

Point Light Controller

DBS-DV65-P01CE-05008-16

User Manual



Thank you for choosing our company's product. Please read this user manual carefully before use.

Revised in April 2025, Version 1.3

Precautions:

 Warnings	
	This product requires an external power supply for power. Ensure the power switch of the controller is in the OFF position when plugging in or unplugging the power supply to prevent electric shock.
	Before using this product, please read this manual in detail; when using this product, follow the operations specified in this manual.
	In case of abnormal conditions, please contact our company. Do not disassemble or assemble the product by yourself.
	Ensure the product is properly grounded to prevent electric shock.
	When using the matching light source, do not look directly at the light emitted by the light source to avoid eye damage.

Document Version Description:

Version No.	Revision Date	Revision Description
V1.1	2024.Jun	New version release
V1.2	2024.Nov	1. Added precautions and document version description 2. Fixed known issues
V1.3	2025.Mar	Updated content and version format

Standard Shipping List

Product Name	Model	Type	Quantity
Light Source Controller	DBS-DC65-P01CE-05008-16		1
Serial Cable	1.5M Male-to-Female		1
Terminal Block	3.81-5P		1
Power Cable	1.5M National Standard IEC 60320 C13 Plug		1
Ethernet Cable	1.5M		1

Note: If you have other requirements for the shipping configuration, please contact the salesperson or distributor in a timely manner.

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1. Product Introduction

1.1 Product Features

- Supports RS232 communication
- Supports 100Mbps Ethernet communication
- Built-in 5V switching power supply
- Low trigger response time
- Supports external trigger mode
- Switchable between constant-on/strobe modes
- Supports millisecond-level and microsecond-level strobe
- Manual adjustment of brightness and mode
- 5~24V bidirectional triggering, adaptable to high/low-level trigger modes
- Easy installation: screw mounting or C45 DIN rail mounting

1.2 Product Selection

Model	Built-in Power Supply Power	Maximum Current per Channel
DBS-DC65-P01CE-05008-16	65W	0.8A

1.3 Main Parameters

Table 1 Main Parameters Table

Item	Parameter	Description
Input Voltage	AC220V	Used by the built-in switching power supply
Output Voltage	5V	Voltage of the built-in switching power supply
Output Current	0.8A	Maximum current per channel is 0.8A (factory-limited according to requirements)
Overcurrent Protection	None	
Overvoltage Protection	None	
Operating Modes	5 Types	NORMAL: 0 (Constant On), 1 (Constant Off), 2 (Steady On), 3 (Single-channel Setting) STROBE: 1~999ms Strobe
Light Emitting Modes	Constant On/Constant Off/Steady On/Strobe	Except for Steady On mode, other modes support external trigger control
Trigger Modes	Edge + Level Trigger	Edge trigger in Strobe mode; Level trigger in Constant On/Constant Off modes
Constant On Brightness Level	255	255-level brightness adjustment
Millisecond-level Strobe Time	1~999	Unit: ms (millisecond)
Communication Modes	Serial Port/Ethernet Port	Serial port baud rate: 9600; Ethernet port: 100Mbps Ethernet port
Built-in Power Supply	65W	
Number of Channels	16	
Connected Light Source Type	5V point light source	5V point light source

Operating Ambient Temperature	-5~50°C	
Dimensions	See Appendix for details	

1.4 Function Modes

Table 2 Function Modes Table

Take Channel 1 as an example:

Operating Mode Switch	Mode	Nixie Tube Display Format		Description
NORMAL	Brightness Setting	1. X	$0 \leq X \leq 255$	Adjust brightness
	Operating Mode	H1. X	X=0 Constant On	Light source turns off when trigger signal is valid
			X=1 Constant Off	Light source turns on when trigger signal is valid
			X=2 Steady On	Trigger signal is invalid; light source remains on
			X=3 Single-channel Editing Mode	Edit the operating mode of each channel individually
	Long press the menu button at H. 0 to enter the following parameter editing mode.			
	Level Trigger Mode	LL. X	X=0 Low-level Valid	Trigger signal is valid at low level
			X=1 High-level Valid	Trigger signal is valid at high level
	Debounce Time Parameter	dt. X	$0 \leq X \leq 99$	X = Debounce time, Unit: μs (microsecond)
STROBE	Millisecond-level Strobe	1. X	1. X $1 \leq X \leq 999$, Unit: ms	Light source flashes once for millisecond-level duration when trigger signal is valid
LOCK	Lock			Lock the controller
UNLOCK	Unlock			Unlock the controller

Note: Channel numbers 10 to 16 are represented by letters A to G respectively (after Channel 9).

