Siman

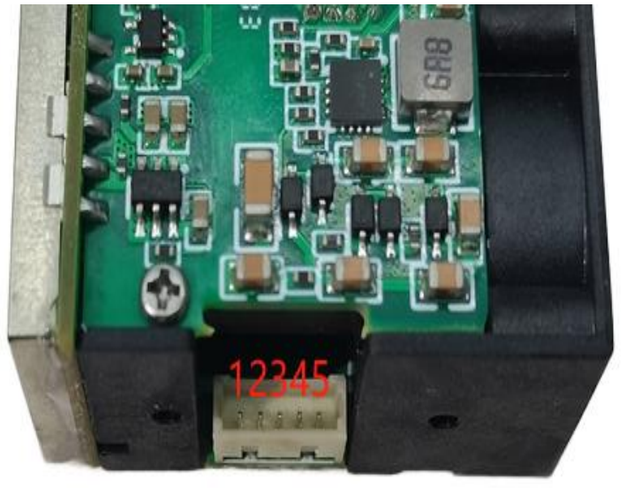
SDFM laser ranging module

The SDFM series is a high-precision mid-to-long-range LiDAR system compatible with both indoor and outdoor environments, featuring strong electromagnetic interference resistance. It enables positioning and collision avoidance monitoring for land transport vehicles and overhead cranes. The system is widely used in various applications including UAV altitude determination (inspection drones), wind turbine monitoring, landslide detection, and material level monitoring. For more product details, visit: www.siman.asia

warn	Follow the device's usage guidelines! This product is not a safety sensor and cannot be used for personal protection.

- Main measurement laser (905nm): Class 1 laser product. Safe under normal operating conditions.
- The product may fail when measuring high-reflection surfaces (e.g., 3M tape) or mirrors.
- This product lacks explosion-proof features and must not be used in flammable or explosive environments.
- Do not disassemble this product.
- Always turn off the power before operating. Do not connect wires while powered on!
  1. Avoid use in dusty/steam environments or corrosive gas environments;
  2. Avoid using in areas where corrosive gases are generated.
- Do not use this product in water.
- When used outdoors, it is important to add a waterproof cover.

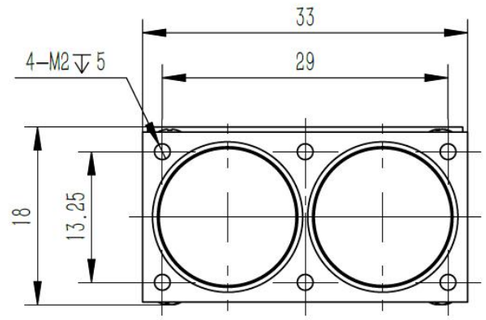
hookup

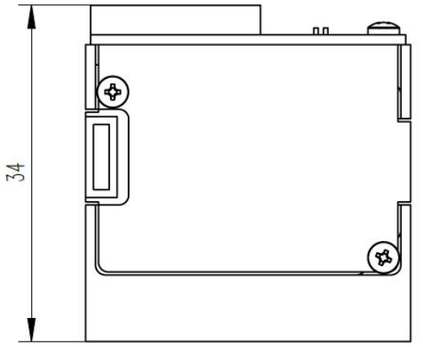


pin	Sequence definition	customer interface
1	VCC 9-36V	External power positive
2	source GND	External power supply negative
3	gorge line GND	GND
4	TX(SCL)	RX(SCL)
5	RX(SDA)	TX(SDA)

