LEO Series
GigE LWIR Camera
User Manual

V2.4.8, Aug. 2024

Preface

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Purpose

This Manual is a basic description of LEO series GigE LWIR Cameras, which mainly includes the product description, quick installation guide and Simple introduction of SDK(iDatum). This manual may be updated due to product upgrades or other reasons. If you need, please contact the sales engineer for the latest version of this manual.

Disclaimer

The information and specifications described in this manual are subject to change without notice.

Latest Manual Version

For the latest version of this manual, see the Download Center on our web site at: http://www.contrastech.com/en/service/005001.html

Technical Support

For technical support, e-mail: support@contrastech.com.

Warranty

To ensure that your warranty remains in force, adhere to the following guidelines:

Do not remove the camera's serial number label
If the label is removed and the serial number can't be read from the camera's registers, the warranty is void.

Do not open the camera housing
Do not open the housing. Touching internal components may damage them.

Prevent ingress or insertion of foreign substances into the camera housing
Prevent liquid, flammable, or metallic substances from entering the camera housing. If operated with any foreign substances inside, the camera may fail or cause a fire.

Avoid electromagnetic fields
Do not operate the camera in the vicinity of strong electromagnetic fields. Avoid electrostatic charging.

Clean with care
Avoid cleaning the sensor if possible.

Handle this camera with care
Do not abuse the camera. Avoid striking, shaking, etc. The camera could be damaged by improper handling.

Read the manual
Read the manual carefully before using the camera.

PRODUCT DESCRIPTION

Product Introduction

LEO LWIR camera is a thermal imaging device that uses high-sensitivity VOx uncooled detector and uses GigE interface to transmit data in real time. It supports remotely acquiring data and setting parameters via client software or SDK.

LEO series industrial cameras compatible with GigE、10GigE、USB3.0、Cameralink and CoaXPress data bus standards, support GenICam、USB3 Vision® and GigE Vision®, Smoothly connect with third-party software, like HALCON and Vision Pro, not need for secondary development. LEO series cameras with excellent cost performance and very suitable for various inspections measurement and high-speed imaging applications. This series cameras won customers high praise because its outstanding performance in cellphone and tablet PC screen inspection, LED automatic packaging, defect inspection, and electronic components manufacturing, wafer positioning and other applications.

With this variety of sensors and interfaces, combined with the extensive features offered, LEO series cameras are fit for a wide range of vision applications.

Product Features

■ Adopts high-sensitivity vanadium oxide uncooled detector with 0.3 MP.

■ Adopts GigE interface and max. transmission distance of 100 meters without relay.

■ Supports software trigger, hardware trigger, free run mode and etc;

■ Supports multiple palette modes, grayscale detection, image adjustment, etc.

■ Compatible with GigE Vision Protocol, GenICam Standard, and third-party software based on the protocol and standard.

＊ The camera functions may differ by camera models,please refer to actual functions.

Status LED Description

Status LED	Description
Slow Flashing Red (the interval between on and off is 2000 milliseconds)	The camera wiring exception occurs.
Red light is always on	The camera exception occurs.
Blue light is always off	The camera is in idle status.
Fast Flashing Blue (the interval between on and off is 200 milliseconds)	The camera is acquiring images normally.
Slow Flashing blue (the interval between on and off is 1000 milliseconds)	The camera is acquiring images in trigger mode.
Flashing Alternately Red and Blue	The firmware is updating.

Mechanical Dimensions

The dimensions is in millimeters：

The cameras are interfaced to an external circuity via connectors located on the back of the housing.
The Industrial camera rear appearance contains standard RJ45 GigE interface, 6pin power, I/O input connector and camera working status indicator light.
There are two M2 screw holes on both side of GigE interface, which used to fix cable to reduce the loosening caused by vibration.
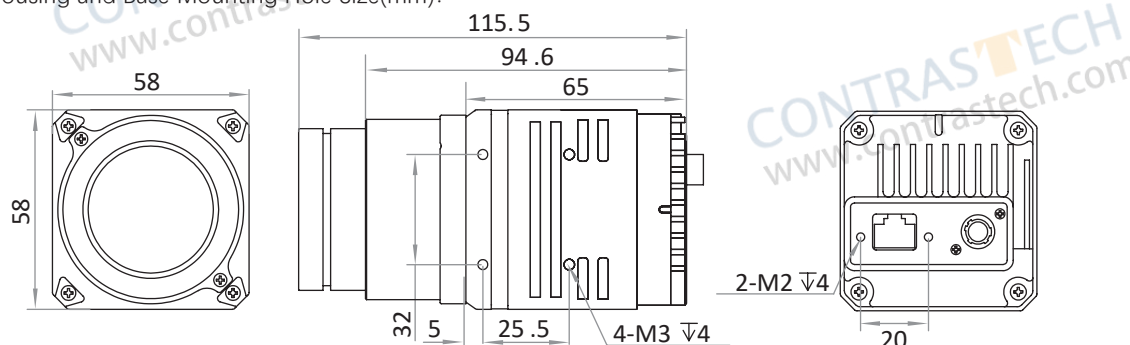
Camera Housing and Base Mounting Hole Size(mm):

Fig. 1-1: Mechanical Dimensions (in mm) of the GigE Cameras with 6.3mm/35mm focal length lens housing (The installation uses M2 and M3 screws).
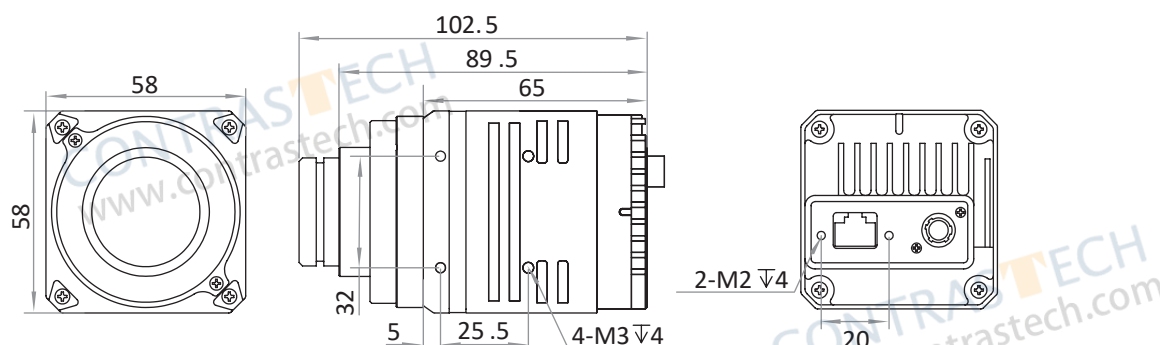
Fig. 1-2: Mechanical Dimensions (in mm) of the GigE Cameras with 15mm focal length lens housing (The installation uses M2 and M3 screws).
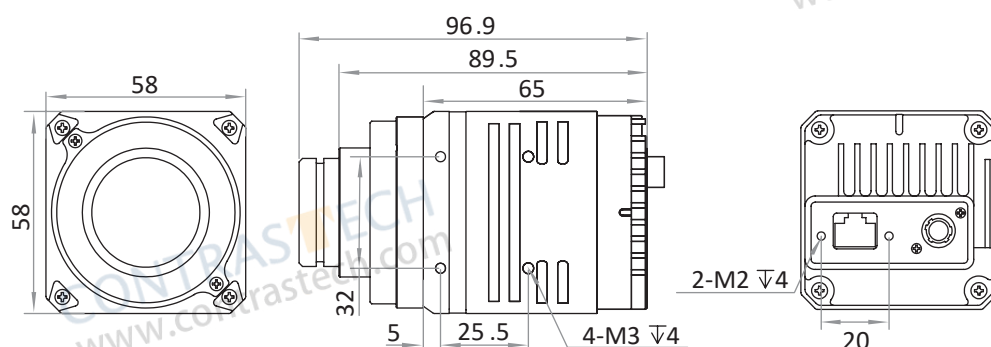
Fig. 1-3 Mechanical Dimensions (in mm) of the GigE Cameras with 25mm focal length lens housing (The installation uses M2 and M3 screws).
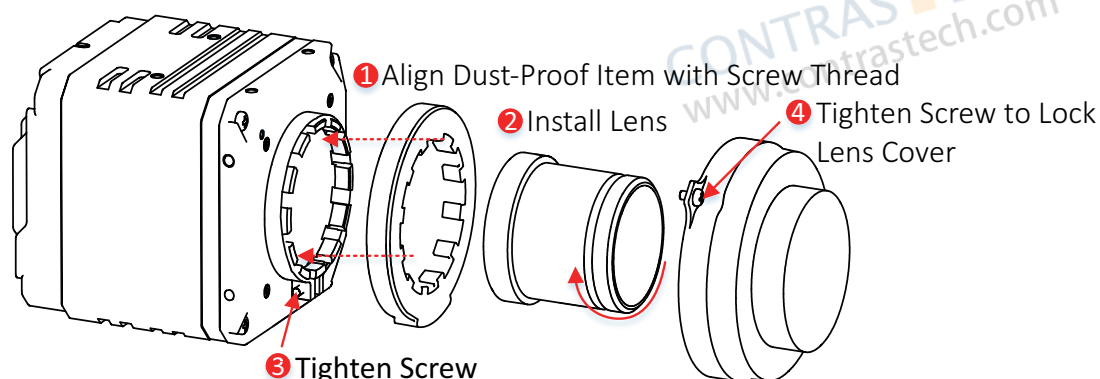
❶ Align Dust-Proof Item with Screw Thread
❷ Install Lens
❹ Tighten Screw to Lock Lens Cover
❸ Tighten Screw

Fig. 1-4: Lens Installation

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CHAPTER 2

POWER AND
I/O IENTERFACE DEFINITION

I/O Connection Definition and Assignments

The device has a 6-pin P7 connector as the power and I/O connector that provides power and I/O signals. Read the table below to get its pin definitions.
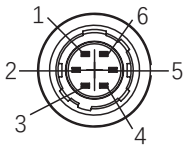
Table 2-1:
Numbering and assignments for 6pin
   Power and I/O Input Connector:

Color	Pin	Signal	Signal Source	Designation
Red	1	DC_PWR	-	DC Camera Power
Green	2	OPTO_IN	Line 0+	Opto-isolated IN
White	3	GPIO	Line 2+	Can be configured as input or output
Blue	4	OPTO_OUT	Line 1+	Opto-isolated OUT
Brown	5	OPTO_GND	Line 0/1-	Opto-isolated Signal Ground
Black	6	GND	Line 2-	Camera Power Supply Ground

The wire color of this user manual is the color of ContrasTech. If you use other manufacturers' cable color definitions may be different, random connection may cause the camera to burn out, please connect according to the I/O port type and pin definition or contact our technical staff for advise.

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CHAPTER 3 ## INSTALLATION AND SETUP

You should perform the software installation procedure first and the hardware installation procedure second.

Software Installation

■ iDatum Installation

If you use a firewall on your computer, disable the firewall for the network adapter to which your camera is connected.

Close the Firewall
In order to ensure the camera software keep running and image transmission stability, please close the firewall before using the software.

System Requirements

LEO Camera Software Suite for Windows requirements that one of the following operating systems is installed on your computer:

■ Windows XP (32 bit)

■ Windows 7 (32 bit or 64 bit)

■ Windows 10 (32 bit or 64 bit)

■ Linux 32 Bit/64 Bit : Ubuntu 14.04(32/64)、Ubuntu 16.04(32/64)、 Redhat7(64)、Centos7(32/64)、gcc/g++ version requires 4.6.3 and above

■ ARM: NVIDIA TX2、RaspberryPiB3.0+

Installation Steps

1.You can download the iDatum software（LEO Series Industrial Cameras SDK For xxx）from：

http://www.contrastech.com/en/service/005001.html

2.Double click iDatum installation package to install the client.

3.Follow the instructions on the screen. The installer will guide you through the installation process.

Environment Testing
After successful installation, please connect the camera and turn on iDatum client software to check the result of camera connection and image preview. You can start secondary development base on the SDK when all environment testing is normal.
You should notice follow items when using GigE Camera：
■ FrameRate   Whether the frame rate is consistent with the actual set frame rate.
■ Errors   If not 0, it means there is a frame skip, it is abnormal.
■ Lost Packets   If not 0, it is abnormal.

Hardware Installation

■ Camera Installation

The installation procedures assume that you will be making a peer-to-peer connection between your camera and a computer.

Make sure that the following items are available before starting the installation：

- ■ LEO GigE LWIR Observation camera
- ■ Applicable power supply or a Gigabit Ethernet Switch
- ■ It refers to the lens that matches with lens mount of the camera.
- ■ The computer with a GigE network adapter installed
- ■ The computer must be equipped with appropriate operating system
- ■ Standard Ethernet cable (CAT5e or above).

Steps：

- ■ Mount lens that matches with lens mount of the camera
- ■ Connect the camera to the computer and power

PoE:

● For the camera that supports PoE, use a network cable to connect the camera to a switch that supports PoE or a network interface card.

Direct supply:

● Use the 6-pin power and I/O cable to connect the camera to a power adapter.

Network Settings

Before using the camera, you need to configure IP is in the same network segment with the computer. You can modify it in"Local Connection" to ensure network communication is normal.

