Product Introduction

RCWL-1005 is a transceiver integrated ultrasonic ranging module designed by our company's independently developed chip RCWL-9624.

By default, the software is fully compatible with our old version HC-SR04; It can be set to UART, 1IC or single-bus mode by resistor. 25CM blind area, 4.5m typical farthest range, 2mA ultra low operating current. Using self-developed chip RCWL-9625, make its periphery more concise, wider working voltage (2.8-5.5V), more interface functions.

Main Features

- Professional chip RCCL-9624 is adopted;
- Operating voltage: 2.8-5V;
- Working current: 2mA;
- Supports GPIO, UART, IIC and 1-WIRE output modes. The default output mode is compatible with HC-SR04;
- 50mS cycle;
- The materials are completely open source and can be downloaded by customers.

Performance Parameters

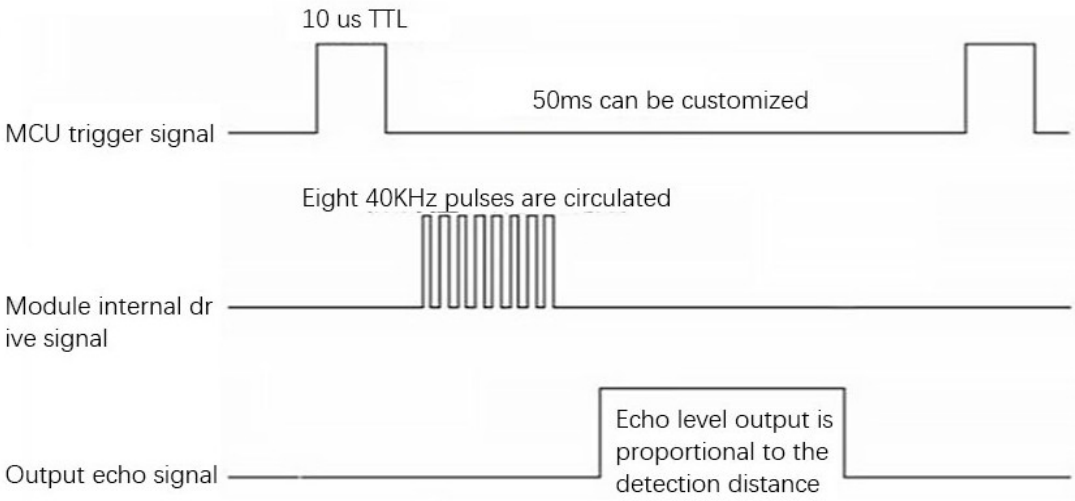
Parameter name	Note	Minimum value	Typical values	Maximum	Unit
Working voltage		2.8		5.5	V
Working current		2.8	2	3	mA
Limit detection range	Flat wall		450	550	CM
Working frequency			40		KHz
Blind area	Random value in the blind zone		25	26	CM
Detection accuracy	Same temperature		±2		%
Resolution of the	Theory		1		MM
Detection Angle	Limit the Angle in the general direction		±15	±20	Degree
Measurement cycle time			50		mS
Output interface mode		GPIO/UART/1IC/1-WIRE			
Working temperature	Molded case probe (to be customized)	-10		60	℃
Working temperature	Aluminum shell probe	-10		70	℃

GPIO/UART/IIC/ 1-Wire mode selection:

Serial number	Model	M1/M2 resistance setting
1	GPI0	M1 = NC M2= NC Default
2	IIC	M1 = NC M2 = 10K
3	UART	M1 = 10K M2= NC
4	1-WIRE	M1 = 10K M2 = 10K

Measuring the operation

1: GPIO mode



Ultrasonic sequence diagram

The working mode is the same as HC-SR04. External MCU gives the module Trig pin a high level pulse greater than 10uS; The module will give a high level pulse signal equal to the distance, which can be calculated according to the pulse-width time "T":

Distance = T*C/2 (C is the speed of sound)

Sound velocity temperature formula: C = (331.45+0.61t/℃) M·S-1 (where 330.45 is at 0℃)

0℃ Sound speed: 330.45m/S

20℃ Sound speed: 342.62m/S

40℃ Sound speed: 354.85m/S

The sound velocity error of 0℃-40℃ is about 7%. In practical application, if accurate distance value is needed, temperature effect must be considered and temperature compensation must be made.

