MANORSHI ELECTRONICS CO.,LTD

PRODUCT SPECIFICATION

Product Name: Ultrasonic sensor module

Part Number: US-015

Document No:

Date: 2020.10.13

DRAWING BY	CHECKED BY	APPROVED BY
CHEN YUAN	YUE QIN	JIN LI

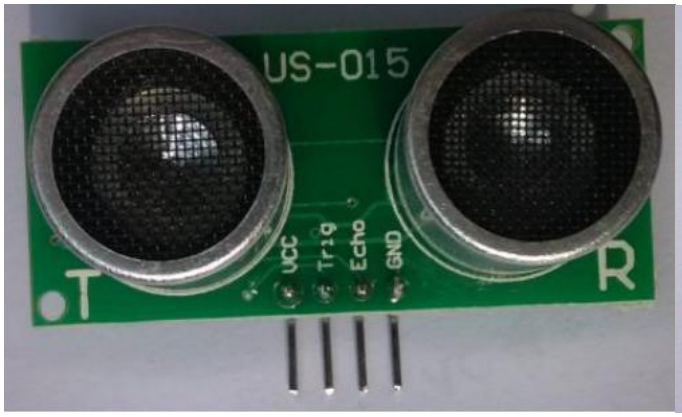
Address:Building 5, No. 8 Chuangye Road, Shezhu Town, Liyang City, Changzhou, Jiangsu, China
Tel:86-519-89185720 E-mail:sales@manorshi.com Http://www.buzzer-supplier.com

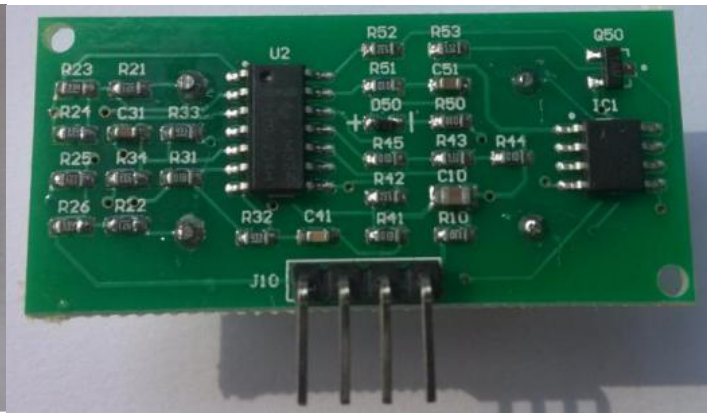
MANORSHI ELECTRONICS CO.,LTD

1.MAIN TECHNICAL PARAMETERS

Electrical parameter	US-015 ultrasonic ranging module
Operating Voltage	DC 5V
Operating Current	2.2mA
Operating temperature	0~+70 ℃
Output Mode	GPIO
Sensing Angle	Less than 15 degrees
Detection Range	2cm-400cm
Detection accuracy	0.1cm+1%
Resolution	Higher than 1 mm (up to 0.5 mm)