Local Network Configuration :

● Click "Control Panel"> "Network and Internet"> "Network and Sharing Center"> "Change Adapter Configuration. "Then select corresponding network card to configure it automatically obtain IP address or manually assign it as same network segment address with the camera. Shown as below:

● Open "Advanced" in the properties, set "Jumbo Frame" as its maximum value:9014bytes, both of transmit buffer and receive buffer set as 2048bytes, the Interrupt Throttle Rate set as extremum value. These maximum values mentioned above depend on the specific network card. Shown as below:
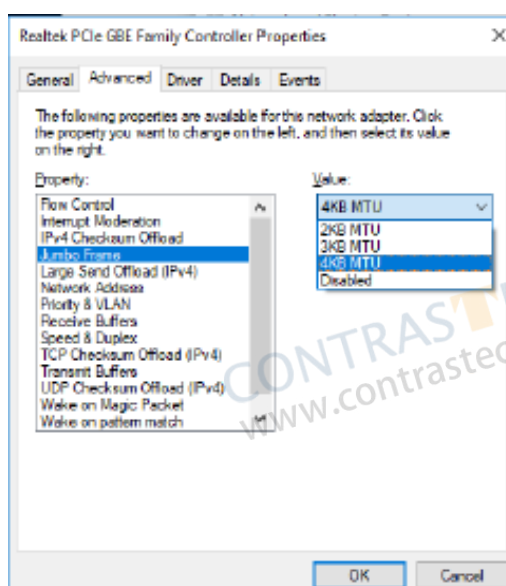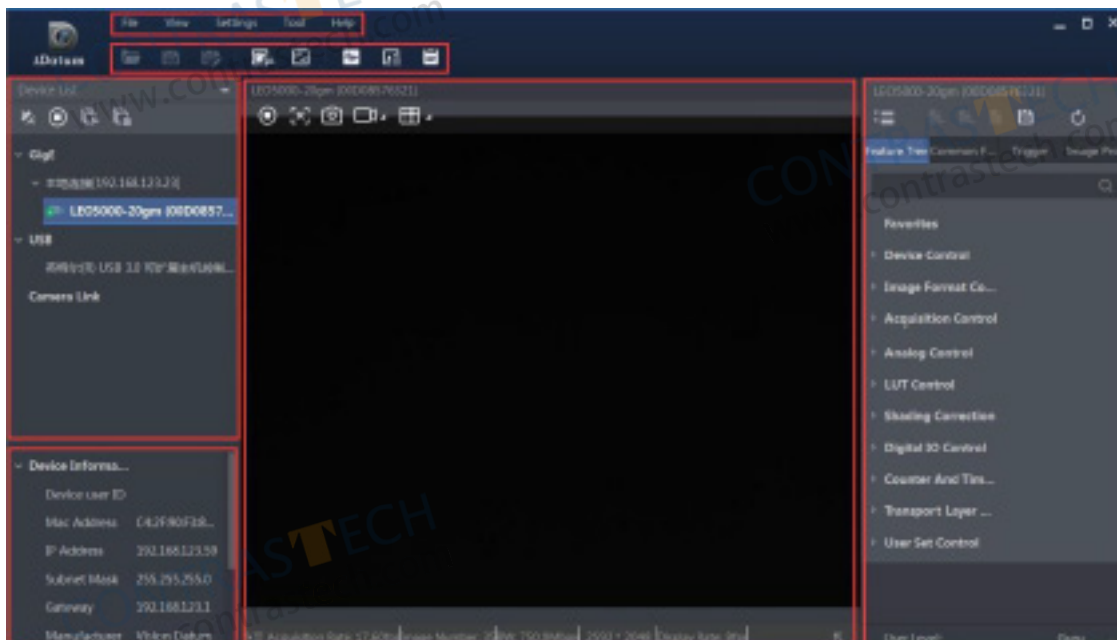
Software Operation

■ iDatum Operation

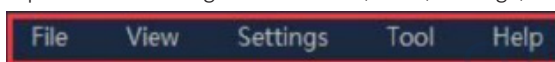1、Double-click the iDatum shortcut on the desktop to open up the client software.

■ Main interface

For specific main window of the client software, please refer to the actual one you got.
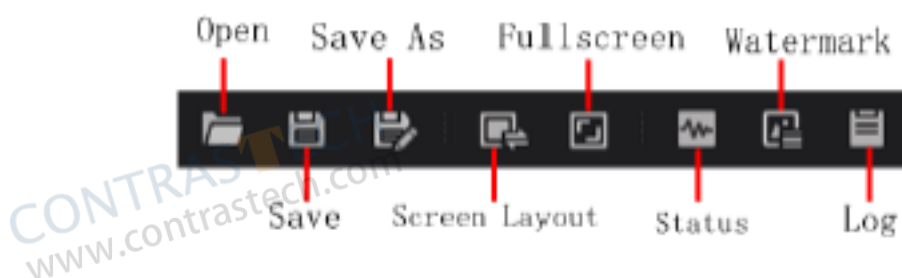

■ Menu Bar

The menu bar for iDatum client provides following functions: File, View, Settings, Tool and Help, as shown in the figure below.
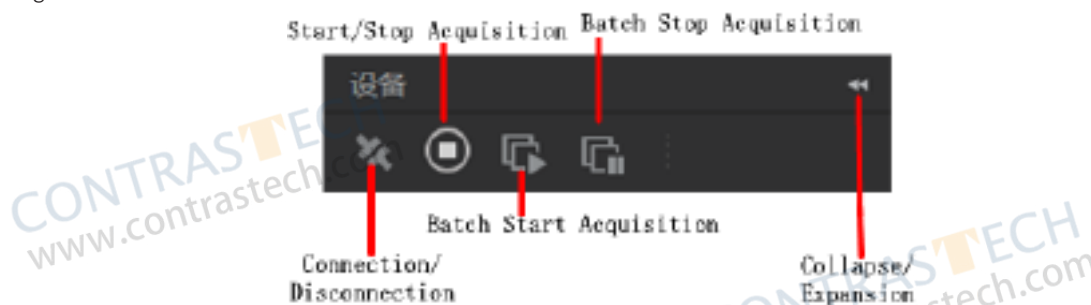

■ Control Toolbar

The control toolbar provides quick operations for the device. the icon meaning is shown in the figure below. The operation buttons in the tool bar can quickly and conveniently edit camera images.

Software Operation

The meaning of shortcut icons in Device List is shown as below.

■   Connection/Disconnection： After you selecting the camera, click "Connect" to connect the camera; click "Disconnect "to disconnect the camera.

■   Start/Stop Acquisition： For current connected camera， click "Start Acquisition "to acquire image data; click "Stop Acquisition "to stop image data acquisition.

■   Batch Start Acquisition： click "Batch Start Acquisition "to start image data acquisition for all currently connected camera by iDatum.

■   Batch Stop Acquisition： click "Batch Stop Acquisition "to stop image data acquisition for all currently connected camera by iDatum.

■   Expansion/Collapse： This function can be used to expand or collapse the Device List and Device Information which list on the left side of iDatum, and the default state is expansion. In the "Collapse" state， the iDatum left side only display the searched cameras.

2、Click in device list [⟳] to search the device.

3、Select a device to be connected.

4、Right click the device, and click Modify IP.

5、Set the IP address of the device in the same network segment with the PC

6、Click OK.

Click ">" in the camera's feature panel to unfold the specific camera parameters, and set them according to actual demands. Please see the table below for the introduction of each attribute classification.

Attribute	Description
Device Control	You can view the device's information, edit its name and reset it.
Image Format Control	You can view and set the device's resolution, pixel format, etc.
Acquisition Control	You can view and set the device's acquisition mode, frame rate, trigger mode, etc.
Analog Control	You can view and set the device's palettes mode, grayscale detection, etc.
Shading Correction	You can correct the device's non-uniformity of pixels.
Digital IO Control	You can set input and output signals.
Counter And Timer Control	You can count external trigger signal via this feature.
File Access Control	You can view and set the device's file access control related parameters.
Event Control	You can view and set the device's event control related parameters to let the device generate an event and transmit a related event message to the computer.
Chunk Data Control	You can view and set the device's chunk data control related parameters to generate supplementary image data and append that data to every image that you acquire.
Transport Layer Control	You can view and set parameters of the device's transport layer.
User Set Control	You can save or load the device's parameters.

ⓘ   The camera's attribute tree and parameters may differ by camera models.

CHAPTER 4   IMAGE ACQUISITION

Frame Rate

Frame rate refers to the image number that is acquired by the camera per second. The higher frame rate, and shorter time used for image acquisition will be.

The following 3 factors determines the camera's frame rate in real-time.

■　Frame readout time: The frame readout time is related with camera's sensor performance and image height. The lower the image height and less the frame readout time, and the higher the frame rate will be.

■　Bandwidth: The larger the bandwidth, the higher the frame rate will be.

■　Pixel format: The more bytes pixel format occupy, the lower the frame rate will be.

| ⓘ	For different models of camera, the Image compression mode may be different, please refer to the actual one you got.

The camera can also manually control the real-time frame rate.

The specific steps are as follows:

Click Acquisition Control > Acquisition Frame Rate, enter Acquisition Frame Rate according to actual demands, and enable Acquisition Frame Rate Control Enable.

_If the current real-time frame rate is smaller than configured frame rate, the camera acquires images according to the real-time frame rate.

_If the current real-time frame rate is larger than configured frame rate, the camera acquires images according to the configured frame rate.

Acquisition Frame Rate	25.33
Acquisition Frame Rate Control Enable	
Resulting Frame Rate	25.33
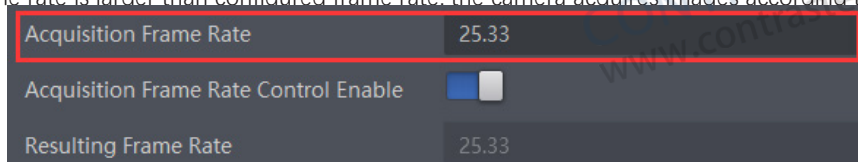
3.View the device's final frame rate in Resulting Frame Rate.

Acquisition Frame Rate	25.33
Acquisition Frame Rate Control Enable	
Resulting Frame Rate	25.33
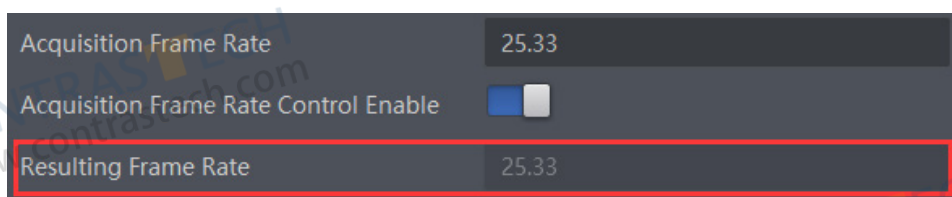
Trigger Mode

The camera has 2 types of trigger mode, including internal trigger mode and external trigger mode.

Internal trigger mode(acquisition modes), including SingleFrame mode and Continuous mode;external trigger mode, including software trigger, hardware trigger.

Trigger Mode	Parameter	Parameter Value	Principle
Internal trigger mode	Acquisition Control > Trigger Mode	Off	The camera acquires images via its internal signals.
External trigger mode		On	The camera acquires images via external signals. These signals can be software signal and hardware signal, including software trigger, hardware trigger, counter trigger, etc..

▪ Internal Trigger Mode
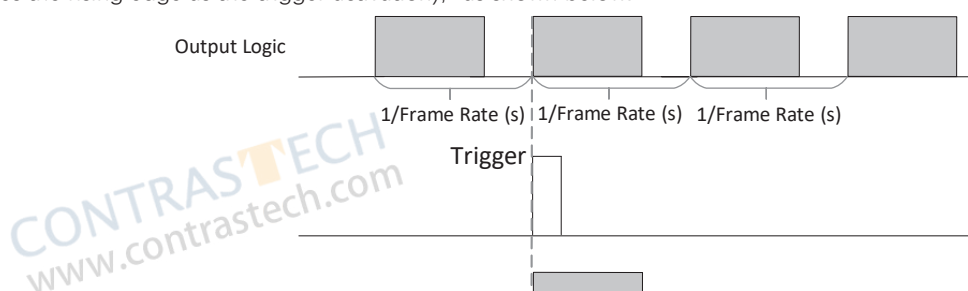
Their principle and parameter setting are shown below.

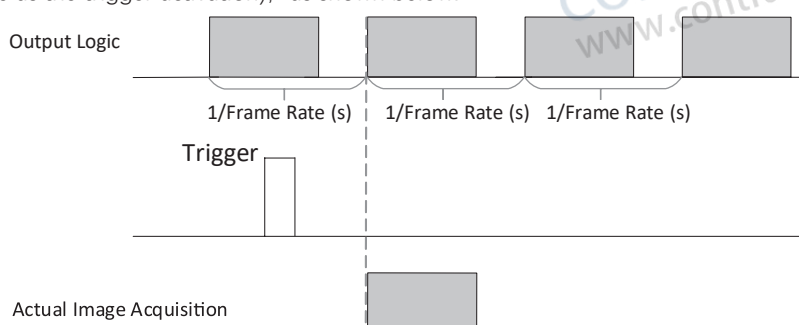| Internal trigger mode	Parameter	Parameter Value	Principle
SingleFrame mode	Acquisition Control > Acquisition Mode	SingleFrame	When camera starts image acquisition, it acquires one image only, and then stops.
Continuous mode		Continuous	When camera starts image acquisition, it acquires images continuously. Real-time frame rate decides the acquisition frame number per second. You can stop camera image acquisition manually.
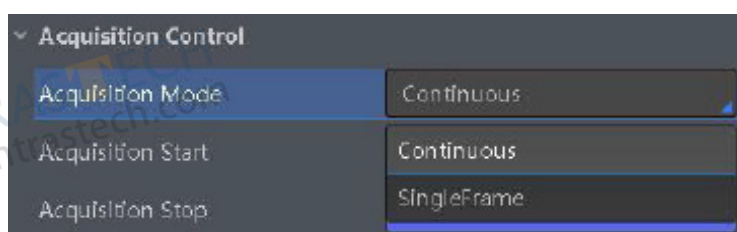
▪ External Trigger Mode

In the external trigger mode, you can select different trigger sources to trigger the device to acquire images, and the device outputs images at a fixed period 1/frame rate (s).

If the device receives the trigger signal at the beginning of outputting each frame of image, it will output the current frame of image,(uses the rising edge as the trigger activation),   as shown below:

If the device receives the trigger signal during the output of each frame of image, the device will acquire images at the next frame,(uses the rising edge as the trigger activation),   as shown below:

Trigger Mode

■ External Trigger Source

There are 4 types of external trigger sources, including software trigger, hardware trigger, counter trigger and anyway. Their principle and parameter setting are shown below.

| External trigger mode	Parameter	Parameter Value	Principle
Software Trigger	Acquisition Control >Trigger Source	Software	The software sends trigger signal to the device via GigE interface to acquire images.
Hardware Trigger		Line 0 Line 2	External device connects to the device via I/O connector. External device sends trigger signal to the device to acquire images.
Counter Trigger		Counter 0	The counter sends trigger signal to the device to acquire images.
Anyway Trigger		Anyway	The device can receive software trigger and hardware trigger to acquire images.

> ℹ These four external trigger sources are valid only when the Trigger Mode is On.

Software Trigger

For the camera support software trigger mode, when user set software trigger, the client software can send commands to camera to acquires and transfer images via Gigabit Ethernet.

1.Click Acquisition Control > Trigger Mode, and select On as Trigger Mode.

2.Select Software as Trigger Source, and click Execute in Trigger Software to send trigger commands.

