ERDI LASER®

80mJ Transceiver Co-Aperture Laser Rangefinder and Target Designator

Model: LDR80K2

PRODUCT DESCRIPTION

The LDR80K2 Laser Designator adopts a transceiver co-aperture lens. It uses an LDA-pumped Nd:YAG crystal combined with an electro-optical Q-switching technology solution to achieve a typical 1064nm pulsed laser output. The single-pulse energy is 80mJ, and the beam divergence angle is 0.25mrad. It employs an adaptive non-temperature-control technology, allowing it to start working immediately. The entire device can operate for 90 seconds, pause for 60 seconds within an ambient temperature range of -40°C to 60°C; 4 cycles (at normal or low temperatures); 1 cycle (at a high temperature of 60°C). It can be compatibly installed and applied in miniaturized electro-optical pods on airborne platforms, loitering munitions, and other combat platforms, realizing continuous ranging and periodic illumination of targets. It is an important laser device in the implementation of semi-active laser guidance.
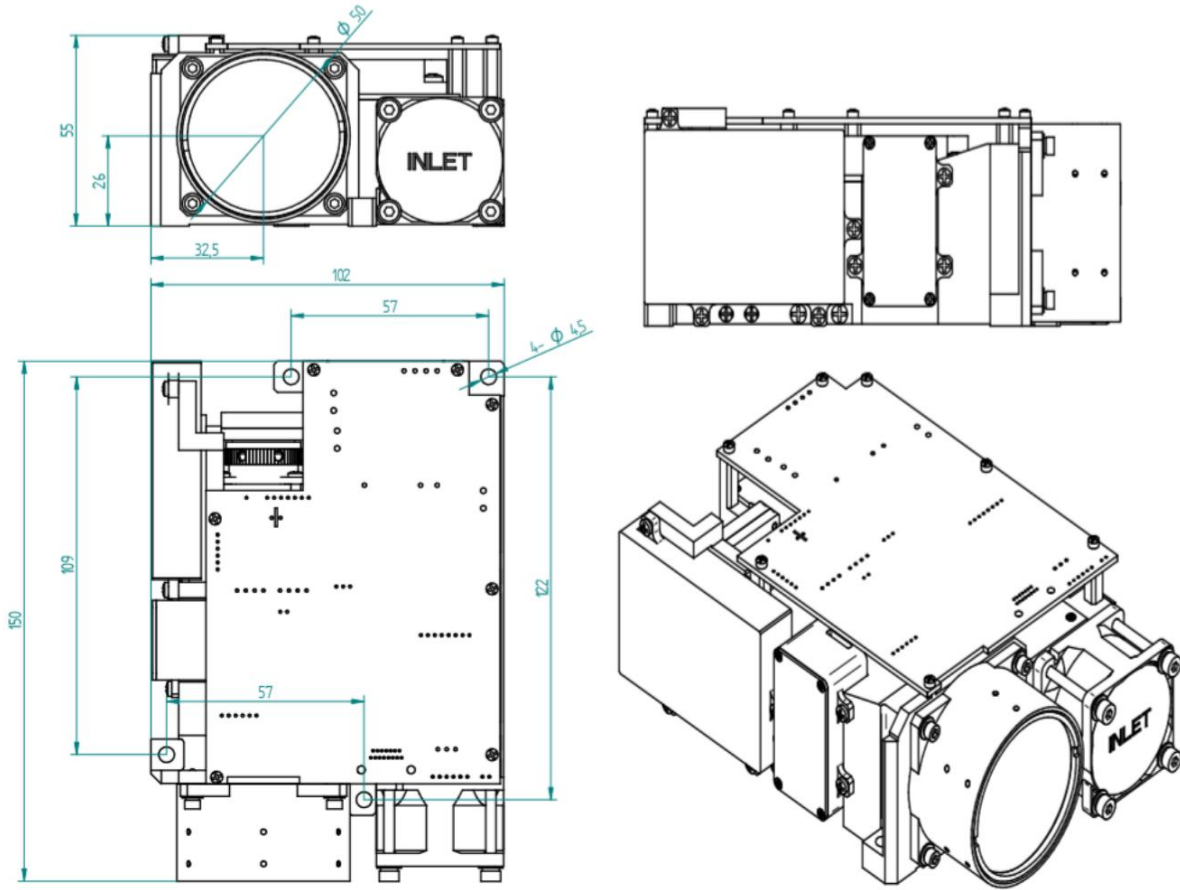

