

F03 Series Strobe Controller

DBS-DVXXX-F03C-48200-XF

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	F03C Series See 1.2 Product Selection for details		1
Serial Cable	1.5M Male-to-Female		1
Terminal Block	3.81-8P		2
Power 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;
- Built-in 48V switching power supply;
- Low trigger response time (500ns);
- Supports ultra-high frequency triggering (100KHz);
- Supports external trigger/internal trigger modes;
- Supports synchronous signal output;
- 5~24V bidirectional triggering, adaptable to high and low level trigger modes;
- Automatic power-off data storage;

1.2 Product Selection

Model	Built-in Power Capacity	Maximum Current per Channel
DBS-DV65-F03C-48200-4F	65W	20A
DBS-DV120-F03C-48200-4F	120W	20A
DBS-DV200-F03C-48200-4F	200W	20A

1.3 Main Parameters

Table 1 Main Parameters Table

Item	Parameter	Description
Input Voltage	AC220V	For built-in switching power supply
Output Voltage	48V	Voltage of built-in switching power supply
Output Current	20A	Maximum instantaneous current per channel
Overcurrent Protection	None	
Overvoltage Protection	None	
Operating Modes	2 Types	Internal trigger / External trigger
Light-emitting Mode	Stroboscopic	
Trigger Mode	Edge	Effective in external trigger mode
Stroboscopic Pulse Width Time	10~999	Unit: Microsecond (μ s)
Internal Trigger Cycle Value	10~999	Unit: Millisecond (ms)
Stroboscopic Delay Time	0~99	Unit: Microsecond (μ s)
Communication Baud Rate	9600bps	
Built-in Power Supply	65/120W/200W	
Number of Channels	4	
Connected Light Source Type	24V Light Source	24V light source
Operating Ambient Temperature	-5~50℃	
尺寸	See Appendix for Details	

1.4 Functional Modes

Table 2 Functional Modes Table

Take Channel 1 as an example:

Function	Nixie Tube Display Mode		Description
Stroboscopic Time Setting	1. X	$10 \leq X \leq 999$	Adjust stroboscopic time, Unit: Microsecond (μ s)
Operating Mode	H1. X	X=0 External Trigger Mode	Trigger the light source via trigger signal
		X=1 Internal Trigger Mode	Trigger signal automatically generated by set time
Synchronous Signal Mode	C1. X	5~99	Delay time of synchronous signal output, Unit: Microsecond (μ s)
Press and hold the MENU button at C1. X to enter the following parameter editing modes			
Edge Trigger Mode	LL. X	X=0 Falling Edge Trigger	Triggered by the falling edge of the trigger signal
		X=1 Rising Edge Trigger	Triggered by the rising edge of the trigger signal
Debounce Time Parameter	dt. X	$0 \leq X \leq 99$	X is the debounce time, Unit: Microsecond (μ s)
Linkage Mode	Lt. X	X=0	No linkage
		X=1	IO linkage

2. User Manual

2.1 Panel Description

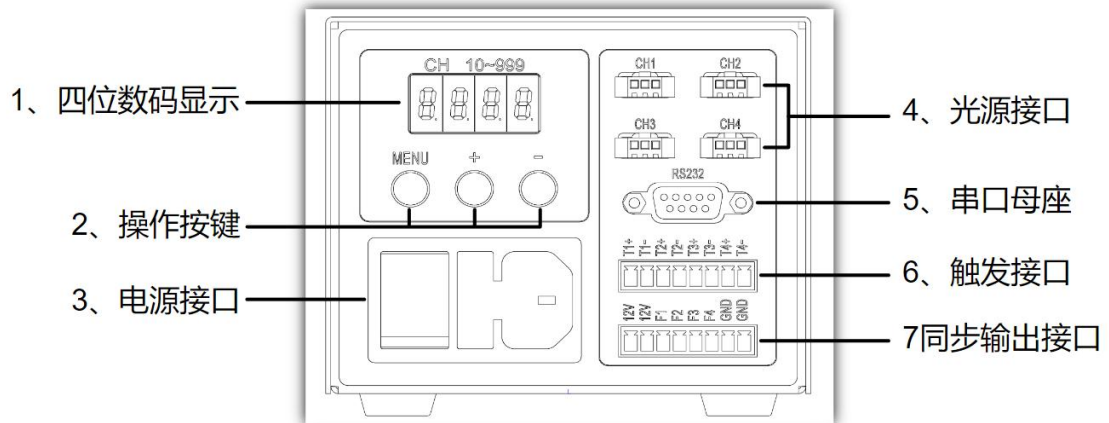


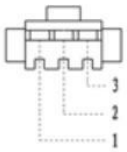
Figure 1: 2-Channel Front Panel

Table 3: Panel Interface Definition Table

No.	Name	Description
1	4-digit Nixie Tube Display	The first digit from the left indicates the currently operated channel, and the last three digits indicate the corresponding value of the currently operated channel.
2	Operation Buttons	MENU = function switching button; "+" = increase value; "-" = decrease value
3	Power Interface	AC220V interface (built-in 5A fuse)
4	Light Source Interface	Connects to a 24V light source
5	Serial Female Connector	Connects to devices with an RS232 interface
6	Trigger Interface	Trigger signal input interface
7	Synchronous Output Interface	Used for synchronous signal output and 12V power supply; the 12V load capacity is 9W

2.2 Light Source Interface Definition

Table 4: Light Source Interface Definition Table

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

2.3 Serial Port Interface Definition

The interface definition of the serial port female connector is shown in Figure 2. It is connected to the 9-pin serial port of the computer host using a parallel cable.

