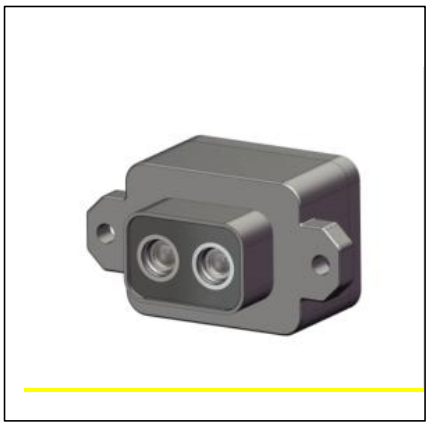
KJT-WYJG10-WS, a single-point lidar based on DTOF technology

500Hz measurement speed; 20 meters measurement distance; outdoor resistance to ambient light 100K Lux;

excellent cost performance

characteristic



- Based on time-of-flight algorithm (Direct Time Of Flight)
- Maximum range: 20m
- Measurement blind area: 3cm
- Range frequency: 500Hz
- Absolute accuracy: 1%
- Resolution: 1mm
- Working temperature: -20℃ ~ +60℃
- Power supply voltage: USRT (IIC): 3.3 ~ 5VDC
- Power supply voltage: PNP+NPN (RS485): 9~30VDC
- Small size: 45.5x24.5x27.5 mm
- Weight: 10g
- Resistant to ambient light: 100KLux

apply

- Drones set altitude and avoid obstacles
- Robot obstacle avoidance
- Industrial grade light screen
- AGV obstacle avoidance
- High speed measurement and safety monitoring in transportation and industrial automation

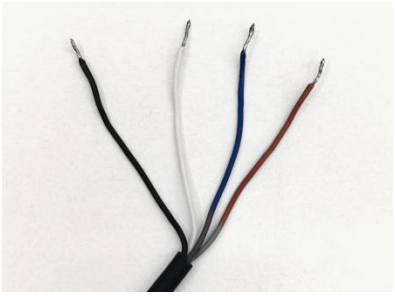
1. Product overview

KJT-WYJG10-WS LiDAR is our company's new laser ranging product launched for drones, cleaning robots, industrial robots, and other fields. Based on the DTOF ranging principle, this product features a compact size, low cost, excellent performance, and strong resistance to environmental light interference. The product is easy to use, flexible to install, and convenient to expand, offering great value for money.

2. Specifications and parameters

#	model	KJT-WYJG10-WS
1	range	0.03 - 20m
2	Range frequency	500Hz
3	absolute accuracy	1%
4	repeatability precision	±10mm
5	Environmental light	12m@100KLux
6	Measure the laser	905nm
7	Measure the laser level	Class 1
8	Measure the laser field	1.7°
9	Indicate the	N/A
10	Indicate the laser level	N/A
11	input voltage	USRT(IIC):3.3-5VDC;PNP+NPN(RS485):9-30VDC
12	peak point current	150mA
13	average current	80mA
14	Average power	< 0.5W
15	output interface	UART，RS485、IIC、PNP+NPN
16	levels of protection	N/A
17	Size (length x width x	45.5 x 24.5 x 27.5mm
18	weight	10g
19	working temperature	-30℃ ~ +65℃
20	Cable specifications	0.2mm 4-core PVC cable, line length 2m (customizable)
21	Custom scope	Supports customization of external structure and output protocol

3、Pin definition



pin	Define / Wire color	customer interface
NPN+PNP		
1	9-30V DC (brown)	The external power supply is positive
2	GND(blue)	The external power supply is negative
3	NPN(black)	NPN
4	PNP(white)	PNP
IIC		
1	3.3-5V DC (brown)	The external power supply is positive
2	GND(blue)	The external power supply is negative
3	SCL(black)	SCL
4	SDA(white)	SDA
UART		
1	3.3-5V DC (brown)	The external power supply is positive
2	GND(blue)	The external power supply is negative
3	RX(black)	TX
4	TX(white)	RX
RS485		
1	9-30V DC (brown)	The external power supply is positive
2	GND(blue)	The external power supply is negative
3	485B (black)	485B
4	485A (white)	485A

