



10GigE Area Scan Industrial Camera User Manual

CIC-A65-CG-17-T

CIC-A65-MG-17-T

V1.2.3

Abstract

The document briefly describes 10GigE Area Scan Industrial Camera, including product introduction, networking, basic parameters and applications for quick operation.

Symbol Convention

The following symbols may appear in this document, and their meanings are as follows:

Symbol	Description
 Danger	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
 Warning	Indicates a moderate or low level of potential danger which, if not avoided, could result in minor or moderate injury.
 Caution	Indicates a potential risk that, if ignored, could result in damage to device, loss of data, degraded performance, or unpredictable results.
 Tips	It can help you solve a problem or save you time.
 Instructions	Indicates additional information to the text, which is to emphasize or supplement.

Important Safety Instructions

Here is the proper use of the product and prevention of dangers as well as loss of property, etc. Be sure to follow the instructions when using.



Caution

- Please do not place or install the device in the location with strong sunlight or near the heat-generating equipment, make sure the cover temperature is controlled below 60°C.
- Please do not install the device in a humid place with dust or soot, please make sure the lens cover is locked if the camera is not connected to the lens, which is to avoid dust entering the camera.
- Please install the device in a stable location, pay attention to prevent the device falling.
- Please do not allow water or other liquid dripping or splashing on the device and make sure there is no object which is full of liquid placed on the device, which is to avoid liquid flowing into the device.
- Please install the device in a location with good ventilation, do not block the ventilation opening of the device.
- Use the device only within the rated input and output range.
- Please do not dismantle the device at will.
- Please transport, use and store the device within the allowable range of humidity and temperature.

Special Announcement

- Please be noted that the manual is for reference only.
- The manual will be regularly updated according to the product update; the updated content will be added in the manual without prior announcement.
- The company is not liable for any loss caused by the operation which is not implemented according to the manual.
- There may be some technical deviation, errors which are not consistent with the product function and operation or misprint, please refer to the company's final explanation if there is any doubt or dispute.

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1 Product Overview

1.1 Product Introduction

GigE area scan camera adopts high-performance sensor chip and realizes real-time non-compressed image data transmission via GigE, which is compatible with any application development tool which meets GigE Vision and GenICam standard. Max transmission rate 10Gbp/s can satisfy the requirements of transmission rate in most industrial applications. It can work in various harsh environments stably with high reliability and cost performance.

1.2 Product Features

Easy installation, convenient operation, support:

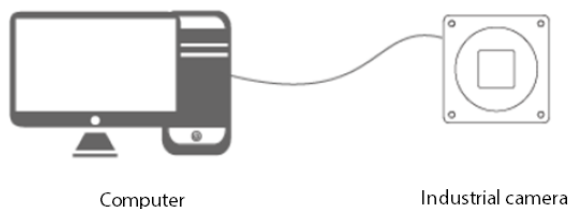
- Ethernet interface provides 10Gbps bandwidth, with max transmission distance up to 100m.
- 128MB on-board frame buffer for image data transmission.
- Supports software trigger, external trigger, mixed mode, free run mode.
- Supports gamma correction, LUT, black level correction, brightness and other ISP functions.
- Supports interpolation algorithm, white balance algorithm etc. for color camera.
- Supports several image data formats output, ROI, binning, mirror, etc.
- Conforms to GigE Vision V2.0 protocol and GenICam standard.
- 24V power supply.
- Conforms to CE, FCC and RoHS certification.

1.3 Typical Networking

The most typical networking mode of area scan camera is point-to-point connection, which needs no other network medium between the host computer and industrial camera. It can be connected through cable, please refer to Figure 1-1.

A host computer can also connect multiple industrial cameras through multiple network ports or switches.

Figure 1-1 Typical Networking



1.4 Main Technical Parameters

Main technical parameters of 10GigE Area Scan Industrial Camera are as follow:

Sheet 1-1 CIC-A65-CG-17-T and CIC-A65-MG-17-T Technical Parameters

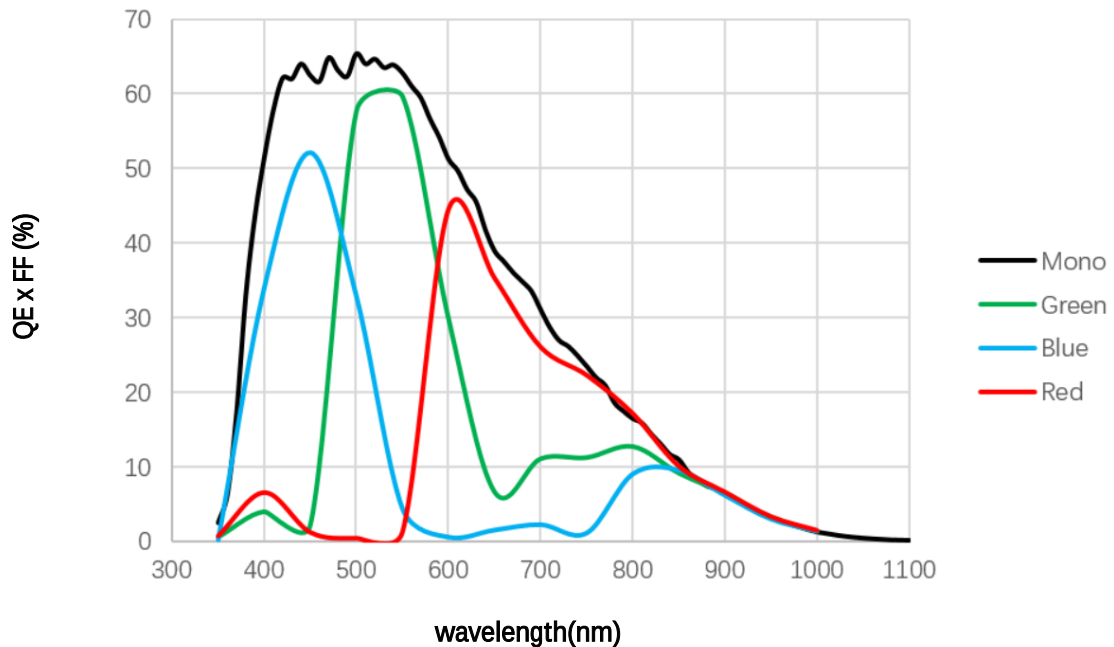
65MP 10GigE Mono/Color Area Scan Industrial Camera		
Sensor	Sensor Model	GMAX3265
	Sensor Type	CMOS
	Mono/Color	CIC-A65-MG-17-T: Mono / CIC-A65-CG-17-T: Color
	Shutter	Global
	Resolution	9344 × 7000
	Pixel Size [μ m]	3.2 × 3.2
	Sensor Size	29.9mm × 22.4mm
	Bit Depth	12
	Frame Rate	17.4 fps
Image	Dynamic Range	66dB
	Signal to Noise Ratio (SNR)	40dB
	Gain	1~32
	Exposure Time	17 μ S ~ 15 S
	Image Format	Mono: Mono8/10/10Packed/12/12Packed; Color: BayerGB8/10/10Packed/12/12Packed/RGB8Packed
Physical Interface	Data Interface	10GigE
	IO Interface	12-pin Hirose connector: 3 channel opto-isolated input, 3 channel opto-isolated output
	Lens Mount	M58 × 0.75
Power/Weight Dimension/ Certification	Power Supply	DC power through Hirose connector

65MP 10GigE Mono/Color Area Scan Industrial Camera		
	Power Consumption	24V $\approx$ 20.16W
	Temperature	Storage Temperature : -30℃ ~ +80℃ ; Operating Temperature: -30℃ $\sim$ +50℃
	Dimension	72mm $\times$ 72mm $\times$ 80mm(Not including the lens mount and the rear case connectors)
	Weight	600g
	Certification	Conforms to CE, FCC, RoHS, GigE Vision V2.0, GenICam
	Software	GenICam and GigE Vision supported devices

1.5 Spectral Curve

The following spectral curve data are derived from the manual of the selected chip.

Figure 1-1 GMAX3265 Spectral Response



1.6 Environmental Requirements

The following are the environmental requirements for 10GigE area scan industrial camera:

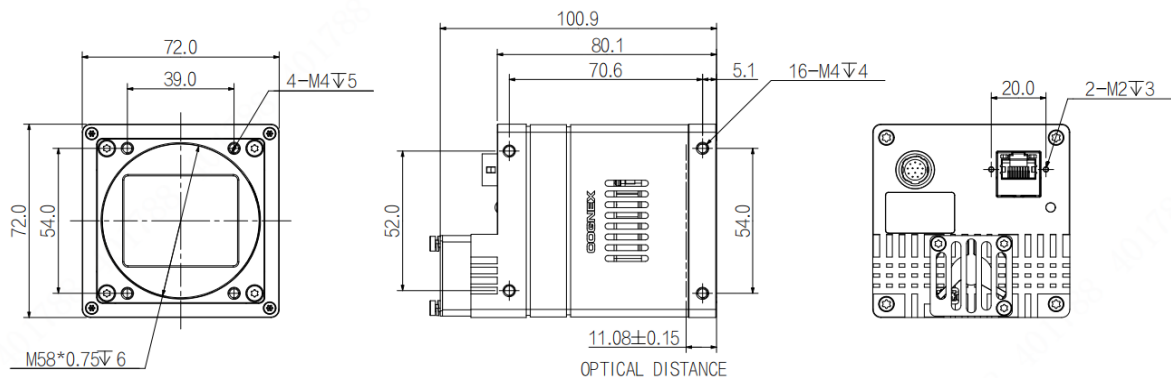
- Temperature and humidity
Ambient temperature should not exceed 50 °C, it is best to work in an air-conditioned environment.
 - ◇ Operating cover temperature: -30°C ~ 50°C.
 - ◇ Operating ambient humidity: 20% ~ 80% no condensation.
 - ◇ Storage temperature: -30°C ~ +80°C.
 - ◇ Storage humidity: 20% ~ 80% no condensation.
- Please install the device in a stable location indoors, with enough heat dissipation space.
- Please keep certain ventilation.