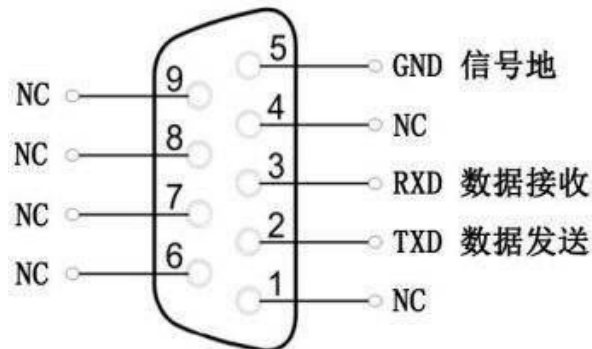


Figure 2: Serial Port Female Connector Interface Definition

Table 5: Serial Port Female Connector Interface Definition Table

Pin No.	Name	Description
1	NC	No function
2	TXD	Controller RS232 data transmission (RS232 level)
3	RXD	Controller RS232 data reception (RS232 level)
4	NC	No function
5	GND	RS232 signal ground
6	NC	No function
7	NC	No function
8	NC	No function
9	NC	No function

2.4 Trigger Description

2.4.1 Trigger Interface

The external trigger input interface is shown in Figure 3:

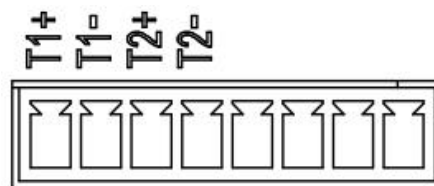


Figure 3: External Trigger Input Interface

There are 2 channels for the external trigger input interface. Each channel has two input terminals: "+" and "-" Tx (x represents the channel number). A unidirectional optocoupler is built inside, and its electrical diagram is shown in Figure 4:

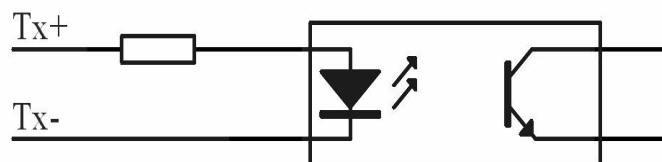


Figure 4: Internal Electrical Diagram of External Trigger

2.4.2 Trigger Interface Wiring Examples

When the valid trigger signal is a rising edge or high-level active, the wiring is shown in Figure 5:

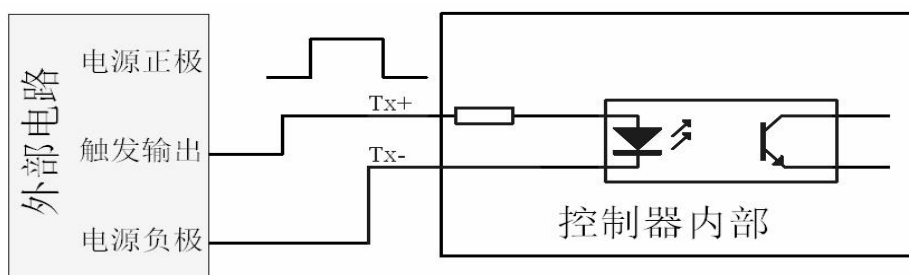


Figure 5: Wiring Example for Rising Edge or High-Level Activation

Connect the trigger output of the external control circuit to Tx+, and the negative pole of the power supply to Tx-. When there is a rising edge or high level at the trigger output terminal, the controller controls the output.

When the valid trigger signal is a falling edge or low-level active, the wiring is shown in Figure 6:

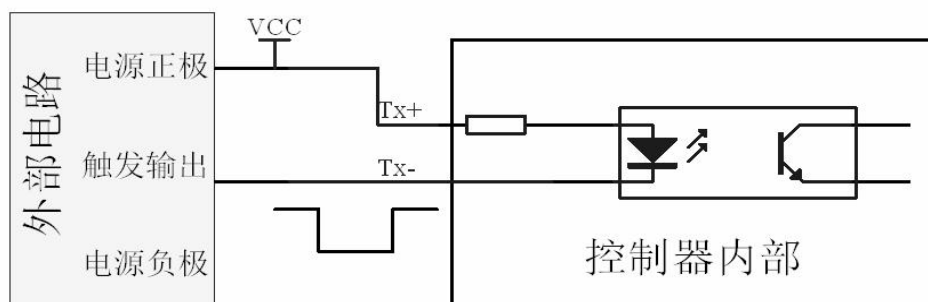


Figure 6: Wiring Example for Falling Edge or Low-Level Activation

Connect the trigger output of the external control circuit to Tx-, and the positive pole of the power supply to Tx+. When there is a falling edge or low level at the trigger output terminal, the controller controls the output.

