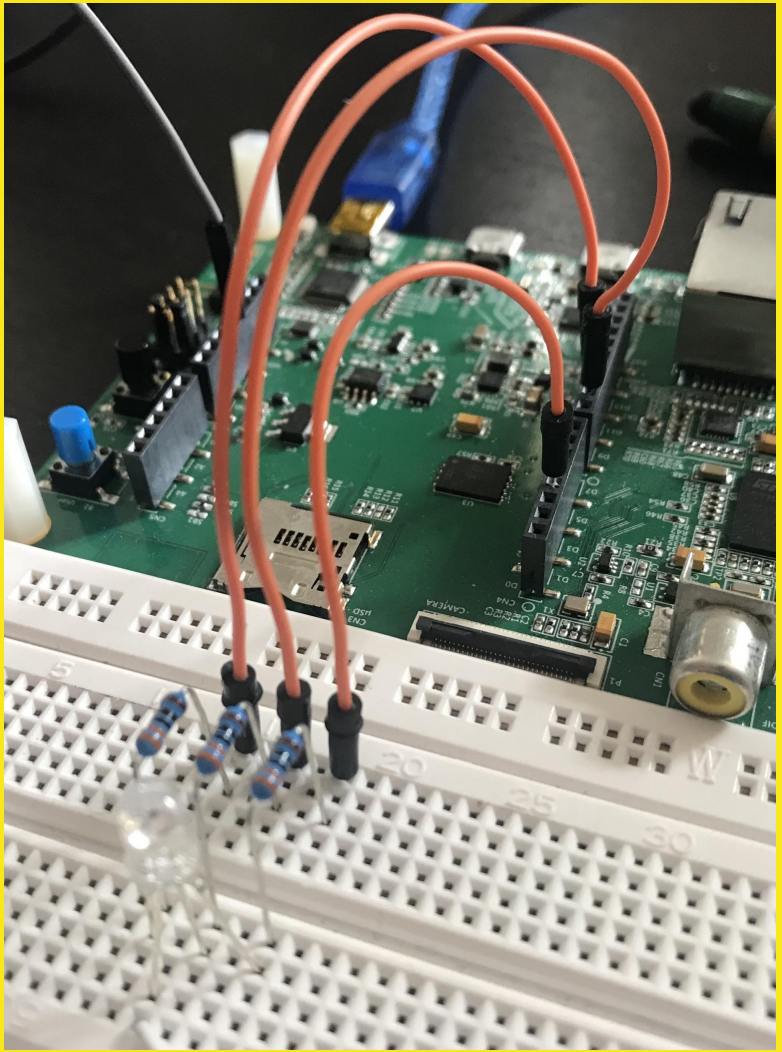
RGB LED MAGIC

HORDON13

RGB LED

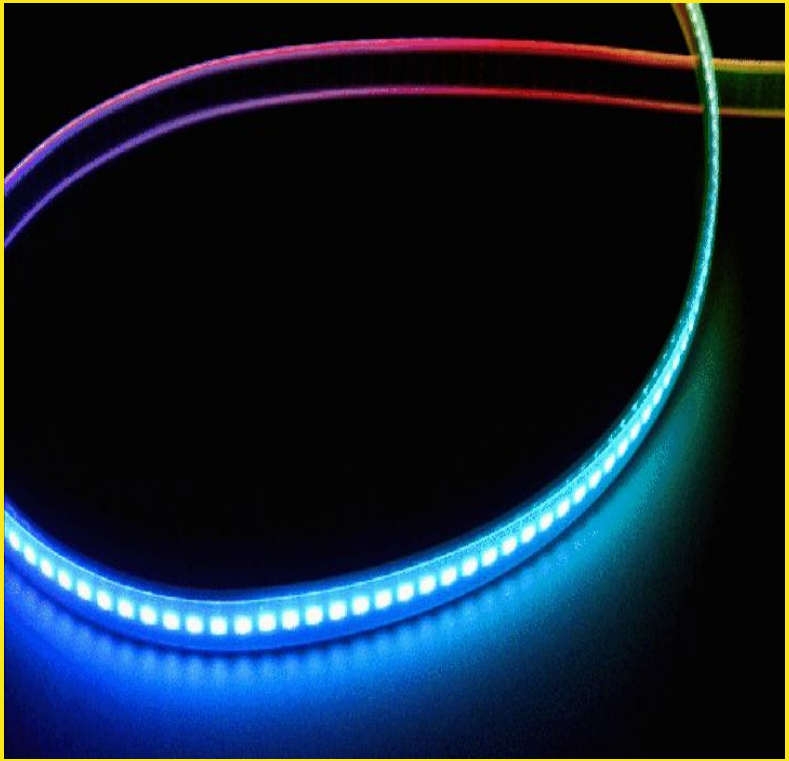
- RGB LEDs are basically 3 different color (RGB) led integrated into 1 LED.
- RGB LEDs has 4 leg:
  - 1 for each color
  - 1 for GND
- “Inverse” wiring: the GPIOs gives the voltage



