

LDK Model 2 series

Introduction

Egismos latest generation of Laser distance measurement modules offers measuring ranges up to 8 meters. The LDK Model 2 series are compact units with small dimensions. They are designed for users to easily connect the Laser measurement unit to a PC or an MCU through RS232 communication (UART TTL). The unit has a 1mm resolution and an accuracy of $\pm 3.0\text{mm}$ along with a high sampling rate (up to 10 samples / second)

The typical UART output uses a serial RS232 with standard communication transmission protocol, which is the most common configuration for PC serial communications today. The common line speed has a Baud Rate of 9600.

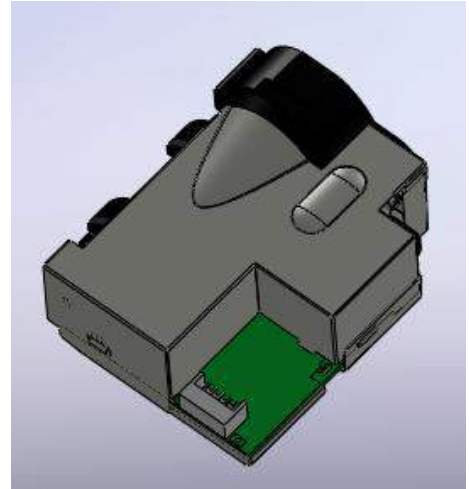


Fig. 1

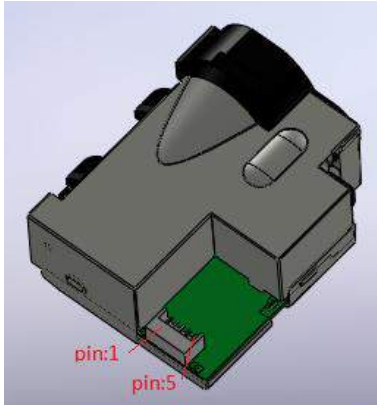
Features

- * Distance measuring capacity.
- * RS-232 serial port connectivity.
- * Compact dimensions: 38.3 x 46 x 19.83 mm.
- * Better EMC protection.

Product Code of Product

| Product | Model Number | Distance Measuring Range | Communication mode |
|---------------------------------------|--------------|--------------------------|--------------------|
| LDK : Laser Distance Measuring Kit | 1M : Model 1 | 08 : 8 meters | RS: RS-232 |
| LDM : Laser Distance Measuring Module | 2M : Model 2 | 20 : 20 meters | BT: Bluetooth |
| | 3M : Model 3 | 30 : 30 meters | |
| | | 60 : 60 meters | |
| | | 100: 100 meters | |
| Example: LDK-2M-08-RS | | | |

Specifications (T=25°C)

| | | |
|-------------------------|--|---|
| Model Name | LDK-2M-08-RS | |
| Measuring Range | 0.06 ~ 8 meters | |
| Measure Accuracy | ± 3.0 mm @ 25°C | |
| Measure Rate | 1 ~ 10 Hz | |
| Mechanical Dimension | 38.3 x 46 x 19.83 mm | |
| Distance Resolution | 1 mm | |
| Starting Current | Min. 300mA, Typ. 500mA | |
| Operating Current | <200 mA | |
| Operating Voltage(DC) | 2.5 ~ 3.0 V | |
| Transmission Mode | RS-232 TTL (UART) | |
| Transmission Interfaces | Female USB "B" connector | |
| Baud Rate | 9600 | |
| Operating Temperature | 0 ~ 50 °C | |
| Storage Temperature | -20 ~ 70 °C | |
| Buzzer Sound | 60 ± 20 dB | |
| Laser Beam Size | 2.5 x 5 mm @ 3 meter (FWHM) | |
| Laser Wavelength | 620~690 nm | |
| Laser Safety | <1 mW (Class 2) | |
| EMC | Class A | |
| Pin Assignment | <ol style="list-style-type: none"> 1. Vin : Vcc 2. Vur : UART Rx, TTL level 3. Vut : UART Tx, TTL level 4. Vpe : Power Enable, used for system ON (High) and OFF(Low) or can be used as Reset pin 5. GND : Ground |  |

※See notice for details.