Specification parameters					
model	**SDFM100**	**SDFM200**	**SDFM300**	**SDFM600**	**SDFM1500**
90% reflectance range	**100m**	**200m**	**300m**	**600m**	**1500m**
10% reflectance range	30m	70m	100m	200m	300m
fade zone	0.05m				
repeatability precision	±5cm (within 10 meters), ±10 cm at 100 meters, 200 meters, 300 meters, and ±50 cm at 600 meters. ±100cm@1500m				
accuracy	±10cm (within 10 m), 1% (outside 10 m)				
measuring frequency	1KHz (adjustable from 20 to 10KHz)		Automatically switches between 1KHz and 50Hz based on the intensity of the reflected signal		
Measurement of laser light source	905nm,Class 1				
Field of View (FOV)	Approximately 4mrad				
anti environmental light ability	100KLux				
communication mode	UART IIC				
working voltage	9～36VDC				
working current	100mA (peak current)				
	30mA (average current)	30mA (average current)	55mA (average current)	55mA (average current)	55mA (average current)
average power consumption	0.7W	0.7W	1.2W	1.2W	1.2W
weight	20±2g				
size	33 x 34 x 18 mm				
working temperature	-20~60℃				
electrical connection	1.25mm, 5P,50cm loose thread				
Customization range	Supports customizing the shape and structure, and the output protocol				

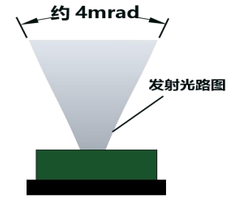
dimensional drawing





range characteristic

Because the light source has a certain divergence angle, the actual measurement requires the surface area of the object to be larger than the diameter of the light spot at this distance to obtain an accurate distance value. The distance measurement optical path diagram is as follows:



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

distance	1m	10m	50m	100m	200m	300m	600m	1500m
Spot diameter	0.4cm	4cm	20cm	40cm	80cm	120cm	240cm	600cm

Communication Description: UART		
Baud rate	460800bps (default), adjustable	
Data bit 8	Stop bit 1	Check digit: None

output format

This product uses 16-bit little-endian mode for both input and output.

frame header	Distance value in bytes		check bit
5C	02	11	EC
5C: Fixed frame header 1 byte			
02 11: The two-byte distance value indicates a measured distance of 4354 cm. Small-end mode, range 0-65535. If not detected, output 65535cm.			
EC: The parity bit is a one-byte value, calculated by summing and then taking the complement of the data from the second byte (02) to the second-to-last byte (11).			

Note: The distance value of SDFM1500 is three bytes, with the format as follows

frame header	distance value three bytes			check bit
5C	02	11	03	EC
5C: Fixed frame header 1 byte				
02 11 03: The three-byte distance value indicates a measured distance of 200962cm in little-endian mode, with a range of 0-16777215 cm. If the distance cannot be measured, it outputs 16777215 cm.				
EC: From 02 to 03, perform and verify the reverse byte.				

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

function	direction	data	definition
Read product serial number	transmit by radio	5A 0D 02 0D 0D D6	10 01 indicates product serial number 272: small-end mode. The host machine displays the serial number as S00272 (with 'S' added before the 5-digit number).
	return	5A 8D 02 10 01 5F	
Read software version number	transmit by radio	5A 16 02 16 16 BB	03 02 indicates the product software version number V2.3: 02 for small end mode, 03 for 3, with a dot (.) in between.
	return	5A 96 02 03 02 62	
Change baud rate	transmit by radio	5A 06 02 80 04 73	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	
Change measurement frequency	transmit by radio	5A 0B 02 E7 03 08	E7 03 indicates a serial data output frequency divider of 999 in little-endian mode, with the set frequency f calculated as 1,000,000/(999+1) = 1,000 Hz.
	return	5A 0B 02 E7 03 08	

Validation Function: All the above check bytes are processed by this function

Sum and invert from the second byte to the second-to-last byte

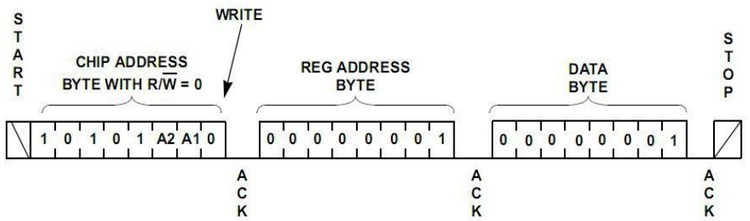
```
uint8_t Check_Sum(uint8_t *_pbuff, uint16_t _cmdLen)
{
uint8_t cmd_sum=0;
uint16_t i;
for(i=0;i<_cmdLen;i++)
{
cmd_sum += _pbuff[i];
}
cmd_sum = (~cmd_sum);
return  cmd_sum;
}
```

