



# GigE Frame Grabber

User Manual

# Legal Information

© 2023 Hangzhou Hikrobot Co., Ltd. All rights reserved.

## About this Manual

The Manual includes instructions for using and managing the Product. Pictures, charts, images and all other information hereinafter are for description and explanation only. The information contained in the Manual is subject to change, without notice, due to firmware updates or other reasons. Please find the latest version of this Manual at the Hikrobot website (<https://en.hikrobotics.com>). Please use this Manual with the guidance and assistance of professionals trained in supporting the Product.

## Trademarks

**HIKROBOT** and other Hikrobot's trademarks and logos are the properties of Hikrobot in various jurisdictions. Other trademarks and logos mentioned are the properties of their respective owners.

## Disclaimer

TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, THIS MANUAL AND THE PRODUCT DESCRIBED, WITH ITS HARDWARE, SOFTWARE AND FIRMWARE, ARE PROVIDED "AS IS" AND "WITH ALL FAULTS AND ERRORS". HIKROBOT MAKES NO WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION, MERCHANTABILITY, SATISFACTORY QUALITY, OR FITNESS FOR A PARTICULAR PURPOSE. THE USE OF THE PRODUCT BY YOU IS AT YOUR OWN RISK. IN NO EVENT WILL HIKROBOT BE LIABLE TO YOU FOR ANY SPECIAL, CONSEQUENTIAL, INCIDENTAL, OR INDIRECT DAMAGES, INCLUDING, AMONG OTHERS, DAMAGES FOR LOSS OF BUSINESS PROFITS, BUSINESS INTERRUPTION, OR LOSS OF DATA, CORRUPTION OF SYSTEMS, OR LOSS OF DOCUMENTATION, WHETHER BASED ON BREACH OF CONTRACT, TORT (INCLUDING NEGLIGENCE), PRODUCT LIABILITY, OR OTHERWISE, IN CONNECTION WITH THE USE OF THE PRODUCT, EVEN IF HIKROBOT HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES OR LOSS.

YOU ACKNOWLEDGE THAT THE NATURE OF THE INTERNET PROVIDES FOR INHERENT SECURITY RISKS, AND HIKROBOT SHALL NOT TAKE ANY RESPONSIBILITIES FOR ABNORMAL OPERATION, PRIVACY LEAKAGE OR OTHER DAMAGES RESULTING FROM CYBER-ATTACK, HACKER ATTACK, VIRUS INFECTION, OR OTHER INTERNET SECURITY RISKS; HOWEVER, HIKROBOT WILL PROVIDE TIMELY TECHNICAL SUPPORT IF REQUIRED. YOU AGREE TO USE THIS PRODUCT IN COMPLIANCE WITH ALL APPLICABLE LAWS, AND YOU ARE SOLELY RESPONSIBLE FOR ENSURING THAT YOUR USE CONFORMS TO THE APPLICABLE LAW. ESPECIALLY, YOU ARE RESPONSIBLE, FOR USING THIS PRODUCT IN A MANNER THAT DOES NOT INFRINGE ON THE RIGHTS OF THIRD PARTIES, INCLUDING WITHOUT LIMITATION, RIGHTS OF PUBLICITY, INTELLECTUAL PROPERTY RIGHTS, OR DATA PROTECTION AND OTHER PRIVACY RIGHTS. YOU SHALL NOT USE THIS PRODUCT FOR ANY PROHIBITED END-USES, INCLUDING THE DEVELOPMENT OR PRODUCTION OF WEAPONS OF MASS DESTRUCTION, THE DEVELOPMENT OR PRODUCTION OF CHEMICAL OR BIOLOGICAL WEAPONS, ANY ACTIVITIES IN THE CONTEXT RELATED TO ANY NUCLEAR

EXPLOSIVE OR UNSAFE NUCLEAR FUEL-CYCLE, OR IN SUPPORT OF HUMAN RIGHTS ABUSES.

THE PERFORMANCE DATA IN THIS PUBLICATION IS BASED ON HIKROBOT'S INTERNAL RESEARCH/EVALUATION. ACTUAL DATA MAY VARY DEPENDING ON SPECIFIC CONFIGURATIONS AND OPERATING CONDITIONS AND HIKROBOT SHALL NOT BEAR THE CONSEQUENCES ARISING THEREFROM.

IN THE EVENT OF ANY CONFLICTS BETWEEN THIS MANUAL AND THE APPLICABLE LAW, THE LATTER PREVAILS.

## Regulatory Information

---



### Note

These clauses apply only to the products bearing the corresponding mark or information.

---

### FCC Information

Please take attention that changes or modification not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

#### FCC Compliance

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

#### FCC Conditions

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

### EU Conformity Statement



This product and - if applicable - the supplied accessories too are marked with "CE" and comply therefore with the applicable harmonized European standards listed under the Directive 2014/30/EU(EMCD), Directive 2001/95/EC(GPSD) and Directive 2011/65/EU(RoHS).



2012/19/EU (WEEE directive): Products marked with this symbol cannot be disposed of as unsorted municipal waste in the European Union. For proper recycling, return this product to your local supplier upon the purchase of equivalent new equipment, or dispose of it at designated collection points. For more information see: <http://www.recyclethis.info>



2006/66/EC (battery directive): This product contains a battery that cannot be disposed of as unsorted municipal waste in the European Union. See the product documentation for specific battery information. The battery is marked with this symbol, which may include lettering to indicate cadmium (Cd), lead (Pb), or mercury (Hg). For proper recycling, return the battery to your supplier or to a designated

**Warning:** This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

### KC Certification

**Class A:** The device is advised to note that as a seller or a business user (Class A) Devices and intended for use outside the Home area.

A급 기기: 이 기기는 업무용(A급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기바라며, 가정 외의 지역에서 사용하는 것을 목적으로 합니다.

## Symbol Conventions

The symbols that may be found in this document are defined as follows.

| Symbol                                                                                             | Description                                                                                                                                                     |
|----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <b>Danger</b>  | Indicates a hazardous situation which, if not avoided, will or could result in death or serious injury.                                                         |
|  <b>Caution</b> | Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance degradation, or unexpected results. |
|  <b>Note</b>    | Provides additional information to emphasize or supplement important points of the main text.                                                                   |

## Available Model

This manual is applicable to the GigE frame grabber.

## Contact Information

Hangzhou Hikrobot Co., Ltd.

E-mail: [global.support@hikrobotics.com](mailto:global.support@hikrobotics.com)

Website: <https://en.hikrobotics.com/>

# Contents

|                                                   |           |
|---------------------------------------------------|-----------|
| <b>Chapter 1 Safety Instruction .....</b>         | <b>1</b>  |
| 1.1 Safety Claim .....                            | 1         |
| 1.2 Safety Instruction .....                      | 1         |
| 1.3 Electromagnetic Interference Prevention.....  | 2         |
| <b>Chapter 2 Overview.....</b>                    | <b>4</b>  |
| 2.1 Introduction.....                             | 4         |
| 2.2 Key Feature.....                              | 4         |
| 2.3 Appearance.....                               | 4         |
| 2.3.1 ATX Power Supply Interface.....             | 5         |
| 2.3.2 I/O Connector .....                         | 6         |
| 2.3.3 PCIe2.0 Interface.....                      | 8         |
| 2.3.4 GigE Interface .....                        | 9         |
| 2.3.5 Indicator.....                              | 9         |
| <b>Chapter 3 Installation and Debugging .....</b> | <b>11</b> |
| 3.1 Installation Preparation.....                 | 11        |
| 3.2 Install Frame Grabber .....                   | 11        |
| 3.3 Install MVS Client Software.....              | 12        |
| 3.4 Basic Operation of MVS Client Software.....   | 13        |
| 3.4.1 GenTL.....                                  | 13        |
| 3.4.2 GigE .....                                  | 16        |
| 3.5 Secondary Development .....                   | 17        |
| <b>Chapter 4 Operating Principle .....</b>        | <b>19</b> |
| <b>Chapter 5 I/O Introduction .....</b>           | <b>20</b> |
| 5.1 External I/O Connector .....                  | 20        |
| 5.1.1 I/O Electrical Feature .....                | 20        |
| 5.1.2 I/O Input Wiring .....                      | 25        |
| 5.1.3 I/O Output Wiring .....                     | 27        |
| 5.2 Input and Output Signals .....                | 28        |
| 5.2.1 Input Signal.....                           | 29        |

|                                                                               |           |
|-------------------------------------------------------------------------------|-----------|
| 5.2.2 Encoder Control .....                                                   | 31        |
| 5.2.3 Timer Control .....                                                     | 35        |
| 5.2.4 Output Signal .....                                                     | 37        |
| <b>Chapter 6 Other Functions .....</b>                                        | <b>40</b> |
| 6.1 Device Control .....                                                      | 40        |
| 6.2 PoE .....                                                                 | 41        |
| 6.3 Action Control .....                                                      | 42        |
| 6.4 Stream .....                                                              | 44        |
| 6.5 Set Image Parameters .....                                                | 46        |
| 6.5.1 Set ROI .....                                                           | 46        |
| 6.5.2 Set Reverse X .....                                                     | 47        |
| 6.5.3 Set Image Interpolation .....                                           | 48        |
| 6.5.4 Set Gamma Correction .....                                              | 48        |
| 6.6 Update Firmware .....                                                     | 50        |
| 6.7 User Set Control .....                                                    | 51        |
| 6.7.1 Save User Set .....                                                     | 51        |
| 6.7.2 Load User Set .....                                                     | 52        |
| 6.7.3 Set User Default .....                                                  | 52        |
| 6.8 File Access Control .....                                                 | 53        |
| <b>Chapter 7 FAQ (Frequently Asked Questions) .....</b>                       | <b>54</b> |
| 7.1 Why the frame grabber cannot be enumerated? .....                         | 54        |
| 7.2 Why the camera connected to the frame grabber cannot be enumerated? ..... | 54        |
| 7.3 Why the camera's frame rate is not stable? .....                          | 55        |
| 7.4 How to deal with the packet loss? .....                                   | 55        |
| <b>Chapter 8 Revision History .....</b>                                       | <b>56</b> |
| <b>Appendix A Frame Grabber Accessories .....</b>                             | <b>1</b>  |
| <b>Appendix B Frame Grabber Fields .....</b>                                  | <b>3</b>  |

# Chapter 1 Safety Instruction

The safety instructions are intended to ensure that the user can use the device correctly to avoid danger or property loss. Read and follow these safety instructions before installing, operating and maintaining the device.

