ERDI LASER®

# 2000m 905nm Semiconductor Multi-Pulse Rangefinder Module

Model:LRF2000A

## OVERVIEW

This 905nm pulsed laser rangefinder module has a range of 2000m and is characterized by small size, light weight and long measuring distance. It can be applied to handheld rangefinder, micro UAV, rangefinder scope and so on. It has Uart (TTL_3.3V) data transmission interface, and provides the upper computer software and communication protocol instruction set, which is convenient for users to carry out secondary development.

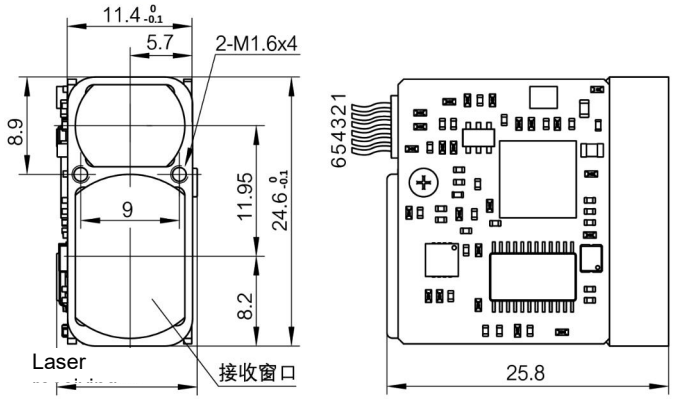
## TECHNICAL SPECIFICATIONS

| Project | Technical data |
|---|---|
| Model | LRF2000A |
| Laser Wavelength | 905nm |
| Eye Safety | Class 1 |
| Divergence Angle | 1×12mrad |
| Receiving Field of View (FOV) | ~20mrad |
| Launch Lens Diameter | Φ10×7.5mm |
| Receiver Lens Diameter | Φ15×10mm |
| Measuring Range（3m x 3m Target) | ≥5~2000m |
| Ranging Accuracy | ±1m |
| Ranging Frequency | 3Hz（5~45m）；0.75~3Hz（45~2000m） |
| Precision Rate | ≥98% |
| False Alarm Rate | ≤1% |
| Data Interface | UART（TTL_3.3V） |
| Supply Voltage | DC 3~5 V |
| Standby Power Consumption | ≤1mW |
| Operating Power Consumption | ≤1.5W |
| Weight | 10±0.5g |
| Dimention (L×W×H) | 25×26×13mm |
| Operation Temperature | -40~＋60℃ |
| Storage Temperature | -55~＋65℃ |
| Impact Resistance | 1200 g，1 ms |
| Anti-vibration | 5～50～5 Hz，1 Octave range /min，2.5 g |
| Dependability | MTBF≥1500 h |
| Activation Time | ≤200ms； |

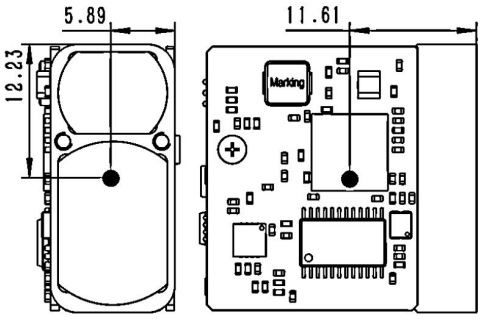
| | |
|---|---|
| Protection Class | IP67 |
| ESD Class | (Lens position)<br>Contact discharge 6kV<br>Air discharge 8kV |
| Electromagnetic Compatibility (EMC) | CE/FCC Certification |
| Eco-friendly | RoHS2.0 |

