1. PRODUCT DESCRIPTION

ERDI LASER® **LDR25K1** is a **1064 nm laser designator and rangefinder module** for UAVs, EO/IR gimbals, and compact targeting systems. It supports single-shot and continuous ranging, frequency-coded laser designation, and first/last target logic, providing reliable distance measurement and target illumination for guided weapon and cooperative engagement applications. The module is optimized for airborne integration with a compact form factor, controlled power consumption, and stable operation across wide environmental conditions.

2. CONTROL FUNCTIONS

- Respond to ranging commands; stop upon stop command;
- Output one set of range data and status per pulse during ranging;
- Range gate function for ranging;
- Auto- stop continuous ranging after 5 min (1 Hz) or 1 min (5 Hz) if no stop command is received;
- Configure designation mode and code;
- Respond to designation command per configured mode/code; stop upon stop command;
- Auto- stop after one designation cycle if no stop command is received;
- Output distance and status per pulse during designation;
- Power- on and periodic self- test with status output;
- Respond to self- test command with status output;
- Report cumulative number of emitted laser pulses.

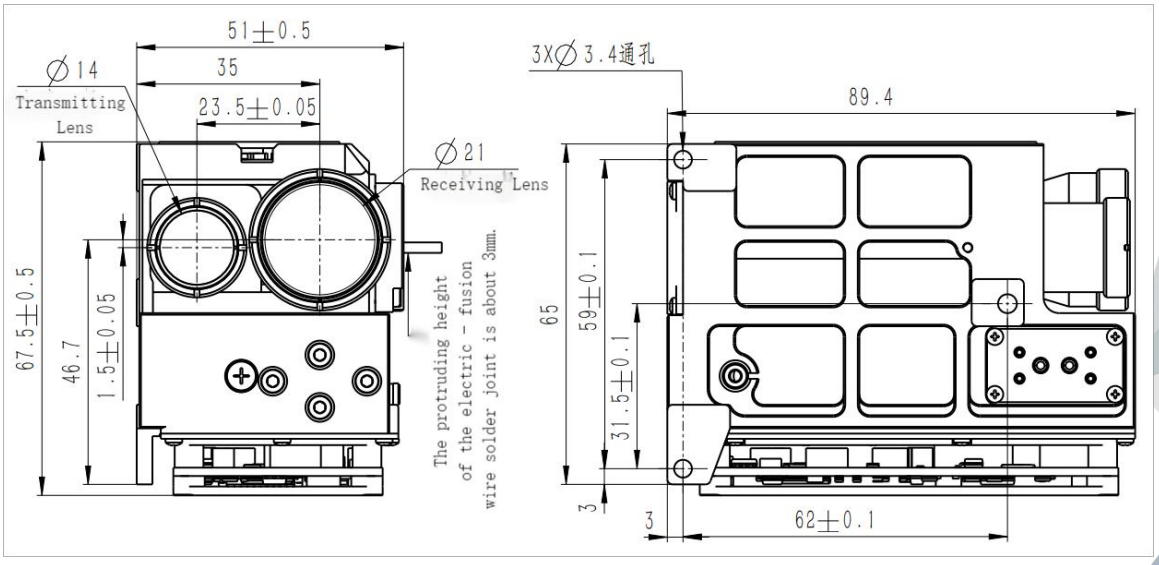
3. TECHNICAL SPECIFICATIONS

Laser Wavelength	1.064 ± 0.003 μm
Pulse Average Energy	≥ 25 mJ
Pulse Energy Stability	Within one illumination cycle, single-pulse energy fluctuation ≤ ±10% of mean energy (measured 2 s after emission).
Beam Divergence	≤ 0.5 mrad
Laser Optical-Axis Stability	≤ 0.05 mrad
Dimensions	≤ 68 mm × 52 mm × 90 mm
Weight	≤ 380 g
Ranging Performance	
Frequency	1 Hz / 5 Hz / single shot

Continuous ranging duration	5 min (1 Hz) / 1 min (5 Hz)
Minimum range	≤ 120 m
Maximum range	≥ 5000 m
Ranging accuracy	±2 m
Acquisition rate	≥ 98%
Ranging logic	first / last target
Designation Performance	
Designation range	≥ 2 km
Coding	complies with weapon system requirements; supports user- defined code expansion
Coding method	precise frequency code (eight pre- stored cycle codes)
Coding accuracy	≤ 2.5 μs
Designation mode	single illumination ≥ 25 s; restart interval ≤ 15 s; 8 continuous cycles; rest 30 minutes before next use.
Environmental Adaptability	
High-temperature operation	+55 °C
Low-temperature operation	−40 °C
Power Supply	
Average operating power	≤ 50 W; peak power ≤ 100 W
Operating voltage range	20 V–28 V

4. ELECTRICAL INTERFACE

4.1 Mechanical Interface



External envelope: ≤68mm×52mm×90 mm

4.2 Electrical Interface

Communication interface: one TTL-level serial port.

