



**L1 Series GigE Industrial Line Scan Camera
Specifications**

V2.1.0

Preface

The purpose of this section is to ensure that users can use the product correctly through this manual to avoid danger or property damage during operation. Before using this product, please read the product manual carefully and keep it for future reference.

Overview

This paper briefly describes the contents of gigabit electric port line scan industrial camera, including product introduction, networking, basic parameters and fast operation of application software.

Symbolic conventions

The following signs may appear in this document and they represent the following:

Symbol	Description
 说明	Description class text, said to supplement and explain the text.
 注意	Note the type of text, which means to remind the user of some important operations or to prevent potential injury and property damage.
 警告	Warning type text, indicating that there is a potential risk, if not avoided, may cause injury accident, equipment damage or business interruption.
 危险	Hazard type text, indicating a high potential risk, if not avoided, may cause serious danger of casualties.

Notes on Safe Use

In order to prevent the occurrence of danger and prevent the loss of personnel and property, the following is the correct use of this product. Please read this manual carefully before using the equipment and strictly abide by it when using it. Please keep the manual properly after reading it.



- During the installation and use of the product, the electrical safety regulations of the country and the use area must be strictly observed.
- Please use the power adapter provided by the regular manufacturer. Please refer to the product parameter table for the specific requirements of the power adapter.
- To reduce the risk of fire or electric shock, do not expose the product to rain or moisture.
- When installing in the use environment, please ensure that the product is firmly fixed.
- If the product is not working properly, please contact the nearest service center and do not disassemble or modify the product in any way.

(The company does not assume any responsibility for problems caused by unauthorized modifications or repairs).



- Avoid installing the product in a vibration or shock environment, and keep the product away from electromagnetic interference. (Ignoring this item may damage the product).
- Do not directly touch the heat dissipation parts of the product to avoid scalding.
- Do not install indoor products in an environment where water or other liquids may be exposed.
- Please do not use the product in extremely hot, cold, dusty, corrosive or high humidity environment. Please refer to the parameter table of the product for specific temperature and humidity requirements.
- Avoid aiming the lens at strong light (such as lighting, sunlight or laser beams), otherwise the image sensor will be damaged.
- Do not touch the image sensor directly. If necessary, please moisten a soft clean cloth with alcohol and gently wipe off the dust. When the product is not in use, please add a dust cover to protect the image sensor.
- Please keep all the original packaging materials of the camera properly, so that when there is a problem, use the packaging materials to pack the camera and send it to the agent or return to the manufacturer for processing. The company does not assume any responsibility for accidental.

- Damage during transportation caused by non-original packaging materials.



Quality requirements for installation and maintenance personnel:

- Have the qualification certificate or experience in the installation and maintenance of weak current system, and have the experience and qualification to engage in related work, in addition, must have the following knowledge and operation skills.
- Basic knowledge and operation skills of low voltage wiring and low voltage electronic circuit wiring.
- Have the ability to read the contents of this manual.



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Chapter1 Overview of Products

1.1. Product Introduction

Gigabit Ethernet line scan industrial camera is the 1 highly reliable and cost-effective line scan industrial camera. It uses a high-performance photosensitive chip, real-time transmission of non-compressed image data through Gigabit Ethernet, can be compatible with any GigE Vision and GenICam standard application development tools, the maximum transmission rate of 1 Gb/s can meet the transmission rate requirements of most industrial applications, can work stably in a variety of harsh environments.

1.2. Product Features

- Gigabit Ethernet interface maximum transmission distance can be up to 100m.
- Support software trigger/hardware trigger/soft and hard mixed trigger/free collection and other modes.
- Support gamma correction, look-up table, black level correction, brightness, contrast and other ISP functions.
- The color camera supports interpolation, white balance, color conversion matrix, chroma, saturation, etc.
- Support multiple image data format output, ROI, mirror, etc.
- Meets GigE Vision 2.0 protocol and GenICam standards.
- Support DC 12V ~ 24V voltage power supply.
- EMC compliant, RoHS certified.

1.3. Typical networking

The most typical networking mode of industrial cameras is point-to-point connection, that is, there is no need for other network media between the host and the industrial camera, and the network cable can be used.

A host can also be connected to multiple industrial cameras through multiple network ports or switches, as shown in the following figure.

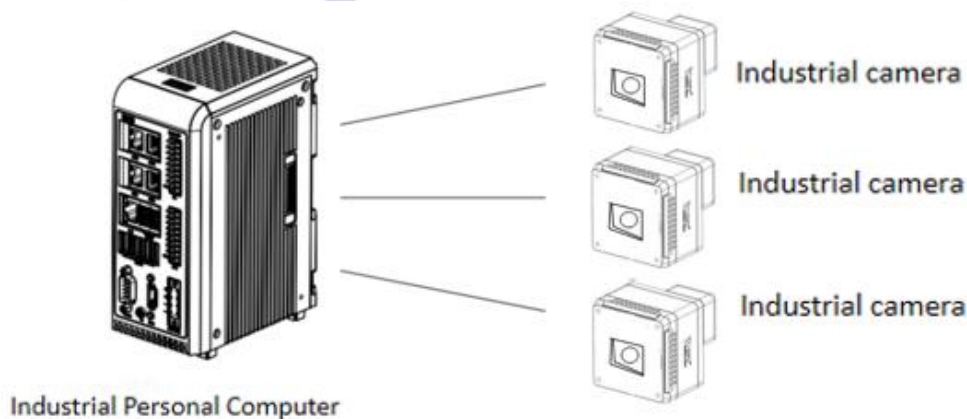


Figure 1-1 Typical Networking Mode

1.4. Environmental requirements

The environmental requirements for Gigabit Ethernet line scan industrial cameras are as follows:

- Temperature and Humidity

The ambient temperature should not exceed 50 °C, it is best to work in an air-conditioned environment.

- ◇ Working shell temperature: 0 °C ~ 60 °C.
- ◇ Ambient humidity at work: 20% ~ 80% without condensation.
- ◇ Storage temperature: -30 °C ~ +80 °C.
- ◇ Storage humidity: 20% ~ 80% without condensation.

- The equipment is installed indoors, the position is stable, and there is enough heat dissipation space left and right.

- Ensure a certain air flow.



Chapter2 Interface Description

2.1. Camera structure size

The structural dimensions of the product are as follows:

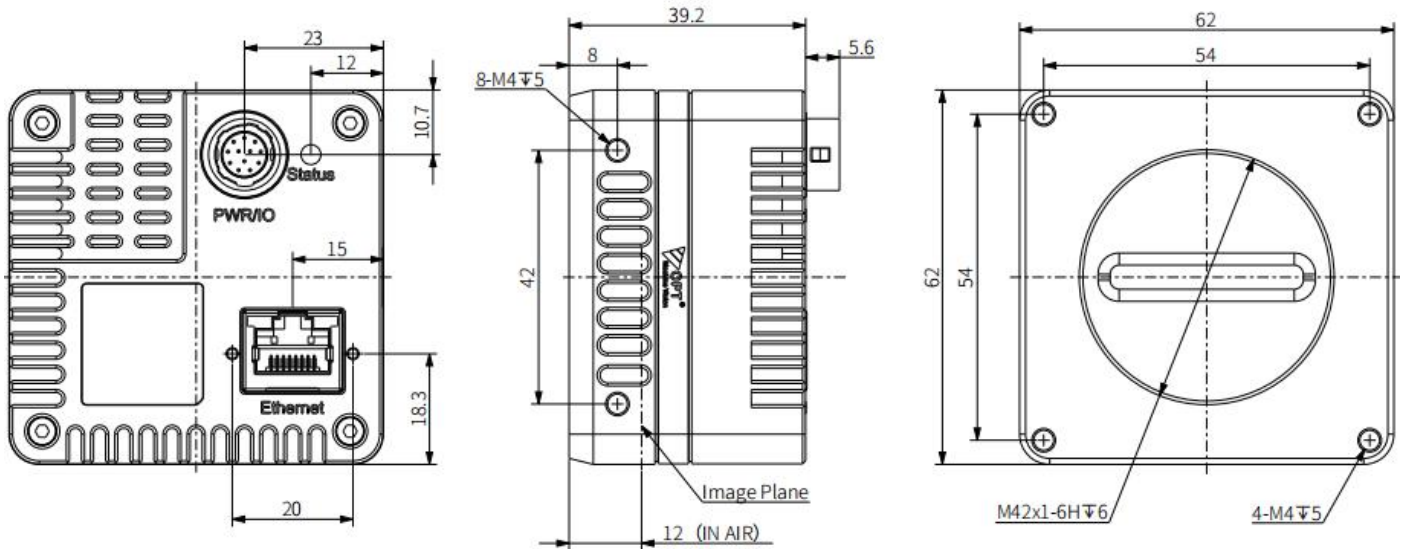


Figure 2-Gigabit Port Line Scan Camera Dimensions 1

2.2. Interface Description

There are two interfaces on the back of the device, the network interface and the 12pin power supply and I/O interface, as shown in the following figure:

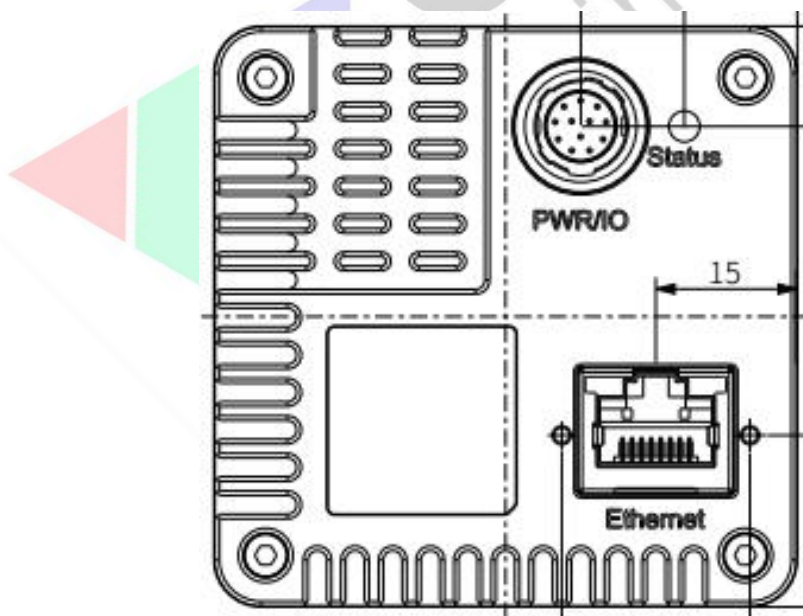


Fig. 2-1 Dimensional Drawing of Gigabit Port Line Scan Camera

2.3. Network Interface

Network interface, namely RJ45 network port, Ethernet 1000Mbps transmission interface, used for camera control, data transmission.

