Siman

SDM50 Laser rangefinding Module

The SDM50 LiDAR is a brand-new laser ranging product launched by our company, specifically designed for applications such as altitude hold and obstacle avoidance for drones, obstacle avoidance for robots, industrial-grade light curtains, AGV obstacle avoidance, high-speed measurement and safety monitoring in transportation and industrial automation fields. Based on the DTOF ranging principle, this product features a compact size, low cost, superior performance, and strong resistance to ambient light interference. It is easy to use, flexible in installation, and highly scalable, offering excellent value for money. For more product information, please visit: www.siman.asia

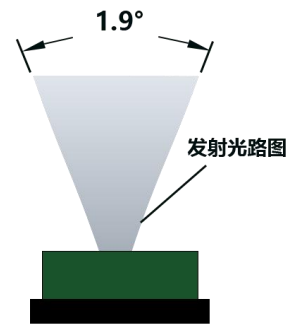| Warning	Please follow the equipment usage guidelines! This product is not a safety sensor and cannot be used for personnel protection.
⚠	- Main measurement laser (905 nm): Class 1 laser product. Safe under normal operating conditions. - The product may fail when measuring highly reflective objects (such as 3M tape) or mirror surfaces. - This product does not have an explosion-proof design and must not be used in flammable or explosive environments. - Do not disassemble this product. - Be sure to turn off the power before performing any operations. Do not perform wiring operations while the power is still on! 1. Avoid use in dusty/vapor environments or environments with corrosive gases; 2. Avoid inPlaces where corrosive gases are generatedUse; - This product cannot be used in water. - When using outdoors, be sure to add a waterproof cover.

Wiring diagram

Pin	Line sequence definition	User interface
1	GND	External power negative
2	VCC 3.3-5V	External power positive
3	RX（SDA）	TX（SDA）
4	TX（SCL）	RX（SCL）

Specifications Parameter

Model	SDM50
Measurement range	0.05 ~ 50 m (90% reflectance), 0.05 ~ 20 m (10% reflectance)
Repeatability	±30mm
Accuracy	±5 cm (<5 m), 1% (≥5 m)
Measure frequency	500Hz
Measure the laser light source	905nm,Class 1
Field of View FOV	1.9°
Laser wavelength indication	N/A
Laser class indication	N/A
Anti-environmental light capability	10m@60KLux
Control output	UART TTL, IIC
Input voltage	3.3 ~ 5VDC
Peak current	5V@70mA
Average current	5V@40mA
Average power consumption	0.2W
Weight	1.3g
Size	18.7 x 11.8 x 13.3mm
Operating temperature	-20~60℃
Electrical connection	41.0mm pin terminal, model HC-1.0-4PLT, paired with 10cm tinned stranded wire.
Customization scope	Supports external structure customization and customized output protocols.

Dimensional drawing

Ranging characteristics

Since the probing light source has a certain divergence angle, in actual measurements, if an accurate distance value is required, the surface area of the object being measured must be larger than the diameter of the light spot at that distance. The optical path diagram for range measurement is as follows:

1.9°

发射光路图

The spot diameters of SDM50 at different distances are shown in the table below:

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

Siman

Siman Sensing Technology Co., Ltd.

Website:www.siman.asia

Building 1, Wanda Mall, Qingpu District, Shanghai City

No. 11 Changchun Road, High-Tech Zone, Zhengzhou City, Henan Province National University Science and Technology Park, Building C5B2

Phone: 0371-63383997

Scan the code to follow us.

Communication Instructions:UART TTL

Baud rate	460800bps (default), can be modified	
Data bit 8	Stop bit 1	Check digit: None

Output format

This product uses the little-endian hexadecimal format for both input and output.

Frame header	Distance value, two bytes	Check digit
5C	02 11	EC

5C: Fixed frame header, 1 byte

02 11The distance value is represented by two bytes, indicating a measured distance of 4354 mm.

Little-endian mode,Range 0-50000,Cannot detect output 50000.

EC: The checksum is one byte, calculated by summing all bytes from the second byte (02) to the second-to-last byte (11), then taking the bitwise complement of the sum..

UART instruction

Function	direction	Data	Definition
Read the product serial number	Send	5A 0D 04 0D 0D 0D 0D BA(checksum)	10 01 00 00The product serial number is 272: little-endian format. On the host computer, the displayed product serial number is: S0000000272（In10(Add "S" before the digit)
	Return	5A 8D 04 10 01 00 00 5D(checksum)	
Read the software version number	Send	5A 16 02 16 16 BB(checksum)	03 02Indicates that the product software version number is V2.3: Little-endian mode, where 02 represents 2 and 03 represents 3, with a period (.) in between.
	Return	5A 96 02 03 02 62(checksum)	

Modify the baud rate	Send	5A 06 02 80 04 73(checksum)	60 00（9600） C0 00（19200） 80 01（38400） 80 04（115200）
	Return	5A 86 02 80 04 F3(checksum)	00 09（230400） 00 0A（256000） 00 12（460800） Other baud rates are not supported.
Switch IIC instruction	Send	5A 1F 02 1F1F A0(checksum)	Return 5A 9F 02 1F 1F 20 Switched successfully
	Return	5A 9F 02 1F 1F 20(checksum)	
Stop ranging	Send	5A 0A 02 00 00 F3	Return 5A 8A 02 00 00 73 Stop ranging
	Return	5A 8A 02 00 00 73	
Start ranging	Send	5A 0A 02 02 00 F1	Return 5A 8A 02 02 00 71,Start ranging
	Return	5A 8A 02 02 00 71	

Validation function: AboveThe last oneThe checksum byte is all generated using this checksum function.