Connector model and interface definition: see Table 1

Socket: MOLEX 53048-0810

Mating Plug: MOLEX 51021-0800

Table1—Electrical Interface Definition(TTL)

Pin No.	Signal Name	Description
1	24V	Power supply +
2	24V	Power supply +
3	24V GND	Power return (–)
4	24V GND	Power return (–)
5	—	—
6	TTL_RX	Host → laser rangefinder/designator module
7	TTL_TX	Laser rangefinder/designator module → host
8	TTL_GND	Serial port ground

5. COMMUNICATION PROTOCOL

5.1 Communication Standard

Asynchronous serial communication standard: RS-422/TTL

Baud rate: 115200bps

Transmission format: 8 data bits, 1start bit, 1stop bit, no parity

For cach byte, transmit the least significant bit (LSB) first. For multi-byte data, transmit the low byte frst

5.2 Output Information

Output information refers to commands sent from the host system to the laser rangefinder/designator module, comprising:

- Header:0x55
- Command Byte 1
- Command Byte 2
- Command Byte 3
- Checksum (tail): bitwise XOR of bytes 1-4

Table 2—Command Byte 1 Definitions

BIT07	BIT06	BIT05	BIT04	BIT03	BIT02	BIT01	BIT00
0x00: Standby 0x01: Start self-test 0x02: Single ranging 0×03: Continuous ranging (1 Hz) 0×04: Continuous ranging (5 Hz) 0x05: Designation 0x08:Stop ranging/designation 0x09: Set range gate value 0x0A: Report cumulative laser pulse count 0x19-0x20: Modify laser code parameters (Codes 9-16) 0x29-0x30:Readlasercodeparameters(Codes 9-16)							

The definitionsof Command Byte 2 are as follows:

Table 3— Command Byte 2 Definitions

BIT07	BIT06	BIT05	BIT04	BIT03	BIT02	BIT01	BIT00
Duringlaser designation: laser code 1-16 During ranging: 1-first target; 2- last target When setting range gate value: lower byte of the range gate value When modifyingparameters for laser codes 9-16: lower byte of the laser code; period × 100 (e.g., 5000 represents 50 ms, valid range 46-56 ms)							

The definitions of Command Byte 3 are as follows:

Table4—Definition of Command Byte3

BIT07	BIT06	BIT05	BIT04	BIT03	BIT02	BIT01	BIT00
During designation: laser illumination time setting (1-25) When seting range gate value: higher byte of the range gate value When modifying parameters for laser codes 9-16: higher byte of the laser code; period×100 (eg,5000 represents 50ms, valid range 46-56ms)							

5.3 Input Information

Input information refers to status data received by the host system fromthe laser rangefinder/designator module, including:

- Header: 0x55
- Status byte
- Target distance/cumulative laser pulse count(2 bytes); low byte first,high byte second.

For laser code parameters 9-16, the value is period×100 (e.g., 5000 represents 50 ms, valid range 46-56 ms); low byte first, high byte second.

- Current temperature of thelaserrangefinder/designator module
- Checksum(tail): bitwise XOR of bytes 1-5

Definitions of the status byte are shown in Table 5— Status Byte Definitions.

Table 5— Status Byte Definitions

BIT07	BIT06	BIT05	BIT04	BIT03	BIT02	BIT01	BIT00
0: No laser emission 1: Laser emission present	0:Valid ranging 1:Invalid ranging	Laser flag alternates Between 1 and 0	1:Over-temperature alarm 0: Temperature normal			00: Standby 01: Ranging 02: Designation	

Target Distance Information Definition:

The distance value is represented by 2 bytes (16 bits) as an integer and can be converted directly to a decimal value.
In standby mode, a periodie self-test status is returned every 10 s.
In ranging and designation modes, status is returned according to the laser pulse frequency.

Cumulative Laser Pulse Count Definition:

Because a 16-bit binary number covers 0-65535, while the service life of the laser rangefinder/designator is 1,000,000 pulses, the pulse count is defined as a multiple of 20, yielding a range of 0-1,310,700.

Current Temperature ofthe Laser Module:

Bits d7-d0 are in two's-complement format, with a valid range of -128 to +127(℃).

5.4 Preset Coding Information

Code l period =50,000
Code 2 period =49,800
Code 3 period=49,600
Code 4 period=49,400
Code 5 period =50,200
Code 6 period =50,400
Code 7 period =50,600
Code 8 period =50,800

The above values are pulse interval times, in microseconds (μs).

6. PRECAUTIONS FOR USE

● The laser housing is hermetically sealed and dustproof. Do not open the housing without authorization. Breaking the seal may damage core laser components.
● Unauthorized disassembly voids all related after-sales service commitments.
● High voltage is present inside the device. Do not disassemble the product unless you arequalified personnel.
● To prevent damage to the laser detector, do not perform ranging on targets within 50 m.
● Do not block the optical window with your hand or any object while the device is operating
● During optical axis alignment or indoor laser emission, ensure the receiving window is fully covered to avoid damaging the photodetector.

7. ACCOMPANYING DOCUMENTS AND ACCESSORIES

● One miniature laser designator
● One operation manual
● One connector plug
● One inspection report
● One certificate of conformity

8. TRANSPORTATION AND STORAGE

During transportation or storage, avoid dust, moisture, exeessive cold or heat, and environments containing acidie or alkaline vapors or other corrosive chemicals.