In order to ensure the transmission quality, it is better to use the network cable with shielded super 6

twisted pair to prevent excessive data retransmission and data packet loss.

2.4.12PIN power supply and I/O interface

The I/O interface pin signal definitions are shown in table 2-1.

Table 2-1Pin Signal Definition

Pin	Signal	Description
1	GND	Power ground
2	PWR	DC 12V ~ 24V camera power supply
3	IN Line1+	Encoder input Encoder A +
4	IN Line1-	Encoder input Encoder A-
5	IN Line2+	Encoder input Encoder B +
6	IN Line2-	Encoder input Encoder B-
7	OUT GND	Optocoupler isolation output ground
8	OUT Line5	Optocoupler isolated output Line Out1
9	OUT Line6	Optocoupler isolated output Line Out2
10	IN GND	Optocoupler isolation input ground
11	IN Line4	Optocoupler Isolated Input Line2
12	IN Line3	Optocoupler Isolated Input Line1

12Pin female pin bit ordering and wiring definition (corresponding to wiring definition and I/O interface) are as follows:

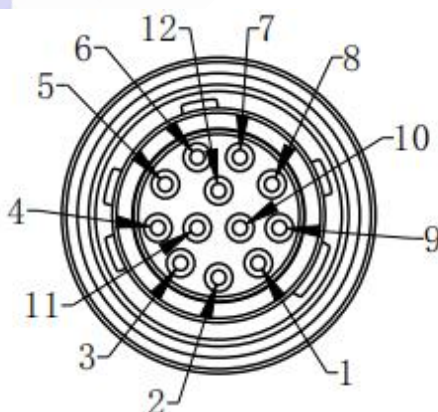


Figure 2-3 Pin Bit Ordering of 12pin Female

Table 2-2 12 pin female pin wiring definition

Pin	Signal	Line color
-----	--------	------------

Pin	Signal	Line color
1	GND	Black
2	PWR	Red
3	IN Line1+	White orange
4	IN Line1-	Orange
5	IN Line2-	Green
6	IN Line2+	White green
7	OUT GND	White
8	OUT Line5	White brown
9	OUT Line6	Brown
10	IN GND	Grey
11	IN Line4	Blue
12	IN Line3	White blue

2.4. Electrical Specifications

2.4.1. Electrical specifications for power and network ports

Table 2-3 Power Supply and Network Port Electrical Specifications

Parameters	Description
Camera Power Specifications	DC +12V ~ +24V, <1% ripple, powered by camera 12-core Hirose connector; A minimum of 26AWG cable is required.
EMI Standard	Radiated Interference (Radiation) QP:30-230MHz,40dBuV/m@10m; 230-1000MHz,47dBuV/m@10m; Conducted interference (Conduction) 0.15-0.5MHz,79dBuV-QP;66dBuV-AV; 0.5-30MHz,73 dBuV-QP;60 dBuV-AV;
EMS Standard	Electrostatic Immunity (ESD) Contact Discharge: $\pm 4\text{kV}$ Air Discharge: $\pm 8\text{kV}$ Electrical fast compliant pulse group (EFT) $\pm 2\text{kV}$ Surge immunity (Surge) $\pm 2\text{kV}$ Conducted Immunity (Conducted Susceptibility) 0.15-80MHz,10V,80% AM(1KHz) Radiated Immunity (Radiated Susceptibility) 80-1000MHz,10V/m; 1.4-2.0GHz,3V/m; 2.0-2.7GHz,1V/m;
EMC standard	Class A



说明

- Support DC +12V ~ +24V external power supply.
- The power supply must meet SELV and LPS specifications.

2.4.2. IO Interface Electrical Specifications

2.4.2.1. Optocoupler Isolated Input

Table 2-4 Optocoupler Isolation Input

Input voltage	Description
30V	Limit voltage, the input can not exceed this limit value, otherwise it will cause damage to the equipment
DC 0~24V	I/O input safe operating voltage range
DC 0~1.4V	represents logical 0
DC >1.4V~2.2V	The input state is flipped here, and the logic state is indefinite within this voltage range.
DC >2.2V	Represents logical 1



注意

Isolated I/O input port pouring current 5mA ~ 15mA.

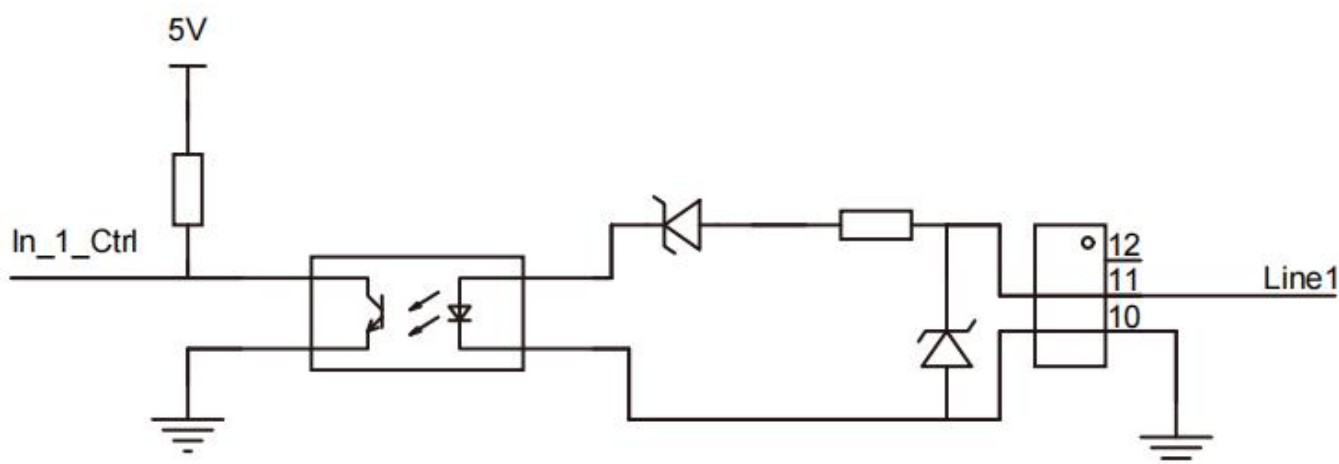


Figure 2-4 Frame Trigger Optocoupler Isolated Input Circuit

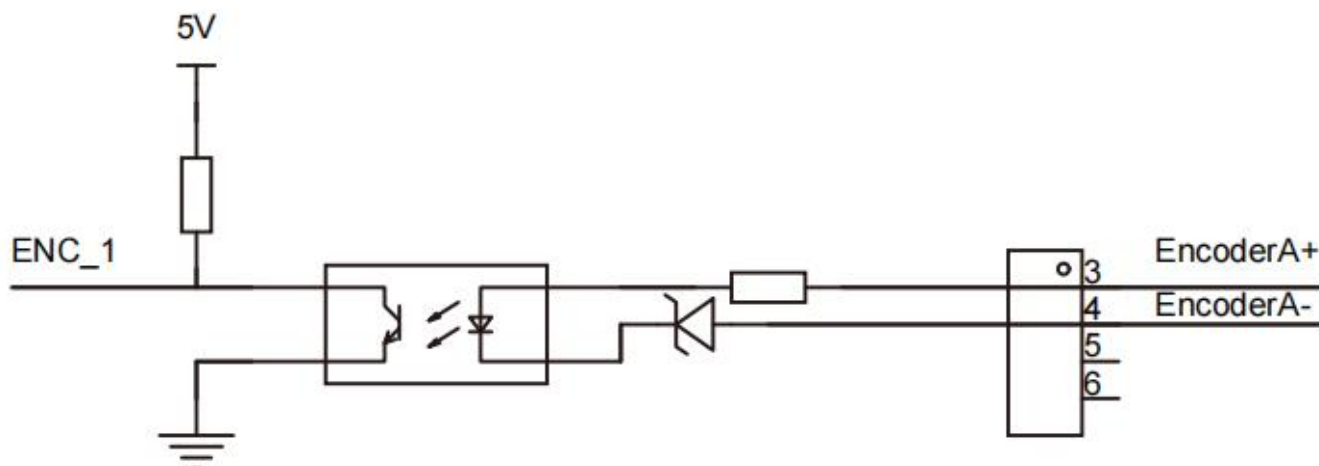


Fig. 2-5 Encoder Optocoupler Isolated Input Circuit

2.4.2.2. Optocoupler isolated output

Table 2-5 Optocoupler Isolation Output

Voltage	Description
DC 30V	Limit voltage, the input can not exceed this limit value, otherwise it will cause damage to the equipment
DC <3.3V	I/O output may be wrong
DC 3.3V~+24V	I/O Output Safe Operating Range



注意

The isolated I/O output port continuously passes a maximum of 50mA current.

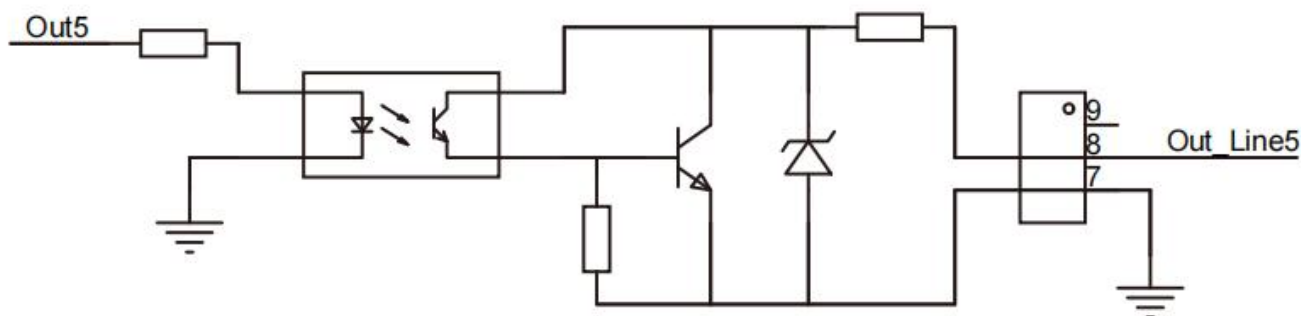


Fig. 2-6 Optocoupler Isolated Output Circuit

2.5. Camera Wiring Diagram

2.5.1. Frame trigger optocoupler isolation input

The camera input is connected to the optocoupler isolated output of the frame signal of the load.