2.4.3 Trigger Timing Diagram

The controller is a microsecond-level strobe controller. When the trigger input signal of the controller is a valid signal, the light source turns on. Taking high-level activation as an example, the timing relationship is shown in Figure 7:

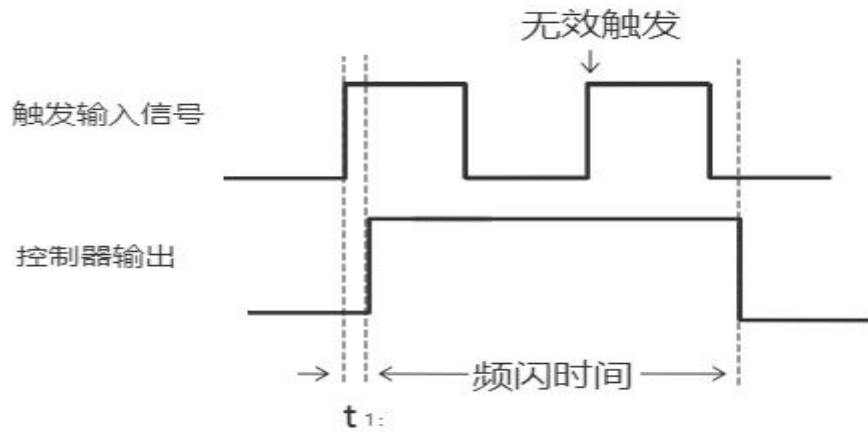


Figure 7: Strobe Mode Timing Diagram

Parameter	Time
t_1	$\leq 500\text{ns}$

2.4.4 Synchronous Output Signal Interface

If the camera requires power supply from the controller, the 12V power supply of this interface can be used to power the camera. The signal connection definition is as follows:

REMO Terminal Pin No.	Signal Name	Signal Definition
1	12V	12V output
2	12V	12V output
3	F1	Trigger Output 1
4	F2	Trigger Output 2
5	F3	Trigger Output 3
6	F4	Trigger Output 4
7	GND	12V power ground
8	GND	12V power ground

The synchronous output signal is used to trigger cameras, PLCs, or other control devices for synchronous control. Its electrical interface is shown in Figure 8:

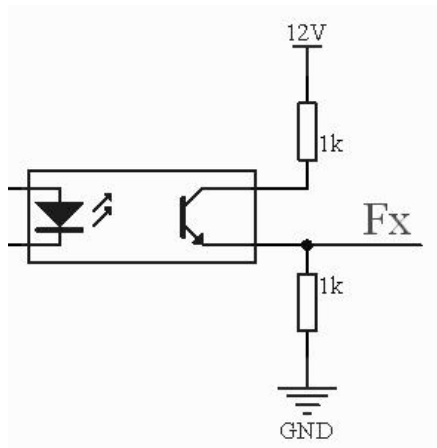


Figure 8: Electrical Interface of Synchronous Output Signal

The timing of the synchronous output signal and the external trigger signal is shown in Figure 9:

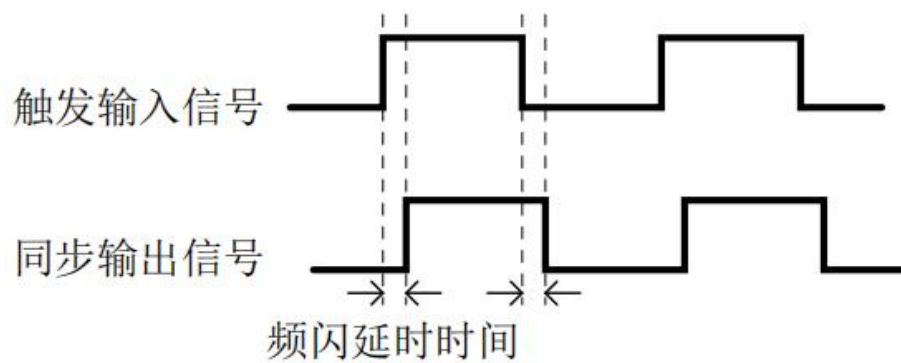


Figure 9: Timing Diagram of Synchronous Output Signal

2.5 Operation Instructions

2.5.1 Strobe Time Setting

Figure 10 shows the operation flow chart for setting the strobe time of Channel 1.