Electrical Characteristics

| Value | Symbol | Min | Typical | Max | Unit |
|----------------------|--------|------|---------|---------|------|
| Voltage Input | Vin | 2.5 | 3.0 | 3.1 | V |
| Current Input | Iin | 300 | 500 | - | mA |
| UART Rx Logic 1 | Vuth | 3.0 | 3.3 | 3.4 | V |
| UART Rx Logic 0 | Vutl | -0.3 | 0 | 0.8 | V |
| UART Tx Logic 1 | Vurh | 3.0 | 3.3 | 3.4 | V |
| UART Tx Logic 0 | Vurl | -0.3 | 0 | 0.3 | V |
| Power Enable Logic 1 | Vpeh | 3.0 | 3.3 | Vin+0.3 | V |
| Power Enable Logic 0 | Vpel | -0.3 | 0 | 0.1 | V |

System compliance

Dos, OS/2, Unix, Xenix, Linux, Windows and Netware

Connection

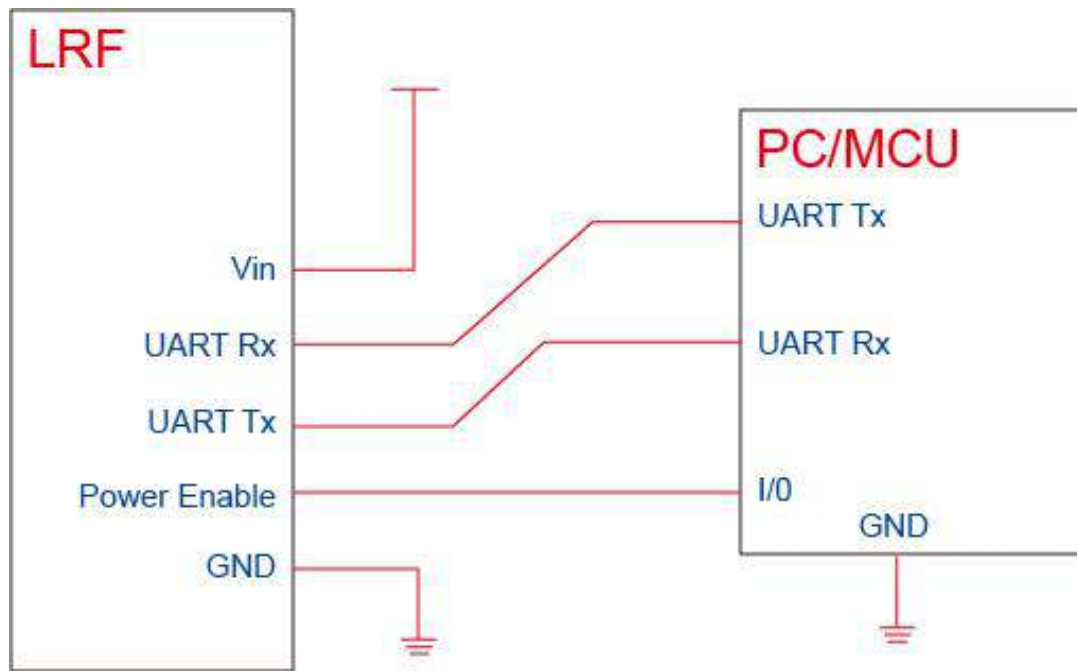


Fig. 2

Note

Users should check their OS version (Operating System) to confirm that RS232 data transmission is available.

Communication Format

| Master (PC/MCU) Read/Write | | | | | | | |
|--------------------------------------|---------|---------|--------|--------|--------|-----------|--------|
| Initiate | Address | Command | Data 1 | | Data N | Check Sum | End |
| 1 Byte | 1 Byte | 1 Byte | 1 Byte | 1 Byte | 1 Byte | 1 Byte | 1 Byte |
| Slave (Laser Distance Measuring Kit) | | | | | | | |
| Initiate | Address | Command | Data 1 | | Data N | Check Sum | End |
| 1 Byte | 1 Byte | 1 Byte | 1 Byte | 1 Byte | 1 Byte | 1 Byte | 1 Byte |

Initiate: 0xAA

End: 0xA8

Address: 0 is the master, 1-127 are the slave/devices on the Bus.

The master can communicate with all the slave devices on the Bus

Data: Some commands may have no response

Checksum: Only Bit 7 to avoid conflict with Initiate or End. The highest level is set at 0.

Checksum = (Address+Command+Data 1+...+Data n) & 0x7F.

Commands

| | Remark |
|------|-----------------------------|
| 0x01 | Read Software version |
| 0x02 | Read Device Type |
| 0x04 | Read slave address |
| 0x41 | Set Slave address |
| 0x08 | Read device error code |
| 0x42 | Laser ON |
| 0x43 | Laser OFF |
| 0x44 | Single measurement |
| 0x45 | Continuous measurement |
| 0x46 | Stop continuous measurement |

| Read SW version | | | | | | |
|-----------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Master | Initiate | Address | Command | CheckSum | End | |
| | 0xAA | 0x00 | 0x01 | 0x01 | 0xA8 | |
| Slave | Initiate | Address | Command | Data 1 | Data 2 | Data 3 |
| | 0xAA | 0x01 | 0x01 | 0x28 | 0x48 | 0x4D |
| | Data 4 | Data 5 | Data 6 | Data 7 | Data 8 | Data 9 |
| | 0x53 | 0x44 | 0x33 | 0x30 | 0x2D | 0x33 |
| | Data 10 | Data 11 | CheckSum | End | | |
| | 0x30 | 0x29 | 0x72 | 0xA8 | | |