2 Interface Description

2.1 Product Dimensions

The product dimensions are as follows:

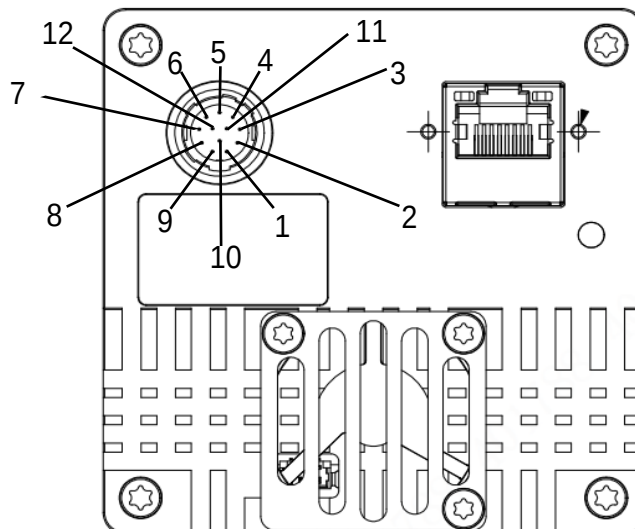
Figure 2-1 72mm×72mm×80mm (Unit: mm)



2.2 Interface Description

The back of the device has two interfaces, the network interface and 12pin power as well as I/O interface, as shown below:

Figure 2-2 Interface Description



2.2.1 Network Interface

Network interface, RJ45 Ethernet port, 10000Mbps transmission interface for camera control, data transmission.

It is best to use shielded twisted-pair Category 6 cable in order to ensure the transmission quality as well as to prevent too much data retransmission and packet loss phenomenon.

2.2.2 12pin Power and I/O Interface

Sheet 2-1 lists the pin signal definition of the I/O interface.

Sheet 2-1 Pin Signal Definition

Pin	Signal	Description
1	GND	Power and Signal Ground
2	Power	Power Supply
3	-	Reversed, do not connect
4	-	Reversed, do not connect
5	Line 3	Opto-isolated input
6	Line 4	Opto-isolated input
7	Line 5	Opto-isolated input
8	OPT_IN_GND	Opto-isolated input GND
9	Line 0	Opto-isolated output
10	Line 1	Opto-isolated output
11	Line 2	Opto-isolated output
12	OPT_OUT_GND	Opto-isolated output GND

2.3 Electrical Specification

2.3.1 Power Supply and Network Port Electrical Specifications

Sheet 2-2 Power Supply and Network Port Electrical Specifications

Parameter	Description
Power specification	24 VDC, < 1% texture ripple, powered by the Hirose 12-pin connector of the camera. The cable must be at least 26 AWG.
EMS Standard	ESD (GBT17626.2/IEC61000-4-2): 6 KV for contacting with a metal surface Surge (IEC61000-4-5): 2 KV in common mode/1 KV in differential mode through the Ethernet port (10/700 μ s) Power port: 500 V in common mode (1.2/50 μ s)
EMC Standard	Class A

2.3.2 IO Port Electrical Specification

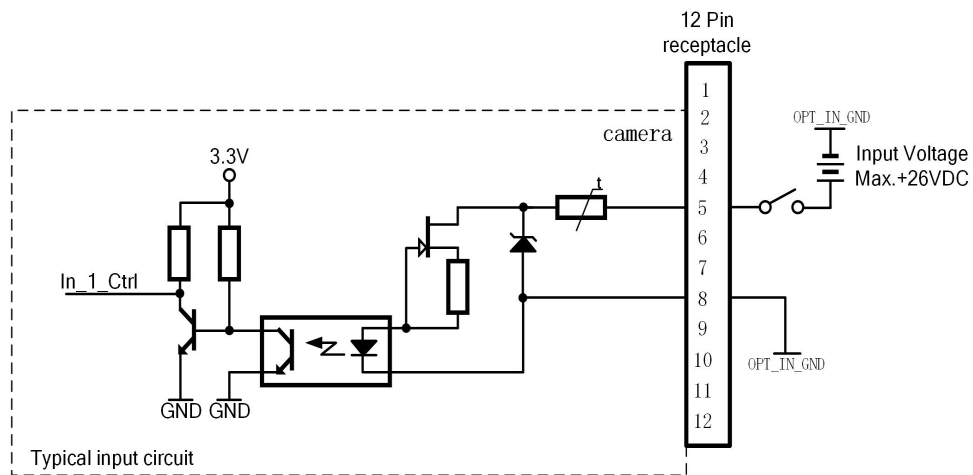
2.3.2.1 Opto-isolated Input

Sheet 2-3 Opto-isolated input

Input Voltage	Description
DC 26V	Limit voltage: input voltage should not exceed this limit, otherwise it will cause damage to the device
DC 0~24V	I/O input safe operating voltage range
DC 0~1.4V	Indicates logical 0
DC >1.4V~2.2V	Input state reverses and logic state is not certain
DC >2.2V	Indicates logical 1

Isolated I/O input sink current is 5mA~15mA.

Figure 2-8 Opto-isolated Input Circuit



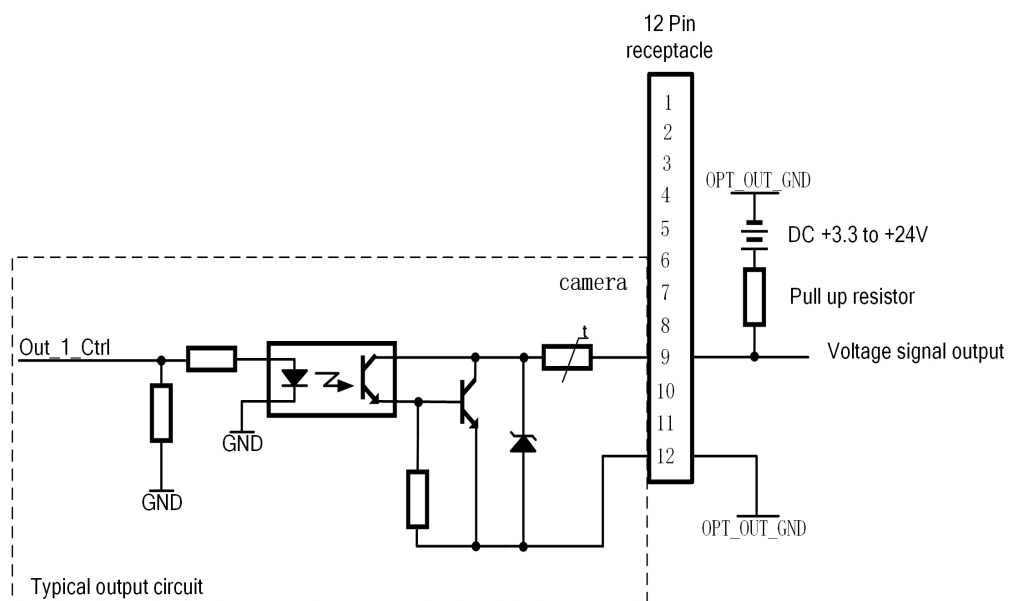
2.3.2.2 Opto-isolated Output

Sheet 2-4 Opto-isolated Output

Voltage	Description
DC 0~26V	I/O output swing range, 26V is limit voltage which should not be exceeded, otherwise it will cause damage to the device
DC <3.3V	I/O output may go wrong if logical 1 has been set within this range, it is advised to use 0V to indicates logical 0
DC +3.3V~+24V	Any voltage within this range can be used to indicates logical 1, it is defined by user

The max continuous current of isolated I/O output is 50mA.

Figure 2-9 Opto-isolated Output Circuit



2.4 Indicator Light Description

The indicator light description of the device is shown in Sheet 2-7.

Sheet 2-7 Indicator Light Description

Status	Indicator light status		Note
Normal	Red	Red light quick flashing	Device booting.
	Blue	Blue light slight brightness	IP is assigned, and the application software API is not connected to the device.
		Blue light high brightness	The application software API is connected to the device, free mode, no image transmission.
		Blue light quick flashing	The application software API is connected to the device, free mode, with image transmission.
		Blue light slow flashing	Use trigger mode.
	Red ↔ Blue	Red and blue light alternate flashing	Firmware upgrading.
Abnormal	Red	Red light normally on	Device abnormality: such as no stream, firmware upgrade failure and etc.
		Red light slow flashing	Network disconnected.

3 Main Function Description

This chapter mainly introduces function parameters related to industrial camera.

Instructions

- The parameter items displayed in black indicate that the parameter can be changed or set. The parameter items displayed in gray indicate that the parameter does not support change or setting in the current operating mode.

