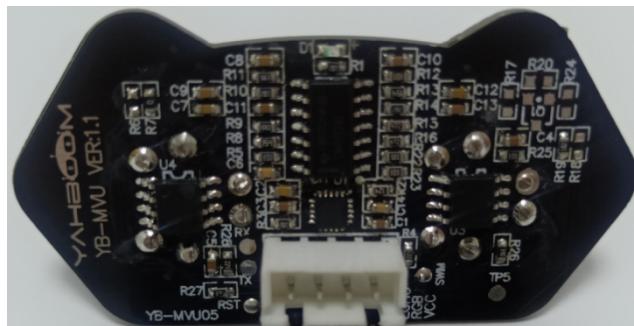


### Color ultrasonic module

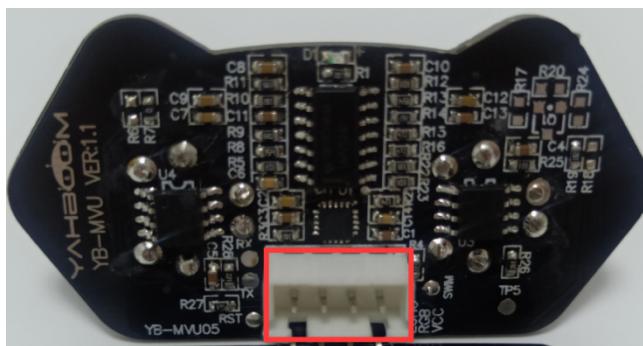
Front:



Back:



#### 1. Description of Pin:



According to the above figure, from left to right are: GND, ECHO, RGB, VCC.

The anti-reverse port is used here, which can be connected via 4pin cable or DuPont cable.

Name of pin	Description
GND	GND
ECHO	Send ultrasonic waves, receive ultrasonic waves
RGB	Control RGB light
VCC	Connect 5v power supply

## 2. Ultrasonic Transmitter



This interface is used to transmit ultrasonic signals.

The input function of the ultrasonic module can be triggered by inputting a high level signal of at least 10 $\mu$ s to the transmit pin (the ECHO pin) of the ultrasonic module. (**It recommended high level 10~15us**)

## 3. Ultrasonic Receiver



After the ranging function is triggered, the module will automatically send out 8 40 kHz ultrasonic pulses and automatically detect whether there is a signal return. This step is automatically completed by the module.

The ECHO pin will output a high level once an echo signal is detected. The high level duration is the time from the transmission to the return of the ultrasonic wave.

**Formula: Distance = High Time \* Sound Speed (340M/S)/2.**

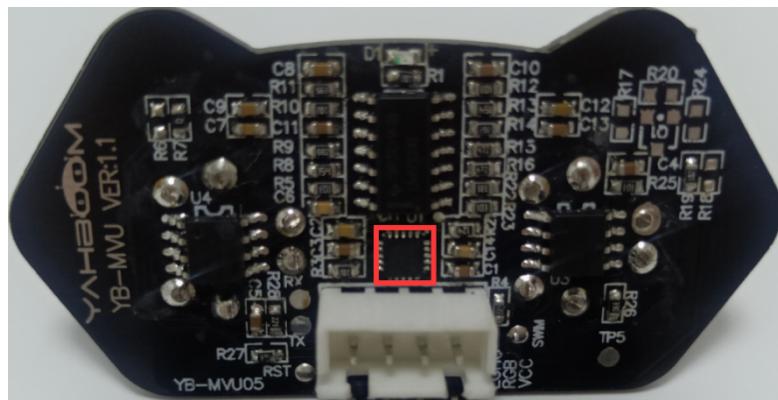
In the general control program we will use the following formula to calculate the distance:

**Distance = pulseIn(SingPin, HIGH) / 58.00**

The reasons are as follows:

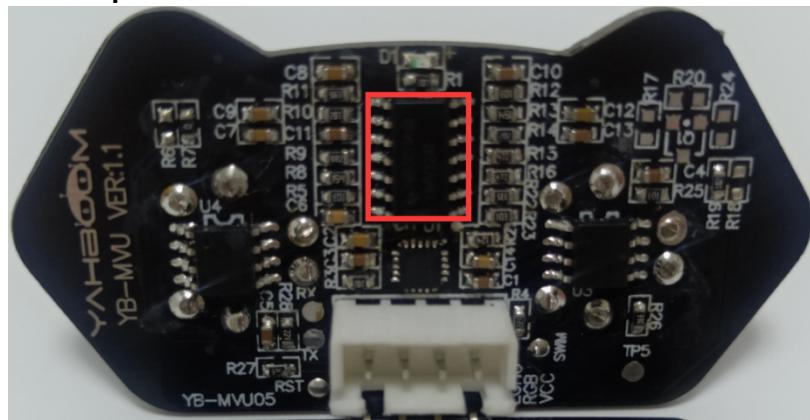
The `pulseIn()` unit is microsecond, and the sound propagation speed is 340m/s. The crystal frequency of the MCU is about 14MHZ, so the distance distance =  $340*100/(1000000-14000)*pulseIn()/2$ , after simplifying it For `pulseIn()` /  $[(1000000-14000)*2/(340*100)]$  is equal to `pulseIn() / 58.0.`

## 4. Main chip



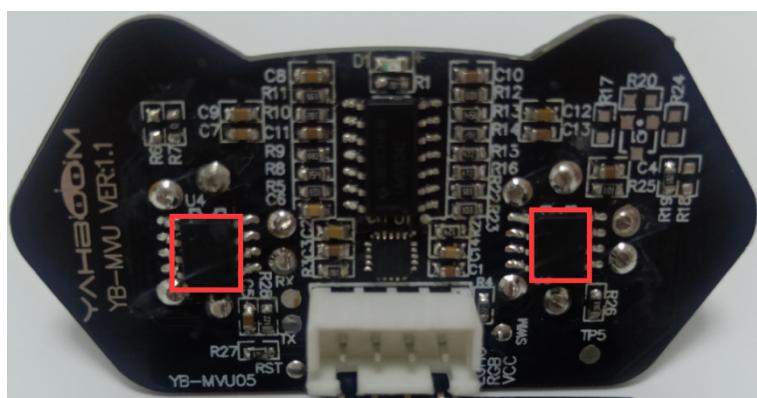
We adopt STM8S003F3U6 chip, the data sheet for this chip is already available in the documentation.

## 5. Operational Amplifier



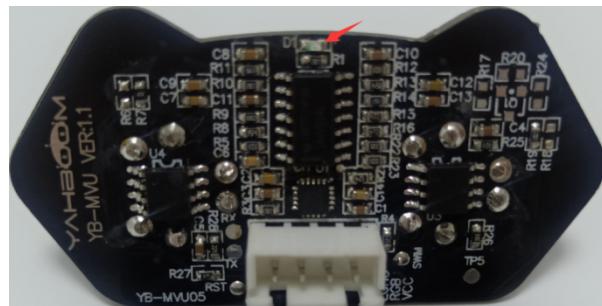
We adopt LMV324 chip, the data sheet for this chip is already available in the documentation.

## 6. RGB



We adopt two WS2811.

## 7. Indicator light



When module is working, red indicator light D1 will keep flashing.

## 8. Range

Detection distance is about 0~3m.

### !!!Note:

1. This module should not be directly connected with power. If you want to connect with power, you need to connect the GND pin of the module at the first, otherwise it will affect the normal operation of the module.
2. When measuring distance, the measured object should be no less than 0.5 square meters and the plane should be flat as much as possible, otherwise the measurement result will be affected.