BAIJIA DAGU

Microbit

Starter kit

中山市百佳大谷电子科技有限公司

Catalog

LED module

（Red/Yellow/Green/Blue/White)

Module description: LED is the abbreviation of light-emitting diode. It is usually made of gallium arsenide, gallium phosphide semiconductor material. LED has two electrodes, one positive and one negative. When the positive current passes through, it will light up. It can be red, blue, green or yellow light, and the color of the light depends on the material it uses.

Working voltage:3.3V~5V
Output type:Digital signal. (For analog voltages from 0V to 5V, values (0-255) are also allowed to be entered as digital values.)
Working mode:4 type
Interface mode:PH2.0~3P
Module size:35*26.3mm
Module weight:47g

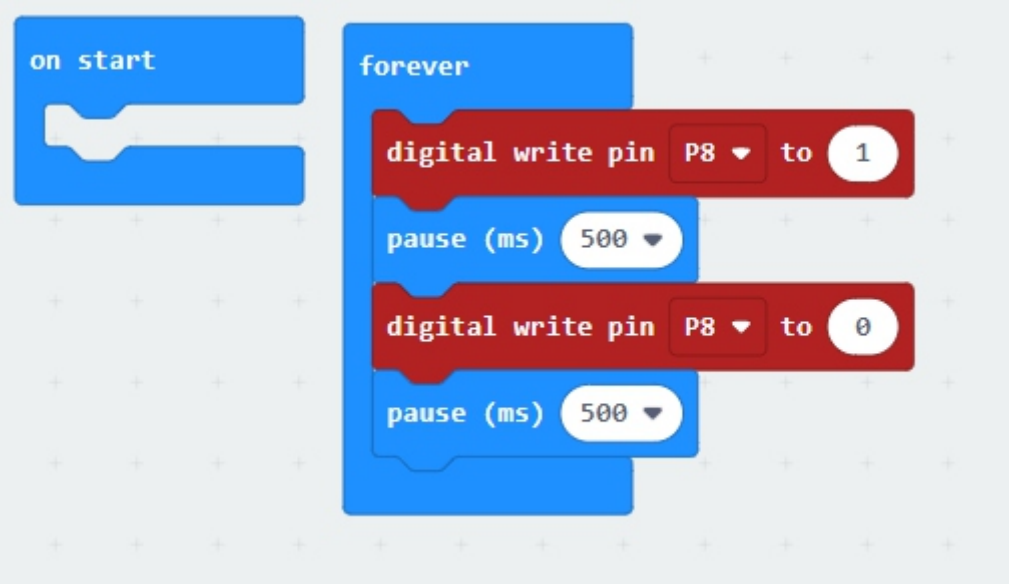
Pin denifition:

IN	Input
+	VCC
–	GND

Micro:bit
Example 1
code

```
from microbit import *
#write your program:
while True:
    pin8.write_digital(1)
    sleep(500)
    pin8.write_digital(0)
    sleep(500)
```

Microbit graphic programming



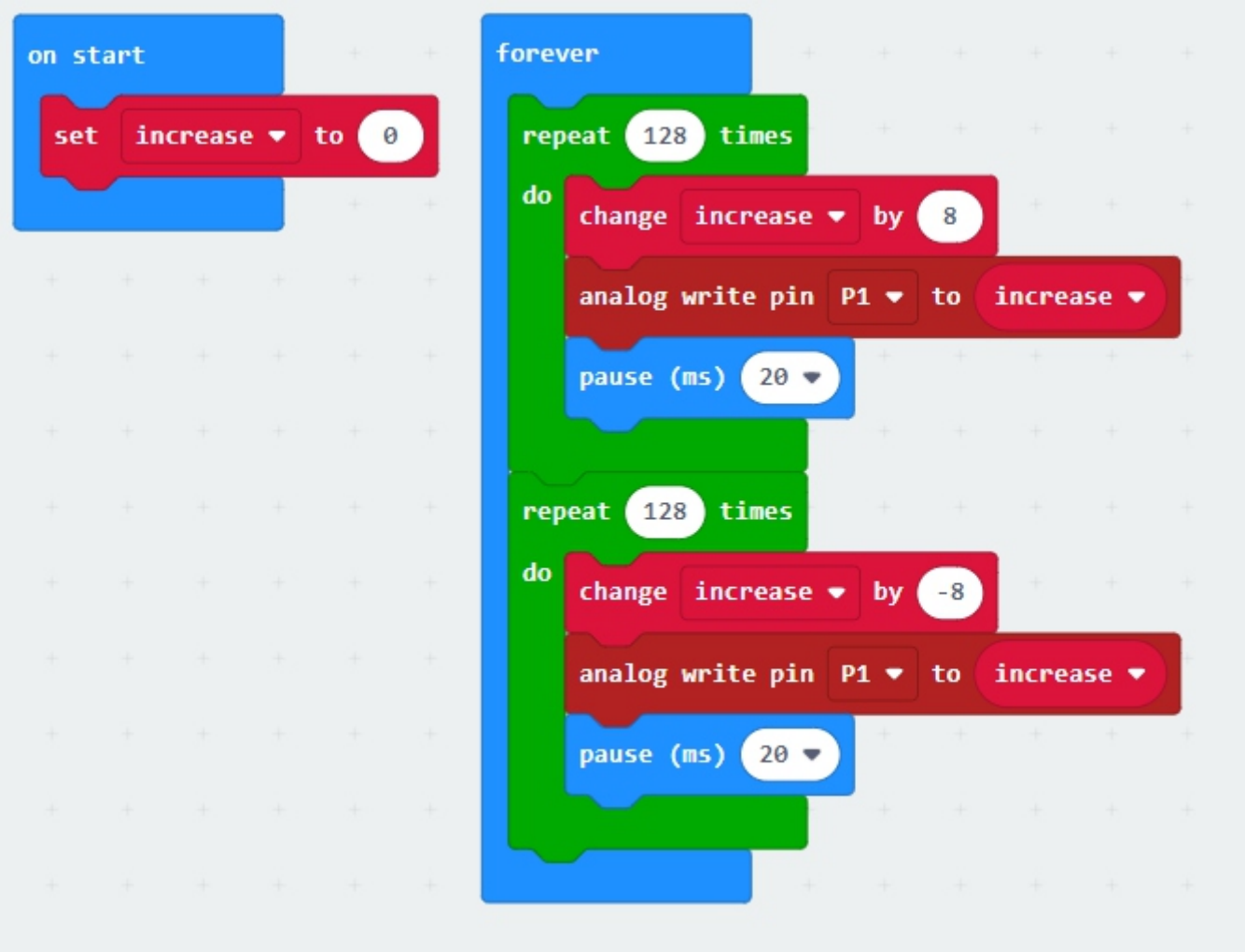
Results: after pin 8 is plugged in, the LED lamp will cycle on for 1 second and off for 1 second.

Example 2
code

```
from microbit import *
#write your program:
increase = 0

while True:
  for i in range(1,128):
    increase += 8
    pin1.write_analog(increase)
    sleep(20)
  for i in range(1,128):
    increase -= 8
    pin1.write_analog(increase)
    sleep(20)
```

Microbit graphic programming



Results: the LED lamp on pin 1 had a slow process from on to off, rather than directly on and off.

RGB module

Product description: RGB LED consists of 3 leds. Each led has a red light, a green light and a blue light. These three colors leds can produce any color. The RGB LED has red, green and blue light transmitters and is usually connected to a common lead (anode or carthode) using three wires. The module is a commong cathode led.