Functions of ISP module for different image formats are shown in Sheet 3-1:

Sheet 3-1 Functions of ISP Module for Different Image Formats

Format	Exposure	Gain	Black level	White Balance	Gamma
Mono	Y	Y	Y	/	Y
Bayer	Y	Y	Y	Y	Y
Disable Function	/	Set GainRaw to 1	Set BlackLevelAuto to Off; set BlackLevel to 0	Set BalanceWhiteAuto to Off; select Red, Green or Blue in BalanceRatioSelector and set BalanceRatio to 1	Set Gamma to 1
Format	LUT	ColorTransformation	Sharpness	Hue	Saturation
Mono	Y	/	/	/	/
Bayer	Y	/	/	/	/
Disable Function	Set LUTEnable to False	Select ColorTransformationSelector as RGBtoRGB and set ColorTransformationEnable to False	Set SharpnessEnabled to Off	Set HUE to 50	Set Saturation to 50
Format	Denoising	Contrast	DigitalShift	Brightness	
Mono	/	Y	Y	Y	
Bayer	/	/	Y	Y	
Disable Function	Set Denoising to Disable	Set Contrast to 50	Set DigitalShift to 0	Set Brightness to 50	

3.1 Device Control

You can check the device information and change the device name in Property; please refer to Sheet 3-2 for parameter setting details.

Sheet 3-2 Device Control—Parameter Explanation

Parameter	Explanation
DeviceType	The device type defined by GigE Vision.
DeviceScanType	The scan type of the sensor: area scan / line scan.
DeviceVendorName	Device vendor name.
DeviceModelName	Device model name.
DeviceManufacturerInfo	Device manufacturer info.
DeviceVersion	Device version, including updated date and SVN number in the bracket.
DeviceFirmwareVersion	Device firmware version, including updated date and SVN number in the bracket and the number following the semicolon represents the hardware version.
DeviceSerialNumber	Device serial number.
DeviceUserID	User-programmable device identifier.
DeviceTLType	The protocol type used by the camera transport layer: confirms to GigE Vision / CameraLink / CameraLinkHD / CoaXPress / USB3 Vision. This column can automatically recognize the protocol that comes with the camera, which can't be changed.
DeviceTLVersionMajor	The major version of the transport layer protocol that the device is compatible with.
DeviceTLVersionMinor	The minor version of the transport layer protocol that the device is compatible with.
DeviceMaxThroughput	Maximum bandwidth of the data that can be streamed out of the device.
DeviceCharacterSet	Character set used by the strings of the device's bootstrap registers. The default is UTF8.
DeviceReset	Device reset button which can restart the camera by calling API.
DeviceTemperatureSelector	Select to view the temperature of sensor board / mainboard.
DeviceTemperature	The actual temperature of sensor board / mainboard (°C) .
DeviceRegisterIsBigEndian	Endian of the registers of the device: big-endian / little-endian. The default is big-endian.
DeviceTLVersionSelector	Select the compatible version of the device transport layer. The GigE camera supports switching between V2.0 and V1.0.

3.2 ImageFormatControl

In this property, you can change image size, image pixel format, region of interest(ROI) and test image mode etc. ; please refer to Sheet 3-3 for more details about parameter settings.

Instructions

The image output formats supported by the industrial camera are shown in sheet 3-3. Specific supported formats are subject to the formats supported by the camera.

Sheet 3-3 Image Format Control – Parameter Explanation

Parameter	Explanation
SensorWidth	Sensor raw image width in pixels.
SensorHeight	Sensor raw image height in pixels.
WidthMax	Maximum width of the image (in pixels), which will be affected by decimation, etc.
HeightMax	Maximum height of the image (in pixels), which will be affected by decimation, etc.
Width	The actual output image width (pixels).
Height	The actual output image height (pixels).
OffsetX	The horizontal offset of the image from the top left. The max value is determined by the Width value.
OffsetY	The vertical offset of the image from the top left. The max value is determined by the Width value.
ReverseX	Flip the image horizontally based on the original size of the sensor but not the image after ROI.
ReverseY	Flip the image vertically based on the original size of the sensor but not the image after ROI.  Instructions If the output format of the color type is Bayer, the image format needs to be modified after reversing vertically to interchange BayerRGxxx and BayerGBxxx.
PixelFormat	Image output format. Different models support different formats.
PixelSize	Total size in bits of a pixel of the image.
PixelColorFilter	Type of color filter that is applied to the image in the current image output format.  Instructions Only the color camera has this property.
PixelDynamicRangeMin	The min image pixel brightness.
PixelDynamicRangeMax	The max image pixel brightness.
TestImageSelector	Selects the test image type: Disable、TestImage1 (Static Image) or

	TestImage2 (Dynamic Image) .  Instructions The test image is not an actual image and is used for testing purposes only.
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3.3 AcquisitionControl

In this property, you can set the image acquisition mode, trigger mode and exposure time etc; please refer to Sheet 3-4 for detailed parameter settings.

Sheet 3-4 Acquisition Control - Parameter Explanation

Parameter	Explanation
AcquisitionMode	Image acquisition mode: - SingleFrame: acquires one frame at a time and stops to capture frames automatically when finished. - MultiFrame: acquires frames specified by AcquisitionFrameCount and stops to capture frames automatically when finished. - Continue: acquires frames continuously until an Acquisition Stop signal is given to stop to capture frames.
AcquisitionStart	SDK starts / stops to capture frames.
AcquisitionStop	
AcquisitionFrameCount	Number of frames to acquire.  Instructions It is invalid to change this parameter when image acquisition mode is SingleFrame or Continue. You can set the acquisition frame count in MultiFrame mode.
AcquisitionFrameRate	Acquisition frame rate. The frame rate set in AcquisitionFrameRate is valid only when AcquisitionFrameRateEnable is True.  Instructions If the frame rate is set beyond the max frame rate (ResultingframeRateAbs) in the current mode, the actual frame
AcquisitionFrameRateEnable	

Parameter	Explanation
	rate of the camera is ResultingFrameRateAbs, not the value set by AcquisitionFrameRate.
AcquisitionStatusSelector	Selects which trigger status to view.
AcquisitionStatus	Selects AcquisitionTriggerWait or FrameTriggerWait in AcquisitionStatusSelector and views in AcquisitionStatus: True is for waiting for a trigger and False for having triggered.
TriggerSelector	Selects the trigger type.
TriggerMode	Selects FrameStart or AcquisitionStart in TriggerSelector and select On/Off in TriggerMode to enable/disable the trigger mode. You need to trigger AcquisitionStart at first when triggering together, then you can trigger FrameStart to acquire frames.
TriggerSoftware	Trigger mode.
TriggerSource	TriggerSource supports SoftwareTrigger and lineN (HardwareTrigger) .
TriggerActivation	- When you select SoftwareTrigger, click or call API in TriggerSoftware to generate software trigger. - When you select lineN, set RisingEdge or FallingEdge in TriggerActivation, then the external cable generates a rising or falling signal to achieve hardware trigger.  Instructions You can separately select trigger source for AcquisitionStart and FrameStart.
TriggerDelay	Trigger delay. Indicates the time between when the camera receives the trigger signal and when the trigger takes effect. It is valid for both soft trigger and hard trigger.
LightTriggerDelay	It is used to set the delay time between when the camera receives the trigger signal and when LightTrigger takes effect to control the opto-coupler conduction. Opto-coupler conduction time is when LightTrigger starts to the end of the exposure.  Instructions During the delay, the camera can't receive a new trigger, otherwise it will be abnormal and needs to stop the frame capture and restart to return to normal.
ExposureMode	Exposure mode: supports Timed mode and TriggerWidth mode. - Timed: exposure time is set in ExposureTime. - TriggerWidth: exposure time is the external trigger pulse width.  Caution Some models do not support TriggerWidth mode.
ExposureTime	Exposure time.

Parameter	Explanation
ExposureAuto	Exposure automatically. ● Off means the function is disabled. You can set exposure time in ExposureTime with a range of 0us~1000000us. ● Once means the camera can modify the exposure time once according to the ambient brightness. The modified value is displayed in gray in ExposureTime. ● Continue means the camera can continuously modify the exposure time according to the ambient brightness. The modified value is displayed in gray in ExposureTime.
ResultingframeRateAbs	The max frame rate the camera can achieve.  Instructions The max frame rate the camera can achieve depends on the network transmission bandwidth, pixel size, resolution and exposure time. The camera default exposure time takes precedence, which means that when the exposure time is greater than the reciprocal of the frame rate, the frame rate is preferentially reduced instead of limiting the max exposure time.

3.4 DigitalIOControl

In this property, you can control different I/O input or output signals; please refer to Sheet 3-5 for detailed parameter settings.

Sheet 3-5 Digital IO Control - Parameter Explanation

Parameter	Explanation
LineSelector	Selects the external IO line for configuration.
LineMode	Configures the output mode of selected IO Line: Input/Output.
LineInverter	Controls the selected physical input or output line signal inversion, True is for the signal to invert, False for the signal not to invert.
LineStatus	Indicates the current status of the selected physical input or output line.
LineStatusAll	Returns the current status of all available lines.
LineSource	When IO line is selected to be the output, you can select the trigger source. Current supported trigger sources are as follows: ● ExposureActive: outputs the signal when exposure starts. ● FrameTriggerWait: outputs the waiting signal for frame trigger. ● Timer0Active: outputs the signal when the Timer0 counts up. ● UserOutput0: outputs the value user set in Userset0. ● AcquisitionTriggerWait: outputs the waiting signal for acquisition trigger. ● LightTrigger: outputs the light trigger signal.

