

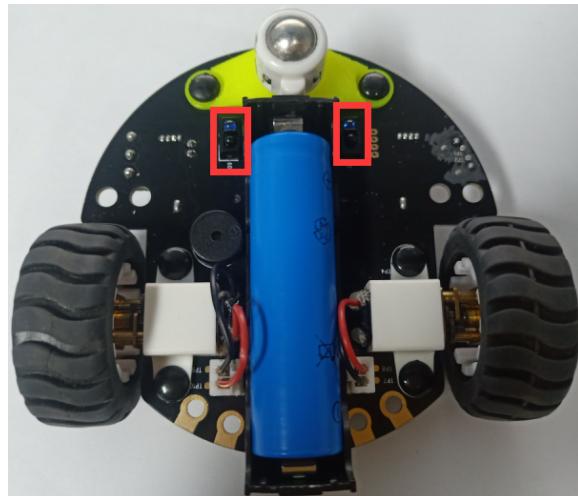
7. Black line control light

Learning goal:

This lesson learns how to use the tracking sensor on the Tiny-bit car.

Preparation:

1. The position of the tracking module in the robot, as shown below.



!!!Note: In order to avoid the interference of sunlight on infrared sensor, we need to carry out this experiment indoors.

2. Learn about the principle of tracking module

The basic principle of the tracking sensor is to use the reflective nature of the object.

Our experiment is to tracking the black line. When the infrared light is emitted to the black line, it will be absorbed by the black line. When the infrared light is emitted to the other color line, it will reflected to the infrared receiver tube.

From the hardware interface manual, we can know that the tracking sensor is directly driven by the micro:bit P13,P14 pin.

Category	Function	Number	Drive	The number of Drive pin	The number of connected to the controller	micro:bit
Buzzer	Buzzer	FM			P0	
Voice sensor	Voice sensor	MIC			P1	
LED light	Water light	LED-RGB			P12	
Tracking sensor	Left tracking	L-DET			LED-RGB	
	Right tracking	R-DET			L-DET	P13
Ultrasonic module	Echo pin	ECHO			R-DET	P14
	Trigger pin	TRIG				
Infrared receiver	Infrared remote control	RX				
I2C interface	I2C interface	SCL				
		SDA				
Motor	Left motor Forward	L-IN1		PC6/TIM1_CH1		
	Left motor Reverse	L-IN2		PC7/TIM1_CH2		
	Right motor Forward	R-IN1		PC3/TIM1_CH3		
	Right motor Reverse	R-IN2		PC4/TIM1_CH4		
RGB Searching light	Red	LED-R		PC5/TIM2_CH1		
	Green	LED-G		PD3/TIM2_CH2		
	Blue	LED-B		PD2/TIM2_CH3		
STM32				SCL, SDA		P19, P20

Code:

```

1 # Shenzhen Yahboom Technology Co., Ltd.
2 # modified from Dolphin
3 # Tiny-bit 2109,07,23
4
5 from microbit import *
6
7 import neopixel
8 np = neopixel.NeoPixel(pin12, 2)
9 # Two RGB light of Tiny-bit connect to Pin 12 of micro:bit
10
11 Val1 = pin13.read_digital()
12 pin13.set_pull(pin13.NO_PULL)
13 Val2 = pin14.read_digital()
14 pin14.set_pull(pin13.NO_PULL)
15 # Because Pin Pin13 and Pin14 micro:bit internal default is PULL_DOWN state,
16 # On the hardware, Pin13 and Pin14 are connected to a pull-up resistor,
17 # and there will be conflicts between them.
18 # So we need to set this two pin to ON_PULL in the program
19 # (which is pull up nor pull down)
20 # Calling set_pull will configure the pin to be in read_digital mode
21
22 while True:
23     if pin13.read_digital() == 1 and pin14.read_digital() == 1:
24         # Two tracking sonser connect Pin13,Pin14 of micro:bit
25         np[0] = (255, 255, 0) # Yellow light
26         np[1] = (255, 255, 0) # Yellow light
27         np.show()
28         display.show(Image.ARROW_S)
29     elif pin13.read_digital() == 1 and pin14.read_digital() == 0:
30         np[0] = (255, 255, 0) # Yellow light
31         np[1] = (255, 0, 255) # Purple light
32         np.show()
33         display.show(Image.ARROW_E)
34     elif pin13.read_digital() == 0 and pin14.read_digital() == 1:
35         np[0] = (255, 0, 255) # Purple light
36         np[1] = (255, 255, 0) # Yellow light
37         np.show()
38         display.show(Image.ARROW_W)
39     else:
40         np[0] = (255, 0, 255) # Purple light
41         np[1] = (255, 0, 255) # Purple light
42
43         np.show()
44         display.show(Image.HEART)

