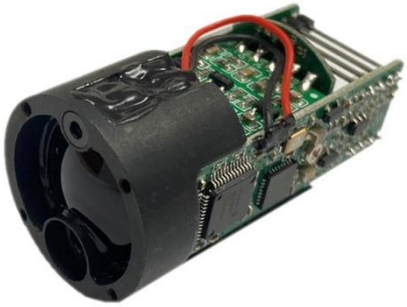
1000m Long-Distance
Outdoor Laser Rangefinder Module



Key Properties

- Measurement Range: 5m ~ 600/1000m
- Measurement Frequency: ≥3 Hz
- Measurement Accuracy: 3~100m approx. ±1m
  ≥100m: ±(1+Dx0.25%)m, D=distance
- Wavelength: 905 nm
- Laser Safety: Class 1
- Communication Interface: TTL (UART)
- Aiming Laser

Application

Handheld equipment / Night vision / Thermal imager / Telescope / Rifle scope / Laser illuminator
Other Application / Aviation / Police / Railway / Electric power / Water conservancy / Communication
Environment / Geology / Construction / Fire station / Blasting / Agriculture / Forestry / Outdoor sports

Product Code

Product	Measure Range	Frequency	Type	Communication Interface
LRF: Laser Range Finder	600M: 600m 1000M: 1000m	3: 3Hz	L: Long-Distance S: Standard	Default: TTL (UART) USB: USB Converter
Example: LRF600M3LS				

Introduction

LRF1000M3LS is a classic model for outdoor long-range laser rangefinder. The measurement range up to 1000 meters, with low power consumption and stable performance that up to the industrial and military standard.

The small-size and lightweight feature is convenient for OEM users to integrate into systems and equipment, and the UART communication interface provides users to develop and program their own application.

We provide two options 600m and 1000m for this product, due to each option will lead to the different specification of its optical lens and circuit adjustments.

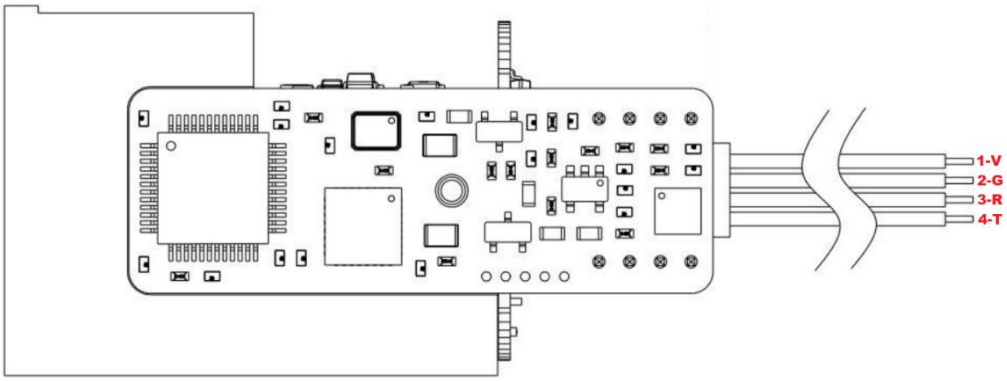
1. Specifications

Technical specifications	
Model Name	LRF600M3LS / LRF1000M3LS
Measurement Range	5m ~ 600m / 1000m
Measurement Frequency	≥3Hz
Measurement Accuracy	3~100m: ±1m ≥100m: ±(1+Dx0.25%)m, D=distance
Wavelength	905nm
Wavelength of Aiming Laser	650nm
Laser Safety	905nm: Class 1 (IEC 60825-1:2014) 650nm: Class 3A (IEC 60825-1:2014)
Measurement Method	Pulse
Communication	
Communication Interface	3.3V TTL (UART)
Interface Connector	1.0T-4P
Baud Rate	2400 / 4800 / 9600 / 19200 / 38400 / 57600 / 115200 bps
Electrical	
Input Voltage	3.3V±0.3V
Power Consumption	Operational: ≤200mW During measurement: ≤500mW
Mechanical	
Dimensions	24 x 24 x 46mm
Weight	23g±5g
Structural Materials	Aluminum
Environmental	
Operating Temperature	-20°C~50°C
Certification	
CE / FCC / RoHS	

