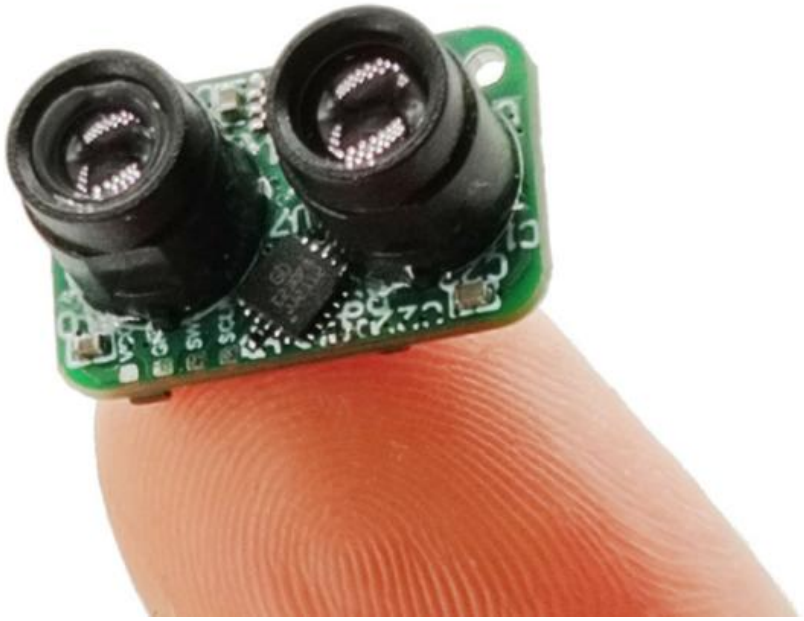
50m Single-point Laser Ranging Radar



Product overview

The STA-B50X laser ranging radar is a new laser ranging module launched by our company for fields such as drones, floor cleaning robots, and industrial robots. This product is based on the DTOF (Direct Time Of Flight) ranging principle and features small size, low cost, stable performance, and strong resistance to light interference. The product is easy to use, flexible to install, and provides a communication command set and upper computer, making it convenient for secondary development and highly cost-effective.

Product application

Drone altitude control and obstacle avoidance
Robot obstacle avoidance
Industrial grade light curtain
AGV/UAV obstacle avoidance
High speed measurement and safety monitoring in the fields of transportation and industrial automation

Detailed parameters of the product

Order number	**Model**	STA-B50X
1	Ranging	0.03-50m (90% reflectivity)
2	Range hole	3cm
2	Range frequency	500Hz
3	Ranging accuracy	±3cm (0.2~6m), 1%(≥6m)
4	Repeatability precision	±10mm

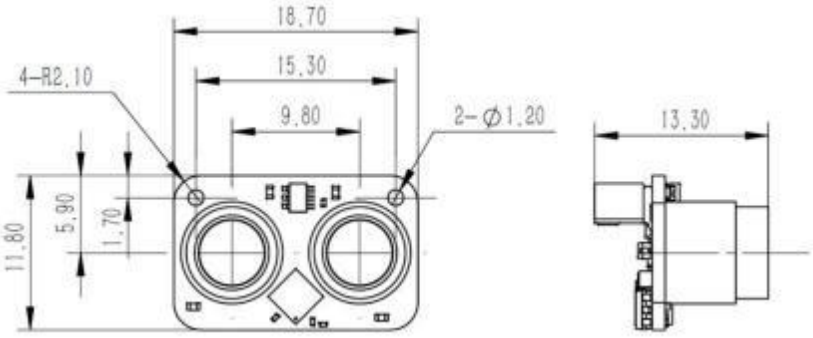
	Resolution ratio	1mm
5	Environmental light resistance	100K Lux
6	Laser wave length	905nm
7	Laser level	Class1
8	Angle of field	1.7°
9	Indicate the laser wavelength	N/A
10	Indicate laser level	N/A
11	Input voltage	3.3-5V
12	Peak point current	120mA
13	Average current	80mA
14	Average power consumption	0.4W
15	Communication mode	UART TTL / IIC
16	Levels of protection	N/A
17	Size (length x width x height)	18.7x11.8x13.3mm
18	Weight	2g
19	Working temperature	-30℃~+65℃
20	Cable specifications	4pin 1.25mm terminal, 10cm tinned loose wire
21	Customization scope	Supports customization of external structure, input voltage and output protocol

