微图视觉
Vision Datum

# LEO Series
# GigE LWIR Camera
# User Manual

V2.4.8, Aug. 2024

# Preface

## 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.visiondatum.com/service/005001.html

## Technical Support

For technical support, e-mail：support@visiondatum.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.

# CHAPTER 1 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):

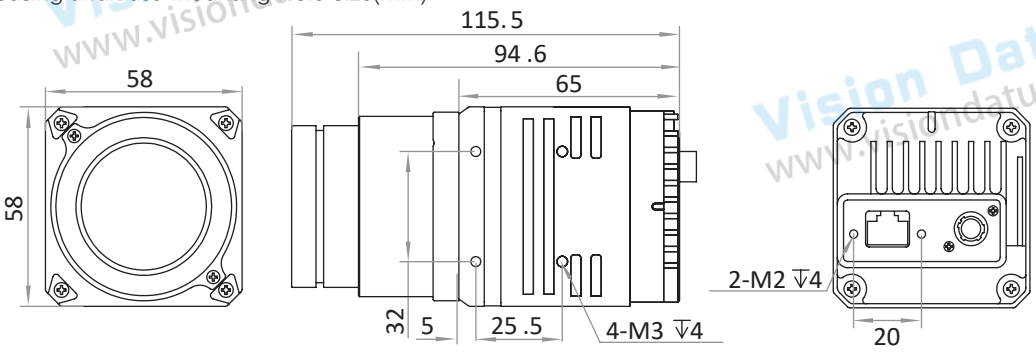



Fig. 1-1: Mechanical Dimensions (in mm) of the GigE Cameras with 6.3mm/35mm focal length lens housing (The installation uses M2 and M3 screws).

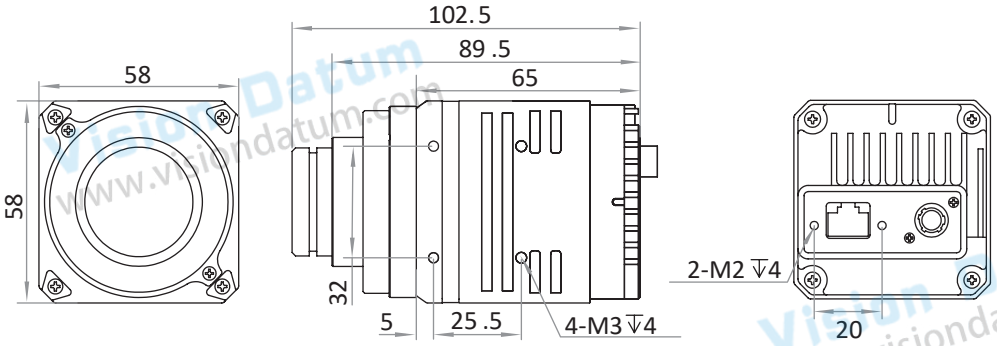



Fig. 1-2: Mechanical Dimensions (in mm) of the GigE Cameras with 15mm focal length lens housing (The installation uses M2 and M3 screws).

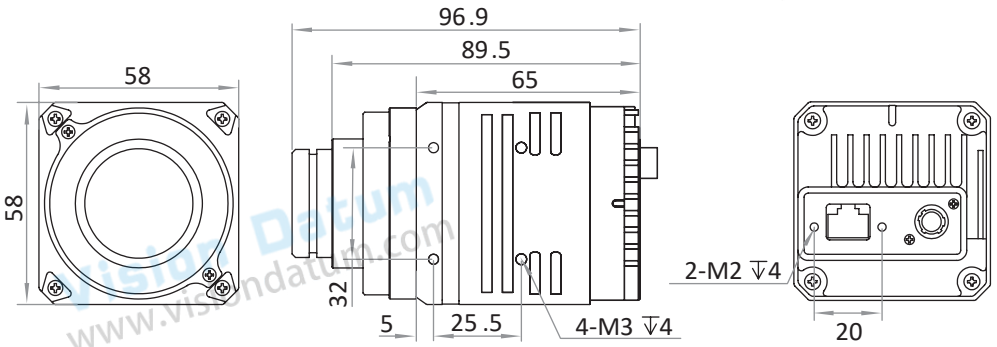



Fig. 1-3 Mechanical Dimensions (in mm) of the GigE Cameras with 25mm focal length lens housing (The installation uses M2 and M3 screws).

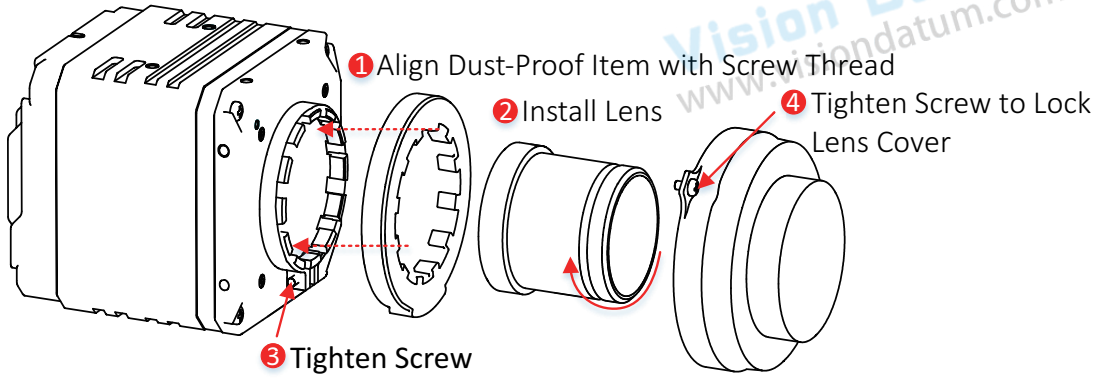



Fig. 1-4: Lens Installation

# 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.

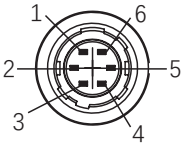



Table 2-1:
Numbering and assignments for 6pin Power and I/O Input Connector:

| 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 Vision Datum. 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.**

# 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.visiondatum.com/service/005001005.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:

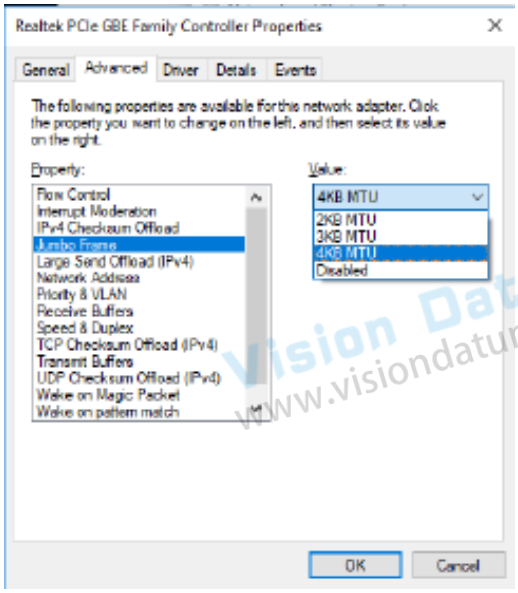
- Use the 6-pin power and I/O cable to connect the camera to a power adapter.

