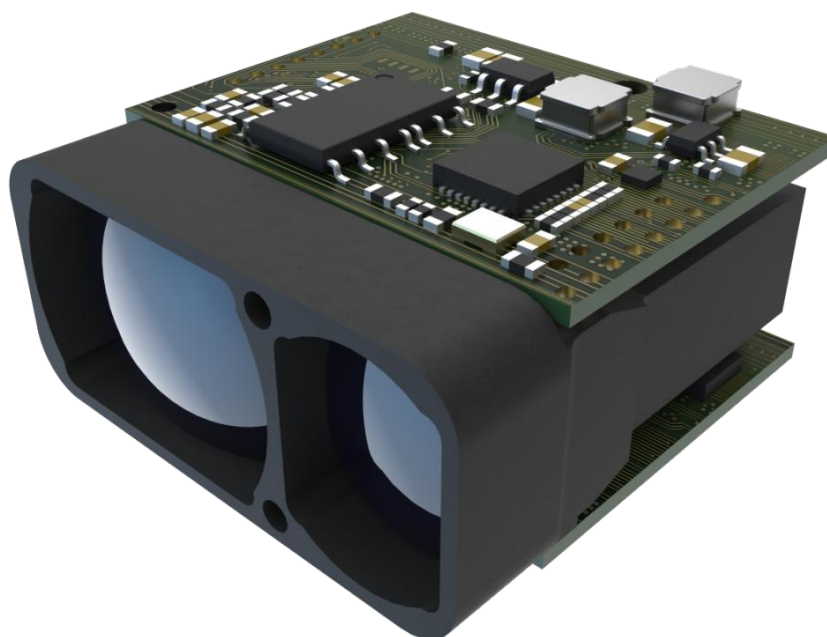


SDDM
Laser Ranging
Module
Product
Manual



Ximan Sensing Technology Co., Ltd

www.siman.asia

catalogue

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1、Product Overview

SDDM is a high-performance, long-range, and compact Dtof (direct time of flight) laser ranging module independently developed by Siman Corporation. This module adopts advanced DTOF ranging technology and has excellent measurement performance, with a maximum range of over 1500 meters, while maintaining a very small volume and lightweight design, weighing only 10 grams, making it easy to integrate into various compact devices.

The module is equipped with UART interface, supporting high-speed data transmission and convenient system integration, suitable for multiple fields such as unmanned aerial vehicle height determination, industrial automation, robot navigation, intelligent transportation, etc. Its high precision, high reliability, and low power consumption make it an ideal choice for various ranging applications, especially suitable for scenarios with strict requirements for space and weight.

Product features:

- ✓ The measurement distance under outdoor sunlight can reach 1500m;
- ✓ Resistant to high and low temperatures of -20~+70 °C;
- ✓ Compact size, measuring 26mm in length, 24.6mm in width, and 11.4mm in thickness;
- ✓ Lightweight: about 10g
- ✓ UART TTL level output of the distance value of the measured object, simple and easy to use;

Please carefully read the installation and operation related chapters before installing and using the module to prevent damage to the module.

Application scenarios:

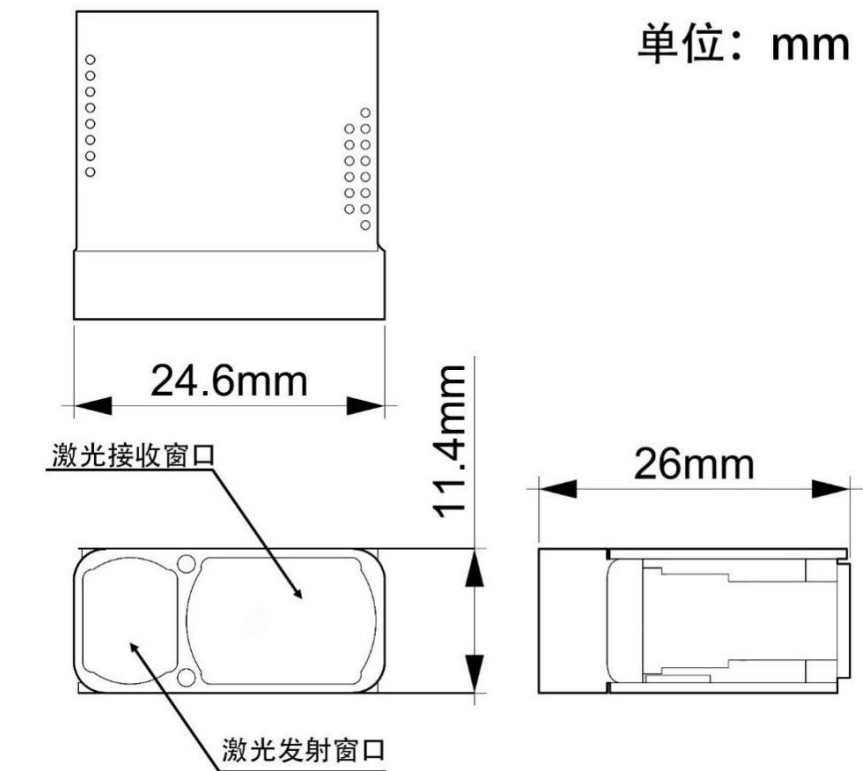
- UAV
- Gun aiming equipment
- Infrared positioning
- military
- Security