## MECHANICAL DIMENSION( mm)

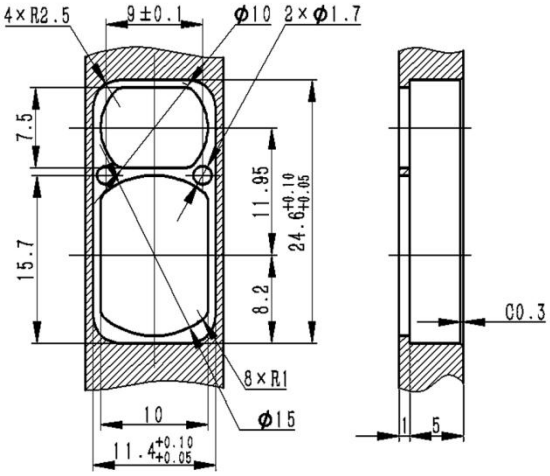
The outside dimensions of the LRF2000A rangefinder module are as follows:




The center of mass of the LRF2000A ranging module is located as follows:




The recommended design of the mounting interface for the LRF2000A rangefinder module is as follows:




The window lens coating design requirements for the LRF2000A rangefinder module are as follows:

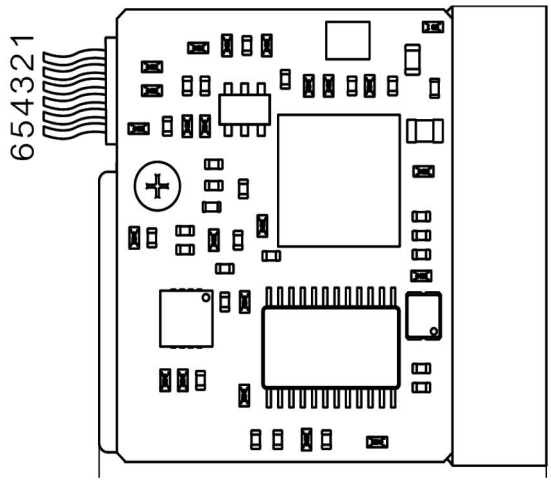
### Technical Requirement

1. ⊕ Permeation enhancement membrane,R < 0.5%@905±15nm.
2. Protective chamfering.

# ELECTRICAL INTERFACE

User Electrical interface: UART（TTL_3.3V）

The connector model of electrical interface is FWF08002-S06B13W5M（TXGA）, and the specific wiring definition is shown in the table below.




| Pin | Definition | Description |
|---|---|---|
| 1 | GND | Serial ground |
| 2 | Power positive | |
| 3 | UART_NC | |
| 4 | UART_TX | Serial transmitter, TTL_3.3V level |
| 5 | UART_RX | Serial receiver, TTL_3.3V level |
| 6 | POWER_ON | Power switch, TTL_3.3V level (＞0.7V ON，＜0.15V OFF，Default OFF) |

# COMMUNICATION PROTOCOL

## Communication rate and format

| | |
|---|---|
| Format standard Baud rate (bps): | Format standard Baud rate (bps): 9600/14400/19200/38400/57600/115200 (default)/128000/230400. |
| Byte data format: | 1 start bit, 8 data bits, 1 stop bit, no parity |

## Basic format for sending data packets

| Zone description | Number of bytes | Range of values | Remarks |
|---|---|---|---|
| Frame headers | 2 | 0x55 0xAA | Fixed values |
| Command codes | 1 | 0~255 | Indicates the control object of the current control command |
| Data 1 | 1 | 0~255 | |
| Data 2 | 1 | 0~255 | |
| Data 3 | 1 | 0~255 | |
| Data 4 | 1 | 0~255 | |
| Checksum | 1 | 0~255 | Checksum is the command code, data 1 to 4 all bytes of data summed to the lower 8 bits |

## ● Basic format of return packets

| Zone description | Number of bytes | Range of values | Remarks |
|---|---|---|---|
| Frame headers | 2 | 0x55 0xAA | Fixed values |
| Command codes | 1 | 0~255 | Indicates the control object of the current control command |
| Data 1 | 1 | 0~255 | |
| Data 2 | 1 | 0~255 | |
| Data 3 | 1 | 0~255 | |
| Data 4 | 1 | 0~255 | |
| Checksum | 1 | 0~255 | Checksum is the command code, data 1 to 4 all bytes of data summed to the lower 8 bits |

## ● Baud rate settings

**The baud rates (bps) that can be set are: 9600, 14400, 19200, 38400, 57600bps, 115200, 128000, 230400, a total of eight baud rates can be set. The baud rate setting takes effect immediately after the baud rate is set and no re-powering is required.**

Note: Transmit parity code = byte 3 + byte 4 + byte 5 + byte 6 + byte 7.