### 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:

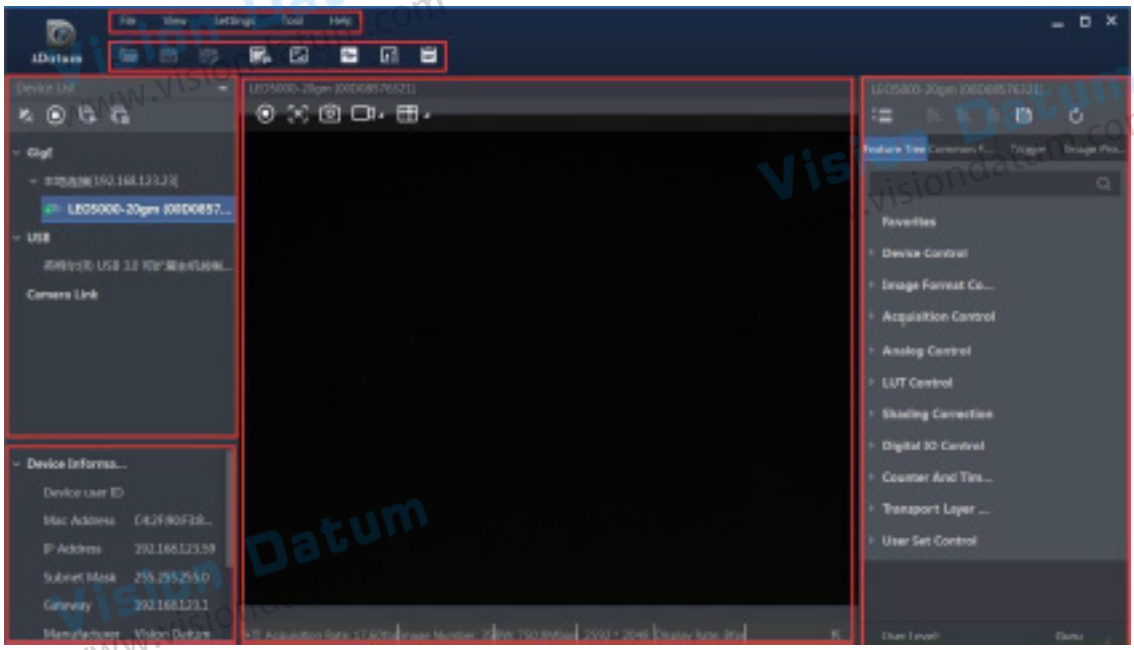
# Software Operation

## iDatum Operation

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

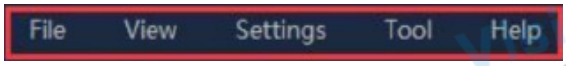
### Main interface

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



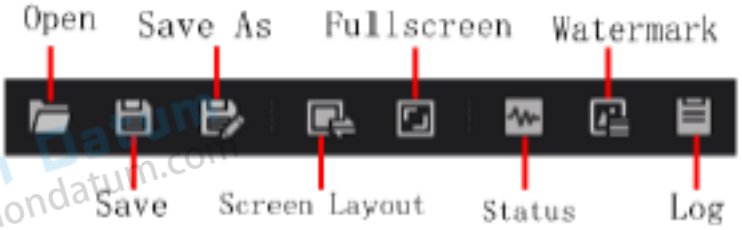
### Menu Bar

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.

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

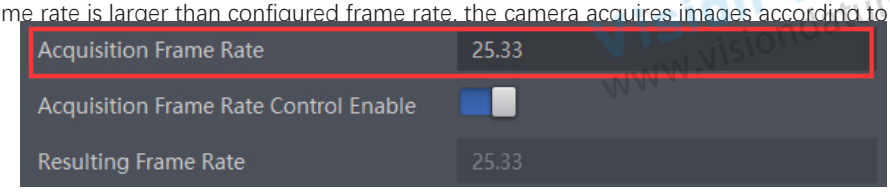
The camera can also manually control the real-time frame rate.

The specific steps are as follows:

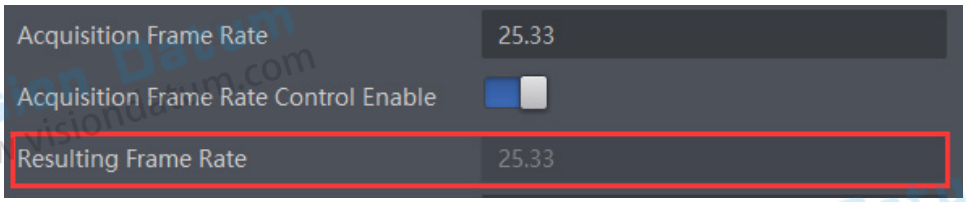
Click Acquisition Control > Acquisition Frame Rate, enter Acquisition Frame Rate according to actual demands, and enable Acquisition Frame Rate Control Enable.

_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.




3.View the device's final frame rate in Resulting Frame Rate.



## Trigger Mode

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

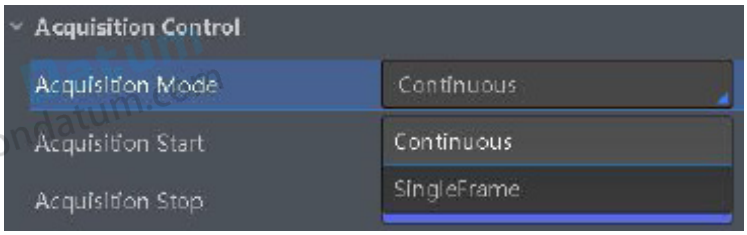
Internal trigger mode(acquisition modes), including SingleFrame mode and Continuous mode;external trigger mode, including software trigger, hardware trigger.

| 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.

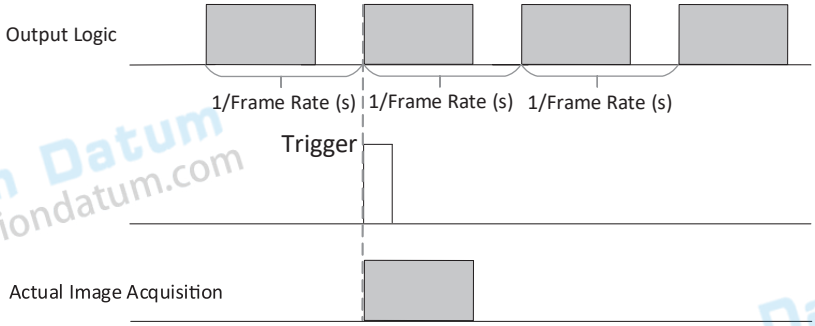
| Internal trigger mode | Parameter | Parameter Value | Principle |
|---|---|---|---|
| SingleFrame mode | Acquisition Control > Acquisition Mode | SingleFrame | When camera starts image acquisition, it acquires one image only, and then stops. |
| Continuous mode | | Continuous | When camera starts image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



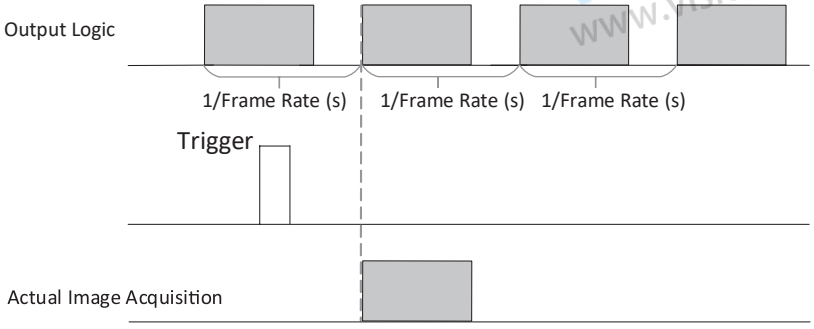

### External Trigger Mode

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<br>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. |

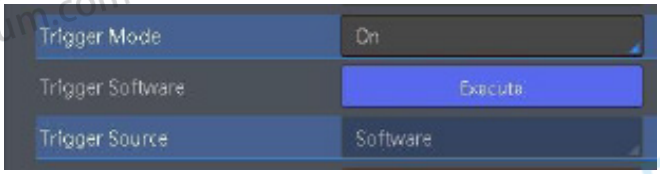
These four external trigger sources are valid only when the Trigger Mode is On.

### 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.




### Hardware Trigger

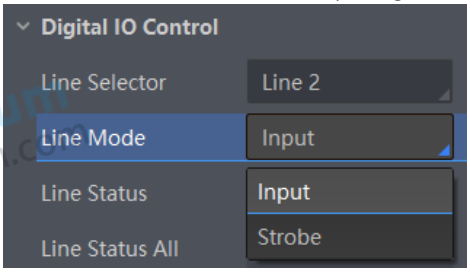
If set “Hardware” as “Trigger Source” can switched to hardware external trigger mode.

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:

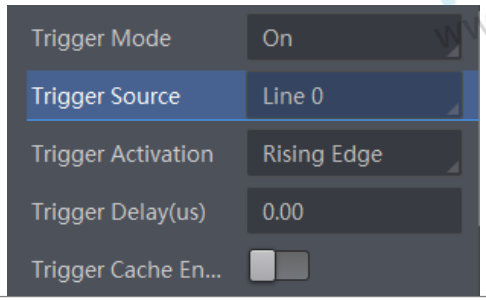
1.Click Digital IO Control.

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




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.




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

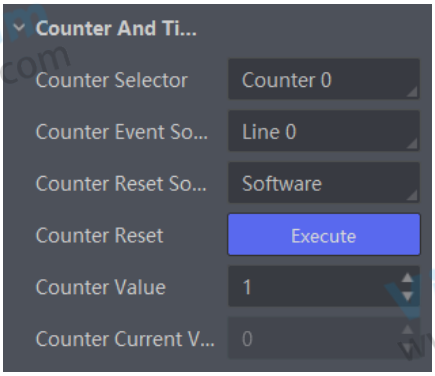
The counter trigger provides frequency division to the external trigger signal. The camera performs an external trigger after receiving multiple hardware trigger signals.

