LRF1500H LiDAR Based on DTOF Principle

1KHz/50Hz Measuring Frequency / 1500 meters Range / Ambient Light Immunity 100Klux / Cost-effective

Features

- Based on DTOF principle (Direct Time of Flight)
- Maximum Measuring Range: 1500m
- Measuring Blind Zone: 5cm
- Measuring Frequency: 1KHz or 50Hz
- Accuracy: ±10cm (<10m), 1% (≥10m)
- Resolution: 1cm
- Operating Temperature: -20℃ ~ +60℃
- Supply Voltage: 9 ~ 36V DC
- Compact Size: 33mm x 34mm x 18mm
- Weight: 20±2g
- Ambient Light Immunity: 100Klux



Applications

- Traffic Safety Early Warning
- Camera Focusing
- Tower Crane Distance Detection
- Blade Encroachment Detection



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1. Product Overview

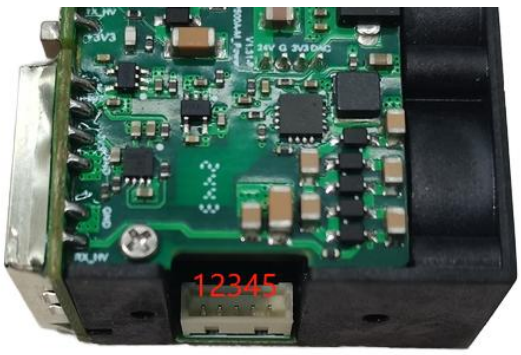
LRF1500H is a long-range LiDAR with compact size and 1500m maximum range, widely used in drones (UAV), pods, security and other similar application fields. It is designed as a module, allowing customers to conduct secondary development and integration.

2. Specifications

#	Model	LRF1500H
1	Range	0.05m ~ 1500m (90%reflectivity), 0.05m ~ 300m (10%reflectivity)
2	Frequency	1KHz or 50Hz (Switch automatically to match the intensity of reflected signals)
3	Accuracy	±10cm (<10m), 1% (≥10m)
4	Repeatability	±5cm (<10m), ±100cm@1500m
5	Ambient Light Immunity	100KLux
6	Central Wavelength	905nm
7	Photobiological Safety	Class1
8	FOV	about 4mrad
9	Wavelength for Indication	N/A
10	Photobiological Safety for Indication	N/A
11	Supply Voltage	9~36VDC
12	Peak Current	100mA
13	Average Current	55mA
14	Average Power Consumption	1.2W
15	Communication Interface	UART/IIC
16	Protection Level	N/A
17	Dimension	33 x 34 x 18mm
18	Weight	20±2g
19	Operating Temperature	-20℃~+60℃
20	Wire Specification	1.25mm, 5P 50cm stranded wires
21	Customization	available in appearance / structure / output protocol

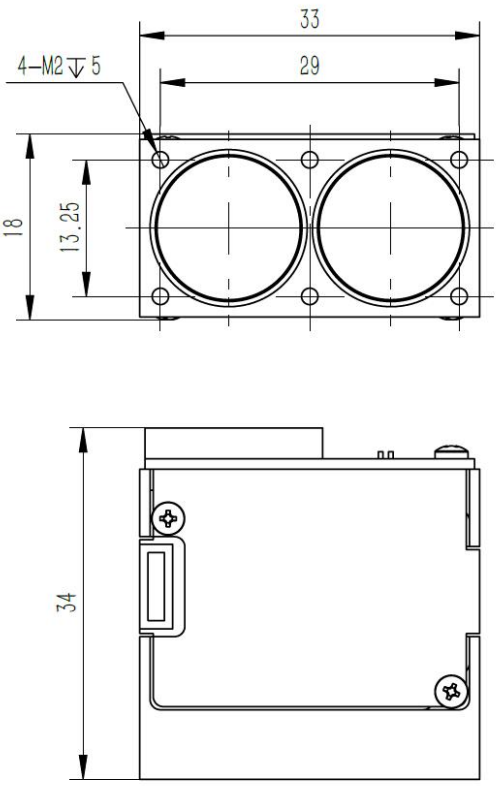
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3. Definitions of Pins



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

4. Dimensions



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5. Communication Protocol: UART

5.1 Communication Interface

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

5.2 Data Communication Protocol

For both input and output, this product adopts Hexadecimal Little-Endian Mode 5-Byte Output.

(1) Default frequency 1KHz or 50Hz. One full data has 5 bytes. The format shown as follows:

Frame Header	Distance 3 Bytes			Check Byte
5C	02	11	03	EC

5C: Frame header 1 byte

02 11 03: Distance value 3 bytes means the measuring distance is 200962cm, little-endian, range 0-16777215cm. When out of range, it would output 16777215cm.

EC: From 02 to 03, opposite of the Check byte, 1 byte

(2) Set and Read Commands:

①Reading serial no.

Send	5A	0D	02	0D	0D	Check byte
Return	5A	8D	02	10	01	Check byte

10 01 means the serial no. is 272: little-endian, the serial no. shown in the upper computer is: S00272 (Add S before the number).