2: UART mode

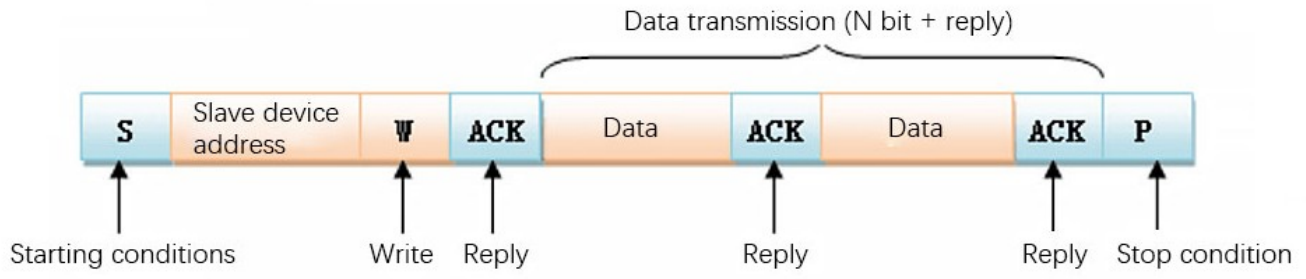
Baud rate in UART mode: 9600 N 1

Command	Return value	Instructions
0XA0	BYTE_H BYTE_M BYTE_L	The output distance is: ((BYTE_H< < 16)+(BYTE_M< < 8)+BYTE_L)/1000 Unit of mm
0XF1		Company and version information

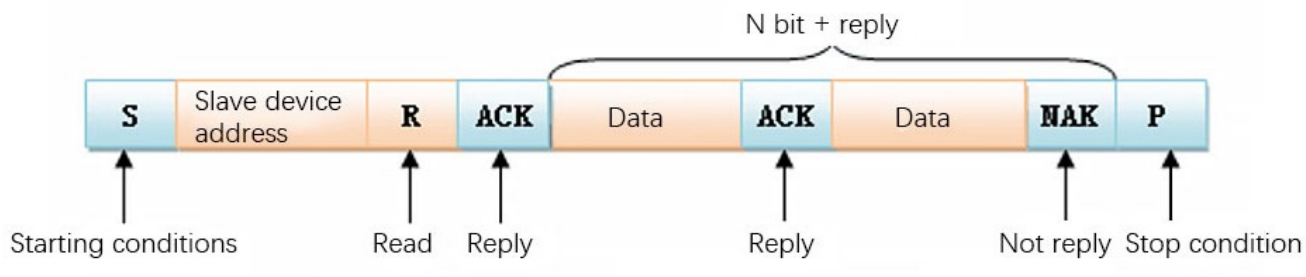
Connect the serial port. The external MCU or PC sends the command 0XA0, and the module sends three return distance data after completing the distance measurement:
BYTE_H, BYTEM_M, and BYTE_L.
Distance calculation method is as follows (unit: mm):
Distance = ((BYTE_H< < 16) + (BYTE_M&lt: < 8)+BYTE_L) /1000

3: IIC mode

IIC address: 0X57
IIC transmission format:
Write data:



Read data:

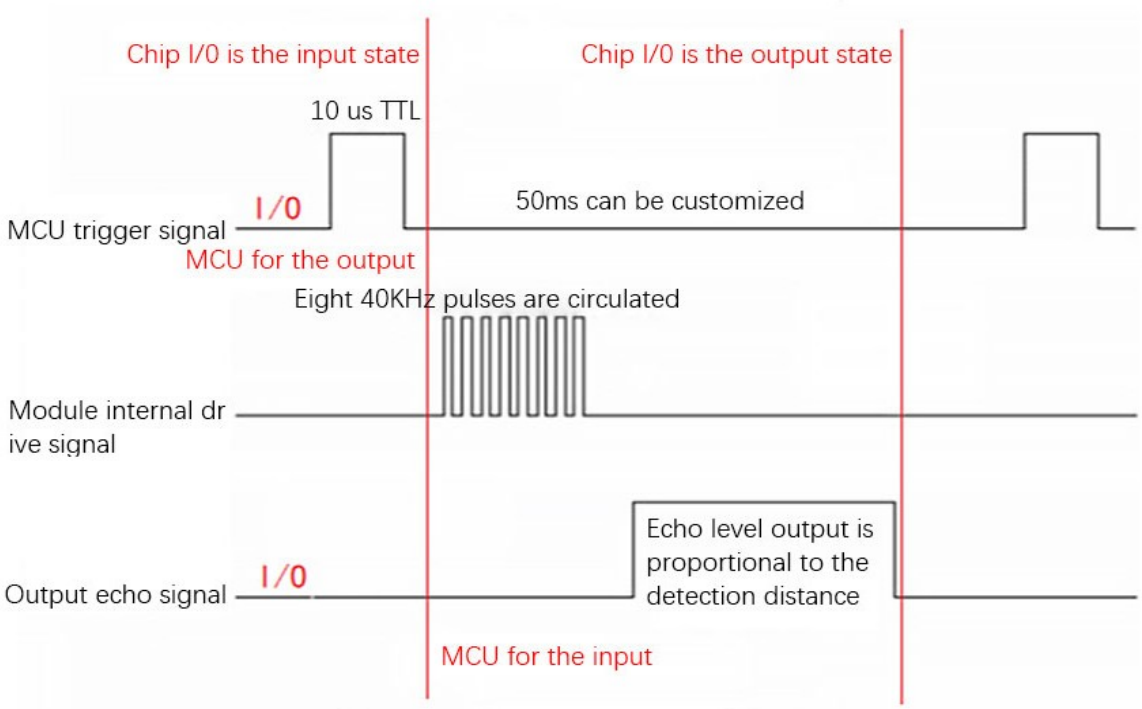


Command format:

Address	Command	Return value	Instructions
Write the address 0XAE	0X01		Start ranging command
Read the address 0 xaf		BYTE_H BYTE_M BYTE_L	The output distance is: ((BYTE_H< < 16)+(BYTE_M< < 8)+BYTE_L)/1000 Unit of mm

Write 0X01 to the module, the module starts ranging; Wait for more than 100ms (module maximum ranging time). Read three distance data directly. BYTE_H, BYTE_M, and BYTE_L.
Distance calculation method is as follows (unit: mm):
Distance = ((BYTE_H << 16) + (BYTE_M << 8) + BYTE_L) /1000

4: 1-WIRE single-bus mode



Ultrasonic sequence diagram

The external MCU is initially set as output, giving the module I/O pin a high level pulse greater than 10us; After the pulse signal is output, THE MCU is set to the input mode and waits for a high level pulse signal equal to the distance given by the module. After the measurement, MCU is set to output mode for the next measurement. The sound velocity can be calculated according to the pulse width time "T" :

Distance = T*C/2 (C is the speed of sound)

Sound velocity temperature formula: C = (331.45+0.61t/R℃) M·S-1 (330.45 is at 0℃)

0℃ Sound speed: 330.45m/s

20℃ Sound speed: 342.62m/s

40℃ Sound speed: 354.85m/s

Matters needing attention

1. This module should not be connected with power. If it is connected with power, let the Gnd end of the module be connected first.