4、product size

5、Distance measurement characteristics

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

The spot diameters of GY10-BD at different distances are shown in the following table:

distance	1m	2m	5m	10m	20m
spot	3cm	6cm	15cm	30cm	60cm

6、Communication protocol 1-UART

6.1 Communication interface parameters

UART gorge line	
protocol	Free to negotiate
Baud rate	460800 (optional)
data bit	8
stop bit	1
check bit	not have

6.2 Output format

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

Frame header	The distance value is two		check bit
5C	02	11	EC

Four-byte output

5C: Fixed frame header 1 byte

02 11: The two bytes of distance value indicate that the measured distance is 4354mm, little-end mode, range 0-65535, and the output cannot be measured 50m

EC: Check bit is a byte, from the second byte 02 to the last second byte 11, sum and reverse

6.3 UART instructions

#	**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: little-endian 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 (.) in the middle indicates
3	Modify the baud	5A 06 02 80 04	5A 86 02 80 04	60 00 (9600)

	rate	checksum	checksum	C0 00 (19200) 80 01 (38400) 80 04 (115200) 00 09 (230400) 00 0A (256000) 00 12 (460800) Other baud rates are not supported

6.4 Check function: The above check bytes are checked by this check function

From the second byte to the last but two bytes, 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;
}
```

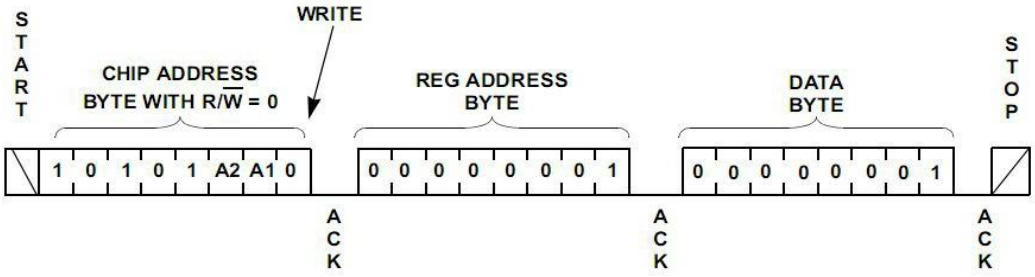
7. Communication protocol 2-IIC

7.1 The default address of this device is 0x52 (7bit address mode).

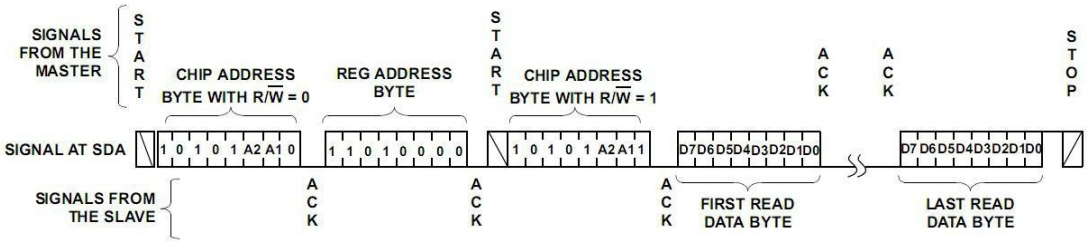
7.2 Communication protocol

This product supports fast transfer protocols (1KHz-400KHz). Reading and writing specific registers on the product is accomplished by writing appropriate values to the register pointer. For a complete list of registers and their corresponding addresses, see 6.3 Register Definitions.

The IIC single register write sequence is as follows:



The IIC multi-register read timing is as follows:



7.3 Register definition

serial number	Register address	What registers mean	Read/write properties	remarks
