

JSN-SR04T-V3.0 Integrated Ultrasonic Ranging Manual

Product features:

The JSN-SR04T-V3.0 ultrasonic ranging module can provide non-contact distance sensing function of 21cm-600cm, with ranging accuracy up to 3mm; The module consists of an integrated ultrasonic sensor and control circuit for transmission and reception. The usage of mode 0 is compatible with the HC-SR04 module. This version solves the problem of blind spot data jumping and improves the stability of the product.

This product adopts an industrial grade integrated ultrasonic probe design, waterproof, stable performance, and compatible with all MCU operations on the market.

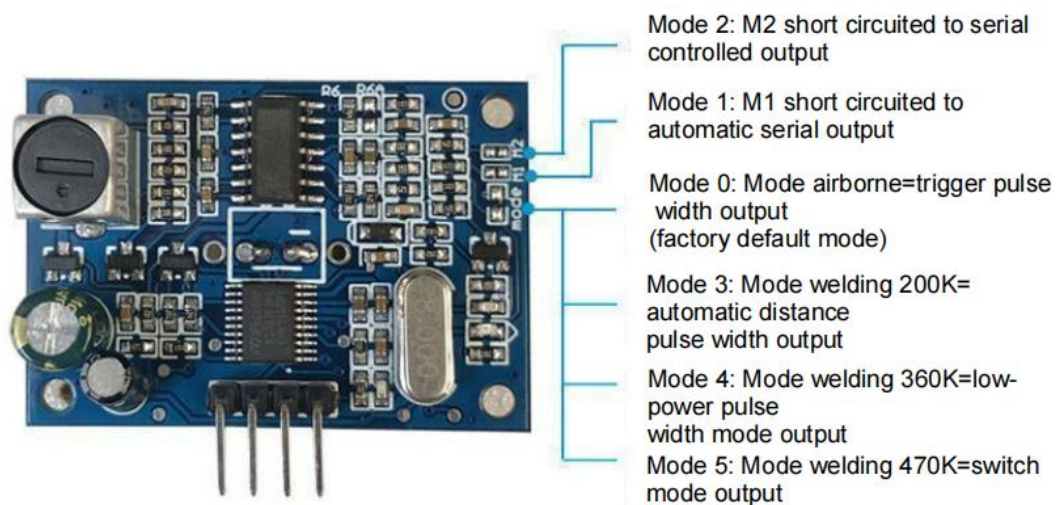
1. Small size, easy to use
2. Wide power supply range and low power consumption
3. High measurement accuracy and resolution
4. Small blind spots for detection, longer distances
5. Diversified output methods, pulse width output, serial output, and switching output.



Specification parameters

	Pulse width output	Serial port output
Working voltage	DC: 3.0-5.5V	
Working current	Less than 8mA	
Probe frequency	40KHz	
Farthest range	600cm	
Shortest range	21 cm	
Long range	±1cm	
Accuracy	3 mm	
Resolution Measurement angle	75 degrees	
Input trigger signal	1. TTL pulse above 10uS	
	2. Serial port sends command 0X55	
Output echo signal	Output pulse width level signal, or TTL	
Wiring	3-5.5V (positive pole of power supply)	
	Trig (Console)RX	
	Echo (output) TX	
	ND (negative pole of power supply)	
Product Dimensions	L42*W29*H12 mm	

Function description:



Mode 0: Mode = floating high level (PWM) pulse width output

(1) Pin definition

serial number label		Pin description	Remark
2	Trig	trigger control pin	
3	Echo	High level pulse width output	

1. Basic working principle:

(1) Use the IO port TRIG to trigger ranging and give a high-level signal of at least 10us.

(2) The module automatically sends 8 40khz square waves and automatically detects whether there is a signal returned;

(3) When a signal returns, a high level is output through the IO port ECHO. The duration of the high level is the ultrasonic wave.