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.<br>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.

| | |
|---|---|
| i | ● 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).<br>● When software is trigger source, you can set acquisition burst frame count, trigger delay, and trigger cache only. |

# Trigger Mode

## ■ Trigger Related Parameters

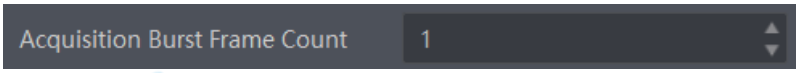
In external trigger mode, you can set five related parameters, including acquisition burst frame count, trigger activation, trigger delay, trigger cache, and trigger debouncer. Different trigger sources can set various trigger parameters, and their relation is shown below.

| Trigger Parameter \ Trigger Source | 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

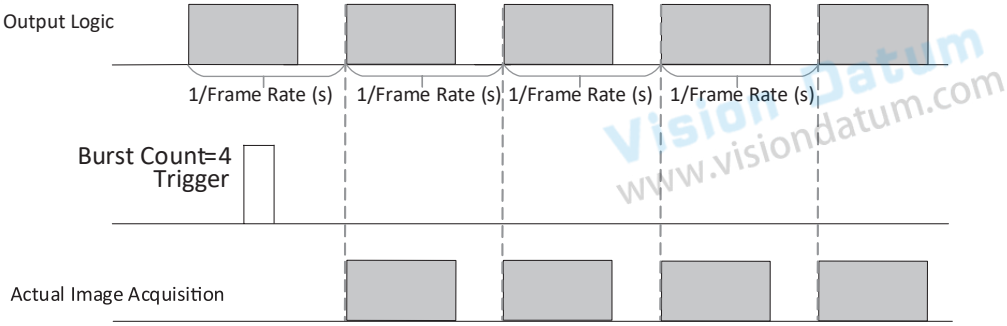
Under external trigger mode, you can set burst frame count as shown below.

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.




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.

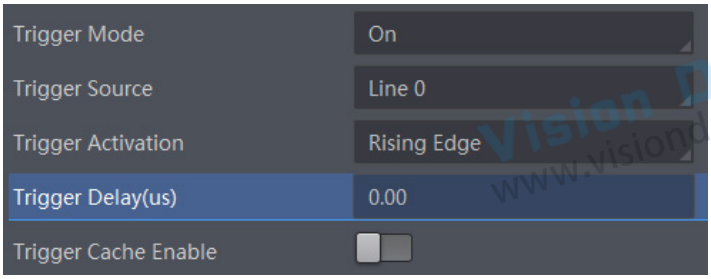
If Acquisition Burst Frame Count is n, when input 1 trigger signal to the device, the device stops acquiring images after exposing n times and outputting n frame images.




Rising Edge as Trigger Signal

### Trigger Delay

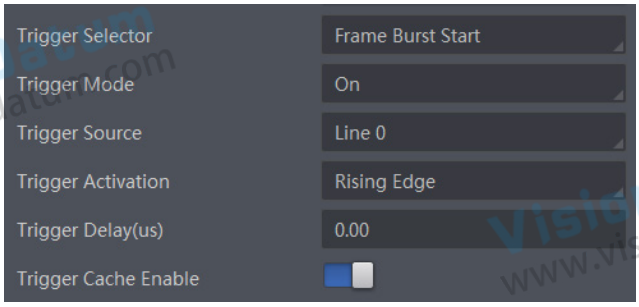
The trigger delay function allows the device to add a delay between the receipt of trigger signal and the moment the trigger becomes active. Go to Acquisition Control → Trigger Delay, and enter Trigger Delay, and the unit is μs.



# Trigger Mode

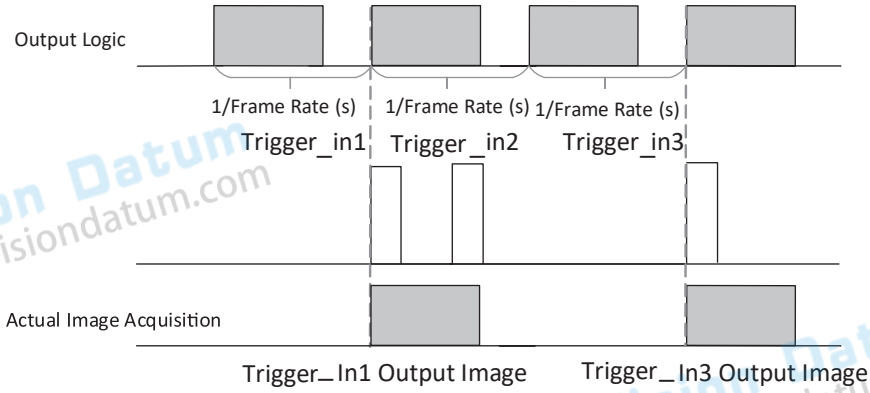
## Trigger Cache

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.

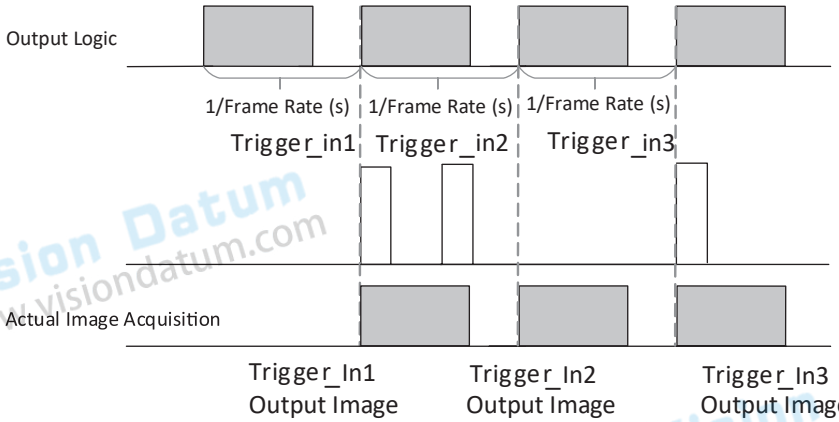



For example, if the device receives the 2nd trigger signal when it is processing the 1st trigger signal, and the result will be different depending on whether Trigger Cache Enable is enabled or not.

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




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



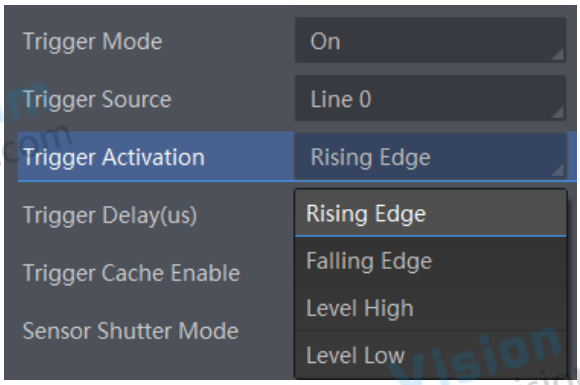
# Trigger Mode

## Trigger Activation

The camera supports trigger acquisition in the rising edge, falling edge, level high, or level low of the external signal.

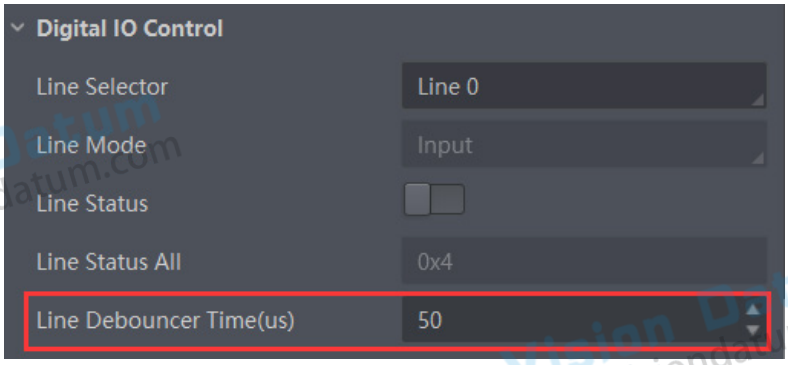
The principle and parameter of trigger activation are shown below.

| 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. |

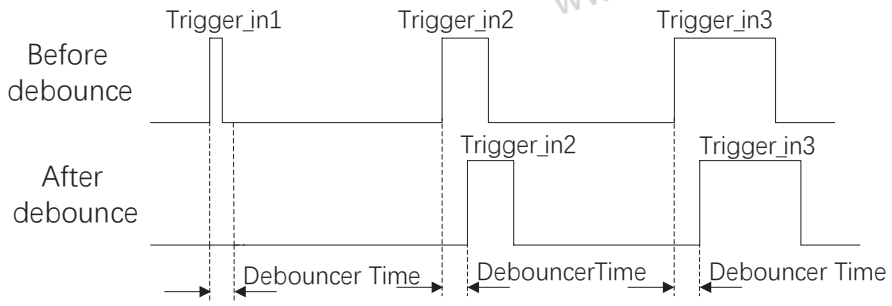



## Trigger Debouncer

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

# CHAPTER 5 I/O OUTPUT

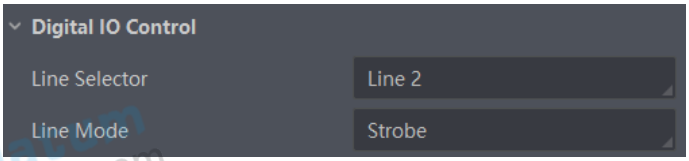


## Select Output Signal

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.