## 1.1 Safety Claim

- To ensure personal and device safety, when installing, operating, and maintaining the device, follow the signs on the device and all safety instructions described in the manual.
- The note, caution and danger items in the manual do not represent all the safety instructions that should be observed, but only serve as a supplement to all the safety instructions.
- The device should be used in an environment that meets the design specifications, otherwise it may cause malfunctions, and malfunctions or component damage caused by non-compliance with relevant regulations are not within the scope of the device's quality assurance.
- Our company will not bear any legal responsibility for personal safety accidents and property losses caused by abnormal operation of the device.

## 1.2 Safety Instruction

### **Caution:**

- Do not install the device if it is found that the device and accessories are damaged, rusted, water ingress, incorrect model, missing parts, etc. when unpacking.
- Avoid storing and transporting the device in places where have water splashing and rain, direct sunlight, strong electric fields, strong magnetic fields, strong vibrations, etc.
- Avoid dropping, smashing, or vigorously vibrating the device and components during handling.
- Do not touch the electronic components of the device with bare hands, which may cause damage to the device due to ESD.
- When installing the device, it needs to be installed by professionals under the condition of electrostatic protection. The PCB should not be exposed after the device is installed.
- It is forbidden to install the indoor device in an environment where it may be exposed to water or other liquids. If the device is damp, it may cause fire and electric shock hazard.
- Place the device in a place out of direct sunlight and ventilation, away from heat sources such as heaters and radiators.
- When the device is installed in a cabinet or terminal equipment, the cabinet or terminal equipment shall be provided with corresponding protective devices such as fireproof enclosures, electrical protective enclosures and mechanical protective enclosures, and

the protection level shall comply with IEC standards and local laws and regulations.

- In the use of the device, you must be in strict compliance with the electrical safety regulations of the nation and region.
- Make sure that the power consumption of ATX meets that of the device. For the specific power consumption of the device, please refer to the device's specifications.
- If the device emits smoke, odor or noise, please turn off the power and unplug the power cord immediately, and contact the dealer or service center in time.
- If the device is not working properly, contact the store or the nearest service center. Do not disassemble or modify the device in any way. (The company does not bear any liability for any problem arising from unauthorized modification or maintenance).
- Caution: If the device has battery, risk of explosion if battery is replaced by an incorrect type. Dispose of used batteries according to the instructions.
- Please dispose of the device in strict accordance with the relevant national or regional regulations and standards to avoid environmental pollution and property damage.

### **Note:**

- Check whether the device's package is in good condition, whether there is damage, intrusion, moisture, deformation, etc. before unpacking.
- Check the surface of the device and accessories for damage, rust, bumps, etc. when unpacking.
- Check whether the quantity and information of the device and accessories are complete after unpacking.
- Store and transport the device according to the storage and transport conditions of the device, and the storage temperature and humidity should meet the requirements.
- It is strictly prohibited to transport the device in combination with items that may affect or damage the device.
- Please read the manual and safety instructions carefully before installing the device.
- The device must not be exposed to water droplets or splashes, and it is strictly prohibited to place anything containing liquids (such as vases) on the device.
- The device should not be placed with exposed flame sources, such as lighted candles.
- Do not touch sharp edges of the device.
- Quality requirements for installation and maintenance personnel:
  - Qualification certificate or working experience in weak current system installation and maintenance, and relevant working experience and qualifications. Besides, the personnel must possess the following knowledge and operation skills.
  - The basic knowledge and operation skills of low voltage wiring and low voltage electronic circuit connection.
  - The ability to comprehend the contents of this manual.

## 1.3 Electromagnetic Interference Prevention

- Make sure that the shielding layer of cables is intact and 360° connected to the metal connector when using shielded cables.
- Do not route the device together with other equipment (especially servo motors, high-



power devices, etc.), and control the distance between cables to more than 10 cm. Make sure to shield the cables if unavoidable.

- The control cable of the device and the power cable of the industrial light source must be wired separately to avoid bundled wiring.
- The power cable, data cable, signal cable, etc. of the device must be wired separately. Make sure to ground them if the wiring groove is used to separate the wiring and the wiring groove is metal.
- During the wiring process, evaluate the wiring space reasonably, and do not pull the cables hard, so as not to damage the electrical performance of the cables.
- The unused cables of the device must be insulated.
- To avoid the accumulation of static electricity, ensure that other equipment (such as machines, internal components, etc.) and metal brackets on site are properly grounded.
- Make sure that the connector metal barrier of the device is well connected to the PC and other chassis, and if necessary, copper foil should be used to enhance the grounding effect.
- During the installation and use of the device, high voltage leakage must be avoided.
- Use a figure-eight bundle method if the device cable is too long.
- When connecting the device and metal accessories, they must be connected firmly to maintain good conductivity.
- Use a shielded network cable to connect to the device. If you use a self-made network cable, make sure that the shielding shell at the aviation head is well connected to the aluminum foil or metal braid of the shielding cable.

## Chapter 2 Overview

### 2.1 Introduction

The GigE frame grabber adopts four RJ45 interfaces and supports connecting to four cameras at most. It adopts onboard cache for image processing, which can reduce CPU load. The frame grabber can connect to the computer via the PCIe Gen2×2 or PCIe Gen2×4 bus and uses DMA technology to read acquired image data rapidly.

### 2.2 Key Feature

- Supports GigE Vision protocol and single channel can access to 1 Gbps at most.
- Supports PoE and single channel can provide 15 W at most.
- Adopts bus indicator and stream indicator to display frame grabber status in real time.
- Adopts multiple I/O interfaces and integrates inputs and outputs.
- Complies with general protocol stack.
- Provides SDK for secondary development.
- Comply with GenICam standard.

---

#### Note

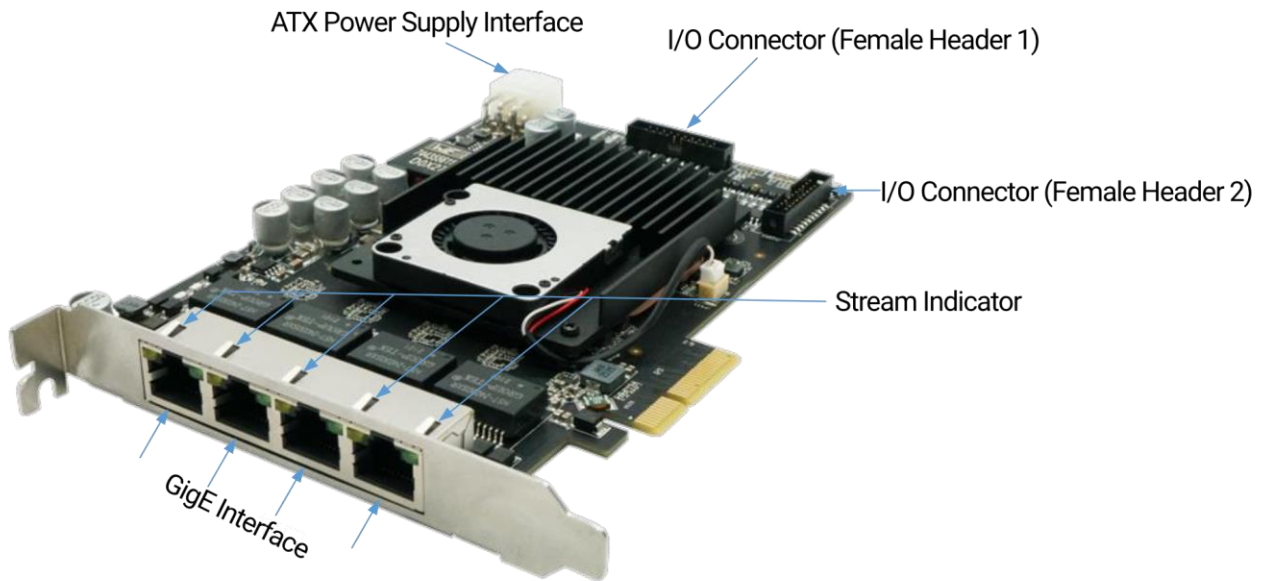
- The key feature may differ by device models.
  - Refer to the specification of the frame grabber for detailed parameters.
- 

### 2.3 Appearance

---

#### Note

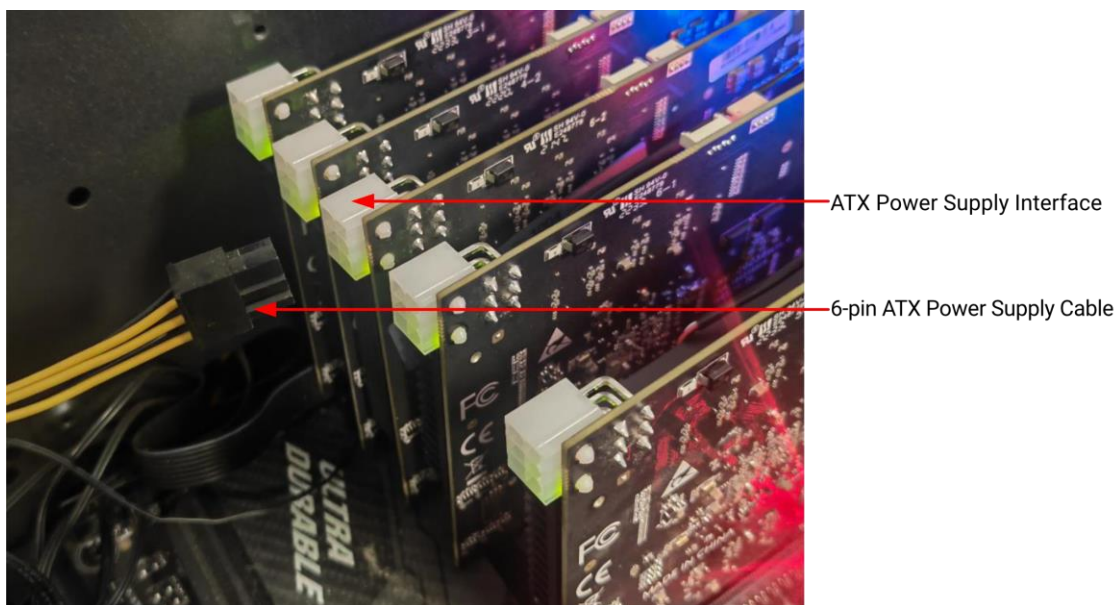
- Refer to the specification of the frame grabber for specific appearance and dimension.
  - The appearance is subject to change, and the actual device you purchased shall prevail.
-



**Figure 2-1 Appearance**

### 2.3.1 ATX Power Supply Interface

The ATX power supply interface is used for PoE link power supply. When the RJ45 interface uses the PoE function, make sure that the interface is connected to the 6-pin ATX 12V power supply cable of the host. The connection diagram is shown below.