GOAL

- Make an RGB LED work
- Create smooth color transitions using PWMs

- Blue user button - start/stop
- 3 different timer
- 3 PWM compatible GPIO



Init GPIOs...

```
__HAL_RCC_GPIOA_CLK_ENABLE();
__HAL_RCC_GPIOB_CLK_ENABLE();

LED_red_config.Pin = GPIO_PIN_15;
LED_red_config.Mode = GPIO_MODE_AF_PP;
LED_red_config.Pull = GPIO_NOPULL;
LED_red_config.Speed = GPIO_SPEED_FAST;
LED_red_config.Alternate = GPIO_AF1_TIM1;

/* [...] */

HAL_GPIO_Init(GPIOA, &LED_green_config);
HAL_GPIO_Init(GPIOA, &LED_red_config);
HAL_GPIO_Init(GPIOB, &LED_blue_config);
```

Init timers...

```
__HAL_RCC_TIM1_CLK_ENABLE();
__HAL_RCC_TIM2_CLK_ENABLE();
__HAL_RCC_TIM3_CLK_ENABLE();

timer1_handle.Instance = TIM1;
timer1_handle.Init.Prescaler = 108 - 1;
timer1_handle.Init.Period = 100 - 1;
timer1_handle.Init.ClockDivision = TIM_CLOCKDIVISION_DIV1;
timer1_handle.Init.CounterMode = TIM_COUNTERMODE_UP;

/* [...] */

HAL_TIM_PWM_Init(&timer1_handle);
HAL_TIM_PWM_Init(&timer2_handle);
HAL_TIM_PWM_Init(&timer3_handle);
```

Init PWM...

```
void init_PWM()
{
  pwm_config.Pulse = 0;
  pwm_config.OCMode = TIM_OCMODE_PWM1;
  pwm_config.OCPolarity = TIM_OCPOLARITY_LOW;
  pwm_config.OCFastMode = TIM_OCFAST_ENABLE;

  HAL_TIM_PWM_ConfigChannel(&timer1_handle, &pwm_config, TIM_CHANNEL_1);
  HAL_TIM_PWM_ConfigChannel(&timer2_handle, &pwm_config, TIM_CHANNEL_1);
  HAL_TIM_PWM_ConfigChannel(&timer3_handle, &pwm_config, TIM_CHANNEL_1);
}
```

Control RGB colors...

```
if (!flag) {

      __HAL_TIM_SET_COMPARE(&timer1_handle, TIM_CHANNEL_1, 100);
      __HAL_TIM_SET_COMPARE(&timer2_handle, TIM_CHANNEL_1, 100);
      __HAL_TIM_SET_COMPARE(&timer3_handle, TIM_CHANNEL_1, 100);

    } else if (flag) {

    __HAL_TIM_SET_COMPARE(&timer1_handle, TIM_CHANNEL_1, dim_green);
    __HAL_TIM_SET_COMPARE(&timer2_handle, TIM_CHANNEL_1, dim_red);
    __HAL_TIM_SET_COMPARE(&timer3_handle, TIM_CHANNEL_1, dim_blue);

    if (turn == 0){
        dim_green++;
        if (dim_green == 100)
          turn++;
    [ ... ]
```

```
if (turn == 0){
      dim_green++;
      if (dim_green == 100)
        turn++;
    } else if (turn == 1) {
      dim_red--;
      if (dim_red == 0)
        turn++;
    } else if (turn == 2) {
      dim_blue++;
      if (dim_blue == 100)
        turn++;
    } else if (turn == 3){
      dim_green--;
      if (dim_green == 0)
        turn++;
    } else if (turn == 4) {
      dim_red++;
      if (dim_red == 100)
        turn++;
    } else if (turn == 5) {
      dim_blue--;
      if (dim_blue == 0)
        turn = 0;
    }
```

Thank you!