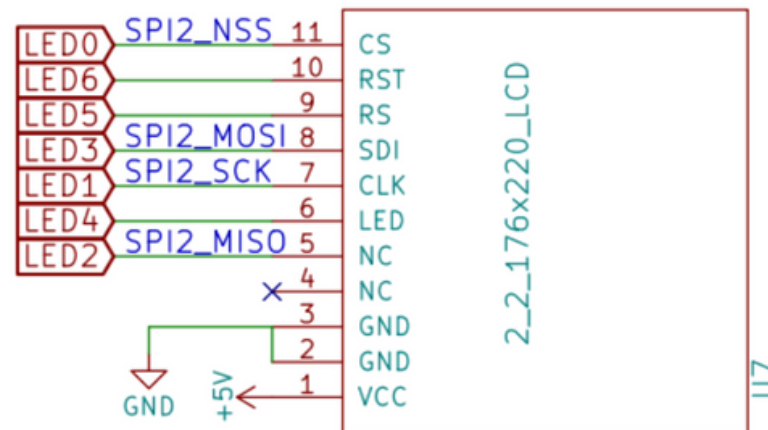
변화하는 LED 밝기값 출력

Output of changing LED brightness value

LED(PC6)의 밝기가 반복적으로 변화(점점 밝아지다
가 점점 어두워짐)하도록 하고, 그 때의 ARR값, CCR1
의 값을 화면에(Tera Term) 출력

- TIM3 설정 : Clock = 72MHz, PSC = 71(72-1),
  Counter = 999(1000-1)
- PWM Pulse(Duty Cycle)값 0.5초마다 100씩 증감
- 참고)
  - Counter Period : ARR 값 설정
  - Pulse(Duty Cycle) : CCR1 값 설정

변화하는 LED 밝기값 출력

Output of changing LED brightness value

```
60  /* Private user code --------------------------------------------
61  /* USER CODE BEGIN 0 */
62  int __io_putchar(int ch) {
63      HAL_UART_Transmit(&huart2, (uint8_t *)&ch, 1, 0xFFFF);   // 0xFFFF
64      if (ch == '\n') {
65          HAL_UART_Transmit(&huart2, (uint8_t *)"\r", 1, 0xFFFF);
66      }
67      return ch;
68  }
69
70  void print_pwm(){
71      led_ccr1 = __HAL_TIM_GET_COMPARE(&htim3, TIM_CHANNEL_1);
72      led_arr = __HAL_TIM_GET_AUTORELOAD(&htim3);
73      printf("LED_ARR : %d, LED_CRR1 : %d\n\n", led_arr, led_ccr1);
74  }
75  /* USER CODE END 0 */
76
```

```
24  #include<stdio.h>
25  /* USER CODE END Includes */
```

```
112  /* USER CODE BEGIN WHILE */
113      while (1)
114      {
115  #if 0
116  // led 밝기 연속 변화
117      for (int i = 0; i < 1000; i += 10) {
118          __HAL_TIM_SET_COMPARE(&htim3, TIM_CHANNEL_1, i); //  TIM3 -> CCR1 = i;
119          HAL_Delay(100);
120      }
121      for (int j = 999; j >= 0; j -= 10) {
122          __HAL_TIM_SET_COMPARE(&htim3, TIM_CHANNEL_1, j);   //  TIM3 -> CCR1 = j;
123          HAL_Delay(100);
124      }
125  # endif
126      for (int i = 0; i < 1000; i += 100) {
127          __HAL_TIM_SET_COMPARE(&htim3, TIM_CHANNEL_1, i);
128          print_pwm();
129          HAL_Delay(500);
130      }
131      for (int i = 1000; i > 0; i -= 100) {
132          __HAL_TIM_SET_COMPARE(&htim3, TIM_CHANNEL_1, i);   //  TIM3 -> CCR1 = j;
             print_pwm();
             HAL_Delay(100);
         }
     /* USER CODE END WHILE */

     /* USER CODE BEGIN 3 */
```