**Figure 2-2 ATX Power Supply Interface**

### 2.3.2 I/O Connector

The frame grabber has multiple I/O connectors that provide input and output signals. You can use the I/O cable to connect the frame grabber and external devices.

The I/O cable is shown below. One end of the cable is DB26 connector that can be connected to external devices. The 1 to 20 pins of the DB26 connector have the same pin definition with that of the female header, and 21 to 26 pins are reserved. The other end of the cable is female header that can be connect to the frame grabber' s female header.

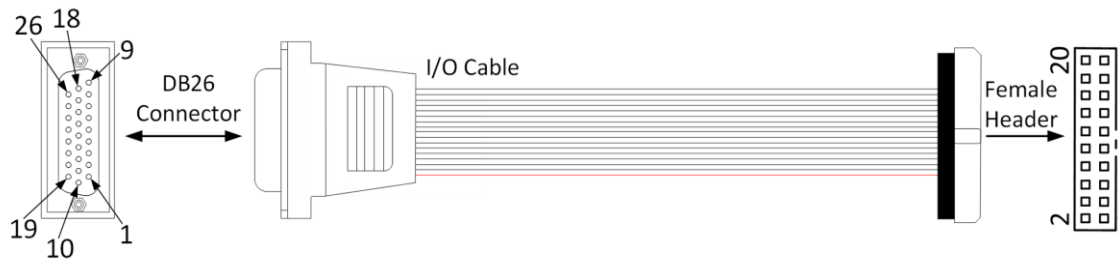


Figure 2-3 I/O Cable

#### Note

- The I/O cable mentioned above is sold alone, and you can contact the technical support to purchase it.
- MV-GE1104 frame grabber does not support I/O Connector

### Female Header 1

Refer to the figure and table below for the pin definition of the female header 1.

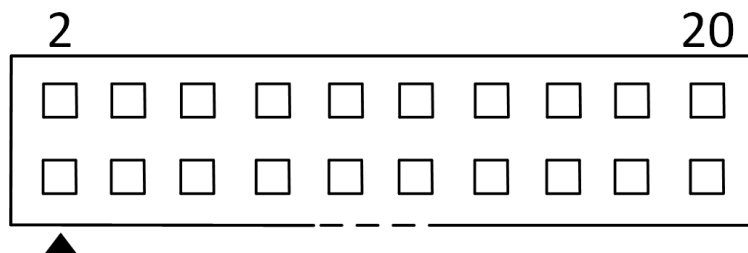


Figure 2-4 Female Header 1

#### Note

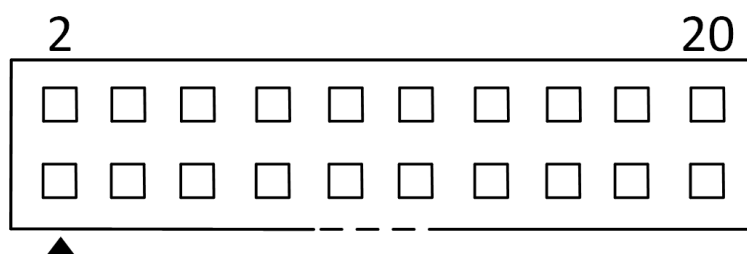
The non-isolated I/O ground can be used as the signal ground of other signals apart from opto coupler input/output.

**Table 2-1 Pin Definition of Female Header 1**

| No. | Signal    | Description                | No. | Signal      | Description             |
|-----|-----------|----------------------------|-----|-------------|-------------------------|
| 1   | OPTO_IN0  | Opto coupler input 0       | 11  | TTL_INPUT0  | TTL input 0             |
| 2   | OPTO_IN1  | Opto coupler input 1       | 12  | TTL_INPUT1  | TTL input 1             |
| 3   | OPTO_IN2  | Opto coupler input 2       | 13  | TTL_INPUT2  | TTL input 2             |
| 4   | OPTO_IN3  | Opto coupler input 3       | 14  | TTL_INPUT3  | TTL input 3             |
| 5   | IN_COM    | Opto coupler input ground  | 15  | GND         | Non-isolated I/O ground |
| 6   | OPTO_OUT0 | Opto coupler output 0      | 16  | TTL_OUTPUT0 | TTL output 0            |
| 7   | OPTO_OUT1 | Opto coupler output 1      | 17  | TTL_OUTPUT1 | TTL output 1            |
| 8   | OPTO_OUT2 | Opto coupler output 2      | 18  | TTL_OUTPUT2 | TTL output 2            |
| 9   | OPTO_OUT3 | Opto coupler output 3      | 19  | TTL_OUTPUT3 | TTL output 3            |
| 10  | OUT_COM   | Opto coupler output ground | 20  | GND         | Non-isolated I/O ground |

## Female Header 2

Refer to the figure and table below for the pin definition of the female header 2.



**Figure 2-5 Female Header 2**

### Note

The non-isolated I/O ground can be used as the signal ground of other signals apart from opto coupler input/output.

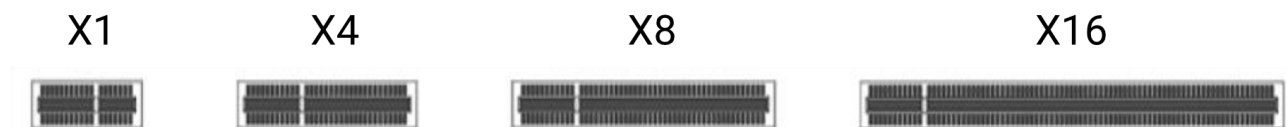
**Table 2-2 Pin Definition of Female Header 2**

| No. | Signal   | Description             | No. | Signal   | Description |
|-----|----------|-------------------------|-----|----------|-------------|
| 1   | TX422_0P | 422 output 0            | 11  | GND      | TTL input 0 |
| 2   | TX422_0N | 422 output 0            | 12  | TX422_2P | TTL input 1 |
| 3   | GND      | Non-isolated I/O ground | 13  | TX422_2N | TTL input 2 |

| No. | Signal      | Description               | No. | Signal   | Description             |
|-----|-------------|---------------------------|-----|----------|-------------------------|
| 4   | RX422_0P    | 422 input 0               | 14  | RX422_2P | TTL input 3             |
| 5   | 422 input 0 | Opto coupler input ground | 15  | RX422_2N | Non-isolated I/O ground |
| 6   | GND         | Non-isolated I/O ground   | 16  | GND      | TTL output 0            |
| 7   | TX422_1P    | 422 output 1              | 17  | TX422_3P | TTL output 1            |
| 8   | TX422_1N    | 422 output 1              | 18  | TX422_3N | TTL output 2            |
| 9   | RX422_1P    | 422 input 1               | 19  | RX422_3P | TTL output 3            |
| 10  | RX422_1N    | 422 input 1               | 20  | RX422_3N | Non-isolated I/O ground |

### 2.3.3 PCIe2.0 Interface

The frame grabber has a PCIe2.0 interface in x4 mode, which can be connected to the host. When in use, the PCIe2.0 interface of the frame grabber can be inserted into the X8 or X16 slots of the host, as shown below.



**Figure 2-6 PCIe2.0 Interface**

---

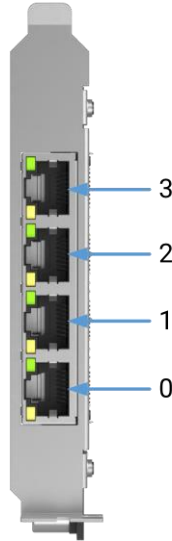
#### Note

MV-GE1104 frame grabber supports PCIe 2.0 x2 at most.

---

### 2.3.4 GigE Interface

The frame grabber has four RJ45 interfaces (0 to 3) that are used to connect GigE network.



**Figure 2-7 GigE Interface**

---

#### **Note**

MV-GE1104 frame grabber does not support PoE function.

---

### 2.3.5 Indicator

The frame grabber has 3 types of indicators, including PoE indicator, bus indicator, and stream indicator.

#### **PoE Indicator**

PoE indicator is used to indicate the status of PoE 48 V power supply.

- The power supply is normal if the indicator is solid.
- The power supply is abnormal or 6-pin ATX 12V power supply cable is not connected if the indicator is unlit.

---

#### **Note**

MV-GE1104 frame grabber neither supports PoE function nor has PoE indicator.

---

### **Bus Indicator**

Bus indicator is used to indicate whether the host's PCIe identifies the frame grabber.

- PCIe identifies the frame grabber if the indicator is solid.
- PCIe does not identify the frame grabber if the indicator is unlit.

### **Stream Indicator**

Stream indicator is used to indicate the status of GigE interface, and each GigE interface has two stream indicators.

- The network is connected if the indicator is solid green.
- Data is transmitting if the indicator is flashing yellow.



## Chapter 3 Installation and Debugging

### 3.1 Installation Preparation

Table 3-1 Installation Preparation

| Category             | Name                                       | Description                                                                                      |
|----------------------|--------------------------------------------|--------------------------------------------------------------------------------------------------|
| Software             | MVS Client Software                        | It is used to enumerate and set the frame grabber's parameters.                                  |
|                      | MVS Tool Kit                               | It is used to provide tool kit for you to finish the frame grabber's function configuration.     |
| Hardware             | GigE Network Cable                         | It is used to connect the frame grabber and cameras.                                             |
|                      | I/O Cable                                  | It is used to connect the frame grabber and external devices to realize I/O signal input/output. |
| API Function Library | SDK                                        | It is used for the secondary development.                                                        |
| Firmware Package     | MV_GE1004_.... .zip<br>MV_GE1104_.... .zip | It is used to update the frame grabber's firmware.                                               |

### 3.2 Install Frame Grabber

#### **Before You Start**

- Power off the host before installing the frame grabber, and then power on the host after the frame grabber is installed to avoid damage to it.
- In order to avoid the damage of human body static electricity to the frame grabber, make sure to clear the body static electricity before installing the frame grabber. Under normal circumstances, you can choose to touch the ground or computer metal shell and other simple methods to quickly release the body static electricity.