Note:

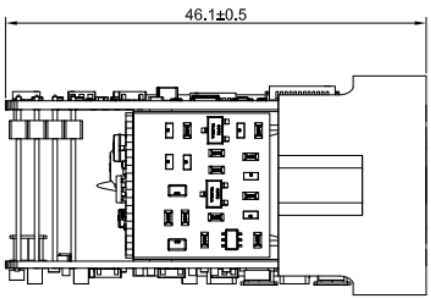
1. Conditions of measurement: Target size ≥ 1m × 1m, reflectivity ≥ 85%, outdoor visibility ≥ 5 km.
   (Influencing factors: color, size, surface reflectivity and atmospheric visibility).
2. This product can be customized, if you require any further assistance please feel free to contact us.

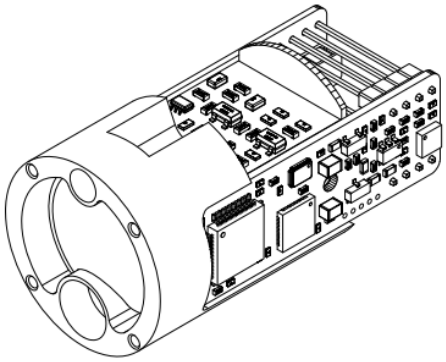
2. Pin Assignment

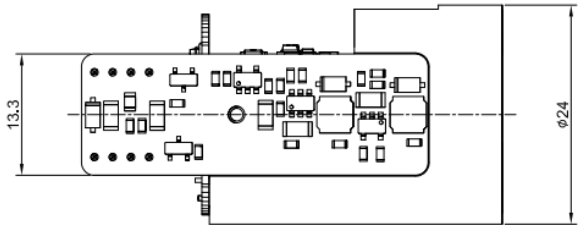


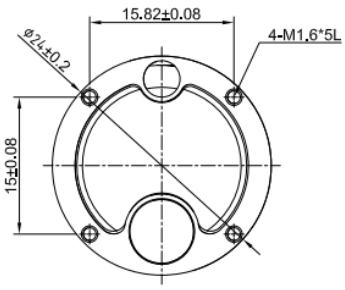
Pin	Function	Describe
1	V+	DC 3~3.3V
2	GND	Ground
3	RxD	UART-RxD (TTL: Voltage is programmable: 3.3V)
4	TxD	UART-TxD (TTL: Voltage is programmable: 3.3V)

3. Dimensions









4. Communication

4.1 Communication frame format:

Head1 (1 byte)	Head2 (1 byte)	Data Length (1 byte)	Address (1 byte)	Command (1 byte)	Data (N byte)	Checksum (1 byte)	End1 (1 byte)	End2 (1 byte)
AE	A7	*	*	*	*	*	BC	BE

*Head: Fixed to 0xAE 0xA7

*Data Length: Length from Data Length to Checksum. (Included checksum)

*Address: Default is 0x00.

*Command: Command identification characters, please refer to ***Chapter 5.1*** Command List.

*Data: Data content and the number of bytes depends on command.

*Checksum: Sum of Data Length, Address, Command and Data. (Calculate without carry).

*End: Fixed to BC BE

4.2 UART configuration parameters:

8N1 with default 9600 baud rate, byte data are expressed in hexadecimal.