MAIN INDEX PARAMETERS

Project	Parameters
Dimensions	≤150×102×55mm
Weight(without cover)	≤0.88kg
Wavelength	1064nm±1nm
Pumping mode	Semiconductor side pumping (without amplification stage)
Irradiation frequency	Fixed frequency: 45ms - 125ms (20Hz by default)
Trigger mode	Internal synchronization irradiation, external synchronization irradiation (trigger delay: 304.0us ± 0.1us)
Output energy	≥80mJ@20Hz
Maximum irradiation distance	≥10km
Q-switch	Electro - optical Q - switch
Pulse width	10ns - 20ns
Beam divergence angle	≤0.25mrad
Energy instability	≤8%
Irradiation duty cycle	Operate for 60s, pause for 60s; 2 cycles
Power supply	DC 24V±4V
Power consumption	<60W (Standby current at normal temperature: < 0.2A, Peak operating current <5A)
Communication serial port	RS422
External synchronization interface	3V differential level chip, RS422 interface (Delay from external synchronization signal to laser emission: 304.0us ± 0.1us)
Coding mode	Precise frequency coding, time coding, pseudo - random coding
Period accuracy	<±1us

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Laser Ranging Parameters	
Ranging mode	Ranging within 0 - 25Hz
Maximum ranging distance	>20km (Visibility of 25km, typical target of 4x6m, target reflectivity > 20%)
Minimum ranging distance	300m
Ranging accuracy	±5m
High temperature, low temperature, and damp heat tests	
Low temperature	Operating temperature: - 40°C
	Storage temperature: - 45°C
High temperature	Operating temperature: + 60°C
	Storage temperature: + 65°C
Humidity	Relative humidity: 95%±3%
	Temperature: + 35°C±2°C
	Storage time: 72h
Shock Test	
Waveform	Half - sine pulse
Peak acceleration	15g
Pulse width	11ms
Vibration reversal	3 axes
Vibration Test	
Frequency range	5 - 16Hz Single - amplitude displacement: 1.5mm
	16 - 200Hz (16 - 60Hz for optical devices) Acceleration: 2.0g
One - time scanning time	12 min
Duration	Vertical axis: 36 min
Temperature Cycle Test	
Temperature range	-40°C~60°C
Storage time	1h.
Temperature rate	3°C/min
Cycle	6

STRUCTURAL DIMENSIONS

ELECTRICAL PARAMETERS

1• Electrical connection interface consists of connectors J30J-21ZKP and J30J-04ZK.The interface definition is as follows:

Table 1 J30J-21ZKP Interface Definition

J30J-21ZKP				
Pin	Functionality	Description	Direction	Remarks
1	TX+	RS422 Tx+	Output	RS422 Communication Interface
2	TX-	RS422 Tx-	Output	
3	RX+	RS422 Rx+	Input	
4	RX-	RS422 Rx-	Input	
5	GND	RS422 Ground	GND	
6	EN+	Power Enable		24V Power Supply Enable
7	EN-	Power Enable		Switch
8-13		Empty		
14	A	External Sync Differential+(A)	Input	A,B are the A and B outputs of the differential chip(RS422 chip).
15	B	External Sync Differential-(B)	Input	

16-21		Empty		

Table 2 J30J-04ZK Interface Definition

J30J-04ZK				
Pin	Description	Direction	Remarks	Description
A、B	24V	Power Supply	Input	Red
C、D	GND	Ground	Input	Black

- Power Supply Interface:+24VDC±10%;
- External Trigger:RS422 differential signal;
- Heat Dissipation Mode:Cooling fan located at the front end of the device.

ꓤ COMMUNICATION PROTOCOL

1.Physical Interface
- Communication Interface:RS422 full duplex;
- Communication Format:1 start bit,8 data bits,1 stop bit,no parity bit;
- Baud Rate:115200bps;
- Communication Format:Case insensitive.

2.Communication Messages
• Corresponding messages are sent through the computer.

3.Communication Format
• The communication format is as follows:

Frame Header	Data Length	Command Code	Data	Checksum
2 bytes	1 bytes	1 byte	N bytes	1 bytes

- Frame Header:The first byte is fixed at 0xEB,and the second byte is fixed at 0x90.
- Data Length:The number of bytes sent,including the length byte itself,excluding the frame header.
- Command Code:1 byte.
- Data:The command data sent;if it is a 16-bit data,it is split into two bytes,with the most significant byte first and the least significant byte second.
- Checksum:The cumulative sum of the data(8 bits,excluding frame header and checksum),taken modulo 0xFF.