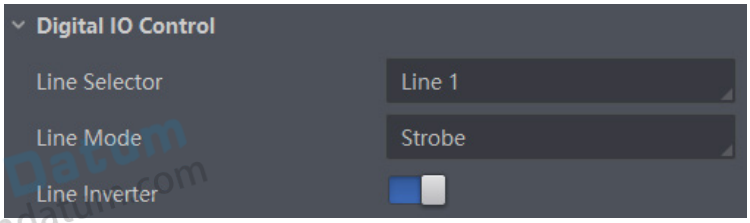

For details about the electrical characteristics and wiring of the IO interface, please refer to Chapter I/O Electrical Characteristics and Wiring.

## 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.

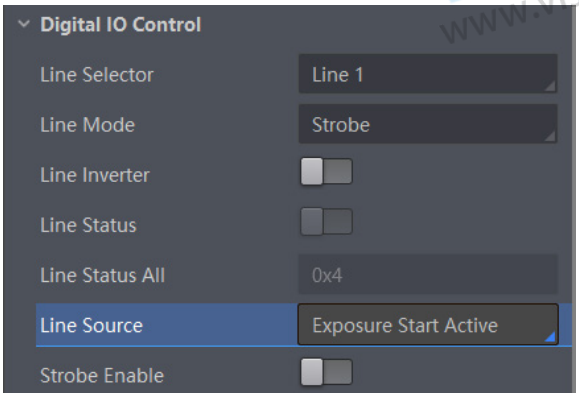



### Enable Strobe Signal

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.

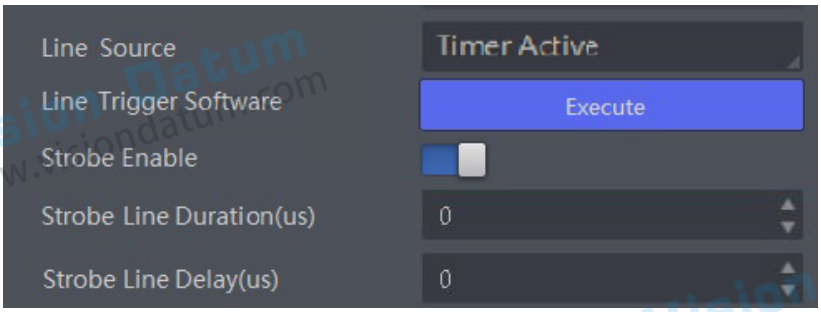


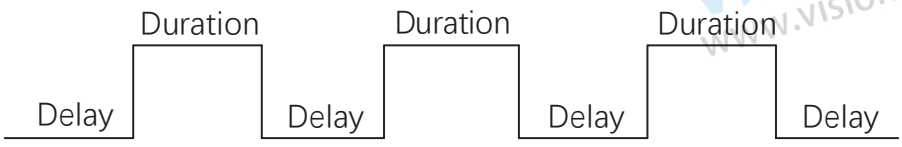
## Set Output Signal

For specific Line Source, please refer to following table for details.

| Name | Description |
|---|---|
| Acquisition Start Active | The device outputs signals to external devices when it starts acquiring images. |
| Acquisition Stop Active | The device outputs signals to external devices when it stops acquiring images. |
| Frame Burst Start Active | The device outputs signals to external devices when the device's frame burst starts. |
| Frame Burst End Active | The device outputs signals to external devices when the device's frame burst stops. |
| Soft Trigger Active | The device outputs signals to external devices when it has a software trigger. |
| Hard Trigger Active | The device outputs signals to external devices when it has a hardware trigger. |
| Counter Active | The device outputs signals to external devices when it has a counter trigger. |
| Timer Active | The device outputs signals to external devices when it has a timer trigger. |

If Timer Active is selected as Line Source, you can click Execute in Line Trigger Software, and enter Strobe Line Delay according to actual demands. The device will output signals whose duration is configured in Strobe Line Duration.

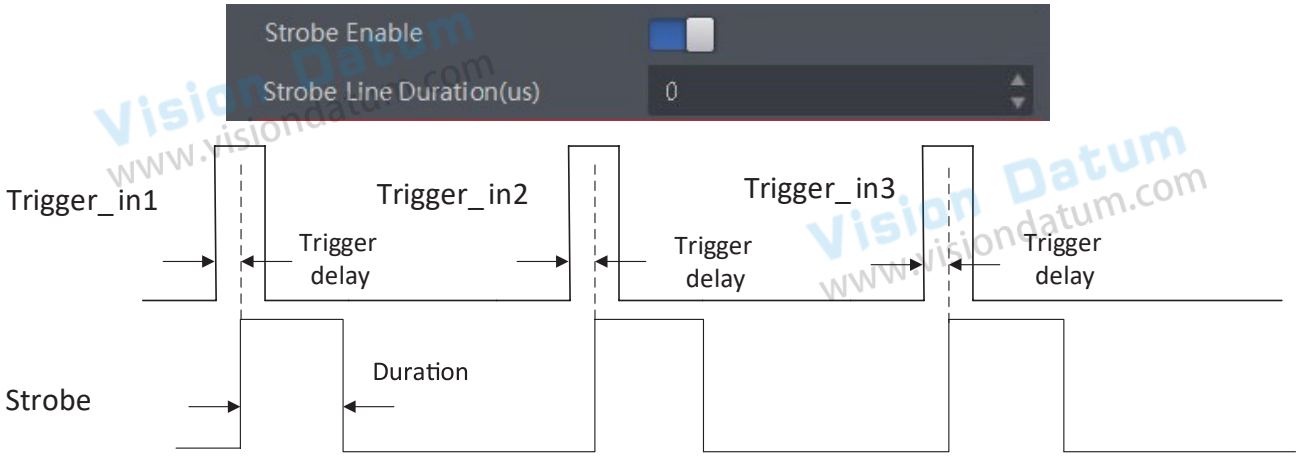


## Set Output Signal

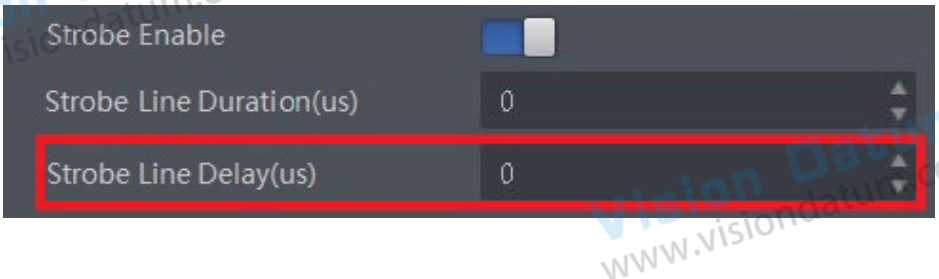
### Strobe Line Duration

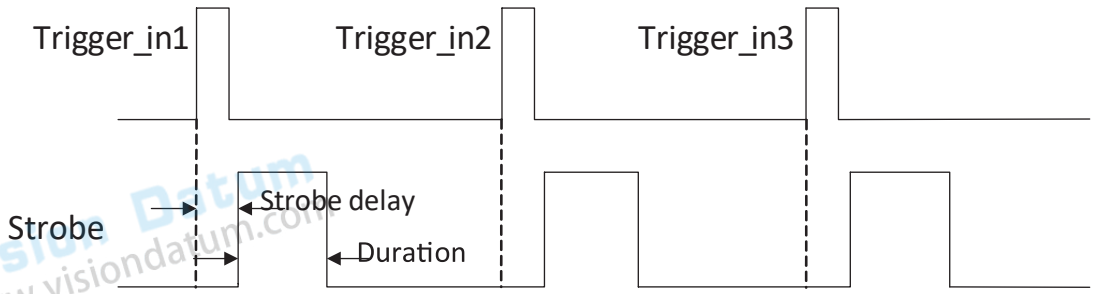
After enabling strobe signal, you can set its duration. Go to Digital IO Control → Strobe Line Duration, and enter it according to actual demands.