Parameter	Explanation
	 Instructions Output 1 means the opto-coupler is on, 0 means off.
LineFormat	Shows whether the currently selected IO line supports opto-coupler isolation.
UserOutputSelector	User-defined output group selection.
UserOutputValue	The output value of the user-defined output group.
UserOutputValueAll	Sets all values of the user-defined output group to 0 or 1.
LineDebouncerTimeAbs	Sets the absolute value of the selected line debouncer time in microseconds  Instructions A pulse less than the set value will not be considered as a valid trigger input.

3.5 EventControl

In this property, you can control the event; please refer to Sheet 3-6 for detailed parameter settings.

Sheet 3-6 Event Control - Parameter Explanation

Parameter	Explanation
EventSelector	Event setting. Selects the type of event, including: - ExposureEnd (Exposure end event) - FrameTrigger(Event for frame trigger sending signal to sensor) - FrameStart (Receiving frame trigger event) - AcquisitionTrigger (Acquisition trigger event) - AcquisitionStart (Acquisition start event) - ReadOut (Category that contains all the data features related to the ReadOut Event)
EventNotification	Sets whether to notify the upper layer software after selecting the event type. ON is for notifying, OFF for not notifying.

3.6 AnalogControl

In this property, you can adjust the acquired analog signals, including gain, black balance, white balance and gamma correction etc.; please refer to Sheet 3-7 for detailed parameter settings.

Sheet 3-7 Analog Control - Parameter Explanation

Parameter	Explanation
GainSelector	The channel gain is not supported to set, the default is All.
GainRaw	The larger the gain, the brighter the image. The set range is different for different types and the default value is 1.  Instructions The analog gain is preferentially enabled.
BlackLevelSelector	BlackLevelSelector is used to select the black balance channel.
BlackLevel	BlackLevel is used to eliminate the impact of Sensor's dark current. The dark current is a phenomenon that the image brightness is a value greater than 0 when it is all black. By modifying the black level value, the brightness of the channel can be more responsive to the actual image brightness. The setting range is 0 ~ 255.
BlackLevelAuto	- When BlackLevelAuto is set as Off, the fixed black level that the algorithm minus is 1/4 of the value set in BlackLevel. - When BlackLevelAuto is set as Once, it will automatically set BlackLevel for once according to the return value of sensor. Then it will change to be Off. - When BlackLevelAuto is set as Continues, it will continuously set BlackLevel according to the return value of sensor.  Caution Black level will change when the temperature rises. It is recommended to capture a more accurate black level when the temperature is constant.
BalanceRatioSelector	Selects Red, Green or Blue channel to set white balance.
BalanceRatio	Adjusts the image color through adjusting R/G/B, in order to achieve a highest color reproduction.
BalanceWhiteAuto	- When BalanceRatioSelector is set as Off, it represents manual white balance mode. User can manually set red, green, blue channel values in BalanceRatio. - When BalanceRatioSelector is set as Once, it represents auto white balance mode for once. Auto white balance mode will operate for a period and then stops according to the current scene. An algorithm for searching gray region is used to find possible gray region in Bayer data. - When BalanceRatioSelector is set as Continues, it represents continuous white balance mode.  Instructions White balance correction is only available for the color camera. White balance of the mono camera defaults to 1.
Gamma	Gamma value setting. It is a non-linear correction for image data to correct the non-linear response of the monitor. The larger the Gamma value, the brighter the

Parameter	Explanation
	image. The Gamma value setting range is 0~3.99998. The default value is 1 with no Gamma process.

3.7 LUTControl

In this property, you can stretch and highlight the gray-level range of the region of interest. The operation applies to linear curve as well as customized mapping curve; please refer to Sheet 3-8 for detailed parameter settings.

Instructions

- LUT: short for Look-Up Table.
- LUT and Gamma are mutually exclusive. If Gamma is enabled, LUT will not take effect. If LUT is enabled, Gamma needs to be set to 1.

Sheet 3-8 LUT Control - Parameter Explanation

Parameter	Explanation
LUTSelector	Selects the channel of LUT.  Instructions Currently only Luminance (brightness) Look-Up Table is supported.
LUTEnable	LUT setting. 1. Enables LUT for LUT lookup table function. 2. Sets digital points of the lookup table in LUTIndex with range of 0~4095. 3. When LUTIndex is selected, you can set corresponding values in LUTValue.
LUTIndex	
LUTValue	
LUTValueAll	Sets all the values of Index to the same value.

3.8 TransportLayerControl

In this property, you can set parameters related to camera's transport layer protocol; please refer to Sheet 3-9 for detailed parameter settings.

Sheet 3-9 Transport Layer Control - Parameter Explanation

Parameter	Explanation
PayloadSize	The number of bytes transferred for each image or chunk on the stream channel.
GevActiveLinkCount	The number of logical channels currently connected.
GevInterfaceSelector	The number of network ports on the device. The value starts at 0, so the value is 0.

Parameter	Explanation
GevLinkSpeed	The speed of transmission negotiated by the given logical link.
GevMACAddress	MAC address of the device.
GevCurrentIPconfigurationLLA	Enables LLA function. Selects True in GevCurrentIPconfigurationLLA and the IP address will be in LLA mode after the device is powered on.
GevCurrentIPconfigurationDHCP	Enables DHCP function. Selects True in GevCurrentIPconfigurationDHCP and the IP address will be in DHCP mode after the device is powered on. The device IP address can be obtained automatically.
GevCurrentIPconfigurationPersistentIP	Static IP function. Selects True in GevCurrentIPconfigurationPersistentIP and IP will be in static mode after the device is powered on.  Instructions The three IP precedence relationships are: static IP> DHCP> LLA.
GevCurrentIPAddress	IP address of the current device.
GevCurrentSubnetMask	Subnet mask of the current device.
GevCurrentDefaultGateway	Default gateway of the current device
GevIPConfigurationStatus	Displays how the current IP address is allocated, LLA, DHCP or static IP.
GevFirstURL	Obtains the first URL address of GenICam XML.
GevSecondURL	Obtains the second URL address of GenICam XML.
GevNumberOfInterface	Displays the number of logical channels supported by this device.
GevPersistentIPAddress	Sets the persistent IP address of the device.
GevPersistentSubnetMask	Sets the persistent IP subnet mask of the device.
GevPersistentDefaultGateway	Sets the persistent IP default gateway of the device.
GevMessageChannelCount	Displays the number of message channels supported by this device.
GevStreamChannelCount	Displays the number of stream channels supported by this device.
GevHeartbeatTimeout	Sets the heartbeat timeout period.
GevTimestampTickFrequency	Defines the tick frequency of the timestamp.
GevTimestampControlLatch	Latches the current timestamp into GevTimestampValue.
GevTimestampControlReset	Resets the internal timestamp.

Parameter	Explanation
GevTimestampValue	Stores the latched timestamp.
GevGVCPExtendStatusCodesSelector	Selects GigE Vision to output extended status codes.
GevGVCPExtendStatusCodes	Determines whether to output extended status codes.
GevGVCPPendingAck	Determines whether to report Pending_ACK when the command is timed out.
GevGVCPHeartbeatDisable	Disables GVCP heartbeat detection.
GevGVCPPendingTimeout	GVCP command execution time-out time.
GevGVSPExtendedIDMode	Enables GVSP extended ID mode.
GevCCP	Controls application's access to the camera. ● ExclusiveAccess: application connected to the camera can modify the registers. ● ControlAccess: application connected to the camera can only read the registers but can't modify them.
GevPrimaryApplicationSocket	Displays the UDP source port of the application connected to this camera.
GevPrimaryApplicationIPAddress	Displays the IP address of the application connected to this camera.
GevMCPHostPort	Sets the destination port of the message channel.
GevMCDA	Sets the destination address of the message channel.
GevMCTT	The time-out time of the message channel.
GevMCRC	The max retransmission count of the message channel.
GevMCSP	Displays the source port of the message channel.
GevStreamChannelSelector	Selects the stream channel number when the camera supports multiple stream channels.
GevSCPInterfaceIndex	Displays the logical channel number corresponding to the device.
GevSCPHostPort	The source port used by the camera stream channel.
GevSCPSFireTestPacket	Sends a test packet.
GevSCPSDoNotFragment	The state of this feature is copied into the "do not fragment" bit of IP header of each stream packet. It can be used by the application to prevent IP fragmentation of packets on the stream channel.
GevSCSPPacketSize	The stream packet size in bytes.
GevSCPD	Controls the delay (in timestamp counter unit) to insert between each packet for this stream channel.

Parameter	Explanation
	 Instructions Change this value can lower the standard of the network card, but it will affect the max bandwidth and increase the single frame acquisition time.
GevSCDA	Stream channel destination address.
GevSCSP	Stream channel destination port.

3.9 UserSetControl

In this property, you can save or load the parameter scheme set by user and set the default parameter configuration when opening the client; please refer to Sheet 3-10 for detailed parameter settings.