2. Control Commands
Table 1: Laser Control Commands

No.	Command	Explanation	Remarks
Byte1	0XEB	Frame Header 1	
Byte2	0X90	Frame Header 2	
Byte3	0X09	Data Length	Byte3~Byte11
Byte4	0X00	Stop Laser Ranging or Illumination	
	0X01	Single Ranging Start	
	0X02	1Hz Ranging Start	
	0X03	1-25Hz Ranging Start	
	0X04	External Synchronization Illumination Delay Setting	External Synchronization Illumination:The delay from when the laser receives an external synchronization signal to when it emits light.
	0X05	Internal/External Synchronization Illumination Start	
	0X06	Distance Gating Setting	(This time the power is on,it takes effect)
	0X07	Distance Gating Inquiry	

	0X08	Internal Synchronization Illumination Period Setting	(This time the power is on,it takes effect)
	0X09	Internal Synchronization Illumination Period Inquiry	
	0X0B	Internal/External Synchronization Illumination Switch	
	0X0C	LD Current Option Setting	Default LD Current 0(Effective on this power-up)
	0X50	Q Delay,LD Pulse Width Setting	
	0X51	LD Current Setting	
	0X52	Q High Voltage Setting	
	0X53	APD High Voltage Setting	
	0X54	LD Parameter Inquiry	
	0X55	APD High Voltage Status Setting	Default Off(Receives Enable and Disable Commands)
	0X56	Q High Voltage Status Setting	Default On(Temporarily Unavailable)
	0X57	LD1 Power Supply Status Setting	Default On
	0X59	Fan Start Temperature Point	
	0X5F	Serial Port Upgrade Command	
	0X60	Software Version Inquiry	
Byte5~10	Data1~6		
Byte11	Checksum		The sum of bytes from the 3rd to the 10th is taken modulo 0xFF.

Table:Explanation of Laser Control Command 1
The relationship between Byte 4 and the data 1 to 6 in Bytes 5 to Byte 10.

NUM	Byte4	Byte5~Byte10 Data1~6		Remarks
1	0X00	Data1~6	0X00	Laser Stop Ranging or Illumination
2	0X01、0X02	Data1~6	0X00	Single Ranging, 1Hz Ranging
323	0X03	Data1	Distance Measurement Frequency	Ranging Start Range: 1-25Hz (1LSB = 1Hz)
		Data2~6	0X00	
4	0X04	Data1	External Synchronization Light Emission Delay High	External Synchronization Illumination:Laser Emission Delay After Receiving External Synchronization Signal Range:303.0-305.0(1LSB=0.1 microseconds) Default:304.0(1LSB=0.1 microseconds)
		Data2	External Synchronization Light Emission Delay Low	
		Data3~6	0X00	
5	0X05	Data1~5	0X00	Illumination Start
		Data6	1. Internal Synchronization Illumination Encoding Number: 0X01:Fixed Frequency 0XF2:Time Coding 2. When using external synchronization,this value is fixed at 0X01.	
6	0X06	Data1	Distance Range Selection High-Short Range	Distance Range Selection Setting Unit is in meters(Minimum measuring range is 300 meters,maximum measuring range is 50,000 meters).
		Data2	Distance Range Selection Low-Short Range	
		Data3	Distance Range Selection High-Long	