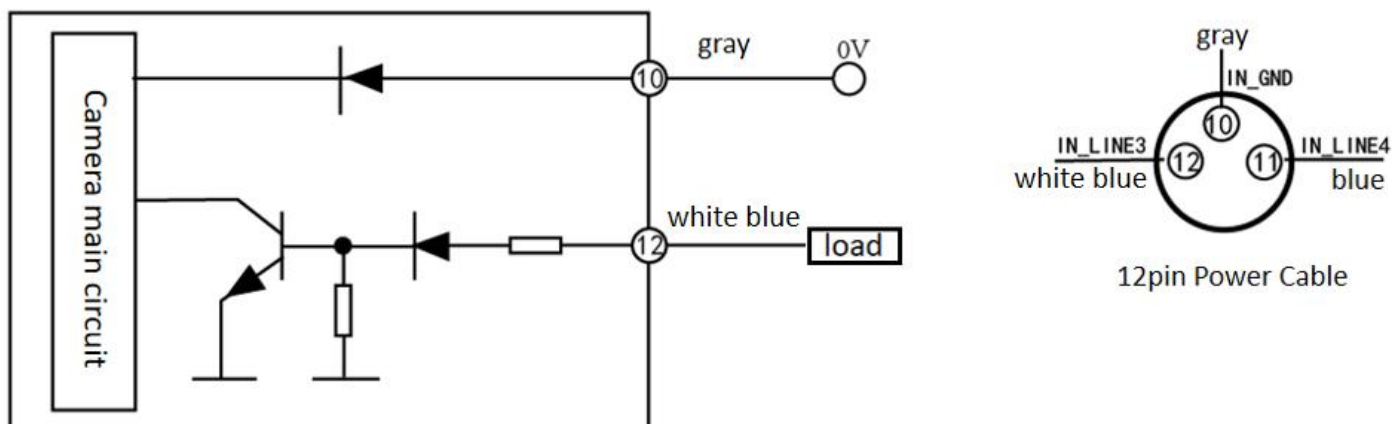


Figure 2-7 Wiring Diagram Frame Trigger Optocoupler Isolation Input

2.5.2. Encoder trigger optocoupler isolation input

The encoder input of the camera is connected to the optocoupler isolated output of the encoder signal of the load.

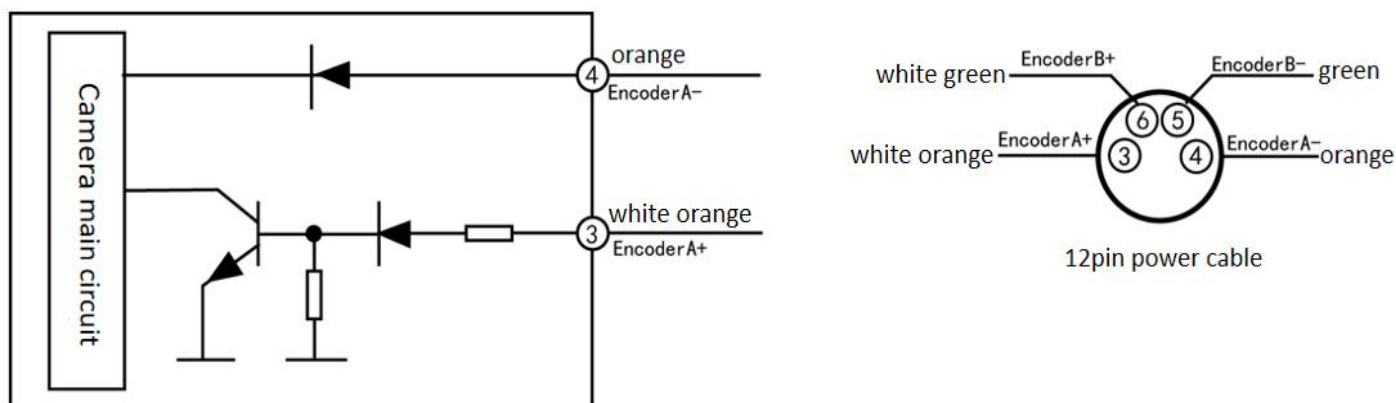


Figure 2-8 encoder trigger optocoupler isolation input wiring Diagram

2.5.3. Optocoupler Isolated Output

The optocoupler isolation output signal of the camera is connected to the input of the load, and the connection mode is divided into NPN load and PNP load.

NPN

Output Circuit Wiring Diagram

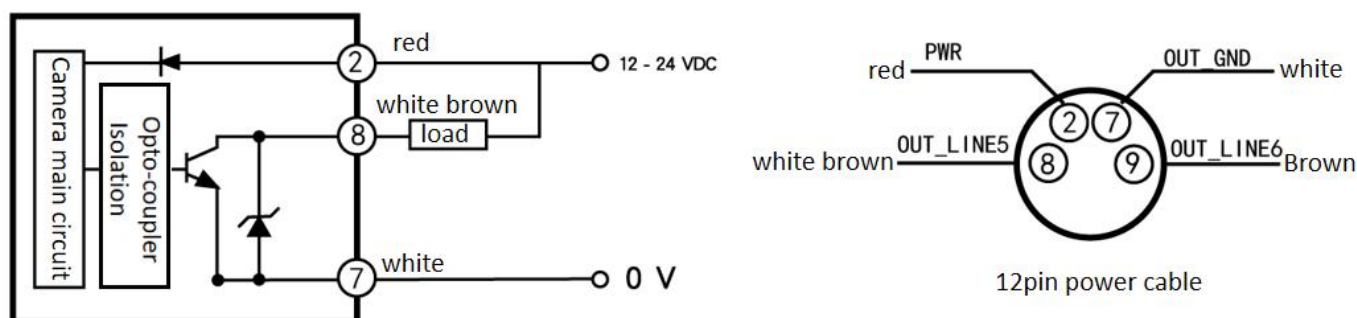


Fig 2-9 Optocoupler Isolated Output Load NPN Wiring Diagram

P N P

Output Circuit Wiring Diagram

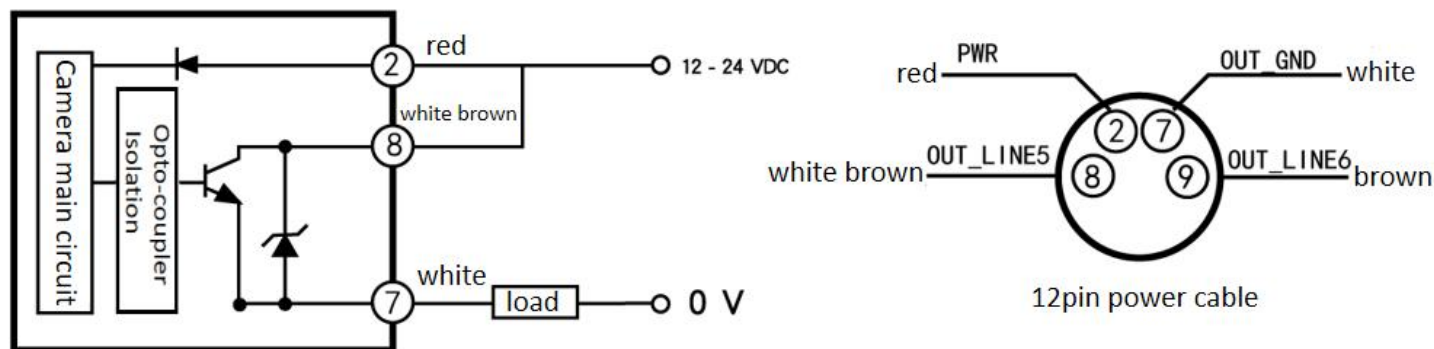


Fig 2-10 Optocoupler Isolated Output Load PNP Wiring Diagram

2.6. Status Indicator

Table 2-8 describes the status indicator of the equipment.

Table 2-8 Description of Indicator Lights

● Color and Status	● Schematic Diagram	● Description
Close		The device is not powered
Red light flash		System startup
Green Flash		Device in free acquisition state
Green light flashing slowly		Device is in trigger acquisition mode
Red light flashing slowly		Device is in startup complete pending connection state
Red light and green light switch flashing		Device is in IAP status to be upgraded
The green light is always on		Device connection successful

Chapter3 Product Installation

Installation is mainly divided into hardware installation and application installation.

3.1. Hardware Installation

Before installation, please check the equipment for obvious damage and confirm whether it is consistent with the matching list.

1. Fix the camera to the installation position and select the appropriate lens to install on the camera.
2. Use super six types of network cable to connect the camera and 10 Gigabit network card (it is recommended to use the company's recommend 10 Gigabit network card).
3. Select any 1 of the following power supply methods.

Power supply: use 12-pin power I/O cable and connect it to the appropriate power adapter according to the correct wiring method. for I/O interface definition, please refer to chapter power supply and I/O interface definition 1.4.

12V power adapter power supply: use the 12PIN dedicated power cord provided by our company. the power cord is a 2-pin in-line power cord. refer to the adapter data for the line sequence.

3.2. Application Installation

The steps for the host to install the application are as follows:



Contact the relevant technical support personnel for the application installation package.

1. Open the software, double-click the desktop shortcut, and open the application installation package.



2. If the driver has been installed before, it will pop up in Figure 3-1 window, confirm whether to automatically uninstall and reinstall as required, and if click Yes, start to uninstall.