The time from launch to return. Test distance at normal temperature = (high level time * speed of sound (348M/S))/2;

(4) After the module is triggered for ranging, if no echo is received (the reason is beyond the measured range or the probe is not working properly)

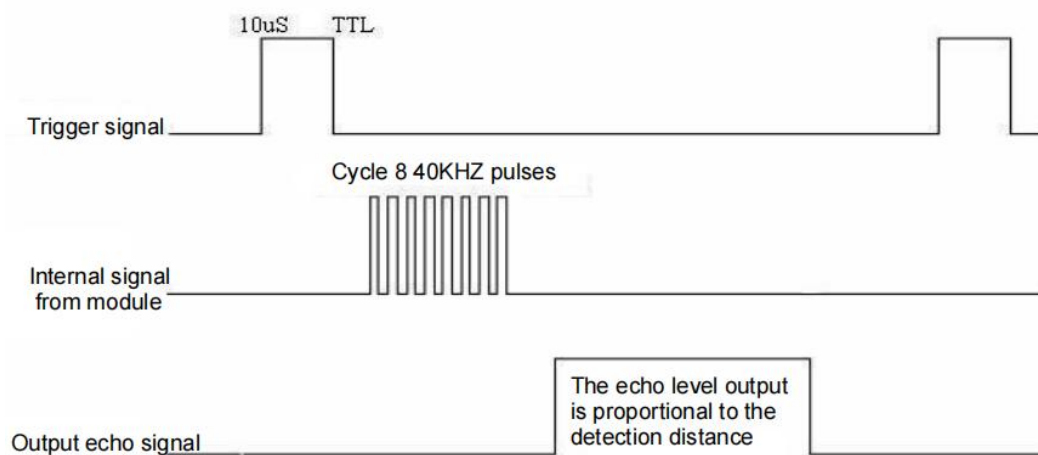
(for the object under test), the ECHO port will automatically change to low level after 40MS, marking the end of this measurement, regardless of success.

Trig Work or not.

(5) The LED does not light up when it is powered on. It only lights up after a trigger signal is given to the TRIG pin. The flash frequency depends on the trigger cycle.

period synchronization, indicating that the module has received the correct instructions and entered the working state.

2. Ultrasonic timing diagram:



The above sequence diagram indicates that you only need to provide a pulse trigger signal of over 10uS, and the module will emit 8 40kHz cycle levels internally and detect echoes. Once an echo signal is detected, an echo signal is output. The pulse width of the echo signal is proportional to the measured distance. The distance can be calculated by calculating the time interval between transmitting the signal and receiving the echo signal. Formula:

uS/57.5=centimeters or uS/148=inches; Or: distance=high-level time * sound speed (348M/S)/2;
It is recommended to have a measurement cycle of more than 50ms to prevent the impact of transmitted signals on echo signals

Mode 1: Mode=47K (or directly short the M1 bit) UART automatic output

UART automatic output mode outputs the measured distance value (hexadecimal number) according to the UART communication format. This mode

There is no need to add an external trigger signal. The module can automatically measure once every 100ms. After each measurement is completed, it is output on the TX pin. Get the measured distance value.

(1) Pin definition

serial number label		Pin description	Remark
2	TX	UART output pin	
3	RX	none	

(2) Communication protocol

UART baud rate		Check Digit	data bit stop bit	
TTL	9600 bps	N	8	1

(3) Format description

frame data	illustrate	byte
Frame header	Fixed to 0XFF	1 byte
H_DATA	The upper 8 bits of the distance data	1 byte
L_DATE	The lower 8 bits of the distance data	1 byte
SUM	Data checksum	1 byte

Note: The checksum only retains the lower 8 bits of the accumulated value

For example:

Product response FF 07 A1 A7

Among them, the check code $SUM=A7=(0x07+0xA1+0Xff)\&0x00ff$

0x07 is the high-order data of the distance;

0xA1 is the low-order data of the distance;

The distance value is 0x07A1; converted to decimal is 1953; unit: mm

Note: The module outputs the nearest distance value of about 21cm in the blind area. If the module cannot measure data or exceeds the distance Range output is 0. After the Led is powered on and enters the working mode, it will automatically flash at 100MS.

