# Program download and simulation

#### **Program download and simulation**

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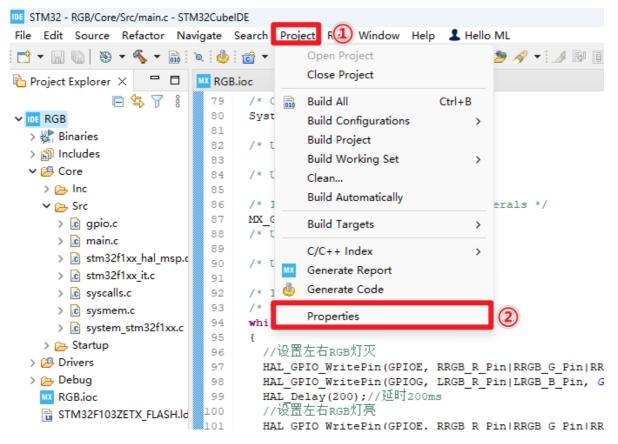
## 1、FlyMCU: Program download

FlyMCU software can download the compiled program code (hex file) to the target MCU chip through the serial port.

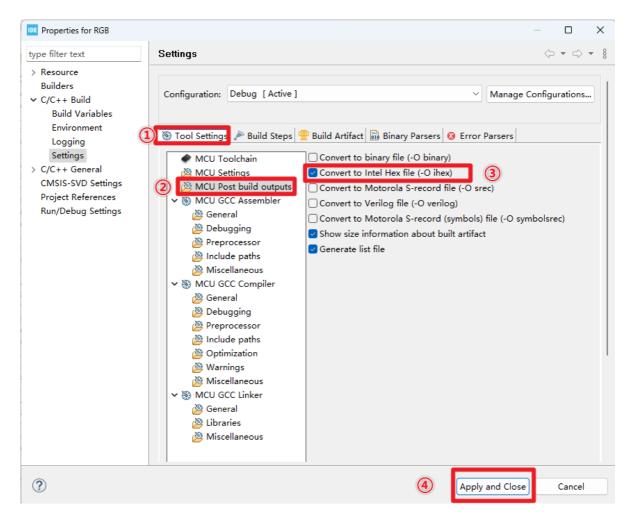
### 1.1. Generate.hex files

Using STM32CubeIDE will not generate.hex files by default, You need to check the appropriate option.

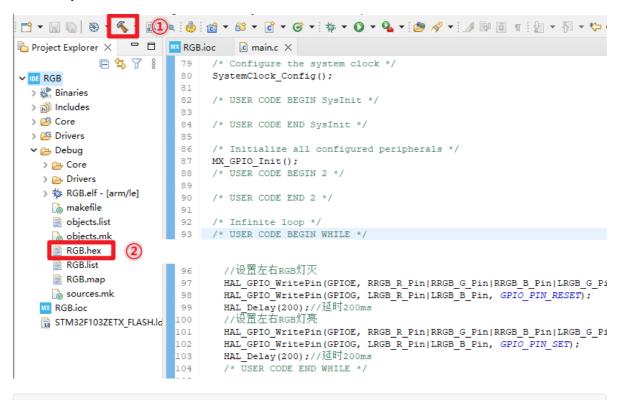
#### Properties



Check the appropriate options



#### • compilation



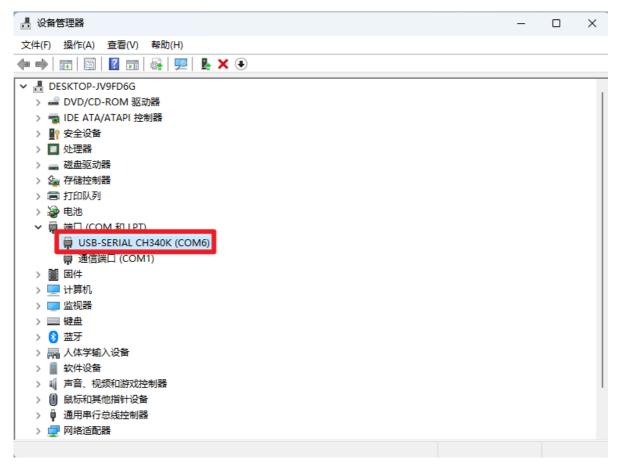
.hex file location: Debug folder of the project file

