



DesignNews

IoT Designs Using STmicro Microcontrollers

Day 5: **Get Your Motor Running**

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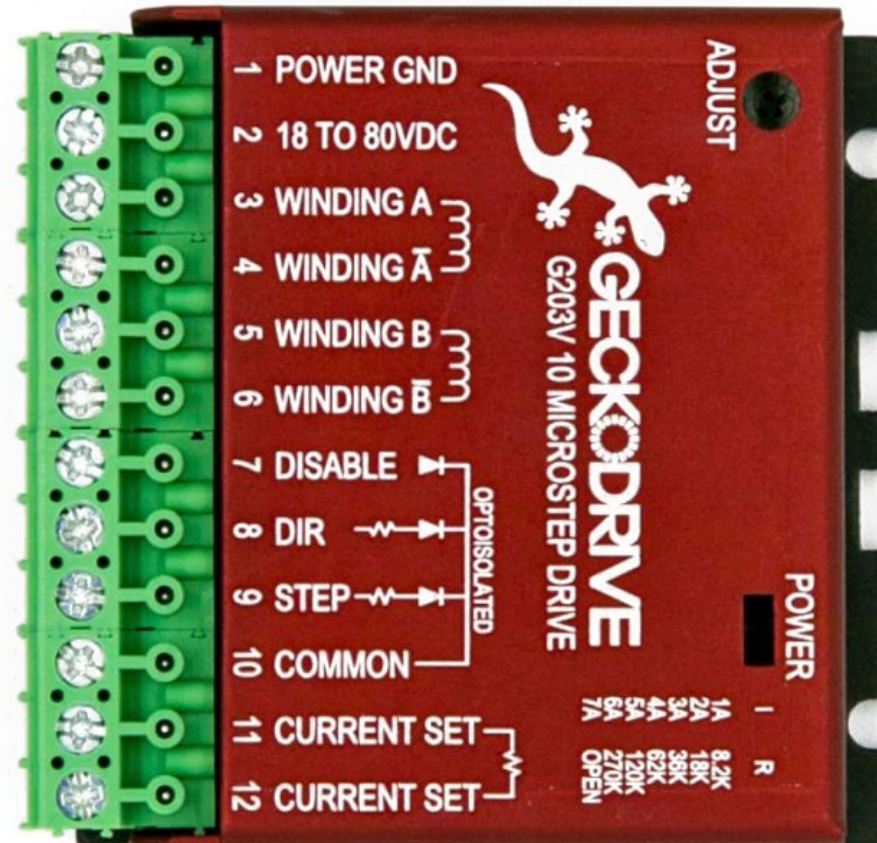


Fred Eady

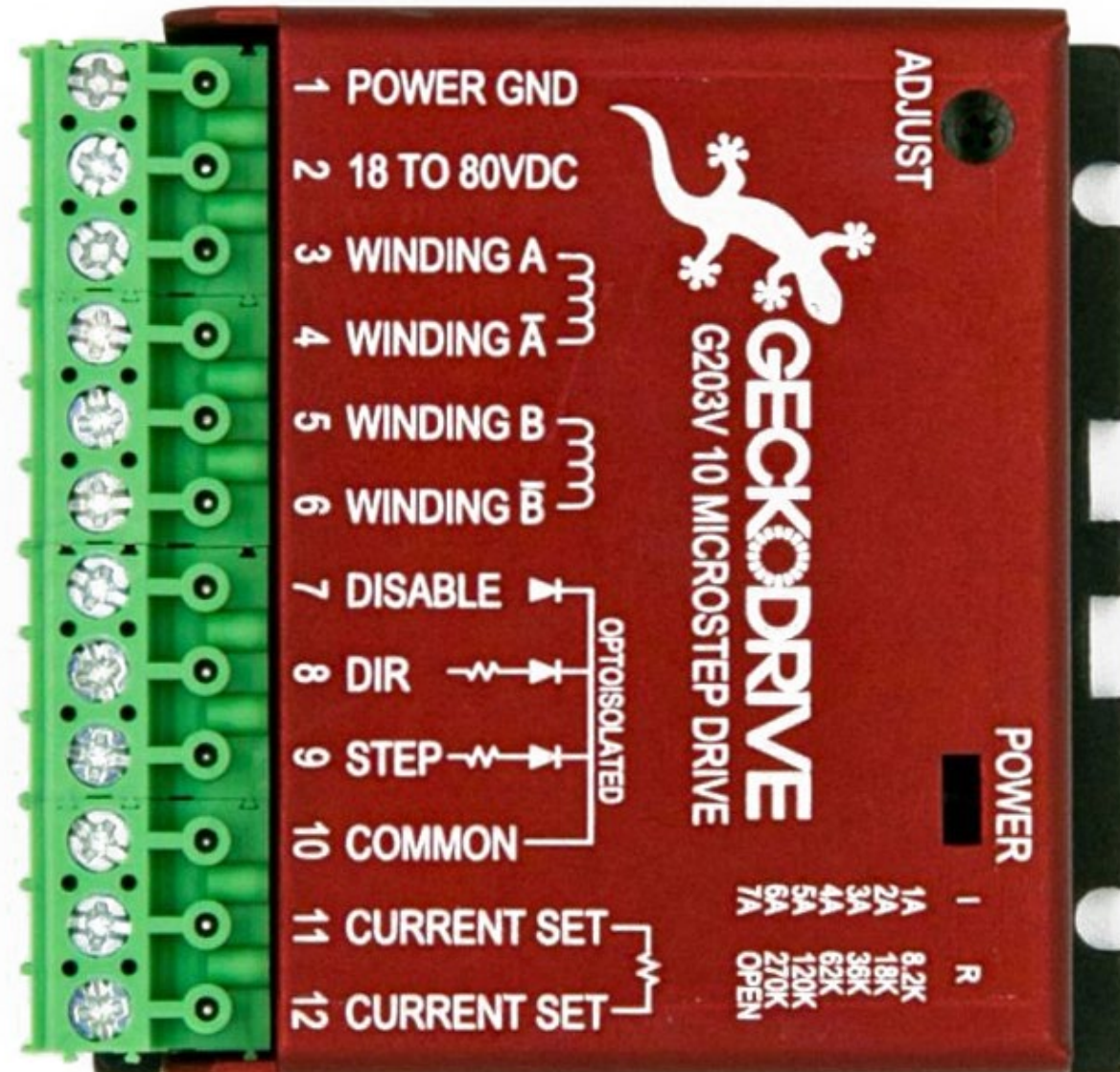
Visit 'Lecturer Profile' in your console for more details.

