

Driving the light bar

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1. Learning objectives

- Master the control of RGB light bar by Raspberry Pi series motherboard
- Use CubeRaspberry driver library to control RGB light bar
- Control RGB light bar through Jupyter lab

2. Preparation before the experiment

Install the Raspberry Pi chassis according to the assembly video tutorial. You can also refer to the "Raspberry Pi chassis_hardware wiring" tutorial document for installation. Here, the chassis expansion board and RGB light bar and fan hardware connection are shown.



Chassis expansion board	3Pin interface	2Pin interface
	RGB light strip	Fan

3. Use CubeRaspberry driver library to control RGB light strip

1. Import CubeRaspberry driver library and create objects

The name of the CubeRaspberry driver library is CubeRaspberryLib. Use CubeRaspberryLib to import the library in the program.

```
from CubeRaspberryLib import CubeRaspberry
```

CubeRaspberryLib library functions needed to control RGB light strips:

```
set_RGB_Effect(effect) #Set RGB light effects
set_RGB_Speed(speed) #Set RGB light effects speed
set_RGB_Color(color) #Set RGB light effects color
set_Single_Color(index, r, g, b) #Set single RGB light color
```

2. Set RGB light effects

```
| set_RGB_Effect(effect): Set RGB light effects |
| :-----: |
```

effect value	RGB light effects
0	Turn off effects
1	Monochrome breathing light
2	Marquee
3	Rainbow light
4	Colorful light
5	Flowing light
6	Circular breathing light

3. Set the speed of RGB light effects

set_RGB_Speed(speed): Set the speed of RGB light effects

speed value	RGB light effect speed
1	Low speed
2	Medium speed
3	Fast

4. Set the color of RGB light effects

Note: This function can only be used to set the effect for single-color breathing lights and flowing lights.

set_RGB_Color(color): Set the RGB light effect color

color value	RGB light effect color
0	Red
1	Green
2	Blue
3	Yellow
4	Purple
5	Cyan
6	White

5. Set the color of a single RGB light

Note: All colors can be composed of different brightness levels of red, green and blue;

set_Single_Color(index, r, g, b): Set the color of a single RGB light

Parameters	Single RGB light color
index	Serial number (0 - 13, 255)
r	Red (0 - 255)
g	Green (0 - 255)
b	Blue (0 - 255)

Index parameter: 0-13 corresponds to different lamp numbers; index = 255 means setting all RGB lamp colors.

r, g, b parameters: 0-255 represent different color brightness levels.

6. Code demonstration

- **Control RGB light bar effects and functions (python interactive interface: each statement needs to be run separately)**

```
from CubeRaspberryLib import CubeRaspberry
bot = CubeRaspberry(i2c_bus=1) bot.set_RGB_Effect(0) bot.set_RGB_Effect(1)
bot.set_RGB_Effect(2) bot.set_RGB_Effect(3) bot.set_RGB_Effect(4)
bot.set_RGB_Effect(6) bot.set_RGB_Speed ••(1) bot.set_RGB_Speed(2)
bot.set_RGB_Speed(3) bot.set_RGB_Effect(1) bot.set_RGB_Color(0)
bot.set_RGB_Color(1) bot.set_RGB_Color(2) bot.set_RGB_Color(3)
bot.set_RGB_Color(4) bot.set_RGB_Color(6) bot.set_Single_Color(5,0,0, 255)
bot.set_Single_Color(255,255,255,255) del bot
```

```

pi@raspberrypi:~/cube_pi $ python3
Python 3.11.2 (main, May 2 2024, 11:59:08) [GCC 12.2.0] on linux
Type "help", "copyright", "credits" or "license" for more information.
>>> from CubeRaspberryLib import CubeRaspberry
>>> bot = CubeRaspberry(i2c_bus=1)
>>> bot.set_RGB_Effect(0)
>>> bot.set_RGB_Effect(1)
>>> bot.set_RGB_Effect(2)
>>> bot.set_RGB_Effect(3)
>>> bot.set_RGB_Effect(4)
>>> bot.set_RGB_Effect(5)
>>> bot.set_RGB_Effect(6)
>>> bot.set_RGB_Speed(1)
>>> bot.set_RGB_Speed(2)
>>> bot.set_RGB_Speed(3)
>>> bot.set_RGB_Effect(1)
>>> bot.set_RGB_Color(0)
>>> bot.set_RGB_Color(1)
>>> bot.set_RGB_Color(2)
>>> bot.set_RGB_Color(3)
>>> bot.set_RGB_Color(4)
>>> bot.set_RGB_Color(5)
>>> bot.set_RGB_Color(6)
>>> bot.set_Single_Color(5,0,0,255)
>>> bot.set_Single_Color(255,255,255,255)
>>> del bot
CubeRaspberry End!