2. If the test surface is not very regular or testing distant objects, multiple measurements can be used to correct.

3. The interval between two tests should be at least 50mS.

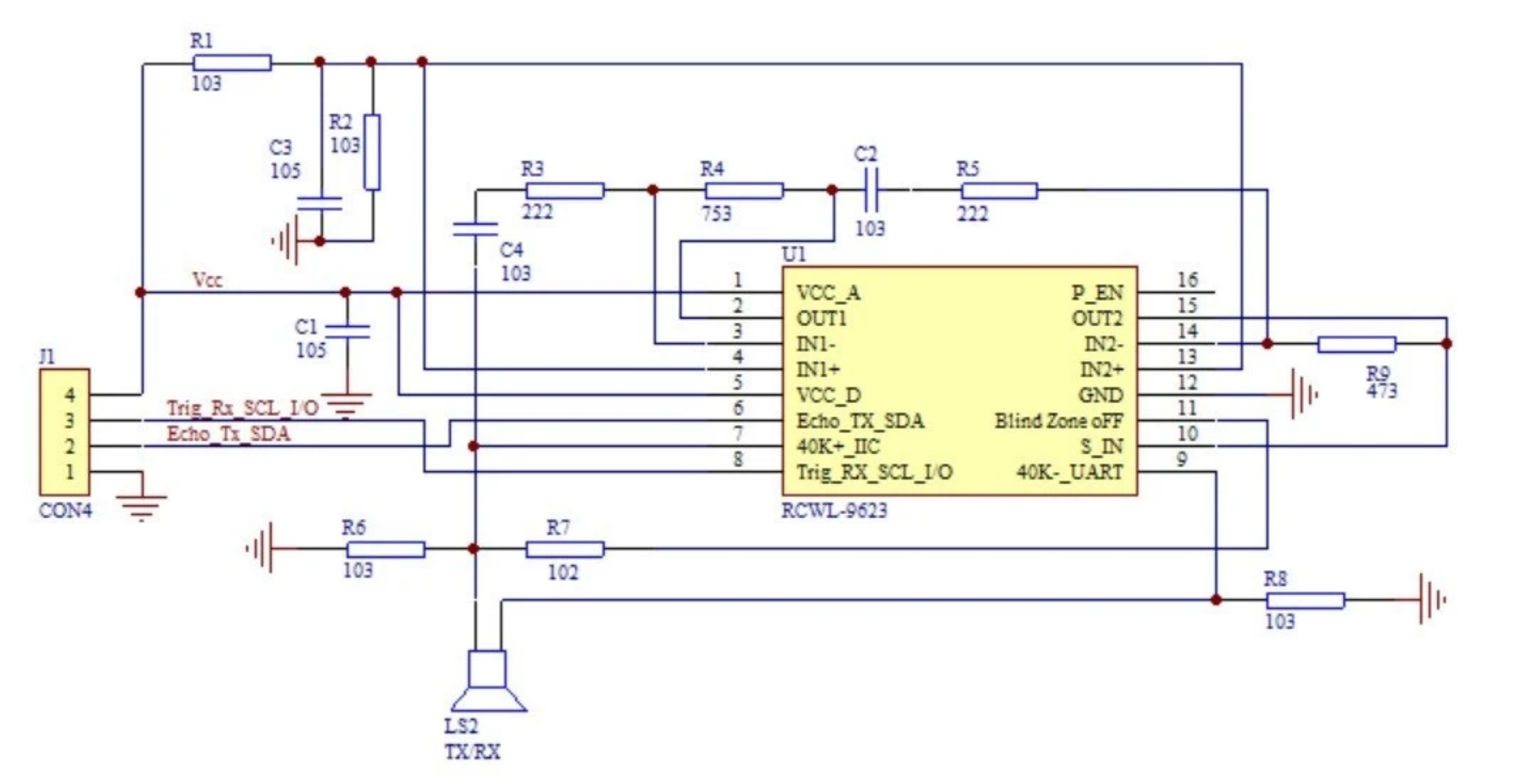
4. If the customer needs to put the module into the mold of its own product, the external parameters of the module may need to be adjusted, so you can contact our company to confirm the parameters before batch.

This user manual is for reference only, and the company reserves the right to further explain the reliability, functionality and design improvements of all the above products. The user manual is subject to change without notice. Customers can download the latest information (WWW.WX-RCWL.COM) for design reference.

Do not use in places that may cause personal injury due to faults or other reasons. It is not authorized to be used as a critical component in life-saving, life-sustaining devices or systems. Wuxi Richen Wulian Technology Co., Ltd. reserves the right to modify the products without prior notice.

Typical Applications

- Toys, robot obstacle avoidance
- Liquid level, water level measurement
- Other ranging applications