Figure 3-1 Prepare the unloading window

3. Enter the unloading installation window as shown in Figure 3-2, waiting for uninstall (if the driver has not been installed before, steps 2 and 3 are required)

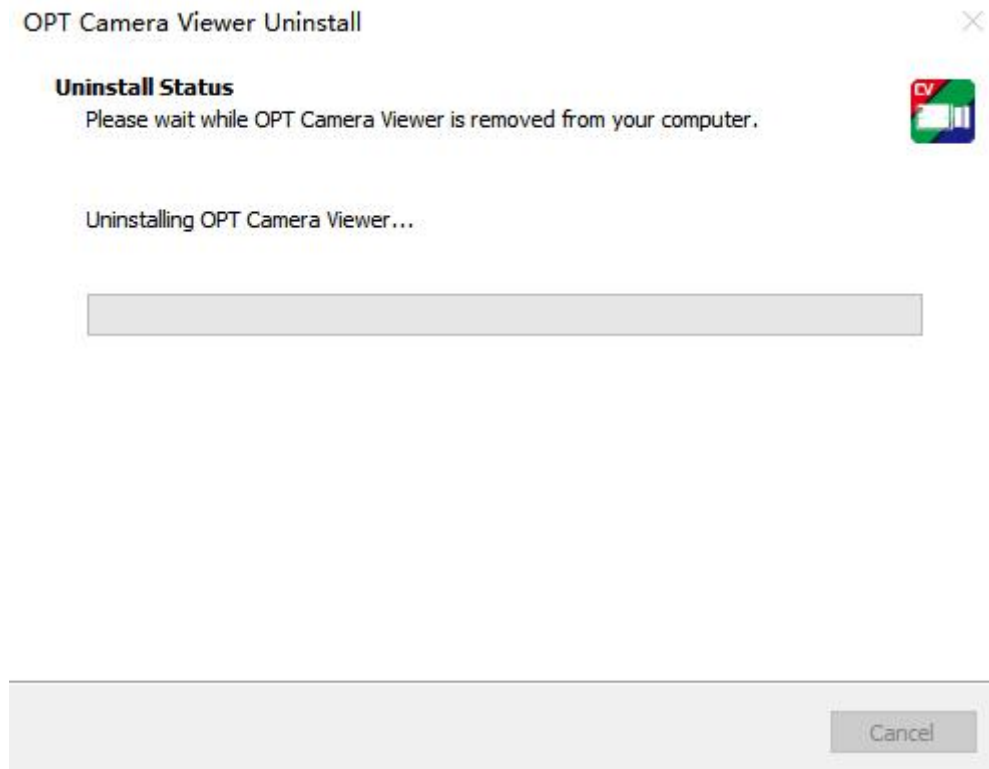


Figure 3-2, Unloading window

4. After the uninstallation is completed, directly enter the installation process, and the license agreement window will pop up as shown in Figure 3-3. After carefully reading the license agreement, confirm the agreed license terms, and then click the next button to continue the installation process.

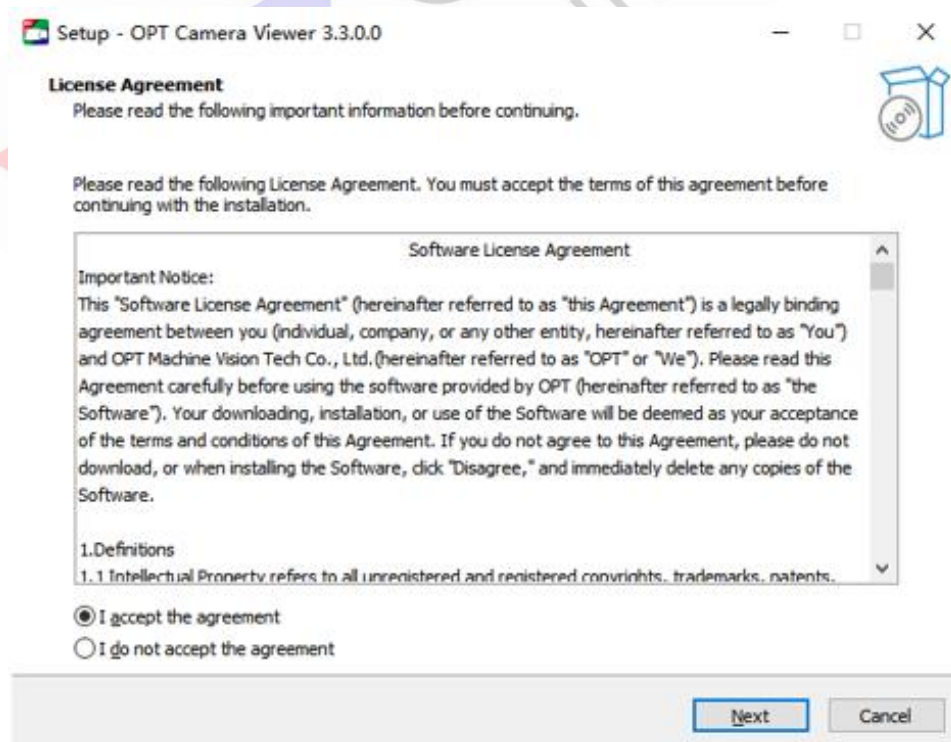


Figure 3-3 Prepare the installation window

5. Enter the installation folder window as shown in Figure 3-4, select the software installation path (default path: C: \ Program Files \ OPT \ OPTCameraViewer Demo) and click the next button to continue the installation process.

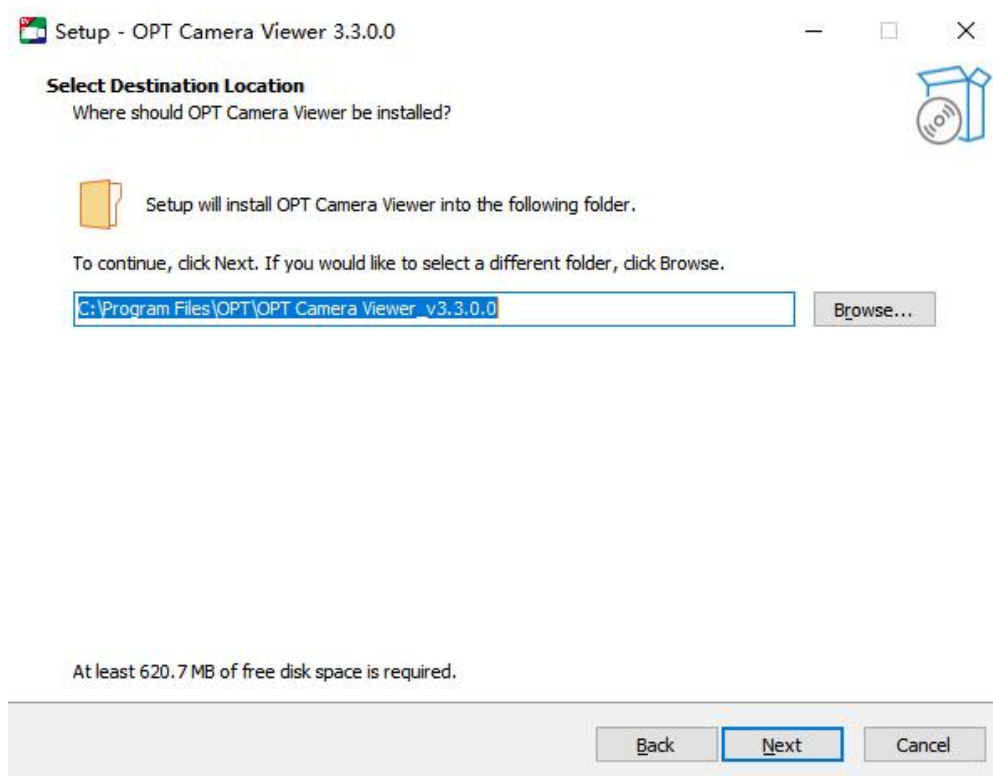


Figure 3-4 Installation folder window

6. Enter the preparation for installation window as shown in Figure 3-5, check the installation summary information and click the next button to continue the installation process.