AGENDA

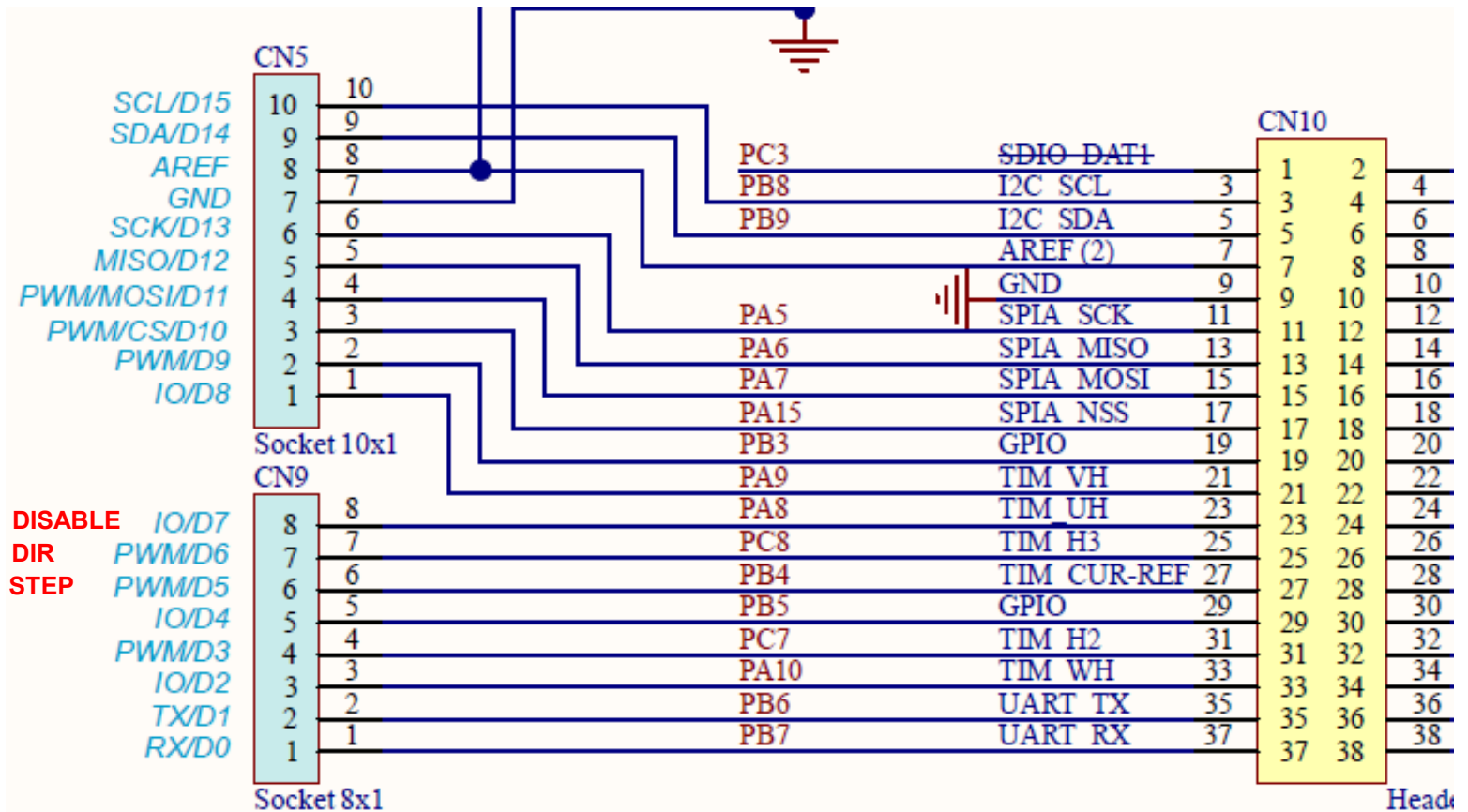
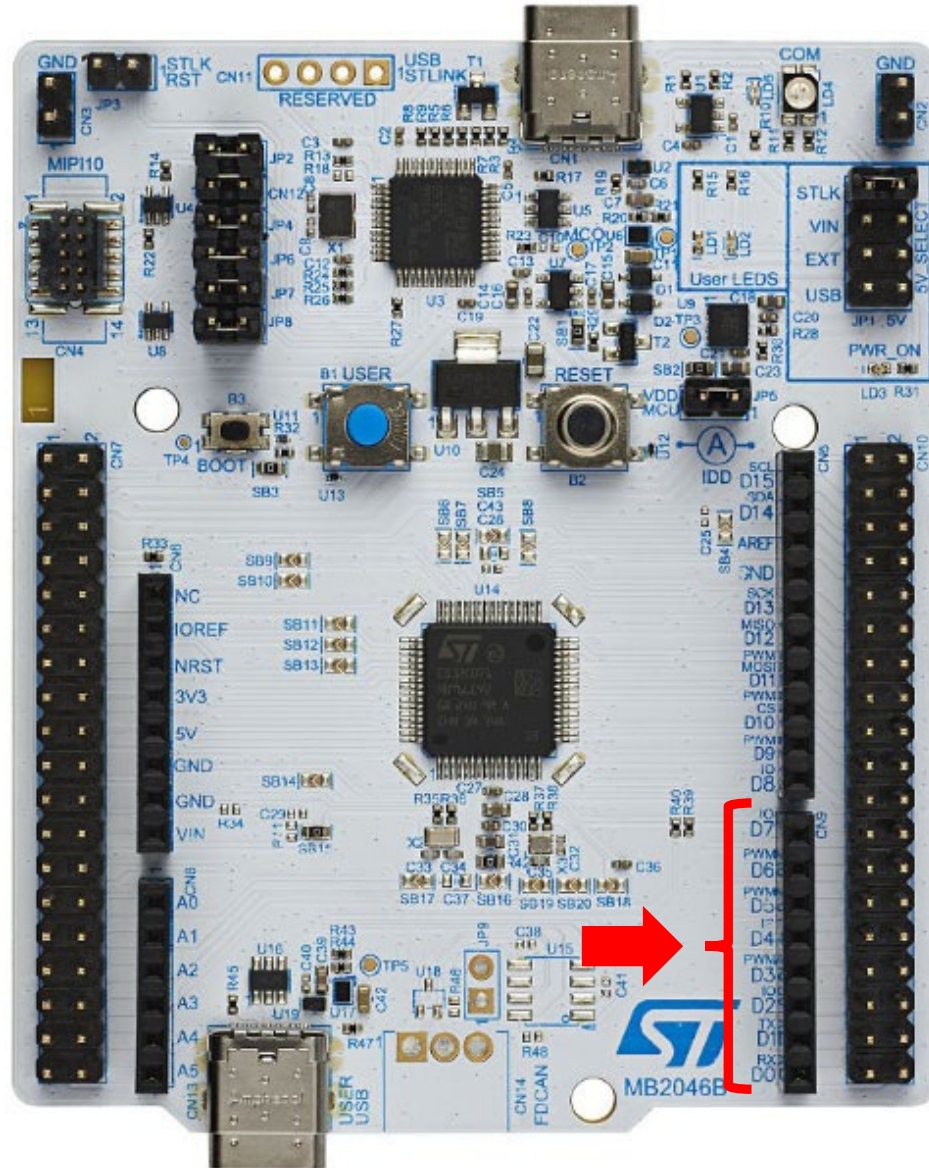
- **Assemble a NUCLEO-C071RB Stepper Motor Driver**
 - **Configure the Hardware**
 - **Code the GECKODRIVE G203V Driver Module**
 - **Program and Run the Stepper Motor Project**