R1
103
R2
103
C3
105
R3
222
R4
753
C2
103
R5
222
C4
103
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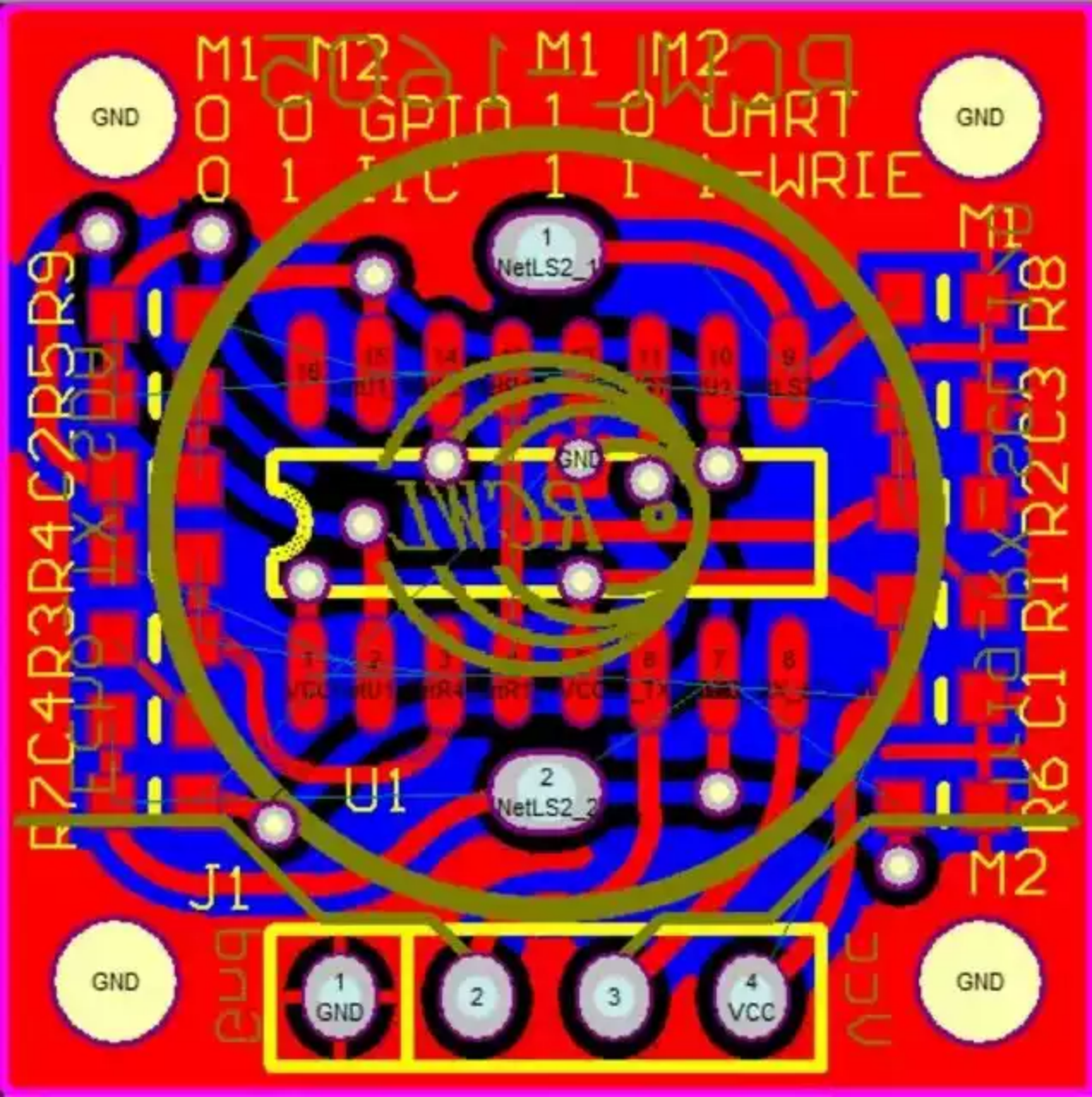
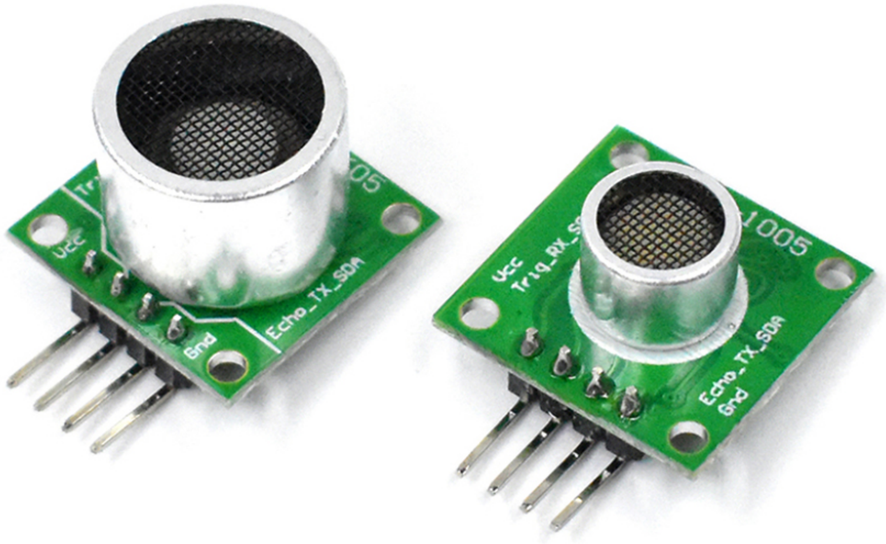
Vcc
C1
105
J1
4
3
2
1
Trig_Rx_SCL_I/O
Echo_Tx_SDA
CON4
1
2
3
4
5
6
7
8
VCC_A
OUT1
IN1-
IN1+
VCC_D
Echo_TX_SDA
40K+_IIC
Trig_RX_SCL_I/O
16
15
14
13
12
11
10
9
P_EN
OUT2
IN2-
IN2+
GND
Blind Zone oFF
S_IN
40K-_UART
RCWL-9623
R9
473
R6
103
R7
102
R8
103
LS2
TX/RX