2. User Instructions

2.1 Panel Description

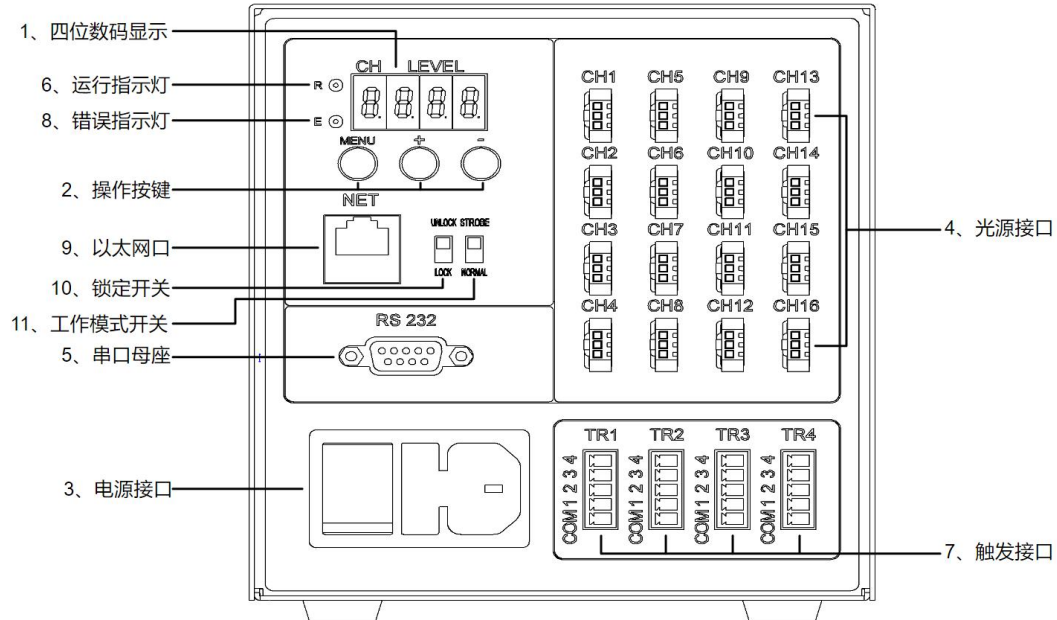


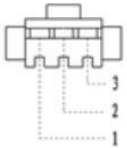
Figure 1 Front Panel

Table 3 Panel Interface Definition Table

No.	Name	Description
1	Digital tube display - 4 digits	The first digit (from the left) indicates the current operating channel; the last three digits represent the parameter value of the current channel
2	Operation Buttons	MENU = Function switching button; "+" = Increase value; "-" = Decrease value
3	Power Interface	AC220V power input interface
4	Light Source Interface	Connects to 10mA~0.8A 5V point light sources
5	Serial Female Connector	Connects to devices with RS232 interface
6	Running Indicator	Flashes when the controller is in normal operation
7	Trigger Interface	Connects to external signals for trigger control
8	Error Indicator	Lights up when the controller malfunctions
9	Ethernet Interface	100Mbps Ethernet port for network communication
10	Lock Switch	LOCK = Disables panel operations; UNLOCK = Enables panel operations
11	Operating Mode Switch	STROBE = Strobe mode; NORMAL = General digital mode

2.2 Light Source Interface Definition

Table 4 Light Source Interface Definition

	Position	Definition	Description
	1	Light+	Positive pole of light output
	2	Light-	Negative pole of light output
	Empty	Empty	No function

2.3 Serial Female Connector Interface Definition

The interface definition of the serial female connector is shown in Figure 2. Use a straight-through cable to connect it to the 9-pin serial port of a computer host.

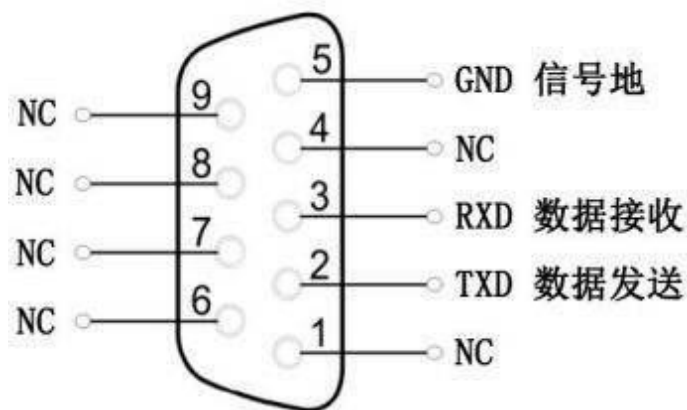


Figure 2 Serial Female Connector Interface Definition

Table 5 Serial Female Connector Interface Definition

Pin No.	Name	Description
1	NC	Not connected
2	TXD	Controller RS232 data transmission (RS232 level)
3	RXD	Controller RS232 data reception (RS232 level)
4	NC	Not connected
5	GND	RS232 signal ground
6	NC	Not connected
7	NC	Not connected
8	NC	Not connected
9	NC	Not connected

2.4 Trigger Description

2.4.1 Trigger Interface

There are 16 external trigger input interfaces (see Figure 3).

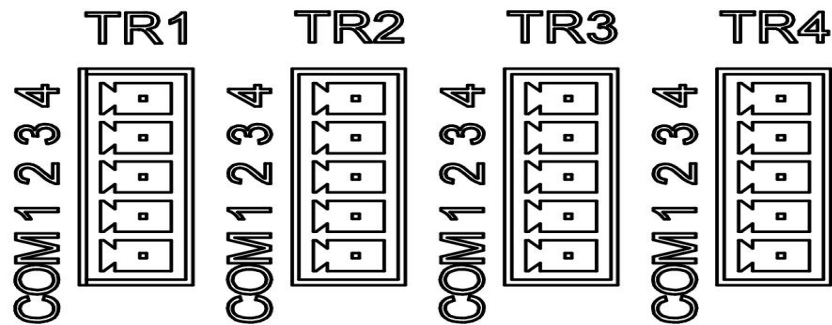


Figure 3 External Trigger Input Interface

Each interface has a trigger port labeled TRx (x = channel number), and COM is the common port (can be connected to either the positive or negative pole of the power supply). The internal structure adopts a bidirectional optocoupler, and its electrical diagram is shown in Figure 4.

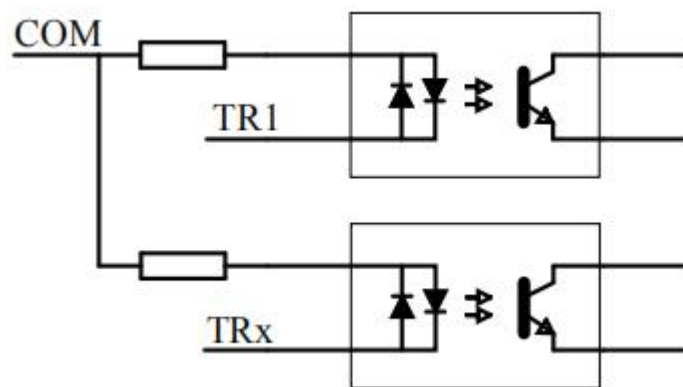


Figure 4 Internal Electrical Diagram of External Trigger

2.4.2 Trigger Interface Wiring Example

When the valid signal is triggered on a rising edge or high level, its wiring is shown in Figure 5:

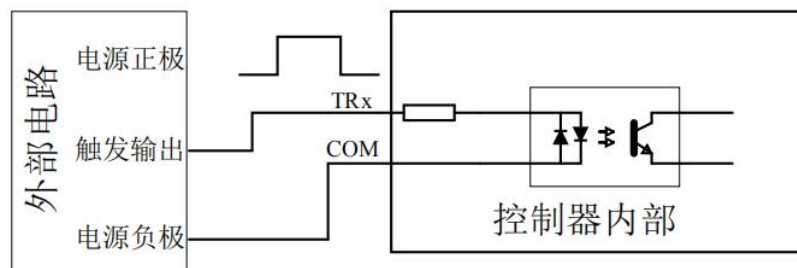


Figure 5 Wiring for Rising Edge/High-Level Valid Trigger
connect the trigger output of the external control circuit to TRx, and the negative pole of the power supply to COM. The controller will execute the trigger action when a

rising edge or high level is detected at the trigger output.