#### **Steps**

1. Insert the frame grabber into the computer's PCIe2.0 × 4 slot or above.
2. Use screws to fix the frame grabber with the host.
3. Use the cable of 6-pin ATX 12V to connect the frame grabber's ATX power supply interface to the host if PoE function is used.
4. Use GigE network cable to connect the camera and the frame grabber.

## 3.3 Install MVS Client Software

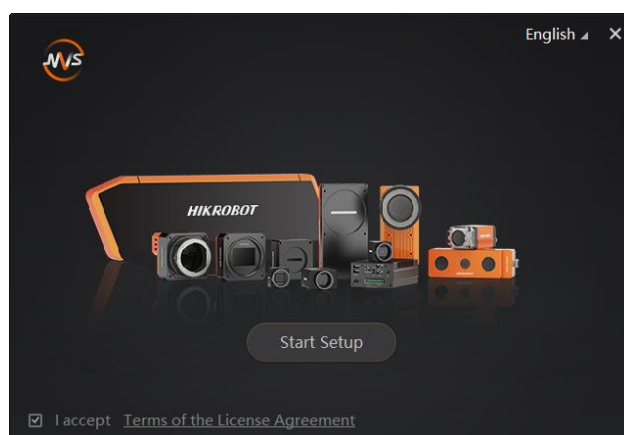
---

### Note

- The MVS client software is compatible with 32/64-bit Windows XP/7/10 and 64-bit Windows 11 operating systems.
  - Make sure that the version of MVS is V3.4.1 and above.
  - The graphic user interface may differ by different versions of client software you use.
  - The client software has integrated driver required by hardware, and no need to download and install other drivers.
  - You can download the client software from ***en.hikrobotics.com***.
- 

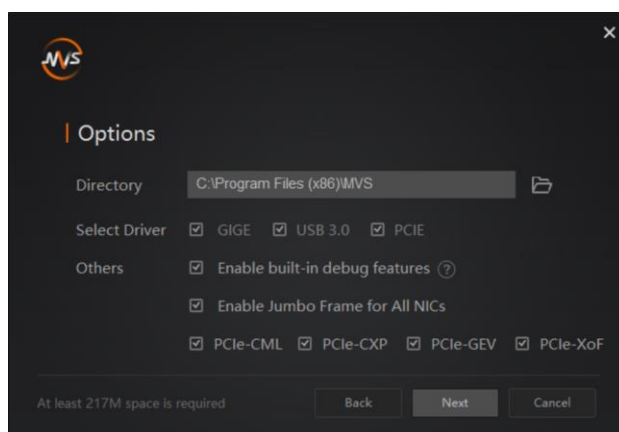
### Steps

1. Double click the MVS installation package.
2. Select the language.
3. Read and check **Terms of the License Agreement**.



**Figure 3-1 Installation Window**

4. Click **Start Setup**.
5. Select installation directory, driver and others.
  - **Select Driver:** You can check **GIGE**, **USB 3.0** and **PCIE** according to actual demands.
  - **Others:** Check **Enable built-in debug features** to make it easier to use breakpoints while the device is connected and streaming images. Check **Enable Jumbo Frame for All NICs** to enhance network transmission performance. Check **PCIE-CML**, **PCIE-CXP**, **PCIE-GEV**, **PCIE-XoF** to enumerate the corresponding frame grabbers.



**Figure 3-2 Installation Options**

---

### Note

- Regarding options, it is recommended to keep default settings.
- **PCle-CML, PCle-CXP, PCIE-GEV, PCIE-XoF** can be checked only when **PCIE** is checked.
- **PCle-CML, PCle-CXP, PCIE-GEV, PCIE-XoF** supports frame grabbers developed by our company only.

6. Click **Next** to install.

7. Finish the installation process according to the prompts.

---

## 3.4 Basic Operation of MVS Client Software

---

### Note

Device enumeration via GenTL or GigE cannot be done at the same time.

---

### 3.4.1 GenTL

The frame grabber and the camera connected to the frame grabber can be enumerated via GenTL in the device list of the MVS client software. You can also set parameters and update firmware of the frame grabber via the client software.

#### Steps

---

### Note

Refer to the user manual of the client software for detailed operations.

---

1. Run the MVS client software.
2. Click  in **GenTL** in device list, and select **Default Load** or **Import CTI File** to load CTI file.

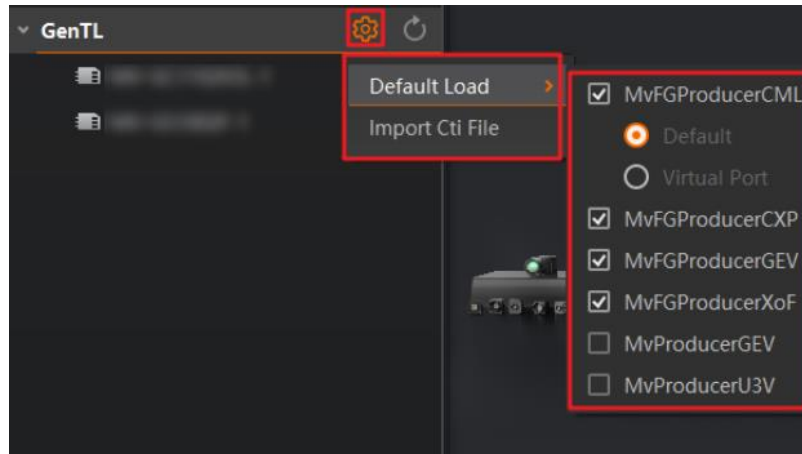


Figure 3-3 Select CTI File

- If you select **Default Load**, check **MvFGProducerGEV** and the client software will enumerate the frame grabber automatically.
- If you select **Import CTI File**, select **MvFGProducerGEV.cti** file from the local PC, and click **Open**.

### Note

- The SDK file path for the GenTL standard library is C:\Program Files (x86)\CommonFiles\MVS\Runtime.
- The CTI file is divided into 32-bit and 64-bit, please select according to actual needs. The 32-bit CTI file path is located: C:\Program Files (x86)\Common Files\MVS\Runtime\Win32\_i86. The 64-bit CTI file path is located: C:\Program Files (x86)\CommonFiles\MVS\Runtime\Win64\_x64.

3. Click  in the specific frame grabber name to connect it. The main window of the client software is shown below.

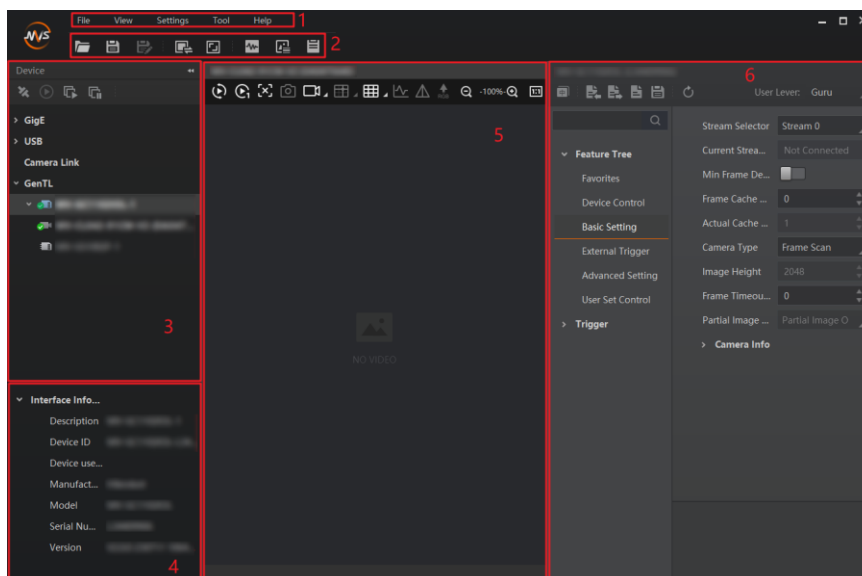


Figure 3-4 Main Window

---

### Note

- For specific main window of the client software, please refer to the actual one you got.
  - The feature tree displayed in the client software may differ by device models.
- 

**Table 3-2 Main Window Description**

| No. | Area Name                | Description                                                                                                                     |
|-----|--------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| 1   | Menu Bar                 | The menu bar displays function modules, including <b>File</b> , <b>View</b> , <b>Settings</b> , <b>Tool</b> , and <b>Help</b> . |
| 2   | Control Toolbar          | The control toolbar provides quick operations for the device.                                                                   |
| 3   | Device List Panel        | This panel displays device list, and you can connect or disconnect device, etc.                                                 |
| 4   | Device Information Panel | This panel displays the detailed device information.                                                                            |
| 5   | Display Window           | This area displays the acquisition images in real-time. You can click different icons to capture and save image, record, etc.   |
| 6   | Feature Panel            | You can view and set features of the selected device.                                                                           |

4. Set parameters in the feature tree according to actual demands.

**Table 3-3 Parameter Description**

| Parameter Name            | Description                                                                |
|---------------------------|----------------------------------------------------------------------------|
| Device Control            | It displays the basic information about the frame grabber.                 |
| GigE                      | It sets PoE related parameters.                                            |
| Stream                    | It selects specific stream, enables frame delay and quick frame mode, etc. |
| Encoder Control           | It sets signal sources and other parameters of the encoder.                |
| Digital IO Control        | It sets the I/O signals.                                                   |
| Counter and Timer Control | It sets signal sources and other parameters of the counter.                |
| User Set Control          | It allows loading or saving default or user-defined settings.              |

5. After loading GenTL library, the client software will enumerate the frame grabber and connected cameras automatically.

---

### Note

Refer to the camera's user manual and MVS's user manual for detailed camera operation.

---

### 3.4.2 GigE

MV-GE1104 frame grabber not only supports enumeration via GenTL, but also via virtual network interface card (NIC).

#### Note

Under the virtual NIC, only the first connected camera can acquire images from the card side through DMA.

