

1.1.1 communicating protocol

1.1.2 protocol definition

- ◆ RS422 asynchronous serial communication standard;
- ◆ The baud rate is 115200bps.
- ◆ Transmission format: 8 data bits, 1 start bit, 1 stop bit, no parity bit.
- ◆ For each byte of data, transmit the least significant bit (LSB) first. For multi-byte data, transmit the least significant byte first.

1.1.3 The command sent by the host computer system to the laser photometry module

- ◆ Information header (0x55);
- ◆ Command word 1;
- ◆ Command 2;
- ◆ Command word 3;
- ◆ The "information tail" is a checksum, which is the result of a XOR operation with 1-4 bytes.

表 1 Command Word 1 Definition

BIT07	BIT06	BIT05	BIT04	BIT03	BIT02	BIT01	BIT00
0x00: Standby							
0x01: Start self-test							
0x02: Single ranging							
0x03: Continuous ranging (1Hz)							
0x04: Continuous ranging (5Hz)							
0x05: Irradiation							
0x08: Stop ranging/irradiation							
0x09: Set the select value							
0xAA: Cumulative number of laser pulses reported							
0x19 ~ 0x20: Laser encoding 9 ~ 16 parameter change							
0x29 ~ 0x30: Laser encoded 9 ~ 16 parameters read							

表 2 Command Word 2 Definition

BIT07	BIT06	BIT05	BIT04	BIT03	BIT02	BIT01	BIT00
During laser irradiation: laser encoding 1 ~ 16 (see Table 5)							
Laser ranging: 1-First target 2-Last target							
When setting the select value: the low byte of the select value							

When modifying parameters 9-16 in laser encoding: the low byte of laser encoding, period $\times 100$ (5000 represents 50ms, 46ms-56ms)

When reading parameters 9-16 with laser encoding: the low byte of the laser code, period $\times 100$ (5000 represents 50ms, 46ms-56ms)

表 3 Command Word 3 Definition

BIT07	BIT06	BIT05	BIT04	BIT03	BIT02	BIT01	BIT00
Irradiation time: laser irradiation duration (1 ~ 42)							
When setting the select value: the high byte of the select value							
When modifying parameters 9-16 in laser encoding: The high byte of laser encoding is multiplied by 100 (5000 indicates 50ms, 46ms-56ms).							
When reading parameters 9-16 with laser encoding: the high byte of the laser code, period $\times 100$ (5000 indicates 50ms, 46ms-56ms)							

表 4 laser coding 1-8 definition

code type code	code pattern (ms)	remarks
0x01		Customizable for customers
0x02		Customizable for customers
0x03		Customizable for customers
0x04		Customizable for customers
0x05		Customizable for customers
0x06		Customizable for customers
0x07		Customizable for customers
0x08		Customizable for customers

1.1.4 The laser photometer sends data to the system software.

- ◆ Information header (0x55);
- ◆ status word ;
- ◆ Target distance/cumulative laser pulse count (2 bytes), with the lower byte preceding the upper byte. The laser encoding parameters range from 9 to 16, where the period is multiplied by 100 (5000 indicates 50ms, 46ms-56ms). The lower byte precedes the upper byte.
- ◆ The current temperature of the laser photometry module;
- ◆ The "information tail" is a checksum, which is the result of a bitwise XOR operation on 1-5 bytes.

The definitions of status word information are shown in Table 6.

表 5 state word description

BIT07	BIT06	BIT05	BIT04	BIT03	BIT02	BIT01	BIT00
0: No laser 1: Laser present	0: Range measure ment is valid 1: Range	laser marking 1/0 alternate	1: Overtemp erature alarm 0:			00: Standby 01: Range measurement 02: Instruction	

	measure ment failed		Normal temperatu re			
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Target distance information definition: The distance value is represented as a 16-bit integer (2 bytes), which can be directly converted to decimal.

The cumulative number of laser pulses is defined as a multiple of 20, ranging from 0 to 1,310,700, since the 16-bit binary number represents a range of 0 to 65,535, and the laser photometer's service life is 1 million pulses.

The current temperature of the laser photometric module (d7-d0) is represented by a two's complement, with a valid range of -128°C to +127°C.