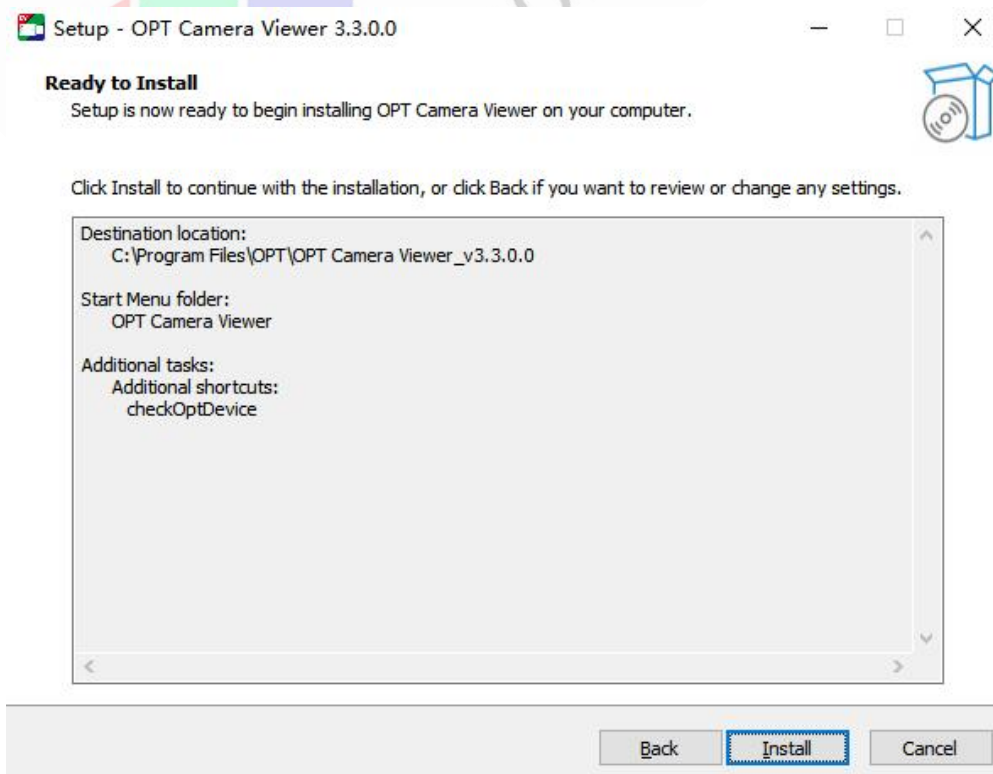


Figure 3-5 Prepare the installation window

7. Enter the installation window as shown in Figure 3-6 and wait for installation.

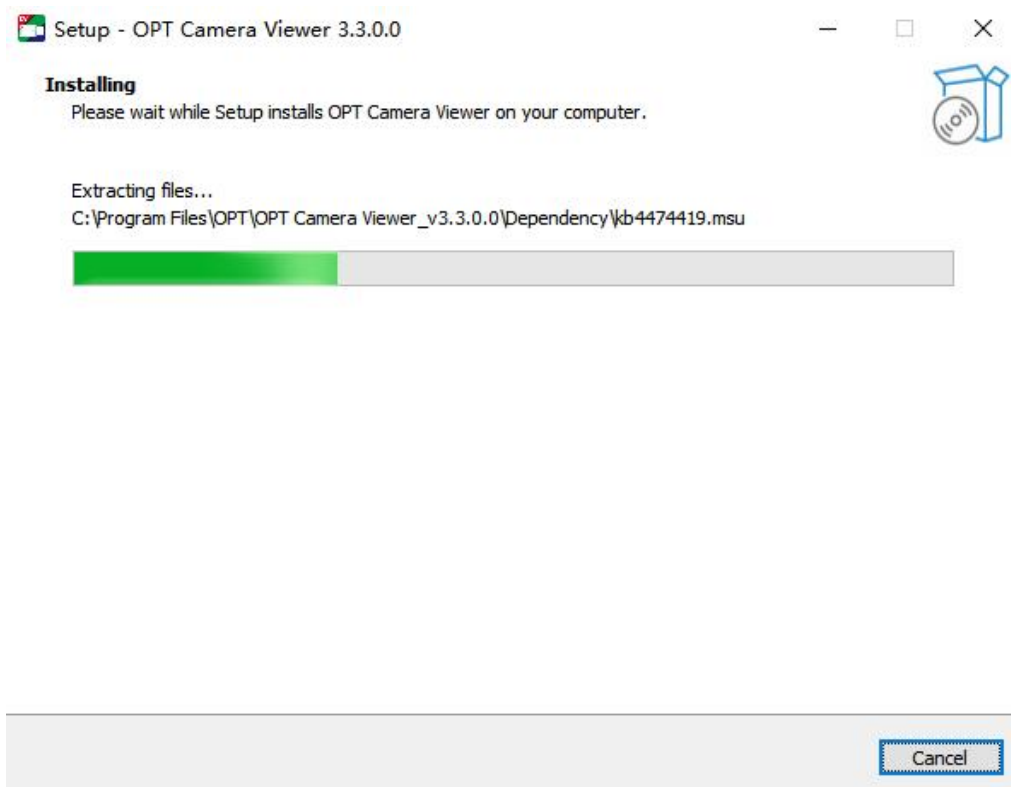


Figure 3-6, showing the installation window

8. The software installation success window is shown in Figure 3-7. The software OPT Camera Viewer is installed successfully, click the complete button to end the installation process.

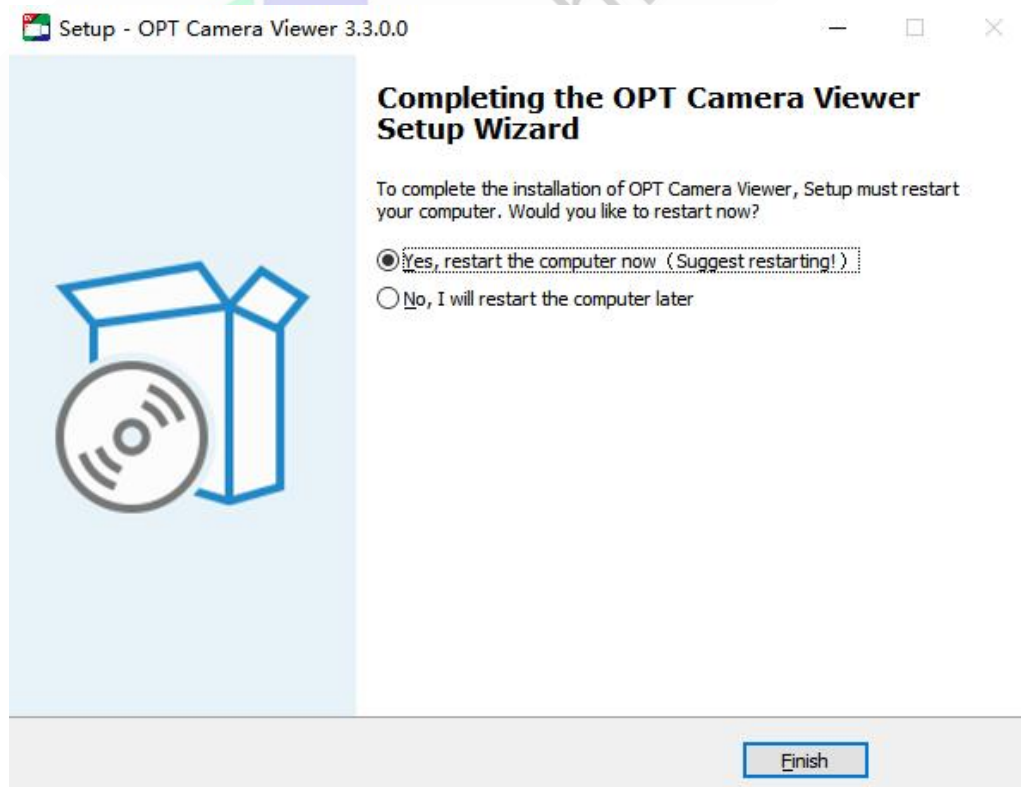


Figure 3-7 Windows for software installation success

Chapter4 Network Settings



注意

- Please ensure that the 10 Gigabit Ethernet cable array industrial camera is properly connected to the PC.
- Install the application on the PC. Please refer to “3.2 Application installation” for details ”.

After the 10 Gigabit Ethernet cable array industrial camera is connected with the cable, the application installed on the host can detect the online camera to ensure that the camera IP and the local computer IP are on the same network segment, and the camera can operate normally.

The specific operation steps of network setting are as follows:

1. Open the software.

Open the application software by double-clicking the desktop shortcut . The software will automatically detect all online devices. The interface is shown in Figure 4-1.



Figure 4-1 Software window

2. Camera IP settings.

Click to select the device information, and then right-click to configure the IP, as shown in Figure 4-2.

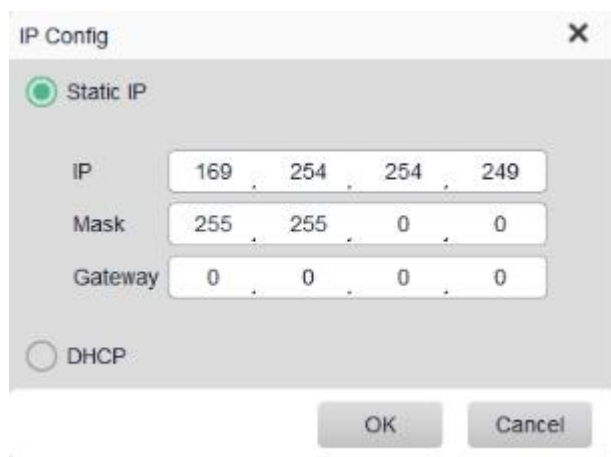


Fig. 4-2 IP setting interface

3. Equipment connection.

Select the target camera and click  to connect the device. After the connection is successful, click .

The device tab and property tab are shown in Figure 4-2.

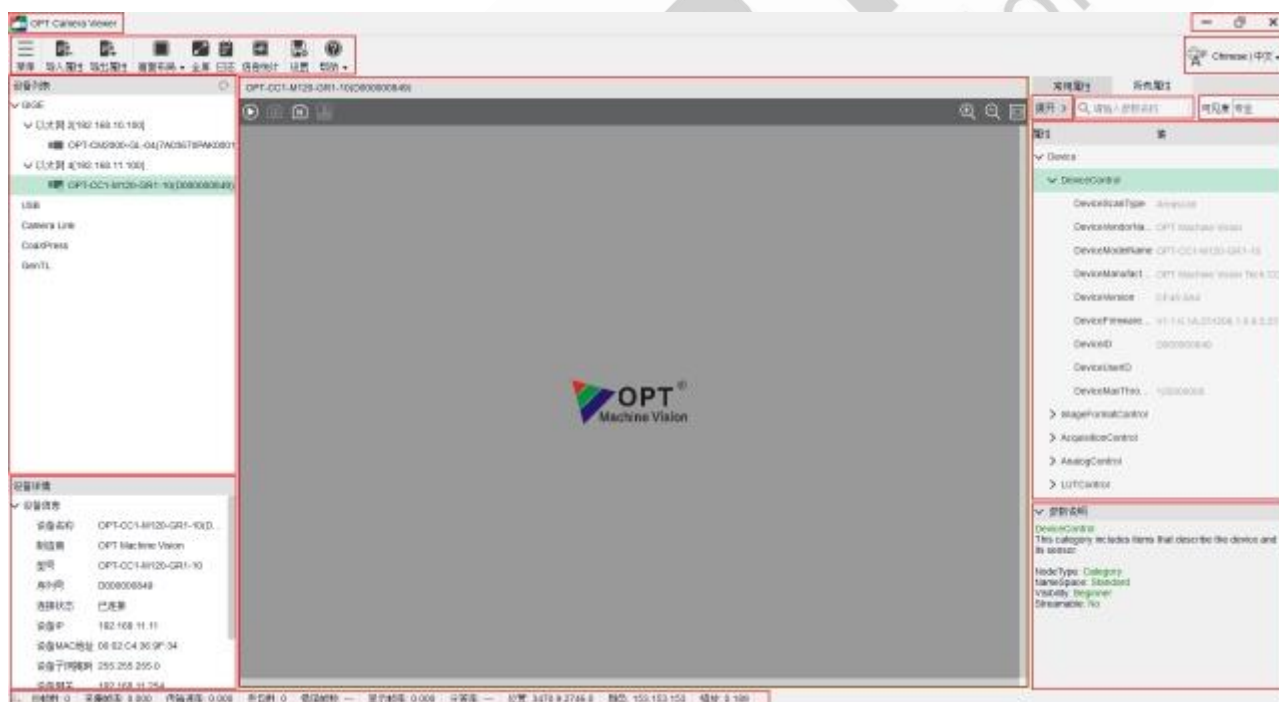


Figure 4-2 Successful device connection (Device tab)



You can click  to disconnect the device.

Table 4-1 OPT Camera Viewer parameters

Serial Number	Parameters	Parameter Description
1	Menu Bar	Provides functions for files, views, settings, tools, and help. For more information, see Table 4-2.
2	Control Tool Area	Provides quick, easy manipulation of camera images as follows:  Import Attribute : Click the icon to quickly import configuration parameter attribute information. (This icon appears gray when the camera is in stream fetching state.)  Export Attribute : Click the icon to quickly export the configuration parameter attribute information. (This icon appears gray when the camera is in stream fetching state.)  Layout : The screen layout is a display setting for the preview multi-window layout.  Full Screen : Click the icon to globally expand the image preview, press the keyboard ESC to return. (Global preview is also available by double-clicking under the Image Preview window)  Log : Quickly use the log information preview function, the information type can be customized selection and support the output to save as text view.  Statistics : Click this icon for a quick preview of the information statistics.  Setting : Click this icon to jump to the settings window for image saving and caching options.  Help : Click the icon to quickly view the software version information, etc.  English 英文 : Click this icon to select the software system display language.
3	Equipment List	Displays a list of devices that detect all online devices, Including GigE, USB, CameraLink and other common multi-protocol interface devices.  : Refresh. Click the icon to manually refresh the online device information.  Click this icon to manually configure the camera IP.:  : The device is in a connectable state.  : The device is connected.