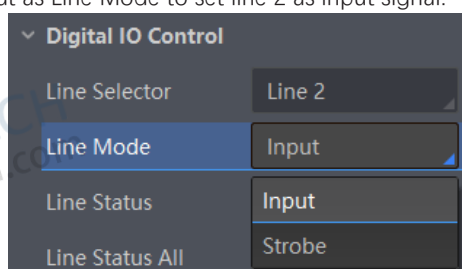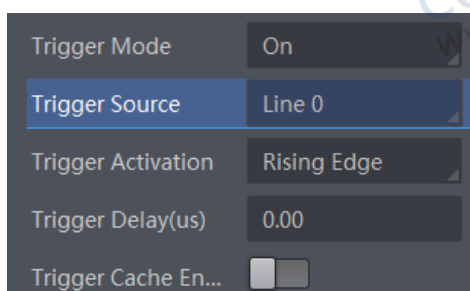| Trigger Mode | On |
| Trigger Software | Execute |
| Trigger Source | Software |
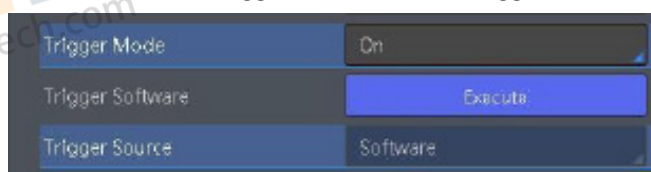
Hardware Trigger

If set "Hardware" as "Trigger Source" can switched to hardware external trigger mode.

The camera has 1 Opto-isolated input (Line 0), and 1 bi-directional I/O (Line 2) that can be configured as input signal,

The setting of Line 2 as input signal is as shown below：

1.Click Digital IO Control.

2.Select Line 2 as Line Selector, and Input as Line Mode to set line 2 as input signal.

Digital IO Control

Line Selector	Line 2
Line Mode	Input
Line Status	Input
Line Status All	Strobe

3.Click Acquisition Control, select On as Trigger Mode, select Line 0 or Line 2 as Trigger Source as shown in the figure below.

The command to trigger the photo is given to the camera by the external device.

Trigger Mode	On
Trigger Source	Line 0
Trigger Activation	Rising Edge
Trigger Delay(us)	0.00
Trigger Cache En...	

> ℹ For details about the electrical characteristics and wiring of the IO interface, please refer to Chapter I/O Electrical Characteristics and Wiring.
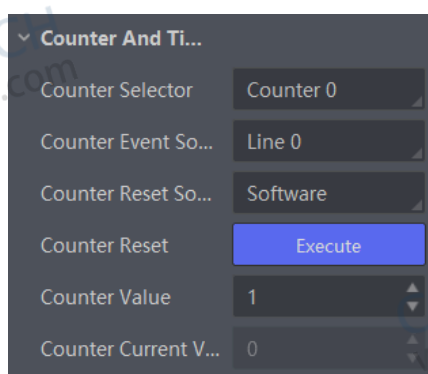
Trigger Mode

Counter Trigger

The counter trigger provides frequency division to the external trigger signal. The camera performs an external trigger after receiving multiple hardware trigger signals.

1. Click Acquisition Control > Trigger Mode, and select On as Trigger Mode.

2. Select Counter 0 as Trigger Source.

When using counter as trigger source, you need to set relevant parameters under Counter And Timer Control. For specific parameter function and setting, please refer to the following table.

Parameter	Read/Write	Description
Counter Selector	Read and write	It selects counter source. Counter 0 is available only at present.
Counter Event Source	Read and write	It selects the signal source of counter trigger. Line 0 and Line 2 are available. It is disabled by default.
Counter Reset Source	Read and write	It selects the signal source of resetting counter. Software is available only. It is disabled by default.
Counter Reset	Write is available under certain condition	It resets counter and it can be executed when selecting Software as Counter Reset Source.
Counter Value	Read and write	It is the counter value with the range of 1 to 1023. For example, if the parameter is set to n, then the trigger signal n times can execute the counter trigger once to obtain 1 frame of image.
Counter Current Value	Read only	It displays the number of executed external trigger.

Anyway Trigger

In the free trigger mode, the camera can receive signals from software trigger, hardware trigger, action command trigger, and counter trigger.

1.Click Acquisition Control > Trigger Mode, and select On as Trigger Mode.

2.Select Anyway as Trigger Source.

	● When the device is in free trigger, you can set acquisition burst frame count, trigger activation, trigger delay, trigger cache, and trigger debouncer (under certain conditions). ● When software is trigger source, you can set acquisition burst frame count, trigger delay, and trigger cache only.

Trigger Mode

■ Trigger Related Parameters

In external trigger mode, you can set five related parameters, including acquisition burst frame count, trigger activation, trigger delay, trigger cache, and trigger debouncer. Different trigger sources can set various trigger parameters, and their relation is shown below.

| Trigger Source / Trigger Parameter	Software Trigger	Hardware Trigger	Counter Trigger	Action Command Trigger	Anyway Trigger
Burst Frame Count	√	√	√	√	√
Trigger Delay	√	√	√	√	√
Trigger Cache Enable	√	√	√	√	√
Trigger Activation	×	√	√	×	√
Trigger Debouncer	×	√	√	×	√

Burst Frame Count

Under external trigger mode, you can set burst frame count as shown below.

Click Acquisition Control > Acquisition Burst Frame Count, and enter Acquisition Burst Frame Count according to actual demands. The range of Acquisition Burst Frame Count is from 1 to 1023.

Acquisition Burst Frame Count	1

If Acquisition Burst Frame Count is 1, the device is in single frame trigger mode. If Acquisition Burst Frame Count is larger than 1, the device is in multi-frame trigger mode.
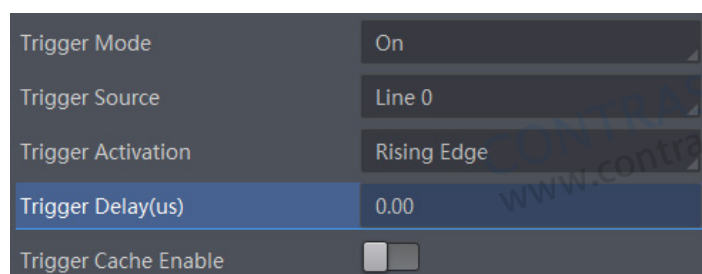
If Acquisition Burst Frame Count is n, when input 1 trigger signal to the device, the device stops acquiring images after exposing n times and outputting n frame images.
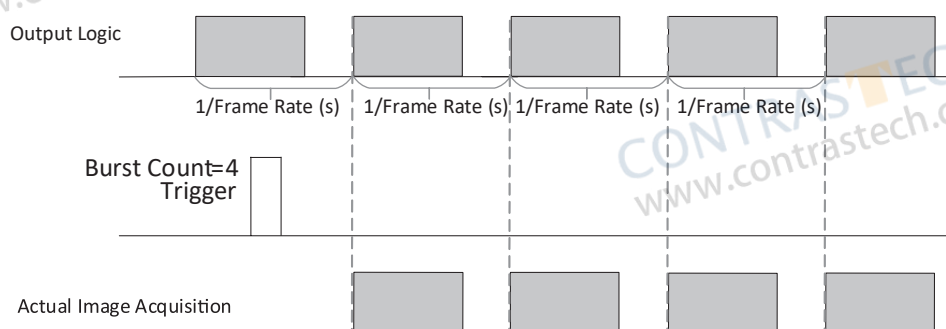
Rising Edge as Trigger Signal
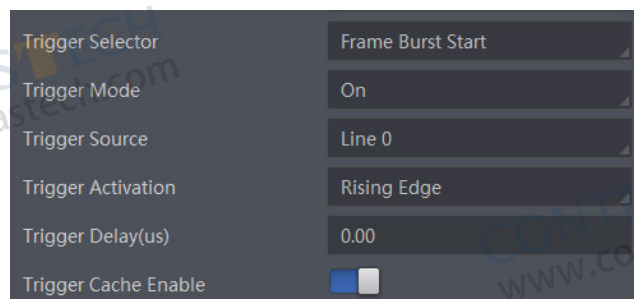
Trigger Delay

The trigger delay function allows the device to add a delay between the receipt of trigger signal and the moment the trigger becomes active. Go to Acquisition Control → Trigger Delay, and enter Trigger Delay, and the unit is μs.

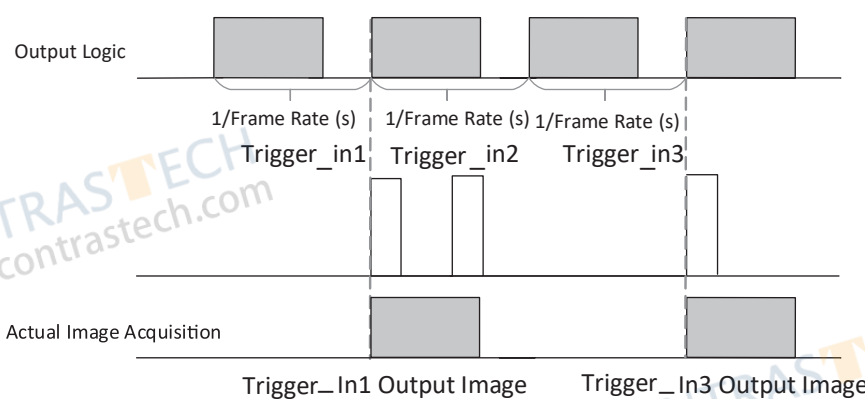| Trigger Mode	On
Trigger Source	Line 0
Trigger Activation	Rising Edge
Trigger Delay(us)	0.00
Trigger Cache Enable	

Trigger Mode

Trigger Cache

The trigger cache function allows the device to save and process new signal during trigger stage, and the device can save and process three trigger signals at most. Go to Acquisition Control → Trigger Cache Enable, and enable Trigger Cache Enable.

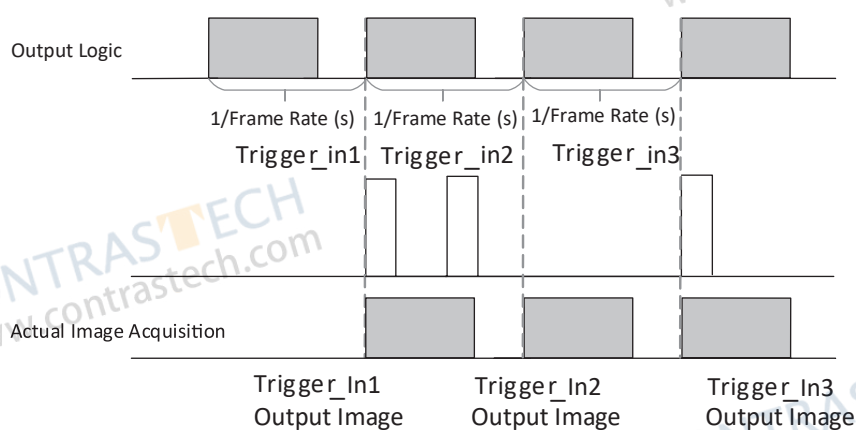|	
Trigger Selector	Frame Burst Start
Trigger Mode	On
Trigger Source	Line 0
Trigger Activation	Rising Edge
Trigger Delay(us)	0.00
Trigger Cache Enable	

For example, if the device receives the 2nd trigger signal when it is processing the 1st trigger signal, and the result will be different depending on whether Trigger Cache Enable is enabled or not.

The 2nd trigger signal will be filtered without processing if Trigger Cache Enable is disabled.

Output Logic

1/Frame Rate (s)   1/Frame Rate (s)   1/Frame Rate (s)
Trigger_in1   Trigger_in2   Trigger_in3

Actual Image Acquisition

Trigger_In1 Output Image   Trigger_In3 Output Image

The 2nd trigger signal will be saved if Trigger Cache Enable is enabled.

Output Logic

1/Frame Rate (s)   1/Frame Rate (s)   1/Frame Rate (s)
Trigger_in1   Trigger_in2   Trigger_in3

Actual Image Acquisition

Trigger_In1   Trigger_In2   Trigger_In3
Output Image   Output Image   Output Image

Trigger Mode

Trigger Activation

The camera supports trigger acquisition in the rising edge, falling edge, level high, or level low of the external signal.
The principle and parameter of trigger activation are shown below.

| Trigger Activation	Parameter	Parameter Value	Principle
Rising Edge	Acquisition Control > Trigger Activation	Rising Edge	It means that when the level signal sent by external device is in rising edge, the device receives trigger signal and starts to acquire images.
Falling Edge		Falling Edge	It means that when the level signal sent by external device is in falling edge, the device receives trigger signal and starts to acquire images.
Level High		Level High	The level high of the trigger signal is valid. As long as the trigger signal is in level high, the device is in image acquisition status.
Level Low		Level Low	The level low of the trigger signal is valid. As long as the trigger signal is in level low, the device is in image acquisition status.
Any Edge		Any Edge	It means that when the level signal sent by external device is in rising edge, falling edge, level high or level low, the device receives trigger signal and starts to acquire images.
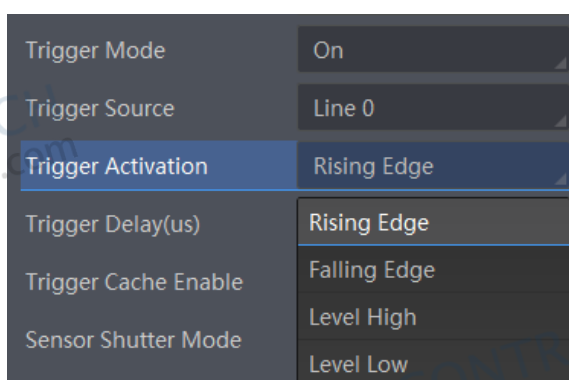
Trigger Debouncer