### 1.2. Downloading the program

Using the data line can be through the development board Type-C interface burning program;

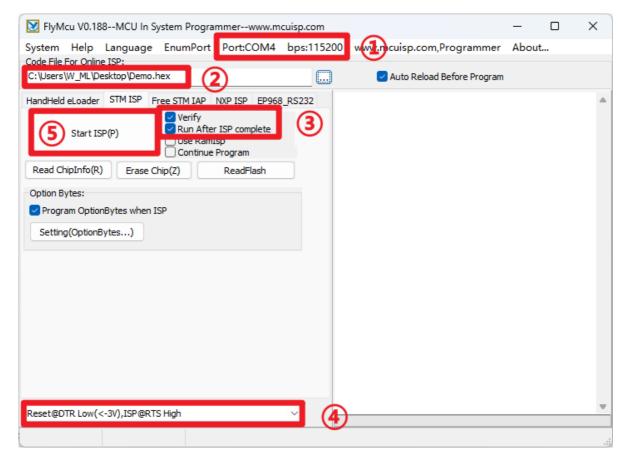
After connecting the computer with Type-C data cable, you can check the serial port number of the corresponding device in the device manager: port.

• Device Manager



### • Flymcu

BootLoader options: DTR low reset, RTS high reset into BootLoader



### 1.3、Running the program

After downloading the program successfully, press the RESET button of the development board to observe whether the phenomenon of the development board is normal.

## 2. ST-Link: Program download and simulation

To download a program using ST-Link, you need to check and set the debugger to ST-Link.

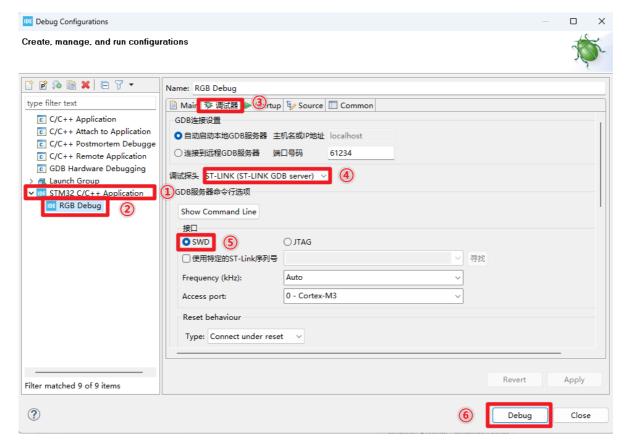
### 2.1. Debug configuration

```
IDE STM32 - RGB/Core/Src/main.c - STM32CubeIDE
File Edit Source Refactor Navigate Search Project Run Window Help 🎩 Hello ML
🗂 - 🔚 😭 🦠 - 🦠 - 🛗 i 🐧 i 🔞 i 💣 - 🚳 - 🔞 - 😅 - 🕳 - 🏰 - 🌗 🚇 - 📂 - 👂 - 💹 🚇 🗐 - 🛭 i 🖠
                                                           1 RGB Debug
陷 Project Explorer 🗴 📅 🗖 🖟 main.c 🗡
                             79 /* Configure the sy
              Debug As
                             80
                                 SystemClock_Config(

✓ IDE RGB

                                                           Debug Configurations...
                             81
  > 🐉 Binaries
                                  /* USER CODE BEGIN
                                                           Organize Favorites...
  > 🛍 Includes
                             83
  > 🔑 Core
                                  /* USER CODE END SysInit */
                             84
  > 🕮 Drivers
                             86
                                  /* Initialize all configured peripherals */
  > 🗁 Debug
                             87
                                  MX GPIO Init();
    MX RGB.ioc
                                /* USER CODE BEGIN 2 */
                             88
    RGB Debug.launch
    STM32F103ZETX_FLASH.ld
                             90
                                  /* USER CODE END 2 */
                                   /* Infinite loop */
                                  /* USER CODE BEGIN WHILE */
                             93
```