Sheet 3-10 User Set Control - Parameter Explanation

Parameter	Explanation
UserSetSelector	UserSetSelector: supports Default, UserSet1, UserSet2, UserSet3. Selects which series to use for the subsequent UserSetLoad and UserSetSave operation. UserSetLoad: restores the camera configuration to the configuration that user selected. UserSetSave: saves the current configuration to the selected series, but the Default series does not support saving.
UserSetLoad	
UserSetSave	
UserSetDefault	Default user set when the power is on. UserSet1 and UserSet2 need to execute UserSetSave before display.
UserSetLoadLastUserSet	The last user configuration the user used.
UserSetLoadStatus	User set load status. Displays whether the configuration has been successfully loaded.

3.10 CounterAndTimerControl

In this property, the counter can divide the frequency of the external input trigger signal and execute exposure control according to the user's logic; please refer to Sheet 3-11 for detailed parameter settings.

Instructions

Please set TriggerSource in 3.3 AcquisitionControl before using.

Sheet 3-11 Counter and Timer Control - Parameter Explanation

Parameter	Explanation
CounterSelector	Selects the counter which needs to configure: Counter0 or Counter1. If Counter0 is selected, CounterEventSource displays FrameTrigger. If Counter1 is selected, CounterEventSource displays FrameStart.
CounterResetSource	Selects the signal source to reset the counter: non-reset Off、software signal reset SoftwareSignal0 and hardware signal reset Line1.
CounterEventSource	Select the events that will be the source to increment the Counter: FrameTrigger/FrameStart.
CounterReset	The selected counter used for software reset.
TimerSelector	Selects the counter needs to configure. The default is Timer0.
TimerTriggerSource	Selects the trigger source of the start timer. The default is ExposureStart.
TimerTriggerActivation	Selects the trigger mode of the start timer: RisingEdge, FallingEdge or AnyEdge.
TimerDelay	Sets start timer delay when receiving the trigger. (μ s)
TimerDuration	Sets the duration of the timing pulse. (μ s)

3.11 ISPControl

In this property, you can adjust the image sharpness, brightness, saturation, contrast and so on; please refer to Sheet 3-12 for detailed parameter settings.

Sheet 3-12 ISP Control - Parameter Explanation

Parameter	Explanation
DigitalShift	Adjusts DigitalShift. The brightness can be doubled when the value increases by one.
Brightness	Brightness. Adjust the brightness value of the exposure target. The default value is 50. The greater the value, the brighter the image adjusted by exposure.
Contrast	Sets Contrast level. The greater the value, the more obvious the contrast. ContrastMode is used to control ContrastThreshold. It supports three modes: manual, single and continuous. ContrastThreshold is used to set the threshold of the contrast.
ContrastMode	
ContrastThreshold	

4

Vision Pro and Industrial Camera Configuration Guidance

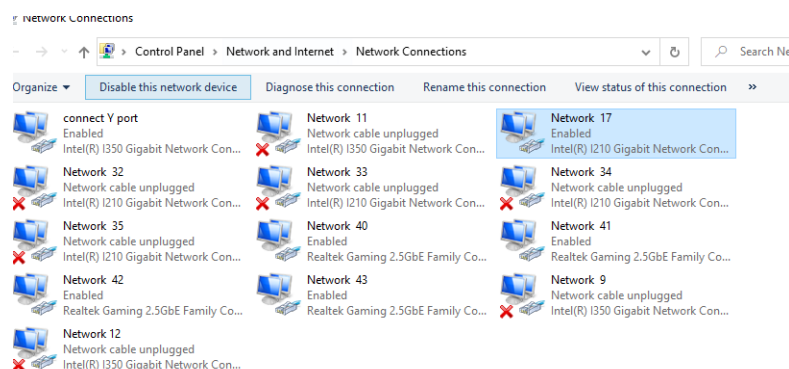
This document mainly introduces how to use Vision Pro to pull streams through different trigger modes with GigE industrial cameras. The specific content is as follows.

Before using the camera, you must first configure the environment, including the network port configuration on the industrial computer and the IP configuration of the camera.

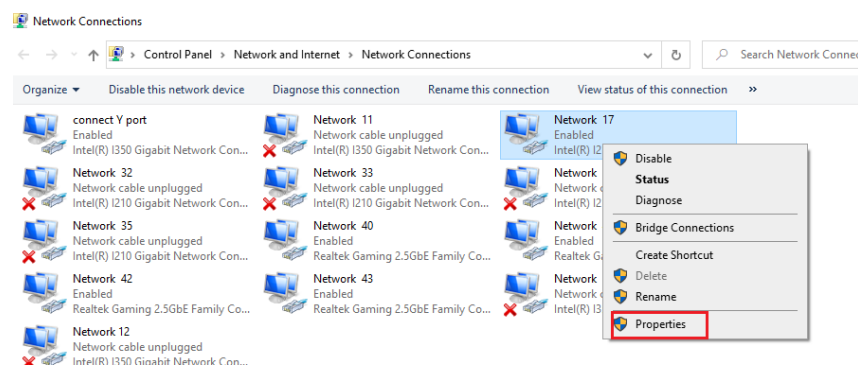
4.1 Network Port Configuration

Network port settings include enabling jumbo frames and IP settings. Modify network port related settings on the PC's "network connections".

4.1.1 Left-click to select the corresponding network port

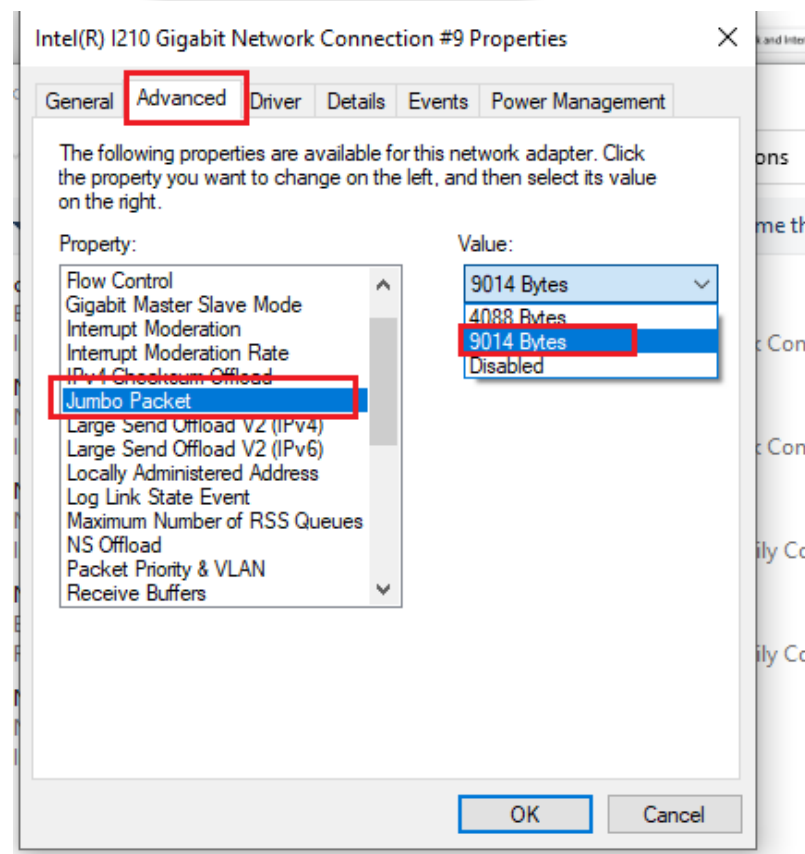
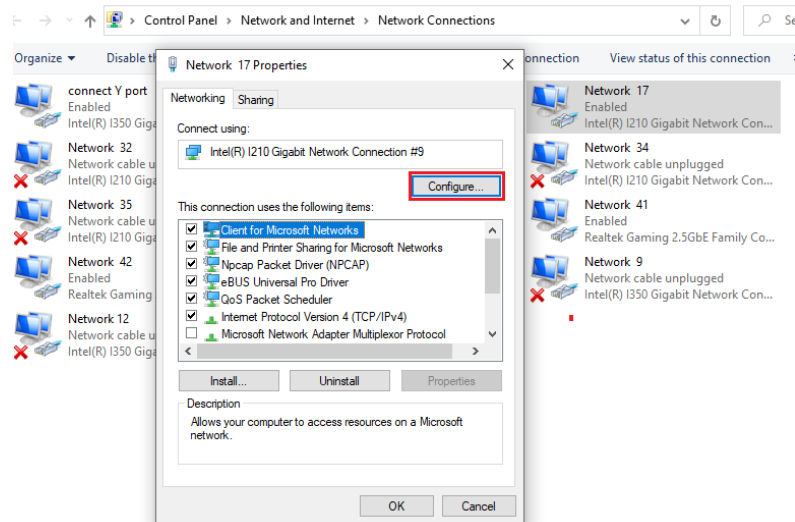