When the effective signal is triggered by a falling edge or a low level, its wiring is shown in Figure 6:

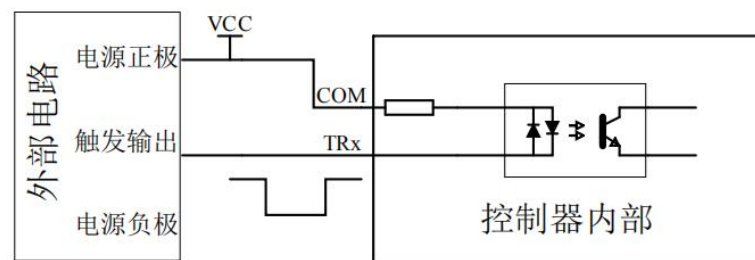


Figure 6 Wiring for Falling Edge/Low-Level Valid Trigger

The trigger output of the external control circuit is connected to TRx, and the positive terminal of the power supply is connected to COM. When there is a falling edge or low level at the trigger output terminal, the controller controls the output.

2.4.3 Trigger Timing Diagrams

Trigger signal: The valid level of the external trigger signal and the valid edge in Strobe mode can be configured. For example, to set high-level validity (for non-Strobe modes) and rising-edge validity (for Strobe mode): First, enter the engineer mode via serial communication (refer to the Communication Protocol chapter). After entering the engineer mode, the 7-segment display on the controller's front panel shows "LL. X" (X = 0 or 1). Use the "+" and "-" buttons to set X to 1—at this point, the trigger signal is valid for high level and rising edge. If X is set to 0, the trigger signal is valid for low level and falling edge.

Constant Off Mode: When the controller's trigger input signal is valid, the light source turns on. The timing relationship (taking high-level validity as an example) is shown in Figure 7.

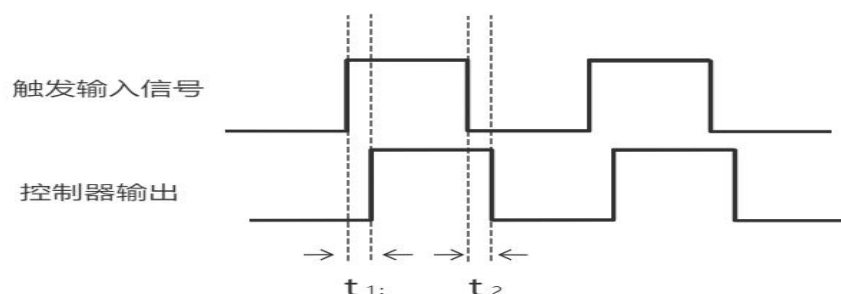


Figure 7 Constant Off Mode Timing Diagram

Parameter	Time
t_1	$\leq 600\mu s$
t_1	$\leq 600\mu s$

Constant On Mode: When the controller receives a valid trigger input signal, the light source turns off. Taking high-level validity as an example, the timing

relationship is shown in Figure 8:

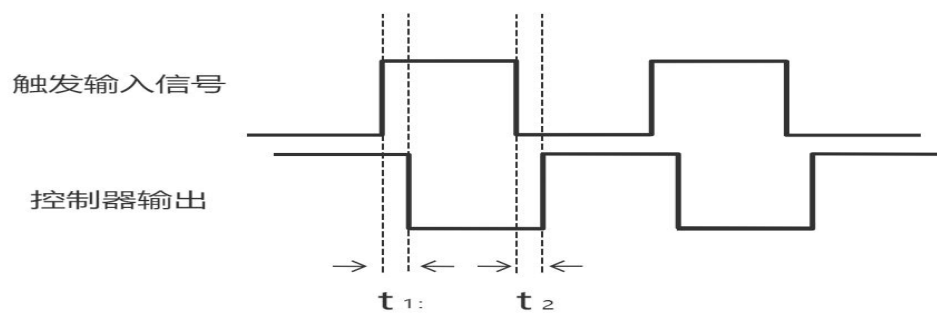


Figure 8 Constant On Mode Timing Diagram

Parameter	Time
t_1	$\leq 600\mu s$
t_2	$\leq 600\mu s$

Strobe mode: When the controller is set to millisecond or microsecond strobing, the light source is on when the controller trigger input signal is active. The timing relationship is illustrated with a high level active signal as an example, as shown in Figure 9:

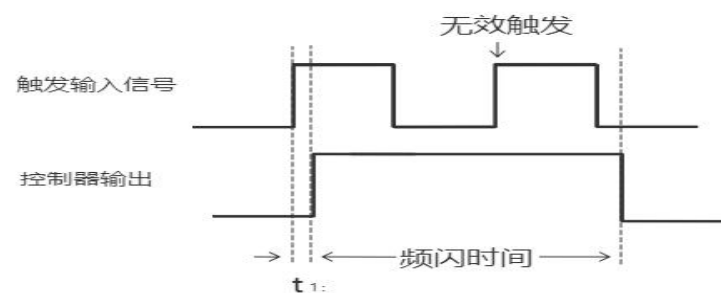


Figure 9 Strobe Mode Timing Diagram

Parameter	Time
t_1	$\leq 600\mu s$

2.5 Manual Setting for NORMAL Operating Mode

Switch the operating mode switch to NORMAL—the controller will work in general digital mode.

2.5.1 Brightness Setting

In general digital operating mode, when the controller is turned on, the 4-digit 7-segment display shows "Channel Number + Brightness Value". Initially, it displays Channel 1 and its brightness value. For example, if the brightness value of Channel 1 was set to 10 last time, the display will show "1.010".

The following takes "setting the brightness of Channel 2 to 125" as an example, and its flow chart is shown in Figure 10.