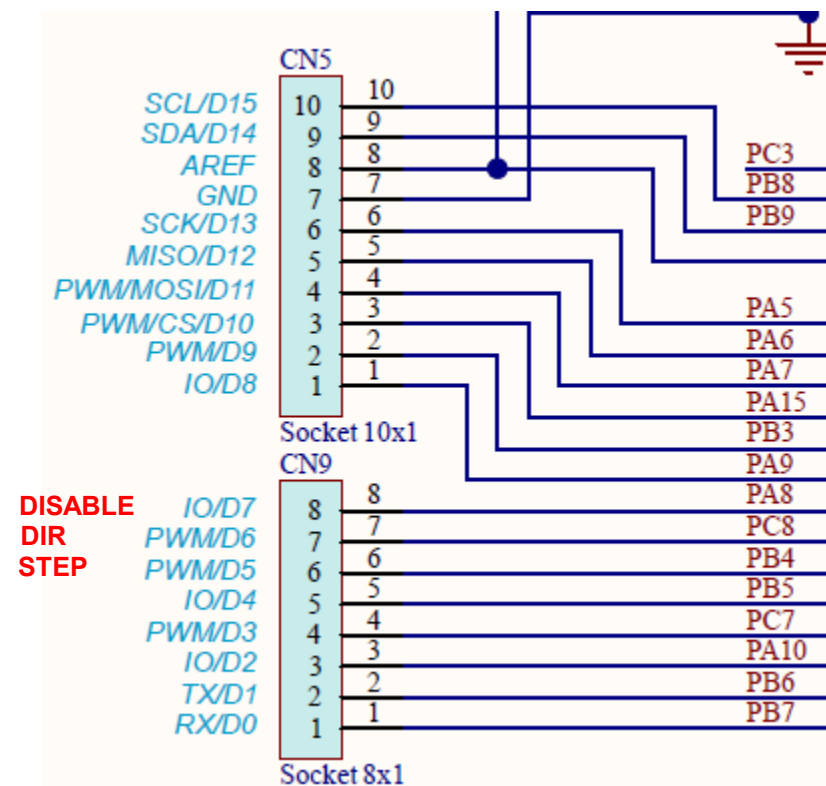
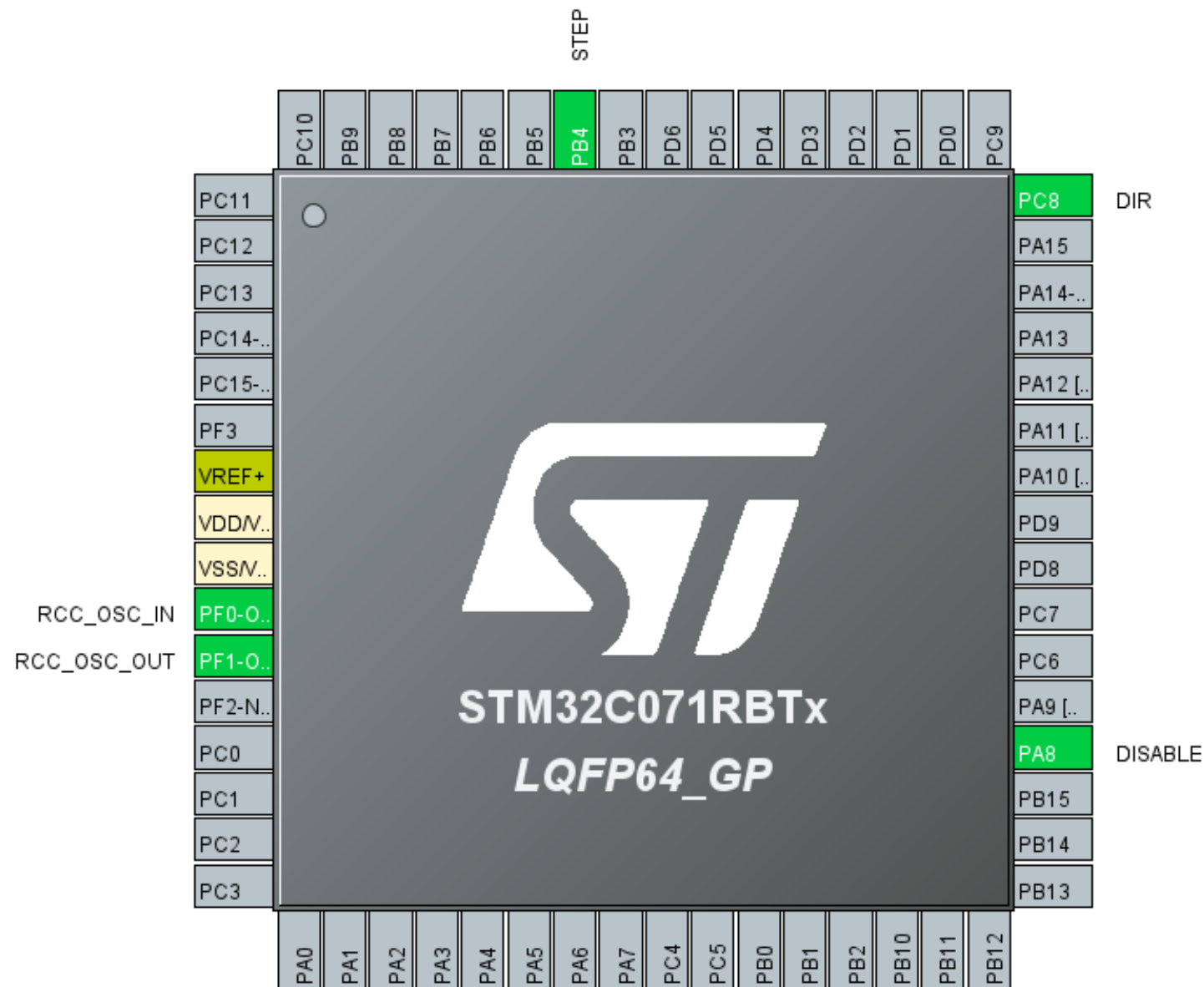
Configure the Hardware – GECKODRIVE G203V