M1 M2 M1 M2
GND
GND
1
NetLS2_1
GND
U1
2
NetLS2_2
J1
GND
1
GND
2
3
4
VCC
GND
M1
M2

EQV®

10/16 transceiver integrated ultrasonie ranging module

✅ GPIO/UART/IIC/ I-Wire four interface modes



— Product introduction —

·RCWL-1005 is a transceiver integrated ultrasonic ranging module designed by our company's independently developed chip RCWL-9624.

·By default, the software is fully compatible with our old version HC-SRO4; It can be set to UART, 1 IC or single-bus mode by resistor. 25CM ultra small blind area, 4.5m typical farthest range, 2mA ultra low operating current. Using self-developed chip RCWL-9624, make its periphery more concise, wider working voltage (2.8-5.5V), more interface functions.

Main features

·Professional chip RCCL-9624;

·Operating voltage: 2.8-5V;

·Working current: 2mA;

·Support GPIO, UART, 1 IC and 1-WIRE output mode, the default output mode compatible with HC-SR04;

·50mS cycle;

·The materials are completely open source and can be downloaded by customers.

·RCWL-1605 is a transceiver integrated ultrasonic ranging module designed by our company's independently developed chip RCWL-9623

·By default, the software is fully compatible with our old version HC SR04; It can be set to UART, 1IC or sing le-bus mode by resistor. 25CM blind area, 4.5m typical farthest range, 2mA ultra low operating current. Using self-developed chip RCWL-9625, make its per iphery more concise, wider working voltage (2.8-5.5V), more interface functions.

Main features

·Professional chip RCCL -9623 is adopted;
·Operating voltage: 2.8-5V;
·Working current: 2mA;
·Supports GPIO, UART, IIC and 1-WIRE output modes. The default output mode is compatible with HC-SR04;
·50mS cycle;
·The materials are completely open source and can be downloaded by customers.

Performance parameters

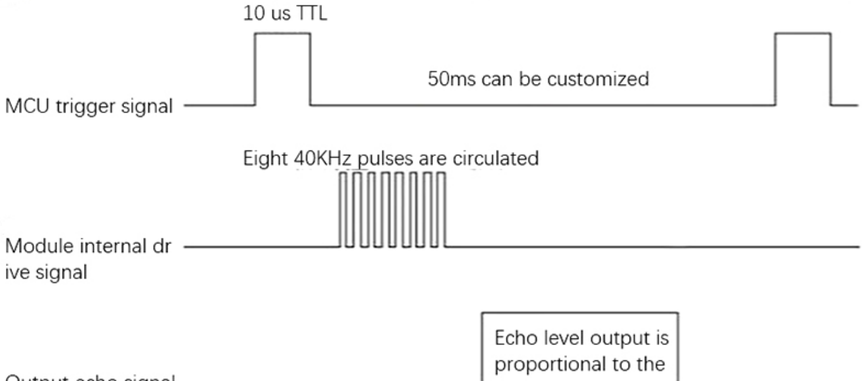
Parameter name	Note	Minimum value	Typical values	Maximum	Unit
Working voltage		2.8		5.5	V
Working current		2.8	2	3	mA
Limit detection range	Flat wall		450	550	CM
Working frequency			40		KHz
Blind area	Random value in the blind zone	24	25	26	CM
Detection accuracy	Same temperature		±2		%
Resolution of the	Theory		1		MM
Detection Angle	Limit the Angle in the general direction		±15	±20	Degree
Measurement cycle time			50		mS
Output interface mode		GPIO/UART/1IC/1-WIRE			
Working temperature	Molded case probe (to be customized)	-10		60	℃
Working temperature	Aluminum shell probe	-10		70	℃

