

**DESCRIPTION:** Ultrasonic Sensor  
**MODEL:** JSN-SR20-Y1-2-W100

### CHARACTERISTIC

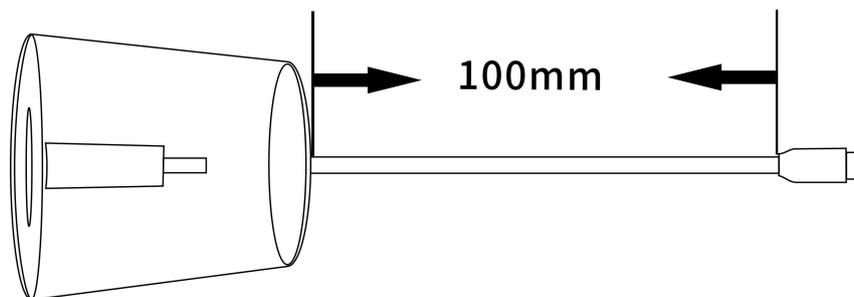
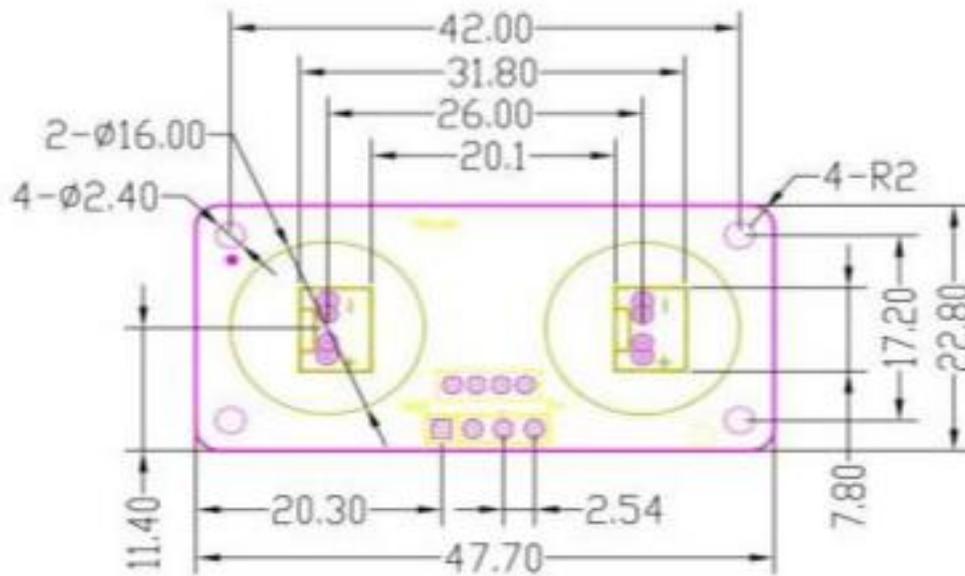
This model has two types. One is the sensor be soldered on board. Another one is using a sensor with wire, normal wire length 1 meter.

**PICTURE:**



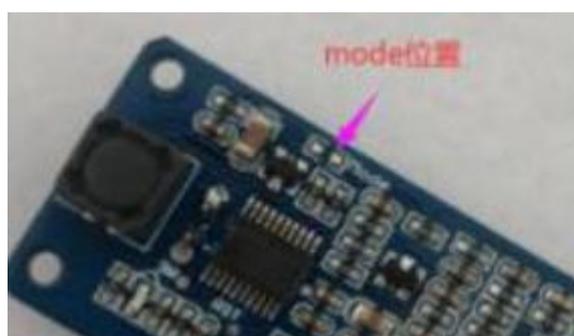
Item	Value	
	Pulse width output	Serial output
Operating voltage	DC 3.3~5V	
Working current	≤8mA	
Working frequency	40kHz	
The longest range	500cm	
The shortest range	2cm	
Long range accuracy	±1cm	
Measuring angle	60 °	
Input the trigger signal	1. 20uS TTL pulse 2. Serial port send command 0X55	
Output echo signal	Output TTL level signal, proportional to range 3-5.5V (power supply positive)	
Wiring	Trig (control terminal) RX Echo (output terminal) TX GND (negative power supply)	
Size	L48*W23*H10 mm	
Operating voltage	-20°C - +70°C	
Color	PCB board is blue	

## MECHANICAL DRAWING



## FUNCTION OUTPUT DESCRIPTION

No.	Output method	Mode bit resistance	Remarks
Modle 0	PWM pulse width output	Floating	Factory default
Modle 1	UART automatic output	47K $\Omega$	
Modle 2	UART controlled output	120K $\Omega$	Instruction 0X5 5
Modle 3	PWM automatic output	200K $\Omega$	Cycle 200MS
Modle 4	Low power PWMoutput	360K $\Omega$	
Modle 5	Switch output	470K $\Omega$	



This model has 6 kinds of working modes for choosing, customer could change or test according to demand. Please see the above resistance configuration.