1	0x00	Distance-high byte	read only	Distance is expressed in 2byte
2	0x01	Distance-low byte	read only	Distance is expressed in 2byte
3	0x02	Laser enables control	write only	0: Turn off the laser, 1: turn on the laser
4	0x03	ladar ID	read only	The default is 0x4A, which is used for communication read/write testing

8. Communication protocol 3-RS485

8.1 RS485 serial port parameters

project	content
communicating protocol	Modbus-RTU
Baud rate	115200
data bit	8
stop bit	1

check bit	not have

8.2 Register parameter description (16 bits, register is 16 bits)

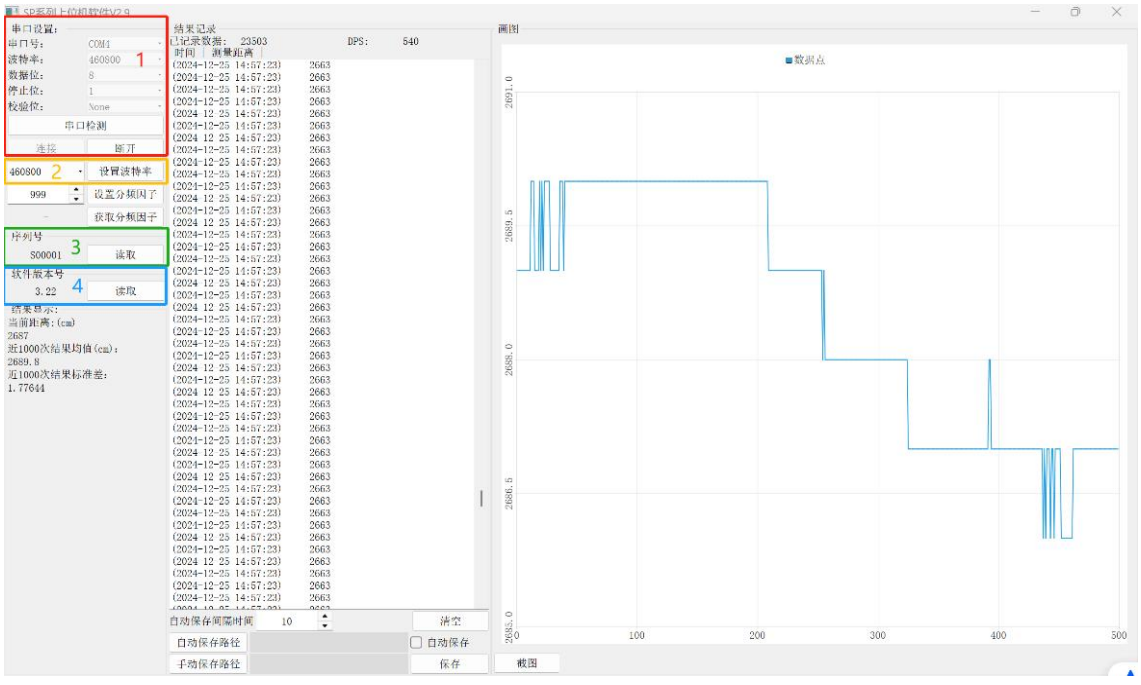
Register address	definition	explain
00 00	Distance values	Unit mm, output 20000 when it cannot be measured or exceeds the range
00 01	485 machine address	Default 1, value range 1-247, R/W
00 02	work pattern	Standby: 00 00 working: 00 01 The default working state is standby, the distance value is 0 when standby, and the power failure in standby state is not saved, R/W
00 03	Baud rate	The default is 1152. Expanding by 100 times means the baud rate is 115200, R/W
00 04	Software version number	read only
00 05	factory data reset	Write 01 to restore factory Settings, only write

9. Quick test

Test material list: TTL to USB adapter, 5V power supply (battery, charge bank, computer USB port can be used), upper machine/serial port assistant.

After the correct connection of GY10-BD, select the baud rate and click OK to observe the measured data on the upper computer.

The upper computer displays as follows:



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

Area 2: Set the baud rate

Area 3: Read the product serial number

Area 4: Read the software version number

10. Use precautions

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

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

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

-When touching 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

11. Update your resume

Documentation Edition	Updated (year/month/day)	Update content
V0.5	24/04/29	First edition of the production
V1.0	24/12/30	Update the specification sheet layout
V2.0	25/03/17	Add a new IIC protocol