GPIO/UART/IIC/ 1-Wire mode selection:

Serial number	Model	M1/M2 resistance setting
1	GPI0	M1 = NC M2= NC Default
2	IIC	M1 = NC M2 = 10K
3	UART	M1 = 10K M2= NC
4	1-WIRE	M1 = 10K M2 = 10K

Measuring the operation

1: GPIO mode



Output echo signal detection distance

Ultrasonic sequence diagram

The working mode is the same as HC-SR04. External MCU gives the module Trig pin a high level pulse greater than 10uS; The module will give a high level pulse signal equal to the distance, which can be calculated according to the pulse-width time "T" :

Distance = T*C/2 (C is the speed of sound)

Sound velocity temperature formula: C = (331.45+0.61t/℃) M • S-1 (where 330.45 is at 0℃)

0℃ Sound speed: 330.45m /S

20℃ Sound speed: 342.62m /S

40℃ Sound speed: 354.85m /S

The sound velocity error of 0℃-40℃ is about 7%. In practical application, if accurate distance value is needed, temperature effect must be considered and temperature compensation must be made.

2: UART mode

Baud rate in UART mode: 9600 N 1

Command	Return value	Instructions
0XA0	BYTE_H BYTE_M BYTE_L	The output distance is: ((BYTE_H< < 16)+(BYTE_M< < 8)+BYTE_L)/1000 Unit of mm
0XF1		Company and version information

Connect the serial port. The external MCU or PC sends the command 0XA0, and the module sends three return distance data after completing the distance measurement:

BYTE_H, BYTEM_M, and BYTE_L.

Distance calculation method is as follows (unit: mm) :

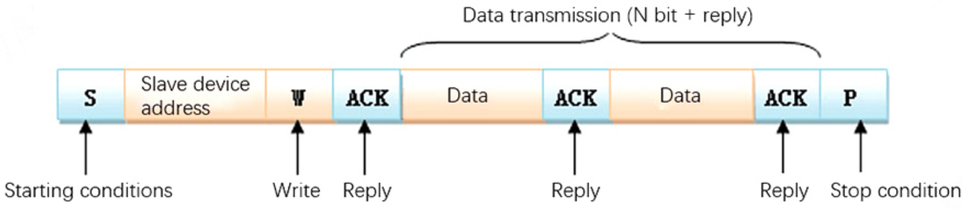
Distance = ((BYTE_H< < 16) + (BYTE_M< < 8) + BYTE_L) /1000

3: IIC mode

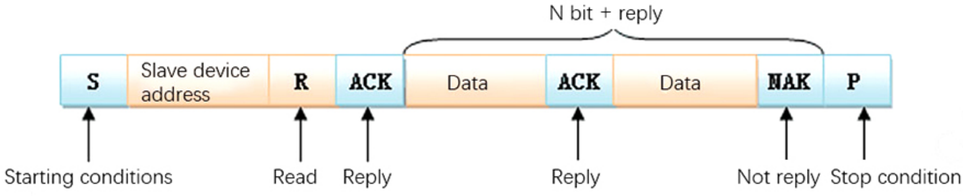
IIC address: 0X57

IIC transmission format:

Write data:



Read data:



Command format:

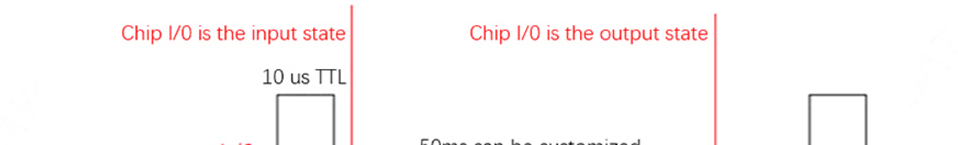
Address	Command	Return value	Instructions
Write the address 0XAE	0X01		Start ranging command
Read the address 0 xaf		BYTE_H BYTE_M BYTE_L	The output distance is: ((BYTE_H< < 16)+(BYTE_M< < 8)+BYTE_L)/1000 Unit of mm