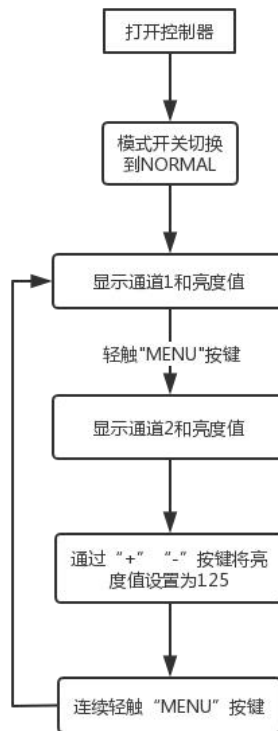


Figure 10 Brightness Setting Flow Chart

2.5.2 Operating Mode Setting

This model of controller has 3 light-emitting modes in NORMAL operating mode, which can be set via manual buttons or communication. For details on the 3 modes, refer to Table 2.

The mode of each channel can be set individually. The following takes "setting the mode of Channel 2" as an example; the setting method for other channels is similar.

2.5.3 Constant Off Mode Setting

The flow chart for setting Channel 2 to Constant Off mode is shown in Figure 11.

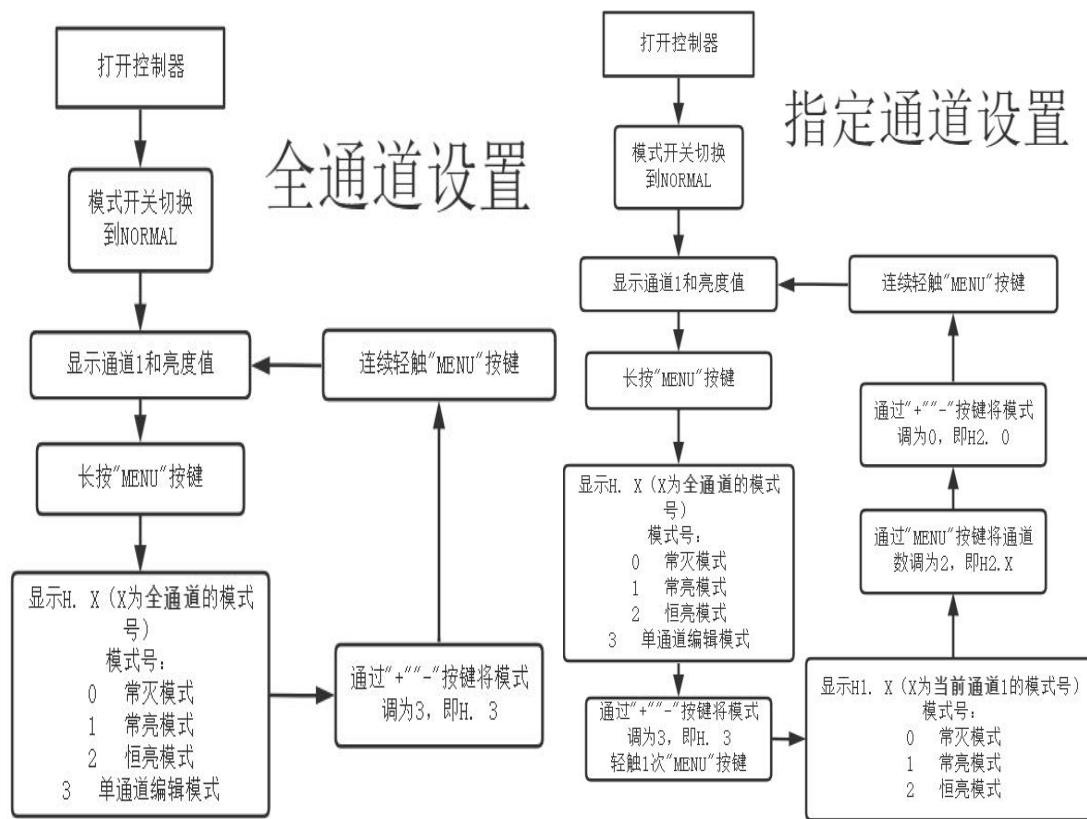


Figure 11 Constant Off Mode Setting Flow Chart

2.5.4 Constant On Mode Setting

The flow chart for setting Channel 2 to Constant On mode is shown in Figure 12.

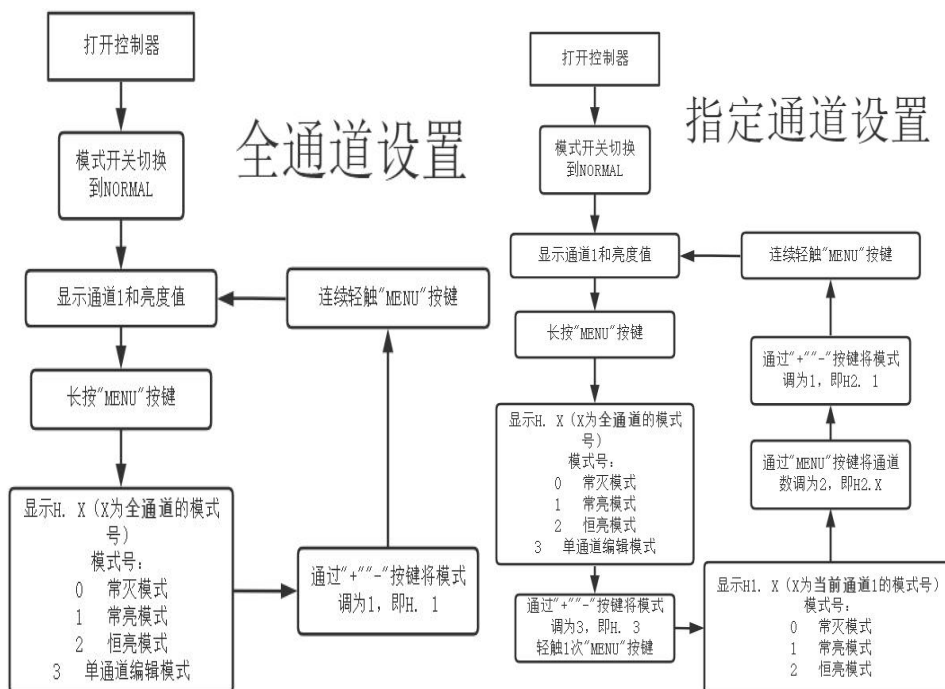


Figure 12 Constant On Mode Setting Flow Chart

2.5.5 Steady On Mode Setting

The flow chart for setting Channel 2 to Steady On mode is shown in Figure 13.