•  $ST-Link \rightarrow SWD$ 



### • Hardware wiring

Before using ST-Link to download programs, you need to use four mother-to-mother dupont wires to connect the ST-Link to the development board, and the ST-Link is connected to the computer through a USB interface.

ST-Link	The SWD interface of the board
3.3V	3V3
SWCLK	SWCLK
SWDIO	SWDIO
GND	GND

### 2.2、Program download

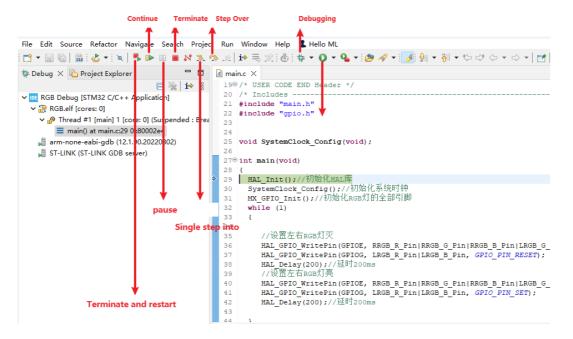
Click the Debug icon

```
File Edit Source Refactor Navigate Search Project Run Window Help 🎩 Hello ML
Project Explorer X 📅 🗖 🖟 main.c X
                      63
          640 int main (void)

✓ IDE RGB

 > 🐉 Binaries
                          /* USER CODE BEGIN 1 */
                      66
 > 🔊 Includes
 > 🕮 Core
                      68
                          /* USER CODE END 1 */
 > 🕮 Drivers
                      69
                         /* MCU Configuration---
                      70
 > 📂 Debug
                      71
   MX RGB.ioc
                      72
                          /* Reset of all peripherals, Initializes the Flash interface
   RGB Debug.launch
                      73
                          HAL_Init();
   STM32F103ZETX_FLASH.ld
                      74
                          /* USER CODE BEGIN Init */
                      75
                      76
                      77
                          /* USER CODE END Init */
                      78
                      79
                          /* Configure the system clock */
                          SystemClock Config();
                      81
                          /* HOPD CODE DECTM CHATNIE */
                    🖳 Problems 🔊 Tasks 📮 Console 🗡 🔲 Properties
                                             Download verified successfully
                    Shutting down...
                    Exit.
```

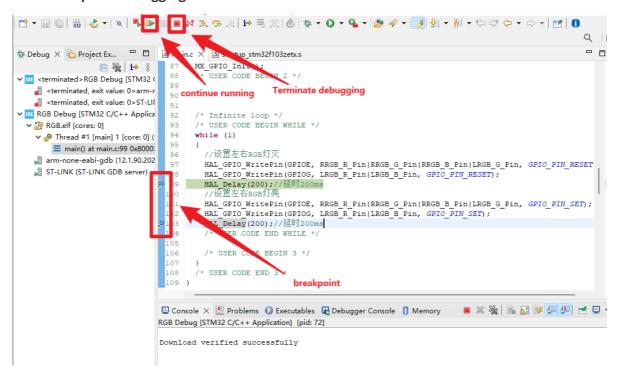
### 2.3. Program simulation



• Debug: Click on "Little Beetle"