Data bits: 8

Parity bits: None

Stop bits: 1

5. Command

5.1 Command List

Master Command	
Command code	**Description**
0x01	Read Version
0x0A	Set BaudRate
0x0B	Set Address
0x05	Single Measurement
0x0E	Continuous Measurement
0x0F	Stop Measurement
0x40	Aiming Laser ON/OFF

Slave Response	
Recognition code	**Description**
0x81	Device Version
0x8A	BaudRate Setting Result
0x8B	Address Setting Result
0x85	Measurement Results
0xC0	Aiming Laser ON/OFF

5.2 Command Detail

5.2.1 Read Version

Master sends								
Head1 (1 byte)	Head2 (1 byte)	Data Length (1 byte)	Address (1 byte)	Command (1 byte)	Data (0 byte)	Checksum (1 byte)	End1 (1 byte)	End2 (1 byte)
0xAE	0xA7	0x04	0x00	0x01		0x05	0xBC	0xBE
Slave responses								
Head1 (1 byte)	Head2 (1 byte)	Data Length (1 byte)	Address (1 byte)	Command (1 byte)	Data (N byte)*	Checksum (1 byte)	End1 (1 byte)	End2 (1 byte)
0xAE	0xA7	*	0x00	0x81	VER*	*	0xBC	0xBE

*N byte: The number of bytes is Data Length - 4.

*VER: Version of module, format is ASCII and needs to be convert into string.

5.2.2 Set Baudrate

Master sends								
Head1 (1 byte)	Head2 (1 byte)	Data Length (1 byte)	Address (1 byte)	Command (1 byte)	Data (1 byte)	Checksum (1 byte)	End1 (1 byte)	End2 (1 byte)
0xAE	0xA7	0x05	0x00	0x0A	BAUD*	*	0xBC	0xBE

*BAUD: 0x00 is 2400bps / 0x01 is 4800bps / 0x02 is 9600bps / 0x03 is 19200bps
0x04 is 38400bps / 0x05 is 57600bps / 0x06 is 115200bps

*Default baudrate is 9600bps.

*After changing the baudrate, the module needs to be re-powered to take effect.

Slave responses								
Head1 (1 byte)	Head2 (1 byte)	Data Length (1 byte)	Address (1 byte)	Command (1 byte)	Data (0 byte)	Checksum (1 byte)	End1 (1 byte)	End2 (1 byte)
0xAE	0xA7	0x04	0x00	0x8A		08E	0xBC	0xBE

5.2.3 Set Address

Master sends								
Head1 (1 byte)	Head2 (1 byte)	Data Length (1 byte)	Address (1 byte)	Command (1 byte)	Data (1 byte)	Checksum (1 byte)	End1 (1 byte)	End2 (1 byte)
0xAE	0xA7	0x05	0x00	0x0B	ADDR*	*	0xBC	0xBE
Slave responses								
Head1 (1 byte)	Head2 (1 byte)	Data Length (1 byte)	Address (1 byte)	Command (1 byte)	Data (0 byte)	Checksum (1 byte)	End1 (1 byte)	End2 (1 byte)
0xAE	0xA7	0x04	ADDR*	0x8B			0xBC	0xBE

*ADDR: Address of module, setting range is 0x01~0xEF.

*0x00 is a general broadcast address, if you forget the module address, you can still use 0x00 to control the module.

5.2.4 Single Measurement

Master sends								
Head1 (1 byte)	Head2 (1 byte)	Data Length (1 byte)	Address (1 byte)	Command (1 byte)	Data (0 byte)	Checksum (1 byte)	End1 (1 byte)	End2 (1 byte)
0xAE	0xA7	0x04	0x00	0x05		0x09	0xBC	0xBE
Slave responses								
*Please refer to ***Chapter 5.2.6*** Measurement Result								

5.2.5 Continuous Measurement

Master sends								
Head1 (1 byte)	Head2 (1 byte)	Data Length (1 byte)	Address (1 byte)	Command (1 byte)	Data (0 byte)	Checksum (1 byte)	End1 (1 byte)	End2 (1 byte)
0xAE	0xA7	0x04	0x00	0x05		0x09	0xBC	0xBE
*Once module received command it will responds AE A7 04 00 8E 92 BC BE and then starts continuous measurement.								
Slave responses								
*Please refer to ***Chapter 5.2.6*** Measurement Result								

