LRF50H LiDAR Based on DTOF Principle

1000Hz Measuring Frequency / 50 meters Range / Ambient Light Immunity 100Klux /high cost-effectiveness

Features

- Based on DTOF principle (Direct Time of Flight)
- Maximum Measuring Range：50m
- Measuring Blind Zone：5cm
- Measuring Frequency：1KHz
- Accuracy：±5cm(< 10m)，1%(≥10m)(2σ)
- Resolution：1cm
- Operating Temperature：-20℃-+60℃
- Supply Voltage：9-36VDC
- Compact Size：38mm x 20mm x 30mm
- Weight：15±2g
- Ambient Light Immunity：45m@100Klux



Applications

- Overhead crane positioning
- Distance Control for Carriage Connection
- Security and Protection
- Inspection Robot



1.Product Overview

LRF50H is a mid-range laser ranging module with high frequency and high accuracy. It comes with a coaxial aiming light that can be freely turned on or off, which helps users to align and install this product easily. It has a strong immunity to ambient light, supporting various indoor and outdoor applications.

2.Specifications

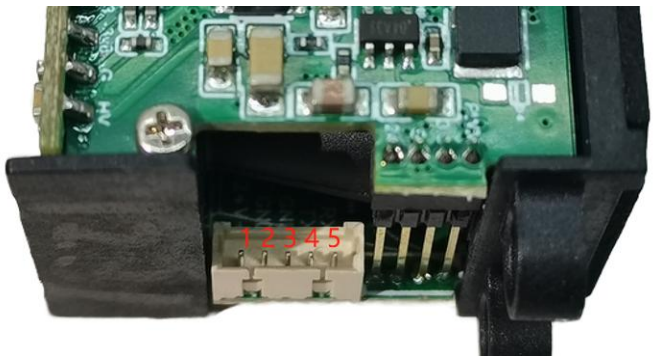
#	Model	**LRF50H**
1	Range	0.05m ~ 50m (90%reflectivity), 0.05m ~ 15m (10%reflectivity)[1]
2	Frequency	20Hz ~ 10KHz (Default: 1KHz)
3	Accuracy	±5cm(< 10m) , 1%(≥10m)(2σ)
4	Repeatability	±5cm
5	Ambient Light Immunity	45m@100KLux[2]
6	Central Wavelength	905nm
7	Photobiological Safety	Class 1
8	FOV	about 4mrad
9	Wavelength for Indication	650nm (visible red light)
10	Photobiological Safety for Indication	Class 2
11	Supply Voltage	9~36VDC
12	Peak Current	24V@100mA
13	Average Current	24V@34mA
14	Average Power Consumption	0.8W
15	Communication Interface	UART
16	Protection Level	N/A
17	Dimension	38 x 20 x 30 mm
18	Weight	15±2g
19	Operating Temperature	-20℃~+60℃ (No condensation，indicator red light automatically turns off when under -20℃)
20	Wire Specification	5-pin 1.25mm terminal, specification M1250V-05P, with 50cm tinned loose wire
21	Customization	available in appearance / structure / output protocol

(Note: 1. This parameter was measured at 25°C in an indoor environment.

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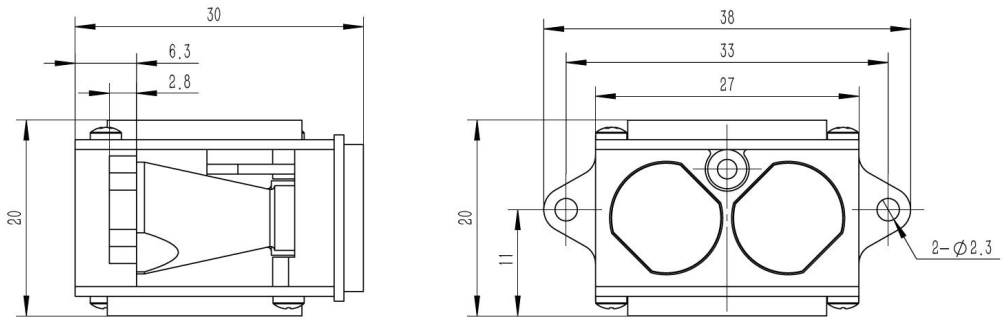
2. This parameter was measured with a 90% reflector in an outdoor environment at 25°C.)

3.Definitions of Pins



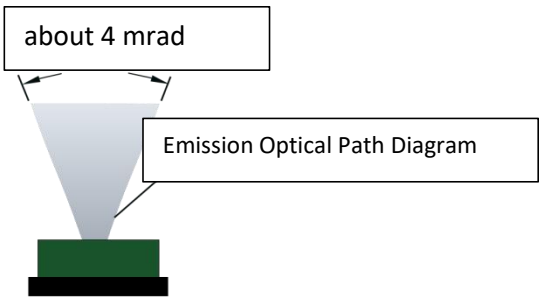
No.	Definition / Wire Color	User Interface
1	9~36V (Red)	External Power +
2	GND (Black)	GND
3	GND (Yellow)	GND
4	TX (Green)	RX
5	RX (Blue)	TX

4.Dimensions



5.Measuring Characteristic

Because of the divergence angle, there would be a light spot with changing size on the target surface depending on the distance. In actual use, the surface area of the target object should be larger than the light spot so that the distance can be accurately measured.



