



File Name: XD-S700L Technical Specification

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Inside information

XD-S700L Technical Specification Document

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Revision Log

Version number	Revision Date	Revise Chapter	Revision note
V1.1.1	2024/08/24	Full Chapter	
V1.1.2	2024/9/22	Chapter Five	Control Command Modification
V1.1.3	2024/11/22	Chapter three	Change the structure interface diagram
V1.1.4	2024/12/5	Chapter two	Edit the electrical section

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Declaration of secrecy

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1. Product Overview

The XD-S700L laser ranging module is developed using a 905 nm semiconductor laser, featuring a compact size, lightweight design, and long 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-S700L Features:

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

1.1. Application Area

XD-S700L 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. XD-S700L Figure 1

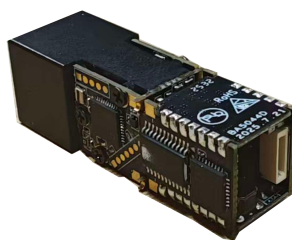


Figure 2. XD-S700L Figure 2



Figure 3. XD-S700L Figure 3

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	5~700m	
	Accuracy	$\leq 400\text{m}$: $\pm 1\text{m}$; $> 400\text{m}$: $\pm(d*0.3\%)$	
	Range measurement frequency	$\leq 4\text{Hz}$	
	Inclination measurement	$\pm 90^\circ$ (two directions), accuracy: $< \pm 1^\circ$	
	Laser emission angle	$\sim 3\text{mrad}$	
	Firing aperture	$\Phi 7.5 \times 5\text{mm}$	
	Receiving aperture	$11.8 \times 5.2\text{mm}$	
	Wavelength	905nm	
System parameter	Work environment	Indoor & Semi-outdoor	
	Working temperature	$-30^\circ\text{C} \sim 60^\circ\text{C}$	
	Storage Temperature	$-30^\circ\text{C} \sim 80^\circ\text{C}$	
	Impact magnitude	1200G.1ms	
	Structure size	$\leq 13.5 \times 13.1 \times 40.2\text{mm}$	
	Weight	$10 \pm 0.5\text{g}$	
Electrical	CI	UART(TTL-3.3)	
	Power interface	SM06B-SURS-TF(LF)(SN)	
	Service voltage	DC3.3-5V	
	Average Power Consumption	$\leq 420\text{mW}$	

	Baud rate	115200bps	
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3. Structure Description and Interface Definition

3.1. Structural Drawings

The structural dimensions of the XD-S700L product are shown below:

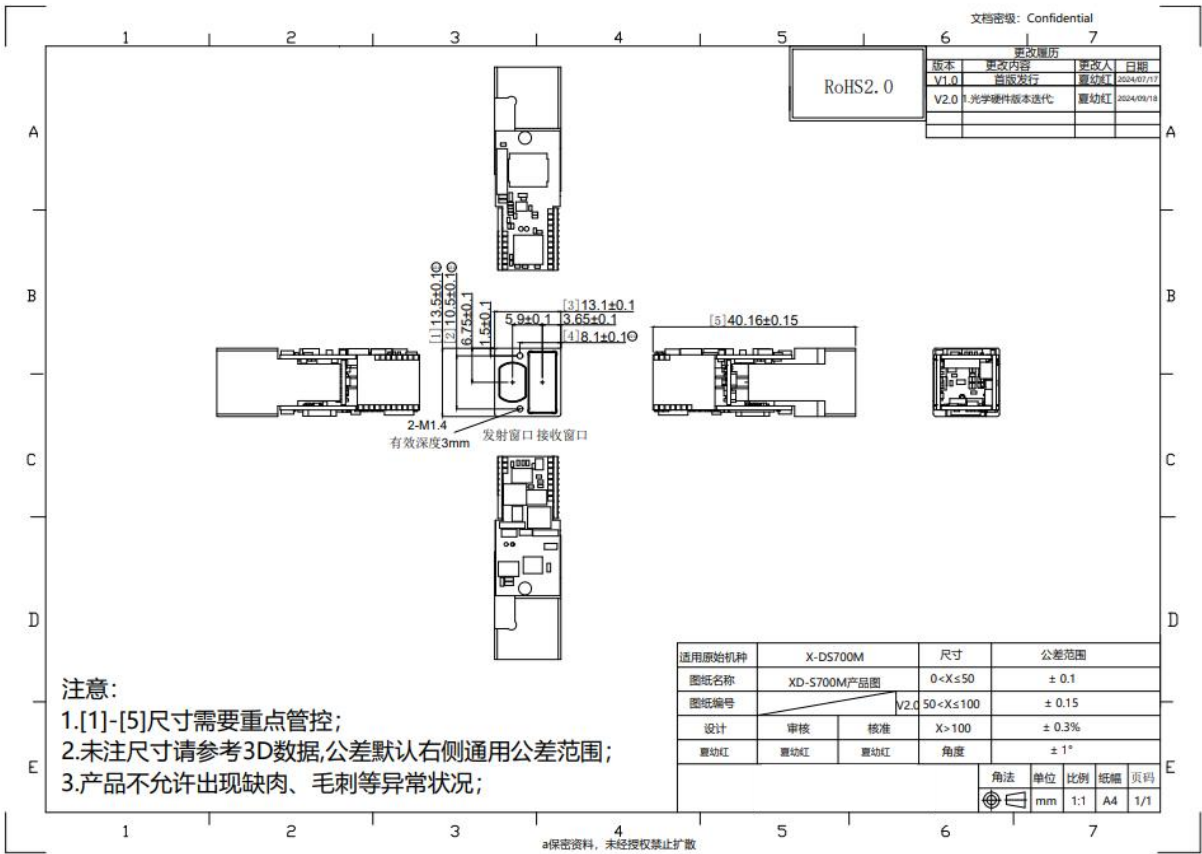


Figure 4. XD-S700L Dimension Diagram

3.2. Hardware Interface Definition

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

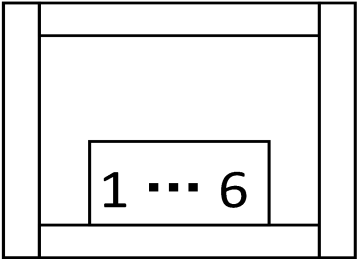


Figure 5. Schematic diagram of product interface line sequence

- Electrical interface: UART (TTL-3.3V)
- Plug type: 6PIN, 0.8mm pitch terminals

Table 2. Connector Pin Sequence Table

Pin	Definition	Explain
1	POWER_ON	Mains switch (The high level activates, 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	NC	NC
5	VCC	Power supply: 3V to 5V, maximum not exceeding 5.5V
6	GND	Serial port ground power ground

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 specifications for the XD-S700L product are shown in the table below:

Table 3. Power Supply Parameters and Specifications Table

Service voltage	DC3.3-5V
Average Power Consumption	≤420mW

Peak Power Consumption	$\leq 1.3\text{W}$
Standby power consumption	$\leq 1.5\text{ mW}$ (EN disabled)

4.2. Reliability Standard

The standard reliability parameters for the XD-S1000 product are shown in the table below:

Table 4. Reliability Standards Table

Working temperature	$-30^{\circ}\text{C}\sim 60^{\circ}\text{C}$
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=lower 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 5	Byte 6	Byte 7	Byte 8
0x55	0xAA	0x89	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 = low 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	0xFF

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
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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-S700L camera for development, users should first contact the staff of Neutral 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-S700L;
- Buy and obtain the XD-S700L prototype through official channels;
- Before development, please contact the personnel of Neutral Limited Company to obtain the necessary information.
- You can choose the appropriate development platform as needed.
- Develop products based on their functions. If you encounter any issues during development, please contact our neutral support 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, a medium-reflectivity target can be measured up to 700 meters, while a low-reflectivity target may only be detected at 400 meters.
- 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.