②UART Baud rate setting

Send	5A	06	02	80	04	Check byte
Return	5A	86	02	80	04	Check byte

80 04 as a decimal is 1152: little-endian, it means the baud rate is set to 115200=1152*100

The following list shows 7 available baud rates. Other baud rate settings would not get respond.

Hexadecimal (little-endian)	Decimal	Baud rate
60 00	96	9600

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C0 00	192	19200
80 01	384	38400
80 04	1152	115200
00 09	2304	230400
00 0A	2560	256000
00 12	4608	460800

③Read the software version no.

Send	5A	16	02	16	16	Check byte
Return	5A	96	02	03	02	Check byte

03 02 means the software version no. is V2.3: little-endian, 02 represents 2, 03 represents 3, Add a point (.) in the middle.

5.3 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;
}
```

6. Quick Test

Test materials: TTL to USB adapter board, DC power, upper computer / serial port assistant.

After the LRF1500H successfully connected to your computer， select the baud rate and click “connect”, then the data can be monitored on the upper computer.

Area 1: Set the parameters and click “connect”

Area 2: Set the baud rate

Area 3: Read the serial no.

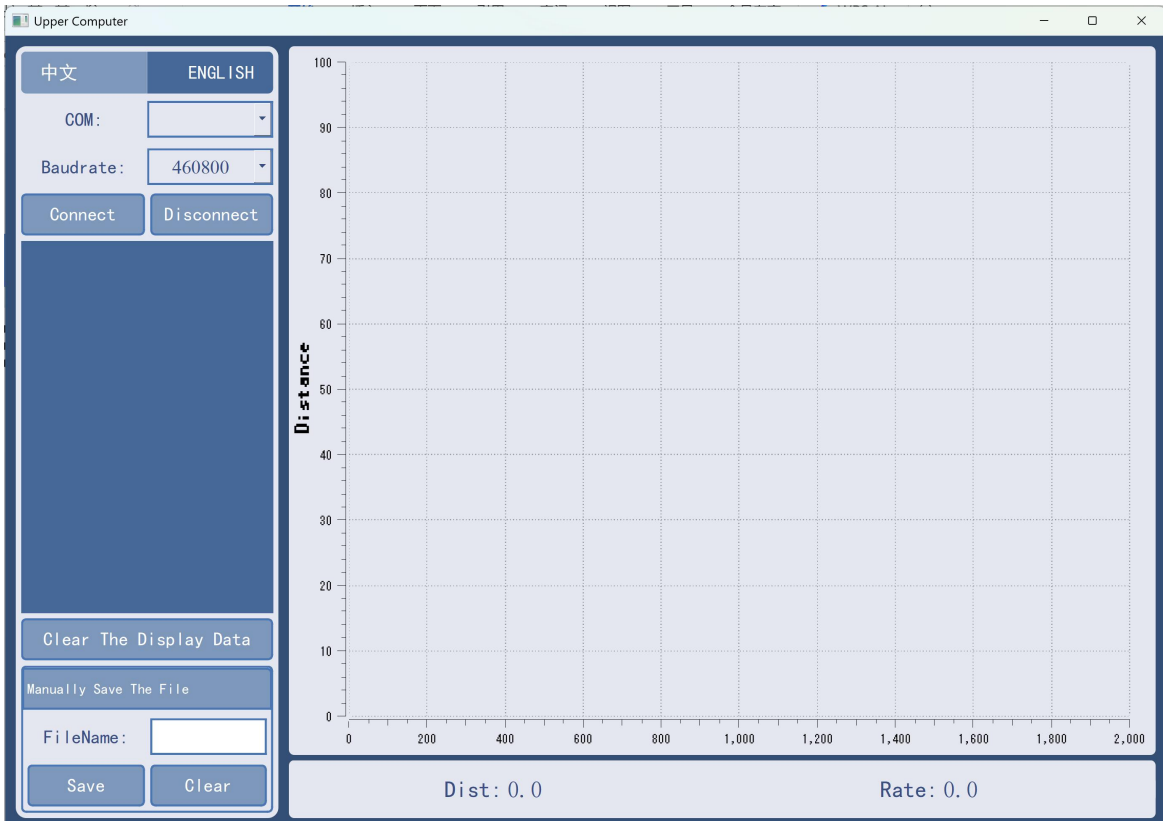
Area 4: Read the software version no.

Connect the TTL-USB adapter board to the computer, and then click “detect the serial port”. When the serial port no. comes out, click “connect” (it is shown as the default in the following figure). The default frequency is 1000/50Hz, and the default baud rate is 460800 (adjustable). Data bit 8, stop bit 1, no parity bit.

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LRF1500H ranging module actively output data (5 bytes each frame) after completing the connection. When out of its measuring range, it would output 0xFFFF (16777215).

Here is a sample figure of upper computer:



7. Update History

Version	Date (YY/MM/DD)	Content
V0.5	23/03/31	Mass produced first editions
V1.0	24/12/30	Updated the format
V2.0	25/03/05	Revised some parameters

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