The trigger debouncer function allows the device to filter out unwanted short external trigger signal that is input to the device. Go to Digital IO Control → Line Debouncer Time, and enter Line Debouncer Time according to actual demands. The range of Line Debouncer Time is from 0 μs to 1000000 μs.
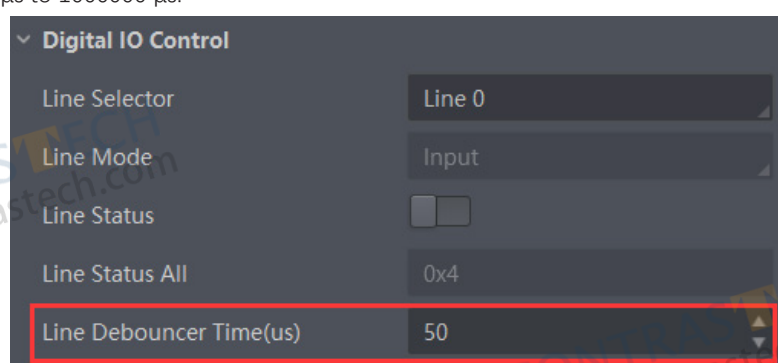
If the Line Debouncer Time you set is greater than the time of trigger signal, this trigger signal will be ignored.
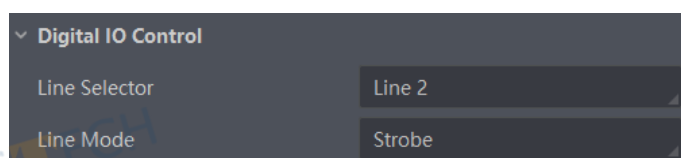

Rising Edge as Trigger Signal

5
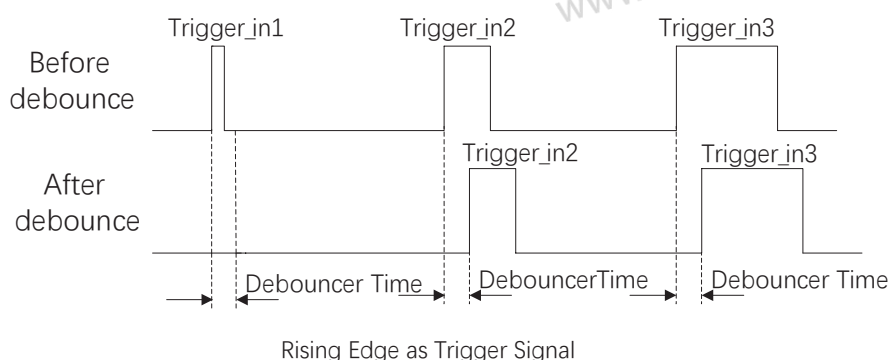
CHAPTER 5 ‎ I/O OUTPUT

Select Output Signal

The device has one opto-isolated output (Line 1), and one bi-directional I/O (Line 2) that can be configured as output signal. The steps for configuring Line 2 as output signal as follows.

Steps

1. Go to Digital IO Control and select Line 2 as Line Selector.

2. Select Strobe as Line Mode.

Digital IO Control	
Line Selector	Line 2
Line Mode	Strobe

> ℹ For details about the electrical characteristics and wiring of the IO interface, please refer to Chapter I/O Electrical Characteristics and Wiring.

Set Output Signal

The output signal of the device is switch signal that can be used to control external devices such as light source, PLC, etc. There are two ways to set output signal, including line inverter and strobe signal.

■ Enable Level Inverter

The line inverter function allows the device to invert the electrical signal level of an I/O line. Go to Digital IO Control → Line Inverter, and enable it.

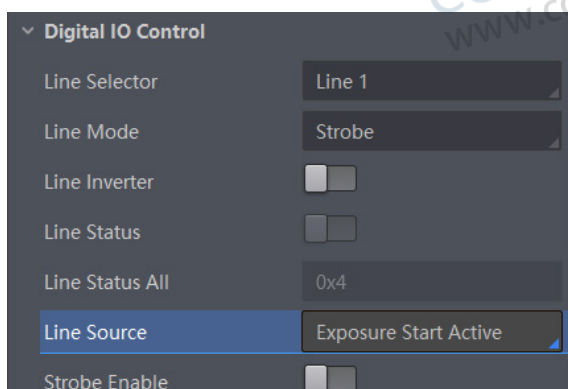| Digital IO Control	
Line Selector	Line 1
Line Mode	Strobe
Line Inverter	◼️
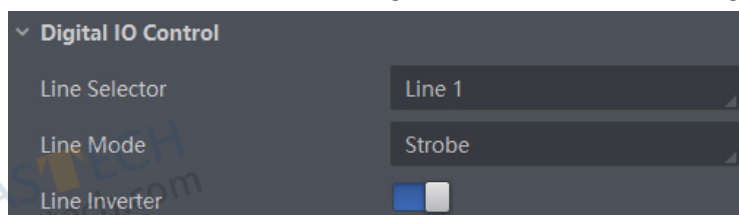
■ Enable Strobe Signal

The strobe signal is used to directly output I/O signal to external devices when the device's event source occurs.

Steps

1. Go to Digital IO Control → Line Source, and select Line Source according to actual demands.
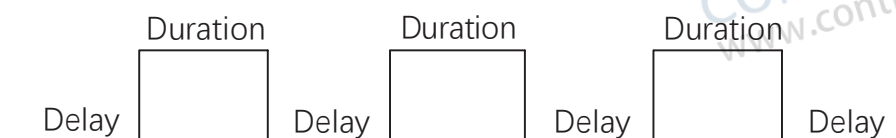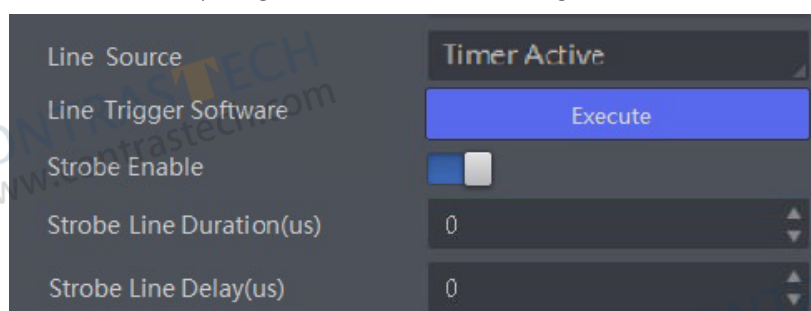
2. Enable Strobe Enable.

Digital IO Control	
Line Selector	Line 1
Line Mode	Strobe
Line Inverter	
Line Status	
Line Status All	0x4
Line Source	Exposure Start Active
Strobe Enable	

Set Output Signal

Strobe Line Duration

After enabling strobe signal, you can set its duration. Go to Digital IO Control → Strobe Line Duration, and enter it according to actual demands.
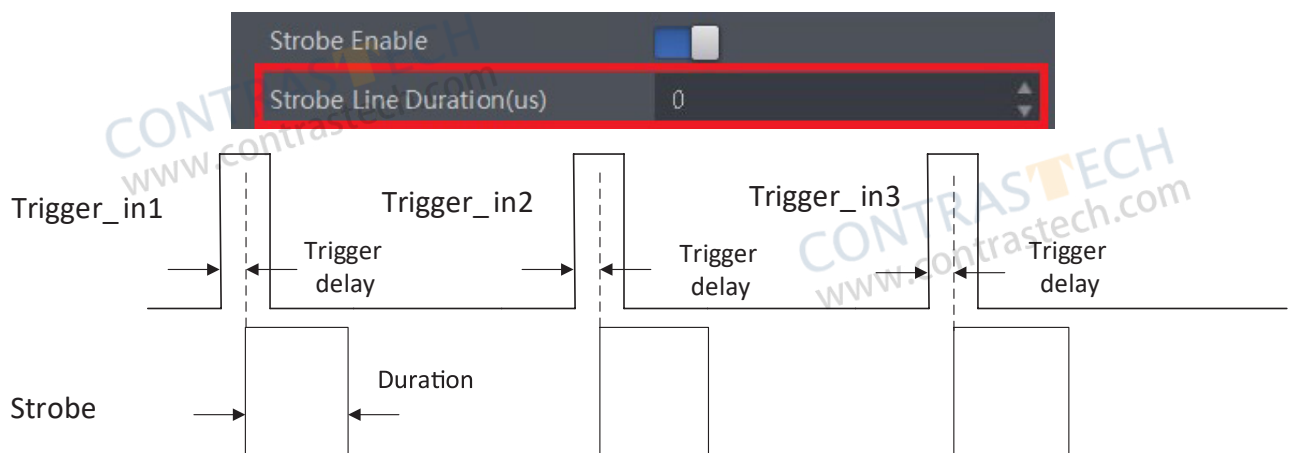
Strobe Line Delay

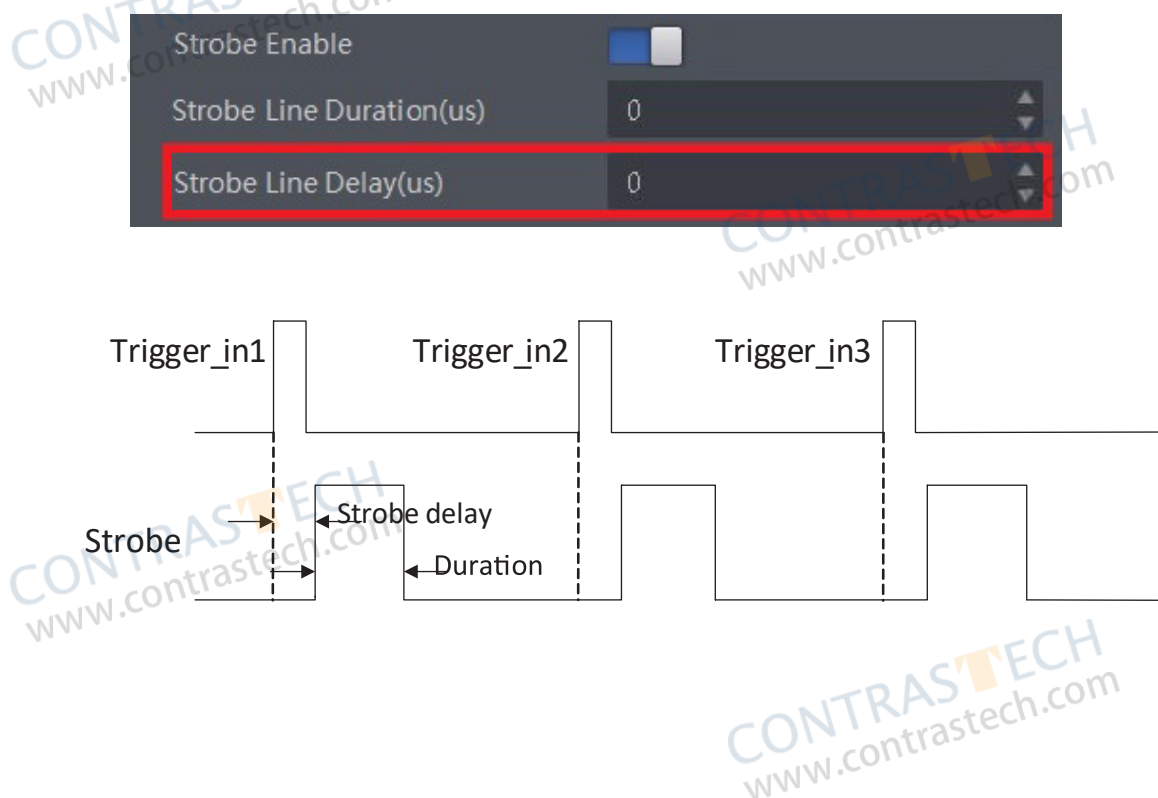The strobe line delay function allows the device to output signal in a delay time. Go to Digital IO Control → Strobe Line Delay, and enter it according to actual demands. The range of Strobe Line Delay is from 0 µs to 10000 µs.
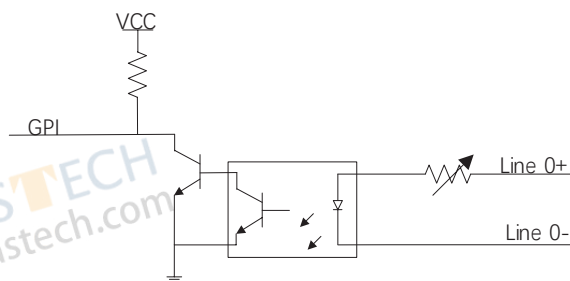
6

I/O ELECTRICAL FEATURE AND WIRING

CHAPTER 6

I/O Electrical Feature

■ Line 0 Opto-isolated Input Circuit

The device's Line 0 is opto-isolated input signal, and its internal circuit is as follows.

The maximum input current of Line 0 is 25 mA.

Input Logic Level:

Input Electrical Feature:

Parameter Name	PARAMETER SYMBOL	VALUE
Input Logic Level Low	VL	0 ~ 1 VDC
Input Logic Level High	VH	1.5 ~ 24 VDC
Input Rising Delay	TDR	1.8 ~ 4.6 µs
Input Falling Delay	TDF	16.8 ~ 22 µs

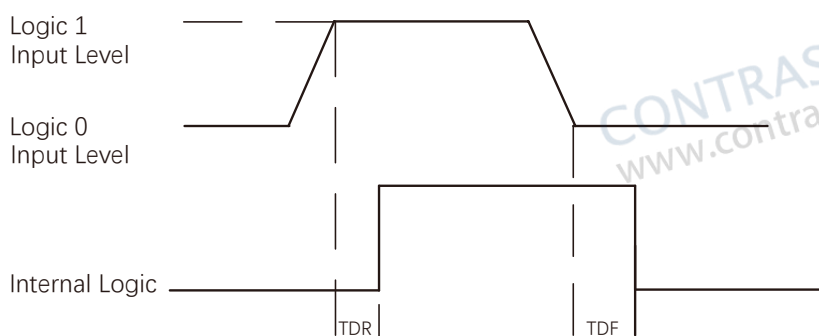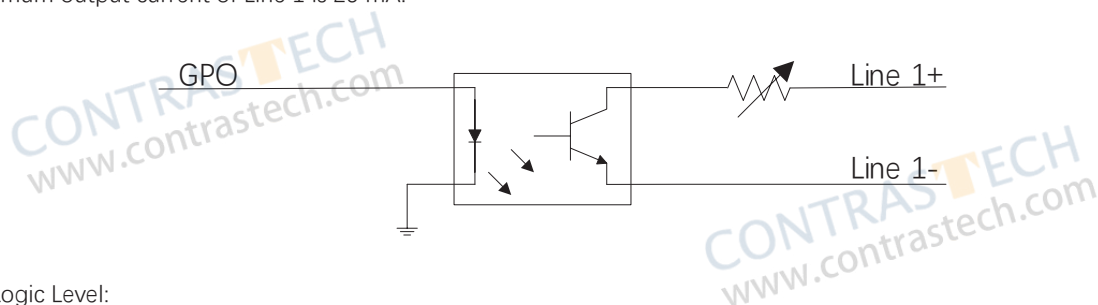|	
ⓘ	● Make sure that the input voltage is not from 1 VDC to 1.5 VDC as the electric status between these two values are not stable. ● The breakdown voltage is 30 VDC. Keep voltage stable.