```

- RGB light effect test (RGB_Test.py)

```

import time
from CubeRaspberryLib import CubeRaspberry

if __name__ == '__main__':
    bot = CubeRaspberry(i2c_bus=1)
    while True:
        bot.set_RGB_Effect(0) # 关闭特效5秒 Turn off the effect for 5 seconds
        time.sleep(5)
        bot.set_RGB_Effect(1) # 单色呼吸灯5秒 Monochromatic breathing lamp for 5
sec
        time.sleep(5)
        bot.set_RGB_Effect(2) # 跑马灯5秒 Marquee for 5 seconds
        time.sleep(5)
        bot.set_RGB_Effect(3) # 彩虹灯5秒 Rainbow lights for 5 seconds
        time.sleep(5)
        bot.set_RGB_Effect(4) # 炫彩灯5秒 Dazzle lights for 5 seconds
        time.sleep(5)
        bot.set_RGB_Effect(5) # 流水灯5秒 Running water lamp for 5 seconds
        time.sleep(5)
        bot.set_RGB_Effect(6) # 循环呼吸灯5秒 Circulate the lamp for 5 sec
        time.sleep(5)

```

```

pi@raspberrypi:~/cube_pi $ python3 RGB_Test.py
^CTraceback (most recent call last):
  File "/home/pi/cube_pi/RGB_Test.py", line 10, in <module>
    time.sleep(5)
KeyboardInterrupt
CubeRaspberry End!

pi@raspberrypi:~/cube_pi $ █

```

Note: Press Ctrl + C to terminate the run

4. Use Jupyter lab to control the RGB light strip

In Jupyter Create a new file in the lab interface and create the following code blocks, edit the following contents respectively (Fan_Test.ipynb):

1. Import the CubeRaspberry driver library and create an object

```
# Import the CubeRaspberry driver library Import the CubeRaspberry driver library
from CubeRaspberryLib import CubeRaspberry
# Create an object Create an object
bot = CubeRaspberry(i2c_bus=1)
```

2. Set RGB light effects

```
bot.set_RGB_Effect(0) # Turn off effects
```

```
bot.set_RGB_Effect(1) # Monochrome breathing light
```

```
bot.set_RGB_Effect(2) # Marquee
```

```
bot.set_RGB_Effect(3) # Rainbow light lights
```

```
bot.set_RGB_Effect(4) # Dazzling lights
```

```
bot.set_RGB_Effect(5) # Running water lamps
```

```
bot.set_RGB_Effect(6) # Circulation breathing lights
```

3. Set the speed of RGB light effects

```
bot.set_RGB_Speed(1) # Low speed
```

```
bot.set_RGB_Speed(2) # Medium speed
```

```
bot.set_RGB_Speed(3) # High speed
```

4. Set the color of RGB light effects

```
bot.set_RGB_Effect(1) # Monochrome breathing light
```

```
bot.set_RGB_Color(0) # red red
```

```
bot.set_RGB_Color(1) # green green
```

```
bot.set_RGB_Color(2) # blue blue
```

```
bot.set_RGB_Color(3) # yellow yellow
```

```
bot.set_RGB_Color(4) # purple purple
```

```
bot.set_RGB_Color(5) # cyan cyan
```

```
bot.set_RGB_Color(6) # white white
```