Working voltage: 3V~5V
Input type: PWM. The value (0~255) is input into RDDB three interfaces as digitial value.
The color of RGB LED is controled by PWM.
Interface mode: pH2.0~4P
Module size: 35*26.3mm
Module weight: 49g

Pin denifition:

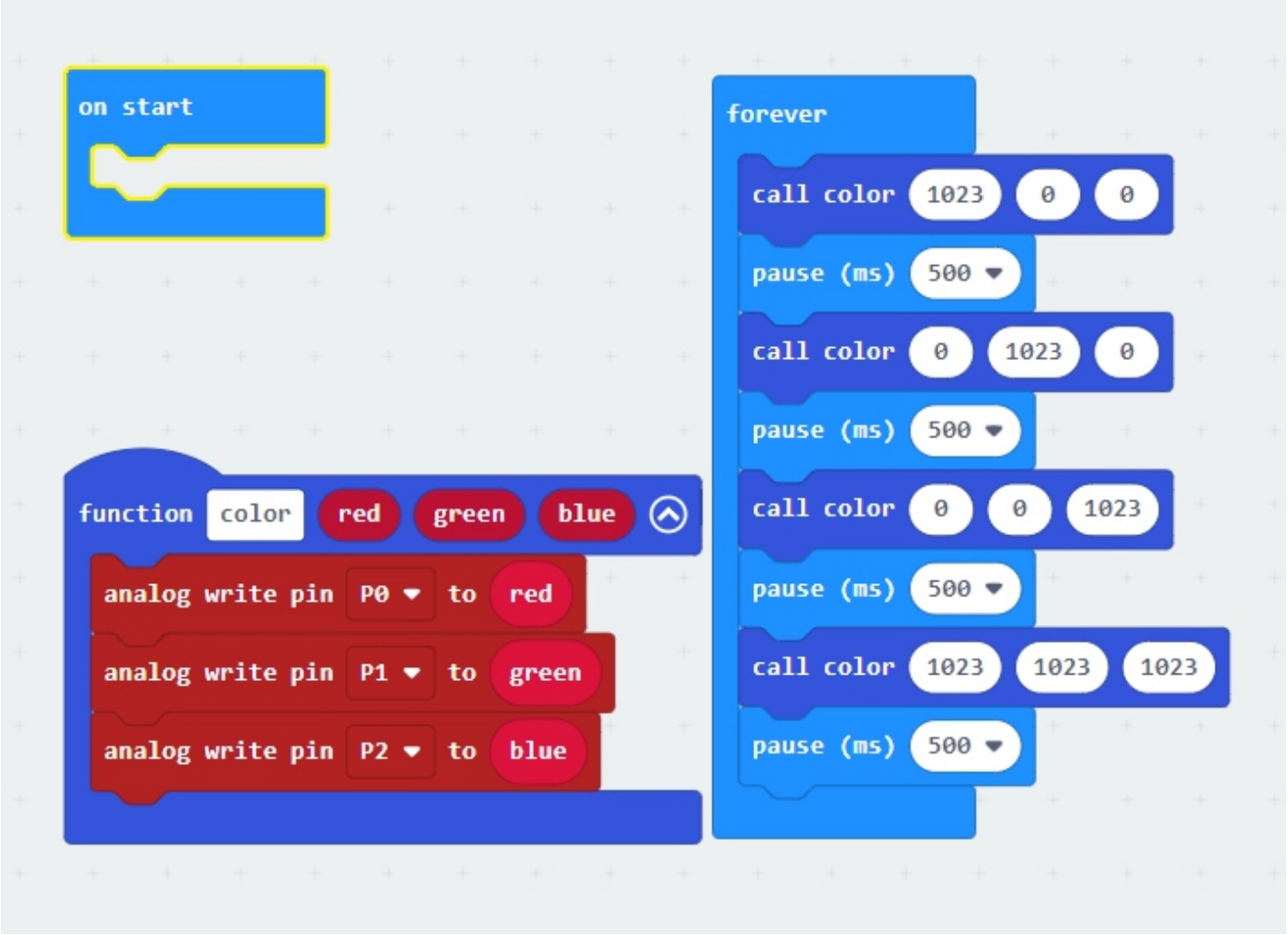
B	Blue intput
G	Green input
-	GND
R	Red input

Micro:bit
Example 1
code

```
from microbit import *
def set_rgb(red, green, blue):
    pin0.write_analog(red)
    pin1.write_analog(green)
    pin2.write_analog(blue)

while True:
    set_rgb(1023, 0, 0)
    sleep(500)
    set_rgb(0, 1023, 0)
    sleep(500)
    set_rgb(0, 0, 1023)
    sleep(500)
    set_rgb(1023, 1023, 1023)
    sleep(5000)
```

Microbit graphic programming



Results: the RGB LED lights of R access pin 0, G access pin 1, B access pin 2 cycle flashing.

Button module

Product description: Buttons are common components used to control electronic devices. They are usually used as switches to connect or disconnect circuits. Under normal circumstances, the two contacts of the button are in the open state, and they only close when the button is pressed.

Working voltage:3.3V to 5V
Output type:Digital signal. Press the key, high level;Release the key, low level.
Interface mode:PH2.0~3P
Module size:35*26.3mm
Module weight:49g. 3mm

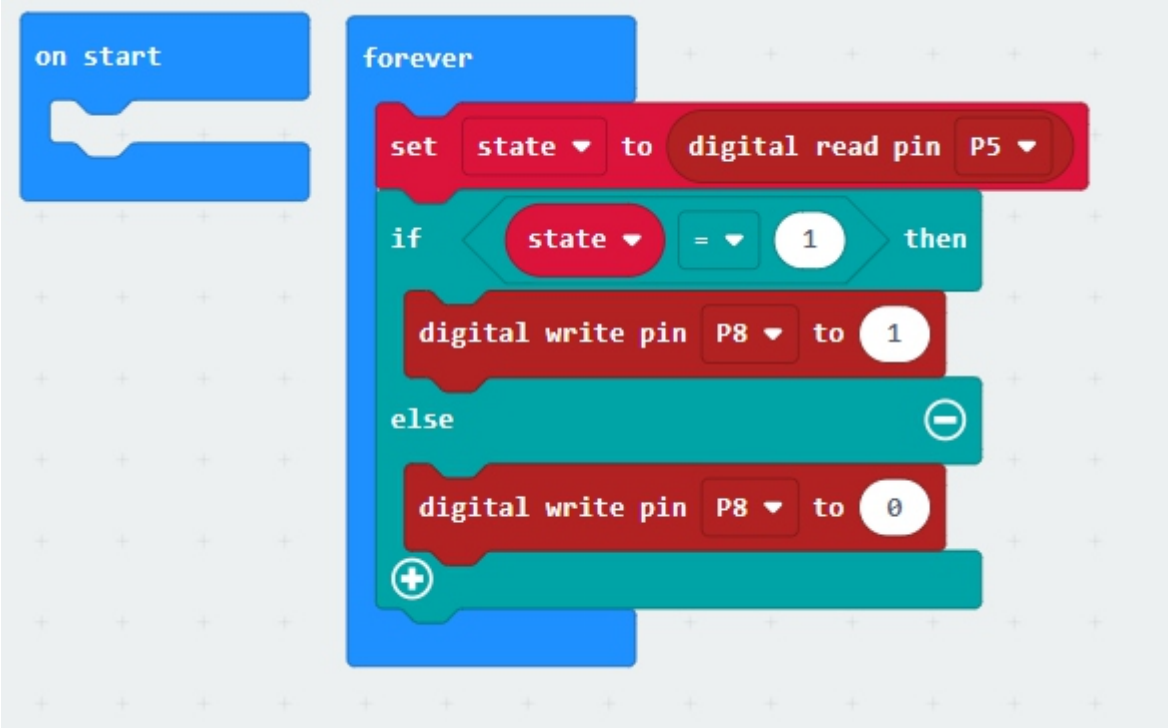
Pin definition:

OUT	Output
+	VCC
-	GND

Micro:bit
Example 1
code

```
from microbit import *
#write your program:
while True:
    state = pin5.read_digital
    if state == 1:
        pin8.write_digital(1)
    else:
        pin8.write_digital(0)
```

Microbit graphic programming



Results: pin 5 is connected to the key and pin 8 is connected to the LED lamp. When the key is pressed, the LED light is on; when the key is released, the LED light is off.

Photoresistor module

Module description: Photoresistor is a kind of light controlled variable resistor.Photoresistors have photoconductivity and can be used in photodetectors. Photoresistors are made of high resistance semiconductors. In the dark, the resistance of photoresist can be as high as several megaohms (m Ω), while in sufficient light, the resistance of photoresist can be as low as several hundred ohms. If the incident light on the photoresist exceeds acertain frequency, the photons are absorbed by the semiconductor to the bound electrons enough energy to jump into the conduction band. The resulting free electrons conduct electricity, thereby reducing resistance.