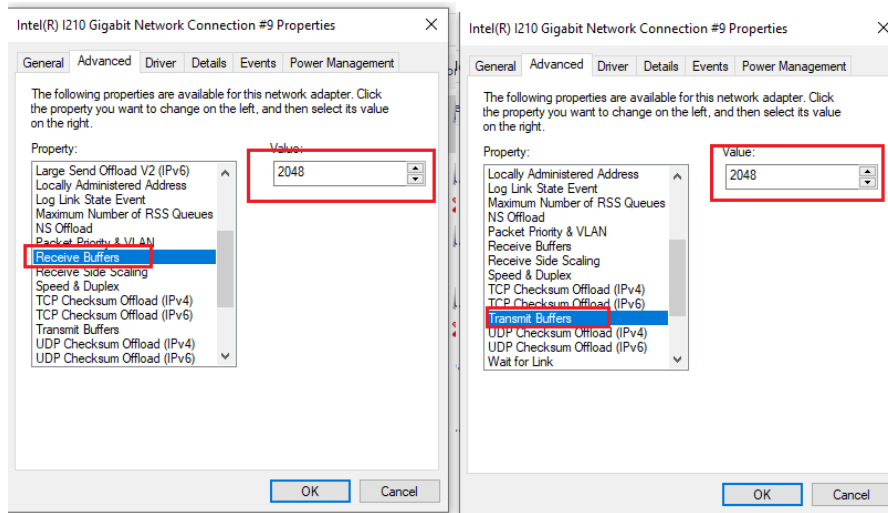
4.1.2 Expand the right-click menu of the selected network port



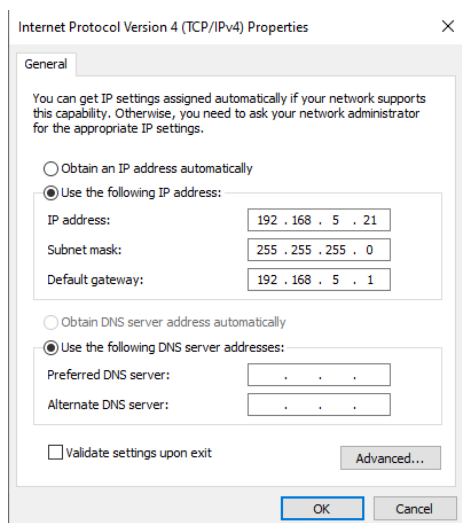
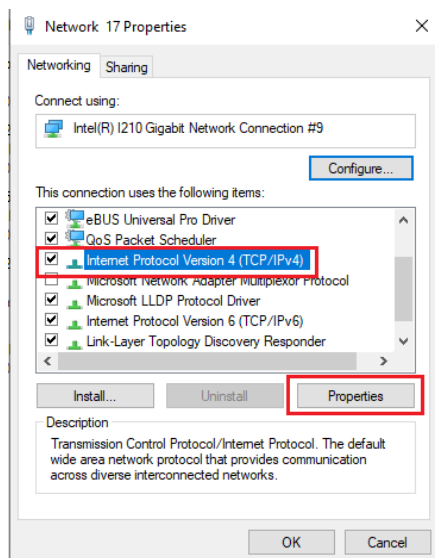
4.1.3 Network port properties configuration

From the network port properties interface -> Configuration interface -> Advanced page, switch on the jumbo packet to 9k, and set the network port's receive buffer and send buffer to the maximum supported values.





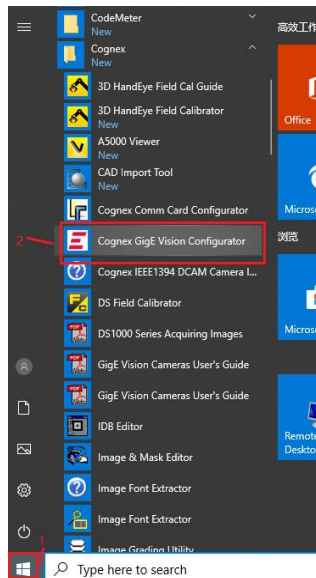
4.1.4 Set the IP of the selected network port



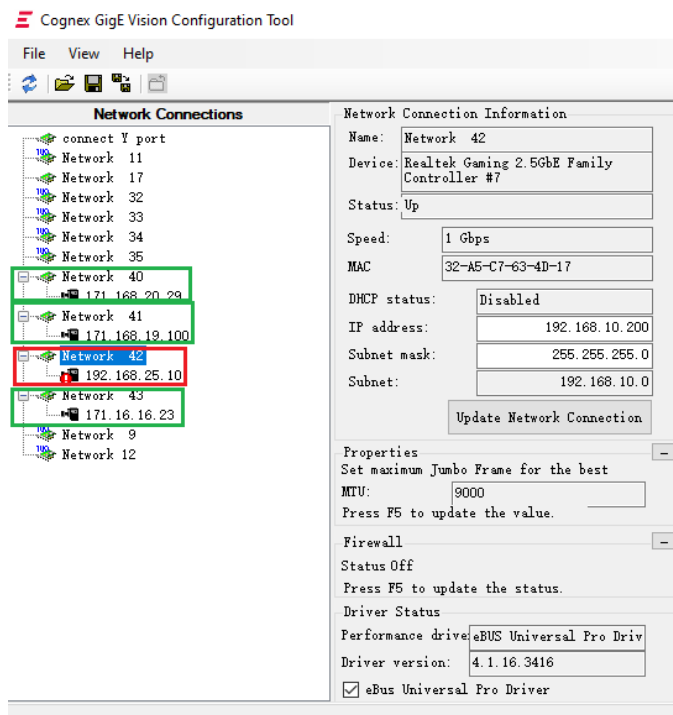
Note: If there are multiple network ports on an industrial computer, each network port needs to be configured as an IP of a different network segment.

4.2 Camera IP settings

Using Cognex GigE Vision Configuration Tool sets the camera IP. The opening method is as follows:

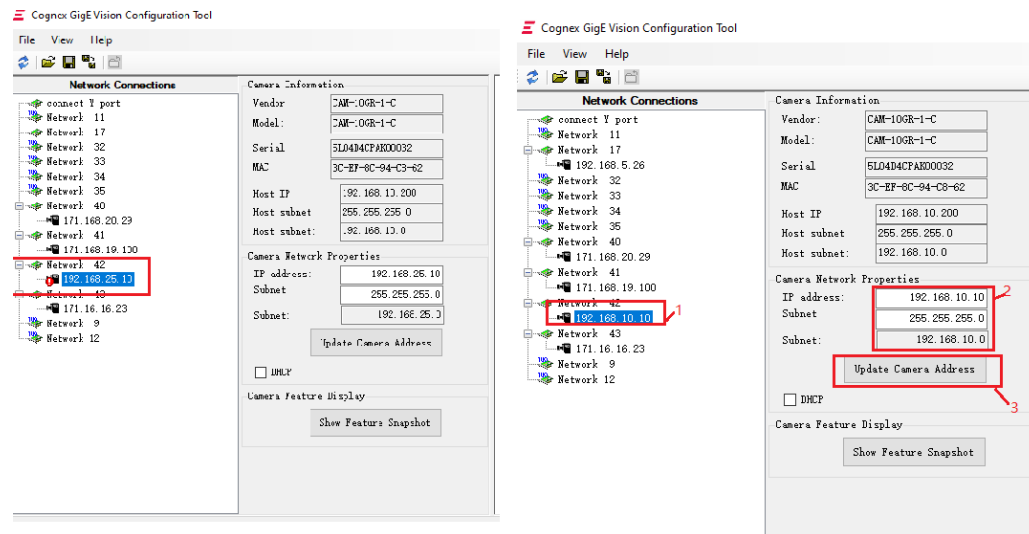


As shown in the figure below, if there is a red exclamation mark in front of the corresponding network port in the red and green rectangles, it means that the current camera and the network port are not in the same network segment, and the camera IP needs to be modified, otherwise the camera will not be able to connect. If there is no red exclamation mark in front of the network port, it means that the camera and network port IP are in the same network segment and can communicate normally.



The following is to modify the IP of a certain network port connected to the camera. From the picture on the right, you can see that after the IP modification is completed, the corresponding

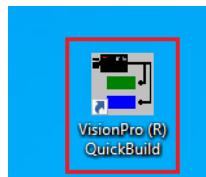
exclamation mark on the network port disappears.



After configuring the network and camera IP according to the above steps, you can use the Vision Pro (abbreviated as VP in the following content) camera and capture the stream.

4.3 VP Configures the Camera for Different Trigger Modes

4.3.1 Find the VP icon on the desktop and double-click it with the left mouse button to open it.

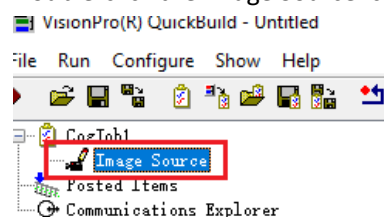


4.3.2 Configure the camera to acquire images using VP 's phase acquisition tool

VP has two ways to connect to the camera. The first is to use the Image Source that comes with CogJob; the second is to use the CogAcqFifoTool in the toolkit; the two methods are consistent when configuring the camera.