			Range		
		Data4	Distance Range Selection Low-Long Range		
		Data5~6	0X00		
7	0X07	Data1~6	0X00	Distance Range Selection Inquiry	
8	0X08	Data1	Internal Synchronization Illumination Cycle-High	Internal Synchronization Illumination Cycle Setting	Internal Synchronization Illumination Cycle T.Illumination cycle=(45,000us-125,000us)with the unit being microseconds;default:50,000us(20 Hz).
		Data2	Internal Synchronization Illumination Cycle-Medium		
		Data3	Internal Synchronization Illumination Cycle-Low		
		Data4	Internal Synchronization Illumination Working Duration		Unit S,Range 190,Default 90
		Data5	Internal Synchronization Illumination Interval Duration		Unit S,Range 1255,Default 40
		Data6	Internal Synchronization Illumination Cycle Count		Range 14,Default 1
9	0X09	Data1~5	0X00	Internal Synchronization Illumination Cycle Inquiry	
		Data6	Synchronization Illumination Encoding Number: 0X01:Fixed Frequency 0XF2:Time coding		
10	0X0B	Data1	Internal Synchronization:0X00 External Synchronization:0X01	Switch Between Internal/External Synchronization Illumination	
		Data2~6	0X00		
11	0X0C	Data1	LD Current Option 0:0X00 LD Current Option 1:0X01 LD Current Option 2:0X02 LD Current Option 3:0X03	LD Current Option Setting Default:LD Current Option 0	
		Data2~6	0X00		
12	0X50 (Save)	Data1	Q Delay High	Laser Diode Q Delay and LD Pulse Width Setting Range:50-300 microseconds(1LSB=1 microsecond)	
		Data2	Q Delay Low		
		Data3	LD Pulse Width High	Range:50-300 microseconds(1LSB=1 microsecond)	
		Data4	LD Pulse Width Low		
		Data5~6	0X00		
13	0X51 (Save)	Data1	LD Current Option 0 Parameters	Range:0-140A(1LSB=1A)	
		Data2	LD Current Option 1 Parameters	Range:0-140A(1LSB=1A)	
		Data3	LD Current Option 2 Parameters	Range:0-140A(1LSB=1A)	
		Data4	LD Current Option 3 Parameters	Range:0-140A(1LSB=1A)	
		Data5~6	0X00		
14	0X52 (Save)	Data1	Q High Voltage-High	Range:2000-5000(1LSB=1V)	
		Data2	Q High Voltage-Low		
		Data3~6	0X00		
15	0X53 (Save)	Data1	APD High Voltage-High	Range:40-450(1LSB=1V)	
		Data2	APD High Voltage-Low		
		Data3~6	0X00		
16	0X54	Data1~6	0X00	LD Parameter Inquiry	
17	0X55	Data1	0X01:On 0X00:Off	APD High Voltage State Setting	
		Data2~6	0X00		
18	0X56	Data1	0X01:On 0X00:Off	Q High Voltage State Setting	

No.	Command			
		Data2~6	0X00	
19	0X57	Data1	0X01:On 0X00:Off	LD1 Power Supply State Setting
		Data2~6	0X00	
20	0X59 (Save)	Data1	Fan Start Temperature Point	Fan Start Temperature Point Setting Unit°C(Range 0-100)
		Data2	0X01: Set 0X00: Inquiry	When querying,Data1 is 0x00.
		Data3~6	0X00	
21	0X5F	Data1~6	0X5F	Serial Port Upgrade Command
22	0X60	Data1~6	0X00	Software Version Inquiry

Table:Laser Control Command 2

No.	Command	Explanation	Remarks		
Byte1	0XEB	Frame Header 1			
Byte2	0X90	Frame Header 2			
Byte3	0X14	Data Length	Byte3~Byte22		
Byte4	0X0A	Time Coding Setting	command		
Byte5	Data1	Time Code 1-High	Time Code 1 1LSB=1us	Time Coding Range:40,000-60,000 microseconds,1LSB=1 microsecond Default Time Code value is 50,000 microseconds. The Time Code value is 16 bits,(high byte first,followed by the low byte).
Byte6	Data2	Time Code 1-Low		
Byte7	Data3	Time Code 2-High	Time Code 2 1LSB=1us	
Byte8	Data4	Time Code 2-Low		
Byte9	Data5	Time Code 3-High	Time Code 3 1LSB=1us	
Byte10	Data6	Time Code 3-Low		
Byte11	Data7	Time Code 4-High	Time Code 4 1LSB=1us	
Byte12	Data8	Time Code 4-Low		
Byte13	Data9	Time Code 5-High	Time Code 5 1LSB=1us	
Byte14	Data10	Time Code 5-Low		
Byte15	Data11	Time Code 6-High	Time Code 6 1LSB=1us	
Byte16	Data12	Time Code 6-Low		
Byte17	Data13	Time Code 7-High	Time Code 7 1LSB=1us	
Byte18	Data14	Time Code 7-Low		
Byte19	Data15	Time Code 8-High	Time Code 8 1LSB=1us	
Byte20	Data16	Time Code 8-Low		
Byte21	Data17	Time Code length	Time Code length	Range:1-8(1LSB=1) Default:1
Byte22	Checksum		The sum of bytes 3 ~ 21,taken modulo 0XFF.	