### 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.



# CHAPTER 6 I/O ELECTRICAL FEATURE AND WIRING

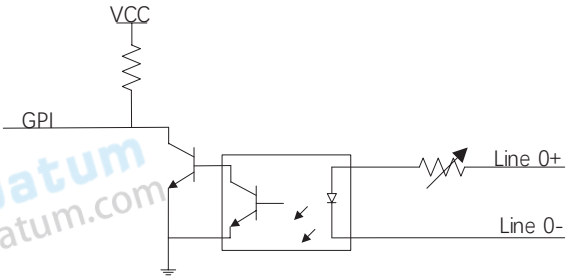


## I/O Electrical Feature

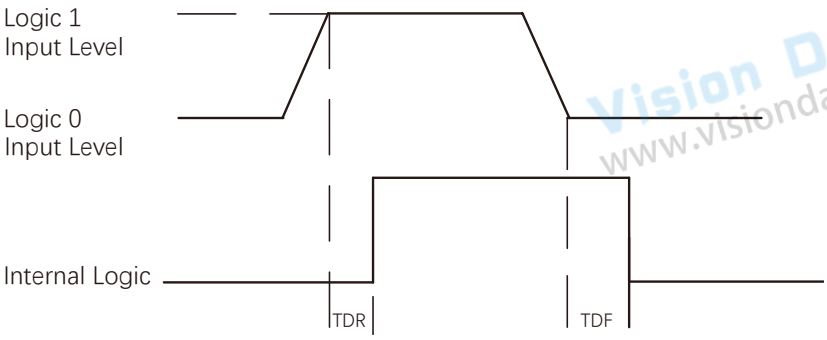
### Line 0 Opto-isolated Input Circuit

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 |

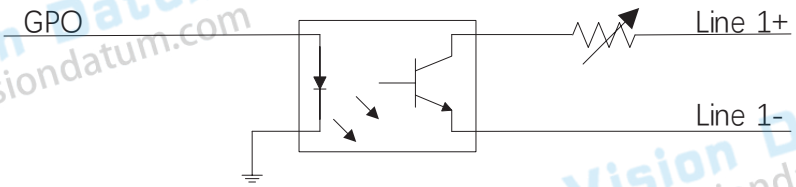
- Make sure that the input voltage is not from 1 VDC to 1.5 VDC as the electric status between these two values are not stable.
- The breakdown voltage is 30 VDC. Keep voltage stable.

## I/O Electrical Feature

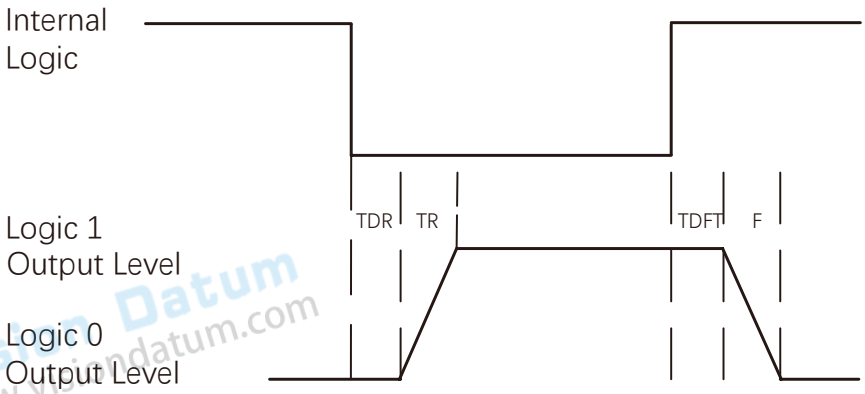
### Line 1 Opto-isolated Output Circuit

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 |

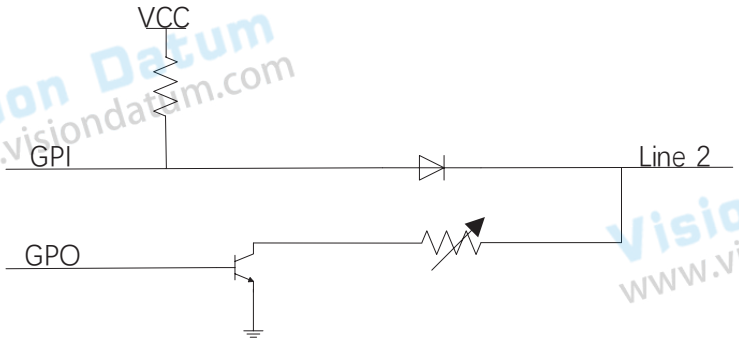
With different external voltage and resistance, the corresponding current and the parameter of output logic level low are shown below.

| 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

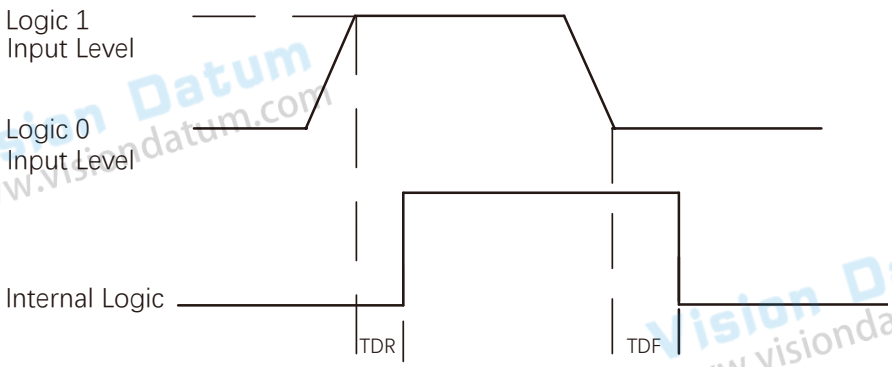
The device has one bi-directional non-isolated I/O signal (Line 2), and you can set it as input signal or output signal according to demands. Its internal circuit is as follows.




### 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 |

- 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

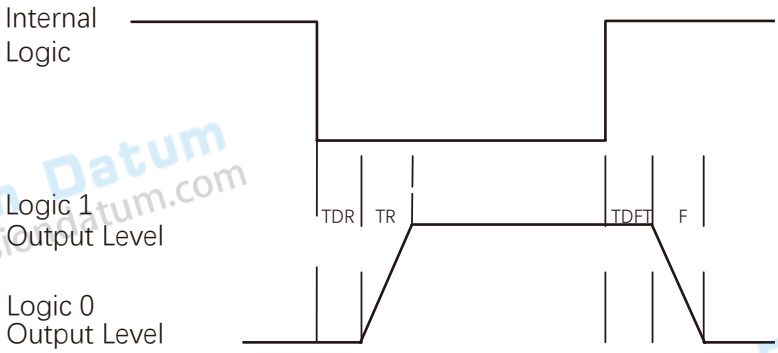
The maximum current is 25 mA and the output impedance is 40 Ω.