#### Steps

1. Go to **GigE** in device list, and find the virtual NIC of MV-GE1104 and its connected cameras.

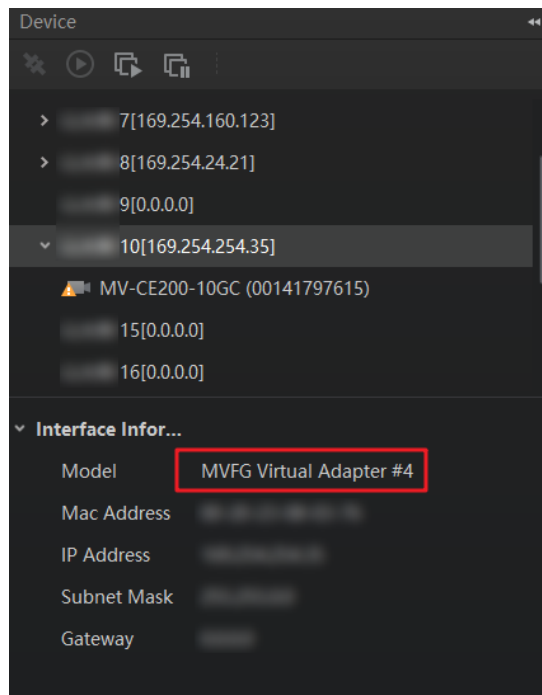


Figure 3-5 Virtual NIC

2. Right click the virtual NIC of MV-GE1104 after selecting it, and click **NIC Settings**.

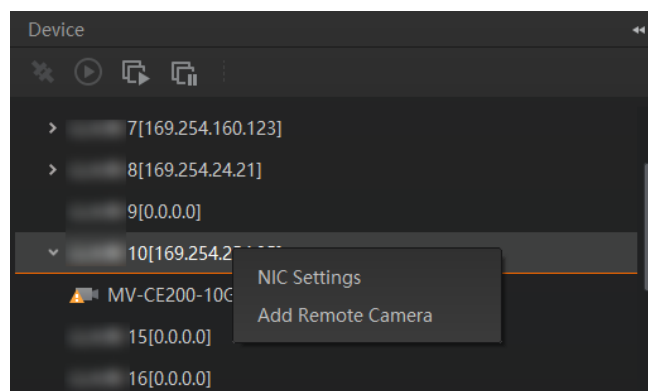
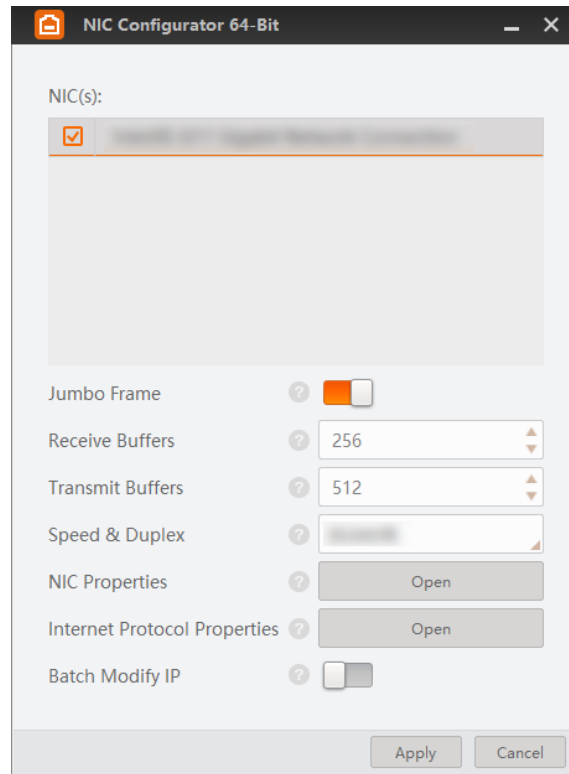


Figure 3-6 NIC Settings

3. Set parameters of the NIC via the NIC configurator tool according to actual demands.



**Figure 3-7 Set NIC Parameters**

### 3.5 Secondary Development

Users can perform secondary development of the frame grabber. The SDK secondary development data path is located: C:\Program Files (x86)\MVS\Development, as shown below. Please refer to the following table for the specific contents of each folder.

| Local Disk (C:) > Program Files (x86) > MVS > Development > |                   |             |
|-------------------------------------------------------------|-------------------|-------------|
| Name                                                        | Date modified     | Type        |
| Bin                                                         | 6/26/2023 6:34 PM | File folder |
| Documentations                                              | 7/4/2023 11:01 AM | File folder |
| DotNet                                                      | 6/26/2023 6:34 PM | File folder |
| Includes                                                    | 6/26/2023 6:34 PM | File folder |
| Libraries                                                   | 6/26/2023 6:34 PM | File folder |
| MVFG                                                        | 6/26/2023 6:34 PM | File folder |
| Samples                                                     | 6/26/2023 6:34 PM | File folder |
| ThirdPartyPlatformAdapter                                   | 6/26/2023 6:34 PM | File folder |

**Figure 3-8 Secondary Development**

**Table 3-4 Parameter Description**

| <b>Folder Name</b>        | <b>Content Description</b>                                                                        |
|---------------------------|---------------------------------------------------------------------------------------------------|
| Bin                       | It is the result of the compilation.                                                              |
| Documentations            | It is secondary development documentation, including SDK development guide and Demo instructions. |
| DotNet                    | Some dynamic libraries developed in C#.                                                           |
| Includes                  | Header files.                                                                                     |
| Libraries                 | Static library.                                                                                   |
| MVFG                      | SDK contents of frame grabber.                                                                    |
| Samples                   | Sample code for various programming languages.                                                    |
| ThirdPartyPlatformAdapter | Third-party platform plug-ins.                                                                    |



## Chapter 4 Operating Principle

The onboard diagram of the frame grabber is shown below. The working process of streaming from the designated camera via the frame grabber is as follows:

After the frame grabber establishes a connection with the camera, the PC side sends a streaming control instruction to the frame grabber through PCIe, and after the frame grabber GVCP data packet and MAC layer processing, the network packet is sent through the external PHY. The external PHY receives the camera network data packet, extracts the valid GVSP stream data packet after MAC layer parsing, sends it to the stream extraction module for image extraction, storage and ISP image processing, and transmits the valid image data to the PC side through PCIe.

Besides, MV-GE1004 frame grabber supports ToE trigger function. External I/O trigger sends action network packets to trigger the camera.

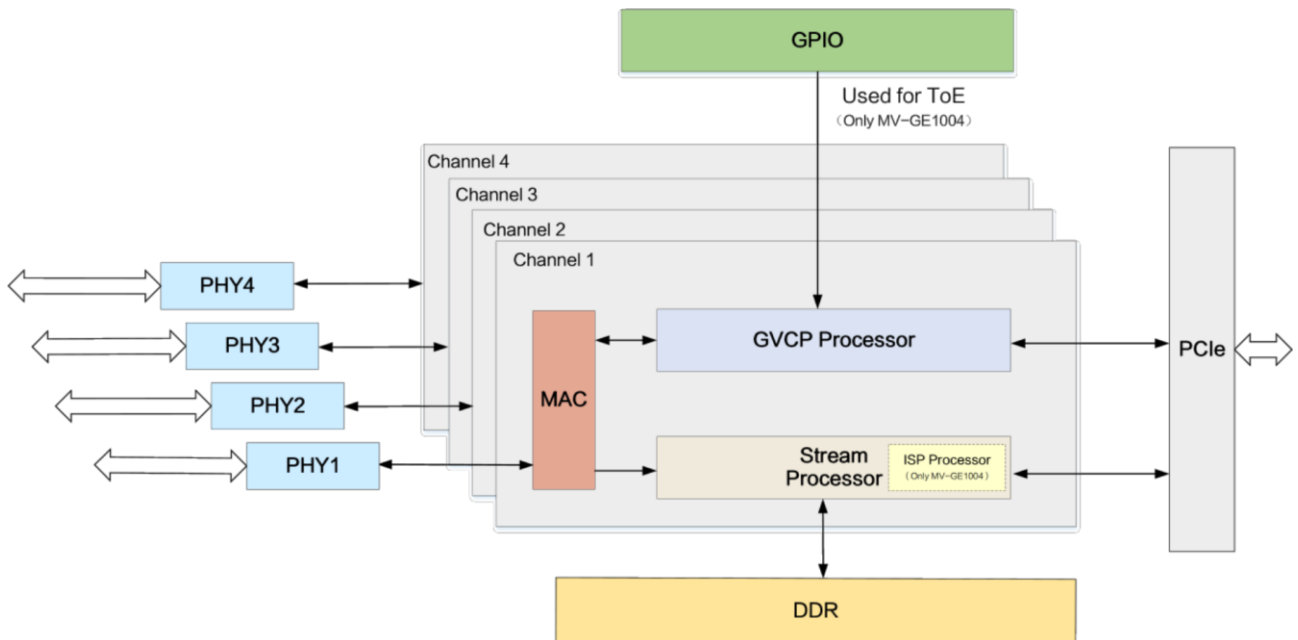


Figure 4-1 Operating Principle

## Chapter 5 I/O Introduction

---

### Note

MV-GE1004 frame grabber does not support I/O input and output.

---

## 5.1 External I/O Connector

### 5.1.1 I/O Electrical Feature

#### Opto Coupler Input

The frame grabber has four opto coupler-isolated input signals, and their internal circuit is shown below.

---

### Note

The max. input current is 25 mA.