Table:Laser Return Data

No.	Command	Explanation	Remarks
Byte1	0XEB	Frame Header 1	
Byte2	0X90	Frame Header 2	
Byte3	0X18	Data Length	Byte3~Byte26
Byte4	0X00	Laser Stop Ranging or Illumination	Rangefinder /Internal Trigger
	0X01	Single Ranging	
	0X02	1Hz Ranging	
	0X03	1-25Hz Ranging Start	1-25Hz
	0X04	External Synchronization Illumination Setting	
	0X05	Start of Internal/External Synchronization Illumination	
	0X06	Distance Range Selection Setting	
	0X07	Distance Range Selection Inquiry	

	0X08	Internal Synchronization Illumination Cycle Setting	
	0X09	Internal Synchronization Illumination Cycle Inquiry	
	0X0A	Time Code Setting	
	0X0B	Switch Between Internal/External Synchronization Illumination	
	0X0C	LD Current Option Setting	
	0X0D	1Hz Status Frame	Upload at a 1Hz frequency when not emitting light.
	0X50	Q Delay and LD Pulse Width Setting	
	0X51	LD Current Setting	
	0X52	Q High Voltage Setting	
	0X53	APD High Voltage Setting	
	0X54	LD Parameter Inquiry	
	0X55	APD High Voltage State Setting	
	0X56	Q High Voltage State Setting	
	0X57	LD1 Power Supply State Setting	
	0X59	Fan Start Temperature Point	
	0XEE	Receiving Data Exception	
	0XED	Setting Parameter Failure	
Byte5~21	Data1~17		
Byte22	Data18	Status Byte 1	
Byte23	Data19	Status Byte 2	
Byte24	Data20	Ambient Temperature	S8,1LSB=1°C
Byte25	Data21	LD Temperature	S8,1LSB=1°C
Byte26	Checksum		The sum of bytes from Byte 3 to Byte 25,taken modulo 0XFF.

Table:Explanation of Laser Return Data
The relationship between Byte 4 and Bytes 5 to 25.

NUM	Byte4	Byte5~Byte25 Data1~17		Remarks
1	0X00	Data1~17	0X11	Laser Stop Ranging or Illumination
2	0X01、 0X02、 0X03、 0X05、	Data1	Distance 1 High	Single Ranging,1Hz Ranging,1-25Hz Ranging,and Internal/External Synchronization Illumination target distance values,unit:meters.
		Data2	Distance 1 Low	
		Data3	Distance 2 High	
		Data4	Distance 2 Low	
		Data5	Distance 3 High	
		Data6	Distance 3 Low	
		Data7~17	0X00	
3	0X04	Data1	External Synchronization Light Emission Delay High	External Synchronization Illumination:Laser Emission Delay After Receiving External Synchronization Signal Range:303.0-305.0(1LSB=0.1 microseconds) Default:304.0(1LSB=0.1 microseconds)
		Data2	External Synchronization Light Emission Delay Low	
		Data3~17	0X00	
4	0X06、 0X07	Data1	Distance Range Selection High-Short Range	Distance Range Selection Setting,Distance Range Selection Inquiry
		Data2	Distance Range Selection Low-Short Range	Distance Range Selection Setting Unit is in meters(Minimum measuring range is 300 meters,maximum measuring range is 50,000 meters).
		Data3	Distance Range Selection High-Long Range	
		Data4	Distance Range Selection Low-	