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 |

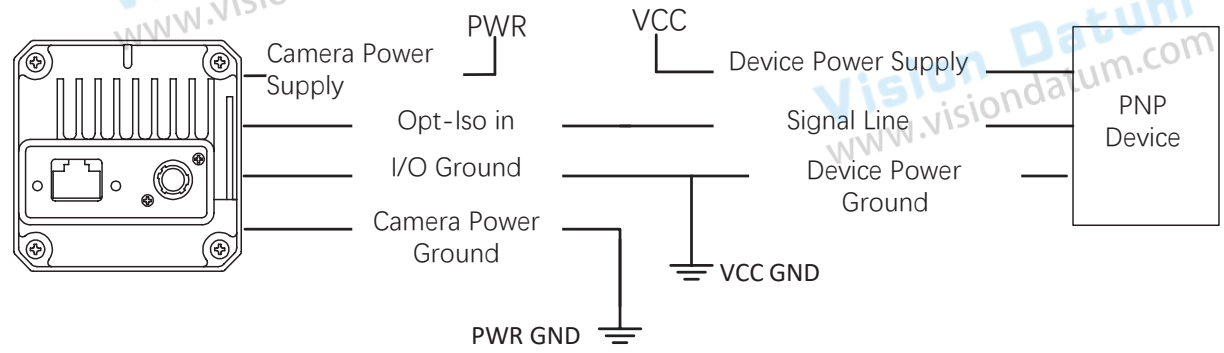
## I/O Wiring

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

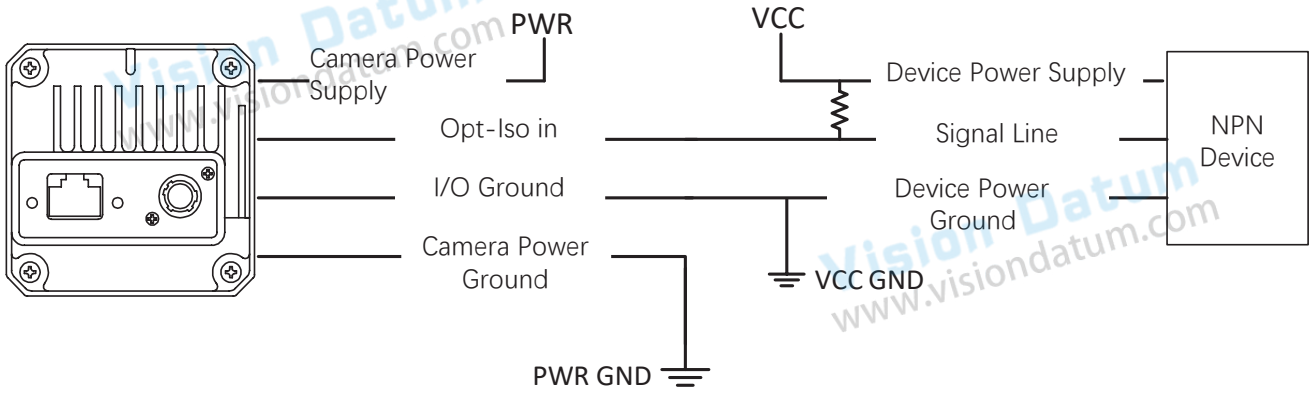
The input signal wiring is shown below when the device uses Line 0 as trigger source in external trigger mode.

Input Signal Connects to PNP Device



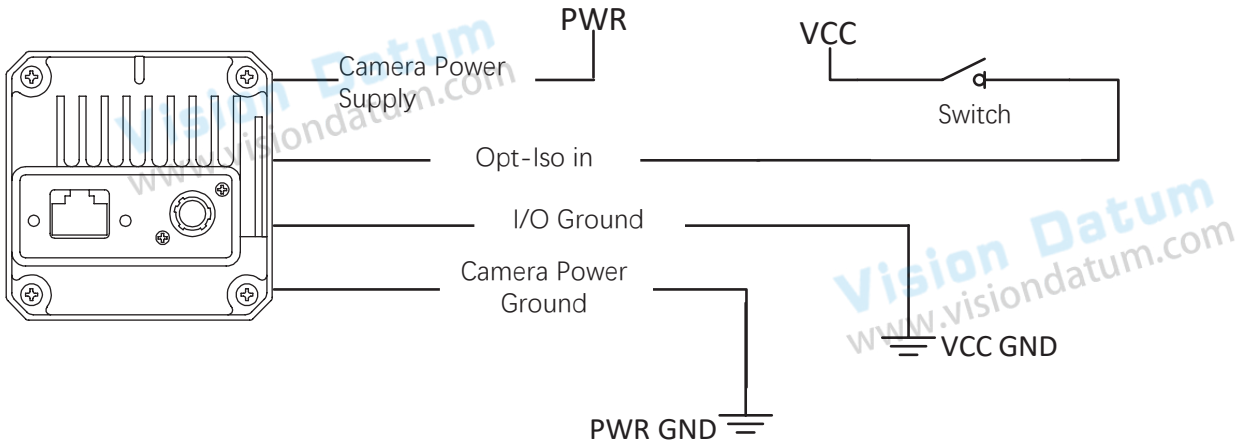

Input Signal Connects to NPN Device

_ 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.

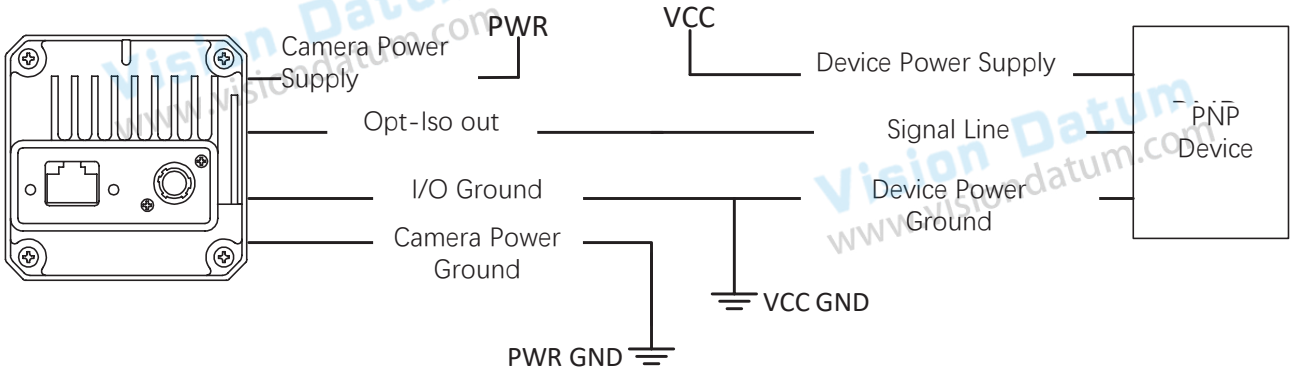


## I/O Wiring

### Line 1 Wiring

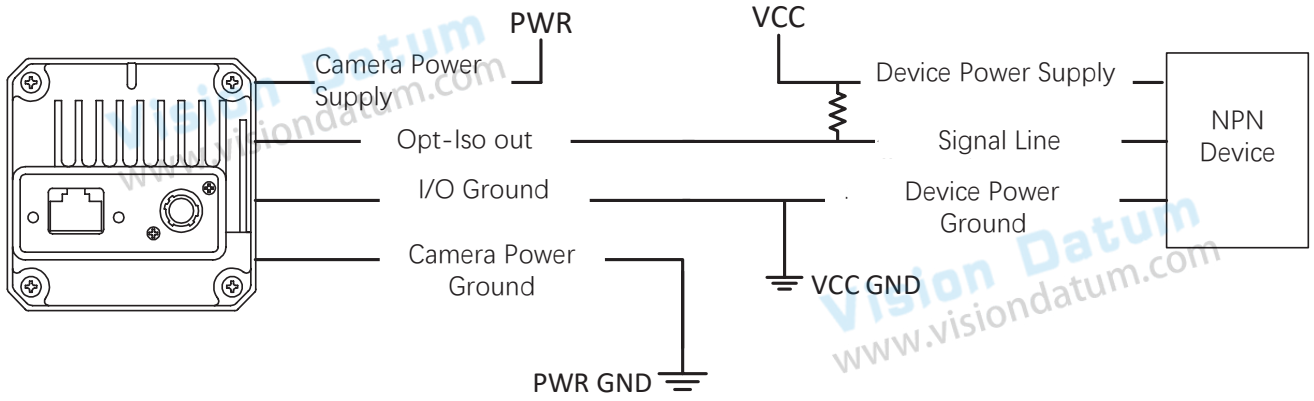
The output signal wiring is shown below when the device uses Line 1 as output signal.