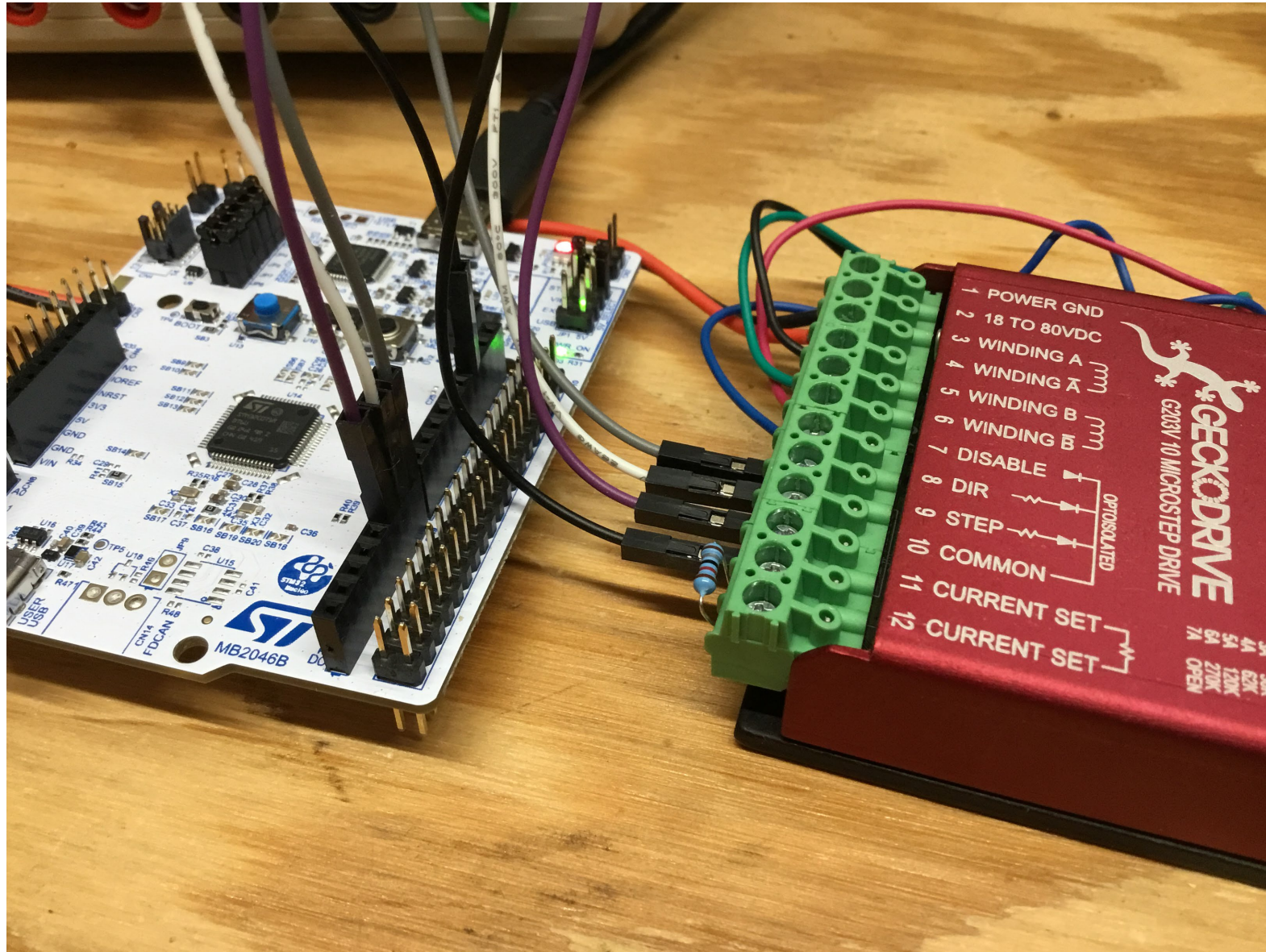
Configure the Hardware - GPIO



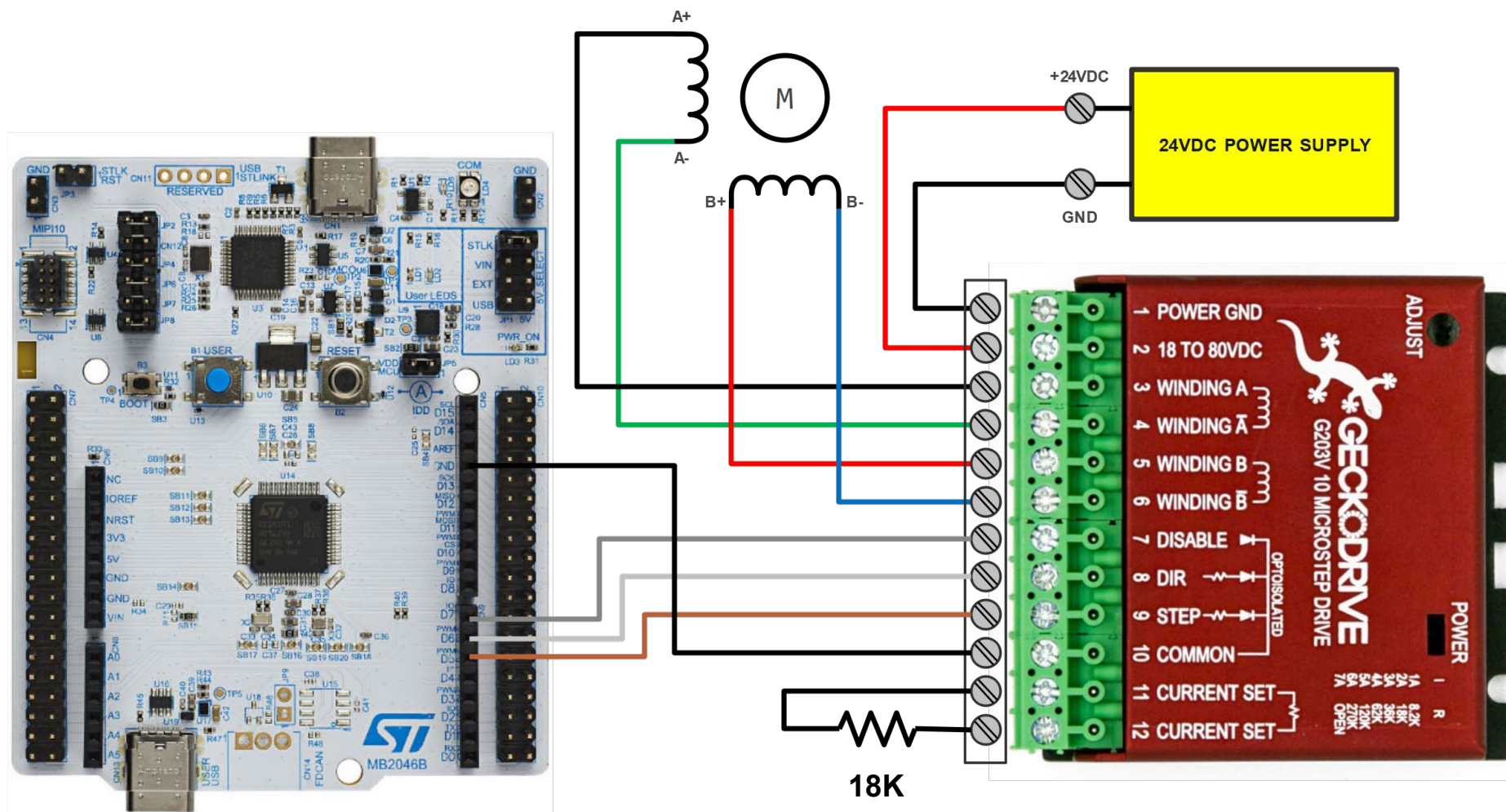
Configure the Hardware - GPIO



Configure the Hardware - GPIO



Configure the Hardware - GPIO



Configure the Hardware – TIMER2

TIM2 Mode and Configuration

Mode

Slave Mode

Trigger Source

Clock Source

Channel1

Channel2

Channel3

Channel4

Combined Channels

Use ETR as Clearing Source

☐ XOR activation

☐ One Pulse Mode

Configuration

Reset Configuration

☒ Parameter Settings ☒ User Constants ☒ NVIC Settings

Configure the below parameters :