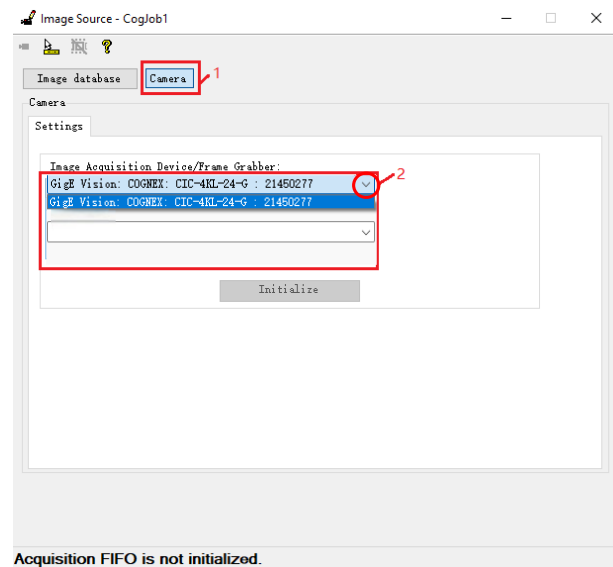
4.3.3 Configuring the camera using Image Source

Double-click the Image Source icon under cogJob to enter the camera configuration interface

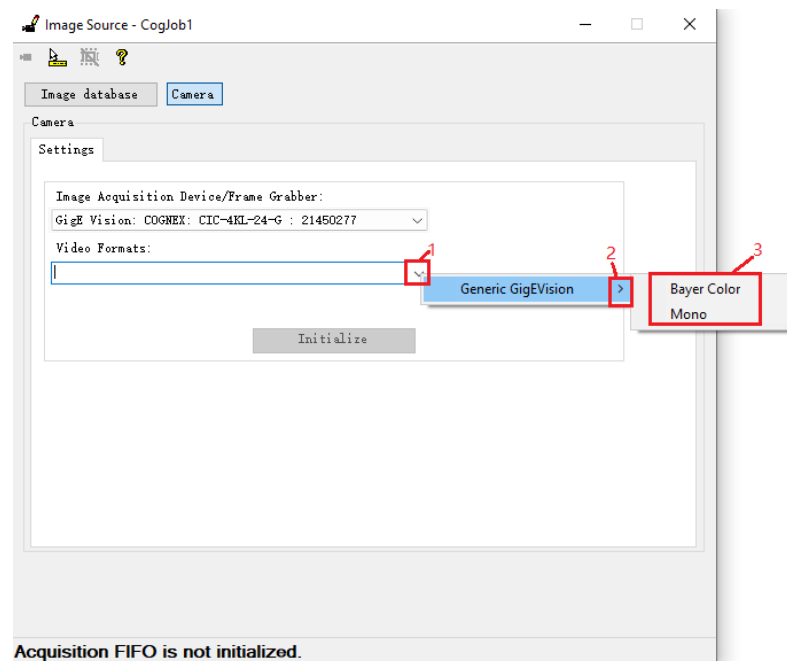


Camera initialization. After selecting the target camera and image format, click the Initialize button to initialize the camera.

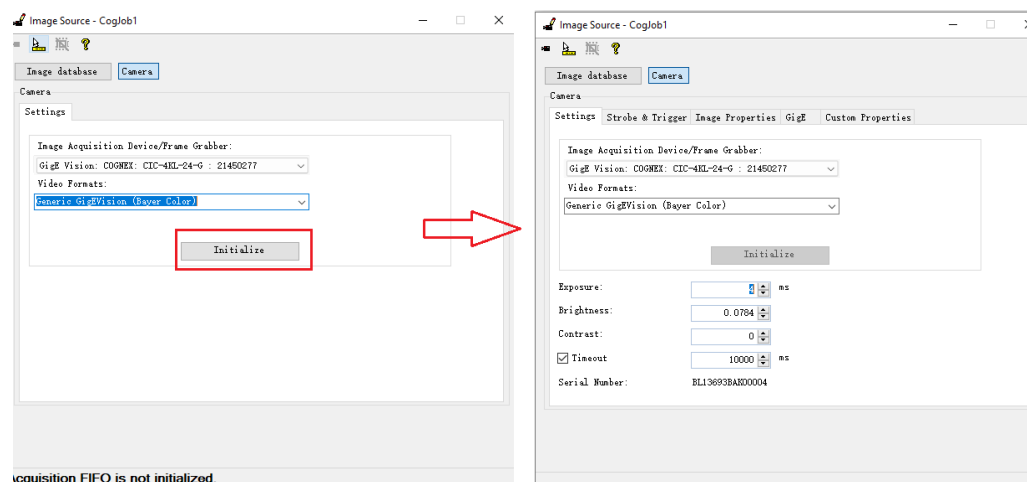
Camera selection



Format selection



Initialize the camera

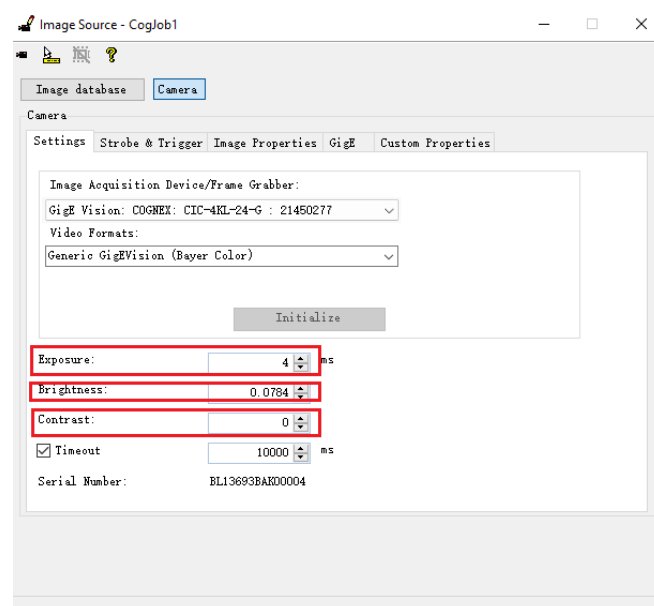


After the camera initialization is completed, some parameters that affect the brightness of the camera image can be adjusted.

Exposure: The larger the value, the brighter the image, but if it is adjusted too large, it may cause the camera frame rate to drop.

Brightness: The larger the value, the darker the image (related to the specific model of the camera, some cameras may not follow this rule)

Contrast: The larger the value, the larger the image, but the noise on the image will also become larger (related to the specific model of the camera, some cameras may not follow this rule)



In the Strobe & Trigger page, you can set the camera's trigger modes. There are 4 types in total. The four trigger modes and their differences are as follows:

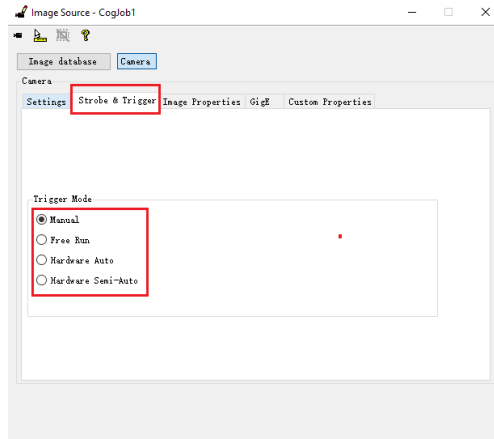
Manual: Every time VP is run, the camera performs the following process: Start streaming -> the camera outputs a frame according to its own theoretical frame rate (the camera is in single frame mode) -> Stop streaming

Free run: Every time VP runs, the camera performs the following process: Starts streaming -> the camera outputs pictures according to its own theoretical frame rate (VP takes one frame)

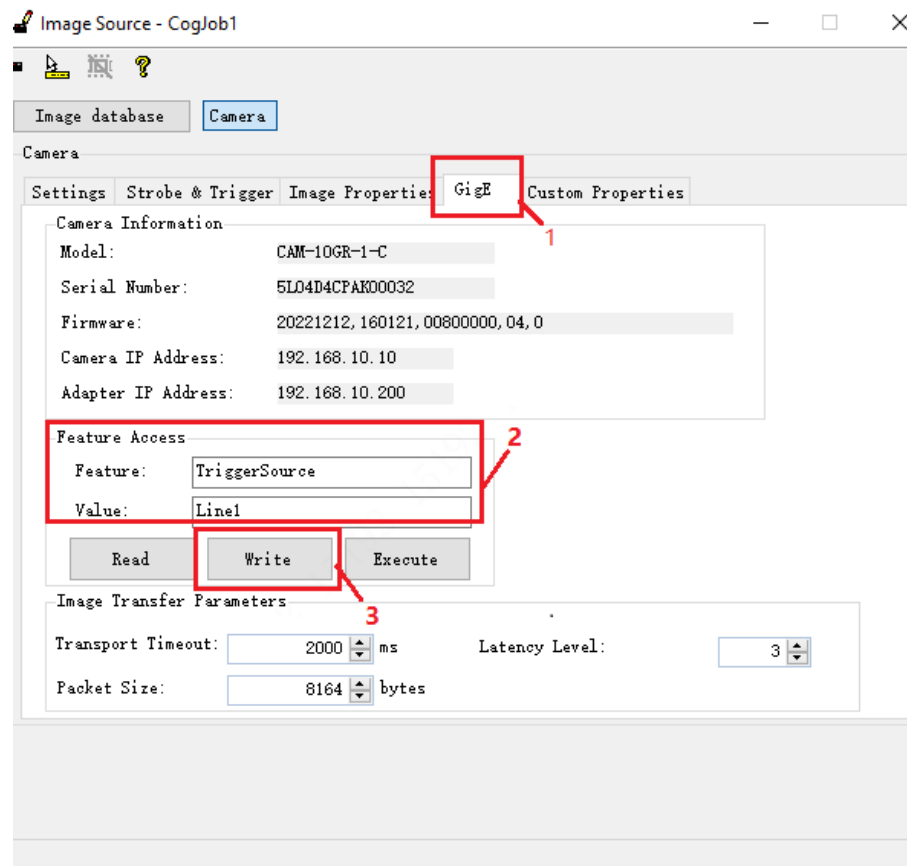
Hardware Auto: An external trigger signal needs to be given to the camera. Each time VP is run, the camera performs the following process: Starts streaming -> waits for the trigger signal to be

received and outputs a frame.