Working voltage: 3.3V~5V
Output type: Digital and analog interfaces. In this module, the stronger the incident light is, the lower the output analog value is.
Interface mode: PH2.0~4P
Module size: 35*26.3mm
Module weight: 42g

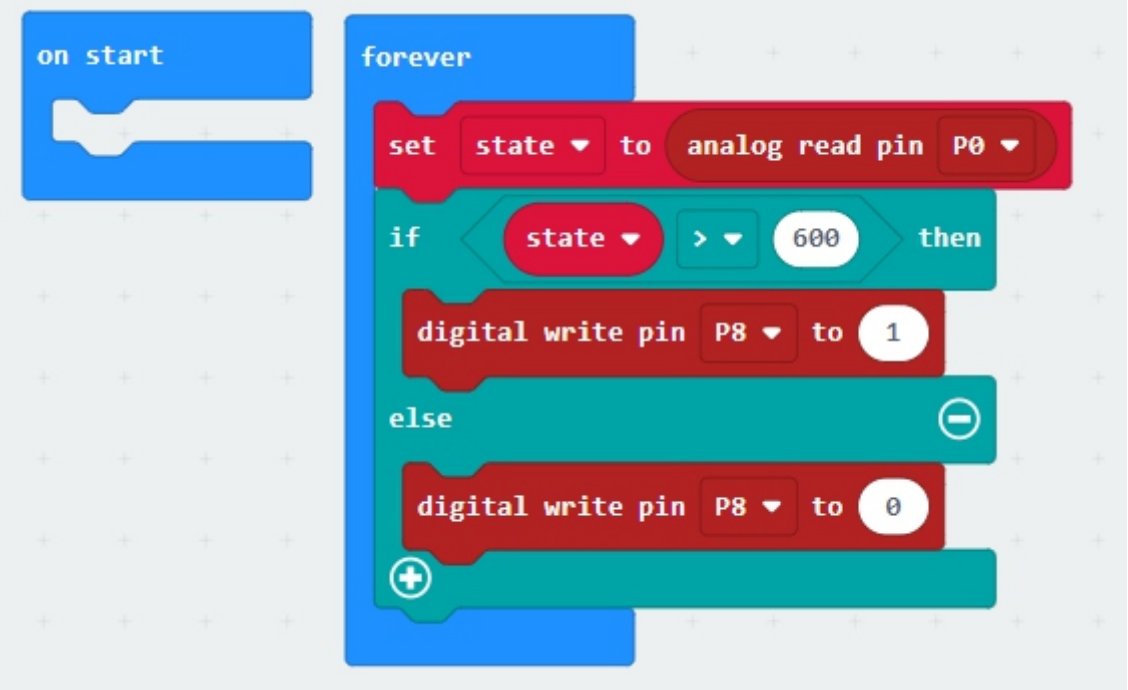
Pin denifition:

DO	Digital output
AO	Analog output
-	GND
+	VCC

Micro:bit
Example 1
code

```
from microbit import *
#write your program:
while True:
    state = pin5.read_digital
    if state > 600:
        pin8.write_digital(1)
    else:
        pin8.write_digital(0)
```

Microbit graphic programming

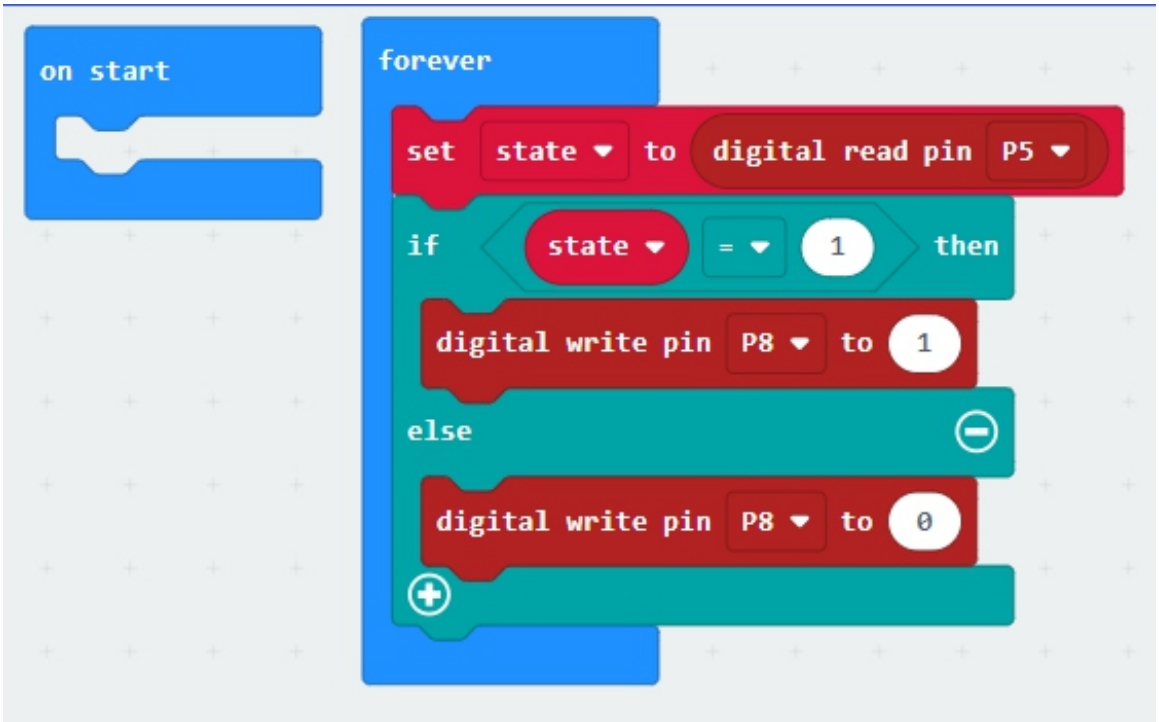


Results: pin 0 was connected to the analog output of photoresistor, pin 8 was connected to the LED lamp. When the analog output value was higher than 600, the LED was on; otherwise, the LED light was not on.

Example 2
code

```
from microbit import *
#write your program:
while True:
    state = pin5.read_digital
    if state == 1:
        pin8.write_digital(1)
    else:
        pin8.write_digital(0)
```

Microbit graphic programming



Results: pin 5 was connected to the digital output of the photoresistor, and pin 8 was connected to the LED lamp. When the digital signal output from pin 5 was 0, the LED light was on; otherwise, the LED light was not on.
Tip: try to twist the cross port on R1 of the module with a screw driver, and observe the change of the output content of the serial port.

Active buzzer module

Module description: Buzzer is a kind of audio signal device. As an integrated electronic buzzer, it is powered by DC voltage and widely used in computers, printers, copiers, alarms,electronic toys, automotive electronic equipment, telephones, timers and other electronic product voice equipment. According to its driving mode, buzzer can be divided into activebuzzer and passive buzzer.
The difference between the active buzzer and the passive buzzer: the source here does not refer to the power supply, but refers to the vibration source. That is to say, there is a vibration source inside the active buzzer, so as long as the power is on, it will ring, and there is no vibration source inside the passive buzzer, so it is impossible to make it ring with DC signal. The buzzer described here is an active buzzer. As long as there is power. We output alternating high and low levels to make the buzzer sound.