● Model 0: Mode = Floating High level (PWM)pulse width output

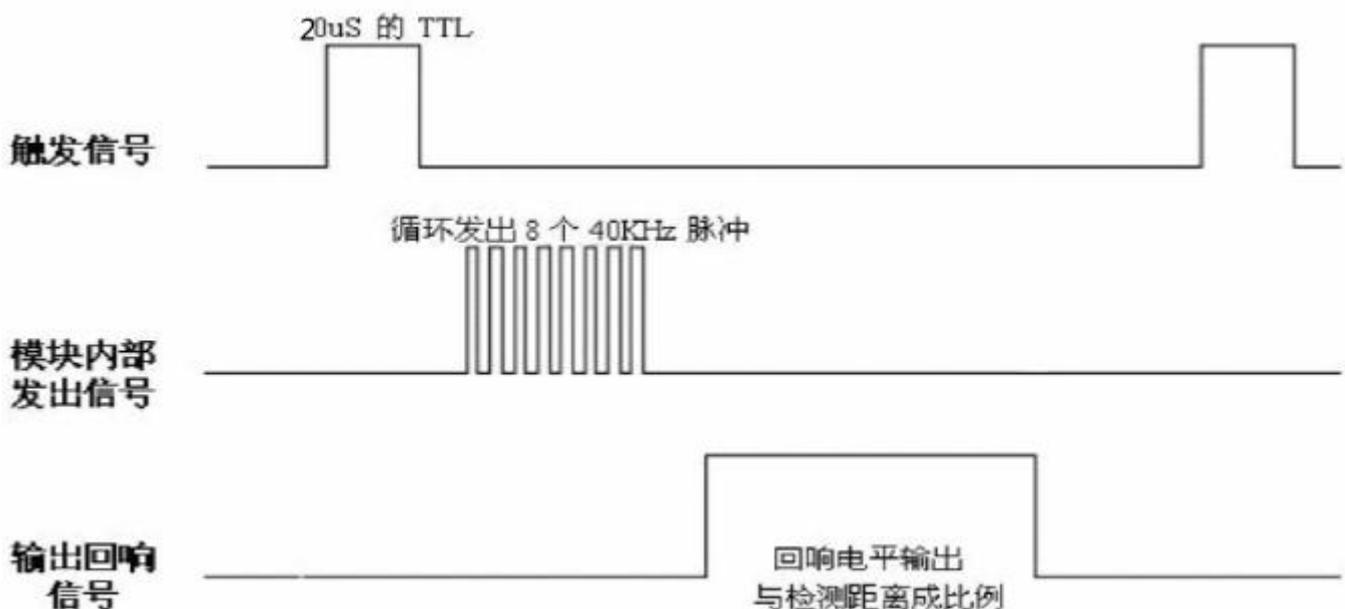
(1) Pin definition

No.	Marking	Description	Remarks
2	Trig	Trigger control pin	
3	Echo	High level pulse width output	

## 1. Working principle

- (1) Use IO to trigger ranging, giving a high level signal of at least 20us
- (2) The module automatically sends 8 40khz square waves to automatically detect whether there is a signal return.
- (3) When the signal returns, a high level is output through IO, and the duration of high level is the time from transmitting to returning. Test distance at room temperature = (high time \* sound speed (348m / s)) / 2
- (4) After the module is triggered for measuring distance, if no echo is received (because it exceeds the measured range or the probe is not directly facing the measured object), the ECHO port will automatically change to low level after 40MS, it means the end of the measurement. Regardless of success or failure.
- (5) The LED does not light up when it is powered on, and it lights up only after the TRIG pin trigger signal is given. The flashing frequency of the light is synchronized with the trigger cycle, indicating that the module has received the correct command and entered the working state.

## 2. Ultrasonic timing diagram



The above timing icon shows that you only need to provide a pulse trigger signal of 20uS or more. The module will internally emit eight 40khz cycle levels and detect echoes. The echo signal is input as soon as an echo signal is detected. The pulse width of the echo signal is proportional to the measured distance. The distance can thus be calculated by transmitting a signal to the received echo signal time interval. Formula:  $\mu\text{S}/57.5=\text{cm}$  or  $\mu\text{S}/148=\text{inch}$ : or: distance=high time\*sonic speed (348M/S)/2;It is recommended that the measurement period be 50ms or more to prevent the influence of the transmitted signal on the reverberation signal.