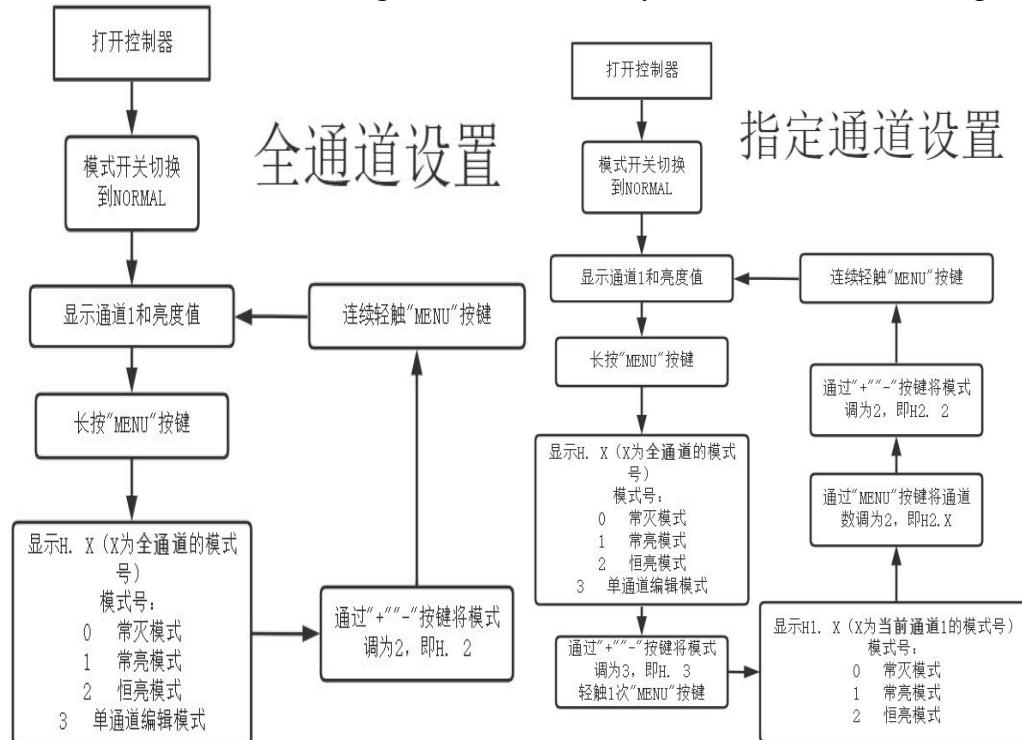


Figure 13 Steady On Mode Setting Flow Chart

2.5.6 High-Level Trigger Mode Setting

The flow chart for setting all channels to High-Level Trigger mode is shown in Figure 14.

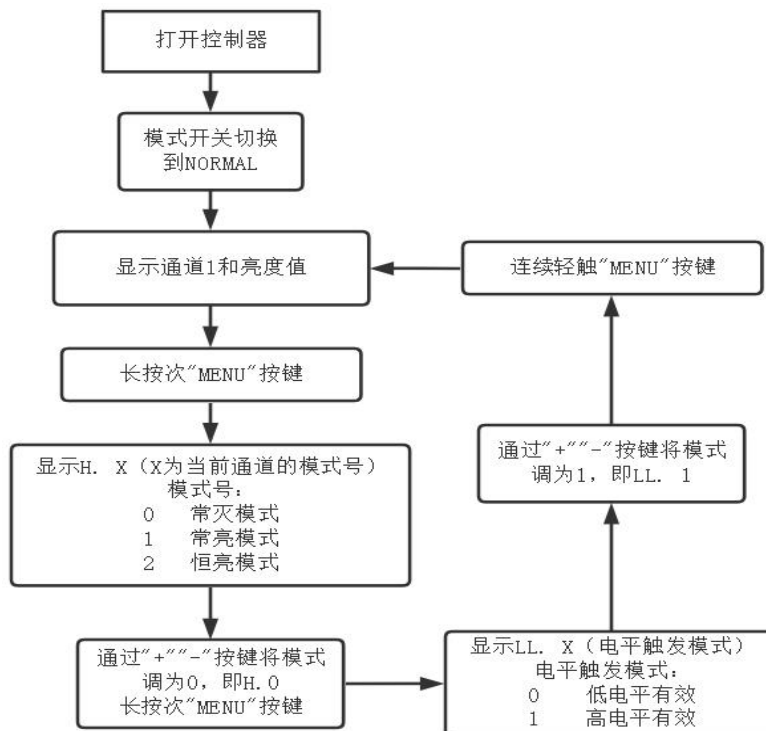


Figure 14 All-Channels High-Level Trigger Mode Setting Flow Chart

2.5.7 Debounce Time Parameter Setting

The flow chart for setting the debounce time parameter of all channels is shown in Figure 15.