Working voltage: 3.3V~5V
Output type: Digital output
Interface mode: pH2.0~3P
Module size: 35*26.3mm
Module weight: 47g

Pin denifition:

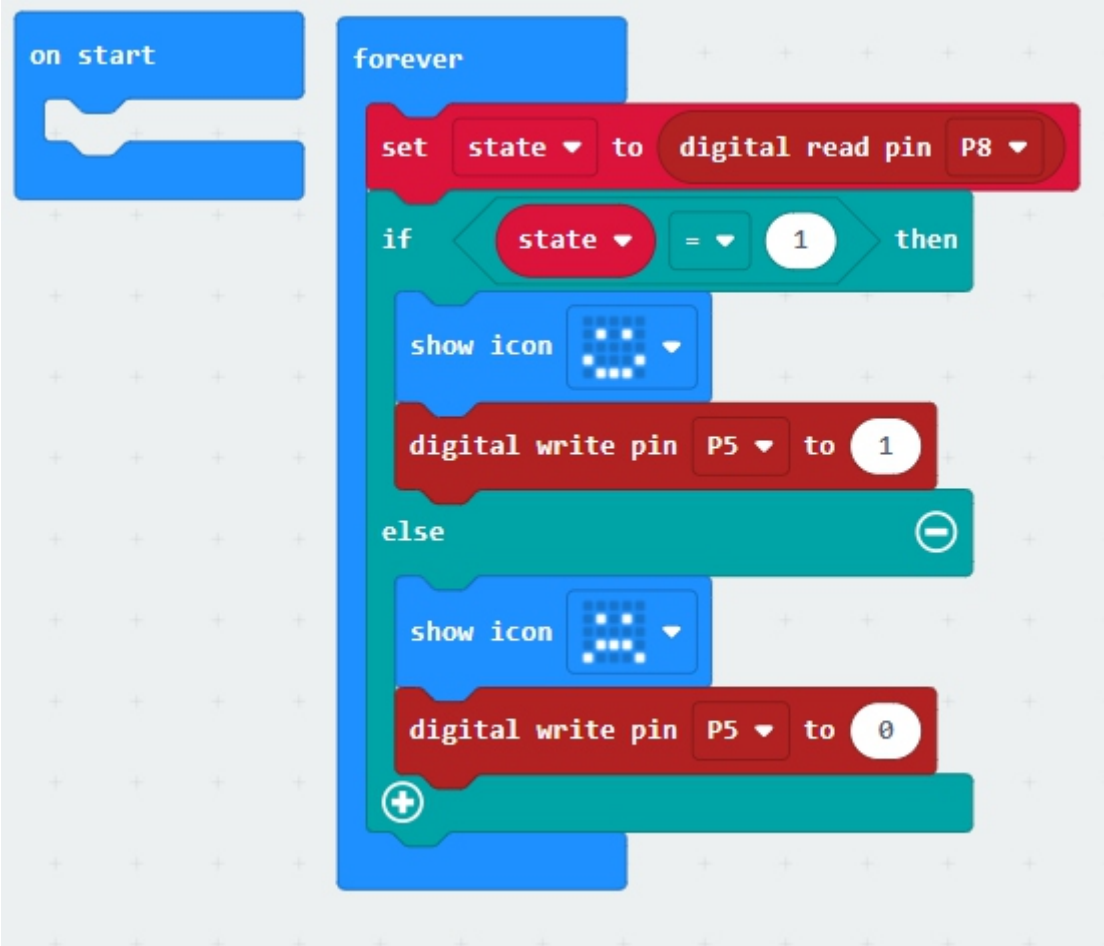
IN	Digital input
+	GND
-	VCC

Micro:bit
Example 1
code

```
from microbit import *
#write your program:

while True:
    state = pin8.read_digital()
    if state==1:
        display.show(Image.HAPPY)
        pin5.write_digital(1)
    else:
        display.show(Image.SAD)
        pin5.write_digital(0)
```

Microbit graphic programming



Results: the key was connected to pin 8 and the active buzzer was connected to pin 5. When the key was pressed, the buzzer made a sound and showed a smiling face. When the key was released, the buzzer did not make a sound and showed a crying face.

Passive buzzer module

Module description: Buzzer is a kind of audio signal device. As an integrated electronic buzzer, it is powered by DC voltage and widely used in computers, printers, copiers, alarms,electronic toys, automotive electronic equipment, telephones, timers and other electronic product voice equipment. According to its driving mode, buzzer can be divided into active buzzer and passive buzzer. Is the input module, digital interface.

The difference between the active buzzer and the passive buzzer: the source here does not refer to the power supply, but refers to the vibration source. That is to say, there is a vibration source inside the active buzzer, so as long as the power is on, it will ring, and there is no vibration source inside the passive buzzer, so it is impossible to make it ring with DC signal. The buzzer described here is a passive buzzer.

Working voltage: 3.3V~5V
Output type: Digital output
Interface mode: pH2.0~3P
Module size: 35*26.3mm
Module weight: 40g

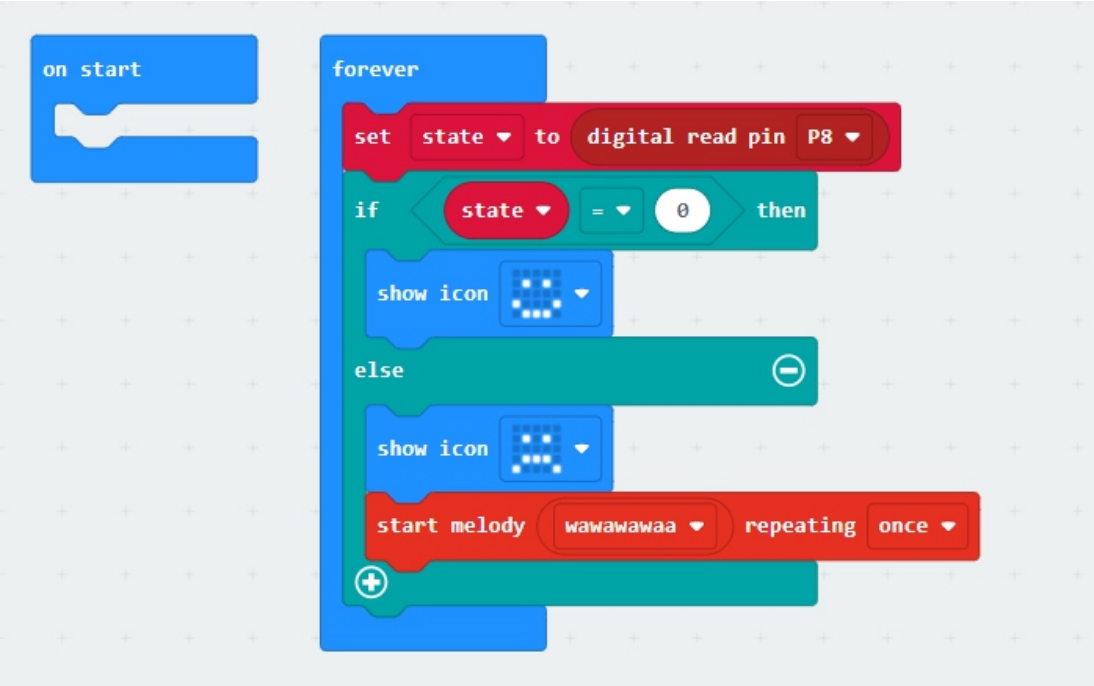
Pin denifition:

IN	Input
+	GND
-	VCC

Micro:bit
Example 1
code

```
from microbit import *
#write your program:
import music
while True:
    state = pin8.read_digital()
    if state==0:
        display.show(Image.HAPPY)
    else:
        display.show(Image.SAD)
        music.play(music.WAWAWAWAA)
```

Microbit graphic programming



Results: pin 8 was connected to the touch module, and pin 0 was connected to the passive buzzer. When the touch module output high level, the crying face was displayed on the microbit board and the passive buzzer made a Wawa sound; when the touch module output low level, the microbit Board showed a smiling face and the passive buzzer did not make a sound.