Sum the bytes starting from the second byte up to, but not including, the second-to-last byte, then take the bitwise complement.

```
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;

}
```
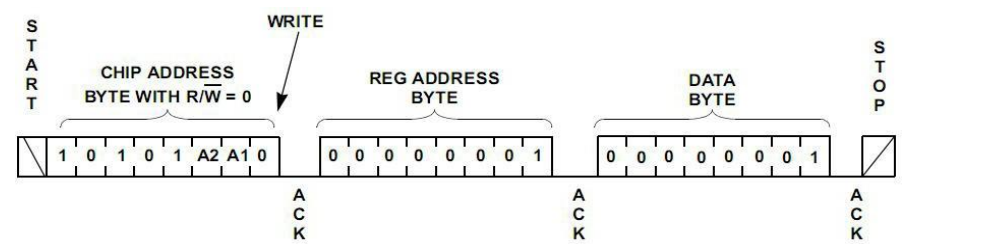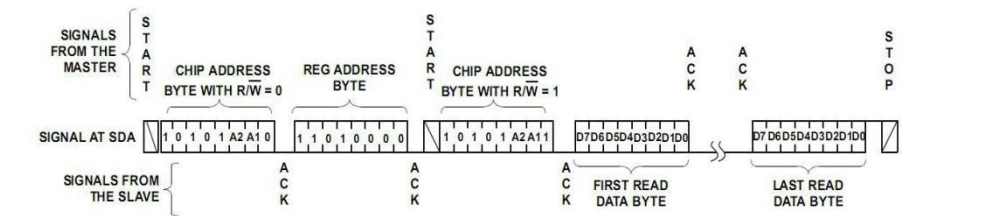
IIC communication protocol

SDM50The LiDAR IIC slave interface supports a clock frequency of up to 400K.

The factory default address is 0x52 (7-bit address mode).

The I2C single-register write timing is as follows:
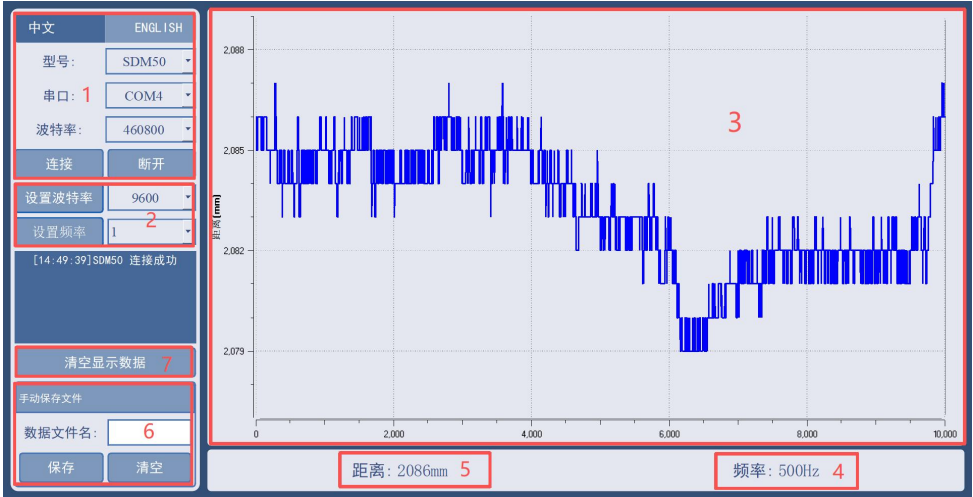

I2C Multi-Register Read Timing Sequence:

Register definition:

Register address	Register Meaning	Read/Write attribute	Note
0x00	Distance – High Byte	Read-only	Distance is represented using 2 bytes.
0x01	Distance – Low Byte	Read-only	Distance is represented using 2 bytes.
0x02	Laser-enabled control	Just write	0: Turn off the laser, 1: Turn on the laser
0x03	LiDAR ID	Read-only	Default value: 0x4A, used for communication read/write testing.
0x04	Switch IIC to UART	Just write	0Write 0xA5 to register x04 and write 0x5A to register x05 at the same time.
0x05		Just write	
0x06	Software Version Number – High Byte	Read-only	The software version number is 2 bytes, with the high byte first and the low byte second.
0x07	Software Version Number – Low Byte	Read-only	
0x08	Serial Number – High Byte	Read-only	The serial number is 4 bytes long, with the high byte first and the low byte last, ranging from 1 to 4,294,967,294.
0x09	Serial Number – Next Highest Byte	Read-only	
0x0A	Serial Number – Next-to-Low Byte	Read-only	
0x0B	Serial Number – Low Byte	Read-only	
0x0C	IIC slave address	Read/Write	IIC slave address, 7-bit mode, range 0 – 127
0x0D	Restore factory settings	Just write	Write 0x01 to restore factory settings.

Fast Test:

Test Bill of Materials: TTL-to-USB adapter,5V power supply (can be from a battery, power bank, or computer USB port)Host computer/Serial port assistant.

After the SDM50 is properly connected, select the baud rate and click OK to start observing the desired data on the host computer.

The host computer displays the following:

Region 1: Set the corresponding serial port baud rate and other parameters for the model, click Disconnect, then click Connect.

Region 2: Set baud rate and frequency

Region 3: Real-time Distance Line Chart

Region 4: Read real-time frequency

Region 5: Read the real-time distance value

Region 6: Save data to a file

Area 7: Clear all displayed data