※Slave response Version hex display (HMSD30-30),The corresponding model is LDK-2M-30-RS.

| Read SW version | | | | | | |
|-----------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Master | Initiate | Address | Command | CheckSum | End | |
| | 0xAA | 0x00 | 0x01 | 0x01 | 0xA8 | |
| Slave | Initiate | Address | Command | Data 1 | Data 2 | Data 3 |
| | 0xAA | 0x01 | 0x01 | 0x28 | 0x48 | 0x4D |
| | Data 4 | Data 5 | Data 6 | Data 7 | Data 8 | Data 9 |
| | 0x53 | 0x44 | 0x36 | 0x30 | 0x2D | 0x33 |
| | Data 10 | Data 11 | CheckSum | End | | |
| | 0x30 | 0x29 | 0x75 | 0xA8 | | |

※Slave response Version hex display (HMSD60-30), The corresponding model is LDK-2M-60-RS.

| Read SW version | | | | | | |
|-----------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Master | Initiate | Address | Command | CheckSum | End | |
| | 0xAA | 0x00 | 0x01 | 0x01 | 0xA8 | |
| Slave | Initiate | Address | Command | Data 1 | Data 2 | Data 3 |
| | 0xAA | 0x01 | 0x01 | 0x28 | 0x48 | 0x4D |
| | Data 4 | Data 5 | Data 6 | Data 7 | Data 8 | Data 9 |
| | 0x53 | 0x44 | 0x31 | 0x30 | 0x30 | 0x2D |
| | Data 10 | Data 11 | Data 12 | CheckSum | End | |
| | 0x33 | 0x30 | 0x29 | 0x20 | 0xA8 | |

※Slave response Version hex display (HMSD100-30), The corresponding model is LDK-2M-100-RS.

| Read Device Type | | | | | | |
|------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Master | Initiate | Address | Command | CheckSum | End | |
| | 0xAA | 0x01 | 0x02 | 0x03 | 0xA8 | |
| Slave | Initiate | Address | Command | Data 1 | CheckSum | End |
| | 0xAA | 0x01 | 0x02 | 0x01 | 0x04 | 0xA8 |

※Slave response: Device type is LFR

| Read Device status | | | | | | |
|--------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Master | Initiate | Address | Command | CheckSum | End | |
| | 0xAA | 0x01 | 0x08 | 0x09 | 0xA8 | |
| Slave | Initiate | Address | Command | Data 1 | CheckSum | End |
| | 0xAA | 0x01 | 0x08 | 0x00 | 0x09 | 0xA8 |

※Slave response: 0x00 as Not ready yet; 0x01 as Standby; 0x31 as Error.

When an error message is displayed, we suggest to the user to reset the system by following the procedure below: set the Power Enable pin level low for 200ms and then back high, and check if the system works.

If not, please contact Egismos for further service.

| Read Slave Address | | | | | | |
|--------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Master | Initiate | Address | Command | CheckSum | End | |
| | 0xAA | 0x00 | 0x04 | 0x04 | 0xA8 | |
| Slave | Initiate | Address | Command | Data 1 | CheckSum | End |
| | 0xAA | 0x01 | 0x04 | 0x01 | 0x06 | 0xA8 |

※Slave response: Address is 0x01

| Set Slave Address | | | | | | |
|-------------------|-------------|-------------|--------------|-------------|-------------|-------------|
| Master | Initiate | Address | Command | Data 1 | CheckSum | End |
| | 0xAA | 0x00 | 0x041 | 0x02 | 0x43 | 0xA8 |
| Slave | Initiate | Address | Command | Data 1 | CheckSum | End |
| | 0xAA | 0x02 | 0x041 | 0x01 | 0x44 | 0xA8 |

※Master command: Set slave Address as 0x02; Slave response: 1-Success, 0-Failed

| Laser ON | | | | | | |
|----------|-------------|-------------|-------------|-------------|-------------|-------------|
| Master | Initiate | Address | Command | CheckSum | End | |
| | 0xAA | 0x01 | 0x42 | 0x43 | 0xA8 | |
| Slave | Initiate | Address | Command | Data 1 | CheckSum | End |
| | 0xAA | 0x01 | 0x42 | 0x01 | 0x44 | 0xA8 |

※This Command is for user to easily aim at the target, but is not a necessary procedure for the measurement

※Slave response: 1-Success, 0-failed

| Laser OFF | | | | | | |
|-----------|-------------|-------------|-------------|-------------|-------------|-------------|
| Master | Initiate | Address | Command | CheckSum | End | |
| | 0xAA | 0x01 | 0x43 | 0x44 | 0xA8 | |
| Slave | Initiate | Address | Command | Data 1 | CheckSum | End |
| | 0xAA | 0x01 | 0x43 | 0x01 | 0x45 | 0xA8 |