Mode 2: Mode=120K (or directly short M2 bit) UART controlled output

The UART controlled output mode outputs the measured distance value (hexadecimal number) according to the UART communication format. This mode

The trigger command 0X55 signal needs to be added to the RX pin. The module will measure once each time it receives a command. Each measurement is completed.

The measured distance value is output at the TX pin. The instruction trigger cycle must be greater than 60MS

(1) Pin definition

serial number label		Pin description	Remark
2	TX	UART output pin	
3	RX	UART controlled receiving pin (Command 0X55)	

(2) Communication protocol

UART baud rate		Check Digit	data bit stop bit	
TTL	9600 bps	N	8	1

(3) Format description

frame data	illustrate	byte
Frame header	Fixed to 0XFF	1 byte
H_DATA	The upper 8 bits of the distance data	1 byte
L_DATA	The lower 8 bits of the distance data	1 byte
SUM	Data checksum	1 byte

Note: The checksum only retains the lower 8 bits of the accumulated value

For example:

Product response FF 07 A1 A7

Among them, the check code $SUM=A7=(0x07+0xA1+0Xff)\&0x00ff$

0x07 is the high-order data of the distance;

0xA1 is the low-order data of the distance;

The distance value is 0x07A1; converted to decimal is 1953; unit: mm

Note: The module outputs the nearest distance value of about 21cm in the blind area. If the module cannot measure data or exceeds the distance Range output is 0. After the Led is powered on and enters the working mode, the command light will light up every time it is triggered. The frequency and triggering period Similarly, the light will turn off every time it is triggered twice.

Mode 3: Mode=200K high level (PWM) pulse width automatic output

Under the automatic pulse width PWM output, the module automatically measures with a period of 200MS, and outputs the relative distance after measurement.

corresponding pulse width high level. Calculate distance method reference mode 0

(1) Pin definition

serial number label		Pin description	Remark
2	Trig		
3	Echo	High level pulse width output	

Mode 4: Mode=360K low power consumption (PWM) high level pulse width controlled output

In low power consumption mode, the module's door close dog is disabled. This mode is suitable for battery-powered users. The electrostatic power consumption is less than 70UA, the working distance measurement method is the same as mode 0.