I/O Electrical Feature

■ Line 1 Opto-isolated Output Circuit

The device's Line 1 is opto-isolated output signal, and its internal circuit is as follows.

The maximum output current of Line 1 is 25 mA.

Output Logic Level:
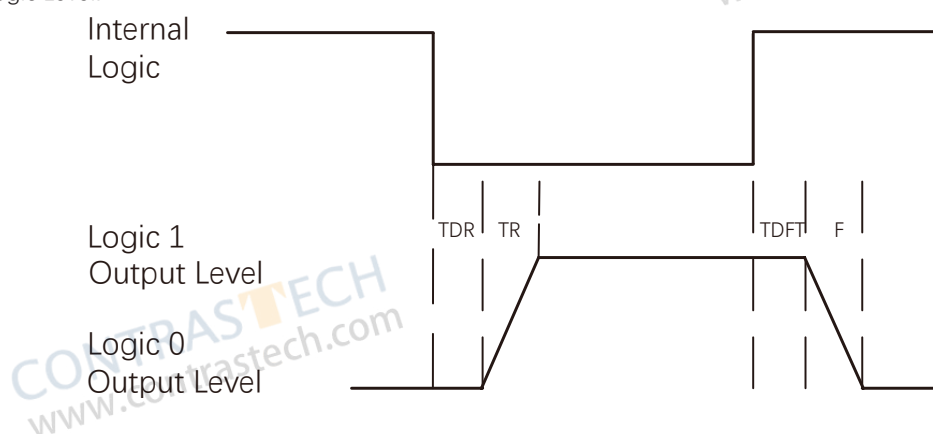
Opto-isolated output electric feature is shown in below (when the external voltage is 3.3 VDC and the external resistance is 1 KΩ).

| Parameter Name	Parameter Symbol	Value
Output Logic Level Low	VL	575 mV
Output Logic Level High	VH	3.3 V
Output Rising Time	TR	8.4 µs
Output Falling Time	TF	1.9 µs
Output Rising Delay	TDR	15 ~ 60 µs
Output Falling Delay	TDF	3 ~ 6 µs

With different external voltage and resistance, the corresponding current and the parameter of output logic level low are shown below.

External Voltage	External Resistance	VL	Output Current
3.3 V	1 KΩ	575 mV	2.7 mA
5 V	1 KΩ	840 mV	4.1 mA
12 V	2.4 KΩ	915 mV	4.6 mA
24 V	4.7 KΩ	975 mV	4.9 mA

I/O Electrical Feature

■ Line 2 Bi-Directional Signal

The device has one bi-directional non-isolated I/O signal (Line 2), and you can set it as input signal or output signal according to demands. Its internal circuit is as follows.
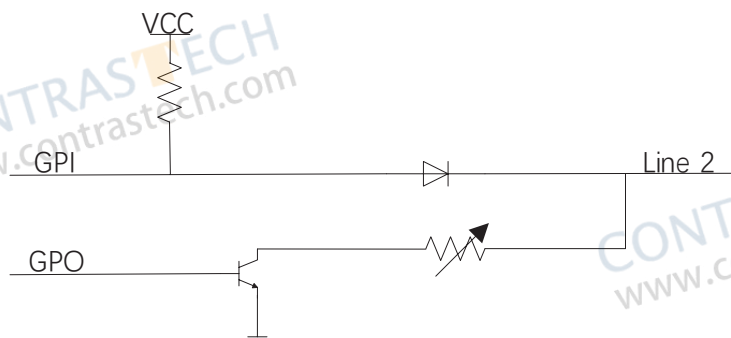
Configured as Input Signal

With the condition of 100 Ω resistance and 5 VDC voltage, the logic level and electrical feature of configuring Line 2 as input signal are shown below.

Input Logic Level:
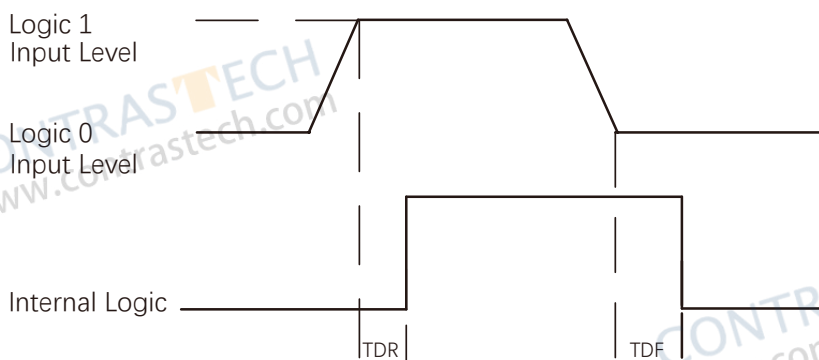
Electrical Feature of Line 2 Input:

Parameter Name	Parameter Symbol	Value
Input Logic Level Low	VL	0 ~ 0.3 VDC
Input Logic Level High	VH	1.5 ~ 24 VDC
Input Rising Time	TDR	< 1 μs
Input Falling Time	TDF	< 1 μs

> ℹ️ ■ Make sure that the input voltage is not from 0.5 VDC to 1.5 VDC as the electric status between these two values are not stable.
> ■ The breakdown voltage is 30 VDC. Keep voltage stable.
> ■ To prevent damage to the GPIO pin, please connect GND first and then input voltage in Line 2.

I/O Electrical Feature

Configured as Output Signal

The maximum current is 25 mA and the output impedance is 40 Ω.

The relation among external voltage, resistance and the output level low is shown below.

External Voltage	External Resistance	VL(GPIO2)
3.3 V	1 KΩ	160 mV
5 V	1 KΩ	220 mV
12 V	1 KΩ	460 mV
24 V	1 KΩ	860 mV
30 V	1 KΩ	970 mV

When the voltage of external resistance (1 KΩ) is pulled up to 5 VDC, the logic level and electrical feature of configuring Line 2 as output are shown below.

Output Logic Level:
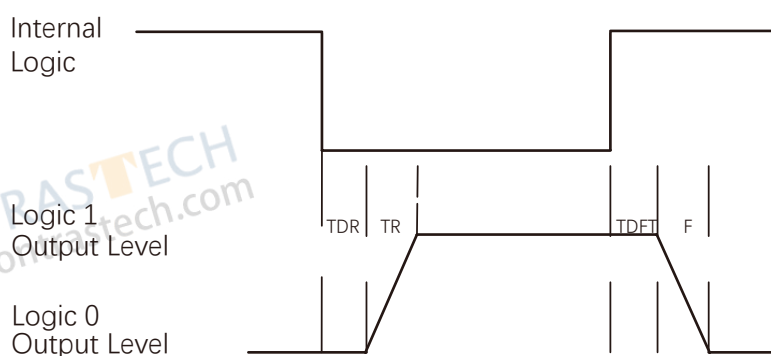
Electrical Feature of Line 2 Output:

Parameter Name	Parameter Symbol	Value
Output Logic Level Low	VL	220 mV
Output Logic Level High	VH	4.75 V
Output Rising Time	TR	0.06 μs
Output Falling Time	TF	0.016 μs
Output Rising Delay	TDR	0 ~ 4 μs
Output Falling Delay	TDF	< 1 μs

I/O Wiring

Here we take type with LWIR camera as an example to introduce I/O wiring. Other cameras can be analogized according to the cable definition in the wiring diagram, combined with the power supply and I/O interface definition chapter.

■ Line 0 Wiring

The input signal wiring is shown below when the device uses Line 0 as trigger source in external trigger mode.

Input Signal Connects to PNP Device
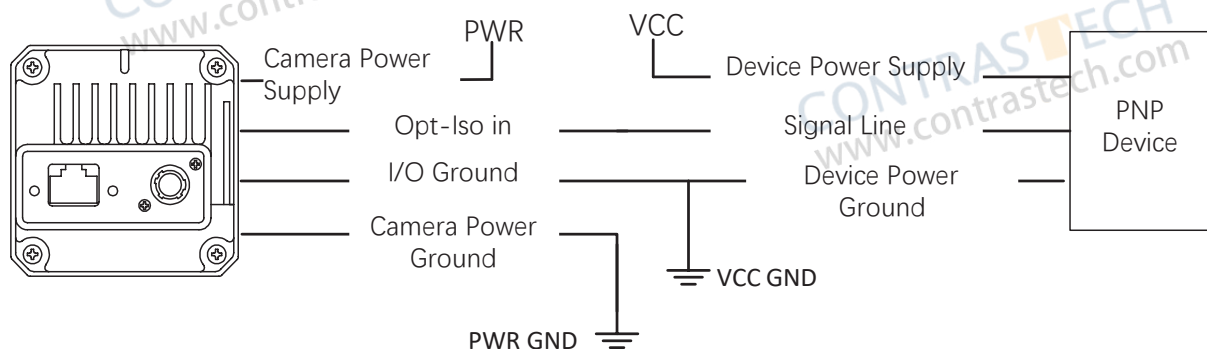
Input Signal Connects to NPN Device
_ If the VCC of NPN device is 24 VDC, it is recommended to use 1 KΩ to 4.7 KΩ pull-up resistor.
_ If the VCC of NPN device is 12 VDC, it is recommended to use 1 KΩ pull-up resistor.
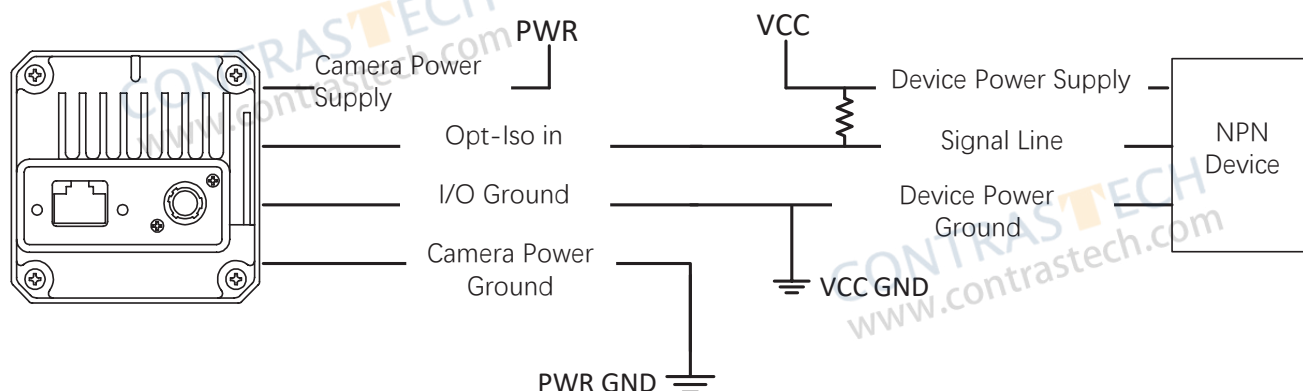
Input Signal Connects to Switch
If the VCC of switch is 24 VDC, it is recommended to use 1 KΩ to 4.7 KΩ resistor to protect circuit.

I/O Wiring

■ Line 1 Wiring

The output signal wiring is shown below when the device uses Line 1 as output signal.

Output Signal Connects to PNP Device

Output Signal Connects to NPN Device
_ If the VCC of NPN device is 24 VDC, it is recommended to use 1 KΩ to 4.7 KΩ pull-up resistor.
_ If the VCC of NPN device is 12 VDC, it is recommended to use 1 KΩ pull-up resistor.

I/O Wiring

■ Line 2 Bi-Directional Signal Wiring

The device's Line 2 can be used as input signal and output signal.

Line2 Configured as Input Signal

The input signal wiring is shown below when the device's Line 2 is configured as input signal.

Input Signal Connects to PNP Device
It is recommended to use 330 Ω pull-down resistor.
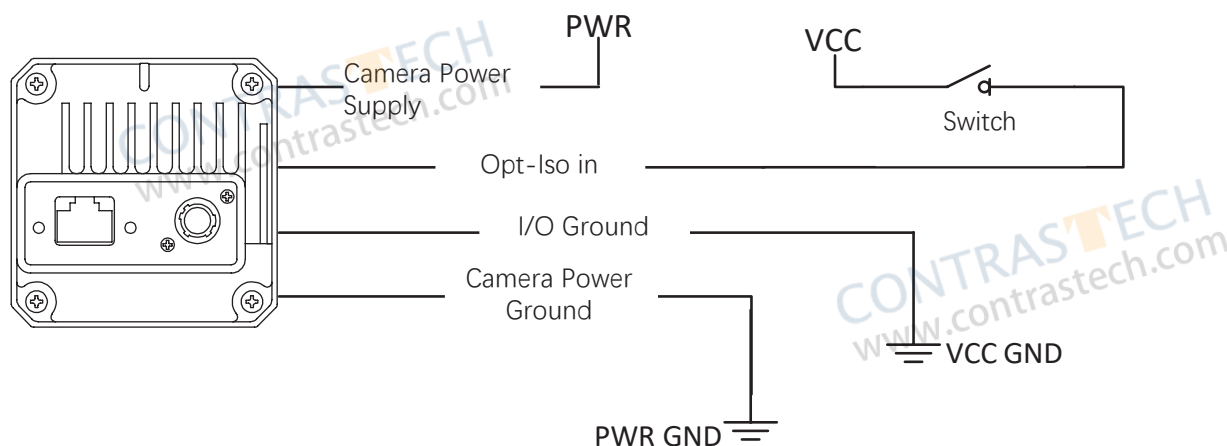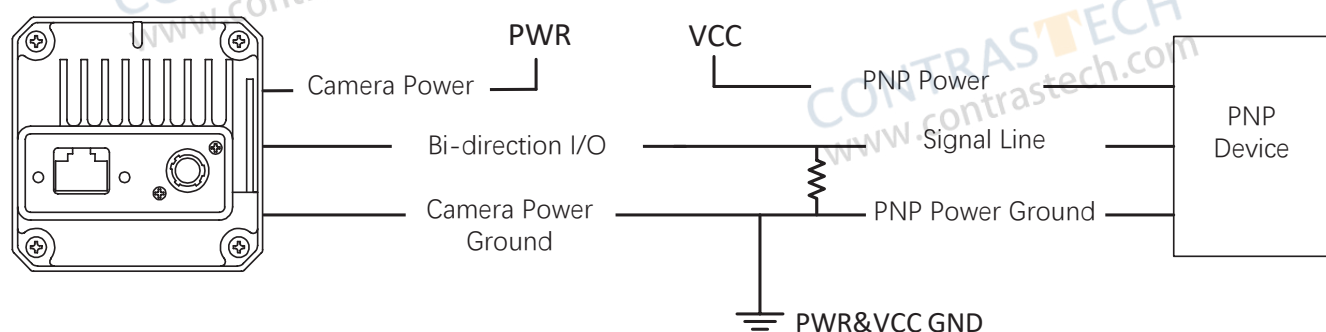

Input Signal Connects to NPN Device
_ If the VCC of NPN device is 24 VDC, it is recommended to use 1 KΩ to 4.7 KΩ pull-up resistor.
_ If the VCC of NPN device is 12 VDC, it is recommended to use 1 KΩ pull-up resistor.