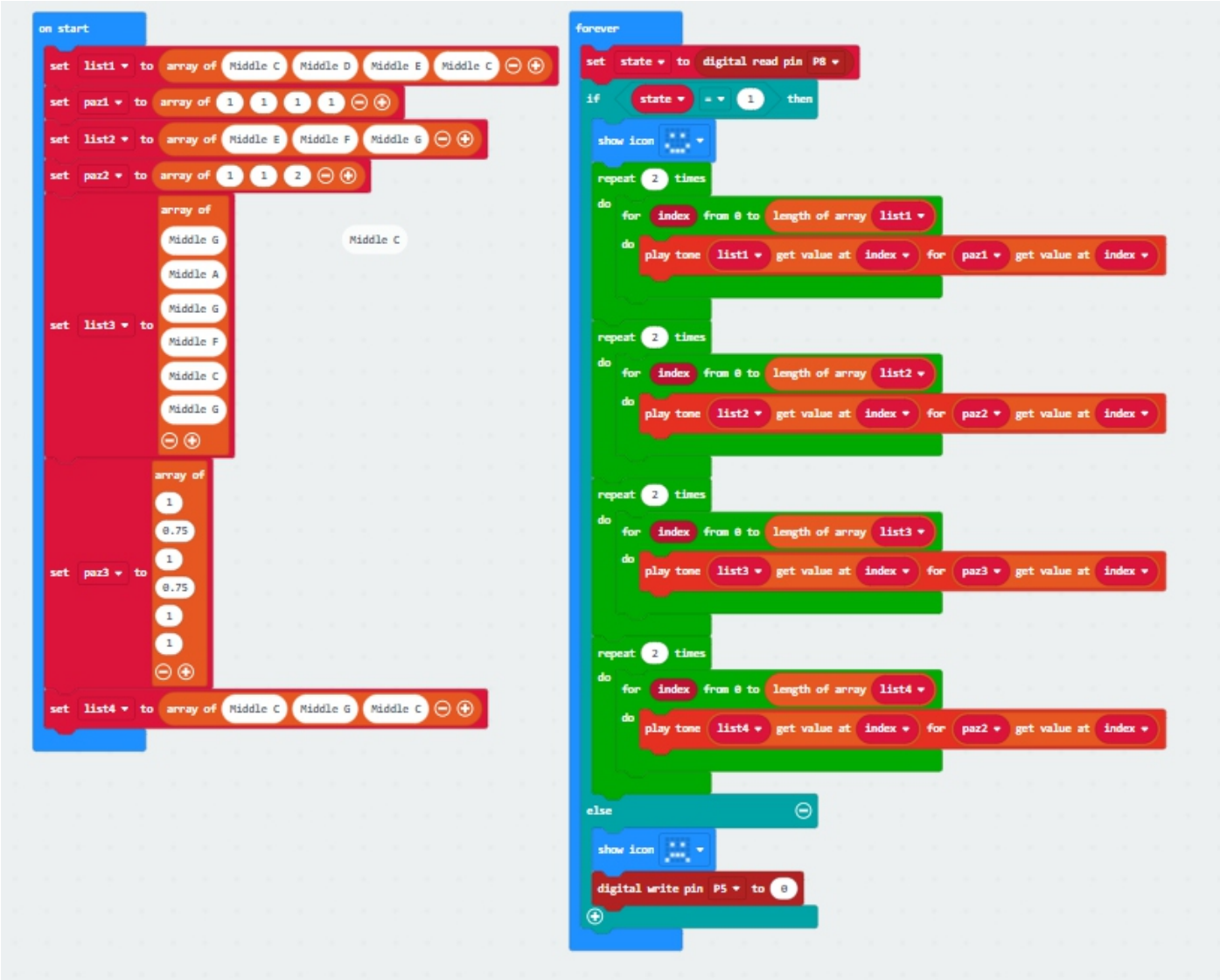
Example 2
code

```
from microbit import *
#write your program:
import music

tune = ["C4:","D","E","D",
        "C","D","E","D",
        "E","F","G:8",
        "E","F","G:8",
        "G","A:3","G","F:3","E","C",
        "G","A:3","G","F:3","E","C",
        "C","G","C:8",
        "C","G","C:8"]


while True:
    state = pin8.read_digital()
    if state == 1:
        display.show(Image.HAPPY)
        music.play(tune)
    else:
        display.show(Image.SAD)
        music.stop()
```

Microbit graphic programming



Results: pin 8 is connected to the touch module and pin 0 is connected to the passive buzzer. When the touch module outputs high level, the buzzer will play songs; when the touch module outputs low level, the buzzer will stop playing songs.

Touch sensor module

Module description: Touch module is a capacitive touch switch module based on touch detection. Normally, the module outputs low level;When touching the corresponding position with fingers, the module will output high level.The module can be installed on the surface of non-metallic materials such as plastic and glass.In addition, a thin piece of paper (non- metallic) can be covered on the surface of the module.As long as the touch position is correct, it can be made into a key hidden in the wall, desktop and other places.This module can help you to avoid the trouble of pressing buttons.

Working voltage:3.3V~5V
Output type:Digital signal
Working mode:4 type
Interface mode:PH2.0~3P
Module size:35*26.3mm
Module weight:36g

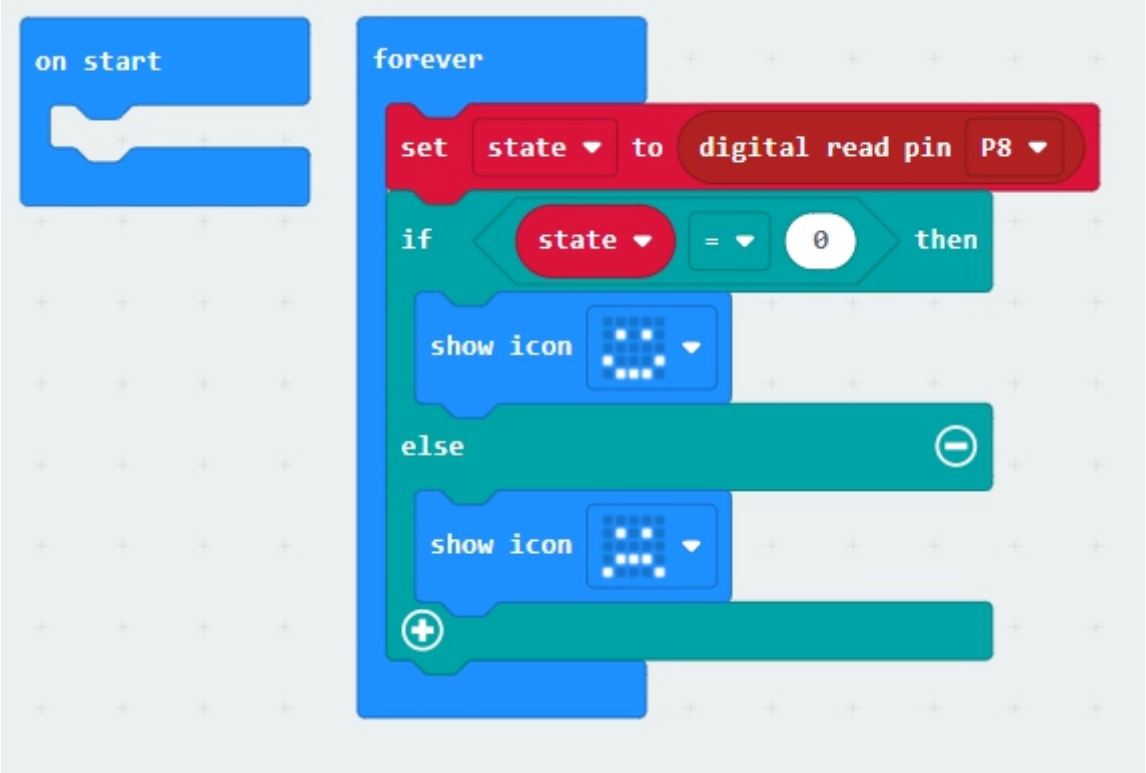
Pin denifition:

OUT	Output
-	GND
+	VCC

Micro:bit
Example 1
code

```
from microbit import *
#write your program:
while True:
    state = pin8.read_digital()
    if state==0:
        display.show(Image.HAPPY)
    else:
        display.show(Image.SAD)
```

Microbit graphic programming



Result: pin 8 is connected to the touch module. Whenever the touch module outputs a high level, the 5 * 5 dot matrix LED displays a bitter face, until the touch module outputs a low level, the 5 * 5 dot matrix LED displays a smiling face.

Supplement: there is a two lattice dial on the module. There are four combinations of dial dial dial, namely 00, 01, 10 and 11 respectively. That is to say, the touch module can realize four touch modes according to the combination of encoder. 00 and 01 will change the current level when touching the module. The difference between them is that 00 means that when the module is powered on, the module will start with output high level first, while 01 means that when the module is powered on, the module will first start with output high level; 10 is that when touching the module, it will output low level, otherwise it will output high level; 11 is when touching the module, it will output high power Flat, otherwise output low level. It should be noted that because of the Unigrid capacitor on the module, after modifying the touch mode of the module, disconnect the power supply to discharge the module!