Pin definition

Pin	Define / Wire color	Explain
1	TX (Yellow)	RX
2	RX (Green)	TX

3	3.3-5V (Red)	Power supply +
4	GND (Black)	Power supply -

Module size



Range measurement characteristics

Because the detection light source has a certain divergence Angle, in order to obtain an accurate distance value during actual measurement, it is required that the surface area of the measured object is greater than the diameter of the light spot at this distance.

The spot diameter of STA-B50A at different distances is shown in the following table:

distance	1m	2m	5m	10m	20m
spot diameter	6cm	12cm	30cm	60cm	1.2m

Protocol

Communication interface

UART	
Default rate	46,608 (adjustable)
data bit	8
stop bit	1
even-odd check	not have

Output format

The input and output of this product are in 16-bit little-endian mode

Frame header	Distance is two bytes		check bit
5C	02	11	EC

Byte output

5C: Fixed frame header of 1 byte

02 11: The two bytes of distance value indicate that the measured distance is 4354mm, little-end mode, range 0-65535, and output 20000 when it cannot be measured
EC: Check bit byte, from the second byte 02 to the last second byte 11, sum and reverse

UART instruct

Order number	Functional description	Up	Down	Remarks
1	Read the product serial number	5A 0D 02 0D OD checksum	5A 8D 02 10 01 checksum	10 01 indicates that the product serial number is 272: small end mode, and the product serial number displayed on the upper computer is: S00272 (S is added in front of the 5-digit number)
2	Read the software version number	5A 16 02 16 16 checksum	5A 96 02 03 02 checksum	03 02 indicates that the product software version number is V2.3: little-endian mode, 02 indicates 2, 03 indicates 3, and a dot (.) is added in the middle
3	Modify the baud rate	5A 06 02 80 04 checksum	5A 86 02 80 04 checksum	60 00(9600) C0 00(19200) 80 01(38400) 80 04(115200) 00 09(230400) 00 0A(256000) 00 12(460800) Other baud rates are not supported

Verification function: The above verification bytes are all using this verification function
Starting from the second byte and ending at the second to last byte, sum and invert

```
uint8_t Check_Sum(uint8_t *_pbuff, uint16_t  cmdLen)
{
uint8_t cmd_sum=0;
uint16_t i;
for(i=0;i<_cmdLen;i++)
{
cmd_sum += _pbuff[i];
```

```
}
cmd_sum = (~cmd_sum);
return  cmd_sum;
}
```

Quick test

Test material list: TTL to USB adapter board, 5V power supply (battery, power bank, computer USB port can be used), upper computer/serial port assistant. After STA-B50X is correctly connected, select the baud rate and click OK to observe the required data on the upper computer.