5. Set the color of a single RGB light

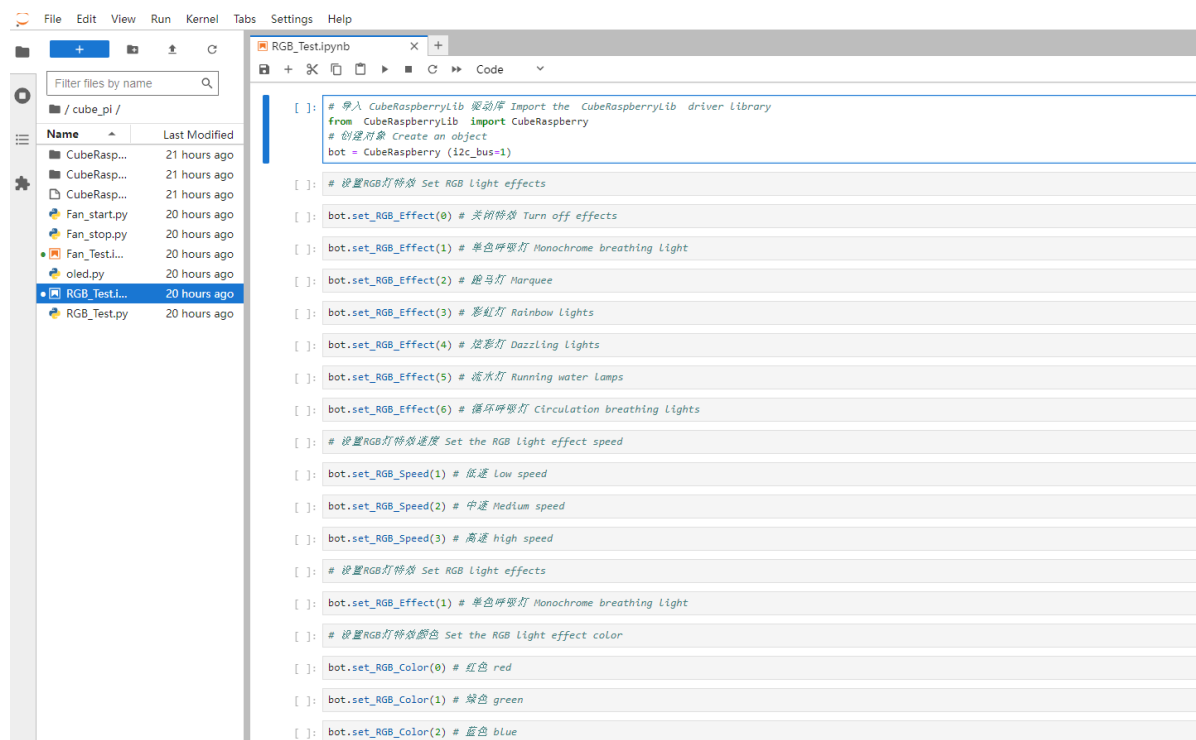
```
bot.set_Single_Color(5,255,0,0) # RGB lights Article 6 lamp beads are displayed  
in red  
# RGB lights Article 6 lamp beads are displayed in red red
```

```
bot.set_Single_Color(255,255,255,255) # All RGB beads are shown in white  
# All RGB beads are shown in white
```

