

Detector

1. Learning target

1.1 In this course, we will learn how to use pins of the Raspberry Pi Pico board.

1.2 How to use temperature-humidity module, ultrasonic module and OLED module make a detector.

2. Preparation

Raspberry Pi Pico board *1

Pico sensor expansion board *1

PC *1

USB data cable *1

Ultrasonic module *1

OLED module *1

Temperature-humidity module *1

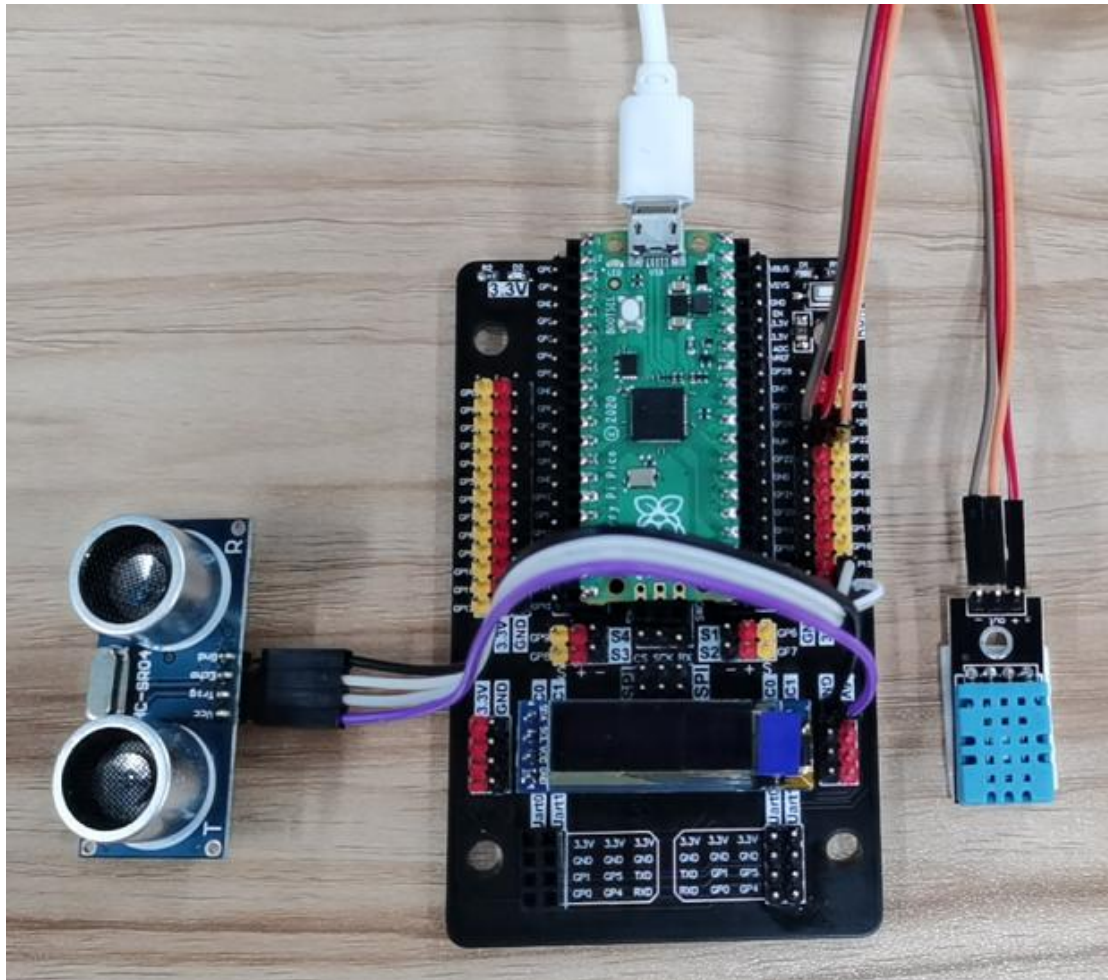
Male-to-male DuPont line *7

3. About wiring

Temperature-humidity module	Pico sensor expansion board
OUT	GP22
+	3.3V
-	GND

Ultrasonic module	Pico sensor expansion board
Trig	GP14
Echo	GP13
VCC	5V
GND	GND

OLED	Pico sensor expansion board
SDA	GP20
SCL	GP21
VCC	3.3V
GND	GND



4. About code

Thonny programming

About how to using ThonnyIDE, please check the tutorials in **【2.Development environment】** .

```
import utime
from ultrasonic import ultrasonic
from dht11 import DHT11
from machine import Pin, I2C
i2c=I2C(0, scl=Pin(21),sda=Pin(20), freq=100000)

from ssd1306 import SSD1306_I2C
oled = SSD1306_I2C(128, 32, i2c)

#Initialize temperature and humidity pins
pin = Pin(22, Pin.OUT)
#Initialize the temperature and humidity library
dht11 = DHT11(pin)

#Initialize ultrasonic
Echo = Pin(13, Pin.IN)
```

```

Trig = Pin(14, Pin.OUT)
ultrasonic = ultrasonic(Trig, Echo)

while True:
    distance = ultrasonic.Distance_accurate() # Update the data detected by ultrasonic
    temperature = dht11.temperature # Update temperature value
    humidity = dht11.humidity # Update humidity value

    #Print data
    print("distance=%dcm,    temperature=%dC,    humidity=%d%%"%(distance,    temperature,
humidity))

    #Format data into string format
    str_distance = "dis=%dcm"%(distance)
    str_temperature = "tem=%dC"%(temperature)
    str_humidity = "hum=%d%%"%(humidity)

    #oled display data
    oled.fill(0x0)
    oled.text(str_distance, 0, 0)
    oled.text(str_temperature, 0, 10)
    oled.text(str_humidity, 0, 20)
    oled.show()


    utime.sleep(.5)

```

Before running this program, you need to load ws2812, dht11, ultrasonic and ssd1306 library, please check the specific steps in **【2.Development environment】**

5. Phenomenon

Click the green run button  of Thonny IDE to start running the program. Click the red stop

button  to stop the program. When the program is running, the temperature and humidity of the current environment and the distance of obstacles in front of the ultrasound are displayed on the OLED screen in real time.