Receive checksum = byte 1 + byte 2 + byte 3 + byte 4 + byte 5 + byte 6 + byte 7.

Byte 3 (Command): 0x01 - set baud rate command.

Byte 7: specific baud rate setting parameters.

**Sent to the Ranging module：**

| Byte | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Description | 0x55 | 0xAA | 0x01 | 0xFF | 0xFF | 0xFF | 0x01 | 0xFF |

Byte 7,Byte 8: 0x01,0xFF - baud rate 9600bps.
0x02,0x00 - baud rate 14,400bps.
0x03,0x01 - baud rate 19200 bps.
0x04,0x02 - baud rate 38400bps.
0x05,0x03 - baud rate 57600bps.
0x06,0x04 - baud rate 115200bps.
0x07,0x05 - baud rate 128000bps.
0x08,0x06 - baud rate 230400 bps.

**The Ranging module returns：**

| Byte | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Description | 0x55 | 0xAA | 0x01 | status | 0xFF | 0xFF | 0x01 | Checksum |

Status: 0x00 - baud rate setting failure.
0x01 - baud rate set successfully.
Byte 7: 0x01 - baud rate 9600 bps.
0x02 - baud rate 14400 bps.
0x03 - baud rate 19,200 bps.
0x04 - baud rate 38400 bps.
0x05 - baud rate 57600 bps.
0x06 - baud rate 115200 bps.
0x07 - baud rate 128,000bps.
0x08 - baud rate 230,400 bps.

## ● Single measurement

**Sent to the Ranging module:**

| Byte | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Description | 0x55 | 0xAA | 0x88 | 0xFF | 0xFF | 0xFF | 0xFF | Checksum |

**The Ranging module returns：**

| Byte | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Description | 0x55 | 0xAA | 0x88 | Status | 0xFF | DATA_H | DATA_L | Checksum |

Status：0 - single measurement failure (DATA_H=0xFF, DATA_L=0xFF).
1 - single measurement success (DATA_H=measurement result high Byte;
DATA_L=measurement result low Byte).

## ● Continuous measurement

**Sent to the Ranging module:**

| Byte | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Description | 0x55 | 0xAA | 0x89 | 0xFF | 0xFF | 0xFF | 0xFF | Checksum |

**The Ranging module returns：**

| Byte | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Description | 0x55 | 0xAA | 0x89 | Status | 0xFF | DATA_H | DATA_L | Checksum |

Status: 0 - multiple measurement failure (DATA_H=0xFF, DATA_L=0xFF).
1 - multiple measurement success (DATA_H=measurement result high Byte;
DATA_L=measurement result low Byte).

## ● Stop continuous measurement

**Sent to the Ranging module:**

| Byte | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Description | 0x55 | 0xAA | 0x8E | 0xFF | 0xFF | 0xFF | 0xFF | Checksum |

**The Ranging module returns：**

| Byte | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Description | 0x55 | 0xAA | 0x8E | Status | 0xFF | 0xFF | 0xFF | Checksum |

Status：0 - stopping multiple measurements from failing.
1 - stopping multiple measurements successfully.

Note: Data is returned in hexadecimal, all data results will be output by multiplying the real data by 10.
Example: dist = 2000.3m, output data is 20003, converted to 4E23 in hexadecimal, i.e. Data1 = 0x4E, Data2 = 0x23.