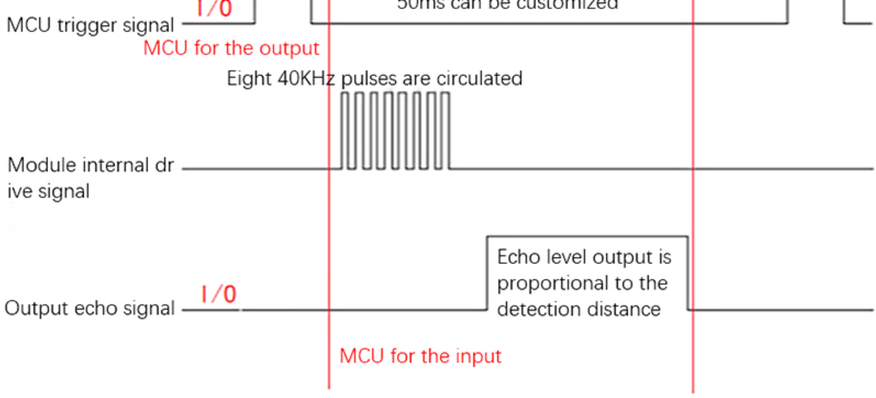
Write 0X01 to the module, the module starts ranging; Wait for more than 100mS (module maximum ranging time). Read three distance data directly. BYTE_H, BYTE_M, and BYTE_L.

Distance calculation method is as follows (unit: mm) :

Distance = ((BYTE_H < < 16) + (BYTE_M < < 8) + BYTE_L)/1000

4:1-WIRE single-bus mode





Ultrasonic sequence diagram

The external MCU is initially set as output, giving the module I/O pin a high level pulse greater than 10uS; After the pulse signal is output, THE MCU is set to the input mode and waits for a high level pulse signal equal to the distance given by the module. After the measurement, MCU is set to output mode for the next measurement. The sound velocity can be calculated according to the pulse width time "T" :

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0℃ Sound speed: 330.45m /s

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Matters needing attention

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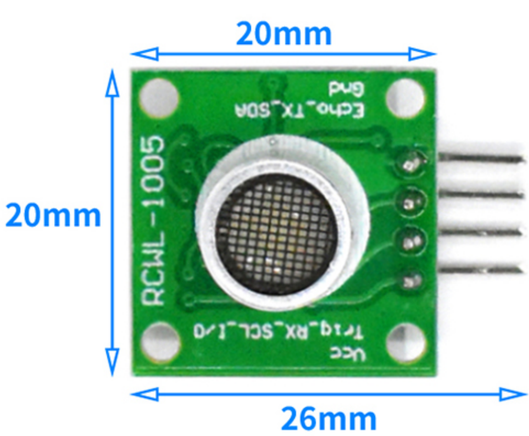
Typical applications

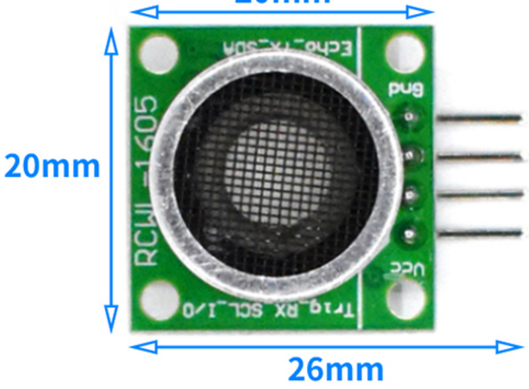
- Toys, robot obstacle avoidance
- Liquid level, water level measurement
- Other ranging applications

Product size



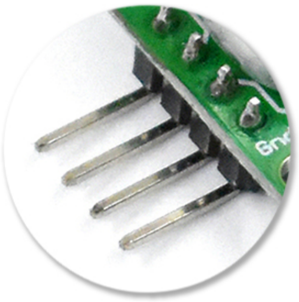
Weight: 2.3g

20mm



Weight: 3.6g

Product details



Product display