Counter Settings

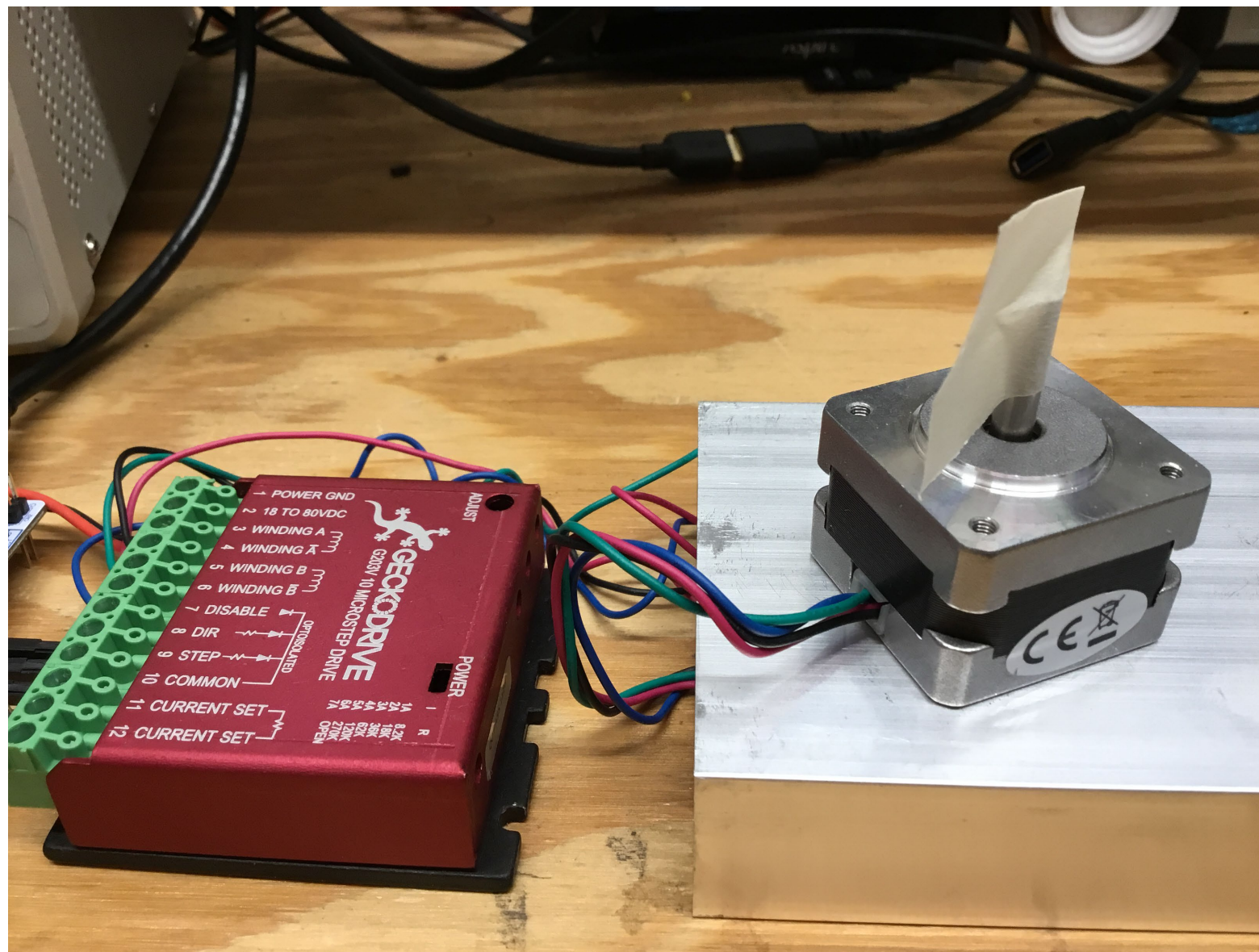
Prescaler (PSC - 16 bits value)	2 (3 - 1)
Counter Mode	Up
Counter Period (AutoReload Register - 32 bits...)	4294967295
Internal Clock Division (CKD)	No Division
auto-reload preload	Disable

Trigger Output (TRGO) Parameters

Master/Slave Mode (MSM bit)	Disable (Trigger input effect not delayed)
Trigger Event Selection TRGO	Reset (UG bit from TIMx_EGR)

Code the GECKODRIVE G203V Driver Module

```
/* Private define -----*/  
/* USER CODE BEGIN PD */  
#define MOTION_ENABLED 0  
#define MOTION_DISABLED 1  
#define CCW 0  
#define CW 1  
/* USER CODE END PD */
```