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

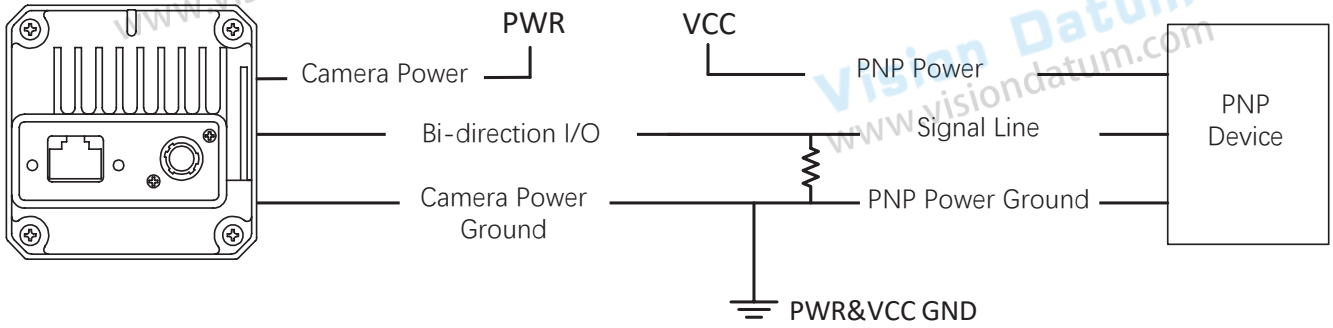
## Line 2 Bi-Directional Signal Wiring

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

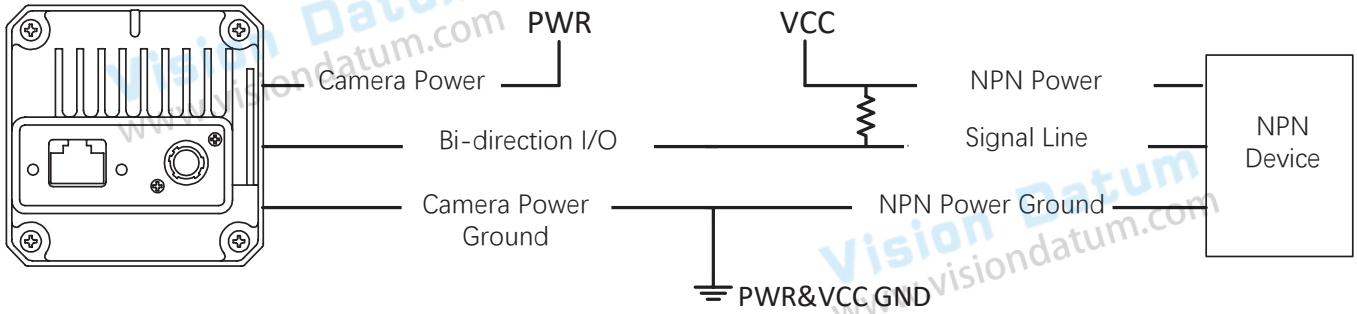
### Line2 Configured as Input Signal

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

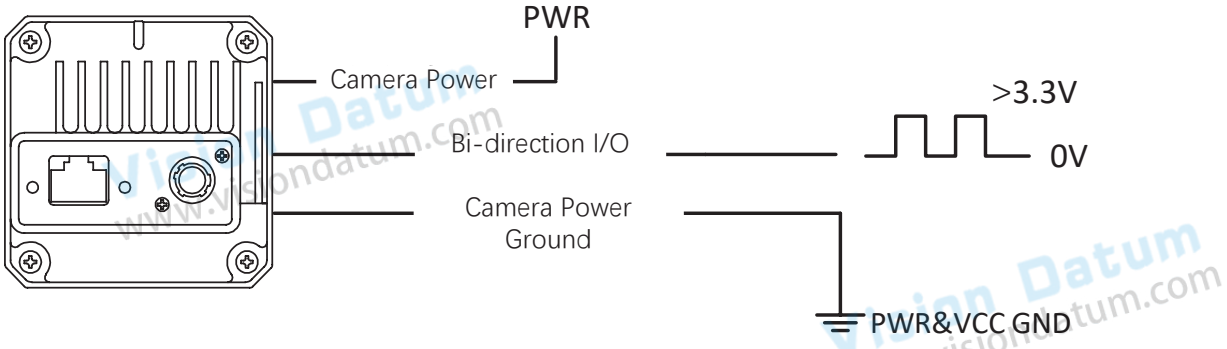
Input Signal Connects to PNP Device
It is recommended to use 330 Ω pull-down resistor.




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.

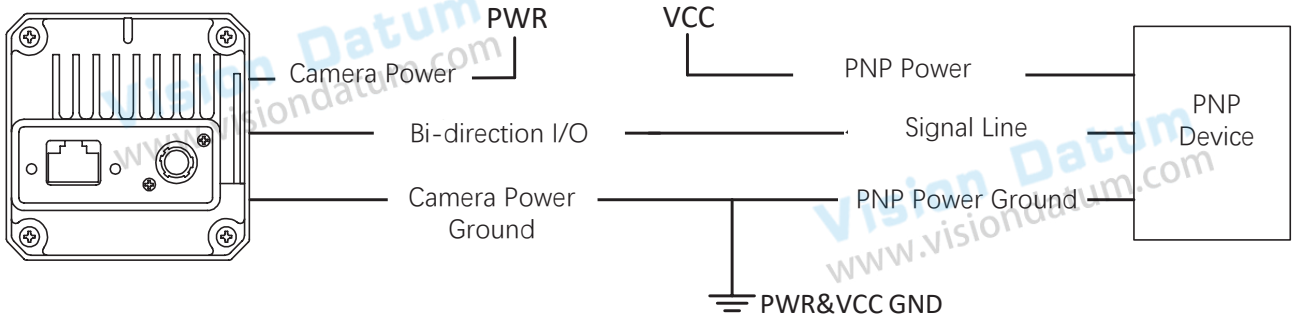


# I/O Wiring

## Line2 Configured as Output Signal

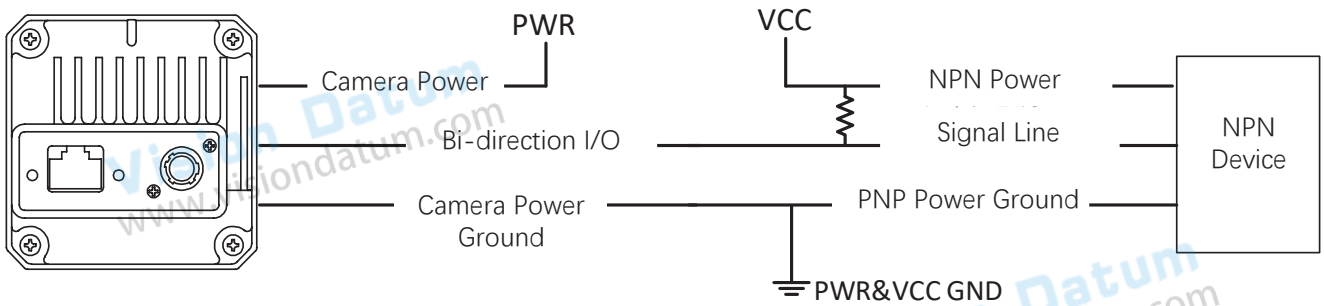
The output signal wiring is shown below when the device's Line 2 is configured as output signal.

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.

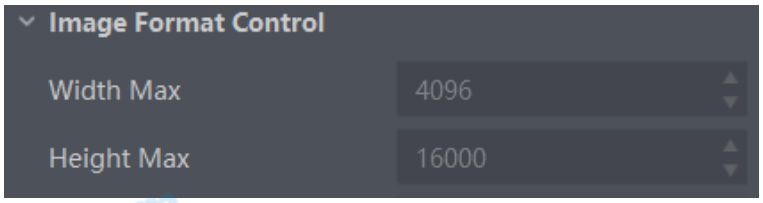


# CHAPTER 7 IMAGE PARAMETER



## 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.

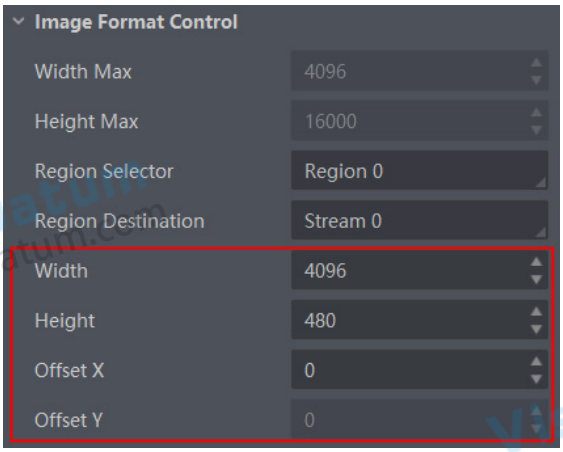



If you are only interested in a certain region of the image, you can set a Region of Interest (ROI) for the camera. Setting Region of Interest can reduce the bandwidth of the image being transmitted. Thus increasing the frame rate to some extent.

| | |
|---|---|
| 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.