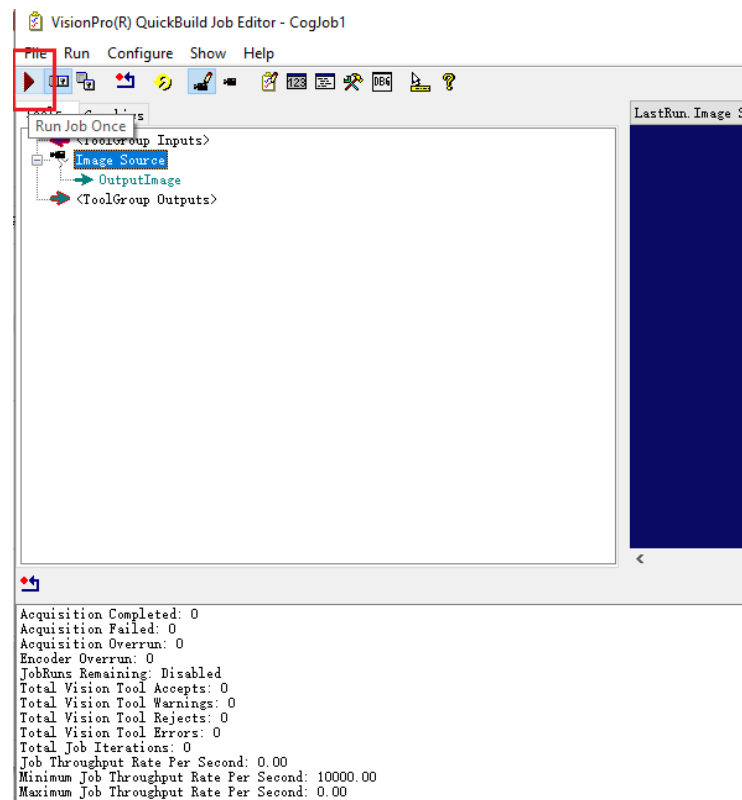
Hardware Semi-Auto: An external trigger signal needs to be given to the camera. Every time VP is run, the camera performs the following process: Start streaming -> wait for the trigger signal to be received to produce a frame -> stop streaming



Hardware Auto and Hardware Semi-Auto modes require modification of the camera configuration. Taking Hardware Auto as an example, the modification method is as follows
The input port line1 of the camera is connected to an external trigger signal source.



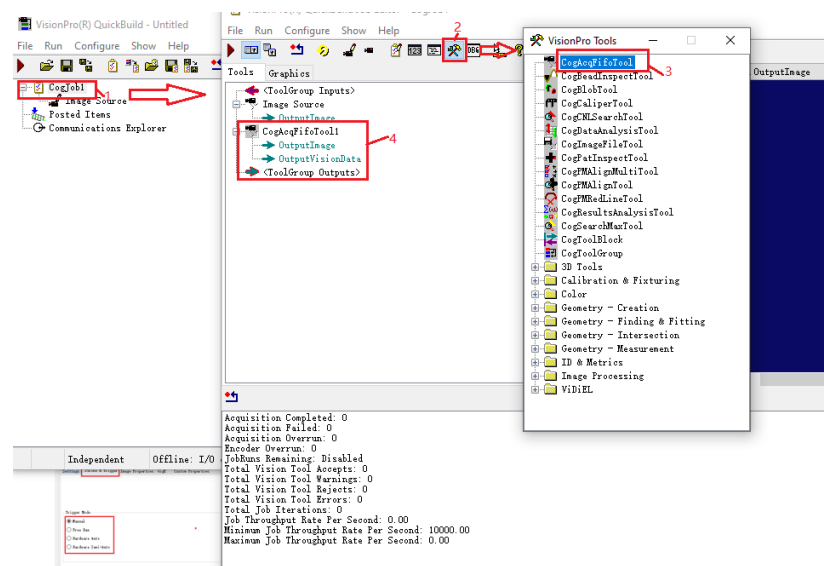
After that, during the running of CogJob, a trigger signal is given to the camera Line1 port during the waiting timeout period, and the image can be received.



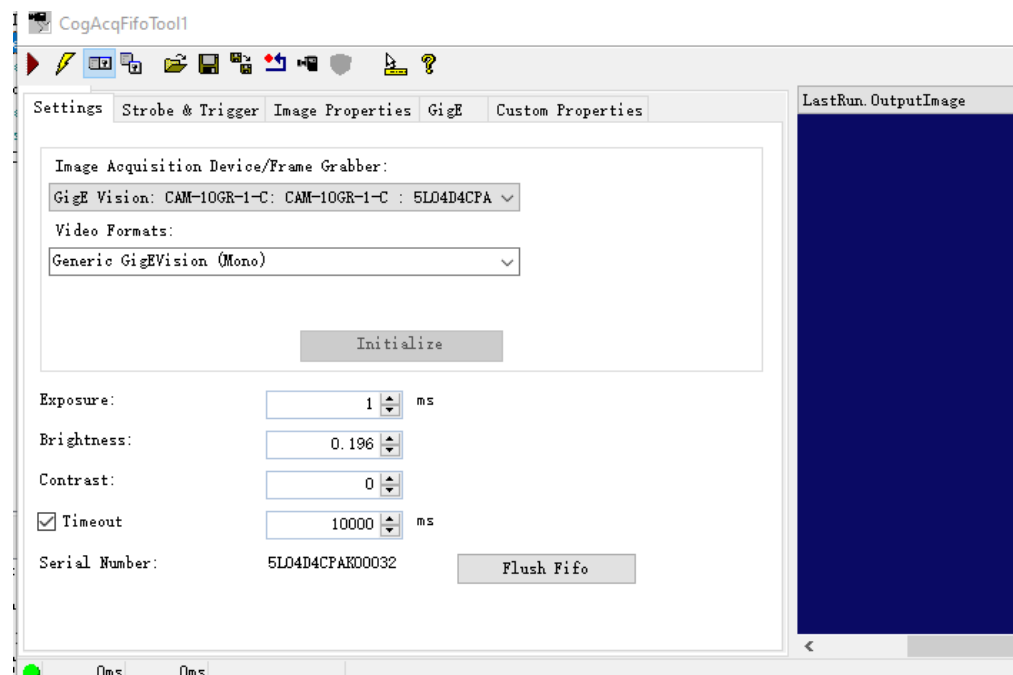
Hardware Semi-Auto are the same as Hardware Auto. The only difference is that Hardware Semi - Auto is selected at Strobe & Trigger.

4.3.4 Use CogAcqFifoTool to configure the camera

According to the following sequence, double-click the cogjob with the left button of the mouse to enter the job configuration page, then left-click the tool set with the VP to display the toolset interface, and then double-click the CogAcqFifoTool with the left button of the mouse to add the tool to the job. ,as the picture shows:



Double-click the CogAcqFifoTool icon to display the setting interface of the tool, as shown in the figure below, which is consistent with Image Source and the usage method is also the same.



5 FAQ

You can solve problems that you may encounter with following instructions:

1. Application fails to discover the device.

Reason analysis:

- The camera fails to boot up normally.
- Connection of network cable is abnormal.
- The camera and the client are not on the same LAN.

Solutions:

Reboot the camera, check if cable connection is abnormal and check if the indicator light is normal. Add device to the same LAN of the client.

2. Application can discover the camera but connection failed.

Reason analysis:

- The camera fails to boot up normally.
- The device IP is not added to the same network segment of the PC IP.
- Another client has been connected to the camera.

Solutions:

Reboot the camera, try to change IP in order to add the device IP to the same network segment of the PC IP; or disconnect the other client that has been connected and then connect this client.

3. The preview interface is all black in the application.

Reason analysis:

- Lens aperture is off.
- Camera runs abnormally.

Solutions:

Open lens aperture, power off and reboot the camera device.

4. It fails to enable external trigger.

Reason analysis:

-
- External trigger connection is wrong.
 - It fails to select external trigger in trigger mode.

Solutions:

Select correct trigger mode and make sure external connection is correct.

5. The image is reverse when the client software checks image.

Reason analysis:

- The installation direction is wrong during device installation.

Solutions:

You can correct the image via “Condition > Image Format Control > Reverse X (horizontal flip) or Reverse Y (vertical flip)” in the client software.

6

Cleaning and Maintenance

This chapter mainly introduces cleaning and replacement of color filter.

We have installed a fully transparent protective glass for the mono camera with the main purpose to prevent dust falling on the surface of image sensor. The color camera is equipped with a low-pass filter that cuts off to the near-infrared band. If you have special requirements, such as not using a color filter or using another light-transmitting filter, you can replace the entire filter mount of the image sensor (no need of removing the cover).

If the surface of the filter needs to clean, we recommend using the special cleaning agent for optical devices that can clean the surface without leaving a mark.