The diameters of the light spot of WT50A in different distances are shown below：

Distance	1m	2m	5m	10m	20m	50m
Diameter of the light spot	0.4cm	0.8cm	2cm	4cm	8cm	20cm

6.Communication Protocol: UART

6.1 Communication Interface

UART	
Baud Rate	460800 (adjustable)
Data Bit	8
Stop Bit	1
Parity Bit	None

6.2 Output Format

The data frames below are all hexadecimal.

Frame Header	Distance 2 Bytes		Check Byte
5C	02	11	EC

(1) Default frequency 1kHz. One full data has 4 bytes. The format shown as follows:

5C: Frame header 1 byte

02 11: Distance value 2 bytes means the measuring distance is 4354cm, little-endian, range 0-65535cm. When out of range, it would output 65535cm.

EC: From 02 to 11, opposite of the Check byte, 1 byte

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(2) Set and Read Commands:

Serial No.	Function Description	Upstream	Downstream	Remarks
1	Reading serial number	5A 0D 02 0D 0D D6(checksum)	5A 8D 02 10 01 5F(checksum)	01 indicates the product serial number is 272: little-endian mode, the product serial number displayed on the host computer is: S00272 (displayed with 'S' added before the 5-digit number)
2	Reading software version number	5A 16 02 16 16 BB(checksum)	5A 96 02 03 02 62(checksum)	03 02 indicates the product software version is V2.3: little-endian mode, 02 represents 2, 03 represents 3, with a dot (.) in between
3	Modifying baud rate	5A 06 02 80 04 73(checksum)	5A 86 02 80 04 F3(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
4	Modifying frequency	5A 0B 02 E7 03 08(checksum)	5A 8B 02 E7 03 88(checksum)	E7 03 indicates the serial data frequency division factor: little-endian mode, representing the set serial frequency division factor is 999 (E7 03), and the corresponding serial data output frequency f=1000000/(999+1)=1000Hz; Serial frequency only supports 20-20KHz
5	Reading frequency	5A 1B 02 1B 1B AC(checksum)	5A 9B 02 E7 03 78(checksum)	E7 03 indicates the serial data frequency division factor: little-endian mode, representing the read serial frequency division factor is 999 (E7 03), and the corresponding serial data output frequency f=1000000/(999+1)=1000Hz; Serial frequency only supports 20-20KHz
7	Stopping distance measurement	5A 0A 02 00 00 F3	5A 8A 02 00 00 73	Returns 5A 8A 02 00 00 73; Stops distance measurement
8	Starting distance measurement	5A 0A 02 02 00 F1	5A 8A 02 02 00 71	Returns 5A 8A 02 02 00 71; Starts distance measurement

6.4 Check function：

Begin with the second byte and end with the last second byte, find the inverse of the sum.

```
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;
}
```

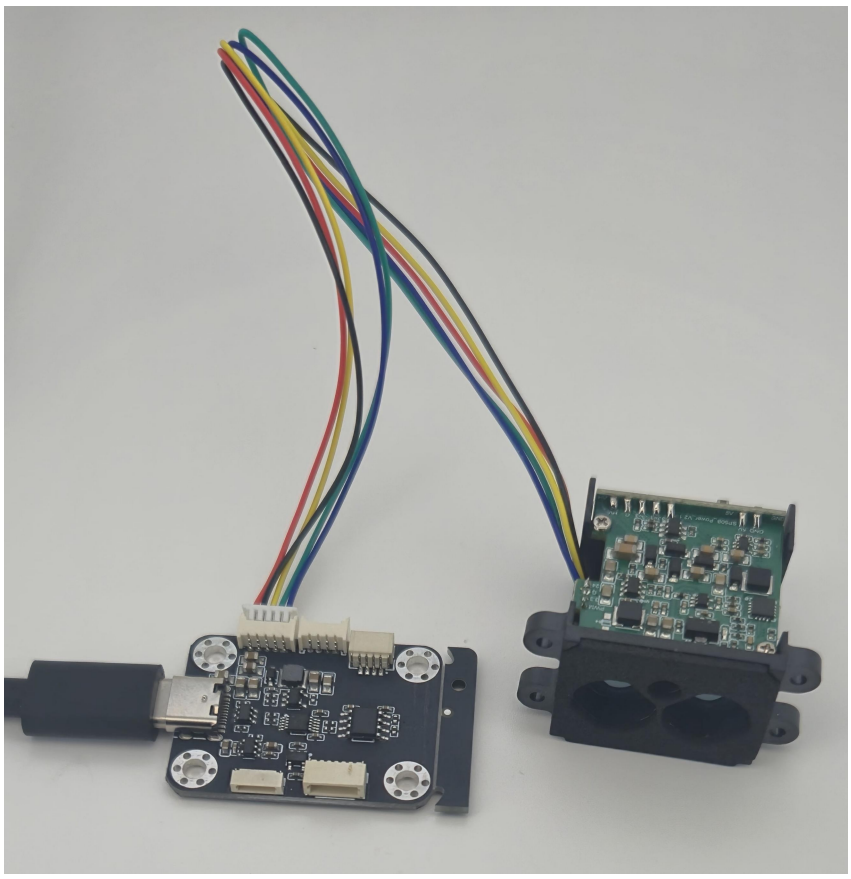
7.Quick Test

Test materials: TTL to USB adapter board,

9-36V DC power supply/or alternatively, our company's self-developed universal test kit + Type-C data cable (as shown in the figure below),