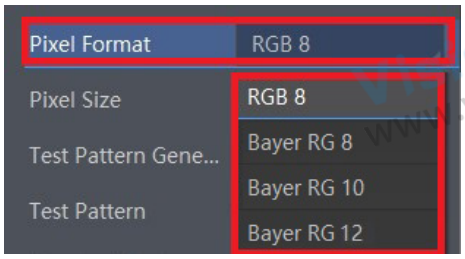

| | |
|---|---|
| i | The Width value plus Offset X value should not be larger than Width Max parameter value, Height value plus Offset Y value should not be larger than Height Max parameter value. |

## 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

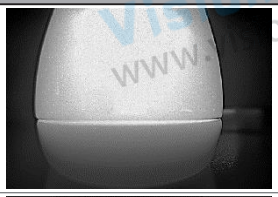
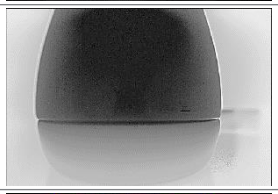
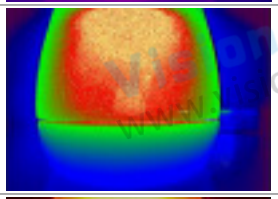
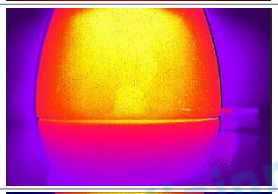
Temporal noise reduction performs noise reduction process on continuous multi-frame images. Go to Analog Control → DNR Temporal Level, and set DNR Temporal Level according to actual demands.
The higher temporal level is configured, the less noise in the image, but the more blurred the image details.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

## Palettes Mode

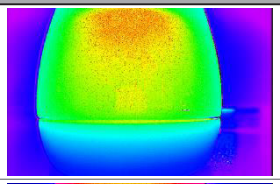
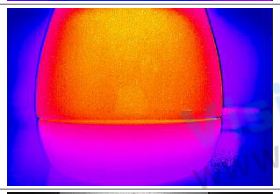
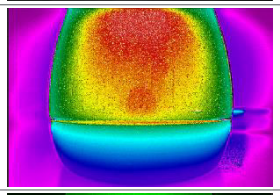
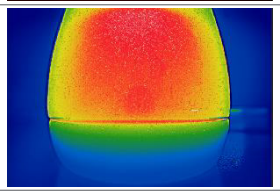
The palettes mode improves the recognizability of the image content in some occasions by overlaying grayscale value of images collected by the device.
The palettes mode has 15 types, including White Hot, Black Hot, Fusion 1, etc. Go to Analog Control → Palettes Mode, and set Palettes Mode according to 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 ,<br>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.

| | |
|---|---|
| i | ■ The device is powered on for more than 45 minutes.<br>■ Prepare a high temperature black body at 70 ° C or a low temperature black body at 10 ° C.<br>■ 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 Analog Control → Manual Background Correction, and click Execute in Manual Background Correction to perform background correction.

| | |
|---|---|
| i | 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.

■ 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 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.

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

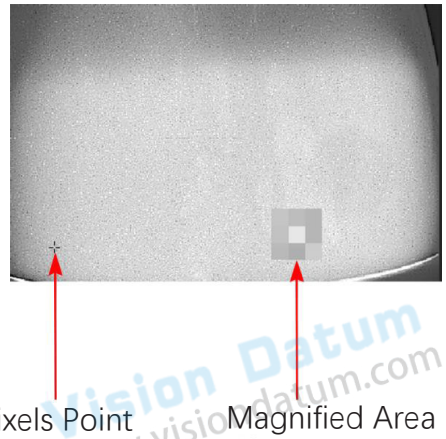
1. Go to Shading Correction → Manual DPC, and set On or Off as Manual DPC.

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.





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.

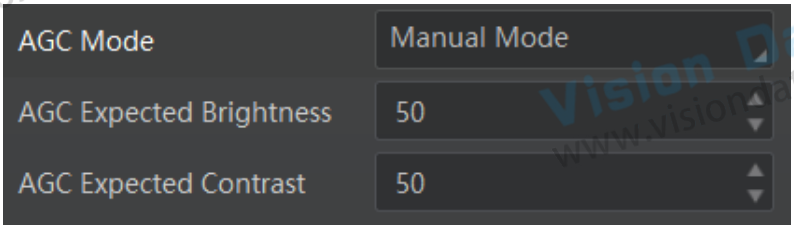
## Set AGV Mode

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.

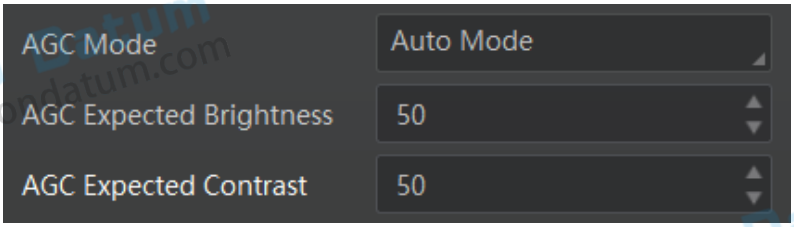



### Auto Mode

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.




| | |
|---|---|
| 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. |

# 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.<br>● If User ID is empty, the client software displays the device model.<br>● 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. |

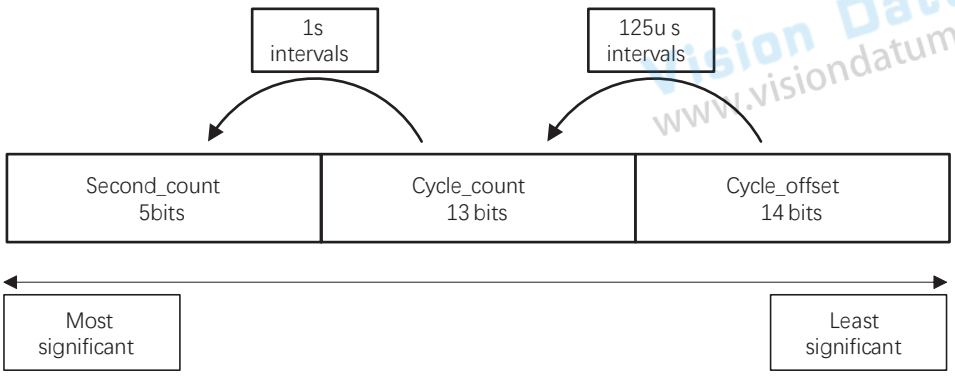
The specific device control parameters may differ by camera models.

## 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. |




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.

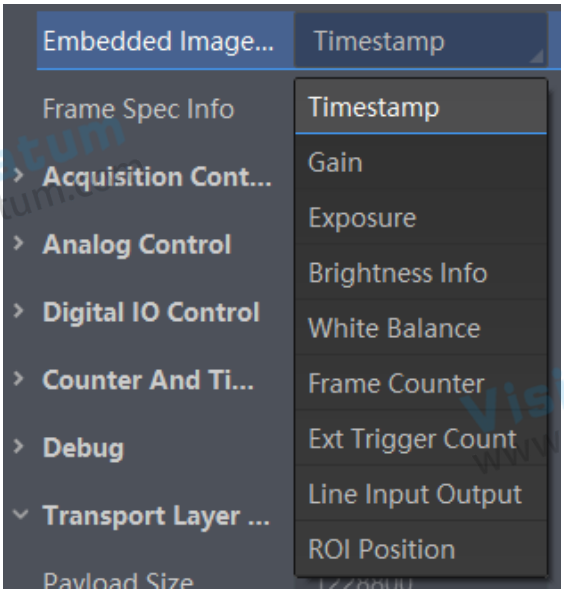
● Chunk Data Comtrol Set: You can also use the chunk data function to add the embedded information in images. The chunk data function allows you to generate supplementary image data and append that data to every image that you acquire.

| | |
|---|---|
| i | ■ The chunk data function may differ by camera models.<br>■ The chunk data function is not supported if the camera enables the image compression mode.<br>■ 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.

| | |
|---|---|
| i | 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. |

## 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.

| | |
|---|---|
| | 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. |
| --- | --- | --- |

## 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. |

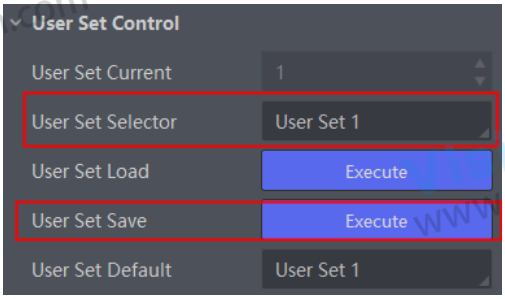
## Save and Load User Set

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.

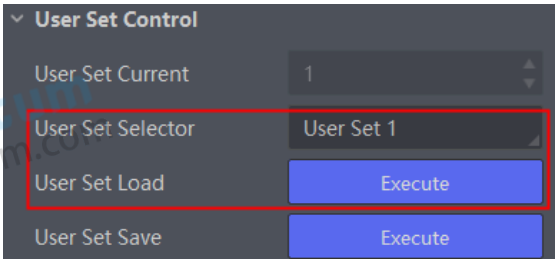
_Save Parameters:

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.

# 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@visiondatum.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. | | |

**Hangzhou Vision Datum Technology Co., Ltd**

No.8 Xiyuan 9th Road, West Lake District Hangzhou Zhejiang 310030 China
Tel: 86-571-86888309
www.visiondatum.com