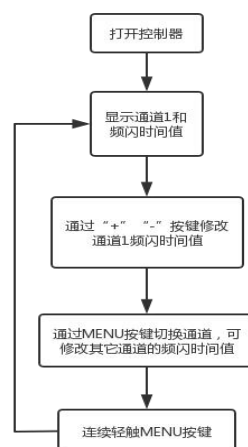


Figure 10: Strobe Time Setting Flow Chart

2.5.2 Trigger Mode Setting

Figure 11 shows the operation flow chart for setting the trigger mode of Channel

1.

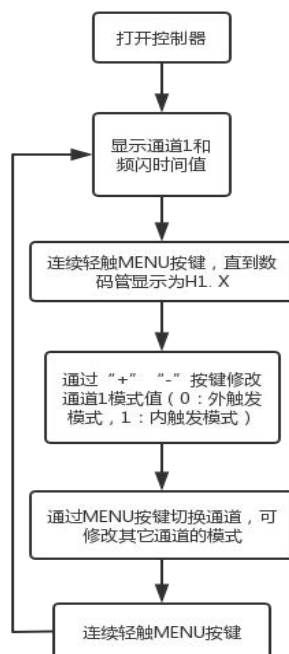


Figure 11: Trigger Mode Setting Flow Chart

2.5.3 Internal Trigger Interval Time Setting

Figure 12 shows the operation flow chart for setting the internal trigger interval time of Channel 1.

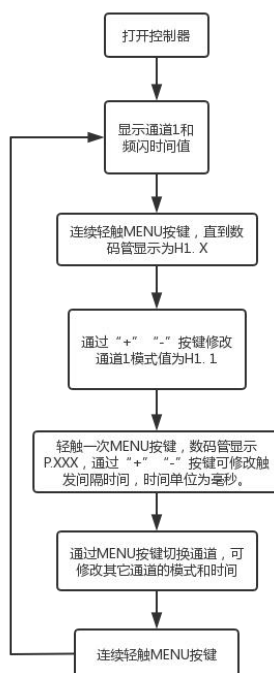


Figure 12: Internal Trigger Interval Time Setting Flow Chart

2.5.4 Synchronous Signal Output Delay Time Setting

Figure 13 shows the operation flow chart for setting the synchronous signal output delay time of Channel 1.

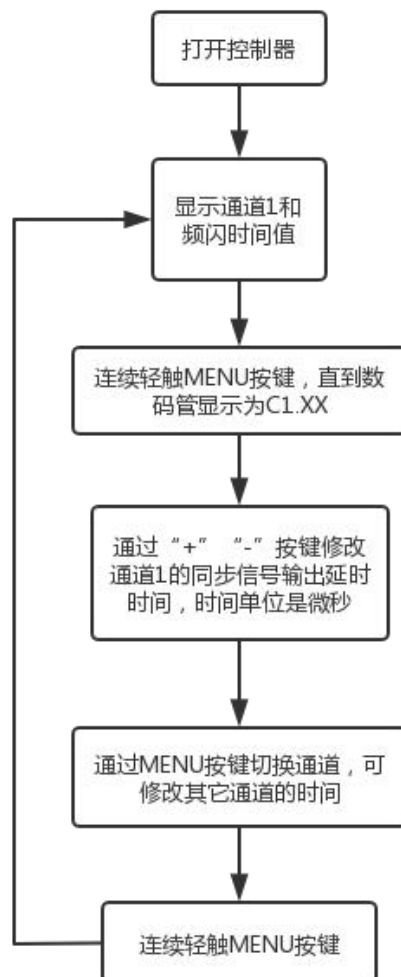


Figure 13: Synchronous Signal Output Delay Time Setting Flow Chart

2.7 Application Examples

2.7.1 Wiring and Setting Method for Hikvision Camera Triggering Strobe Controller

The wiring definition of the Hikvision camera is shown in Figure 14:

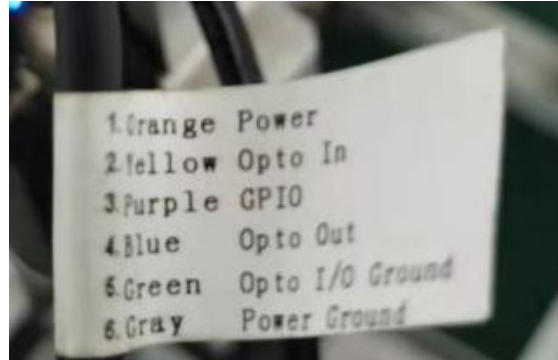


Figure 14

Orange wire: 12V+

Yellow wire: Trigger input

Purple wire: GPIO

Blue wire: Trigger output

Green wire: Input/output negative pole

Gray wire: 12V-

The wiring of the controller is shown in Figure 15:



Figure 15: Strobe Time and Wiring Diagram

Take the application of Channel 1 as an example for wiring:

As shown in Figure 2, connect T1+ to 12V+ with an orange wire, connect the camera's blue wire to T1-, and connect the camera's green wire to GND. The setting parameters of the controller are shown in Figure 16 and Figure 17:



Figure 17: Set to External Trigger Mode

The Hikvision camera is configured and tested using the MVS (Version V3.0.0) software, and the setting method is shown in Figure 18 and Figure 19:

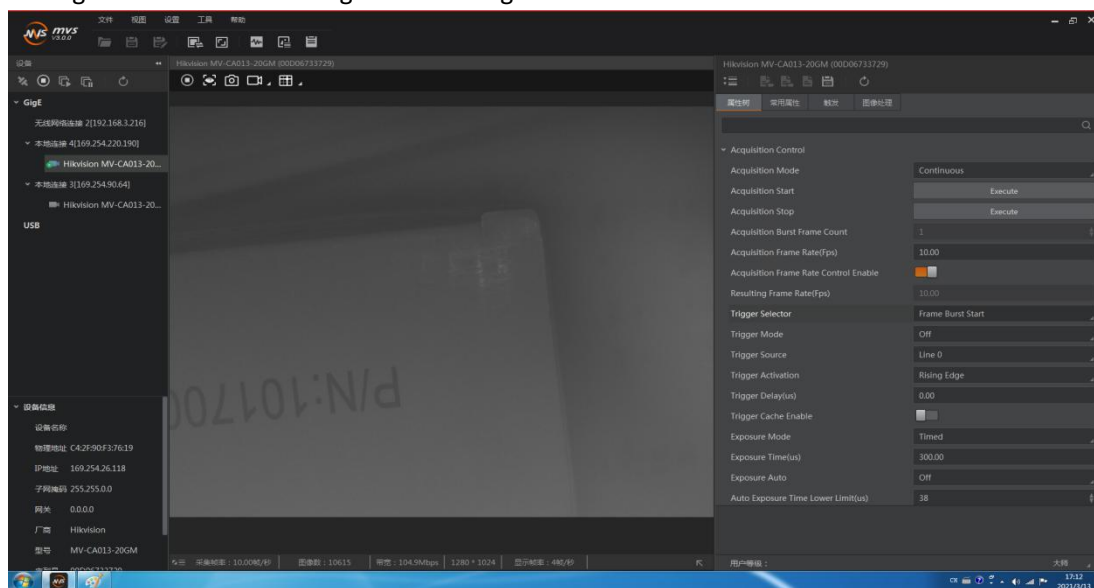


Figure 18

Set the camera exposure time to 300 μ s, Set the frame rate to 10Fps, Set Acquisition Mode to "Continuous"

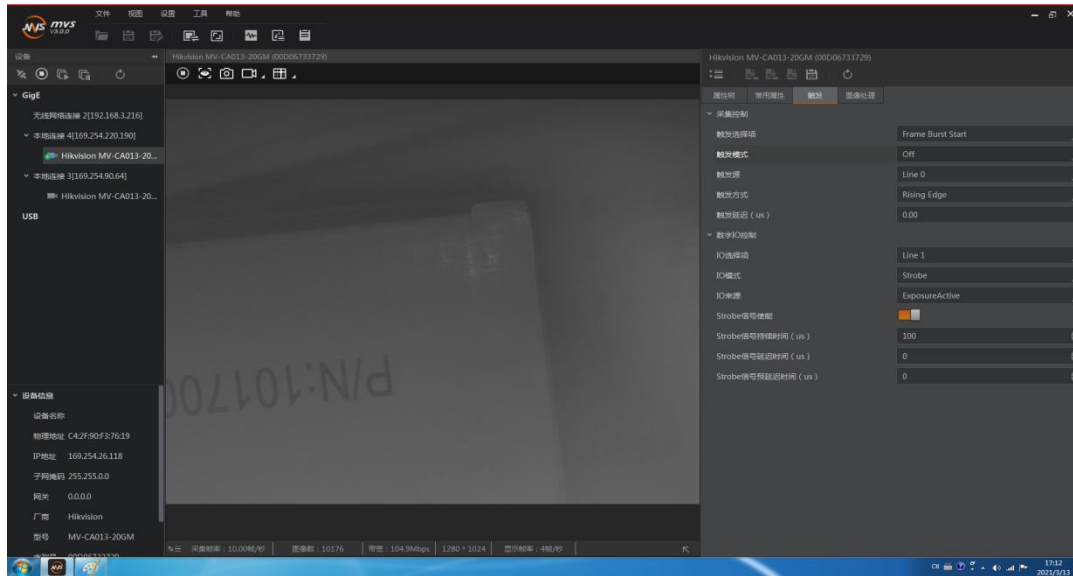


Figure 19

Switch to the trigger subpage: Set Trigger Mode to "Off", Set IO Option to "Line1"

Enable the Strobe signal, Set the Strobe signal duration to 100.