Tracking moudle

Module description: The tracking module is used to transmit light to the road by the infrared transmitting tube. When the infrared light encounters black, it is absorbed. The receiving tube does not receive the reflected light and outputs high level. When the red light meets other colors, the receiving tube receives the reflected light and outputs a low level. When using analog output, the module can be used as a gray-scale sensor. The gray-scale sensor is an analog sensor, which can sense different colors of the ground or desktop and generate corresponding signals.

Operating voltage: 3.3V~5V;
Output mode: digital signal, analog signal;
Interface mode: pH2.0~6P
Module size: 35*26.3mm
Module weight: 51g. 3mm

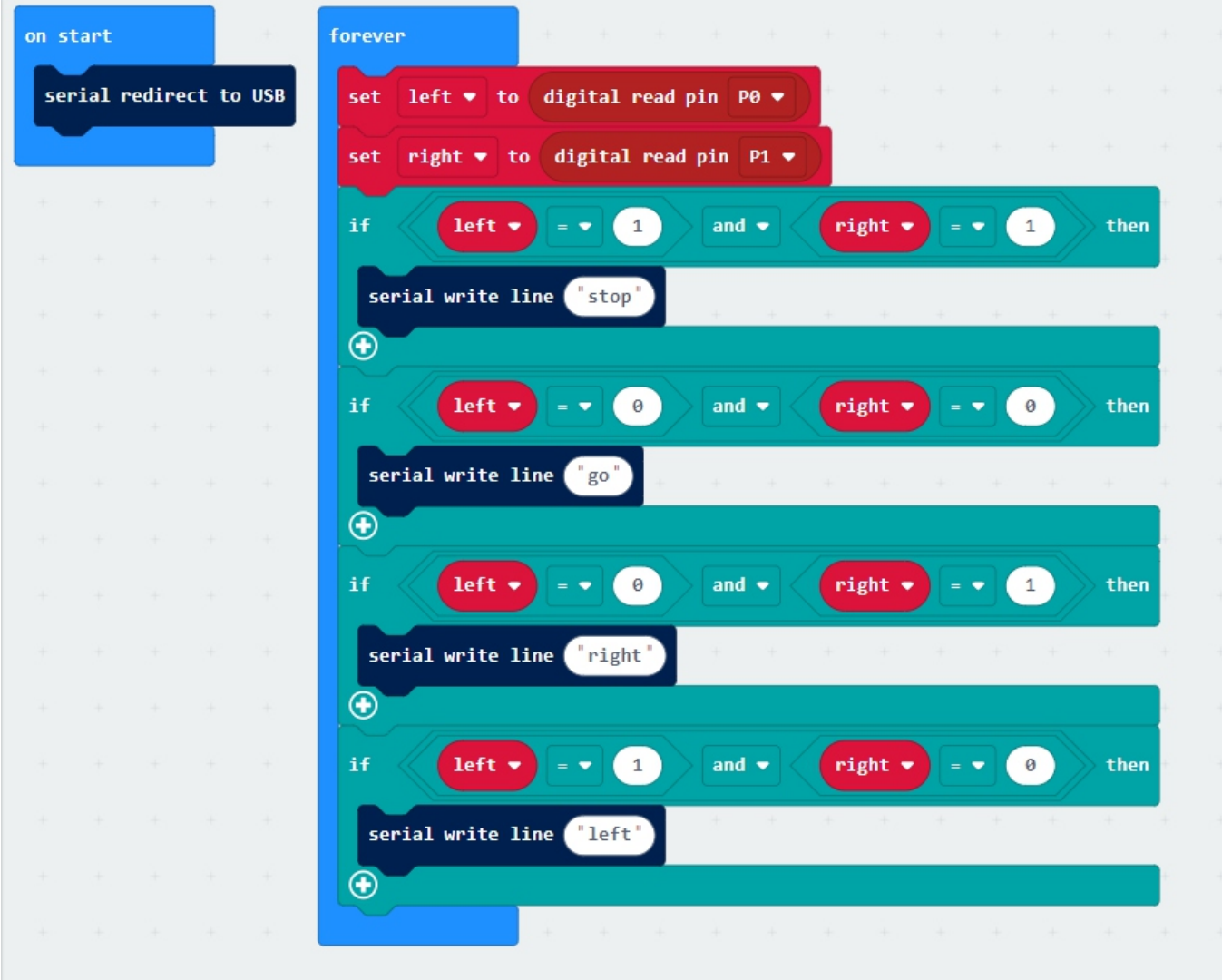
Pin definition:

AO-R	Right analog input
DO-R	Right digital input
AO-L	Left analog input
DO-L	Left digital input
-	GND
+	VCC

Micro:bit
Example 1
code

```
from microbit import *
#write your program:
while True:
    left = pin0.read_digital()
    right = pin1.read_digital()
    if left==1 and right==1:
        display.show(Image.NO)
    if left==0 and right==0:
        display.show(Image.YES)
    if left==0 and right==1:
        display.show(Image.HAPPY)
    if left==1 and right==0:
        display.show(Image.SAD)
```

Microbit graphic programming



Results: do-l access pin 0, do-r access pin 1, open the serial port window. When the infrared of both sides is blocked, the signal can not be received, and the output high level will prompt "stop"; when the infrared of both sides is not blocked, the signal is received, indicating "go"; when the left infrared is blocked, the left side can not receive the signal, indicating "left"; when the right side infrared is blocked, the right side can not receive the signal, indicating "right".

Fan module

Module description: DC motor is a kind of motor that converts DC electric energy into mechanical energy. The most common type depends on the force produced by the magnetic field. Almost all types of DC motors have some internal mechanism, either electromechanical or electronic, to periodically change the current flow direction of some motors. Most types produce rotational motion; linear motors produce force and linear motion directly

Working voltage: 5V.
Input type: digital signal, PWM
Interface mode: ph2.0-4p
Module size: 35*26.3mm

Pin denifition:

IA	Forward digital input
IB	Reverse digital input
-	GND
+	VCC

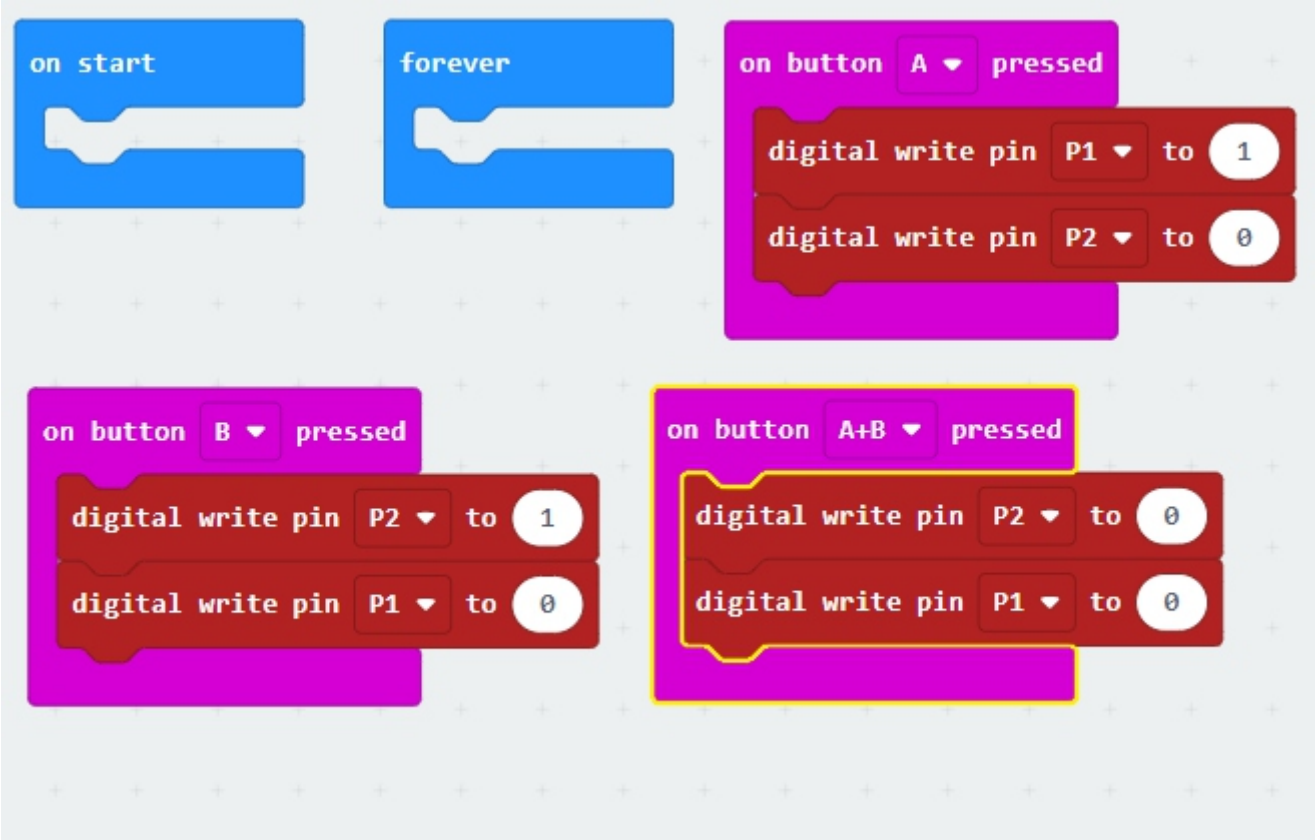
Control method

IA	IB	Function
0	0	Stop
0	1	Reverse
1	0	Forward

Micro:bit
Example 1
code

```
from microbit import *
#write your program:
while True:
    if button_a.is_pressed():
        pin1.write_analog(1)
        pin2.write_analog(0)
    elif button_b.is_pressed():
        pin1.write_analog(0)
        pin2.write_analog(1)
    elif button_a.is_pressed() and button_b.is_pressed():
        pin1.write_analog(0)
        pin2.write_analog(0)
```

Microbit graphic programming



Results: IB interface was connected to pin 2 and IA interface was connected to pin 1. When the key a is pressed, the motor rotates forward; when the key B is pressed, the motor rotates reversely; when pressing the keys a and B at the same time, the motor stops rotating.

Infrared receiving module

Module description: The external receiving tube is an electronic device that receives infrared light. For example, our TV sets, air conditioners and other household appliances need infrared receivers. We all know that the remote control emits infrared light. It is necessary for the TV to have an infrared receiver to receive the infrared signal from the remote control.

Working voltage: 3.3V~5V
Output type:digital signal
Interface mode: pH2.0~3P
Module size: 35*26.3mm
Module weight: 40g

Pin denifition:

OUT	Output
-	GND
+	VCC

Micro:bit
Example 1
code

```
from microbit import *
import necir
def cb(addr,cmd):
    print('addr=',hex(addr))
    print('cmd=',hex(cmd))

necir.init(16)
necir.read(cb)

while True:
    pass
```

According to the serial output of the hexadecimal data, we can modify the code

```
from microbit import *
import necir

def cb(addr,cmd):
  print('addr=',hex(addr))
  print('cmd=',hex(cmd))
  if addr == 0xff00:
    if cmd == 0xef10:
      display.show(Image.HEART)
    if cmd == 0xee11:
      display.show(Image.HEART_SMALL)
necir.init(16,cb)
```

Results: pin 16 was connected to the infrared receiving module. When "1" was pressed, the 5 * 5 dot matrix displayed the big center; when pressing "2", the 5 * 5 dot matrix displayed caution.

Microphone module

(Sound sensor module)

Module description: Output module, digital analog interface. It acts as a microphone. It is used to receive sound waves and display vibration images, but it can not measure the intensity of noise. The sound wave makes the electret film in the microphone vibrate,resulting in the change of capacitance, thus generating the corresponding change of micro voltage, which is received by the data collector through digital / analog conversion, and transmitted to the control board.
Ao analog output microphone's received sound signal in real time Do when the sound intensity reaches a certain threshold, the low-level signal is output (which can be adjusted by R2 on the module). Because the time of outputting the low-level signal is very short, in order to capture useful information, information filtering or interruption is used to present, here information filtering is used.

Working voltage: 3.3V~5V
Output type: Digital output, analog output
Interface mode: pH2.0~4P
Module size: 35*26.3mm
Module weight: 50g

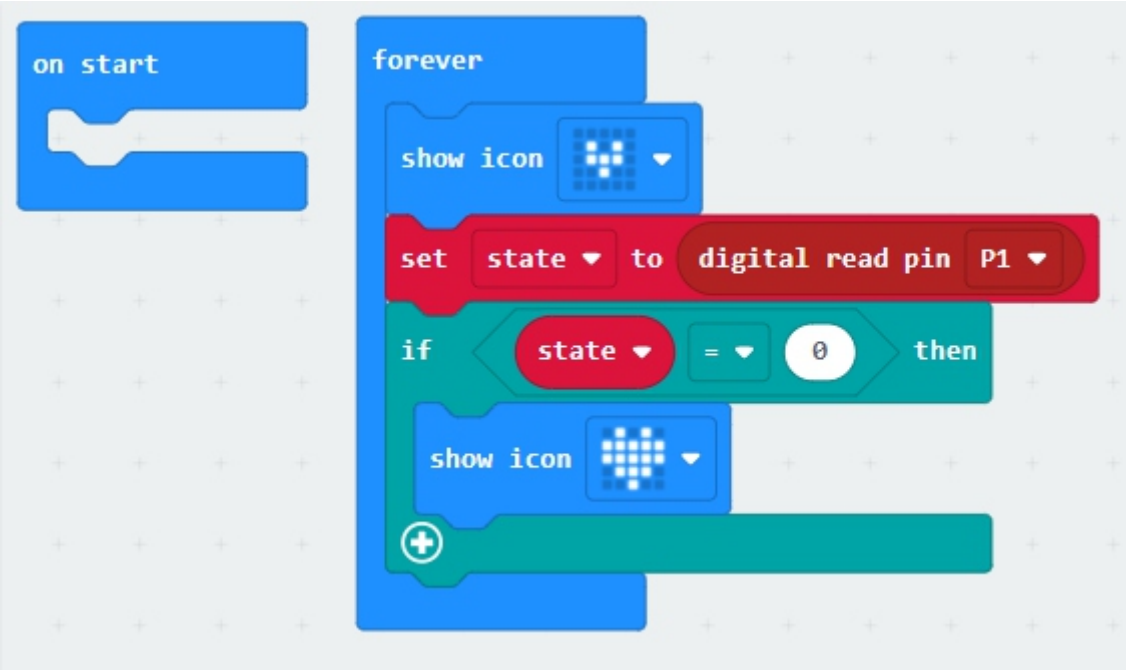
Pin denifition:

DO	Digital output
AO	Analog output
-	GND
+	VCC

Micro:bit
Example 1
code

```
from microbit import *
#write your program:
while True:
    state = pin1.read_digital()
    display.show(state)
```

Microbit graphic programming



Results: in the code programming, the do pin of the module was connected to Pin1, and the current digital value of the module was displayed on the screen. In the graphic programming, the Ao pin of the module is connected to Pin1, and the window is opened to view the analog value changes of the module under different volume levels.

Potentiometer module

Module description: Potentiometer is a kind of three terminal resistance element whose resistance can be changed according to certain rules. It usually consists of a resistance element and a movable brush. When the brush moves along the element, a resistance or voltage is generated at the terminal relative to its moving distance.