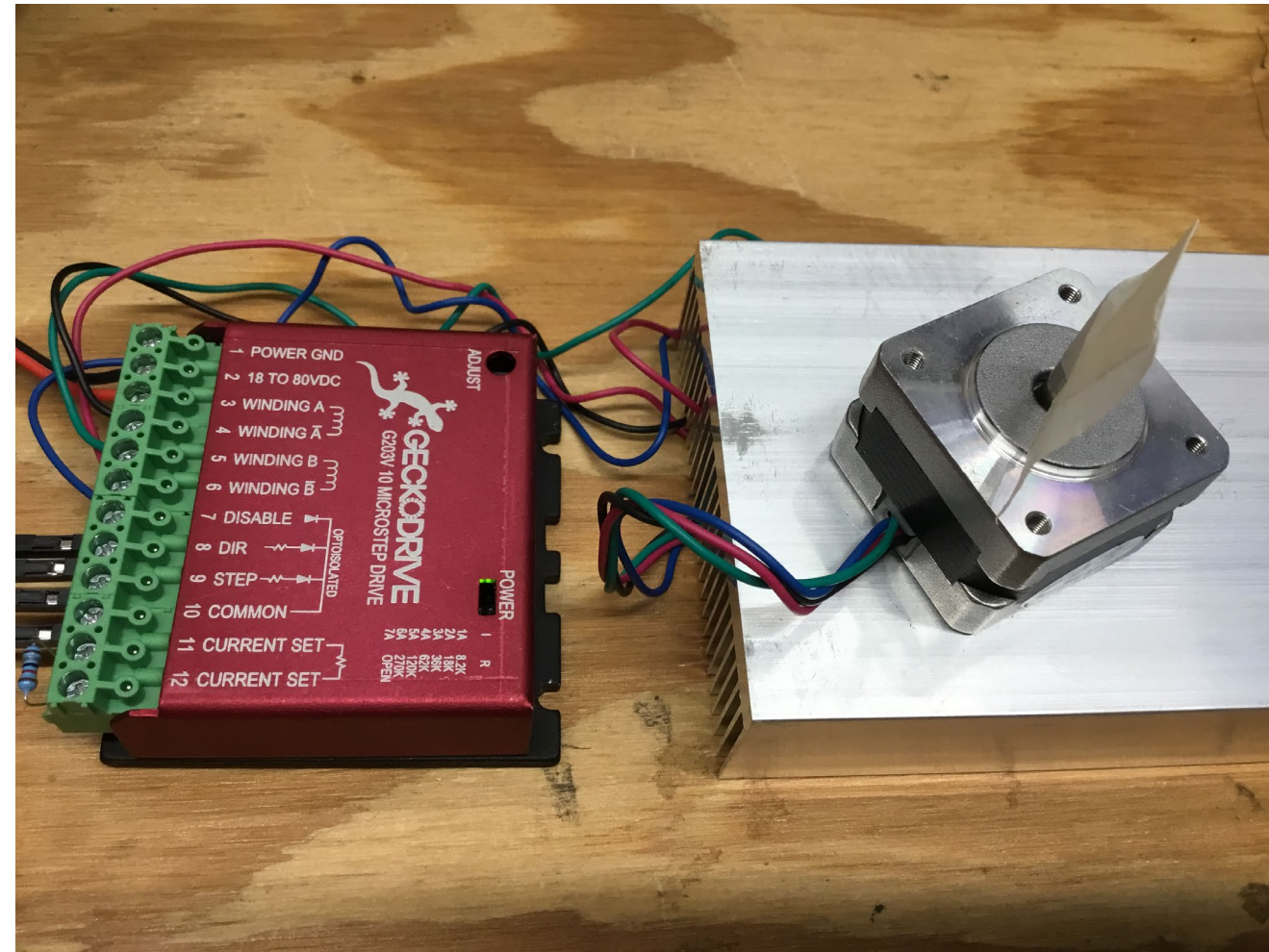


Code the GECKODRIVE G203V Driver Module

```

/*****
/* STEPPER MOVEMENT FUNCTION
/* direction = CW or CCW
*****/
void move(uint8_t direction, uint16_t steps)
{
    uint16_t stepcnt;
    HAL_GPIO_WritePin(DISABLE_GPIO_Port,DISABLE_Pin,MOTION_ENABLED);
    HAL_GPIO_WritePin(DIR_GPIO_Port,DIR_Pin,direction);
    for(stepcnt=0;stepcnt<steps;stepcnt++)
    {
        HAL_GPIO_WritePin(STEP_GPIO_Port,STEP_Pin,1);
        delay_us(50);
        HAL_GPIO_WritePin(STEP_GPIO_Port,STEP_Pin,0);
        delay_us(50);
    }
    HAL_GPIO_WritePin(DISABLE_GPIO_Port,DISABLE_Pin,MOTION_DISABLED);
}

```



Code the GECKODRIVE G203V Driver Module

```

//*****
/* MICROSECOND DELAY FUNCTION
/* TIMER2 MAX CLOCK = 48MHz
/* TIMER2 PRESCALER = 2 (3-1) -> TIMER2 CLOCK = 16MHz
/* TIMER2 TICK = 1/16MHz = 0.00000063
/* 0.00000063 * 16 = 0.000001 -> 16 TICKS PER MICROSECOND