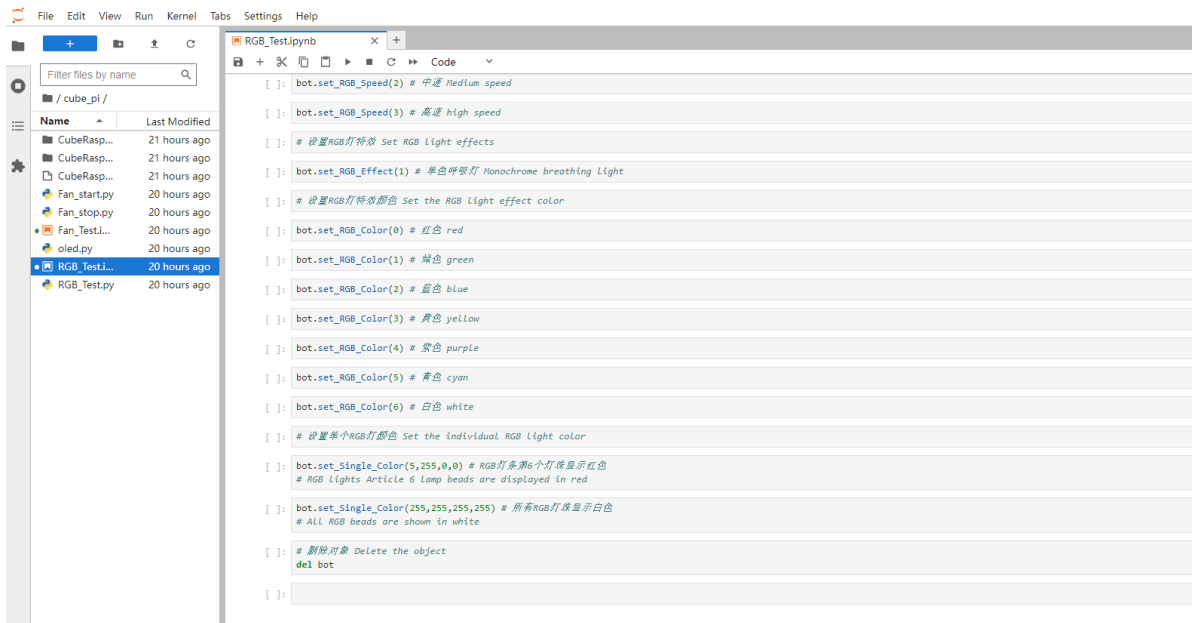
6. Delete the object

```
# Delete the object Delete the object  
del bot
```