Input Signal Connects to Switch
The switch value can provide low electrical level to trigger line 2.
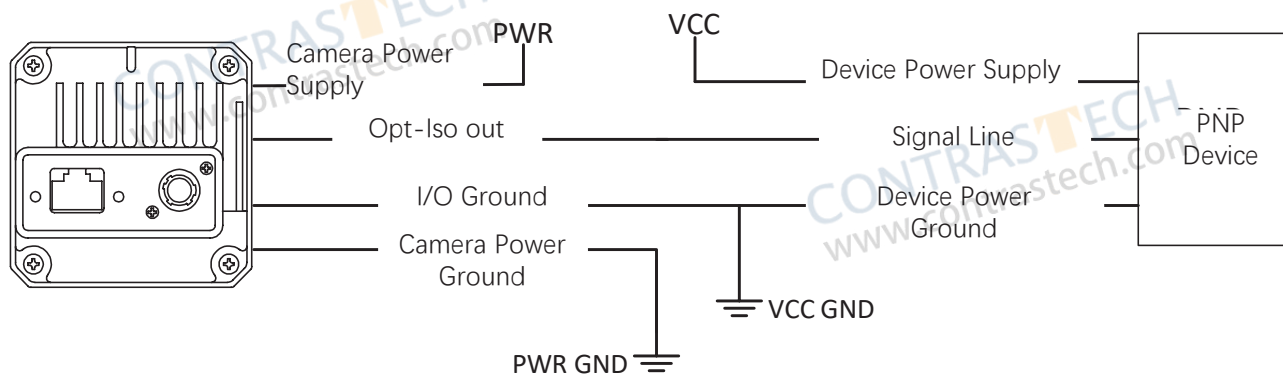
I/O Wiring

Line2 Configured as Output Signal

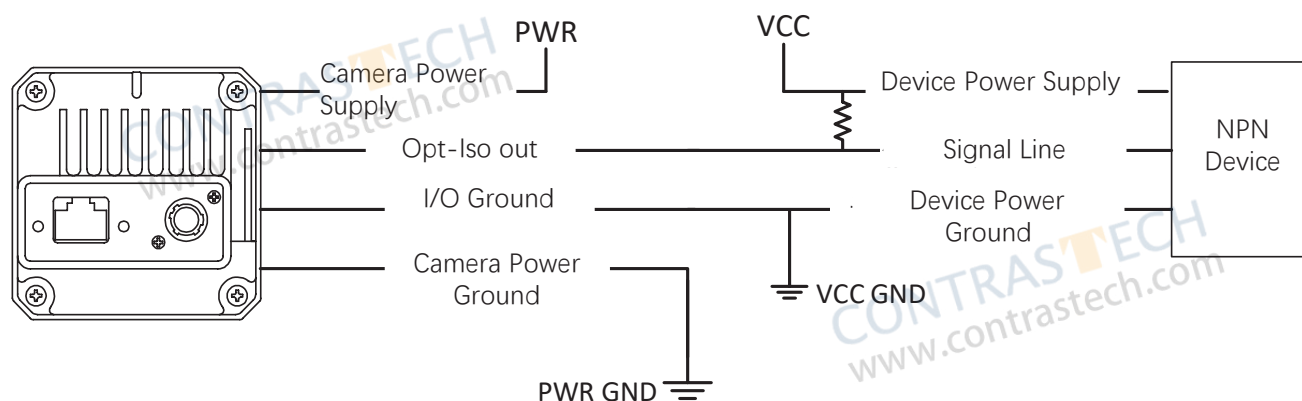The output signal wiring is shown below when the device's Line 2 is configured as output signal.

Output Signal Connects to PNP Device
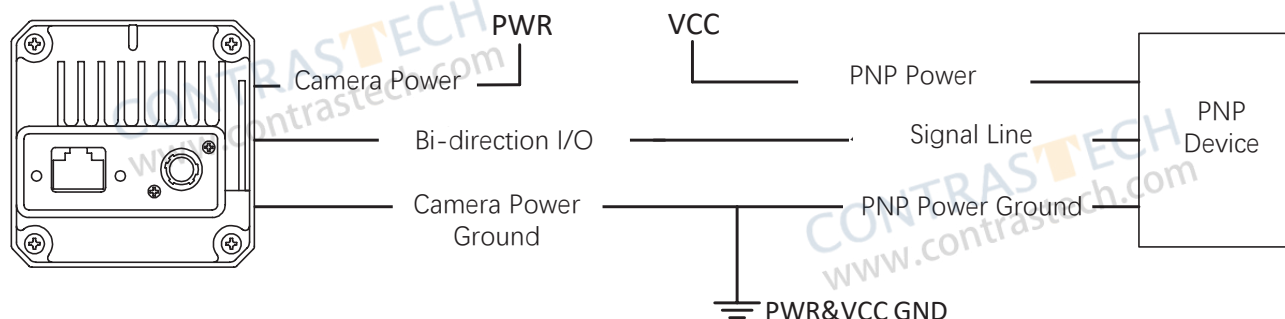
Output Signal Connects to NPN Device
_ If the VCC of NPN device is 24 VDC, it is recommended to use 1 KΩ to 4.7 KΩ pull-up resistor.
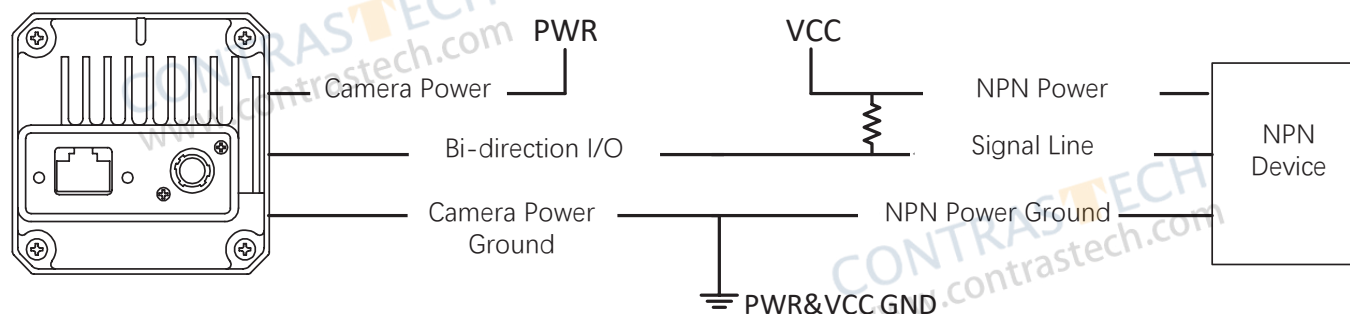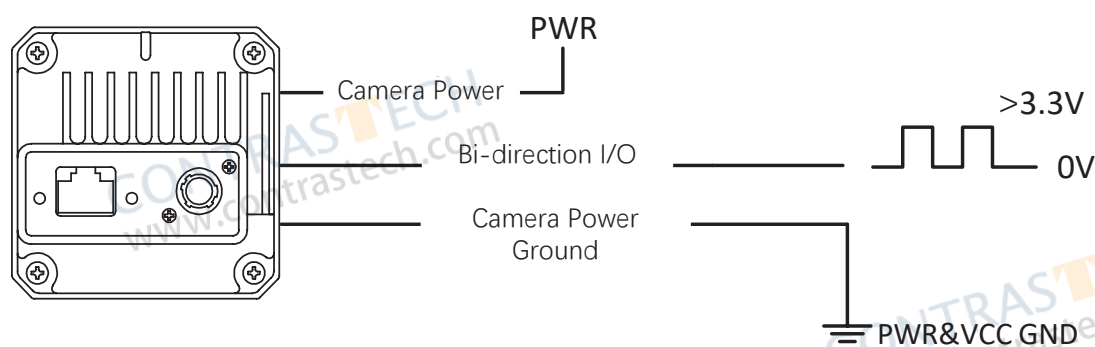_ If the VCC of NPN device is 12 VDC, it is recommended to use 1 KΩ pull-up resistor.

7
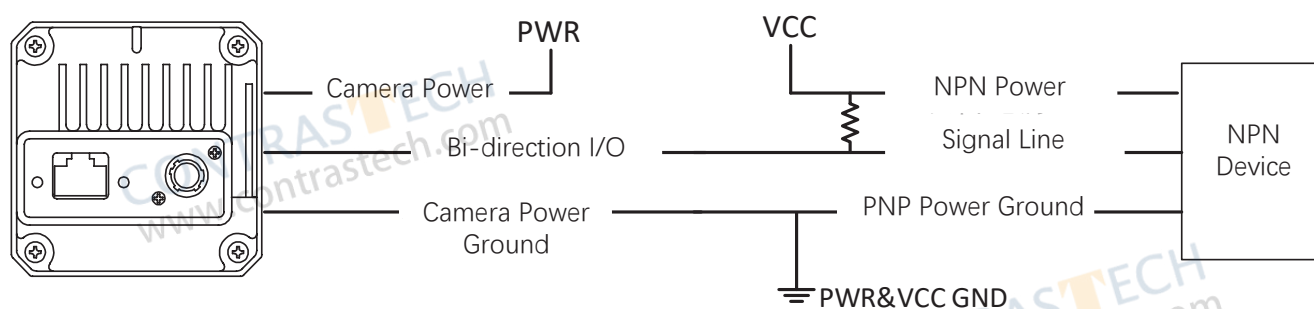
CHAPTER 7   IMAGE PARAMETER

Resolution and ROI

The camera displays the image with max. resolution by default. Click Image Format Control, and view Width Max and Height Max. Width Max stands for the max. pixels per inch in width direction and Height Max stands for the max. pixels per inch in height direction.
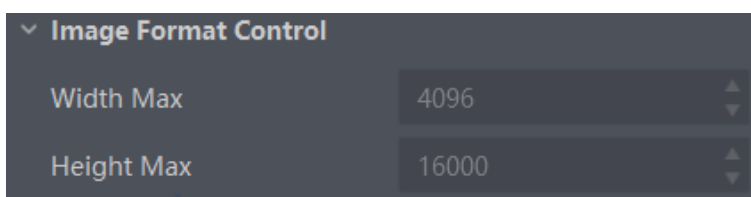
If you are only interested in a certain region of the image, you can set a Region of Interest (ROI) for the camera. Setting Region of Interest can reduce the bandwidth of the image being transmitted. Thus increasing the frame rate to some extent.

> ℹ The camera currently supports 1 ROI only, that is, there is Region 0 for Region Selector parameter only.

Click Image Format Control > Region Selector, and enter Width, Height, Offset X, and Offset Y.

- ■ Width：it stands for horizontal resolution in ROI area.
- ■ Height：it stands for vertical resolution in ROI area.
- ■ Offset X：it refers to the horizontal coordinate of the upper left corner of the ROI.
- ■ Offset Y：it refers to the vertical coordinate of the upper left corner of the ROI.
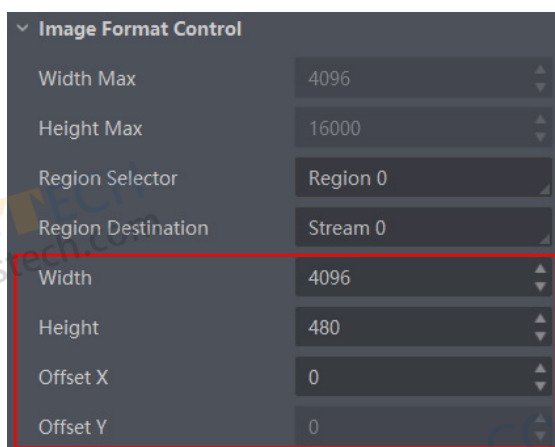
> ℹ The Width value plus Offset X value should not be larger than Width Max parameter value, Height value plus Offset Y value should not be larger than Height Max parameter value.

Pixel Format

This function allows you to set the pixel format of the image data transmitted by the device. Go to Image Format Control → Pixel Format, and set Pixel Format according to actual demands.

Pixel Format	Pixel Size(Bits/Pixel)
Mono 8	8
Mono 12/14、YUV 422 (YUYV) Packed	16

Click Image Format Control > Pixel Format, and set Pixel Format according to actual demands.
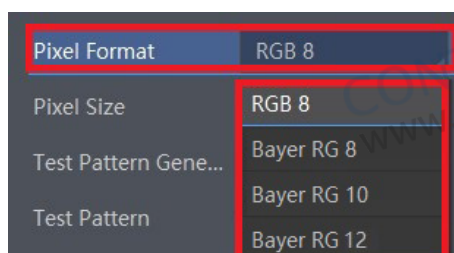
Image Detail Strength

Image detail function improves the recognizability of the image by increasing the sharpness of edges of objects in the image. Go to Analog Control → DDE Detail Strength, and set DDE Detail Strength according to actual demands.
The higher DDE Detail Strength is configured, the more obvious the image details will be, but the noise will be relatively more accordingly.
The lower DDE Detail Strength is configured, the more blurred the image details will be, and the noise will be reduced accordingly.

Digital Noise Reduction

Digital noise reduction uses digital three-dimensional filtering technology based on space and time, which can effectively eliminate noise in videos and images. Digital noise reduction can be performed on single-frame or multi-frame images to improve image quality and clarity. Digital noise reduction includes spatial noise reduction and temporal noise reduction.

■ Set Spatial Noise Reduction

Spatial noise reduction performs noise reduction process on the current frame image. Go to Analog Control → DNR Spectral Level, and set DNR Spectral Level according to actual demands. The higher spectral level is configured, the less noise in the image, but the more blurred the image details. The lower spectral level is configured, the more noise in the image, but the more obvious the image details.

