Laser Radar SDFM Series Based on DTOF Technology

1kHz measurement speed; Measuring distance of 100 meters; Outdoor resistance to ambient light 100KLux; Excellent cost performance ratio

characteristic

- Based on the Direct Time of Flight algorithm
- Maximum range: 100/200/300/600/1500m
- Measurement blind spot: 5cm
- Measurement frequency: max 10KHz
- Absolute accuracy: ± 10cm (within 10m), 1% (beyond 10m)
- Resolution: 1cm
- Working temperature:- 20℃-+60℃
- Supply voltage: 9-36VDC
- Small volume: 33mm x 34mm x 18mm
- Weight: 20 ± 2g
- Resistance to ambient light: 100K Lux

application

- Drone height determination (inspection drone)
- Wind power
- Mountain landslide
- Material level detection

1. product overview

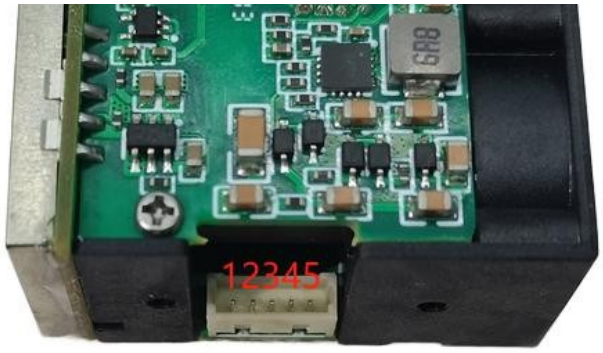
The SDFM series is a high-precision long-range laser radar that supports both indoor and outdoor applications and can resist the influence of strong electromagnetic interference. It can perform positioning or collision prevention monitoring on land transport vehicles and overhead cranes.

2. Specification parameters

#	model	SDFM100	SDFM200	SDFM300	SDFM600	SDFM1500
	Range 90% reflectivity	**100m**	**200m**	**300m**	**600m**	**1500m**
	Range 10% reflectivity	**30m**	**70m**	**100m**	**200m**	**300m**
1	blind area	0.05m				
2	Ranging frequency	1KHz (adjustable from 20 to 10KHz)				
3	Absolute accuracy	± 10cm (within 10m), 1% (outside 10m)				
4	repeatability	± 5cm (within 10m), ± 10cm@300m ， ± 100cm@1500m				
5	Ability to resist environmental light	100KLux				
6	Measure laser wavelength	905nm				
7	Measure laser level	Class1				
8	Measure the laser field of view angle	About 4mrad				
9	Indicate laser wavelength	N/A				
10	Indicate laser level	N/A				
11	INPUT VOLTAGE	9 ~ 36VDC				
12	peak current	100mA				
13	average current	30mA				
14	Average Power	0.7W	0.7W	1.2W	1.2W	1.2W
15	communication model	UART，IIC				
16	protection grade	N/A				
17	Dimensions (length x width x height)	33 x 34 x 18 mm				
18	weight	20±2g				
19	operation temperature	-20℃ ~ +60℃				
20	Cable specifications	1.25mm, 5P 50cm loose line				

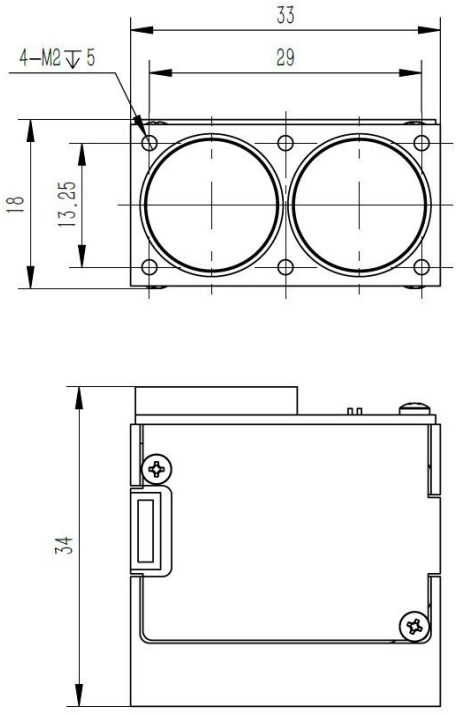
21	Customization scope	Support customization of external structure and output protocol

3. Pin Definition



Pin	Definition/Cable Color	user interface
1	RX (blue)	TX
2	TX (green)	RX
3	Serial port GND (yellow)	GND
4	Power GND (black)	Negative external power supply
5	9-36V (red)	External power supply positive

4. Product size



5. Communication protocol

5.1 communication interface

	UART
Baud rate	460800 (adjustable)
Data bits	8
stop bit	1
Parity check	not have

5.2 Data Communication Protocol

This product uses hexadecimal small terminal mode for both input and output, with 4-byte output

(1) The default output frequency of UART serial port data is 1kHz, and one frame of data has 4 bytes. The format is as follows:

frame header	Distance value of two bytes		check bit
5C	02	11	EC

5C: Fixed frame header 1 byte

02 11: The distance value of three bytes represents the measured distance of 4354cm, in small end mode, with a range of 0-65535cm. When unable to measure, output 65535cm EC: from 02 to 11, perform a sum check and take the opposite, one byte