			Long Range		
		Data5~17	0X00		
5	0X08、0X09	Data1	Internal Synchronization Illumination Cycle-High	Internal Synchronization Illumination Cycle Setting	Internal Synchronization Illumination Cycle T.Illumination cycle=(45,000us-125,000us)with the unit being microseconds;default:50,000us(20Hz).
		Data2	Internal Synchronization Illumination Cycle-Medium		
		Data3	Internal Synchronization Illumination Cycle-Low		
		Data4	Internal Synchronization Illumination Working Duration		Unit S,Range 190,Default 90
		Data5	Internal Synchronization Illumination Interval Duration		Unit S,Range 1255,Default 40
		Data6	Internal Synchronization Illumination Cycle Count		Range 14,Default 1
		Data6-Data17	0X00		
6	0X0A	Data1	Time Code length	Time Code length	Range:1-8(1LSB=1) Default:1
		Data2	Time Code 1-High	Time Code 1 1LSB=1us	Length:8-bit Time Code quantity 1LSB=1 microsecond Range:40,000-60,000 microseconds Default:8 Time Codes with a value of 50,000 microseconds. Time Code value is 16 bits,with the high byte first and the low byte following.
		Data3	Time Code 1-Low		
		Data4	Time Code 2-High	Time Code 2 1LSB=1us	
		Data5	Time Code 2-Low		
		Data6	Time Code 3-High	Time Code 3 1LSB=1us	
		Data7	Time Code 3-Low		
		Data8	Time Code 4-High	Time Code 4 1LSB=1us	
		Data9	Time Code 4-Low		
		Data10	Time Code 5-High	Time Code 5 1LSB=1us	
		Data11	Time Code 5-Low		
		Data12	Time Code 6-High	Time Code 6 1LSB=1us	
		Data13	Time Code 6-Low		
		Data14	Time Code 7-High	Time Code 7 1LSB=1us	
		Data15	Time Code 7-Low		
		Data16	Time Code 8-High	Time Code 8 1LSB=1us	
		Data17	Time Code 8-Low		
7	0X0B	Data1	Internal Synchronization:0X00 External Synchronization:0X01	Switch Between Internal/External Synchronization Illumination	
		Data2~17	0X00		
8	0X0C	Data1	LD Current Option 0:0X00 LD Current Option 1:0X01 LD Current Option 2:0X02 LD Current Option 3:0X03	LD Current Option Setting Default:LD Current Option 0	
		Data2~17	0X00		
9	0X0D (1Hz 上传)	Data1	External Synchronization Light Emission Delay High	External Synchronization Illumination:Laser Emission Delay After Receiving External Synchronization Signal Range:303.0-305.0(1LSB=0.1 microseconds) Default:304.0(1LSB=0.1 microseconds)	
		Data2	External Synchronization Light Emission Delay Low		
		Data3	Time Code length	Range:1-8(1LSB=1) Default:1	
		Data4	Internal Synchronization	Internal Synchronization Illumination Cycle T.The	

			Illumination Cycle-High	illumination cycle is from 45,000 microseconds to 125,000 microseconds,with the unit being microseconds;the default is 50,000 microseconds(20Hz).
		Data5	Internal Synchronization Illumination Cycle-Medium	
		Data6	Internal Synchronization Illumination Cycle-Low	
		Data7	Distance Range Selection High-Short Range	Distance Range Selection Setting,Distance Range Selection Inquiry
		Data8	Distance Range Selection Low-Short Range	Distance Range Selection Setting
		Data9	Distance Range Selection High-Long Range	Unit is in meters(Minimum measuring range is 300 meters,maximum measuring range is 50,000 meters).
		Data10	Distance Range Selection Low-Long Range	
		Data11~17	0X00	
10	0X50	Data1	Q Delay High	Laser Q Delay and LD Pulse Width Setting/Inquiry Range:50-300 microseconds(1LSB=1 microsecond)
		Data2	Q Delay Low	
		Data3	LD Pulse Width High	Range:50-300 us(1LSB=1us)
		Data4	LD Pulse Width Low	
		Data5~17	0X00	
11	0X51	Data1	Set LD Current Option 0	Range:0-140A(1LSB=1A)
		Data2	Set LD Current Option 1	Range:0-140A(1LSB=1A)
		Data3	Set LD Current Option 2	Range:0-140A(1LSB=1A)
		Data4	Set LD Current Option 3	Range:0-140A(1LSB=1A)
		Data5~17	0X00	
12	0X52	Data1	Q High Voltage 1-High	Range:2000-5000(1LSB=1V)
		Data2	Q High Voltage 1-Low	
		Data3~17	0X00	
13	0X53	Data1	APD High Voltage-High	Range:40-450(1LSB=1V)
		Data2	APD High Voltage-Low	
		Data3~17	0X00	
14	0X54	Data1	Q Delay High	Range：50-300us（1LSB=1us）
		Data2	Q Delay Low	
		Data3	LD Pulse Width High	Range：50-300us（1LSB=1us）
		Data4	LD Pulse Width Low	
		Data5	LD Current Option 0	Range: 0-140A（1LSB=1A）
		Data6	LD Current Option 1	Range: 0-140A（1LSB=1A）
		Data7	LD Current Option 2	Range：0-140A（1LSB=1A）
		Data8	LD Current Option 3	Range：0-140A（1LSB=1A）
		Data9	Q High Voltage-High	Range：2000-5000（1LSB=1V）
		Data10	Q High Voltage-Low	
		Data11	APD High Voltage-High	Range：40-450（1LSB=1V）
		Data12	APD High Voltage-Low	
		Data13	External Synchronization Light Emission Delay High	External Synchronization Illumination:Laser Emission Delay After Receiving External Synchronization Signal Range:303.0-305.0(1LSB=0.1 microseconds) Default:304.0(1LSB=0.1 microseconds)
		Data14	External Synchronization Light Emission Delay Low	