```

Programming and downloading:

1. You should open the Mu software, and enter the code in the edit window, , as shown in Figure 7-1.

Note! All English and symbols should be entered in English, and the last line must be a space.

```

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12 pin13.set_pull(pin13.NO_PULL)
13 Val2 = pin14.read_digital()
14 pin14.set_pull(pin13.NO_PULL)

```

Figure 7-1

2. As shown in Figure 7-2, you need to click the Check button to check if our code has an error. If a line appears with a cursor or an underscore, the program indicating this line is wrong.

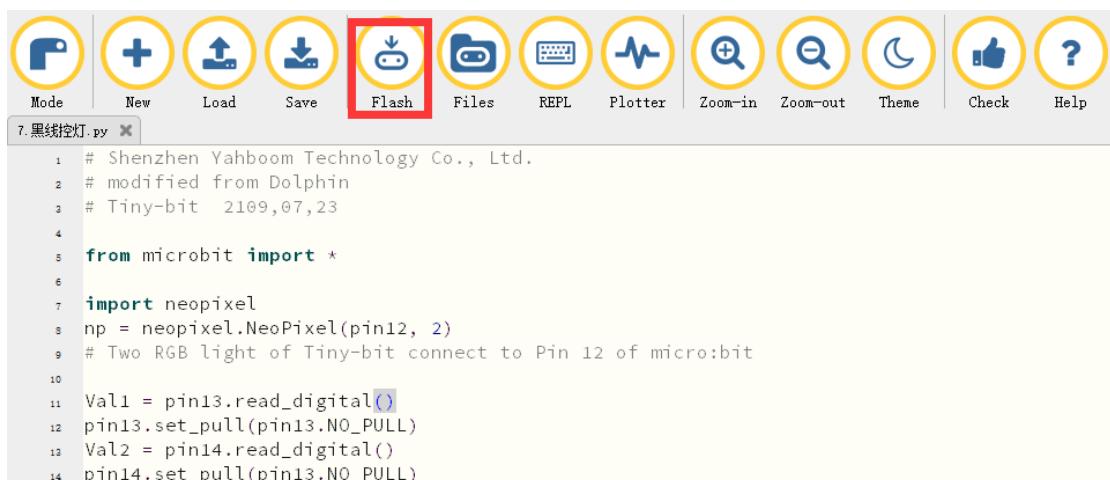
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12 pin13.set_pull(pin13.NO_PULL)
13 Val2 = pin14.read_digital()

```

Figure 7-2

3. You need to connect the micro data cable to micro:bit and the computer, then click the Flash button to download the program to micro:bit as shown in Figure 7-3.



```

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10
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12 pin13.set_pull(pin13.NO_PULL)
13 Val2 = pin14.read_digital()
14 pin14.set_pull(pin13.NO_PULL)

```

Figure 7-3

4. After downloading the program,

when left and right tracking sensor of Tiny-bit detect the black line, the two LED lights are yellow;

When the left line sensor of Tiny-bit detects a black line and the right tracking sensor does not detect a black line, the left LED light is yellow and the right LED light is blue;

When the left line sensor of Tiny-bit does not detect the black line and the right tracking sensor detects the black line, the left LED light is blue, and the right LED light is yellow;

when left and right tracking sensor of Tiny-bit do not detect the black line, the two LED lights are blue;