---

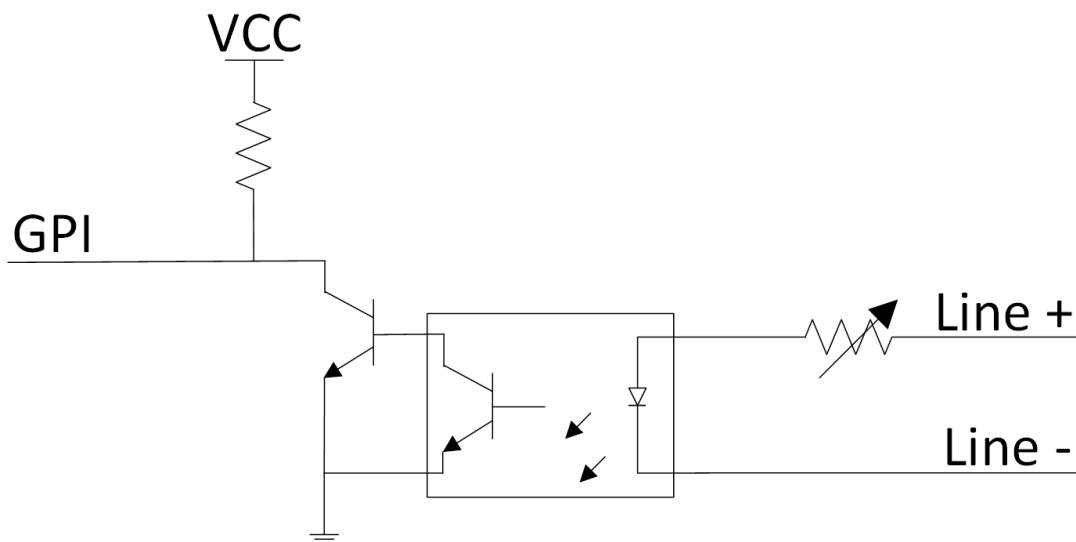


Figure 5-1 Internal Circuit of Opto Coupler Input

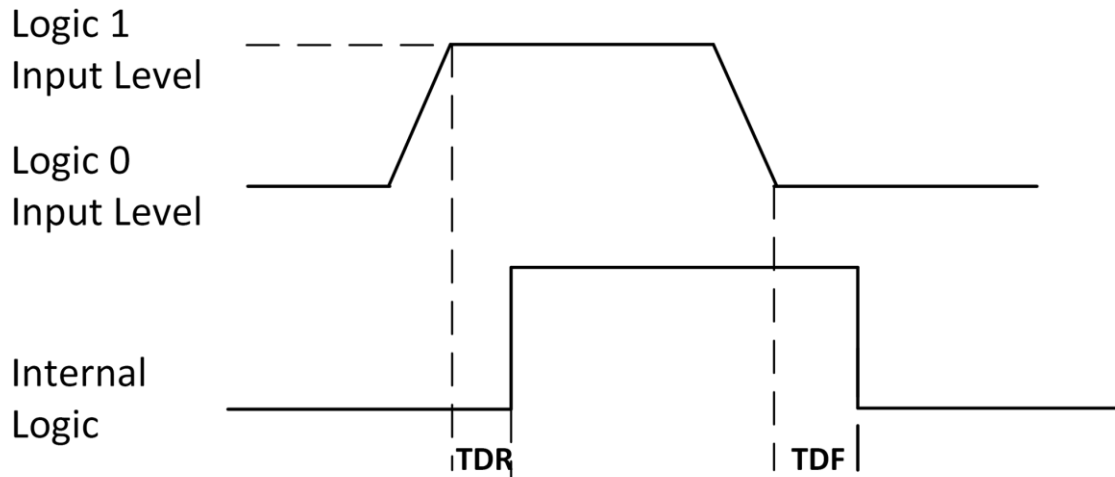


Figure 5-2 Input Logic Level

**Note**

- The electric circuit status is not stable when the input voltage is between 1 VDC and 1.5 VDC, and avoid this voltage range.
- The breakdown voltage is 30 VDC and keep voltage stable.

Table 5-1 Opto Coupler Input Electrical Feature

| Parameter Name         | Parameter Symbol | Value                      |
|------------------------|------------------|----------------------------|
| Input Logic Level Low  | VL               | 0 VDC to 1 VDC             |
| Input Logic Level High | VH               | 1.5 VDC to 24 VDC          |
| Input Rising Delay     | TDR              | 1.8 $\mu$ s to 4.6 $\mu$ s |
| Input Falling Delay    | TDF              | 16.8 $\mu$ s to 22 $\mu$ s |

## Opto Coupler Output

The frame grabber has four opto coupler-isolated output signals, and their internal circuit is shown below.

**Note**

The max. output current is 25 mA.

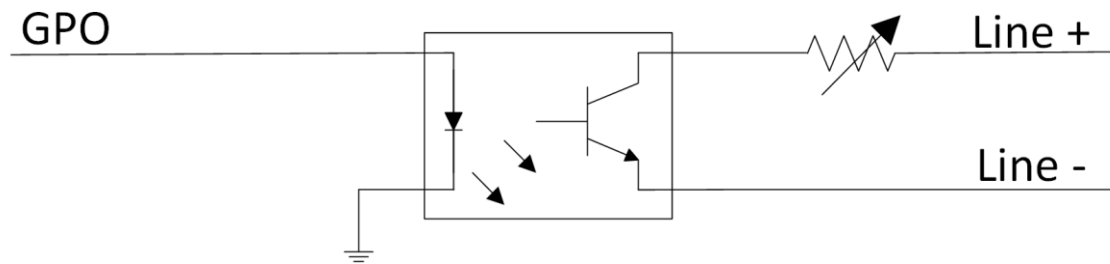


Figure 5-3 Internal Circuit of Opto Coupler Output

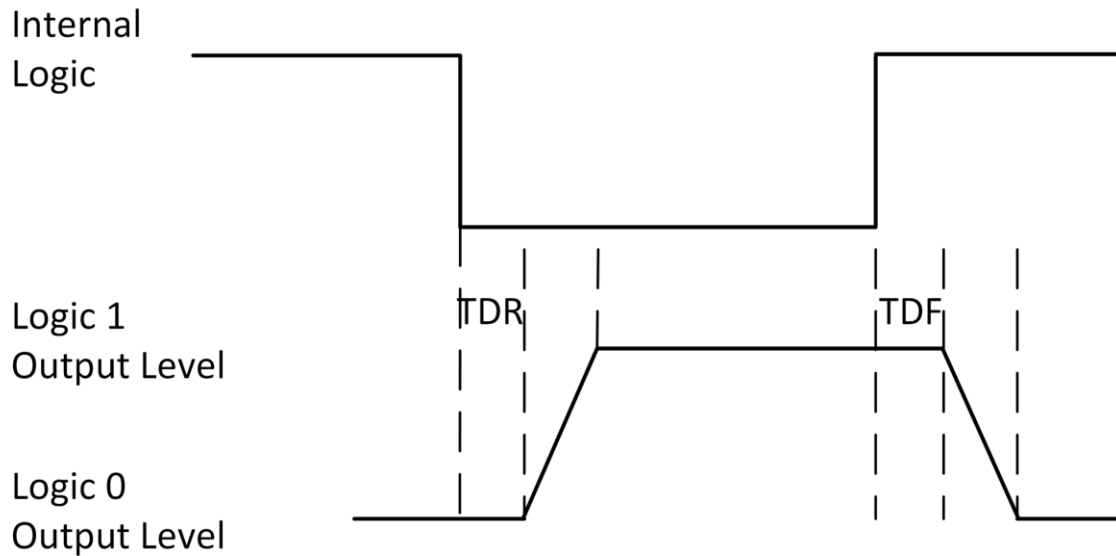


Figure 5-4 Output Logic Level

When the external voltage is 3.3 VDC and the external resistance is 1 K $\Omega$ , the electrical feature of opto coupler output is shown in below.

Table 5-2 Opto Coupler Output Electrical Feature

| Parameter Name          | Parameter Symbol | Value                    |
|-------------------------|------------------|--------------------------|
| Output Logic Level Low  | VL               | 575 mV                   |
| Output Logic Level High | VH               | 3.3 VDC                  |
| Output Rising Time      | TR               | 8.4 $\mu$ s              |
| Output Falling Time     | TF               | 1.9 $\mu$ s              |
| Output Rising Delay     | TDR              | 15 $\mu$ s to 60 $\mu$ s |
| Output Falling Delay    | TDF              | 3 $\mu$ s to 6 $\mu$ s   |

With different external voltages and resistances, the corresponding current and parameters of output logic level low are shown below.

Table 5-3 Parameter of Output Logic Level Low

| External Voltage | External Resistance | VL     | Output Current |
|------------------|---------------------|--------|----------------|
| 3.3 VDC          | 1 K $\Omega$        | 575 mV | 2.7 mA         |
| 5 VDC            | 1 K $\Omega$        | 840 mV | 4.1 mA         |
| 12 VDC           | 2.4 K $\Omega$      | 915 mV | 4.6 mA         |
| 24 VDC           | 4.7 K $\Omega$      | 975 mV | 4.9 mA         |

## TTL Input/Output

The frame grabber has four TTL input signals and four TTL output signals. Their internal circuit is shown below, and A stands for signal input and Y stands for signal output.

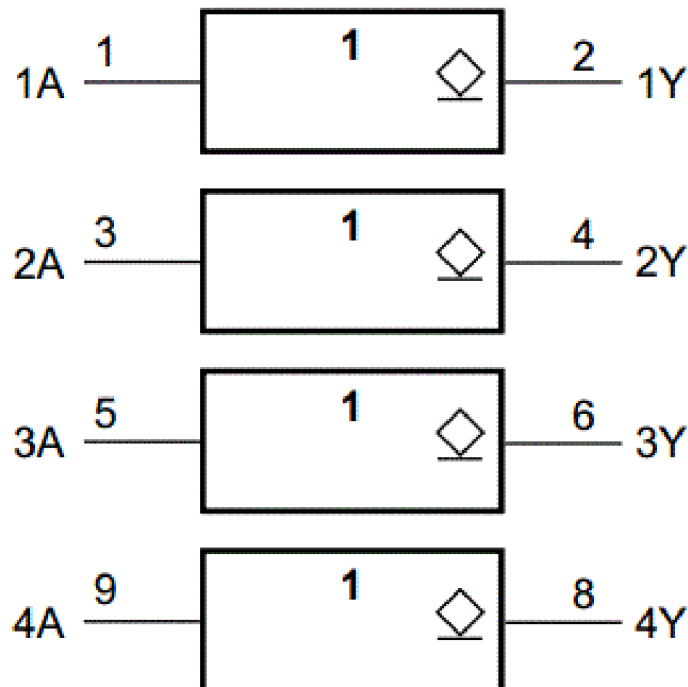
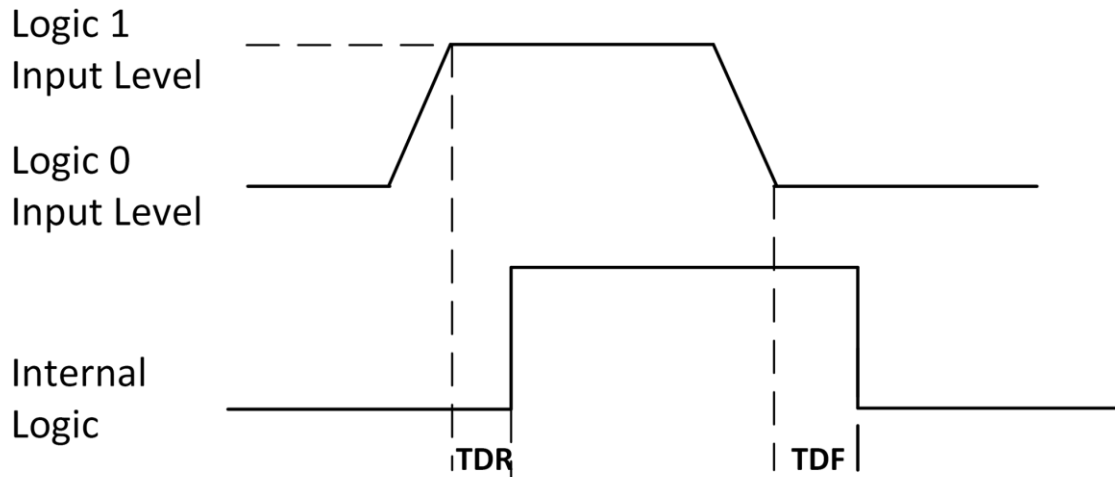


Figure 5-5 Internal Circuit of TTL Input/Output



**Figure 5-6 Logic Level of TTL Input/Output**

The electrical feature of the TTL input/output is shown below.