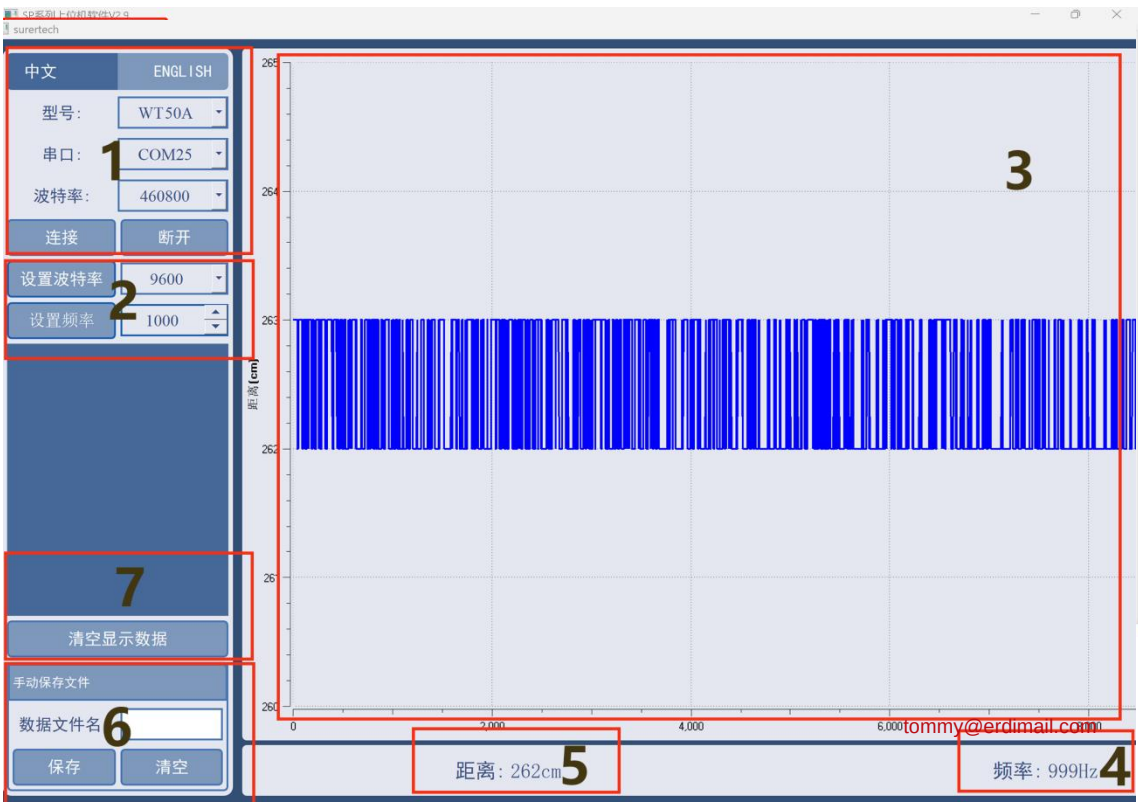
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Host computer/serial port assistant.



After the LRF50H successfully connected to your computer, select the baud rate and click “connect”, then the data can be monitored on the upper computer.

Here is a sample figure of upper computer:



Region	Function Description
Region 1	Set serial port baud rate and other parameters for corresponding models
Region 2	Configure baud rate and frequency
Region 3	Real-time distance point-line graph
Region 4	Read real-time frequency values
Region 5	Read real-time distance values
Region 6	Save data to file
Region 7	Clear all displayed data

8.Attentions

- There is NO protection for reverse polarity and overvoltage, please strictly follow the specification for correct power supply and wiring.
- The photobiological safety for indication of this product is Class 2, so please DO NOT look straight at the lens.
- When operating this product in a dusty place, it is better to add a piece of red transparent glass or acrylic plate over the lens for dust prevention. (905nm wavelength needs a transmittance ≥ 85%.)
- When touching this product, please wear anti-static gloves to prevent the product from failing.
- There is a risk of failure when using this product to measure high-reflective objects (such as 3M tapes) and mirrors.

-This specification is copyrighted by ERDI. Any modifications are subject to change without prior notice.

9.Update History

Version	Date (YY/MM/DD)	Content
V0.5	22/03/10	Mass produced first editions
V1.0	24/12/30	Updated the format
V2.0	25/03/05	Revised some parameters
V3.0	25/07/09	Expanded Function,New Host Computer Added