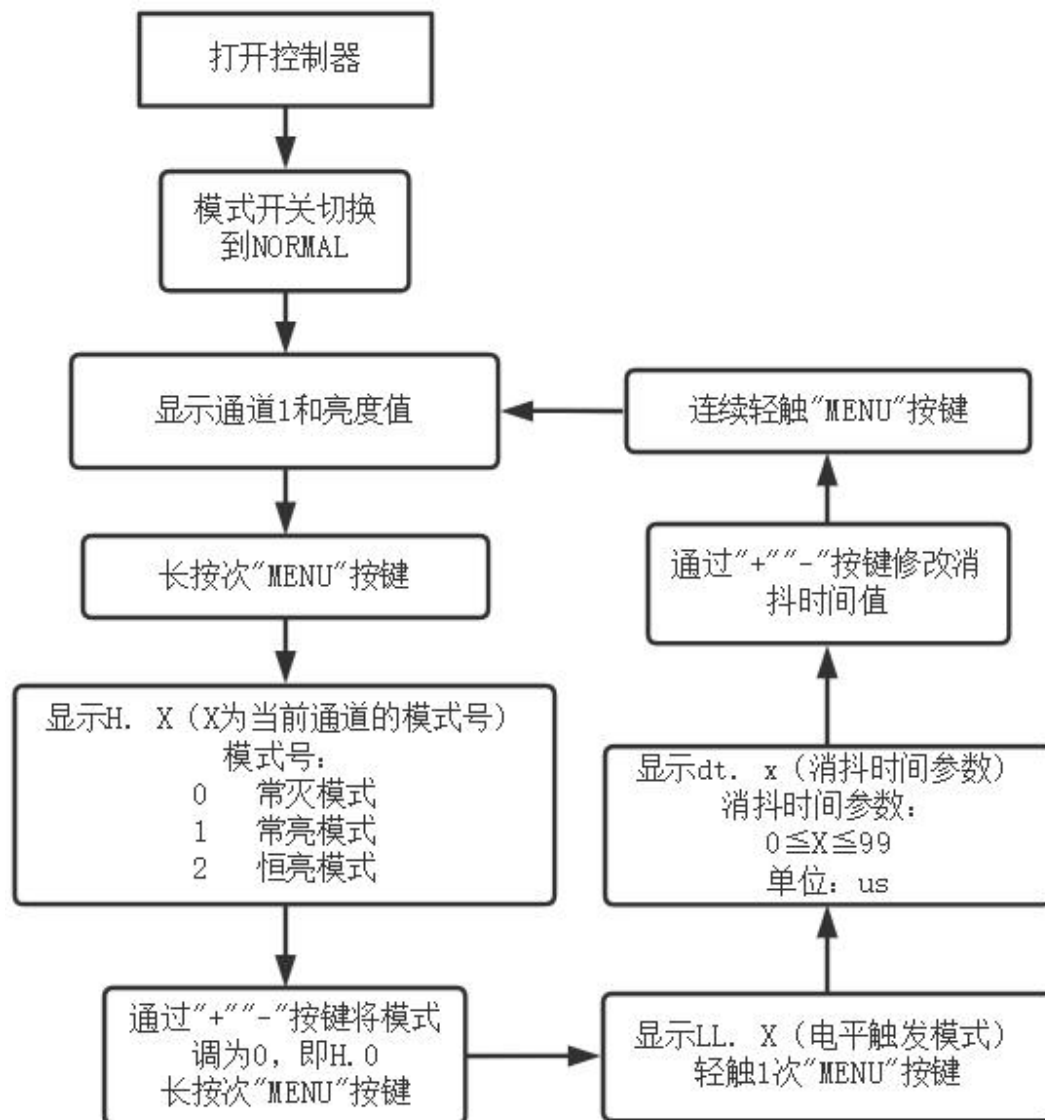


Figure 15 All-Channels Debounce Time Parameter Setting Flow Chart

2.6 Manual Setting for STROBE Operating Mode

Switch the operating mode switch to STROBE—the controller will work in strobe mode.

2.6.1 Strobe Time Setting

In strobe operating mode, when the controller is turned on, the 4-digit 7-segment display shows "Channel Number + Strobe Time Value". Initially, it displays Channel 1 and its strobe time value. For example, if the strobe time value of Channel 1 was set to 10 last time, the display will show "1.010". The strobe mode is set to millisecond-level strobe, and this time represents a 10ms strobe.

2.6.2 Millisecond-Level Strobe Mode Setting

The flow chart for setting Channel 2 to millisecond-level strobe mode and its strobe time is shown in Figure 16.

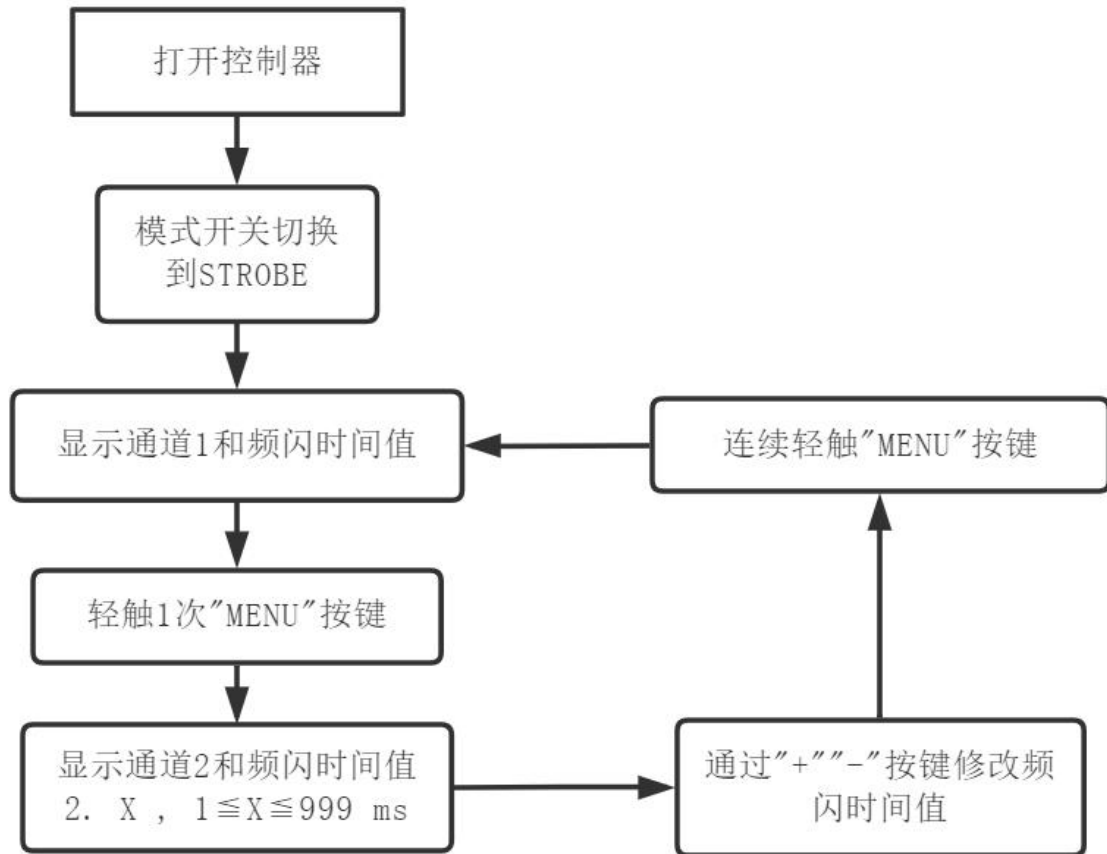


Figure 16 Millisecond-Level Strobe Time Setting Flow Chart

2.7 Manual Setting for LOCK Mode

Switch the lock mode switch to LOCK—the controller will enter lock mode. You can switch between channel data on the 7-segment display, but cannot modify any parameters.