(2) Set and read instructions:

① Product serial number reading

sending	5A	0D	02	0D	0D	Verify bytes
return	5A	8D	02	10	01	Verify bytes

10 01 indicates that the product serial number is 272: in small end mode, the upper computer displays the product serial number as S00272 (displayed with an S before the 5-digit number)

② UART serial port baud rate setting

sending	5A	06	02	80	04	Verify bytes
return	5A	86	02	80	04	Verify bytes

80 04 is decimal 1152: Small end mode, indicating a set baud rate of 115200=1152 * 100

The following are 7 baud rates that can be set. The serial port does not respond to other baud rate settings

Hexadecimal (small end mode)	decimalism	Baud rate
60 00	96	9600
C0 00	192	19200

80 01	384	38400

80 04	1152	115200
00 09	2304	230400
00 0A	2560	256000
00 12	4608	460800

③ Product software version number reading

sending	5A	16	02	16	16	Verify bytes
return	5A	96	02	03	02	Verify bytes

03 02 indicates that the product software version number is V2.3: small end mode, 02 indicates 2, 03 indicates 3, and the dot (.) in the middle indicates

④ UART serial port data output frequency setting (division factor)

sending	5A	0B	02	E7	03	Verify bytes
return	5A	8B	02	E7	03	Verify bytes

E7 03 indicates that the frequency division factor for the set serial data output frequency is 999: in small end mode, the set frequency is f=10000000/(999+1)
=1000Hz.

5.3 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;
}
```

6. Quick testing

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

After correctly connecting the SDFM series, select the baud rate and click OK to observe the required data on the upper computer. Region 1: Set the corresponding serial port parameters and click on connect

Region 2: Set baud rate

Area 3: Read product

serial number Area 4:

Read software version

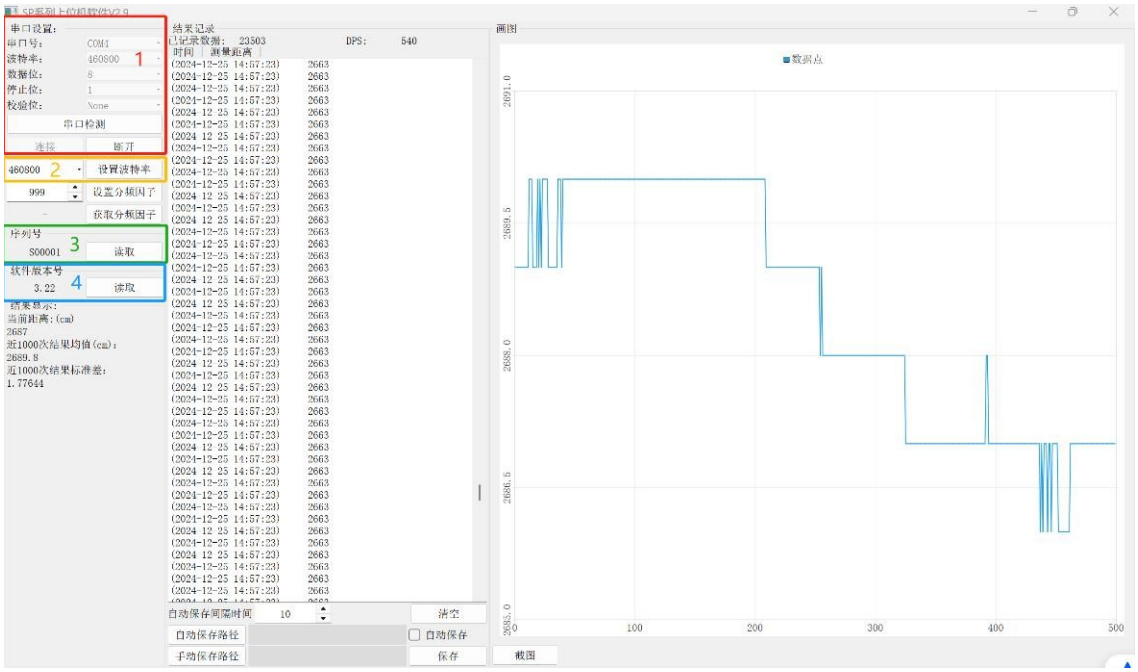
number

Insert the TTL to USB adapter board into the computer serial port, click on serial port detection, wait for the serial port

number to be displayed, and then click on connect (the default state is shown in the above picture) laser

The default ranging frequency is 1000/50Hz, the default serial port baud rate is 460800 adjustable, the data bit is 8, there is 1 stop bit, and there is no parity check

After being powered on, the SDFM series ranging module actively outputs data (4 bytes per frame of data), and outputs 0xFF (65535) when unable to measure. The upper computer displays as follows:



7. Update News

version	update time	UPDATE
V1.0	24/12/30	Organize the initial version based on the current design plan
V2.0	25/03/05	Revise some parameter data