IIC communication protocol

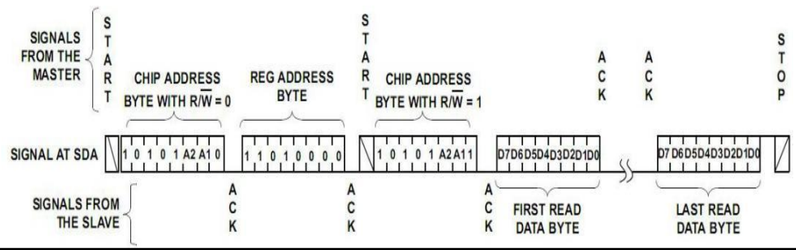
The default address for factory settings is 0x33

This product supports the fast transfer protocol (1KHz-400KHz). To read or write specific registers on the product, write the appropriate value to the register pointer. For a complete list of registers and their addresses, refer to the register definition.

The I2C single-register write sequence is as follows:



IIC multi-register read timing:



Register definition:

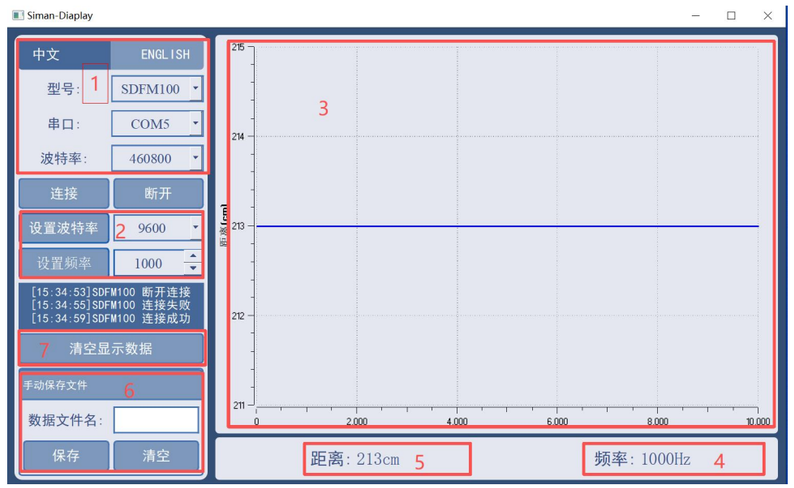
serial number	register address	register meaning	Read/Write Properties	remarks
0	0x00	Distance-High Byte	read only	Distance is represented by 2 bytes
1	0x01	Distance-Low Byte	read only	Distance is represented by 2 bytes
2	0x02	Software version-high byte	read only	
3	0x03	Software version-low byte	read only	
4	0x04	Serial Number-High Byte	read only	
5	0x05	Serial Number-Low Byte	read only	
6	0x06	Change slave address	write only	0x00-0x7F
7	0x07	factory data reset	write only	Write the register to 0x07
8	0x08	Switch to UART	write only	Write 0x08 to register 0x08

Fast Test:

Test equipment: TTL-to-USB adapter, 9-36V DC power supply, host computer/serial port adapter.

After establishing a proper SDFM connection, select the baud rate and click OK to view the required data on the host computer.

The host machine displays the following:



Area 1: Set parameters such as the serial port baud rate for the corresponding model. Click disconnect, then click connect.

Region 2: Set baud rate

Region 3: Real-time distance point line chart

Region 4: Read real-time frequency

Area 5: Read real-time distance value

Region 6: Save data to file

Region 7: Clear all displayed data

contact us

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