2.7.2 Wiring and Setting Method for Hikvision Camera Triggering Strobe Controller

The wiring of the controller is shown in Figure 20:



Figure 20: Strobe Time Setting and Wiring Method

Take the application of Channel 1 as an example for wiring:

As shown in Figure 21, connect the camera's yellow wire to F1 of the controller, and connect the camera's green wire to GND. At this time, the camera is powered by an external power adapter; alternatively, the camera can be powered by the 12V output of the controller. The setting parameters of the controller are shown in Figure 21, Figure 22, and Figure 23:

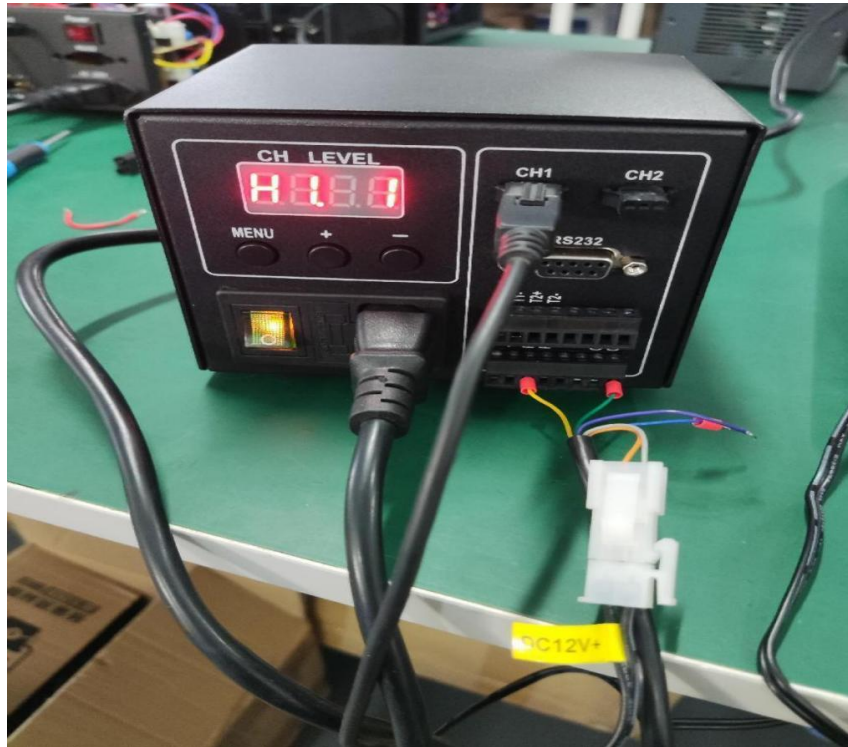


Figure 21: Set to Internal Trigger Mode



Figure 22: Set Internal Trigger Cycle to Trigger Once Every 100ms



Figure 23: Set Trigger Signal Output Delay to 20 μ s

The Hikvision camera is configured and tested using the MVS (Version V3.0.0) software, and the setting method is shown in Figure 24 and Figure 25:

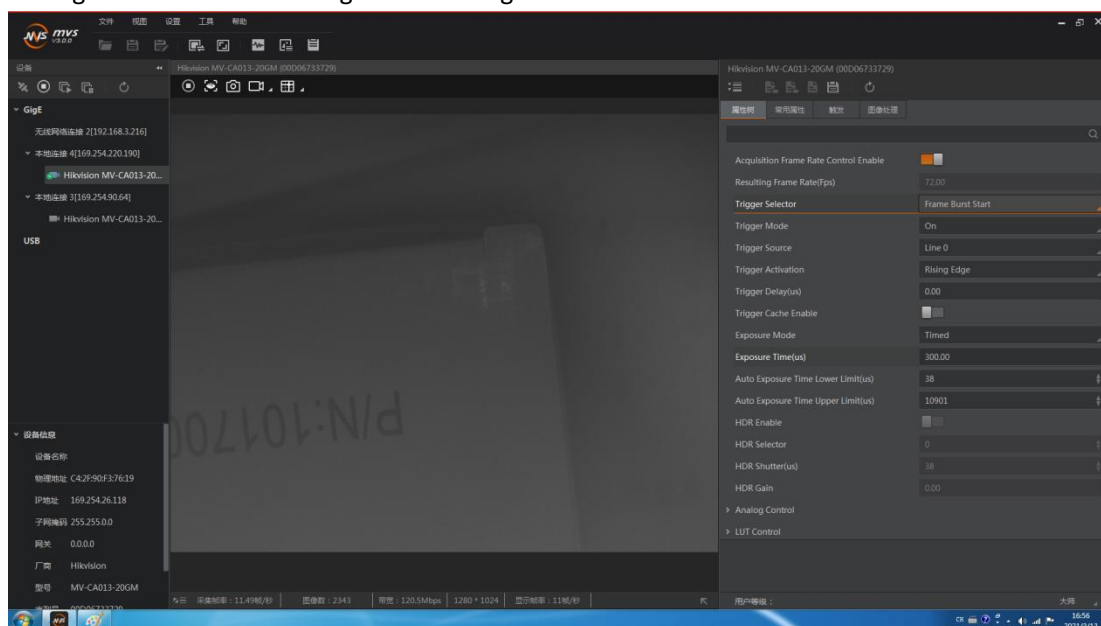


Figure 24

Set the camera exposure time to 300 μ s, Set Acquisition Mode to "Continuous"