### ●Model 1: Mode = 47K UART automatic output

The UART automatic output mode outputs the measured distance value (hexadecimal number) according to the UART communication format. This mode does not require an external trigger signal. The module can automatically measure once every 100ms, and the measured distance value is output on the TX pin after each measurement is completed.

#### (1)Pin definition

No.	Marking	Description	Remarks
2	TX	UART output pin	
3	RX	/	

#### (2)Letter of agreement

UART	Check Digit	Data bit	Stop bit
TTL	N	8	1

#### (3)Format description

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

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

For example:

Product response FF 07 A1 A7

Of which check code  $\text{SUM}=\text{A7}=(\text{0X07}+\text{0XA1}+\text{0Xff})\&\text{0x00ff}$

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

0xA1 is the low data of the distance;

The distance value is 0x07A1; converted to decimal, it is 1953; the unit is millimeters

Note: If the module cannot measure the data or the distance is out of range, 0 will be output. After the LED is powered on and enters the working mode, it will automatically flash at 100MS.

### ● Model 2: Mode = 120K UART controlled output

The UART controlled output mode outputs the measured distance (hexadecimal number) according to the UART communication format. In this mode, the trigger command 05XX signal needs to be added to the RX pin. The module will measure once every time the module receives a command, and each measurement is completed in the TX lead. The pin outputs the measured distance value. The instruction trigger cycle must be greater than 60MS.

#### (1) Pin definition

No.	Marking	Description	Remarks
2	TX	UART output pin	
3	RX	UART Controlled receiving pin (command 0X55)	

#### (2) Letter of agreement

UART	Baud rate	Check Digit	Data bit	Stop bit
TTL	9600 bps	N	8	1

#### (3) Format description

Frame data	Fixed to 0XFF	Byte
H_DATA	The upper 8 bits of the distance data	1 byte
L_DATA	Lower 8 bits of distance data	1 byte
SUM	Data checksum	1 byte

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

For example:

Product response FF 07 A1 A7

Of which check code  $SUM=A7=(0X07+0XA1+0Xff)\&0x00ff$

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

0xA1 is the low data of the distance;

The distance value is 0x07A1; converted to decimal, it is 1953; the unit is millimeters

Note: If the module cannot measure the data or the distance is out of range, output 0. After the LED is powered on and enters the working mode, the instruction light will be on every time it is triggered, and the frequency is the same as the trigger cycle. The light will turn off every time it is triggered twice.

### ● Model 3: Mode = 200K High level (PWM) pulse width automatic output

Under the pulse width PWM automatic output, the module automatically measures at a period of 200MS, and outputs a high level of pulse width corresponding to the distance after the measurement. Calculating distance reference mode 0.

#### (1) Pin definition

No.	Marking	Description	Remarks
2	Trig	-	
3	Echo	High level pulse width output	

### ● Model 4: Mode = 360K Low-power (PWM) high-level pulse width controlled output

In low power consumption mode, the module's gate 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

No.	Marking	Description	Remarks
2	Trig	Trigger control pin	
3	Echo	High level pulse width output	

### ● Model 5: Mode = 470K Switch output

Description: The module will set a threshold value at the factory, the default is 1.5 meters. The module performs distance measurement every 200ms. When the distance value of the detected target is less than the set threshold value, the Echo pin outputs a high level, and the current detected distance value is greater than the set threshold value, and the Echo pin outputs a low voltage. In order to improve the stability, the factory defaults that the distance value of the target detected twice is less than the set threshold value. It is judged that the detected target distance is less than the set threshold value; the Echo pin of the module only outputs high and low level signals. No driving ability. In application, a triode should be added to drive the relay. **If there are special requirements that need to modify the threshold or other settings, special instructions should be given when placing an order.**

(1) Pin definition

No.	Marking	Description	Remarks
2	Trig	-	
3	Echo	Switch high level output pin	Obstacles are H, otherwise L

## 2. APPLICATION CONSIDERATIONS

1: This module should not be connected with power. If you want to have a live connection, let the Gnd terminal of the module be connected first. Otherwise it will affect the module work.

2: When measuring distance, the area of the object to be measured is not less than 0.5 square meters and should be as flat as possible. Otherwise it will affect the test results.