4	Equipment Details	The details of the camera and the connection information of the interface are displayed here.
5	Image Preview Window	Display camera real-time image data, and the camera real-time information statistics and display.
6	Functional Parameter Area	Parameter items for this camera in different (operation level) roles.  : parameter visibility. You can click ▼ to select an entry, professional, or master role from the drop-down menu as needed. The parameters for each role are slightly different.
7	Parameter Interpretation Area	Click a parameter property item to display the explanation of the parameter.
8	Window Action Menu	●  : Maximize the window. ●  : Restores the window size downward. ●  : Minimum speech window. ●  : Close the application.
9	Data Flow Area	The frame rate, total frames, transfer rate, error frames, and display frame rate in the camera capture are shown here.

Table 4-2 Menu Bar-Parameter Interpretation

Menu Bar		Description
File	Import Properties	Import configuration parameter attribute information as a file.
	Export Properties	Export configuration parameter attribute information as a file
	Save Ganicam XML	Saves the output XML file information.
View	Equipment List	
	Equipment Details	
	Common Properties	
	All Properties	
		You can choose to open or hide the above four windows.
Setup	Image Save	Set the image save path, image format, etc.
	Cache Options	Set the cache parameters for the data stream.
	Driver Management	The relevant basic drivers of the OPT Camera Viewer can be loaded or enabled autonomously.
	Bandwidth Management	Monitor network bandwidth and data transmission.
Tools	Network card property settings	Can switch and configure the computer network card parameters.
	Log	Log information preview (including device parameter update, event message channel, pull stream cache and other event notifications), information type can be customized selection and support output saved as text view
	Information statistics	Statistics can be set to capture the frame rate, bandwidth, the number of images received, frame loss rate, the number of error images.
Help	Firmware Upgrade	The camera firmware can be upgraded.
	About	View the current software version information (software version number, software belonging and official website).
	Help documentation	Path location to place the relevant Operations Guide document

Chapter5 Description of Main Functions

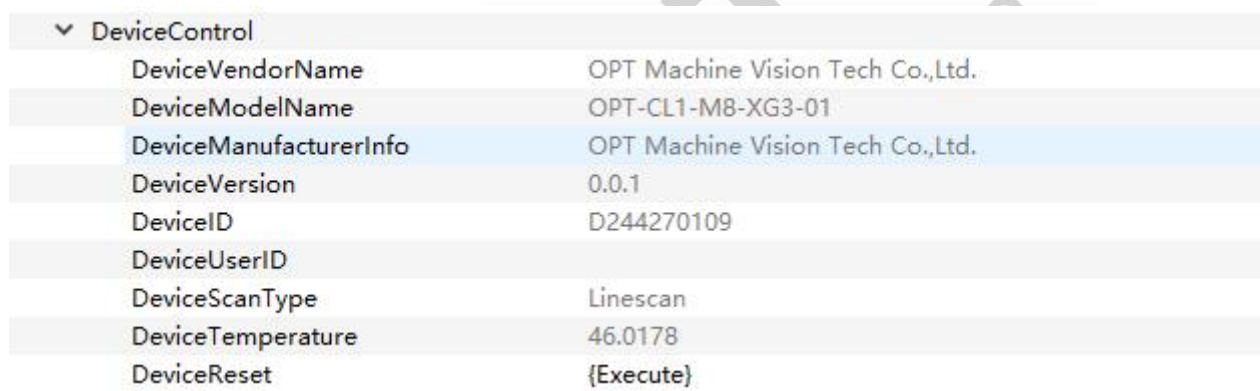
This chapter mainly explains the functional parameters related to industrial cameras.



- The industrial camera supports three types of user level selection: entry (Beginner), professional (Expert) or master (Guru). The parameter items in the attribute window corresponding to each level are slightly different. Please refer Table 4-1 to No. 5 for the user level selection operation.
- A parameter item displayed in black indicates that the parameter can be modified or set, and a parameter item displayed in gray indicates that the parameter does not support modification or setting in the current operation mode.

5.1. Device Control

In the properties, you can view the device information and modify the device name, as shown in Figure 5-1. Refer to Table 5-1 for detailed parameter settings.



DeviceControl	
DeviceVendorName	OPT Machine Vision Tech Co.,Ltd.
DeviceModelName	OPT-CL1-M8-XG3-01
DeviceManufacturerInfo	OPT Machine Vision Tech Co.,Ltd.
DeviceVersion	0.0.1
DeviceID	D244270109
DeviceUserID	
DeviceScanType	Linescan
DeviceTemperature	46.0178
DeviceReset	{Execute}

Figure 5-1Device Management

Table5-1Device Management-Parameter Interpretation

Parameters	Description
DeviceVendorName	Equipment suppliers.
DeviceModeName	Equipment model.
DeviceManufacturerInfo	Equipment manufacturer.
DeviceVersion	Device software version.
DeviceID	Device serial number.
DeviceUserID	User-defined device name.
DeviceScanType	The scan type of the Sensor, such as a linear array or a linear array.
CoreAuthChecksum	Checksum for SHA-1-based license devices
DeviceTemperature	The actual temperature value of the motherboard chip (°C).

Parameters	Description
DeviceReset	Device restart button, call the API to restart the camera.

5.2. ImageFormatControl

In this attribute, you can modify the size of the image captured by the current device, the pixel format of the image, the region of interest and the test image mode, as shown in Figure 5-2. Please refer to Figure 5-2 for detailed parameter settings.



说明

The image output format supported by the industrial camera is subject to the format supported by the camera.

ImageFormatControl	
WidthMax	8192
HeightMax	22000
Width	8192
Height	1024
OffsetX	0
CenterX	On
ReverseX	Off
PixelFormat	Mono8
TestImageEnable	Off
TestImageSelector	(Not Available)
DataReceiverState	0

Figure 5-2 Image Format Management

Table 5-2 Image Format Management-Parameter Interpretation

Parameters	Description
WidthMax	The maximum image width (in pixels) is affected by decimation.
HeightMax	Maximum image height (in pixels), which is affected by decimation, etc.
Width	The image width (in pixels) of the actual output.
Height	The actual output image height in pixels.
OffsetX	The horizontal offset of the image, which starts from the upper left corner, and the maximum value of the is determined by the value of Width.
CenterX	Output image is set in the middle.
ReverseX	The image is flipped horizontally, based on the original size of the Sensor, not the image after the ROI.
ReverseY	The image is flipped vertically. The flip is based on the original size of the Sensor, not the image after the ROI.
PixelFormat	Image output format. Different models support different formats.

Parameters	Description
TestImageEnable	Test image enable control
TestImageSelector	Select the type of test image sent by the device
DataReceiverState	Device data acquisition status

5.3. AcquisitionControl

In this attribute, you can set the image acquisition mode, trigger mode, exposure time, etc. of the camera, as shown in Figure 5-3; see Table 5-3 for detailed parameter settings.

▼ AcquisitionControl	
AcquisitionMode	Continuous
AcquisitionFrameCount	3
TriggerSelector	AcquisitionStart
TriggerMode	Off
TriggerSoftware	{Execute}
TriggerSource	Software
TriggerActivation	{Not Available}
TriggerDelay	0
TriggerStatus	TriggerIdle
FrameBurst	On
ExposureTime	50
AcquisitionLineRate	{Not Available}
AcquisitionLineRateEnable	Off
AcquisitionMaxLineRate	18825.3
AcquisitionActualLineRate	0

Figure 5-3 Collection Management

Table 5-3 Collection Management-Parameter Interpretation

Parameters	Description
AcquisitionMode	Image acquisition mode: - SingleFrame (single frame): refers to the collection of 1 frames at a time, and the pull stream is automatically stopped after collection. - MultiFrame (multi-frame): refers to the number of frames for collecting AcquisitionFrameCount values at one time, and automatically stops pulling streams after collection. - Continue (continuous): refers to continuous acquisition until the Acquisition Stop is issued to stop the acquisition of pull flow.
AcquisitionFrameCount	Set effective when multi-frame acquisition, control trigger once, the number of pictures collected by the camera.
TriggerSelector	Trigger type selection. In the TriggerSelector, select FrameStart (frame trigger) or AcquisitionStart (image capture trigger), and in the TriggerMode, select On/Off to turn the trigger mode on or off. Only the 1 trigger

Parameters	Description
	method can be enabled for FrameStart (frame trigger) or AcquisitionStart (image acquisition trigger). When the 1 trigger method is enabled, the TriggerMode of the other 1 must be selected as Off.
TriggerMode	Whether the trigger mode of the control device is on.
TriggerSoftware	Soft trigger button. A soft trigger can be generated by clicking or calling the API.
TriggerSource	Trigger mode. TriggerSource supports SoftwareTrigger (software triggered) and lineN (hardware triggered). - When you select a software trigger, click on the TriggerSoftware or call an API to generate a soft trigger. - When the hardware trigger is selected, the hard trigger can be completed by setting the RisingEdge (rising edge trigger) or FallingEdge edge (falling edge trigger) at the TriggerActivation and then generating a rising or falling edge signal from the external cable.  说明 The AcquisitionStart and the FrameStart may separately select the trigger source.
TriggerActivation	Trigger mode. Including rising edge, falling edge, double edge and high, low level five trigger mode, in the setting.
TriggerDelay	Trigger delay. It refers to the time when the camera receives the trigger signal and the trigger takes effect. For the trigger source, either a soft trigger or a hard trigger takes effect.
TriggerStatus	Displays the camera trigger status at this time, waiting for trigger or executing trigger
FrameBurst	For indefinite length acquisition, when the level of frame touch is turned on, the acquired image will be a short frame.
ExposureTime	Exposure time.
ExposureAuto	Automatic exposure. - Off means to turn off automatic exposure. - Once means that the camera can automatically modify the exposure once according to the ambient brightness, and the modified value is displayed in gray in the ExposureTime. The Continue indicates that the camera can continuously modify the ExposureTime according to the brightness of the environment to adapt to the change of the environment, and the modified value is displayed in gray in the ExposureTime.