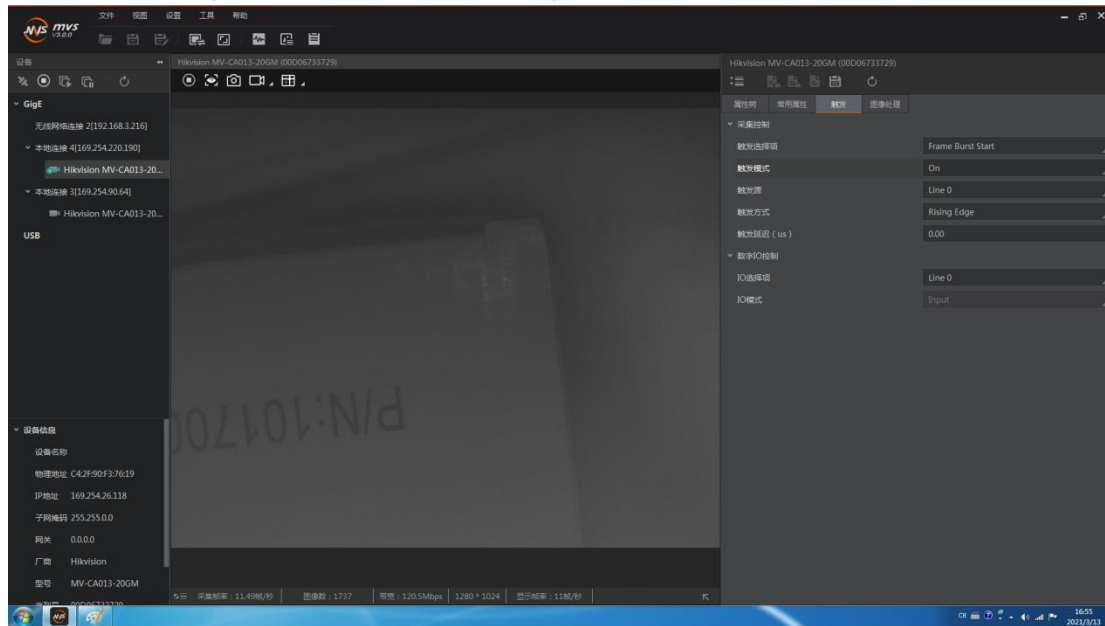


Figure 25

Switch to the trigger subpage: Set Trigger Mode to "On", Set Trigger Source to "Line0", Set Trigger Mode to "Rising Edge"

3. Communication Protocol

3.1 Programming Flow

The communication programming flow when controlling the light source controller via the serial port is shown in Figure 26:

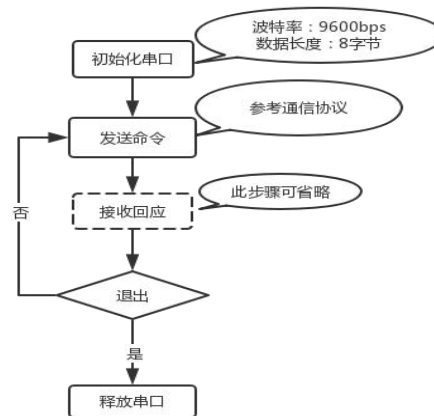


图 26 Communication Programming Flow

3.2 Communication Settings

The communication format settings of the serial port are shown in Table 5:

Table 6: Serial Port Setting Table

Baud Rate	Parity Bit	Data Bit	Stop Bit
9600	None	8	1

3.3 Frame Format Description

The communication frame format is shown in Table 7.

Table 7: Short 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

Table 8: Long Frame Format

Byte 1	Feature Word
Byte 2	Command Word
Byte 3	Sequence Number
Byte 4	Channel Word
Byte 5	Data 1
Byte 6	Data 2
Byte 7	Data 3
Byte 8	XOR Checksum Word 1
Byte 9	XOR Checksum Word 2

- 1、All communication bytes use ASCII code.
- 2、Feature words are: \$, @.
- 3、Command words are as shown in Table 7 and Table 8.
- 4、When the command words are "1", "2", "3", "4", "7", "8", "9", "A", "B", "C", "D", "E": If the controller receives the command successfully, it returns the feature word "\$"; If the controller fails to receive the command, it returns "&".
- 5、Channel words "1" and "2" represent Channel 1 and Channel 2 respectively.
- 6、Data = XXX (XXX is any value within 000 ~ 3E7), corresponding to the setting parameters of the channel, with high bits first and low bits last.
- 7、XOR Checksum Word = XOR checksum of all bytes except the checksum words (including: Feature Word, Command Word, Channel Word, and Data). The high 4-bit ASCII code of the checksum comes first, and the low 4-bit ASCII code comes last.