2.8 Manual Setting for UNLOCK Mode

Switch the lock mode switch to UNLOCK—the controller will exit lock mode. You can switch between channel data on the 7-segment display and modify parameters as needed.

3. Communication Protocol

3.1 Programming Flow

When controlling the light source controller via serial port, the communication programming flow is shown in Figure 17.

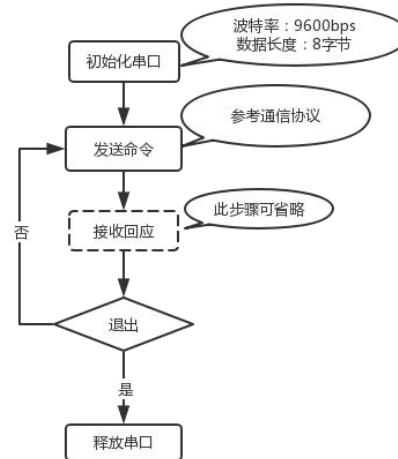


Figure 17 Serial Port Communication Programming Flow Chart

When controlling the light source controller via the Ethernet port, the communication programming flow is shown in Figure 18.

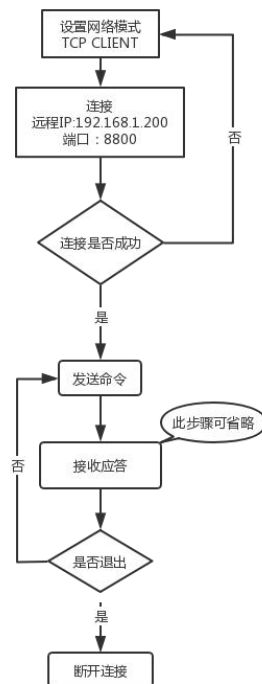


Figure 18 Ethernet Port Communication Programming Flow Chart

3.2 Communication Settings

3.2.1 Serial Port Communication Settings

The communication format settings for the serial port are shown in Table 6.

Table 6 Serial Port Settings Table

Baud Rate	Parity Bit	Data Bit	停止位
9600	None	8	1

3.2.2 Ethernet Port Communication Settings

The default communication configuration at the factory is as follows:

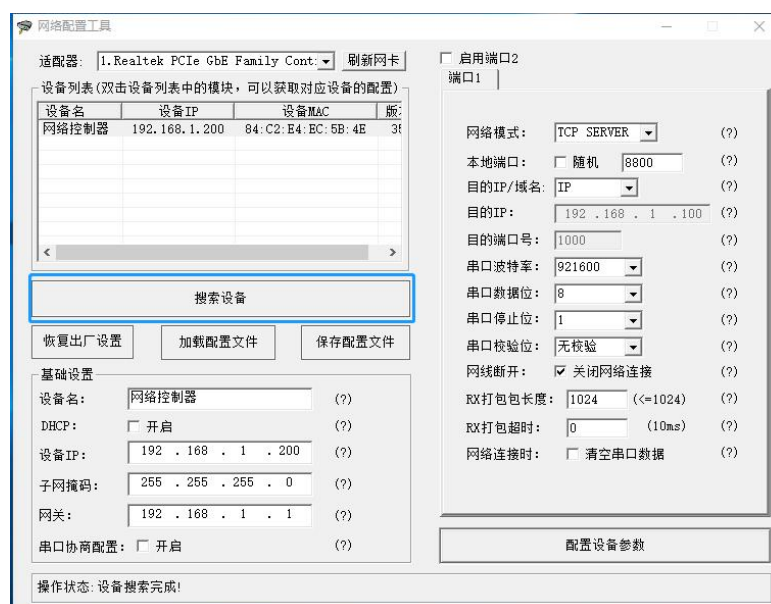
IP Address: 192.168.1.200

Operating Mode: TCP SERVER

Port: 8800

If you need to modify the communication configuration parameters, you can use the supporting configuration software NetModuleConfig.exe for setup. The complete operation process of the configuration software is as follows:

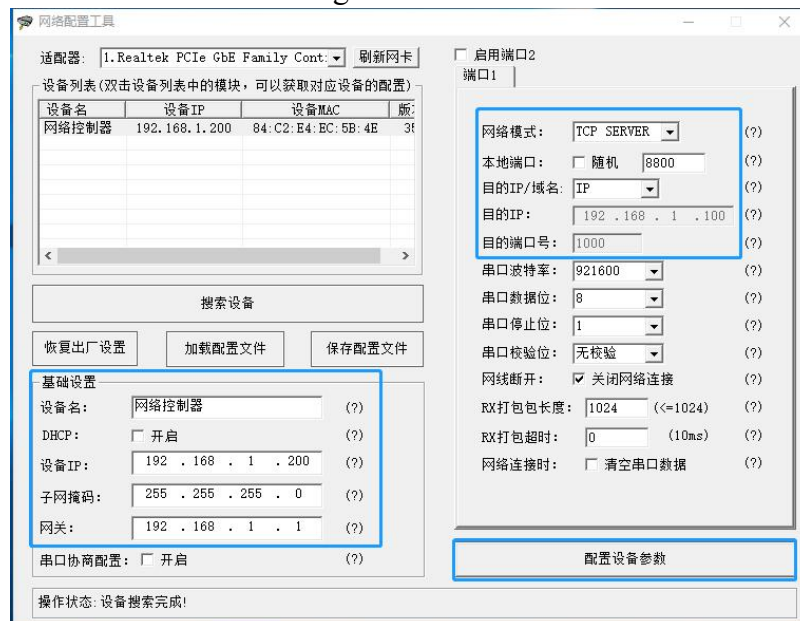
1、Click "Search Devices"—the device list will display all controllers within the subnet.