Parameters	Description
AcquisitionLineRate	Image line frequency. AcquisitionLineRate setting the limit line frequency is effective when the AcquisitionLineRateEnable is True.
AcquisitionLineRateEnable	 说明 If the set line rate exceeds the maximum frame rate that the camera in the current mode can achieve, the actual output frame rate of the camera is AcquisitionActualLineRate instead of the AcquisitionLineRate set value.
AcquisitionMaxLineRate	Maximum settable line frequency.
AcquisitionActualLineRate	The line frequency at which the actual camera captures the image.

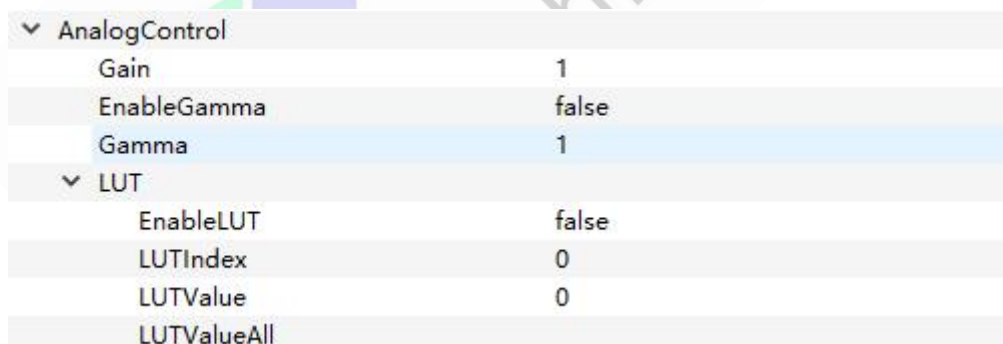
5.4. AnalogControl

In this attribute, the analog signal of the image captured by the camera can be adjusted, including look-up table, black level, gamma correction, etc., as shown in Figure 4; please refer to Table 5-4 for detailed parameter settings.



LUT: Short for look-up table.

LUT and Gamma are mutually exclusive. If Gamma is enabled, the LUT does not take effect. For the LUT to take effect, Gamma must be set to 1.



▼ AnalogControl	
Gain	1
EnableGamma	false
Gamma	1
▼ LUT	
EnableLUT	false
LUTIndex	0
LUTValue	0
LUTValueAll	

Fig. 5-4 Analog Control

Table 5-4 Analog Control-Parameter Interpretation

Parameters	Description
Gain	The larger the gain value, the brighter the image, and the settable range of different models is different. The default value is 1.  说明 Enable analog gain with priority.
EnableGamma	Used to set the image gamma value.

Parameters		Description
Gamma		For correcting the 1 non-linearity of image data due to the non-linear response of a display or the like, the smaller the gamma value, the brighter the image. Gamma value is set from 1 to 4. If the default value is 1, gamma processing is not performed. When the EnableGamma is True, set the image gamma value to be valid.
LUT	EnableLUT	In this attribute, you can stretch and highlight the grayscale range of interest. The operation can be a linear curve or a custom mapping curve. The value of the target towing object in all LUTs is set in the LUTIndex. Modify the value of the object being pulled by the LUTIndex in the LUTValue. LUTValueAll to change all Index values to the same value. LUTIndex and LUTValue operations are only valid when the EnableLUT is True.
	LUTIndex	
	LUTValue	
	LUTValueAll	

5.5. DigitalIO

In this property, you can manage different I/O input or output signals, as shown in as shown in Figure 5-5; see Table 5-5 for detailed parameter settings.

DigitalIO	
LineSelector	Line1
LineSource	{Not Available}
LineInverter	false
LineDebouncerTime	0
LineStatus	false
LineStatusAll	0x0

Fig. 5-5 IO Input/Output Management

Table 5-5 Digital Input/Output Management-Parameter Interpretation

Parameters	Description
LineSelector	Used to select external IO lines to be configured
LineSource	When the IO line is selected as the output, the trigger source can be selected. Currently, the following trigger sources are supported: ● Inactive: signal stability ● ExposureActive: Output signal at the start of exposure. ● FlashWindow: Light source control signal output. ● AcquisitionTriggerWait: output signal of collection trigger waiting state. ● FrameTriggerWait: output frame trigger wait state signal. ● Timer0Active: output signal when counter 0 is full. ● Timer1Active: Counter 1 output signal when full.
LineInverter	Used to control the signal inversion of the selected physical input or output line. True means the signal is inverted and False means the signal is not inverted.
LineDebouncerTime	When the IO line is input, the length of the debounce time can be set.  说明 A pulse less than the set value is not considered a valid trigger input.
LineStatus	Indicates the current logical state of the selected row
LineStatusAll	Returns the current status of all available lines.

5.6. TimerControl

In this property, you can set the device-specific delay unit, as shown in Figure5-6; see Table 5-6for detailed parameter settings.

▼ CounterAndTimerControl	
CounterSelector	Counter0
CounterEventSource	LineTrigger
CounterResetSource	AcquisitionTrigger
CounterResetSoftware	{Execute}
CounterValue	28373
TimerSelector	Timer0
TimerTriggerSource	Off
TimerDuration	0
TimerDelay	0

Fig5. -6 Counter and Timer Control

Table 5-6 Timer Management-Parameter Interpretation

Parameters	Description
CounterSelector	Select Counter counter0 or counter1.
CounterEventSource	Select the counter trigger count time, and the trigger count sets the counter trigger source according to the set trigger mode.
CounterResetSource	Counter reset control source, set, the original signal trigger counter current value clear 0.
CounterResetSoftware	Reset soft start, when the CounterResetSource is set to software, click the execution counter to clear 0.
CounterValue	Displays the current value of the counter count.
TimerSelector	Select the timer for the target to set.
TimerTriggerSource	Select the trigger source for the timer.
TimerDelay	Sets the delay time (in us) after the timer accepts the trigger.
TimerDuration	Sets the hold time (in us) for the device timer.

5.7. UserSetControl

In this attribute, you can save or load the parameter scheme adjusted by the user, and set the default parameter configuration when the client is opened, as shown inFigure 5-7. For detailed parameter settings, please refer toTable 5-7.

▼ UserSetControl	
UserSetSelector	Default
UserSetLoad	
UserSetSave	
UserSetDefault	Default

Figure5-7User Settings Management

Table5-7User Settings Management-Parameter Settings

Parameters	Description
UserSetSelector	UserSetSelector the user to set the group selection. Currently supports Default,UserSet1 and UserSet2. Select which group to use for subsequent UserSetLoad,UserSetSave operations.
UserSetLoad	UserSetLoad user settings to load. The configuration of the camera is restored to the user-selected configuration.
UserSetSave	UserSetSave user settings are saved. Saves the current configuration to the selected group, Default saving is not supported for groups.
UserSetDefault	Default user settings for power-on. UserSet1 and UserSet2 need to be UserSetSave before they can be displayed here.

5.8. AdvancedProcessing

In this attribute, you can set the parameters of the automatic function, as shown in Figure5-8. Please refer to Table 5-8for detailed parameter settings.

▼ AdvancedProcessing	
FlatFieldCorrectionMode	Off
FlatFieldCorrectionActiveSet	Factory
FlatFieldCorrectionType	Standard
FlatFieldCorrectionAlgorithm	Direct
FlatFieldCalibrationMode	Maximum
FlatFieldCalibrationTarget	192
FlatFieldCalibrationROIOffset	0
FlatFieldCalibrationROIWidth	8192
CalibrateFPN	{Execute}
CalibratePRNU	{Execute}
CalibrationSave	{Execute}
CalibrationResetCoefficients	{Execute}
FlatFieldCorrectionPixelXCoordinate	8191
FlatFieldCorrectionGain	1
FlatFieldCorrectionOffset	0
FlatFieldCorrectionResult	{Not Available}

Figure 5-8 Advanced Processing Parameter Settings

Table 5-8 Advanced Processing Parameter Item Settings-Parameter Interpretation

Parameters	Description
FlatFieldCorrectionMode	Flat field correction mode; OFF off flat field correction, ON on correction mode (for correction), active on flat field correction (for use after correction)
FlatFieldCorrectionActiveSet	In the active state, select different correction and saved parameters, including factory, userset1, userset2 and

Parameters	Description
	userset3.
FlatFieldCorrectionType	Correction type, default is standard.
FlatFieldCorrectionAlgorithm	Flat field correction algorithm, there is direct correction, there is low-pass filtering after correction.
FlatFieldCalibrationMode	Brightfield correction, correction mode, optional Maximum (maximum value), Average (average value), Target (target value) three correction modes.
FlatFieldCalibrationTarget	When the FlatFieldCalibrationMode is set to Target (target value) correction, the parameter is valid and the image can be corrected to the target grayscale range.
FlatFieldCalibrationROIOffset	This item can control the effective range of flat field correction; the two parameters are combined, the FlatFieldCalibrationROIOffset is the effective area offset; the FlatFieldCalibrationROIWidth is the width range of the effective area; the range setting must not exceed the maximum width range of the camera.
FlatFieldCalibrationROIWidth	
CalibrateFPN	Dark field correction, click to execute, in the environment of the dark environment for correction.
CalibratePRNU	Bright field correction, click to execute, in the environment is semi-bright (gray level above 150), for correction use.
CalibrationSave	Cooperate with the FlatFieldCorrectionActiveSet to use, save the corrected parameters, in the next use can be directly selected to use.
CalibrationResetCoefficients	Reset, reset the correction parameters, restore the image before correction.
FlatFieldCorrectionPixelXCoordinate	The flat field corrects the pixel X coordinate and sets the image gain of the pixel before flat field correction.
FlatFieldCorrectionGain	Flatfield correction gain.
FlatFieldCorrectionOffset	Correction Offset.
FlatFieldCorrectionResult	Plane field correction results.

5.9. ISPControl

In this attribute, you can adjust the sharpness, brightness, saturation, contrast, etc. of the image, as shown inFigure 5-10; see Table 5-9 for detailed parameter settings.



Chroma, Saturation only for color cameras (Model OPT-CC1-M060-GR1-02, OPT-CC1-M050-GG1-03, OPT-CC1-M200-GR1-00 does not have this function.) Mega line sweep series support digital shift, brightness, contrast.