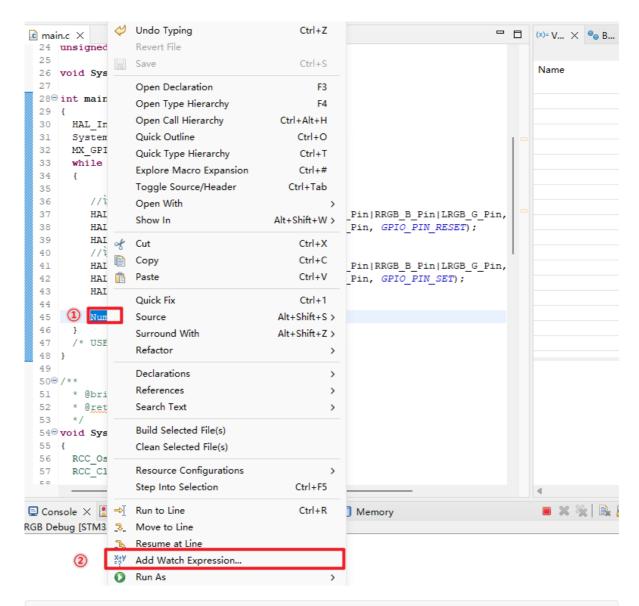
```
IDE STM32 - RGB/Core/Src/main.c - STM32CubeIDE
File Edit Source Refactor Navigate Search Project Run Window
                                                                🚜 Hello ML
Project Ex... X 📅 🗖 🚨 main.c X
           □ $ 7 :
                           91
                           92
                                  /* Infinite loop */
✓ IDE RGB
                           93
                                 /* USER CODE BEGIN WHILE */
  > 🐉 Binaries
                          94 while (1)
95 {
96 //设置左
  > 🛍 Includes
                                  //设置左右RGB灯灭
HAL_GPIO_WritePin(GPIOE, RRGB_R_Pin|RRGB_G_Pin|RRGB_B_Pin|LRGB_G_Pin, GPIO
HAL_GPIO_WritePin(GPIOG, LRGB_R_Pin|LRGB_B_Pin, GPIO_PIN_RESET);
  🗸 🐸 Core
                          97
98
99
    > 🗁 Inc
     🗸 🗁 Src
                                 HAL Delay(200);//延时200ms
//设置左右RGB灯亮
       > 底 gpio.c
                          100
       > c main.c
                                  HAL_GPIO_WritePin(GPIOE, RRGB_R Pin|RRGB_G Pin|RRGB_B_Pin|LRGB_G_Pin, GPIO_HAL_GPIO_WritePin(GPIOG, LRGB_R_Pin|LRGB_B_Pin, GPIO_PIN_SET);
       > .c main.c 101
> .c stm32f1xx_hal_r 102
                          103 HAL_Delay(200);/延时200ms
104 /* USER CODE END WHILE */
       > c stm32f1xx_it.c
       > c syscalls.c
                          105
       > 🖻 sysmem.c
      > c system_stm32f1 106
                                   /* USER CODE BEGIN 3 */
                          107 }
     > 📂 Startup
                          108
                                 /* USER CODE END 3 */
   > 🕮 Drivers
                          109 }
  > 📂 Debug
```

#### Breakpoint debugging



#### Viewing variable values

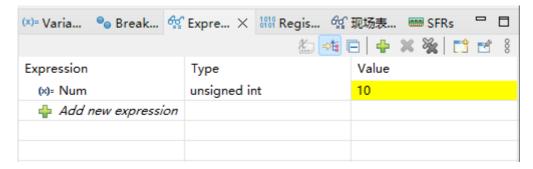
In debug mode, select the Num variable you want to view (here's how to view the Num variable)



Variables can be added to the Expression window by right-clicking and selecting the appropriate option, or by manually entering the variable name

When the Num variable is added to the Express window, the value can be viewed in the Expression window, and the actual value of the variable is displayed only when the program is stopped

The live expression window allows you to view the changes of global variables in real time



**Breakpoint**: Double-click on the leftmost part of the current statement to show a blue breakpoint, where the program stops running

**Keep running**: When the program runs to the breakpoint position, you can use this button to continue running down

Terminate debugging: Exit program debugging