■ Set Temporal Noise Reduction

Temporal noise reduction performs noise reduction process on continuous multi-frame images. Go to Analog Control → DNR Temporal Level, and set DNR Temporal Level according to actual demands.
The higher temporal level is configured, the less noise in the image, but the more blurred the image details. The lower temporal level is configured, the more noise in the image, but the more obvious the image details.

Palettes Mode

The palettes mode improves the recognizability of the image content in some occasions by overlaying grayscale value of images collected by the device.

The palettes mode has 15 types, including White Hot, Black Hot, Fusion 1, etc. Go to Analog Control → Palettes Mode, and set Palettes Mode according to actual demands.
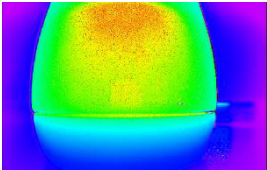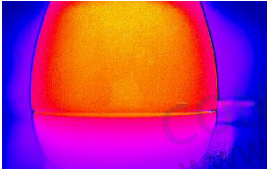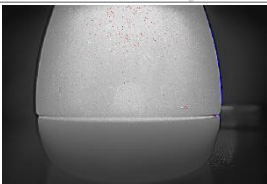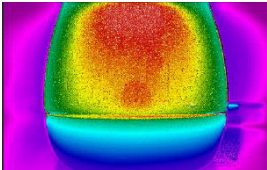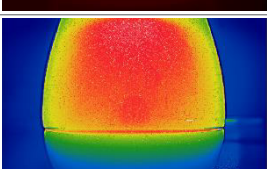
> ℹ The grayscale value of the image captured by the device is related to the acquisition distance from the device to the object. Different grayscale values will present different pseudo-color images. Please refer to the actual display for specific pseudo-color images.

Here we take 100 ° C hot water as the target object to introduce different palettes modes and pseudo-color images.

No.	Palettes Mode	Pseudo-Color Images
1	White Hot , The default palettes mode of the device is White Hot.	
2	Black Hot	
3	Fusion 1	
4	Rainbow	
5	Fusion 2	
6	Ironbow 1	
7	Ironbow 2	
8	Sepia	

Palettes Mode

No.	Palettes Mode	Pseudo-Color Images
9	Color 1	
10	Color 2	
11	Ice Fire	
12	Rain	
13	Green Hot	
14	Red Hot	
15	Dark Blue	

Background Correction

Background correction can correct degraded images such as noise, light spots, etc. It is necessary to use the black body (object with temperature differences) to collect vignetting data, and then perform background correction by going to Analog Control → Manual Background Correction.

	■ The device is powered on for more than 45 minutes.
ⓘ	■ Prepare a high temperature black body at 70 ° C or a low temperature black body at 10 ° C.
	■ Because the use of objects with temperature requires a certain temperature difference with the device to collect vignetting data, if there is no black body, you can use the palm of your hand or an object such as a clear cloudless sky of about -10 ° C to 20 ° C instead.

Steps

1. Adjust the device's focus to about 2 m to make sure that collected images are clear.
2. Aim the device to a black body or other objects to make sure that the device's FOV is totally covered.

ⓘ	Avoid contacting the device's lens with the black body or other objects in case of data exception.

3. Perform the image correction by refer to section Set Shutter Control, and the process is finished when the device generates a baffle sound.
4. Go to Analog Control → Manual Background Correction, and click Execute in Manual Background Correction to perform background correction.

ⓘ	Avoid touching and moving the device when it is collecting images in case of data accuracy.

Set Shutter Control

If a degraded image such as noise, light spots, etc. appears in the process of collecting images, you can use auto shutter control conditions or perform manual shutter control to quickly correct the image. Compared with background correction, using shutter control to correct images is more flexible.

When performing shutter correction, the baffle will fall between the infrared lens and the detector. At this time, the device generates a baffle sound, and collected images will freeze instantly to complete the image correction. Go to Analog Control → Shutter Release Auto-Switch, and set Shutter Release Auto-Switch according to actual demands.

Shutter Release Auto-Switch	Description
Analog Control > Gain Auto	Click Execute in Manual Shutter Correction when the device starts to collect images, and the device generates a baffle sound and image correction is finished.
Open Scheduled Ctrl	Set Shutter Autoswitch Time Interval (min) when the device starts to collect images. If the configured time interval reaches, the device generates a baffle sound and image correction is finished.
Open Temperature Ctrl	Whenever the temperature of the collected image changes by 1° C up and down, the device generates a baffle sound and image correction is finished.
Open Scheduled Temperature	Set Shutter Autoswitch Time Interval (min) when the device starts to collect images. If the configured time interval reaches or the temperature of the collected image changes by 1° C up and down, the device generates a baffle sound and image correction is finished.

Set Grayscale Detection

The grayscale detection sensitivity corresponds to the infrared thermal radiation intensity of each pixel. The grayscale detection can highlight the area with the grayscale value greater than the preset value.

Steps

1. Go to Analog Control → Grayscale Detection Switch, and enable it.

2. Enable Grayscale Detection Marking Switch, and enter Grayscale Detection Sensitivity.

Set Lens Shading Correction

The LSC (Lens Shading Correction) eliminates central illuminance difference caused by uneven light refraction of the lens. The figure 10-11 is an abnormal image before lens shading correction. To get a normal image like figure 10-12, you need to use black body (object with temperature difference) to collect vignetting data, and then perform lens shading correction.

> ℹ
> ■ The device is powered on for more than 45 minutes.
> ■ Prepare a high temperature black body at 70 ° C or a low temperature black body at 10 ° C.
> Because the use of objects with temperature requires a certain temperature difference with the device to collect vignetting data, if there is no black body, you can use the palm of your hand or an object such as a clear cloudless sky of about -10 ° C to 20 ° C instead.

Steps

1. Adjust the device's focus to about 2 m to make sure that collected images are clear.

2. Aim the device to a black body or other objects to make sure that the device's FOV is totally covered.

> ℹ Avoid contacting the device's lens with the black body or other objects in case of data exception.

3. Perform the image correction by refer to section Set Shutter Control, and the process is finished when the device generates a baffle sound.

4. Go to Shading Correction → Correction Selector, and select LSC as Correction Selector.

5. Click Execute in Activate Shading to start lens shading correction.

6. (Optional) View Activate Shading Status:

● Saving: User parameters are being saved.

● Ready: User parameters have been saved.

> ℹ Avoid touching and moving the device when it is collecting images in case of data accuracy.

Set Defective Pixel Correction

A single pixel in the device sensor cannot respond to infrared radiation normally, which is called an invalid pixel. It is reflected in the infrared image as bright and dark spots whose coordinates do not change with the target. Defective pixel correction can eliminate these bright and dark spots. Follow steps below to set the correction.

Steps

1. Go to Shading Correction → Manual DPC, and set On or Off as Manual DPC.

Off means auto defective pixel correction, and On means manual defective pixel correction.

2. Move cursor on defective pixels of the image, and view the corresponding coordinates on the bottom side of the client software main window.

You can click ☰ on the bottom side and check position to display coordinates if the client software does not display.

3. Enter coordinates of the pixel in Dead Pixel X Position and Dead Pixel Y Position, and view the pixel in the image.

| Dead Pixel X Position | 270 |
| Dead Pixel Y Position | 391 |
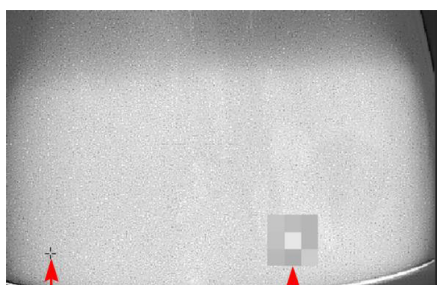
Pixels Point   Magnified Area

4. (Optional) Click Execute in Reset Cursor to let the cursor return to central coordinates.

5. Repair or restore defective pixel.

● Repair defective pixel: Click Execute in Add Dead Pixel to repair selected defective pixels.

● Restore defective pixel: Click Execute in Del Dead Pixel to restore repaired defective pixels.

Set AGV Mode

In order to adapt to differentiated scenes and get clearer images, the AGC mode is divided into two types: manual adjustment and auto adjustment. After selecting different adjustment modes, the brightness value and contrast value of the adjustment mode can be set according to the environmental requirements.

Manual Mode

Steps

1. Go to Acquisition Control → AGC Mode, and select Manual Mode as AGC Mode.

2. Enter AGC Expected Brightness and AGC Expected Contrast according to actual demands.

AGC Mode	Manual Mode
AGC Expected Brightness	50
AGC Expected Contrast	50

Auto Mode

Steps

1. Go to Acquisition Control → AGC Mode, and select Auto Mode as AGC Mode.

2. Enter AGC Expected Brightness and AGC Expected Contrast according to actual demands.

Auto adjustment is to process the image on the basis of manual adjustment to optimize the brightness value and contrast value of the image.

AGC Mode	Auto Mode
AGC Expected Brightness	50
AGC Expected Contrast	50

> **i** It is recommended to use the auto mode to adjust the image. Because in the same brightness and contrast value, the image quality of the auto adjustment is better than the manual adjustment.

8

CHAPTER 8   OTHER FUNCTIONS

Device Control

In the Device Control attribute, you can view device information, edit device name, reset device, etc. The specific parameters in Device Control attribute are shown below.

Parameter	Read/Write	Description
Device Type	Read only	It is the device type.
Device Scan Type	Read only	It is the scan type of the sensor.
Device Vendor Name	Read only	It is the name of device manufacturer.
Device Model Name	Read only	It is the device model.
Device Manufacturer Info	Read only	It is the manufacturer information.
Device Version	Read only	It is the device version.
Device Firmware Version	Read only	It is the device firmware version.
Infrared Version	Read only	It is the APP version of the device module.
Infrared Firmware Version	Read only	It is the FPGA version of the device module.
Device Serial Number	Read only	It is the device serial number.
Device ID	Read only	It is the device ID.
Device User ID	Read and write	Device name and it is empty by default. You can set according to your preference. ● If User ID is empty, the client software displays the device model. ● If you set it, the client software displays the User ID you set.
Device Uptime(s)	Read only	It is the period of time when device is powered up.
Board Device Type	Read only	It is the device type.
Device Connection Selector	Read and write	It is the ID of GenICam XML.
Device Connection Speed(Mbps)	Read only	It is the device connection speed.
Device Link Selector	Read and write	It selects device link.
Device Link Speed(Mbps)	Read only	It is the link speed.
Device Link Connection Count	Read only	It is the link connection quantity.
Device Link Heartbeat Mode	Read and write	It enables heartbeat mode or not.
Device Stream Channel Count	Read only	It counts data packet quantity.
Device Stream Channel Selector	Read and write	It is the character set used in register.
Device Stream Channel Type	Read only	It is the stream channel type.
Device Stream Channel Link	Read only	It is the stream channel link quantity.
Device Stream Channel Endianness	Read only	It is the image data endianness.
Device Stream Channel Packet Size(B)	Read and write	It is the data packet size.
Device Event Channel Count	Read only	It is the channel quantity that the device supports.
- - -	- - -	- - -

Device Control

Parameter	Read/Write	Description
Device Character Set	Read only	It is the character set used in register.
Device Temperature Selector	Read and write	It selects device component to view its temperature. Currently, only sensor can be selected only.
Device Temperature	Read only	It displays the temperature of selected components in Device Temperature Selector.
Find Me	Read and write	The function of finding me is executed. Click Execute to find the currently operating device.
Device Max Throughput(Kbps)	Read only	It is max. bandwidth of the data that can be streamed out of the device.
Device PJ Number	Read Only	It is the device's project number.

> ℹ️ The specific device control parameters may differ by camera models.

Embedded Information in Image

The camera supports adding and embedding the collection information to the image data. You can set in the client software and define which information to be embedded in the image data.

Embedded information includes following categories. Each category of embedded information has its unique data format.

Information Type	Byte	Data Format Description
Timestamp	4	As shown in the figure below
Brightness Info	4	Ranges from 0 to 4095
Frame Counter	4	Ranges from 0 to 2^{32}-1
Ext Trigger Count	4	Ranges from 0 to 2^{32}-1
Line Input Output	4	The 1st byte is input, and each bit corresponds to 1 input. The 2nd byte is output, 3rd and 4th bytes are reserved.
Width	4	Ranges from 0 to 2^{32}-1
Height	4	Ranges from 0 to 2^{32}-1
Offset X	4	Ranges from 0 to 2^{32}-1
Offset Y	4	Ranges from 0 to 2^{32}-1
Pixel Format	4	Ranges from 0 to 2^{32}-1
ROI Position	8	The starting coordinates occupy two bytes each with the column coordinates at the front and the row coordinates at the back. The length and width coordinates each occupy two bytes.
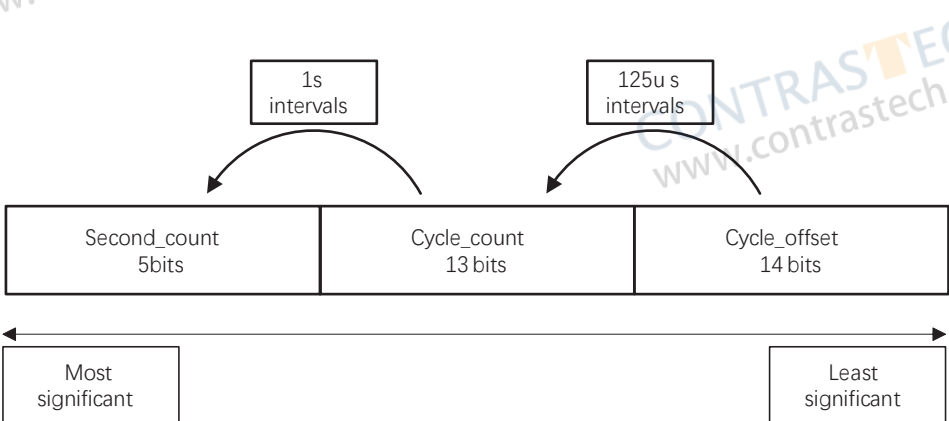
> ℹ️ Width, Height, Offset X, Offset Y and Pixel Format are image embedding information that the device supporting Chunk function has.

Embedded Information in Image

There are two ways to embed information into the image, including watermark function and Chunk function:

● Embedded Information Set: Click Image Format Control > Embedded Image Info Selector, select specific parameters as Embedded Image Info Selector, and enable Frame Spec Info.