※Slave response: 1-Success, 0-failed

| Single measurement | | | | | | | | | | | |
|--------------------|-------------|-------------|-------------|----------------|----------------|----------------|----------------|----------------|----------------|-------------|-------------|
| Master | Initiate | Address | Command | CheckSum | End | | | | | | |
| | 0xAA | 0x01 | 0x44 | 0x45 | 0xA8 | | | | | | |
| Slave | Initiate | Address | Command | Data1 | Data2 | Data3 | Data4 | Data5 | Data6 | Check Sum | End |
| Cond.1 | 0xAA | 0x01 | 0x44 | 0x30'0' | 0x32'2' | 0x33'3' | 0x34'4' | 0x35'5' | 0x36'6' | 0x79 | 0xA8 |
| Cond.2 | 0xAA | 0x01 | 0x44 | 0x45'E' | 0x52'R' | 0x52'R' | 0x32'2' | 0x35'5' | 0x35'5' | 0x74 | 0xA8 |

※1. Slave response: Data Byte coding with ASCII.

| Continuous Measurement | | | | | | | | | | | |
|------------------------|-------------|-------------|-------------|----------------|----------------|----------------|----------------|----------------|----------------|-------------|-------------|
| Master | Initiate | Address | Command | CheckSum | End | | | | | | |
| | 0xAA | 0x01 | 0x45 | 0x46 | 0xA8 | | | | | | |
| Slave | Initiate | Address | Command | Data 1 | Data2 | Data3 | Data4 | Data5 | Data6 | Check Sum | End |
| Cond.1 | 0xAA | 0x01 | 0x45 | 0x30'0' | 0x32'2' | 0x33'3' | 0x34'4' | 0x35'5' | 0x36'6' | 0x7A | 0xA8 |
| Cond.2 | 0xAA | 0x01 | 0x45 | 0x45'E' | 0x52'R' | 0x52'R' | 0x32'2' | 0x35'5' | 0x35'5' | 0x75 | 0xA8 |

※The Continuous measurement command allows the Laser Distance Measuring kit to feedback measurement data continuously.

There are 2 ways to stop the continuous mode: 1. STOP Continuous measurement command, and 2: Level Low the supply power, such as system OFF.

※The slave response is shown above.

For example: If the measuring distance is 23.456mm, Data will be shown as above Cond.1; but if the system fails, the error code will be 255, the response data will be shown as Cond. 2, other error codes will display “ERRxxx”.

| Error code | Problem | Description |
|------------|-------------------------|---|
| ERR204 | calculate error | The Target moved too fast |
| ERR255 | Weak signal reception | Use a reflective film on the target, or find a more adapted measurement point on the target |
| ERR256 | Strong signal reception | Use a reflective film on the target, or move the target away from any light source. |

| STOP Continuous Measurement | | | | | | |
|-----------------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Master | Initiate | Address | Command | Checksum | End | |
| | 0xAA | 0x01 | 0x46 | 0x47 | 0xA8 | |
| Slave | Initiate | Address | Command | Data 1 | Checksum | End |
| | 0xAA | 0x01 | 0x46 | 0x01 | 0x48 | 0xA8 |

※Slave response: 1-Success, 0-failed

| ON/OFF Buzzer | | | | | | |
|---------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Master | Initiate | Address | Command | Data 1 | Checksum | End |
| | 0xAA | 0x01 | 0x47 | 0x01 | 0x49 | 0xA8 |
| Slave | Initiate | Address | Command | Data 1 | Checksum | End |
| | 0xAA | 0x01 | 0x47 | 0x01 | 0x49 | 0xA8 |

※Users can use this command to turn ON or OFF the Buzzer on the Laser Distance measuring kit by sending 0 for OFF or 1 for ON . The example above shows a command to turn the Buzzer ON, and Slave response is: 1-Success, 0-failed.

Notice

1. User should always remember to turn OFF the power of the Laser Distance Measuring Kit when the measurement is complete, as keeping the power on might reduce the life-time of the Laser and of the light receiving element inside the Laser Distance Measuring Kit.
2. Resistors of a few hundred Ohm are preferentially added between the pins UART Rx, UART Tx and the user's MCU in order to limit the voltage discrepancy between the two systems that would lead to current loss.
3. Measure Accuracy ± 3.0 mm @ 25°C, room environment.
The outdoor measurement accuracy can be roughly calculated using the following formula.
Accuracy reference (mm) = (L-20) x C x 0.3 +2
L: measure distance (M), C: constant=1
4. The measure rate changes automatically based on reflectance and environmental conditions.
5. Continuous testing at low temperatures(0°C) should not exceed 30 minutes.
6. Measurement targets should avoid direct light exposure.

Dimensions