//*****
void delay_us(uint32_t us)
{
    uint32_t startCnt = TIM2->CNT;
    while (TIM2->CNT - startCnt < us * 16);
}

```

TIM2 Mode and Configuration

Mode

Slave Mode

Trigger Source

Clock Source

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Channel4

Combined Channels

Use ETR as Clearing Source

☐ XOR activation

☐ One Pulse Mode

Configuration

☒ Parameter Settings ☒ User Constants ☒ NVIC Settings

Configure the below parameters :

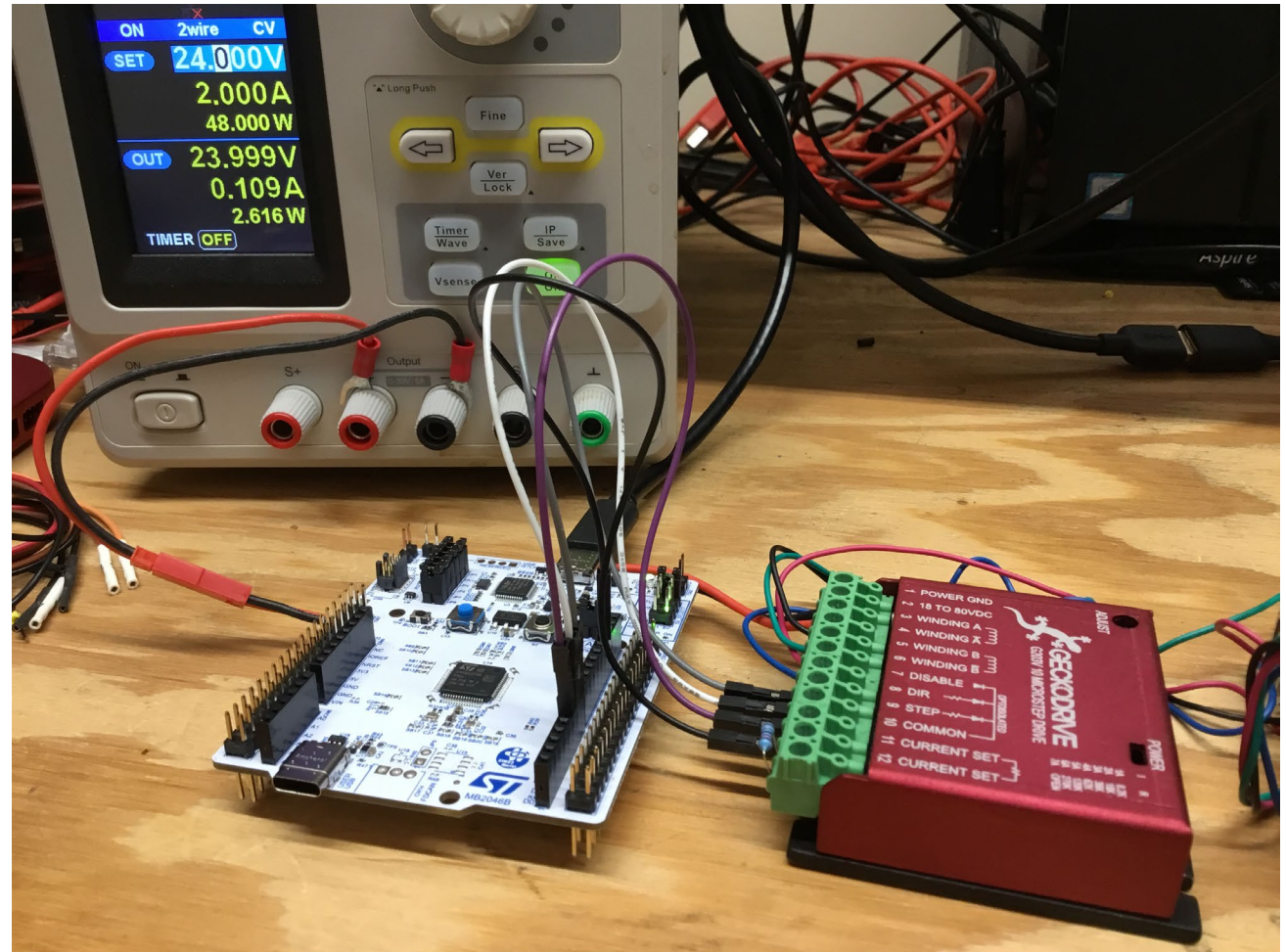
Counter Settings	
Prescaler (PSC - 16 bits value)	2
Counter Mode	Up
Counter Period (AutoReload Register - 32 bits...)	4294967295
Internal Clock Division (CKD)	No Division
auto-reload preload	Disable
Trigger Output (TRGO) Parameters	
Master/Slave Mode (MSM bit)	Disable (Trigger input effect not delayed)
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Code the GECKODRIVE G203V Driver Module

