ERDI LASER®
ERDI TECH LTD

25mJ Laser Target Designator Module

Model: LDR25K1

1. PRODUCT DESCRIPTION

The LDR25K1 laser rangefinder/designator integrates coded laser designation and laser ranging functions to provide laser target illumination for terminally guided weapons



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

3.1 Main Functions

- Laser ranging capability;
- Target laser designation for air-to-ground guided weapons;
- Communication with the host computer in accordance with the protocol;
- User-configurable precise frequency coding capability.

3.2 Performance Requirements

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.

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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.

Dimensions and Weight

- External envelope: ⩽ 68 mm × 52 mm × 90 mm.
- Weight: ⩽ 380 g.

Power Supply

- Average operating power ≤ 50 W; peak power ≤ 100 W.
- Operating voltage range: 20 V–28 V.

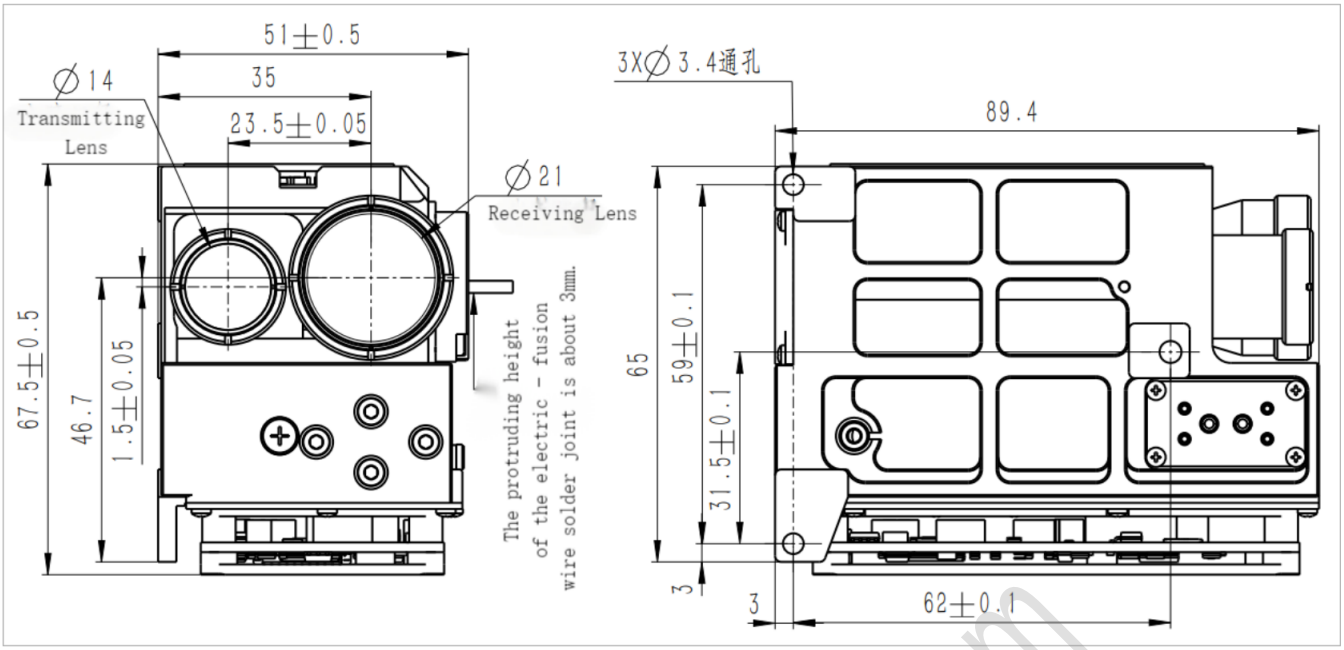
Environmental Adaptability

- High-temperature operation: +55 °C.
- Low-temperature operation: −40 °C.

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4. INTERFACES

4.1 Mechanical Interface



External envelope: ≤ 68 mm × 52 mm × 90 mm

5.2 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

Table 1 — 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

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Asynchronous serial standard: RS-422/TTL

Baud rate: 115200 bps

Transmission format: 8 data bits, 1 start bit, 1 stop bit, no parity
For each byte, transmit the **least significant bit (LSB)** first. For multi-byte data, transmit the **low byte** first.

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 0x03: Continuous ranging (1 Hz) 0x04: 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: Read laser code parameters (Codes 9–16)							

The definitions of Command Byte 2 are as follows:

Table 3 — Command Byte 2 Definitions

BIT07	BIT06	BIT05	BIT04	BIT03	BIT02	BIT01	BIT00
During **laser 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 **modifying parameters 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:

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Table 4 — Command Byte 3 Definitions

BIT07	BIT06	BIT05	BIT04	BIT03	BIT02	BIT01	BIT00
During **designation:** laser illumination time setting (**1–25**) When **setting 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 (e.g., **5000** represents **50 ms**, valid range **46–56 ms**)							

5.3 Input Information

Input information refers to status data received by the host system from the 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 the laser rangefinder/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 periodic 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 of the Laser Module:

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

5.4 Preset Coding Information

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Code 1 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 are **qualified 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, excessive cold or heat**, and environments containing **acidic or alkaline vapors** or other **corrosive chemicals**.

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