



File Name: XD-S200S Technical Specification

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File Number: [Enter
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Total 13 pages, Page 1

Inside information

XD-S200S Technical Specification Document

Wuhan X-Dynamics Technology Co., Ltd.

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File Name: XD-S200S Technical Specification

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[Enter file number]

Total 13 pages, Page 2

Inside information

Revision Record

Version number	Revision Date	Revise Chapter	Revision note
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Declaration of secrecy

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Catalogue

1. Product Overview.....	5
1.1. application area.....	5
2. Specification Parameters.....	5
2.1. Actual product image.....	5
2.2. size of product.....	6
3. Structure Description and Interface Definition.....	7
3.1. structural drawings.....	7
3.2. Hardware Interface Definition.....	7
3.3. Basic Performance Testing.....	8
4. electrical character.....	8
4.1. Power Supply and Power Consumption.....	8
4.2. Reliability Standard.....	9
5. control instruction.....	9
5.1. UART Interface.....	9
5.2. control instruction.....	9
5.2.1. Single Measurement Command.....	10
5.2.2. Continuous Measurement Command.....	10
5.2.3. Continuous Measurement Stop Command.....	10
5.2.4. Port rate setting (effective immediately).....	11
5.2.5. Device Information Acquisition.....	11
6. Appendix.....	12



File Name: XD-S200S Technical Specification

Version/Revision:

File Number: [Enter
file number]

Total 13 pages, Page 4

Inside information

6.1. System Integration Guide.....12

6.2. Use the suggestion..... 12

XD-S200S Technical Specification Document

1. Product Overview

The XD-S200S laser ranging module is developed using a 905 nm semiconductor laser, featuring compact size, lightweight design, and extended measurement range. Its applications include handheld rangefinders, micro-drones, and ranging scopes. Equipped with a UART (TTL protocol) data transmission interface, it provides host computer software and communication protocol command sets, facilitating user secondary development.

Product XD-S200S Features:

- Self-developed high-precision calibration and adjustment algorithms;
- Compact in size and lightweight;
- The measurement range is extensive;

1.1. Application Area

XD-S200S wide application fields:

- Handheld rangefinders, miniature drones, rangefinder scopes, etc.;

2. Specification Parameters

2.1. Actual Product Image

The actual product image is shown below:

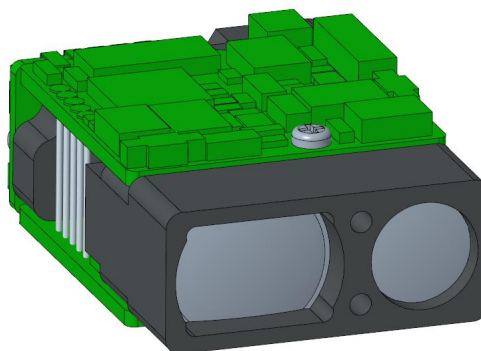


Figure 1. Effect Diagram of XD-S200S

2.2. Size of Product

The product's relevant specifications and parameters are as follows:

Table 1. Product Specification Table

Name	Performance index	Indicator Parameter	Remarks
Key index	Range	0.1~1200m	
	Accuracy	$\pm 1\text{m}$ (d ≤ 400 meters); $\pm(d*0.4\%) \text{ m}$ (d> 400 meters)	
	Range measurement frequency	≤2~4Hz	
	Laser emission angle	~5*5mrad	
	Firing aperture	Diameter 5.4mm	
	Receiving aperture	8.4×5.4mm	
	Wavelength	905nm	
	Security classification	Class I: Safe for human eyes	
System parameter	Work environment	Indoors & outdoors	
	Working temperature	-20℃ ~ 60℃	
	Storage Temperature	-30℃ ~ 80℃	
	Impact magnitude	1200G.1ms	
	Structure size	≤10.2mm ×16.5mm × 25.2mm	
	Weight	6.5±0.5g	
Electrical	CI	UART(TTL-3.3V)	
	Power interface	HDGC0601WR-S-8P	

	Service voltage	DC3V~5V	
	Average Power Consumption	≤450mW	
	Baud rate	115200 bps (default)	

3. Structure Description and Interface Definition

3.1. Structural Drawings

The structural dimensions of the XD-S200S product are shown below:

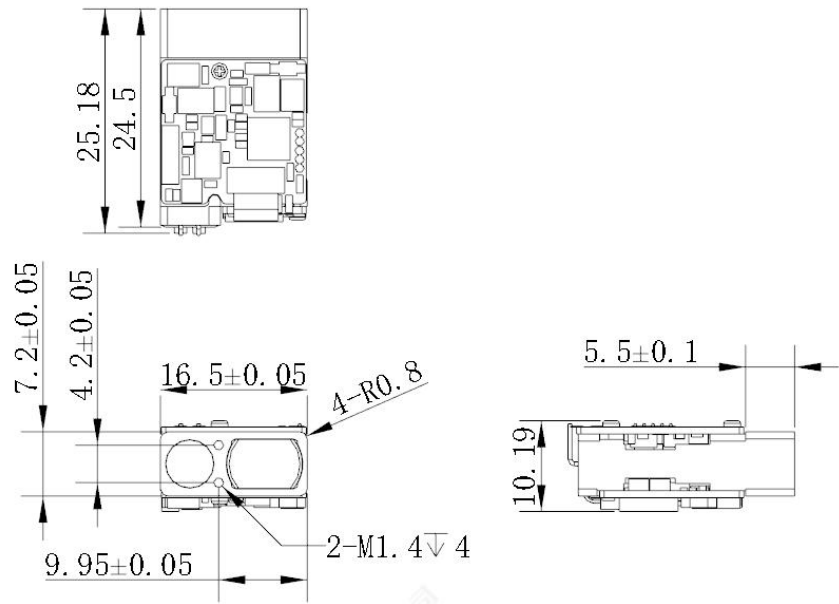


Figure 2. XD-S200S Dimension Diagram

3.2. Hardware Interface Definition

The hardware interface structure diagram of the product is shown below:

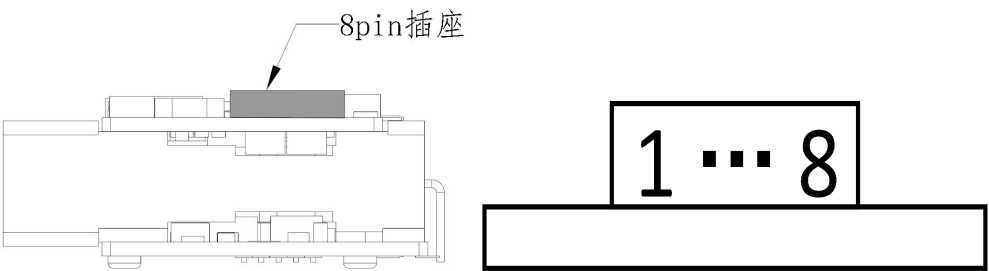


Figure 3. Product Interface Diagram

The corresponding interface specification parameters in the product interface diagram are shown in the table below:

- Electrical interface: UART (TTL-3.3V)
- Plug type: 8PIN, 0.5mm pitch terminals

Table 2. Connector Pin Sequence Table

Pin	Definition	Explain
1	POWER_ON	Mains switch The high level activates and the low level turns off the power supply, where the high level is the power supply level.
2	UART_RX	Serial receiver, TTL 3.3V
3	UART_TX	Serial transmitter, TTL 3.3V
4	VCC	Power supply: 3V–5V, maximum not exceeding 5.5V
5	GND	Serial port ground power ground
6	NC	NC
7	NC	NC
8	NC	NC

3.3. Basic Performance Testing

The range of this product is defined under the following conditions:

- (1) The measurement target has moderate reflectivity: such as building walls.
- (2) The target reflection surface is perpendicular to the laser emission direction.
- (3) The weather was clear but not under direct sunlight;

4. Electrical Character

4.1. Power Supply and Power Consumption

The power supply and power consumption parameters for the XD-S200S product are shown in the table below:

Table 3. Power Supply Parameters and Specifications Table

Service voltage	DC3V~5V
Average Power Consumption	$\leq 450\text{mW}$
Peak Power Consumption	$\leq 1.65\text{W}$
Standby power consumption	$\leq 1.5\text{ mW}$ (EN disabled)

4.2. Reliability Standard

The standard reliability parameters for the XD-S200S product are shown in the table below:

Table 4. Reliability Standards Table

Working temperature	$-20^{\circ}\text{C}\sim 60^{\circ}\text{C}$
Storage Temperature	$-30^{\circ}\text{C}\sim 80^{\circ}\text{C}$
Impact magnitude	1200G.1ms

5. Control Instruction

5.1. UART Interface

- baud rate: 115200 bps (default)
- Start position: Position 1
- Data bits: 8 bits
- Stop bit: 1 bit
- Check bit: None
- Flow control: None

