

#### 1535nm eyesafe Laser Rangefinder Module 0815C

Model:LRF0815C

## *¬* OVERVIEW



The LRF0815C laser rangefinder boasts eye-safety, a compact design, lightness, energy efficiency, durability, and a broad temperature range. Its versatility shines in reconnaissance, surveying, and mapping tasks. This module, shell-free and interfaced with a wide array of connections, integrates smoothly into any system. Plus, it comes with PC software and a communication protocol for seamless handheld and multi-function system us.

### **₹** FEATURES

- Single shot ranging and continuous ranging
- 3-target detection, front and back target indication
- Contain self-checking function
- Wake-on-lan function
- Number of emitted pulses during MNBF ≥1×10<sup>6</sup>times

### *⊇* APPLICATIONS

- Handheld devices
- Unmanned aerial vehicle
- Electro-optical pod
- Border surveillance



## $\mathbf{R} \text{ TECHNICAL SPECIFICATIONS}$

## $\blacksquare$ TECHNICAL SPECIFICATIONS

Project	Performance Indicators
Model	LRF0815C



L	aser Wavelength	1.54µm±0.02µm
	Eye Safety	Class I (IEC 60825-1)
D	Divergence Angle	≤0.35 mrad
Receivir	ng Field of View (FOV)	~2.0 mrad
Lau	nch Lens Diameter	Φ12mm
Rece	eiver Lens Diameter	Ф40mm
	Big Target (4m×6m)	≥12000 m
Measuring Range (Reflectance 30%;	NATO goals(2.3m×2.3m)	≥ 8200 m
visibility $\geq 16$ km.)	People(0.5m×1.7m)	≥ 3000 m
<u> </u>	Drones(0.2m×0.3m)	≥1500 m
Ν	Minimum Range	50 m
Ra	anging Frequency	0.5~10Hz
R	anging Accuracy	±2 m
R	Range Resolution	≤30 m
	Precision Rate	≥98%
F	False Alarm Rate	≤1%
Number of	of multi-target detections	Up to 3 targets
E	lectrical Interface	molex- 532610771
	Supply Voltage	DC12 V
Standb	by power consumption	≤1.2W
Averag	ge power consumption	≤2 W
Peak	Power Consumption	≤3W@10Hz
	Weight	≤175g
Dir	nension (L×W×H)	65mm×46mm×86mm
Ope	erating Temperature	-40 ~ +70 °C
Sto	orage Temperature	-55 ~ +75 °C
It	npact Resistance	1200 g/1 ms (GJB150.16A-2009)
	Anti-vibration	$5\sim50\sim5$ Hz, 1 Octave range /min, 2.5 g
	Ranging Logic	First and last target, multi-target ranging, distance selectivity
1	Activation Time	≤950 ms
	Data Interface	TTL
Electrical isolation		Isolation of power ground, communication ground and structure ground
Reliability		$MTBF \ge 1500h$
Op	otical axis stability	≤0.05 mrad
Non-parallelism betwee	n optical axis and mounting surface	≤0.5 mrad
]	Protection Class	IP67
	ESD Class	(Lens position) Contact discharge 6kV Air discharge 8kV
Electromag	netic Compatibility (EMC)	CE/FCC Certification
	Eco-friendly	RoHS2.0













### $\mathbf{R}$ ELECTRICAL INTERFACE

Electrical connector model: Molex51021-0500. The detailed definition of the electrical interface is as follows:

	Table 1 Interface definit	ion
External plug-in XS3	Model: Molex51021-0500	Remark
1	TTL RX	3.3V
2	TTL TX	3.3V
3	CTRL	3.3V-5V power on, 0V power off
4	+5V	Positive power supply
5	GND	power supply ground

#### $\mathbf{R}$ communication protocol

Communication format: TTL communication, baud rate 115200bps;

Data format: 8 bits of data, one start bit, one stop bit, no parity check, the data consists of header byte, command part, data length, parameter part, check byte;.

Communication method: The main control and the distance measuring machine adopt a master-slave communication method. The main control sends control commands to the distance measuring machine, and the distance measuring machine receives and executes the instructions. In the ranging state, the ranging machine sends back the data and status of the ranging machine to the host computer according to the ranging cycle. The communication format and command content are as shown in the table below.

The format of the ser	nt message is as follow	vs:			
STX0	CMD	LEN	DATA1H	DATA1L	CHK

#### Send message format description

#### Table 2 Description of sending message format

No.	Name	illustrate	code	Remark
1	STX0	Message start flag	55(H)	
2	CMD	Command word	See table 3	
3	LEN	Data length	The number of all bytes except the start flag, command word, and checksum	
4	DATAH	parameter		
5	DATAL			
6	СНК	XOR check	Except for the validation byte, other bytes are XORed	

#### The command is described as follows:

Table 3 Description of commands and data words sent by the main control to the distance measuring machine