▼ ISPControl	
DigitalShift	0
Brightness	50
Contrast	50

Figure 1 5-9 ISP Administration

Table 5-9 ISP Management-Parameter Interpretation

Parameters	Description
Digital Shift	Adjust the (0~4) DigitalShift to collect all the data left shift digits (default value is 0).
Brightness	Brightness. Adjust the exposure target brightness value, the default value is 50, the greater the value, the exposure will adjust the image brighter, the maximum can be set to 100, the minimum is set to 0.
Contrast	Contrast set the contrast intensity, the larger the value, the more obvious the contrast, the maximum can be set to 100.

5.10. TransportLayerControl

In this attribute, you can set the parameters related to the transmission protocol of the camera, as shown in Figure 5-11. Please refer to Table 5-11 for detailed parameter settings.

TransportLayerControl	
PayloadSize	5038848
GevVersionMajor	2
GevVersionMinor	0
GevDeviceModelsBigEndi...	true
GevDeviceModeCharacte...	UTF8
GevInterfaceSelector	0
GevMACAddress	
GevSupportedOptionSele...	UserDefinedName
GevSupportedOption	true
GevCurrentIPConfiguratio...	false
GevCurrentIPConfiguratio...	false
GevCurrentIPConfiguratio...	true
GevCurrentIPAddress	192.168.2.50
GevCurrentSubnetMask	255.255.255.0
GevCurrentDefaultGateway	0.0.0.0
GevFirstURL	Local:C1GigEAR0521.xml;FEC
GevSecondURL	File:C1GigEAR0521.xml
GevNumberOfInterfaces	1
GevPersistentIPAddress	192.168.2.50
GevPersistentSubnetMask	255.255.255.0
GevPersistentDefaultGate...	0.0.0.0
GevMessageChannelCount	1
GevStreamChannelCount	1
GevHeartbeatTimeout	3000
GevTimestampTickFreque...	100000000
GevTimestampTickFreque...	100000000
GevTimestampControlLatch	
GevTimestampControlReset	
GevTimestampValue	0
GevCCP	ExclusiveAccess
GevMCPHostPort	0xfc12
GevMCDA	0x0
GevMCTT	0
GevMCRC	0
GevMCSP	0xc007
GevStreamChannelSelector	0
GevSCPIInterfaceIndex	0
GevSCPHostPort	0xfc13
GevSCPSFireTestPacket	false
GevSCPSDoNotFragment	true
GevSCPSBigEndian	false
GevSCSPPacketSize	1072
GevSCPD	0
GevSCDA	0xc0a85829
GevSCSP	64531

Figure 5-0 Transport Layer Management

Table 5-0 Transport Layer Management

Parameters	Description
PayloadSize	The length of each message.
GevVersionMajor	The major version of the protocol specification.
GevVersionMinor	The minor version of the protocol specification.
GevDeviceModelBigEndian	End value of the device register.
GevDeviceModeCharacterSet	The character set used by all strings in the boot register.
GevInterfaceSelector	The number of network ports of the device. The value starts from 0, so the value is 0.
GevMACAddress	The MAC address of the network port.
GevSupportedOptionSelector	GevSupportedOptionSelector select one of the existing projects to support GEV access.
GevSupportedOption	GevSupportedOption whether the GevSupportedOptionSelector selection supports the selected GEV.
GevCurrentIPConfigurationLLA	Turn on the LLA function. When True is selected in the GevCurrentIPconfigurationLLA, the IP address is LLA after the device is powered on.
GevCurrentIPConfigurationDHCP	Turn on the DHCP function. When True is selected in the GevCurrentIPconfigurationDHCP, the IP address of the device is DHCP after power-on, which can automatically obtain the IP address of the device.

GevCurrentIPConfigurationPersistentIP	Static IP function. When True is selected in the GevCurrentIPconfigurationPersistentIP, the IP address is static after the device is powered on. The  说明three IP configuration priority relationships are: Static IP>DHCP>LLA.
GevCurrentIPAddress	IP address of the current device.
GevCurrentSubnetMask	The subnet mask of the current device.
GevCurrentDefaultGateway	The gateway of the current device.
GevFirstURL	Get the first URL address of the GenICam XML.
GevSecondURL	Get the second URL address of the GenICam XML.
GevNumberOfInterfaces	The number of physical network interfaces supported by the device.
GevPersistentIPAddress	Set the static IP address of the device.
sGevPersistentSubnetMask	Sets the subnet mask of the static IP address of the device.
GevPersistentDefaultGateway	Set the gateway for the static IP of the device.
GevMessageChannelCount	Displays the number of message channels supported by this device.
GevStreamChannelCount	Displays the number of flow channels supported by this device.
GevHeartbeatTimeout	Set the heartbeat timeout.
GevTimestampTickFrequency	Defines the frequency of timestamps.
GevTimestampControlLatch	Latch the current timestamp into the GevTimestampValue.
GevTimestampControlReset	Used to reset the internal timestamp.
GevTimestampValue	Used to store the time stamp of the latch.
GevCCP	Controls the application's access to the camera. ExclusiveAccess: The attached camera application can modify the registers. ControlAccess: Applications connected to the camera can only read registers and cannot modify registers.
GevMCPHostPort	Set the camera message channel destination port.
GevMCDA	Set the destination address of the camera message channel.
GevMCTT	Message channel timeout.
GevMCRC	The maximum number of message channel retransmissions.
GevMCSP	Displays the source port number of the message channel.
GevStreamChannelSelector	If the camera supports multiple flow channels, select the flow channel number.
GevSCPinterfaceIndex	Displays the logical channel number corresponding to the device.

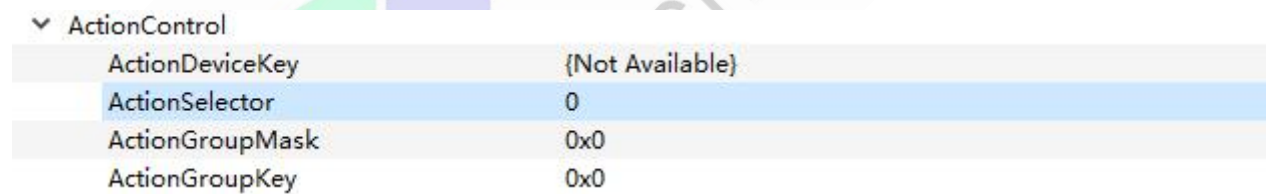
GevSCPHostPort	Port number used by the camera stream channel.
GevSCPSFireTestPacket	Send a test message.
GevSCPSToNotFragment	If the packet is too long, whether to send it in fragments and add fragment position 1 to the IP header.



GevStreamChannelSelector	If the camera supports multiple flow channels, select the flow channel number.
GevSCPInterfaceIndex	Displays the logical channel number corresponding to the device.
GevSCPHostPort	Port number used by the camera stream channel.
GevSCPSFireTestPacket	Send a test message.
GevSCPSDoNotFragment	If the packet is too long, whether to send it in fragments and add fragment position 1 to the IP header.
GevSCPSBigEndian	Sets the end of the pixel data stream for the stream lane.
GevSCPSPacketSize	Sets the message length of the stream channel.
GevSCPD	The interval between control messages.  说明 Modifying this value can reduce the requirements for the network card, but the maximum bandwidth will be affected to a certain extent, and the acquisition time of a single frame will be longer.
GevSCDA	The destination address of the stream channel.
GevSCSP	Source port of flow channel.

5.11. ActionControl

In this attribute, you can select and enable the type of event notification, as shown in Figure5-8. Please refer to Table 5-8for detailed parameter settings.



▼ ActionControl	
ActionDeviceKey	{Not Available}
ActionSelector	0
ActionGroupMask	0x0
ActionGroupKey	0x0

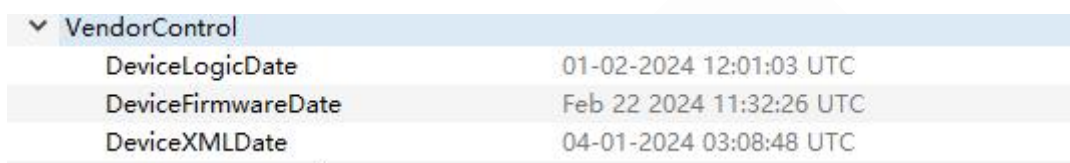
Figure 5-11 Event Notification

Table 5-11 Event Notification Management-Parameter Explanation

Parameters	Description
ActionDeviceKey	Providing a device key allows the device to check the validity of the action command.
ActionSelector	Select the action signal to which further action settings are applied.
ActionGroupMask	Provides a mask that the device will use to validate operations when it receives an operation protocol message.
ActionGroupKey	Provides the key that the device will use to verify the operation when it receives the operation protocol message.

5.12. VendorControl

This attribute contains the firmware update information of the device. For details about parameter settings, see Table 5-12.



▼ VendorControl	
DeviceLogicDate	01-02-2024 12:01:03 UTC
DeviceFirmwareDate	Feb 22 2024 11:32:26 UTC
DeviceXMLDate	04-01-2024 03:08:48 UTC

Figure 1 5-12 Event Notification

Table 5-12 Vendor Management-Parameter Interpretation

Parameters	Description
DeviceLogicDate	Logical bit stream burn date of the device.
DeviceFirmwareDate	Logical firmware burn date of the device.
DeviceXMLDate	Device Electronic File XML Date.

Chapter6 FAQ

Problem Description	Possible causes	Solution
Start the client software and cannot find the camera.	The camera does not start normally or the network cable is connected abnormally.	Check whether the camera power supply and network connection are normal (observe the LED indicator and the network port Link light)
The startup client is able to enumerate to the camera, but the connection fails	● Camera and client are not in the same LAN ● The camera is connected by another program.	● Using the IP Configuration Tool to Modify an IP Address ● After disconnecting the camera from other programs, reconnect it.
Preview screen all black	● Lens aperture closed ● The camera works abnormally	● Open the lens aperture ● Restart camera after power failure
Preview is normal but cannot be triggered	● The trigger mode is not turned on or the trigger source is selected incorrectly. ● Trigger connection error	● Confirm whether the trigger mode of the camera is on, and whether the selected trigger source is consistent with the IO interface used. ● Confirm whether the trigger signal input and wiring are normal
Network usage environment changed from gigabit to 100 megabit	Crystal head or network cable damage	Confirm whether the crystal head and network cable are damaged and can be used normally
Unable to enable external triggering.	● External trigger connection error. ● The trigger mode does not have an external trigger selected.	Select the correct trigger mode and ensure that the external wiring is correct.
When the client software viewed the image, it found that the image was upside down.	● When installing the equipment, the installation direction is wrong.	You can correct the image in the client software by "Properties>ImageFormatControl>ReverseX (horizontal flip) or ReverseY (vertical flip).

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