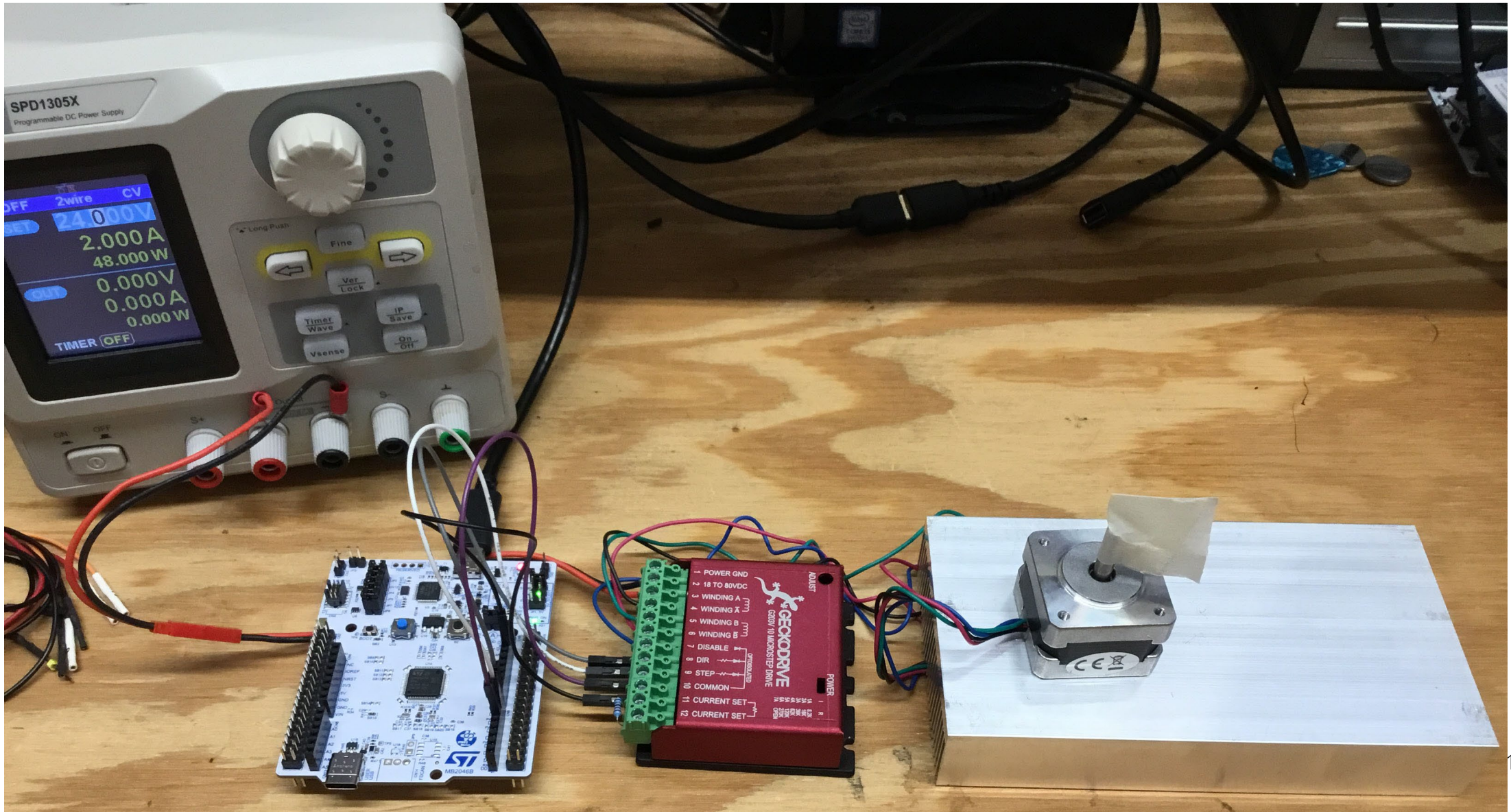
```
// Start TIMER2
HAL_TIM_Base_Start(&htim2);
// Disable motion and set step pin to 0
HAL_GPIO_WritePin(DISABLE_GPIO_Port,DISABLE_Pin,MOTION_DISABLED);
HAL_GPIO_WritePin(STEP_GPIO_Port,STEP_Pin,0);
/* USER CODE END 2 */

/* Infinite loop */
/* USER CODE BEGIN WHILE */
while (1)
{
    move(CW,5000);
    HAL_Delay(10);
    move(CCW,5000);
    HAL_Delay(10);
/* USER CODE END WHILE */

/* USER CODE BEGIN 3 */
}
```



Program and Run the Stepper Motor Project



Next Time...

LET'S EAT!!

Thank you for attending!!!

Please consider the resources below:

- **Today's Download Package**
- **STM32C071RB Datasheet**
- **NUCLEO-C071RB Schematic**
- **GECKODRIVE G203V User Manual**





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Thank You

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