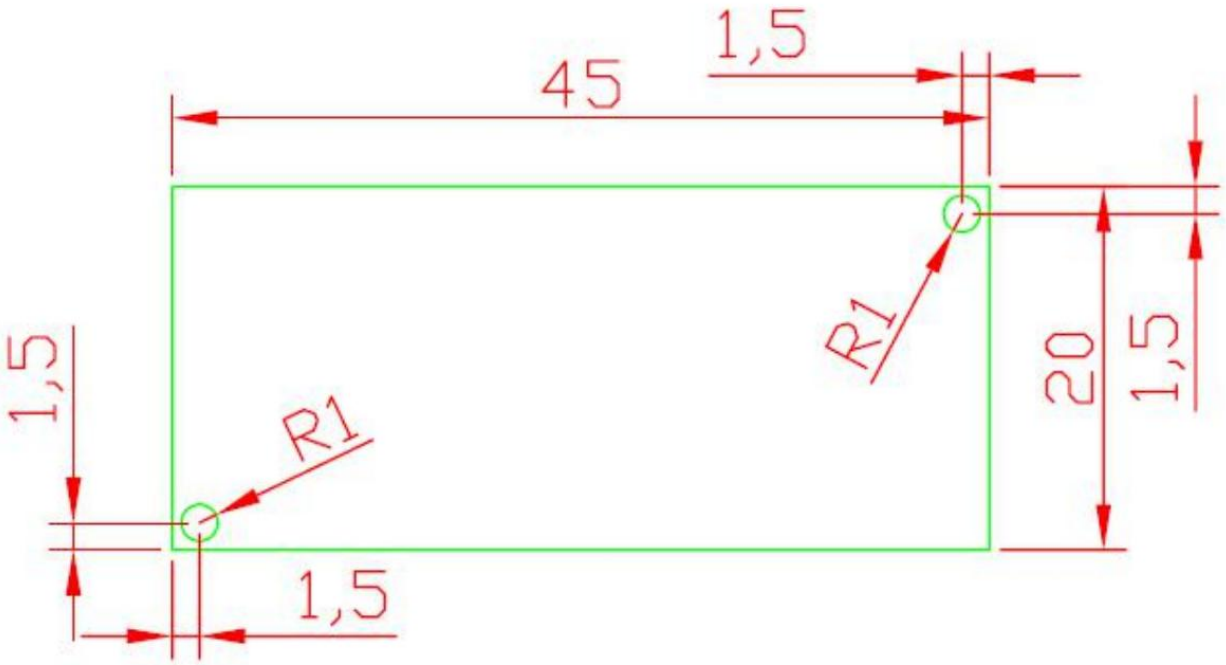
2.PICTURE





Address:Building 5, No. 8 Chuangye Road, Shezhu Town, Liyang City, Changzhou, Jiangsu, China
Tel:86-519-89185720 E-mail:sales@manorshi.com Http://www.buzzer-supplier.com

3. DIMENSIONS



4. INTERFACE DESCRIPTION

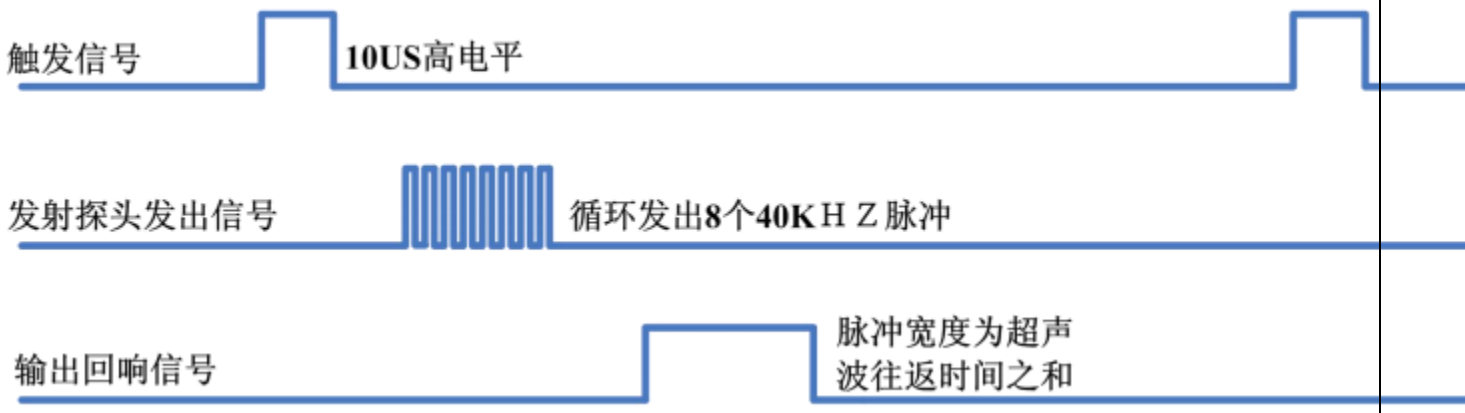
This module has an interface: 4pin power supply and communication interface. 4pin with 2.54 mm pitch, as shown in figure:

From left to right, one, two, three, four. They are defined as follows:

- 1 Pin: VCC Power Supply (DC 5V) .
- 2 Pin: Connect Trig terminal of external circuit, input a high level above 10uS to this Pin, can trigger module ranging.
- 3 Pin: External Circuit connected to the Echo end, when the distance measurement is completed, this Pin will output a high level, level width for the sum of ultrasonic round trip time.
- 4 Pin: Ground to external circuit

5. WORKING PRINCIPLE OF RANGING

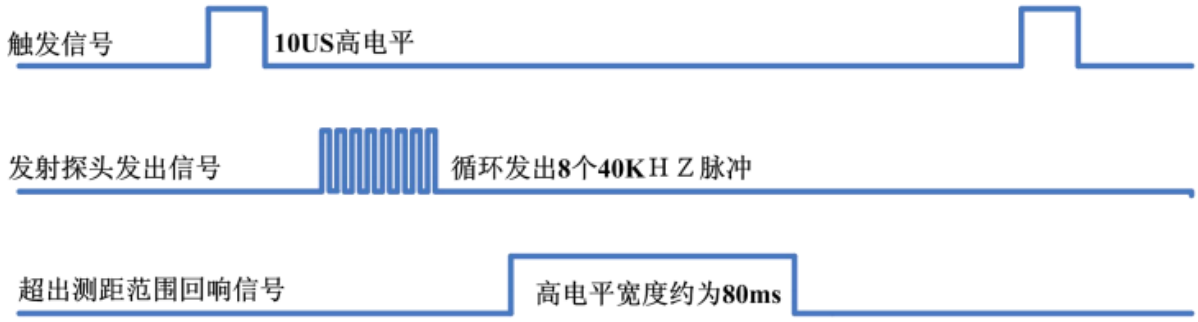
The timing sequence of the module ranging is shown in figure:



By simply entering a high level above 10 US at the Trig Pin, the system emits 840 Khz ultrasonic pulses and detects the return signal. When the ECHO signal is detected, it is output through the Echo Pin. The distance value can be calculated according to the duration of the Echo pin output high level. The distance value is: (High Level Time * 340m/s)/2.

6. RETURN VALUE AND MEASUREMENT PERIOD BEYOND MEASUREMENT RANGE

When the measuring distance exceeds the US-015 measuring range, US-015 still outputs high level signal through Echo pin, and the width of high level is about 80ms. Here's the picture.



Measurement Cycle: After receiving the high-level pulse from US-015 through Echo Pin, the next measurement can be done. So the measurement cycle depends on the measurement distance. When US-015 is close to the object, Echo returns a narrow pulse width, the measurement period is very short; when US-015 is far away from the object, Echo returns a wide pulse width and the measurement period is correspondingly longer. In the worst case, the object is out of the US-015 measurement range, where the return pulse width is the longest, about 80ms, so in the worst case the measurement period is just over 80ms (85ms is enough).

7. APPENDIX: US-015 high precision ranging routines, (Arduino routines)

```
unsigned int EchoPin = 2;
unsigned int TrigPin = 3;
unsigned long Time_Echo_us = 0;
//Len_mm_X100 = length*100
unsigned long Len_mm_X100 = 0;
unsigned long Len_Integer = 0; //
unsigned int Len_Fraction = 0;
void setup()
{
Serial.begin(9600);
pinMode(EchoPin, INPUT);
pinMode(TrigPin, OUTPUT);
}
void loop()
{
digitalWrite(TrigPin, HIGH);
delayMicroseconds(50);
digitalWrite(TrigPin, LOW);
Time_Echo_us = pulseIn(EchoPin, HIGH);if((Time_Echo_us < 60000) && (Time_Echo_us > 1))
{
Len_mm_X100 = (Time_Echo_us*34)/2;
Len_Integer = Len_mm_X100/100;
Len_Fraction = Len_mm_X100%100;
Serial.print("Present Length is: ");
Serial.print(Len_Integer, DEC);
Serial.print(".");
if(Len_Fraction < 10)
Serial.print("0");
Serial.print(Len_Fraction, DEC);
Serial.println("mm");
}
delay(1000);
}
```