2、Performance parameters

Specification parameters			
measuring range	3... 1500m@70 %Reflectivity	Supply Voltage	Typical value DC+3.3V
resolution	0.1m		Voltage range 2.5... 3.5V
Absolute accuracy	±1m	power consumption	500mW@3.3V
Maximum single measurement time	1s	Specification and size	26*24.6*11.4mm
Environmental light impact	Resistant to outdoor sunlight 1000kLux	weight	10g
light source	905nm laser	operation temperature	-20~70°C
Laser safety level	1	communication interface	UART
Laser lifespan	Over 100000 hours		Baud rate 115200bps

Order model			
PRODUCT MODEL	SDDM-800	SDDM-1200	SDDM-1500
range	800m	1200m	1500m

3、 Mechanical dimensions



4、 Pin definition

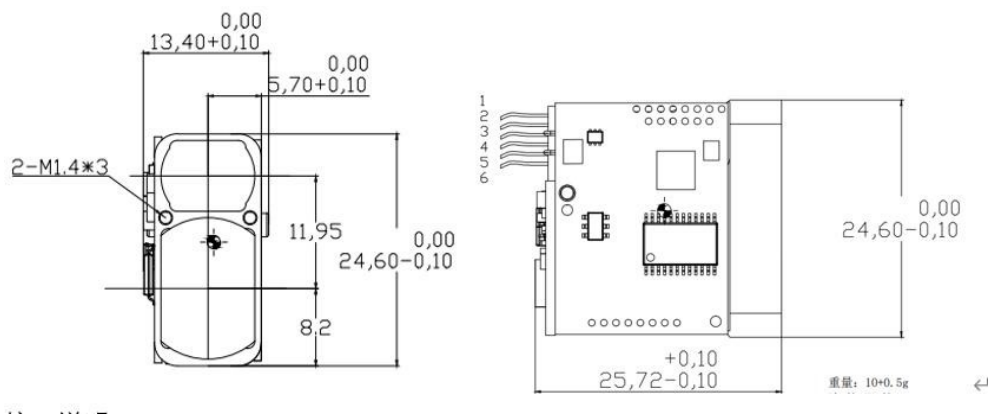


Table4-1 PinDefinition

Serial Number	name	function	Function Description
1	GND	Power Ground	Input: power ground, communication ground
2	VCC	power supply	Input: 3-3.3V DC power supply, current>300mA+
3	NC		
4	UART TX	Communication	Serial communication, module end serial port sending pin, connected to control Device end receiving pin (compatible with

		transmission □	TTL3.3V/TTL5V)
5	UART RX	Communication input	Serial communication, module end serial port receiving pin, connected to control Device end sending pin (compatible with TTL3.3V/TTL5V)
6	POWER ON	power switch	Input: high-level enable; TTL3.3V

5、Communication Protocol

5.1 Serial port configuration

Basic configuration of control terminal serial

port: baud rate:

115200bps

Starting bit: 1,

Data bit: 8,

Stop bit: 1,

Check bit:

None, Flow

control: None

5.2 control command

[Important]

1) The communication stream of this system adopts small end mode;

2) Accumulate the entire message as a U8 array and take the lower 8 bits as the CRC correction value. For detailed usage, refer

to Appendix 1: CRC Stream Calculation&Usage

5.2.1 Start/Stop Measurement

After starting the measurement, the module continuously measures and returns measurement data until the specified number of measurements is reached or a stop command is received; The measurement data format is shown in 5.2.2

Measurement reporting.