**Table 5-4 TTL Input Electrical Feature**

| Parameter Name         | Parameter Symbol | Value            |
|------------------------|------------------|------------------|
| Input Logic Level Low  | VL               | 0 VDC to 0.8 VDC |
| Input Logic Level High | VH               | 2 VDC to 5 VDC   |
| Input Rising Delay     | TDR              | < 10 ns          |
| Input Falling Delay    | TDF              | < 10 ns          |

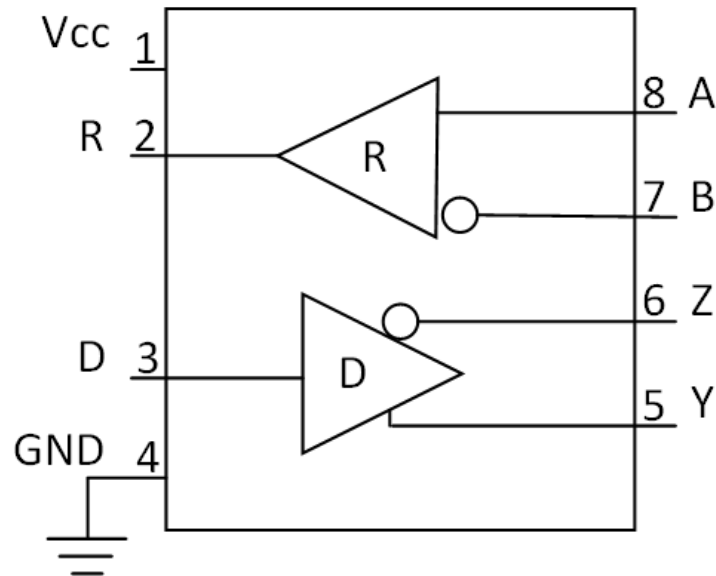
**Table 5-5 TTL Output Electrical Feature**

| Parameter Name          | Parameter Symbol | Value            |
|-------------------------|------------------|------------------|
| Output Logic Level Low  | VOL              | 0 VDC to 0.4 VDC |
| Output Logic Level High | VOH              | 2.4 VDC to 5 VDC |
| Output Rising Delay     | TDR              | < 10 ns          |
| Output Falling Delay    | TDF              | < 10 ns          |

## 422 Input/Output

The frame grabber has four pairs of 422 input signal and four pairs of 422 output signal. Among them, one pair of 422 input signal and one pair of 422 out signal is in DB26 female connector.

The internal circuit of 422 input/output is shown below. A and B stand for 422 differential input, and Y and Z stand for 422 differential output.



**Figure 5-7 Internal Circuit of 422 Input/Output**

The differential signal threshold is  $-0.2\text{ V}$  and  $+0.2\text{ V}$ . The electrical feature of 422 input/output is shown below.

**Table 5-6 422 Input Electrical Feature**

| Input (A-B)                 | Output (R) |
|-----------------------------|------------|
| Higher than $+0.2\text{ V}$ | High       |
| Lower than $-0.2\text{ V}$  | Low        |

**Table 5-7 422 Output Electrical Feature**

| Input (D) | Output (Y) | Output (Z) |
|-----------|------------|------------|
| Low       | Low        | High       |
| High      | High       | Low        |

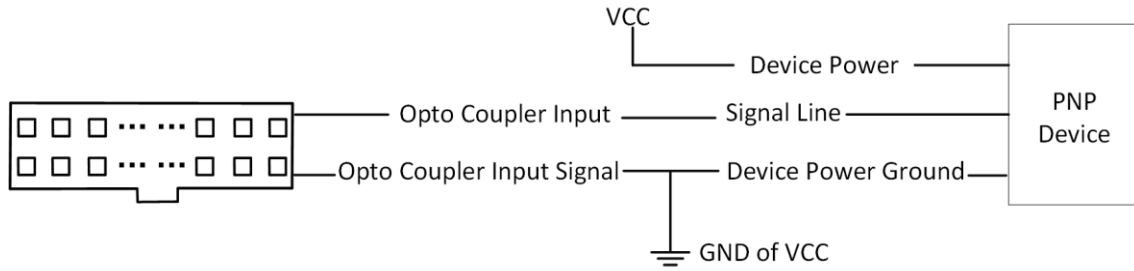
### 5.1.2 I/O Input Wiring

#### Opto Coupler Input Wiring

##### Note

Wirings may differ by types of external devices providing input signals.

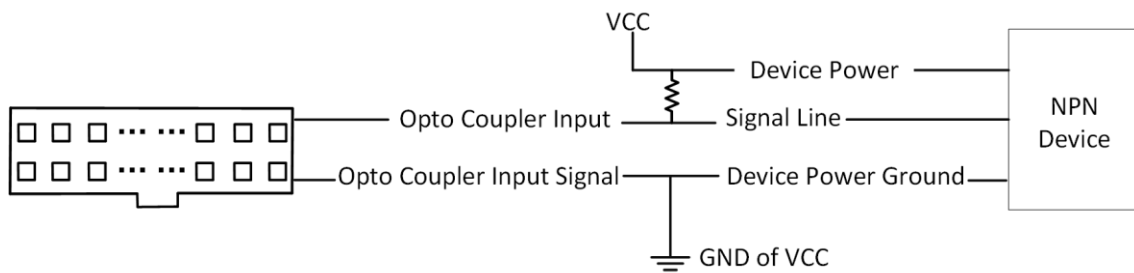
- PNP Device



**Figure 5-8 Opto Coupler Input Connects PNP Device**

- **NPN Device**

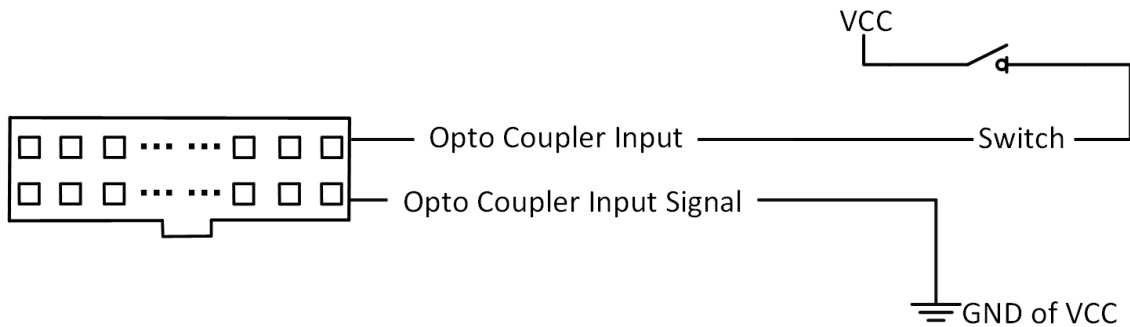
If the VCC of NPN device is 24 V, it is recommend to use 1 K $\Omega$  to 4.7 K $\Omega$  pull-up resistor.  
If the VCC of NPN device is 12 V, it is recommend to use 1 K $\Omega$  pull-up resistor.



**Figure 5-9 Opto Coupler Input Connects NPN Device**

- **Switch**

If the VCC of the switch is 24 V, it is recommended to use a series resistor of 1 K $\Omega$  to 4.7 K $\Omega$  to protect the circuit.

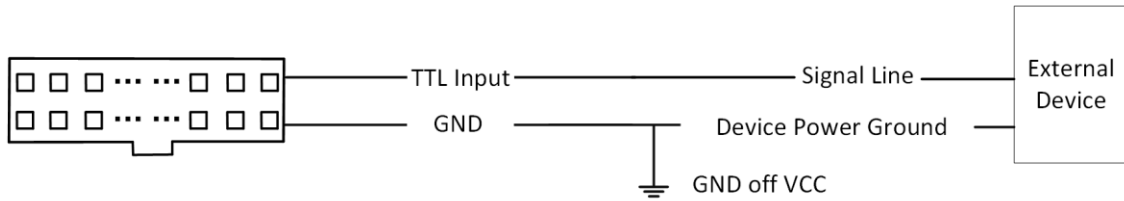


**Figure 5-10 Opto Coupler Input Connects a Switch**

## TTL Input Wiring

When the frame grabber receives the TTL input signal, you can direct connect the frame grabber's signal with the electrical level of external devices.

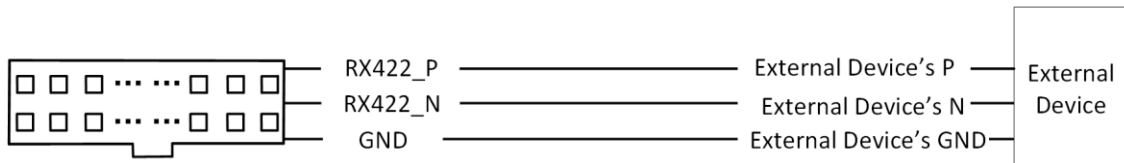




**Figure 5-11 TTL Input Connects External Device**

## 422 Input Wiring

When the frame grabber receives the 422 input signal, you can direct connect the frame grabber's P/N/GND terminal with that of external devices.



**Figure 5-12 422 Input Connects External Device**

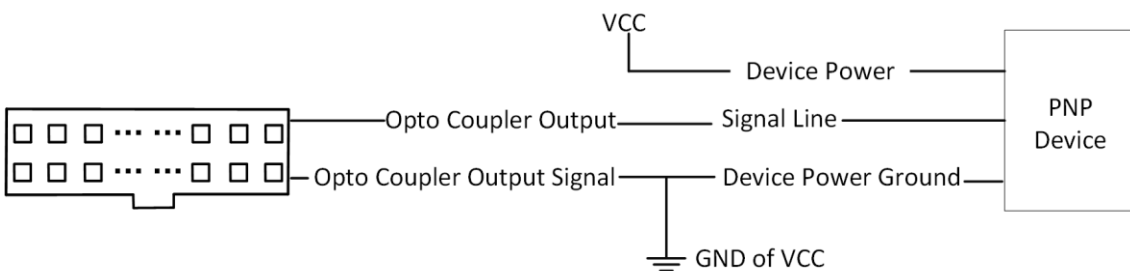
## 5.1.3 I/O Output Wiring

### Opto Coupler Output Wiring

#### Note

Wirings may differ by types of external devices providing output signals.