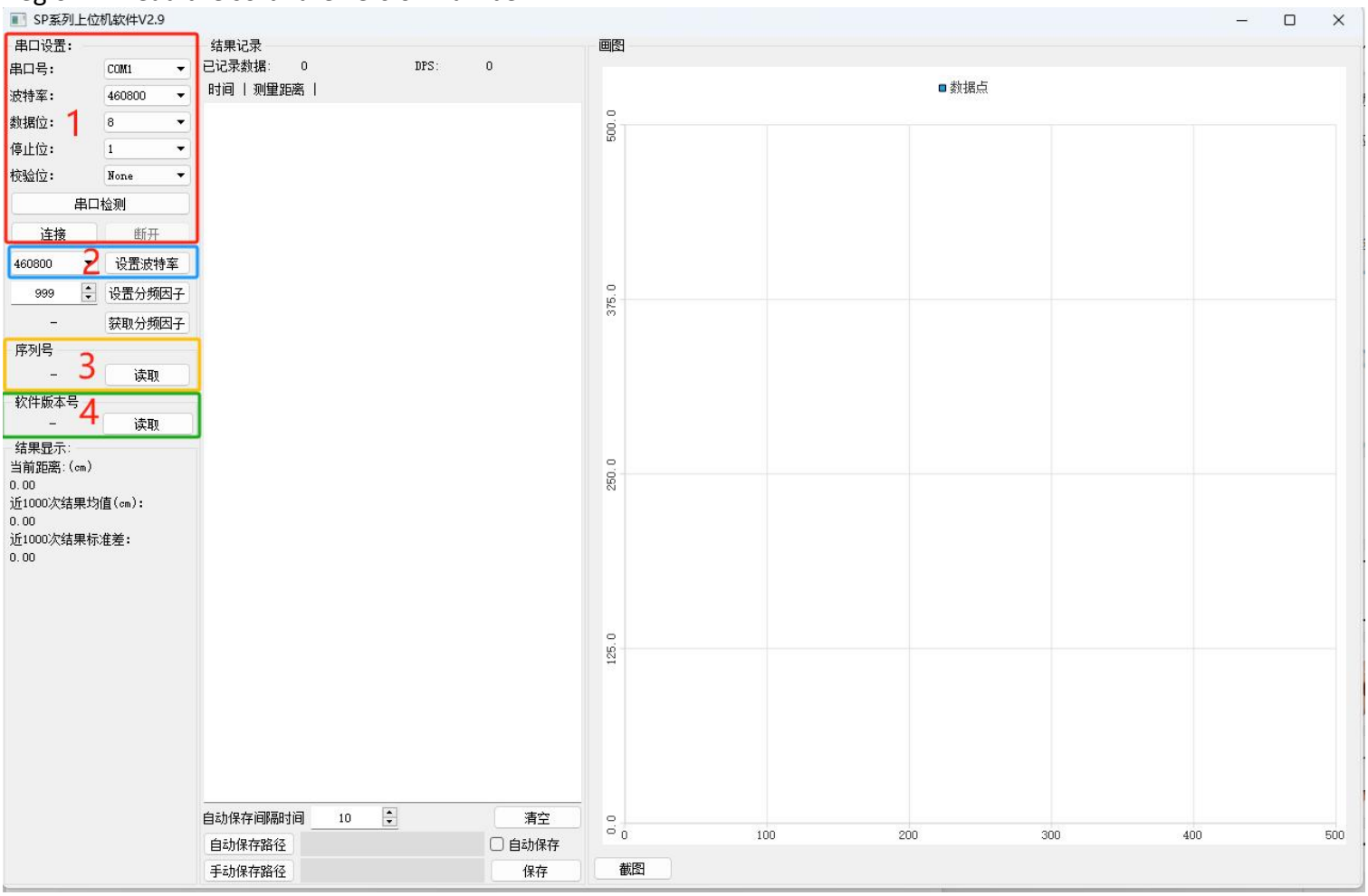
The upper computer is as follows:

Region 1: Set the corresponding serial port parameters and click Connect

Region 2: Set the baud rate

Region 3: Read the product serial number

Region 4: Read the software version number



Use precautions

-The product has no reverse connection and overvoltage protection. Please supply power and connect correctly according to the specification book.

-The laser of the product is Class1. Do not look directly at the lens after power-on.

-When used in dusty environments, it is recommended to add red glass or acrylic panel (transparency of 905nm band is not less than 85%) outside the lens of the product.

-When contacting the product, please wear anti-static gloves to avoid product failure.

-The product may fail when measuring high-reflection objects (such as 3M tape) and mirrors.

Update your resume

Documentation Edition	refresh time	Update content
V1.0	24/12/30	According to the current design scheme, the first edition is organized

Note: If there is any update of the version, no further notice will be given, subject to the product.