Start measurement

Bytes	0	1	2	3	4-5	6-7	8
Name	MsgType	MsgCode	BrdId	PayLoadLen	MeaType	MeaTimes	CRC
Data	0xFA	0x01	0xFF	0x04	0xAAAA	0BBBBB	0xZZ

- ✓ BrdId=0xFF is used to specify the module ID for message reception (default module ID is 0, 0xFF represents broadcast message)
 - ✓ MeaType=0xAAAA represents starting or stopping measurement, where 1 represents starting measurement and 0 represents stopping measurement
 - ✓ MeaTimes=0BBBBB represents the number of consecutive measurements, where 0 represents infinite times and 1 represents a single measurement starting a single measurement. Example: fa 01 ff 04 01 00 01 00 00
- Start continuous measurement example: fa 01 ff 04 01 00 00 00 ff
- Stop measurement example: fa 01 ff 04 00 00 00 00 fe

5. 2. 2 Measurement reporting

After starting the measurement, the module will return the measurement value after each measurement is completed (the maximum time for a single measurement is 1.5 seconds), until the specified number of measurements is reached or a measurement stop message is received.

Bytes	0	1	2	3	5	6	7	8	9
Name	Msg Type	Msg Code	Brd Id	PayLoad Len	DataValidInd		Distance		CRC
Data	0xFB	0x03	0xXX	0x04	0xAAAA		0xB BBBB		0xZZ
Unit							dm		

- ✓ BrdId=0xXX is used to indicate the module ID sent
- ✓ DataValidInd=0xAAAA indicates whether the data is valid, 1 indicates that the measurement data is valid, and 0 indicates that the measurement data is invalid;
- ✓ Distance=0xB BBBB represents the measured distance, measured in dm

Example: Using message fb 03 00 04 01 00 4c 00 4f as an example for analysis

Bytes	0	1	2	3	5	6	7	8	9
Name	Msg Type	Msg Code	Brd Id	PayLoad Len	DataValidInd		Distance		CRC
Data	0xFB	0x03	0xXX	0x04	0xAAAA		0xB BBBB		0xZZ
Case	fb	03	00	04	0100		4c00		4f
					Valid data		76dm		

5. 2. 3 Set module parameters

Bytes	0	1	2	3	4	5	6	7	8
Name	MsgType	MsgCode	BrdId	PayLoad Len	Type		Value		CRC
Data	0xFA	0x06	0xXX	0x04	0xAAAA		0xB BBBB		0xZZ

- ✓ BrdId=0xXX is used to specify the received module ID, where 0xFF represents the broadcast message
- ✓ Type=0xAAAA Parameter Type
- ✓ Value=0xB BBBB New setting value (except for module ID setting which takes effect immediately, all other parameters will take effect after resetting)

Example: fa 06 ff 04 00 00 00 03

Set module parameter response

Bytes	0	1	2	3	4	5	6	7	8
Name	MsgType	MsgCode	BrdId	PayLoad	Err		Type		CRC
Data	0xFB	0x07	0xXX	0x04	0xAAA A		0xB BBBB		0xZZ

- ✓ BrdId=0xXX is used to indicate the module ID sent
- ✓ Err=0xAAAA represents success or failure, where 0 represents success and non-zero represents failure
- ✓ Type=0xB BBBB Parameter

Type Example: fb 07 00 04 00 00 00

06

Module parameter type				
class type	name	Default value	Value range	meaning
0	Module ID	0	0-254	1) The module ID is used in the request message to indicate the receiving module; 2) The module ID is used in response or reporting messages to indicate the source of the message; 3) When the message sender does not pay attention to the receiver module ID When you want to broadcast a message, fill in 0xFF for the module ID
1	Serial Port Baud Rate	1152	9216,1152,384,192,96,24,12	Unit: 100bps