(1) Pin definition

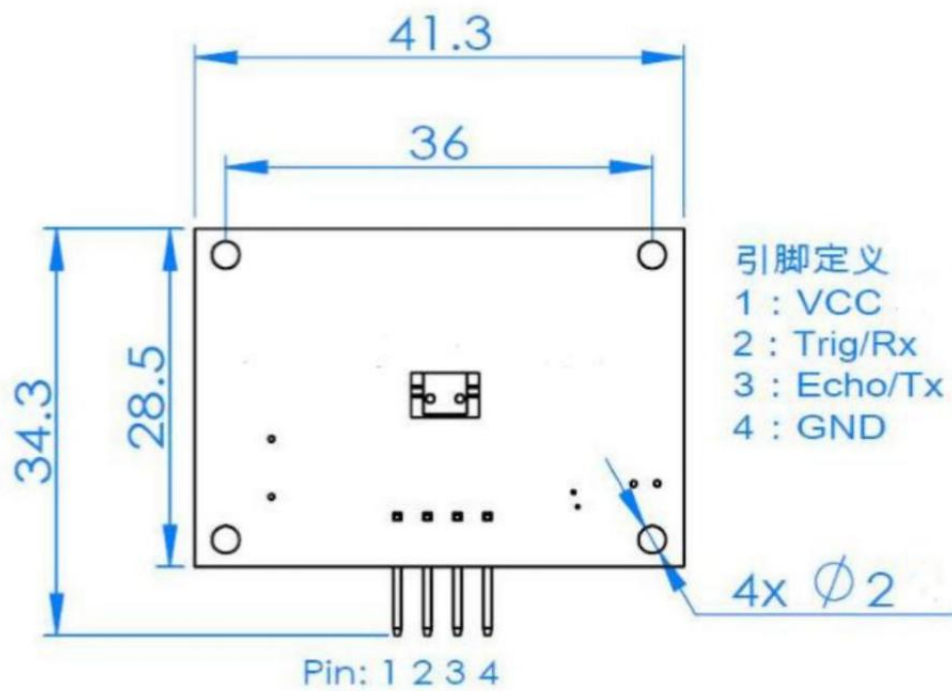
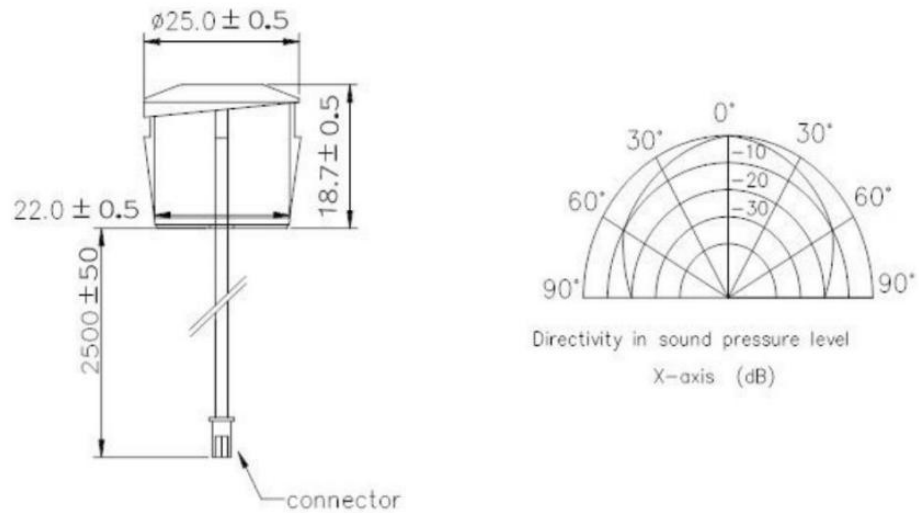
serial number label		Pin description	Remark
2	Trig	trigger control pin	
3	Echo	High level pulse width output	

Mode 5: Mode=470K switching output

The work description module will have a threshold value set at the factory, and the default is 1.5 meters. The module executes every 200ms. Once ranging, when the distance value of the detected target is less than the set threshold value, the Echo pin outputs high level, and the current When the detected distance value is greater than the set threshold value, the Echo pin outputs a low level. In order to improve stability, the factory By default, if the distance value of the detected target for two consecutive times is less than the set threshold value, it is judged that the detected target distance is less than the set threshold value. A certain threshold value; the module Echo pin only outputs high and low level signals and has no driving capability. Transistors should be added when applying Drive relays, etc. If there are special requirements that require modification of the threshold value or other settings, special instructions must be made when purchasing.

(1) Pin definition

serial number label		Pin description	Remark
2		-	
3		If there is any obstacle on the high-level output pin of the Echo switch,	it is H, otherwise it is L



Product application

1. High precision long-distance distance measurement
2. Obstacle avoidance, automatic control
3. Object approaching, presence detected
4. Artificial intelligence, research experiments
5. Traffic, security, industrial control

Note:

1. This module should not be connected with electricity. If you want to connect with electricity, first connect the GND end of the module, otherwise it will affect the normal operation of the module.

2. When measuring distance, the area of the measured object should not be less than 0.5 square meters and the plane should be as flat as possible, otherwise it will affect the measurement results

The serial port mode can be tested through the upper computer software in the folder using a USB to TTL data cable.