7. Code demonstration

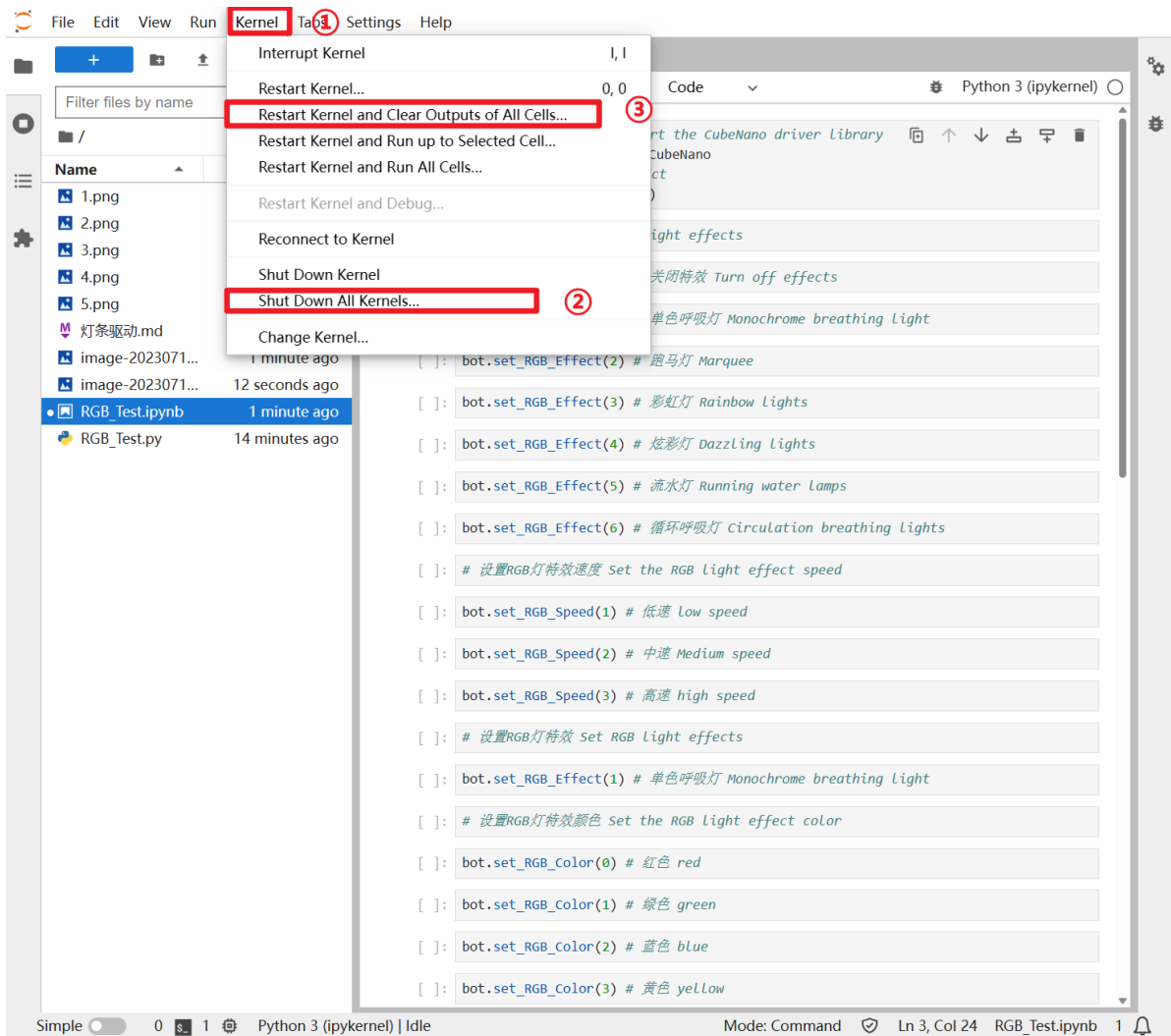


```
[ ]: # 导入 CubeRaspberryLib 驱动程序 Import the CubeRaspberryLib driver library  
from CubeRaspberryLib import CubeRaspberry  
# 创建对象 Create an object  
bot = CubeRaspberry (i2c_bus=1)  
  
[ ]: # 设置RGB灯特效 Set RGB Light effects  
  
[ ]: bot.set_RGB_Effect(0) # 关闭特效 Turn off effects  
  
[ ]: bot.set_RGB_Effect(1) # 单色呼吸灯 Monochrome breathing Light  
  
[ ]: bot.set_RGB_Effect(2) # 跑马灯 Marquee  
  
[ ]: bot.set_RGB_Effect(3) # 彩虹灯 Rainbow Lights  
  
[ ]: bot.set_RGB_Effect(4) # 炫彩灯 Dazzling Lights  
  
[ ]: bot.set_RGB_Effect(5) # 流水灯 Running water Lamps  
  
[ ]: bot.set_RGB_Effect(6) # 循环呼吸灯 Circulation breathing Lights  
  
[ ]: # 设置RGB灯特效速度 Set the RGB Light effect speed  
  
[ ]: bot.set_RGB_Speed(1) # 低速 Low speed  
  
[ ]: bot.set_RGB_Speed(2) # 中速 Medium speed  
  
[ ]: bot.set_RGB_Speed(3) # 高速 high speed  
  
[ ]: # 设置RGB灯特效 Set RGB Light effects  
  
[ ]: bot.set_RGB_Effect(1) # 单色呼吸灯 Monochrome breathing Light  
  
[ ]: # 设置RGB灯特效颜色 Set the RGB Light effect color  
  
[ ]: bot.set_RGB_Color(0) # 红色 red  
  
[ ]: bot.set_RGB_Color(1) # 绿色 green  
  
[ ]: bot.set_RGB_Color(2) # 蓝色 blue
```



8. Basic operation of Jupyter lab

If you find that the code runs abnormally, it is recommended to follow the steps in the figure and then retest the code block.



5. Experimental phenomenon

Calling the function in the CubeRaspberry driver library can achieve the corresponding phenomenon. Before setting the RGB light effect color and speed, you need to set the RGB light effect first.

For example: After executing the "Set Single RGB Light Color" function, directly using "Set RGB Light Effect Color" will not take effect. You need to first "Set RGB Light Effect 1 or 5" and then "Set RGB Light Effect Color".