5.2. Control Instruction

Send the checksum = Byte 3 + Byte 4 + Byte 5 + Byte 6 + Byte 7;

Received verification code = Byte 1 + Byte 2 + Byte 3 + Byte 4 + Byte 5 + Byte 6 + Byte 7;

5.2.1. Single Measurement Command

(1) The single measurement command is as follows:

Table 5. Single Measurement Command

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
0x55	0xAA	0x88	0xFF	0xFF	0xFF	0xFF	Check code

Table 6. Return Value of a Single Measurement

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
0x55	0xAA	0x88	Status	0xFF	DATA_H	DATA_L	Check code

Status = 0: Single measurement failed; DATA_H = 0xFF, DATA_L = 0xFF; Status = 1: Single measurement successful; DATA_H = high byte of measurement result; DATA_L = low byte of measurement result;

5.2.2. Continuous Measurement Command

(1) The continuous measurement command is as follows:

Table 7. Continuous Measurement Command

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
0x55	0xAA	0x89	0xFF	0xFF	0xFF	0xFF	Check code

Table 8. Continuous Measurement Return Value

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
0x55	0xAA	0x89	Status	0xFF	DATA_H	DATA_L	Check code

Status = 0: Multiple measurements failed; DATA_H=0xFF, DATA_L=0xFF; Status = 1: Multiple measurements succeeded; DATA_H=high byte of measurement result; DATA_L= lower byte of measurement result.

5.2.3. Continuous Measurement Stop Command

(1) The continuous measurement stop command is as follows:

Table 9. Continuous Measurement Stop Command

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
0x55	0xAA	0x8E	0xFF	0xFF	0xFF	0xFF	Check code

Table 10. Return Value When Continuous Measurement Is Stopped

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
0x55	0xAA	0x8E	Status	0xFF	0xFF	0xFF	Check code

Status = 0: Multiple measurement attempts failed; Status = 1: Multiple measurement attempts succeeded.

5.2.4. Port Rate Setting (effective Immediately)

Table 11. Port Rate Transmission Settings

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
0x55	0xAA	0x01	0xFF	0xFF	0xFF	DATA	Check code

DATA: 1--9600, 2--14400, 3--19200, 4--38400, 5--57600, 6--115200, 7--230400

Table 12. Port Rate Setting Return

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
0x55	0xAA	0x01	Status	0xFF	0xFF	DATA	Check code

Status=0x00: Port rate configuration failed; Status=0x01: Port rate configuration successful; DATA: Same as above.

5.2.5. Device Information Acquisition

Table 13. Device Information Acquisition

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
0x55	0xAA	0xA0	0xFF	0xFF	0xFF	0xFF	Check code

Table 14. Return of Device Information

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 8
--------	--------	--------	--------	--------	--------	--------	--------	--------

0x55	0xAA	0xA0	Status	0xFF	0x58	0x44	0x02	Check code
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Status=0x00: Device information acquisition failed; Status=0x01: Device information acquisition succeeded.

6. Appendix

6.1. System Integration Guide

Before using the XD-S200S camera for development, users should first contact the staff of Wuhan X-Dynamics Technology Co., Ltd. to obtain technical specifications and other relevant materials. The suitability for mass production can be determined through preliminary evaluation, debugging, and verification steps.

Recommended Process:

- Read the technical specifications of the XD-S200S;
- Buy and obtain the XD-S200S prototype through official channels;
- Before development, please contact the staff of Wuhan X-Dynamics Technology Co., Ltd. to obtain the necessary materials.
- You can choose the appropriate development platform as needed.
- Develop products based on their functions. If you encounter any issues during development, please contact Jidong Intelligence's staff promptly.
- Finalize the mass production plan for the ultimate product;

6.2. Use the Suggestion

Factors affecting ranging capability and accuracy include:

- Target reflectivity: Generally, the higher the target reflectivity, the better the ranging capability and the faster the response speed. For example, targets with medium reflectivity can be measured up to 1000 m, while those with low reflectivity may only be detected at 400 m.
- Measurement Angle: When the laser beam is perpendicular to the target, the ranging capability and response speed are optimal; otherwise, they decrease. Use under extreme conditions does not guarantee achieving the ranging capability and response speed specified in this manual.

- Measuring Environment: Factors affecting ranging capability and response speed also include solar radiation intensity, concentrations of water vapor and suspended particulate matter in the air, and the angle of deviation from sunlight exposure.