		Data15	Fan Start Temperature Point	
		Data16~17	0X00	
15	0X55	Data1	0X01:On 0X00:Off	APD High Voltage State Setting
		Data2~17	0X00	
16	0X56	Data1	0X01:On 0X00:Off	Q High Voltage State Setting
		Data2~17	0X00	
17	0X57	Data1	0X01:On 0X00:Off	LD1 Power Supply State Setting
		Data2~17	0X00	
18	0X59	Data1	0X01:On 0X00:Off	Fan Start Temperature Point(Range 0-100)
		Data2~17	0X00	
19	0XEE	Data1~17	0XEE	Receiving Data Exception
20	0XED	Data1~17	0XED	Setting Parameter Failure

Status Byte 1

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Internal/External Synchronization Illumination 0:Internal 1:External	Standby/Prepare 0:Standby 1:Preparing	Temperature Sensor Status 0:Normal 1:Abnormal	Main Wave 0:Normal 1:Abnormal	APD High Voltage State 0:On 1:Off	APD 0:Normal 1:Abnormal	Ambient Temperature 0:Normal 1:Abnormal	LD Temperature 0:Normal 1:Abnormal(Over Temperature 70°C)

Status Byte 2

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Illumination Status 0:Not Emitting Light 1:Emitting Light	LD Current Status 0:Normal 1:Abnormal	LD1 Power Status 0:On 1:Off	X Default:0	X Default:0	X Default:0	LD Current Options LD Current Option 0:0x00 LD Current Option 1:0x01 LD Current Option 2:0x02 LD Current Option 3:0x03	

==Automatic Transmission of Data at the End of Emission==

Table:Communication in Automatic Mode

No.	Command	Explanation	Remarks
Byte1	0XEB	Frame Header 1	
Byte2	0X90	Frame Header 2	
Byte3	0X0B	Data Length	Byte3~Byte13
Byte4	0X00	Write Temperature Parameter Command	
	0X01	Read Temperature Parameter Command	Upload All Temperature Parameter Data
	0X02	Switch to Auto/Manual Mode Command	
	0X03	Query Current Temperature Parameter Command	
	0X04	Disable Over-Temperature 70°C Stop Emission Command	Stop Emission at Over-Temperature 70°C,Allow Emission at 60°C Recovery

Byte5~12	Data1~8		
Byte13	Checksum		The sum of bytes from the 3rd to the 11th,taken modulo 0xFF.

The Corresponding Relationship Between Byte4 and Bytes 5 ~ 12

NUM	Byte4	Byte5~Byte12 Data1~8		Remarks
1	0X00、0X01	Data1	Temperature Sequence Number	
		Data2	Current	Range:0-140A(1LSB=1A)
		Data3	Q Delay High	Q Delay
		Data4	Q Delay Low	Range:50-300us(1LSB=1us)
		Data5	LD Pulse Width High	LD Pulse Width
		Data6	LD Pulse Width Low	Range:50-300us(1LSB=1us)
		Data7	Q High Voltage-High	Range：2000-5000(1LSB=1V)
		Data8	Q High Voltage-Low	
2	0X02	Data1	Turn Off Auto:0x00 Turn On Auto:0x01	
		Data2-8		
3	0X03	Data1	Current	Range:0-140A(1LSB=1A)
		Data2	Q Delay High	Q Delay
		Data3	Q Delay Low	Range:50-300us(1LSB=1us)
		Data4	LD Pulse Width High	LD Pulse Width
		Data5	LD Pulse Width Low	Range:50-300us(1LSB=1us)
		Data6	Q High Voltage-High	Range：2000-5000(1LSB=1V)
		Data7	Q High Voltage-Low	
		Data8	Current Temperature Point	Turn off Auto Mode,Constant-55
4	0X04	Data1-8	0X00	