2、Double-click the searched device to obtain its current parameters.



3、Modify the module parameters according to actual requirements: set the network mode to TCP SERVER, and ensure the destination IP and destination port match those of the TCP CLIENT. Then click "Configure Device Parameters" to save the settings.



3.3 Frame Format Description

The communication frame format is shown in Table 7.

Table 7 Frame Format

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Feature Character	Command Character	Channel Character	Data 1	Data 2	Data 3	XOR Check Character 1	XOR Check Character 2

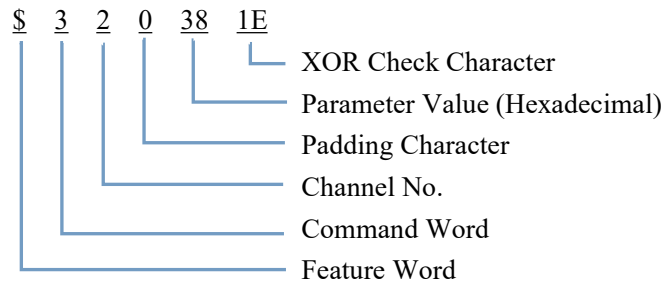
- 1、 All communication bytes use ASCII code.
- 2、 Marker: "\$" (dollar sign).
- 3、 Command: Refer to Table 8 for specific command definitions.
- 4、 When the command is "1", "2", "3", "7", "8", "9", or "A": If the controller receives the command successfully, it returns the marker "\$". If the controller fails to receive the command, it returns "&".
- 5、 When the command is "4": If the controller receives the command successfully, it returns the brightness setting parameters of the corresponding channel (the return format is the same as the send format). If the controller fails to receive the command, it returns "&".
- 6、 Channel: "1", "2", "3", "4" (representing 4 channels respectively).
- 7、 Data: "0XX" (XX is any value ranging from 00 to FF in hexadecimal), which corresponds to the setting parameters of the channel. The high byte comes first, and the low byte comes after.
- 8、 XOR Checksum: Calculated by XORing all bytes except the checksum bytes (including Marker, Command, Channel, and Data). The high 4 bits of the checksum (in ASCII code) come first, and the low 4 bits (in ASCII code) come after.

Table 8 Command Function Table

Character	Function	Description
"1"	Turn on the corresponding channel	The corresponding channel is determined by the Channel byte.
"2"	Turn off the corresponding channel	The corresponding channel is determined by the Channel byte.
"3"	Set brightness parameter of the corresponding channel	The corresponding channel is determined by the Channel byte; brightness parameters are Data 1~Data 3.
"4"	Read brightness parameter of the corresponding channel	The corresponding channel is determined by the Channel byte; the return format is the same as the send format.
"7"	Trigger strobe for the corresponding channel	The corresponding channel is determined by the Channel byte; this function is invalid in non-strobe mode.
"8"	Set mode of the corresponding channel	The corresponding channel is determined by the Channel byte.
"9"	Set strobe time of the corresponding channel	The corresponding channel is determined by the Channel byte; this function is invalid in non-strobe mode.
"A"	Activate Engineer Mode	Activates Engineer Mode; the 7-segment display shows "LL. X", and the trigger level can be adjusted via buttons.

3.4 Communication Examples

To set the brightness of Channel 2 to 56, send the ASCII string: "\$320381E"



	String	ASCII Code	ASCII Code (Hexadecimal)	Represent High 4 Bits and Low 4 Bits with 8421 Code Respectively
Feature Word	\$	36	24	0010 0100
Command Word	3	51	33	0011 0011
Channel Word	2	50	32	0011 0010
Data	0	48	30	0011 0000
	3	51	33	0011 0011
	8	56	38	0011 1000
XOR Sum				0001 1110
XOR Checksum Word				1 E

Note: For the three functions (turning on the corresponding channel, turning off the corresponding channel, and reading the channel parameters), the value of the 3 Data bytes has no impact on the XOR result during the checksum calculation. It is only required to ensure the data format is "0XX" (XX is any value from 00 to FF in hexadecimal).

The following are additional sets of command data:

Turn off Channel 2: Command string = "\$220381F"

	String	ASCII Code	ASCII Code (Hexadecimal)	Represent High 4 Bits and Low 4 Bits with 8421 Code Respectively
Feature Word	\$	36	24	0010 0100
Command Word	2	50	32	0011 0010
Channel Word	2	50	32	0011 0010
Data	0	48	30	0011 0000
	3	51	33	0011 0011
	8	56	38	0011 1000
XOR Sum				0001 1111
XOR Checksum Word				1 F

Turn on Channel 2: Command string = "\$120381C"

	String	ASCII Code	ASCII Code (Hexadecimal)	Represent High 4 Bits and Low 4 Bits with 8421 Code Respectively
Feature Word	\$	36	24	0010 0100
Command Word	1	49	31	0011 0001
Channel Word	2	50	32	0011 0010
Data	0	48	30	0011 0000
	3	51	33	0011 0011
	8	56	38	0011 1000
XOR Sum				0001 1100
XOR Checksum Word				1 C

Read data from Channel 2: Command string = "\$4200012"

	String	ASCII Code	ASCII Code (Hexadecimal)	Represent High 4 Bits and Low 4 Bits with 8421 Code Respectively
Feature Word	\$	36	24	0010 0100
Command Word	4	52	34	0011 0100
Channel Word	2	50	32	0011 0010
Data	0	48	30	0011 0000
	0	48	30	0011 0000
	0	48	30	0011 0000
XOR Sum				0001 0010
XOR Checksum Word				1 0

4. Prompt Command Index

If the controller's nixie tube displays a non-functional prompt command, troubleshoot according to the following command table:

Command	Description	Troubleshooting Solution for Prompt Command
F.1	Unregistered	Re-register
F.2	Storage Chip Damaged	Need to return to the factory for repair
F.3	Exceeding Light Source Power, Short Circuit, Signal Interference	Check the light source power, whether the light source is short-circuited, and whether there is signal interference
F.6	Over-Temperature Alarm (Available for Some Models)	Excessively high temperature; check the controller's operating environment
Loc	Key Lock	Unlock via DIP switch or long-press the "MENU" button

5. Accessories