5. 2. 4 Read module parameters

Module parameter reading request							
Bytes	0	1	2	3	4	5	6
Name	MsgType	MsgCode	BrdId	PayLoadLen	Type		CRC
Data	0xFA	0x08	0xFF	0x02	0xAAAA		0xZZ

- ✓ BrdId=0xFF is used to specify the received module ID, where 0xFF represents the broadcast message
- ✓ Type=0xAAAA Parameter Type

Example: fa 08 ff 02 00 00 03

Table 5-13 Module Parameter Reading Response

Bytes	0	1	2	3	4	5	6	7	8
Name	MsgType	MsgCode	BrdId	PayLoad	Type		Value		CRC
Data	0xFB	0x09	0xFF	0x04	0xAAAA		0xBBBB		0xZZ

- ✓ BrdId=0xFF is used to indicate the module ID sent
- ✓ Type=0xAAAA Parameter Type
- ✓ Value=0xBBBB

Parameter value example: fb 09 00 04 00 00 00 00 08

6、Precautions

The SDDM series long-range distance measurement module is an optical instrument, and its operation is affected by

SDDM 产品手册

environmental conditions. Therefore, the achievable range during application varies, while the ranging accuracy is not affected by such factors. The following conditions may have an impact on the measurement process:

6.1 influence factor

6.1.1 Factors affecting the measurement range

essential factor	Factors for extending the measurement range	Factors that shorten the measurement range
target surface	1. A bright and well reflective surface, such as a reflector. 2. The light source of the measurement module is directly aimed at the target;	1. Dim and dull surfaces, black surfaces, absorbent materials such as sponges/fabrics; 2. Module oblique shooting target;
Air particles	clean air	Dust, fog, rainstorm, snowstorm
Intensity of sunlight	Low light environment	Under bright illumination

6. 1. 2 Reasons affecting measurement accuracy

(1) Transparent surface

To avoid measurement errors, please do not measure against the surface of transparent objects, such as colorless liquids (such as water) or glass (dust-free). For unfamiliar materials or liquids, a trial test can be conducted first. When aiming at a target through a glass window or when there are several target objects in the line of sight, measurement errors may occur.

(2) Damp, high gloss/mirror finish surfaces

When the aiming angle is very small, the laser will be reflected off. At this point, the signal received by the device will be too weak, affecting accuracy/range; When the target is a mirror or other object, the laser signal will be reflected, resulting in a weak signal received by the device, which may not be able to measure the distance between the device and the target.

(3) Slopes, circular surfaces

Measurement can only be carried out when the target area is large enough to accommodate the laser spot.

(4) multipath reflection

When the laser returning from other objects exceeds the reflected light of the target, incorrect measurement results may occur. Please avoid various reflectors on the measurement path.

6. 2 Safety precautions

The following guidance can help SDDM series owners and users understand in advance the potential hazards during operation and take preventive measures. The instrument manager should ensure that all users read and follow these instructions. If the SDDM series is part of the system, the system manufacturer must be responsible for all safety related issues such as manuals, labeling, and guidance.

Instrument usage:

1. Permitted use: Distance measurement.

2. Prohibited scope

- ✓ Using instruments without following instructions
- ✓ Destroy the security system, remove instructions and danger signs
- ✓ Modify or upgrade instruments
- ✓ Aim directly at the sun

Warning:

Prohibited usage methods may result in personal injury, instrument malfunction, and loss if used. The person in charge of the instrument has the responsibility to inform the user of its danger and how to prevent it. Do not operate SDDM-XXX until the usage method is clear. Used under conditions suitable for human survival. Do not use in flammable and explosive environments.

6. 3 limitation of liability

The responsibility of the original equipment manufacturer:

Provide products under completely safe conditions, including this manual, software, and original attachments.

6. 4 Major use hazard

Warning: Do not point the SDDM-XXX laser directly at the sun, otherwise it may damage the instrument; Do not point the SDDM-XXX laser directly at the human eye, as it may cause harm to the eyes;

Appendix 1: CRC Stream Calculation&Usage

Taking a single measurement message as an example, the message stream is: fa 01 ff 04 01 00 01 00 00

1) Accumulate the entire message in U8 array: 0xfa+0x01+0xff+0x04+0x01+0x00+0x01+0x00=0x200

2) Take the lower 8 bits of the accumulated value as the CRC value: i.e. 0x00

7、Contact Us

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