Working voltage: 3.3V~5V
Output type: Obtain the digital output of the potentiometer switch and the analog output of the potentiometer value (0-1023).
Interface mode: PH2.0~4P
Module size: 35*26.3mm
Module weight: 93g

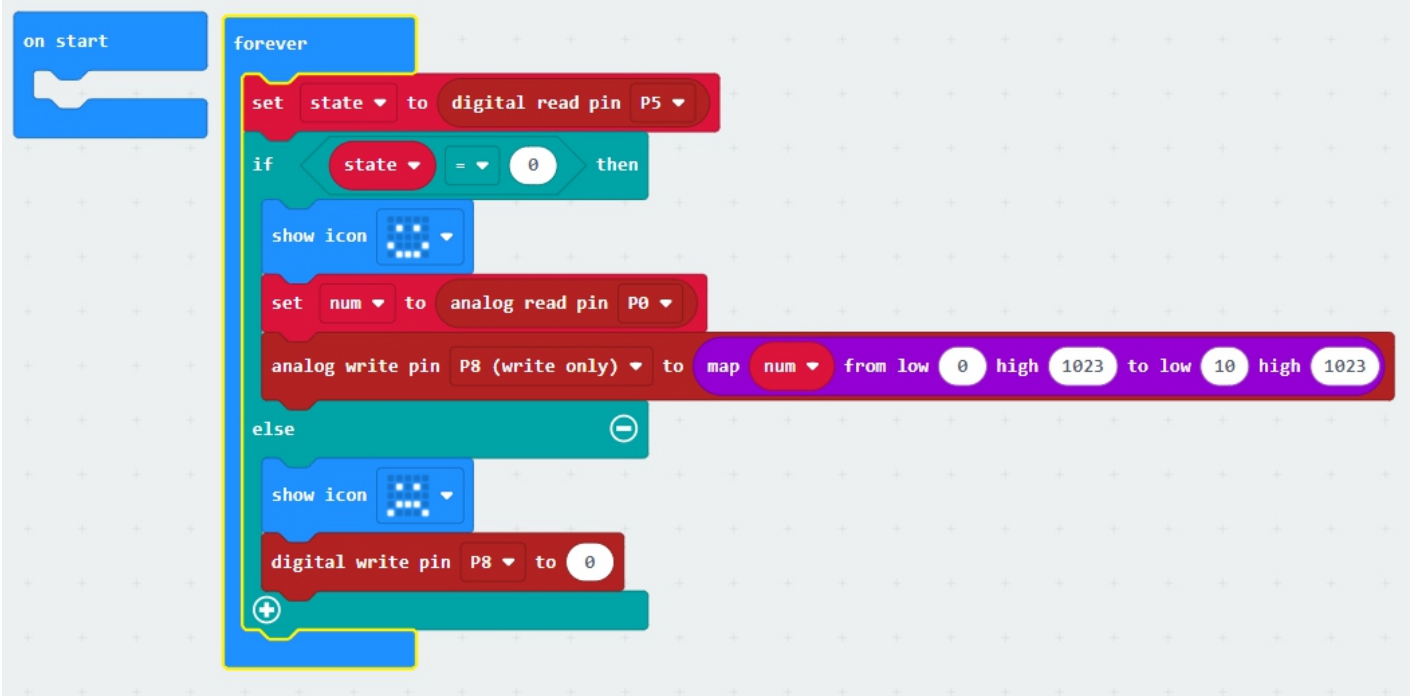
Pin denifition:

AUTO	Analog output
SW	Digital output
-	GND
+	VCC

Micro:bit
Example 1
code

```
from microbit import *
#write your program:
while True:
    state = pin5.read_digital()
    if state==0:
        display.show(Image.HAPPY)
        num = pin0.read_analog()
        pin8.write_analog(num*0.99+10)
    else:
        display.show(Image.SAD)
        pin8.write_digital(0)
```

Microbit graphic programming



Results: pin 5 was connected to the digital interface of the potentiometer, pin 0 was connected to the analog interface of the potentiometer, and pin 8 was connected to the LED lamp. The LED light brightness changes with the twist of the potentiometer. The 5 * 5 dot matrix on micro: bit board changes with the switch of potentiometer.

Ultrasonic Module

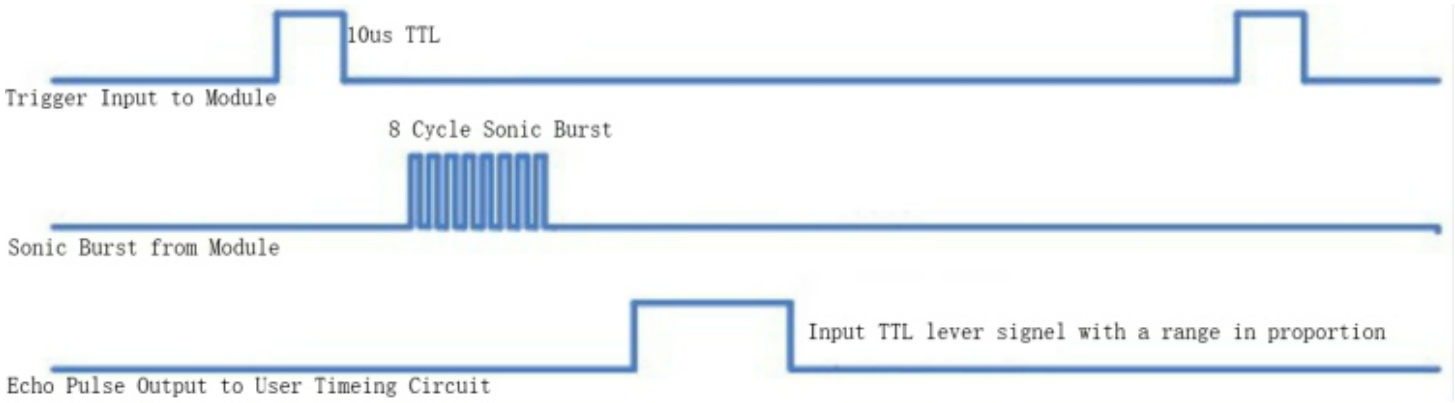
Module description: This module is used to measure the distance. By sending and receiving ultrasonic waves, it measures the time required for the sound to rebound from the object and return to the sensor. Using the time difference and sound propagation speed, it calculates the distance between the module and the obstacles in front.

Working voltage: 3.3V~5V
Minimum measurement distance measurement: 2cm
Maximum measurement distance measurement: 350cm
Type: Echo is the input digital signal, trig is the output digital signal.
Interface mode: Ph2.0-4p
Module size: 35*26.3mm
Module weight: 86g

Pin definition:

Echo	Receive input
Trig	Send output
-	GND
+	VCC

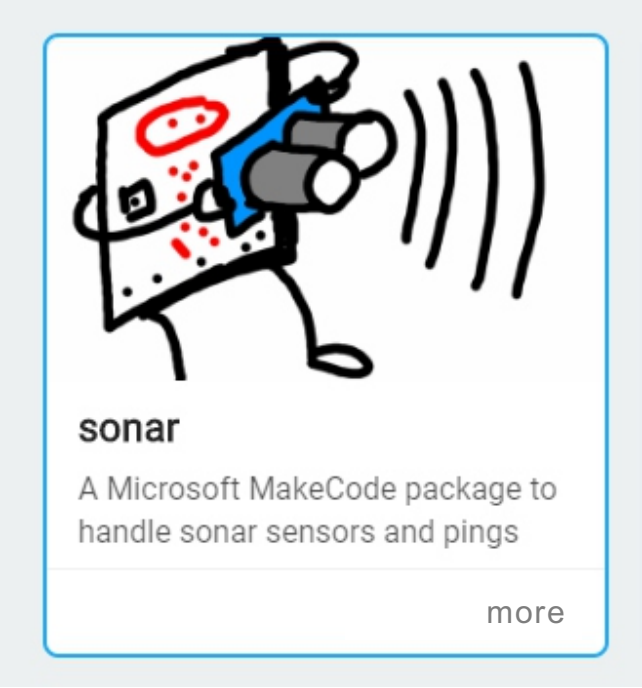
Working principle: input a high level of more than 10us to trig pin to trigger module ranging. When the ranging is finished, the echo pin will output a high level, and the level width is the sum of the ultrasonic round-trip time.



Micro:bit
Example 1
code

```
from microbit import *
import urm10
while True:
    #read(ECHO,TRIG)
    a = urm10.read(2,1)
    sleep(100)
    display.scroll(a)
    display.scroll("cm")
```

Mixly graphic programming
Before graphical programming, you need to add an extension. Click the extension and click "search or enter project URL..." Search for "sonar" and wait for the page to refresh.



Microbit graphic programming

Results: pin 1 was connected to trig and pin 2 was connected to echo. Open the serial port, move the obstacles in front of the ultrasonic ranging module, and the data output to the serial port changes.