● Chunk Data Comtrol Set: You can also use the chunk data function to add the embedded information in images. The chunk data function allows you to generate supplementary image data and append that data to every image that you acquire.

	■ The chunk data function may differ by camera models.
i	■ The chunk data function is not supported if the camera enables the image compression mode.
	■ The camera uses the chunk data function to realize embedded information in image in priority if you enable chunk data function and embedded information function both.

Watermark Settings

Steps

1. Go to Image Format Control → Embedded Image Info Selector, and select Embedded Image Info Selector according to actual demands.
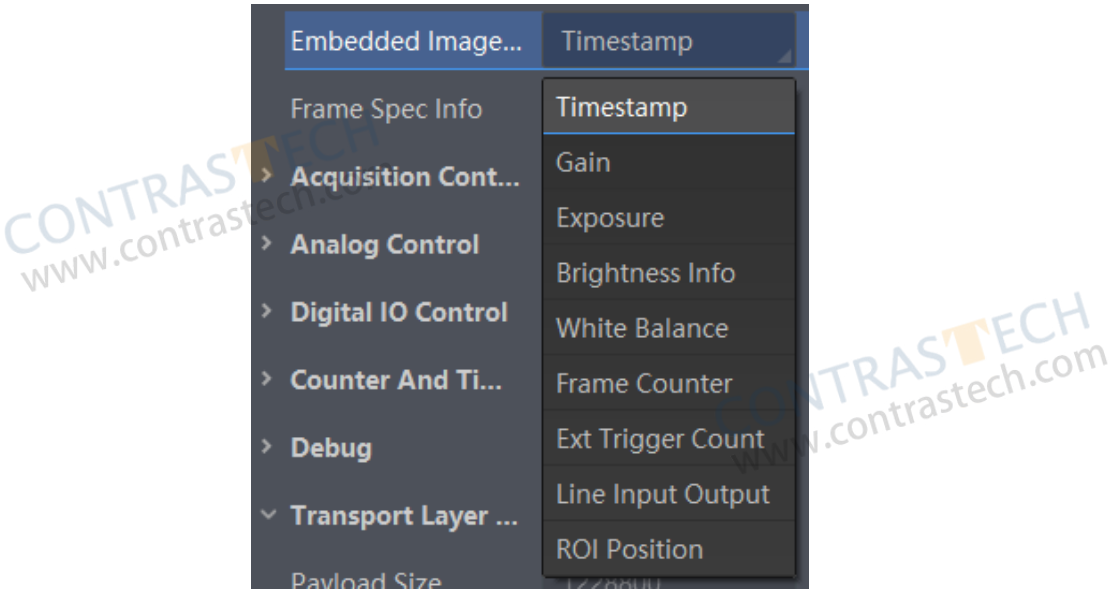
2. Enable Frame Spec Info to add watermark into images.
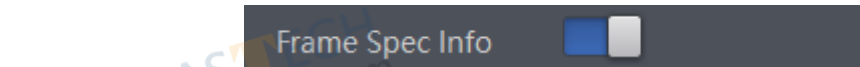
3. (Optional) Repeat steps above to add multiple watermarks.

4. Click on the control toolbar of the client software to view specific watermark information.

	The watermark is embedded into the starting position of the first line of image data. If the ROI is small and the first line of image data is insufficient to embed information, the information will be embedded into the second line of image data.
i	

Chunk Set

Steps:

1. Click Chunk Data Control.

2. Enable Chunk Mode Active.

3. Select Chunk Selector according to actual demands.

4. Enable Chunk Enable to embed information into the image.

5. (Optional) Repeat steps above to add multiple Chunk information types.

6. Click the control toolbar of the client software to view specific information.

File Access Control

The file access function can import or export the device's feature files and save them in mfa format. The supported feature files include User Set 1, User Set 2, and User Set 3.

Steps

1. Select a device in the device list, and click 📄 to open the file access dialogue box.

2. Select Device Feature and click Import or Export.

3. Select a mfa file from local PC to import or select a saving path and enter file name to save and export.

After device feature file is imported, you should load it in User Set Control if use is needed.

ℹ️	Importing and exporting the device feature among the same model of devices are supported.

Event Control

The event control can record events happen to the device and allow you to view them.

Steps

1. Go to Event Control → Event Selector, and select Event Selector according to actual demands.
The specific events may differ by device models.Please refer to the actual parameters for details. Currently supported events are as follows:

■ Acquisition Start
■ Acquisition End
■ Frame Start
■ Frame End
■ Frame Burst Start
■ Frame Burst End
■ Line0 Rising Edge
■ Line0 Falling Edge
■ Frame Start Over Trigger
■ Over Run

2. elect Notification On as Event Notification to output event.

3. Right click the connected device and click Event Monitor.
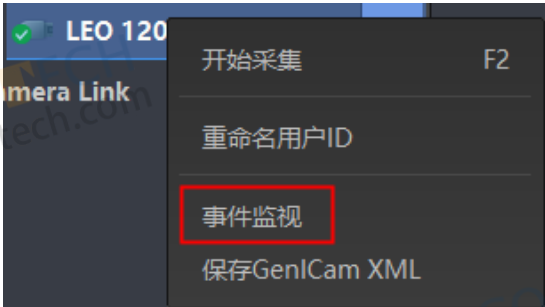
4. Check Messaging Channel Event, and view the specific event after the device starts live view.

Transport Layer Control

You can go to Transport Layer Control to view the device's load size, GEV version, etc.

The specific parameters of transport layer control may differ by device models.

Parameter	Read/Write	Description
Paylode Size(B)	Read only	It is the camera's load size.
GEV Version Major	Read only	It is the major version in GEV version.
GEV Version Minor	Read only	It is the minor version in GEV version.
GEV Device Mode Is Big Endian	Read only	It is the endianness in device's register.
GEV Device Mode Character Set	Read only	It is the character set in device's register.
GEV Interface Selector	Read only	It sets which physical network interface to be controlled.
GEV MAC Address	Read only	It is the MAC address of the network interface.
GEV Supported Option Selector	Read and write	It selects the GEV option to interrogate for existing support.
GEV Supported Option	Read only	It indicates whether the selected GEV option is supported or not.
GEV Current IP Configuration LLA	Read only	It indicates whether the Link Local Address IP configuration scheme is activated on the given network interface.
GEV Current IP Configuration DHCP	Read and write	It indicates whether the DHCP IP configuration scheme is activated on the given network interface.
GEV Current IP Configuration Persistent IP	Read and write	It indicates whether persistent IP configuration scheme is activated on the given network interface.
DEV PAUSE Frame Reception	Read and write	It controls whether incoming pause frames are handled on the given logical link.
GEV Current IP Address	Read only	It is the current IP address for the given network interface.
GEV Current Subnet Mask	Read only	It is the current subnet mask of the given interface.
GEV Current Default Gateway	Read only	It is the default gateway IP address to be used on the given network interface.
GEV First URL	Read only	It is the first choice of URL for the XML device description file.
GEV Second URL	Read only	It is the second choice of URL to the XML device description file.
GEV Number Of Interfaces	Read only	It indicates the number of physical network interfaces supported by this device.
GEV Persistent IP Address	Read and write	It indicates the persistent IP address for this network interface. It is only used when the device boots with the persistent IP configuration scheme.
GEV Persistent Subnet Mask	Read and write	It indicates the persistent subnet mask associated with the persistent IP address on this network interface. It is only used when the device boots with the persistent IP configuration scheme.
GEV Persistent Default Gateway	Read and write	It indicates the persistent default gateway for this network interface. It is only used when the device boots with the persistent IP configuration scheme.
GEV Link Speed	Read only	It indicates the speed of transmission negotiated by the given network interface in Mbps.
GEV Message Channel Count	Read only	It indicates the number of message channels supported by this device.
GEV Stream Channel Count	Read only	It indicates the number of stream channels supported by this device.
GEV Heartbeat Timeout(ms)	Read and write	It indicates the current heartbeat timeout in milliseconds.
GEV Heartbeat Disable	Read and write	It disables the GEV Heartbeat.
Timestamp Control Latch	Read and write	It latches the current timestamp value of the device.
Timestamp Control Reset	Read and write	It resets the timestamp value for the device.
Timestamp Control Latch Reset	Read and write	It resets the timestamp control latch.
Timestamp Value	Read only	It is a read only element. It indicates the latched value of the timestamp.
GEV CCP	Read and write	It controls the device access privilege of an application.
GEV MCP Host Port	Read and write	It controls the port to which the device must send messages. Setting this value to 0 closes the message channel.
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Transport Layer Control

| Parameter	Read/Write	Description
GEV MCDA	Read and write	It controls the destination IP address for the message channel.
GEV MCTT(ms)	Read and write	It provides the transmission timeout value in milliseconds.
GEV MCRC	Read and write	It controls the number of retransmissions allowed when a message channel message times out.
GEV MCSP	Read only	It indicates the source port for the message channel.
GEV Stream Channel Selector	Read only	It selects the stream channel to control.
GEV SCP Interface Index	Read only	It is the Index of network interface to be used.
GEV SCP Host Port	Read and write	It is the host port of the channel.
GEV SCP Direction	Read only	It transmits or receives the channel.
GEV SCPS Fire Test Packet	Read only	It sets whether the GVSP test package is enabled.
GEV SCPS Do Not Fragment	Read and write	It sets whether the flag bit used for sending and controlling GVSP is configured.
GEV SCPS Big Endian	Read only	It is the Endianness of multi-byte pixel data for this stream.
GEV SCPS Packet Size(B)	Read and write	It is the device's packet size during transmission.
GEV SCPD	Read and write	It indicates the delay (in timestamp counter units) to insert between each packet for this stream channel.
GEV SCDA	Read and write	t indicates the destination IP address for this stream channel.
GEV SCSP	Read only	It indicates the source UDP port address for this stream channel.
Gev GVSP Extended ID Mode	Read and write	It can enable the extended ID mode.

Save and Load User Set

The camera supports 4 sets of parameters, including 1 default set and 3 user sets.

You can save parameters, load parameters and set user default as shown below.

_Save Parameters:

1. Click User Set Control, and select a user set in User Set Selector. Here we take selecting User Set 1 as an example.

2. Click Execute in User Set Save to save parameters.
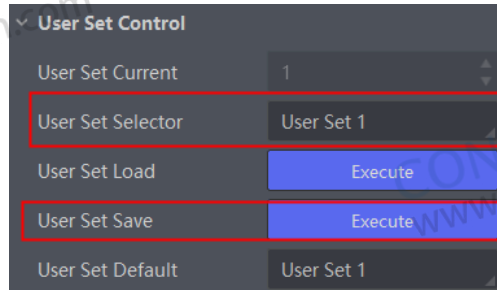
_Load Parameters：

1. Click User Set Control, and select a user set in User Set Selector. Here we take selecting User Set 1 as an example.

2. Click Execute in User Set Load to load parameters to the camera, as shown below.
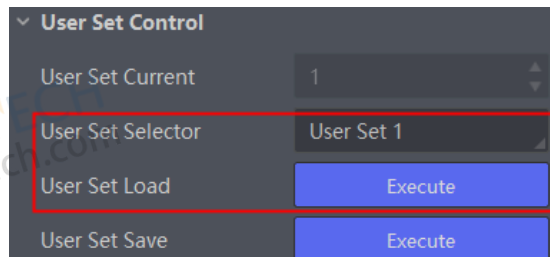
_Set User Default：

You can also set default parameter by selecting parameter from drop-down list of User Set Default.

Multicast

The multicast function enables multiple PCs to access the same device at the same time. At the same time, the same device can only be connected by one client in controller and data receiver mode or controller mode, but can be connected by multiple clients in data receiver mode. The multicast mode of each device within the client is controlled individually. The description of three multicast modes is shown below.

Modes	Description
Controller and Data Receiver	This mode allows you to read and edit the camera's parameters, and get its image data.
Controller	This mode allows you to read and edit the camera's parameters, but you cannot get its image data.
Data Receiver	This mode allows you read the camera's parameters and get its image data, but you cannot edit the camera's parameters.

When the multicast function is enabled, the device icon on the client software of other PCs will become , and you can connect the device via the data receiver mode.

You can set multicast function for both the available device and connected device in the device list, but the specific settings are different.

■ Set Multicast (Available Status)

Follow steps below to set multicast function if the device is in available status.
Steps
1. Right click the available device, and click Multicast Settings.
2. Select Role, and enter the IP Address and Port.
● The available status device can use multicast function in Controller and Data Receiver mode or Controller mode.
● The IP address should be class D IP address, and the port ranges from 0 to 65535.
3. Click OK.

■ Set Multicast (Connected Status)

Follow steps below to set multicast function if the device is in connected status.
Steps
1. Right click the available device, and click Multicast Settings.
2. Enable the multicast function, and edit the IP Address and Port.
● The connected status device can use multicast function in Controller and Data Receiver mode only.
● The IP address should be class D IP address, and the port ranges from 0 to 65535.
3. Click OK.

Trouble Shooting

Trouble:

■ No camera found when running the iDatum

Possible Reason1:	Camera is not started up normally
Solution1:	Check camera power wiring (observe the indicator)
Possible Reason2:	Network cable connection error
Solution2:	Check network connection

■ Camera connection error

Possible Reason1:	Camera and client software are not in the same network segment
Solution1:	Edit its IP address
Possible Reason2:	The camera has been connected by another program
Solution2:	Reconnect after disconnecting the camera from other programs

■ Live view is black

Possible Reason1:	Aperture is closed
Solution1:	Open the aperture
Possible Reason2:	Camera exception occurs
Solution2:	Reboot the camera.

■ Live view is normal, but the camera cannot be triggered.

Possible Reason1:	Trigger mode is not enabled
Solution1:	Check whether the camera trigger mode and related trigger signal input are normal in the current environment.
Possible Reason2:	Incorrect wiring
Solution2:	Check whether the wiring is correct under corresponding triggering mode.

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CHAPTER 9   TECHNICAL SUPPORT

If you need advice about your camera or if you need assistance troubleshooting a problem with your camera, it's highly recommended to describe your issue in details and contact us via E-mail at support@contrastech.com

It would be helpful if you can fill-in the following table and send to us before you contact our technical support team.

Camera Model:		Camera's SN:	
Describe the issue in as much detail as possible:			
If known, what's the cause of the issue?			
How often did/does the issue occur?			
How severe is the issue?			
Parameter set	Please connect the camera directly to PC and use iDatum to make note of the parameter when the issue occurred.		

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