Siman

SDM20 Laser rangefindingModule

The SDM20 LiDAR is our company's product designed for drones.Fixed-altitude obstacle avoidance, robotObstacle avoidance• High-speed measurement and safety monitoring in the fields of transportation and industrial automation,A brand-new laser ranging product launched in fields such as industrial robotics. 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, convenient for expansion, and offers excellent value for money.For more product information, please visit:www.siman.asia
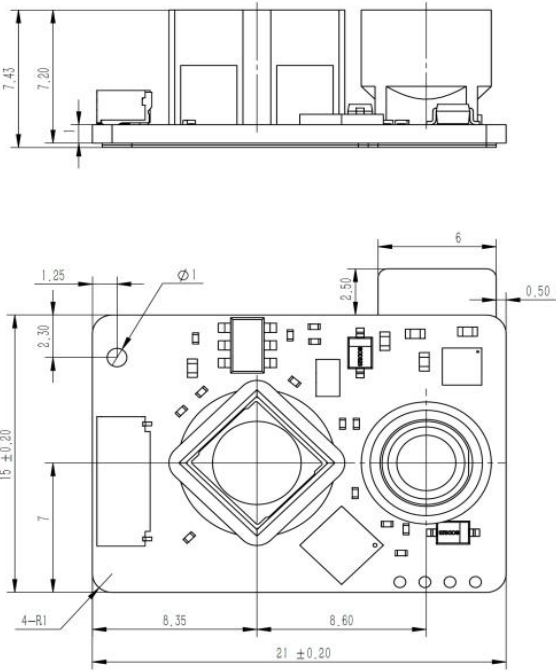
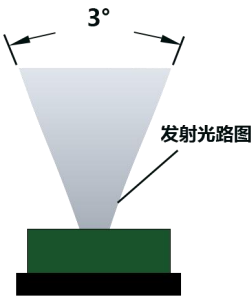| Warning	Please follow the equipment usage guidelines! This product is not a safety sensor and cannot be used for personnel protection.

⚠	➢ 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 is prohibited from use in flammable and 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 atPlaces 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	Pin definitions	User interface
1	NC	
2	VCC +3.3V	External power positive
3	TX (SCL)	RX (SCL)
4	RX (SDA)	TX (SDA)
5	NC	
6	GND	External power sourceNegative

SpecificationsParameter

Model	SDM20
Measurement range	0.05~20m (90% reflectance),0.05~10m (10% reflectance)
Repeatability	±30mm
Accuracy	±5 cm (<5 m), 1% (≥5 m)
Measure frequency	200Hz（Adjustable to 100/50/20/10/1 Hz)
Measure the laser light source	905nm,Class 1
Field of View FOV	3°
Anti-environmental light capability	8Rice@60K Lux
Control output	UART TTL, IIC
Operating voltage	3~3.6VDC
Operating current	3.3V@70mA (peak current) 3.3V@40mA（Average current）
Average power consumption	<0.2 W
Weight	1.5g
Size	21x 15 x 7.43 mm
Operating temperature	-20~60℃
Electrical connection	60.8mm pin terminal, specification HC-0.8-6PWT（Supports custom-made double-ended cable assemblies (including length).

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:

The diameters of the light spots of SDM20 at different distances are shown in the table below:

distance	1m	2m	5m	10m	20m
Spot diameter	5cm	10cm	25cm	50cm	100cm

Contact Us

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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 0－20000If it cannot be measured, output 20000..

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..

Example: The device is this product, and the host is the control receiving end.

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: in little-endian format, the host computer displays the product serial number as: S0000000272 (with an "S" added before the 10-digit number).
	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） 00 09（230400） 00 0A (256000) 00 12（460800） Other baud rates are not supported.
	Return	5A 86 02 80 04 F3(checksum)	
Modification frequency	Send	5A 0B 02 E7 03 08(checksum)	E7 03 indicates the serial port data frequency division factor: in little-endian mode, the configured serial port frequency division factor is 999 (E7 03). The corresponding serial port data output frequency f is calculated as follows: f = 10000 / (999 + 1) = 10 Hz. The serial port frequency supports only six levels: 200 Hz, 100 Hz, 50 Hz, 20 Hz, 10 Hz, and 1 Hz.
	Return	5A 8B 02 E7 03 88(checksum)	
Reading frequency	Send	5A 1B 02 1B 1B AC(checksum)	31 00Indicates serial port dataFrequency division factor: Little-endian mode, indicatingReadof theThe serial port frequency divider factor is 49.（31 00）The corresponding serial port data output frequency f = 10000 / (49 + 1) = 200 Hz. The serial port frequency supports only six levels: 200 Hz, 100 Hz, 50 Hz, 20 Hz, 10 Hz, and 1 Hz.
	Return	5A 9B 02 31 00 31(checksum)	
Switch IIC instruction	Send	5A 1F 02 1F 1F A0	Return 5A 9F 02 1F 1F 20,Switched successfully
	Return	5A 9F 02 1F 1F 20	
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

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;

}
```
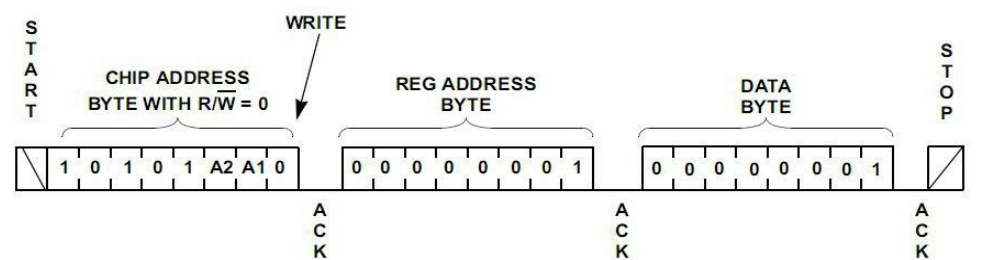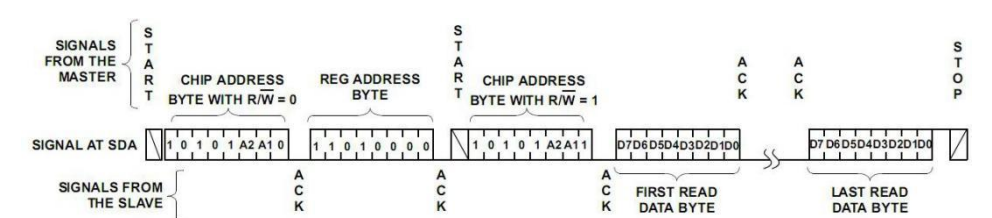
IIC communication protocol

The SDM20 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 simultaneously write 0x5A to register x05.
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-Lowest 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 Testt:

Test Bill of Materials: TTL-to-USB adapter, 3.3V power supply, host computer/serial port assistant.

After correctly connecting the SDM20, select the baud rate and click OK to view 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 the baud rate

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