No.	command word	Functions	Data byte	Remarks	Length	sample code (computing)
1	0x00	Standby (continuous ranging stop)	DATAH=00 (H) DATAL=00 (H)	Distance measuring machine stops working	6 bytes	55 00 02 00 00 57
2	0x01	Single ranging	DATAH=00 (H) DATAL=00 (H)		6 Bytes	55 01 02 00 00 56
3	0x02	Continuous ranging	DATAH=XX (H) DATAL=YY (H)	DATA expresses the ranging period in ms.	6 bytes	55 02 02 03 E8 BE (1Hz ranging)
4	0x03	Self-test	DATAH=00 (H) DATAL=00 (H)		6 Bytes	55 03 02 00 00 54
5	0x04	Distance selection and nearest distance setting	DATAH=XX (H) DATAL=YY (H)	DATA expresses the blind zone value, unit 1m	6 Bytes	55 04 02 00 64 37 (100m closest)
6	0x06	Cumulative number of light out query	DATAH=00 (H) DATAL=00 (H)	Cumulative number of light out query	6 bytes	55 06 02 00 00 51
7	0x11	APD power on	DATAH=00 (H) DATAL=00 (H)		6 bytes	55 11 02 00 00 46
8	0x12	APD power off	DATAH=00 (H) DATAL=00 (H)		6 bytes	55 12 02 00 00 45
9	0xEB	Number Query	DATAH=00 (H) DATAL=00 (H)		6 bytes	55 EB 02 00 00 BC

#### • Master receive format

The receive message format is as follows:

STVO	CMD	LEN	DATAn	DATAO	CUV
5170	CMD	LEIN	DATAn	DATA0	Спк



No.	Name	Description	Code	Remarks
1	STX0	Message start flag 1	55(H)	
2	CMD_JG	Data command word	See Table 5	
3	LEN	Data length	Number of all bytes except start flag, command word, and checksum	
4	Dn	<b>D</b> (	See Table 5	
5	D0	Parameter		
6	СНК	Checksum	All bytes except parity byte	

#### Master receive status description:

Table 5 Description of the data word sent from the rangefinder to the master control

No.	comman d word	Functions	Data byte	Remarks	Total length
1	0x00	Standby (continuous ranging stop)	D1=00 (H) D0=00 (H)		6 bytes
2	0x03	Self-test	D7 ~D0	D0: char type, indicates APD temperature in degrees Celsius; D1: APD high-voltage value, unit V; D3-D2: blind value, unit 1m D5-D4: -5V voltage, unit 0.01V. D7-D6:+5V voltage, unit 0.01V	12 bytes
3	0x04	Setting of the nearest distance to the opt-in, unit m	D1 D0	DATA expresses the closest distance value in 1m; First high then low	6 bytes
4	0x06	Cumulative number of light out query	D3~D0	DATA expresses the number of times the light is emitted, 4 bytes, the high byte comes first	8 bytes
5	0x11	APD power on	DATAH=00 (H) DATAL=00 (H)	APD with high voltage	6 Bytes
6	0x12	APD power off	DATAH=00 (H) DATAL=00 (H)	APD without high voltage	6 Bytes
7	0xED	Work timeout	0x00 0x00	The laser is in laser protection and cannot measure the distance.	6 bytes
8	0xEE	Validation error	0x00 0x00		6 bytes
9	0XEF	Serial communication timeout	0x00 0x00		6 bytes
10	0x01	Single Distance Measurement	D9 D8 D7 D6 D5 D4 D3 D2 D1 D0	<ul> <li>D8-D6 first target distance (unit 0.1m)</li> <li>D5-D3 second target distance (data is 0 when single target) (unit 0.1m)</li> <li>D2-D0 third target distance (data is 0 when single target) (unit 0.1m)</li> <li>3 target from near to far</li> <li>D9 (bit7-bit0) flag byte:</li> <li>D9 bit 7 indicates main wave; 1: with main wave, 0: without main wave.</li> <li>D9 bit 6 indicates return wave; 1: with return wave, 0: without return wave</li> <li>D9 bit 5 indicates the laser status; 1: laser normal, 0: laser failure</li> <li>D9 bit 4 timeout alarm; 1 normal, 0 timeout</li> <li>D9 bit 2 indicates APD status; 1: normal, 0: error</li> <li>D9 bit 1 indicates whether there is a former</li> </ul>	14 bytes

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No.     d word     Functions     Data byte     Remarks     lengt       1     d word     Functions     Jata byte     target, 1: target, 0: no target (the target before the main target is the former target) D9 bit 0 indicates whether there is an after- target; 1: with target, 0: without target (the target after the main target is the after-target)     Image: target, 1: with target, 0: without target (the target after the main target is the after-target)       0     D8-D6 first target distance (data is 0 when single target) (unit 0.1m) D2-D0 third target distance (data is 0 when single target) (unit 0.1m) 3 target from near to far D9 (bit7-bit0) flag byte: D9 bit 7 indicates main wave; 1: with main wave, 0: without main wave. D9 bit 6 indicates return wave; 1: with return wave, 0: without return wave D9 bit 6 indicates return wave; 1: with return wave, 0: without return wave D9 bit 1 indicates main wave; 1: with return wave, 0: without return wave D9 bit 2 indicates fullure D9 bit 2 indicates APD status; 1: laser normal, 0: laser failure D9 bit 1 indicates whether there is a former target; 1: target, 0: no target (the target before the main target is the former target) D9 bit 1 indicates whether there is an after- target; 1: with arget, 0: without target (the target after the main target is the after-target)     14 byte						
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D15 D12 Complete model 20 byte					target after the main target is the after-target)	
						20 bytes
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D3 D2 Laser number						
D1 D0 FPGA version						
Remarks: ① Undefined data byte/bit, default is 0;	Remarks	: 1) Undefin	ed data byte/bit, default is	0;	· · · · · · · · · · · · · · · · · · ·	