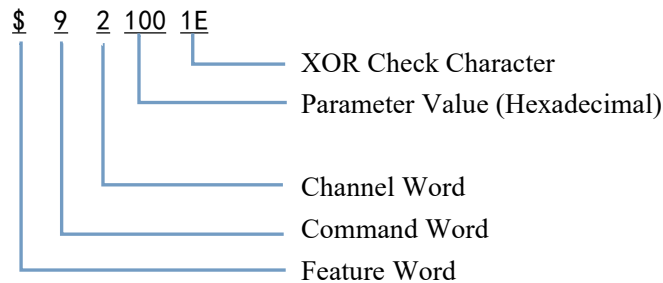
Table 9: Command Word Function Table

Character	Function	Description
"1"	Setting of linkage mode parameters and strobe time	@132XXX; 3 = sequence number, 2 = channel corresponding to the sequence, XXX = strobe time
"2"	Setting debounce time	The corresponding channel is determined by the Channel Word; Data range: 0 ~ 99 μ s
"3"	Setting internal trigger interval time of the corresponding channel	The corresponding channel is determined by the Channel Word; Data range: 10 ~ 999 ms
"4"	Reading strobe time (non-linkage mode)	The corresponding channel is determined by the Channel Word
"7"	Remote communication trigger	The corresponding channel is determined by the Channel Word; Invalid in internal trigger mode
"8"	Setting trigger mode of the corresponding channel	The corresponding channel is determined by the Channel Word; 0 = External Trigger Mode, 1 = Internal Trigger Mode
"9"	Setting strobe time	The corresponding channel is determined by the Channel Word; Data range: 0 ~ 999 μ s
"A"	Setting camera trigger delay time of the corresponding channel	The corresponding channel is determined by the Channel Word; Data range: 5 ~ 99 μ s

"B"	Setting trigger level	The corresponding channel is determined by the Channel Word; data range: 0-1 (0 = falling edge trigger; 1 = rising edge trigger mode)
"C"	Setting linkage mode	The corresponding channel is determined by the Channel Word; 0 = No Linkage, 1 = IO Linkage, 2 = Sequence Linkage, 3 = Combined Linkage
"D"	Setting number of sequences	The corresponding channel is determined by the Channel Word; Data range: 0-8
"E"	Setting camera synchronization signal ID corresponding to linkage sequence	The corresponding channel is determined by the Channel Word; Data range: 0-4

3.4 Communication Examples

Set the strobe trigger time of Channel 2 to 100 μ s: Write "\$921001E" in ASCII code.



	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	9	57	39	0011 1001
Channel Word	2	50	32	0011 0010
Data	1	49	31	0011 0001
	0	48	30	0011 0000
	0	48	30	0011 0000
XOR Sum				0001 1110
XOR Checksum Word				1 E

Remote Communication Trigger for Channel 2: \$7200011

	String	ASCII Code	ASCII Code (Hexadecimal)	Represent High Nibble and Low Nibble with 8421 Code Respectively
Feature Word	\$	36	24	0010 0100
Command Word	7	55	37	0011 0111
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 0001
XOR Checksum Word				1 1

Set Channel 2 to Internal Trigger Mode: \$820011F

	String	ASCII Code	ASCII Code (Hexadecimal)	Represent High Nibble and Low Nibble with 8421 Code Respectively
Feature Word	\$	36	24	0010 0100
Command Word	8	65	38	0011 1000
Channel Word	2	50	32	0011 0010
Data	0	48	30	0011 0000
	0	48	30	0011 0000
	1	49	31	0011 0001
XOR Sum				0001 1111
XOR Checksum Word				1 F

Set Internal Trigger Interval Time of Channel 2 to 100 ms: \$3210014

	String	ASCII Code	ASCII Code (Hexadecimal)	Represent High Nibble and Low Nibble 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	1	49	31	0011 0001
	0	48	30	0011 0000
	0	48	30	0011 0000
XOR Sum				0001 0100
XOR Checksum Word				1 4

Set Camera Trigger Delay Time of Channel 2 to 10 μ s: \$A201066

	String	ASCII Code	ASCII Code (Hexadecima)	Represent High Nibble and Low Nibble with 8421 Code Respectively
Feature Word	\$	36	24	0010 0100
Command Word	A	65	41	0110 0001
Channel Word	2	50	32	0011 0010
Data	0	48	30	0011 0000
	1	49	31	0011 0001
	0	48	30	0011 0000
XOR Sum				0100 0100
XOR Checksum Word				6 6

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

4-channel type;