5.2.6 Measurement Result

Slave responses								
Head1 (1 byte)	Head2 (1 byte)	Data Length (1 byte)	Address (1 byte)	Command (1 byte)	Data (19 byte)	Checksum (1 byte)	End1 (1 byte)	End2 (1 byte)
0xAE	0xA7	0x17	0x00	0x85	MMSG*		0xBC	0xBE

*MMSG: Measurement results, definitions are as follows table.

byte1~2	byte3~4	byte5~18	byte19
Reserved	Straight Distance	Reserved	Distance Unit

* The value of the measurement item occupies two bytes, the high 8 bits before and the low 8 bits after.

*Distance resolution is 0.1 meter and unit is set by byte 19.

Example: If byte3~4 as 0x08 0xCE means Straight Distance is 225.4 meter.

*Distance Unit (byte19): 0x01 as meter. (provide unit customization for yard and feet.)

*Slave Response on failure in Single Measurement : AE A7 04 00 05 09 BC BE.

*Slave Response on failure in Continues Measurement : AE A7 04 00 05 09 BC BE.

*The standard product is only valid for the straight distance function, the rest is reserved (fixed as 0).

For tilt sensor integrated versions with angle and height measurement function, please contact us.

5.2.7 Stop Measurement

Master sends								
Head1 (1 byte)	Head2 (1 byte)	Data Length (1 byte)	Address (1 byte)	Command (1 byte)	Data (0 byte)	Checksum (1 byte)	End1 (1 byte)	End2 (1 byte)
0xAE	0xA7	0x04	0x00	0x0F		0x13	0xBC	0xBE
Slave responses								
Head1 (1 byte)	Head2 (1 byte)	Data Length (1 byte)	Address (1 byte)	Command (1 byte)	Data (0 byte)	Checksum (1 byte)	End1 (1 byte)	End2 (1 byte)
0xAE	0xA7	0x04	0x00	0x8F		0x93	0xBC	0xBE

5.2.8 Aiming Laser ON/OFF

Master sends								
Head1 (1 byte)	Head2 (1 byte)	Data Length (1 byte)	Address (1 byte)	Command (1 byte)	Data (1 byte)	Checksum (1 byte)	End1 (1 byte)	End2 (1 byte)
0xAE	0xA7	0x05	0x00	0x40	DATA*	*	0xBC	0xBE
*DATA: 0x01 for Aiming Laser ***ON***, 0x00 for Aiming Laser ***OFF***								
Slave responses								
Head1 (1 byte)	Head2 (1 byte)	Data Length (1 byte)	Address (1 byte)	Command (1 byte)	Data (0 byte)	Checksum (1 byte)	End1 (1 byte)	End2 (1 byte)
0xAE	0xA7	0x04	0x00	0xC0		0xC4	0xBC	0xBE

Laser Safety

The light emitted from these devices has been set in accordance with IEC60825. However, staring into the beam, whether directly or indirectly, must be avoided.

Class I

The maximum permissible exposure(MPE) cannot be exceeded, it includes High-power lasers within an enclosure that prevents exposure to the radiation and that cannot be opened without shutting down the laser. For example, a continuous laser at 600nm can emit up to 0.39mW, but for shorter wavelengths, the maximum emission is lower.

Class II

“Caution”, visible laser light less than 1.0mW. Considered eye safe, normal exposure to this type of beam will not cause permanent damage to the retina.

Class IIIA

“Danger”, visible laser light between 1.0mW and 5.0mW. Considered eye safe with caution. Focusing of this light into the eye could cause some damage.

Class IIIB

“Danger”, infrared(IR), and high power visible lasers considered dangerous to the retina if exposed. NB: it is important to note that while complying with the above classifications, unless otherwise stated. Our laser diode products are not certified and are designed solely for use in OEM products. The way in which device is used in the final product may alter its original design classification, and it is the responsibility of the OEM to ensure compliance with the relevant standards.

Specifications are subject to change without notice.