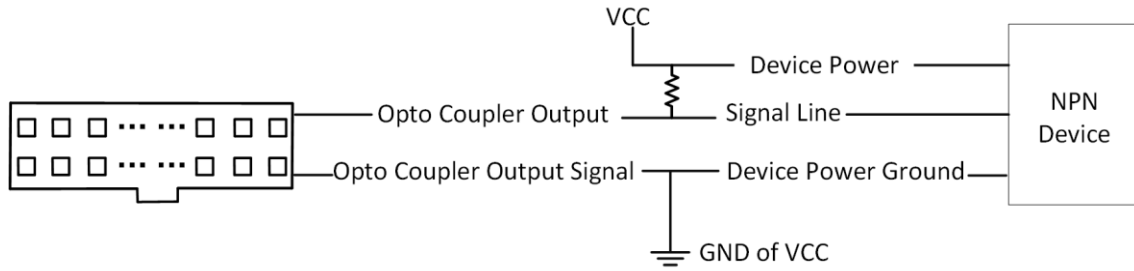
- PNP Device



**Figure 5-13 Opto Coupler Output Connects PNP Device**

- NPN Device

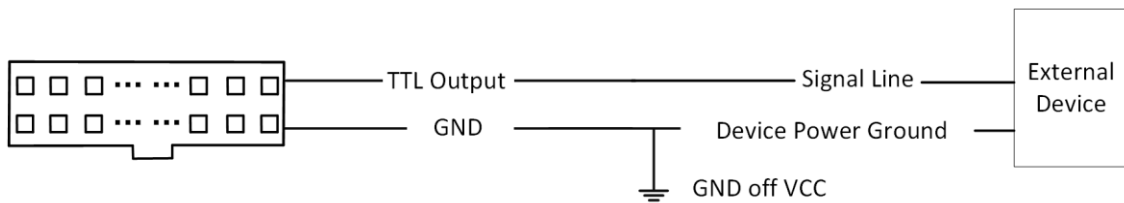
If the VCC of NPN device is 24 V, it is recommend to use 1 K $\Omega$  to 4.7 K $\Omega$  pull-up resistor.  
If the VCC of NPN device is 12 V, it is recommend to use 1 K $\Omega$  pull-up resistor.



**Figure 5-14 Opto Coupler Output Connects NPN Device**

## TTL Output Wiring

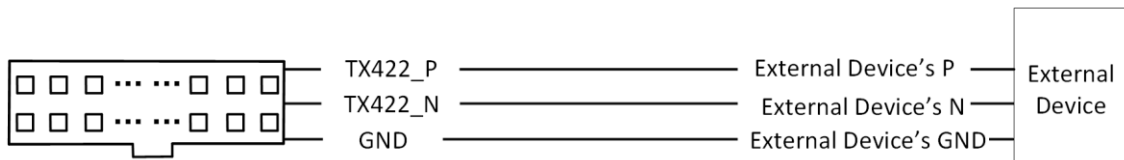
When the frame grabber receives the TTL output signal, you can direct connect the frame grabber's signal with the electrical level of external devices.



**Figure 5-15 TTL Output Connects External Device**

## 422 Output Wiring

When the frame grabber receives the 422 output signal, you can direct connect the frame grabber's P/N/GND terminal with that of external devices.



**Figure 5-16 422 Output Connects External Device**

## 5.2 Input and Output Signals

The frame grabber provides four pairs of opto coupler-isolated input/output signals, four pairs of TTL input/output signals, and four pairs of 422 input/output signals. You can set related parameters via **Digital IO Control**.

## 5.2.1 Input Signal

The frame grabber can receive multiple input signals that can be used as the signal source of output signal, encoder and timer.

### Steps

1. Go to **Digital IO Control**, and select **Line Selector** according to actual demands.

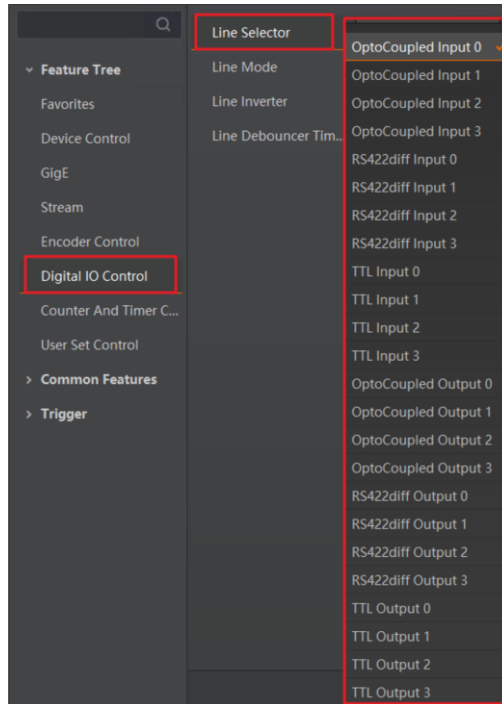


Figure 5-17 Line Selector

2. Select **Input** as **Line Mode**.
3. (Optional) Enable **Line Inverter** if you want to invert the electrical level of selected lines.

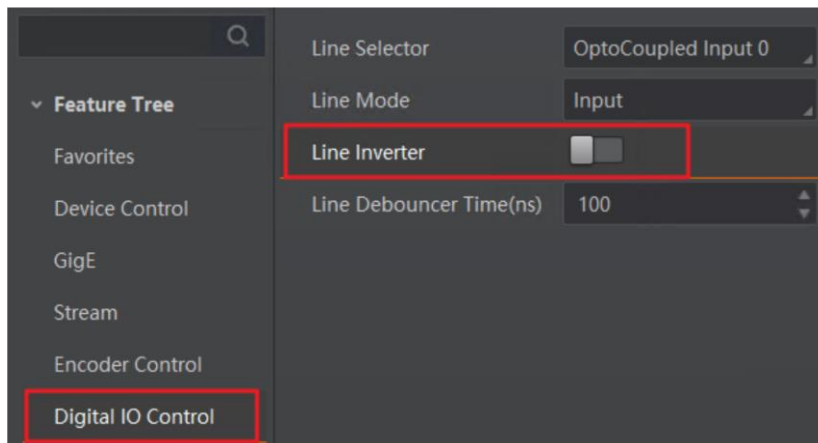


Figure 5-18 Enable Line Inverter

## Note

The line inverter is disabled by default.

- (Optional) Set **Line Debouncer Time** if the trigger signal sent by external devices to the frame grabber has signal bounce that may cause false trigger. Thus, it is necessary to debounce the trigger signal.

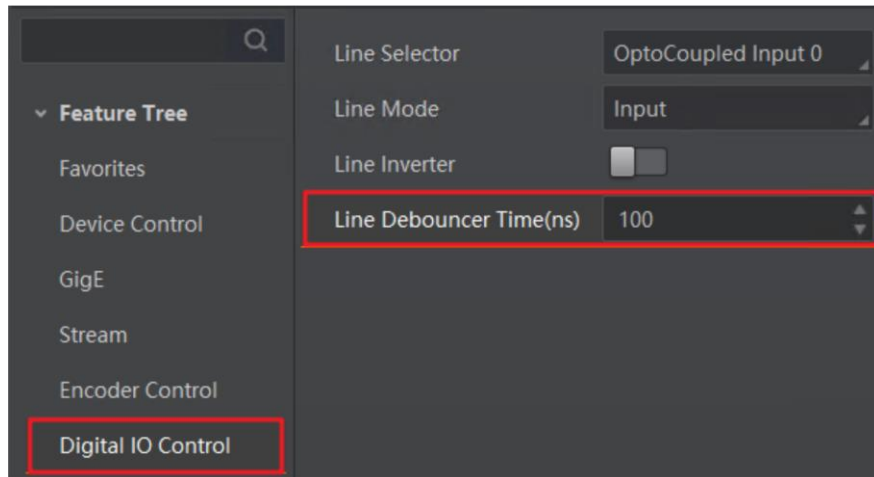


Figure 5-19 Set Line Debouncer Time

## Note

The trigger signal will be ignored if the configured line debouncer time is larger than that of the trigger signal.

The sequence diagram is shown below.

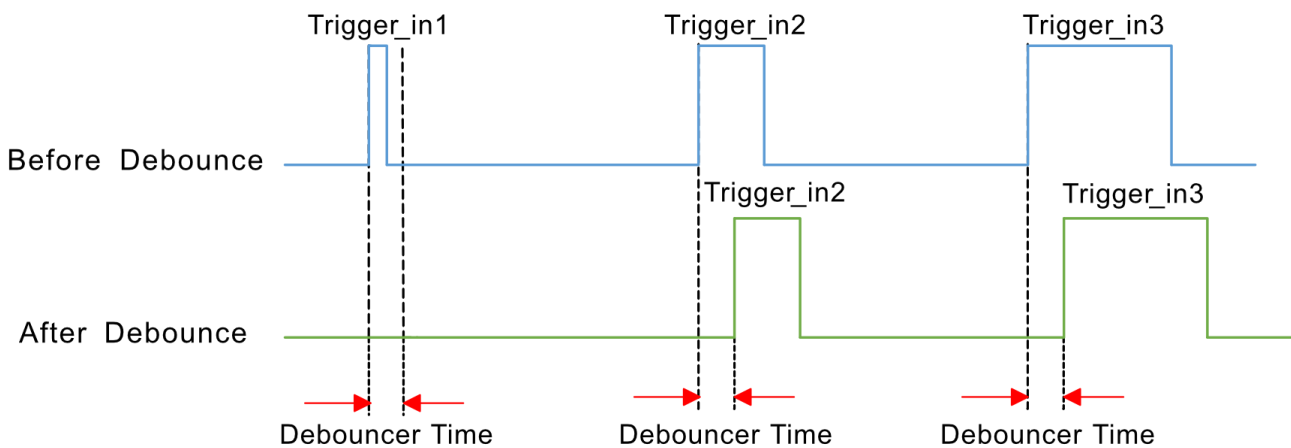


Figure 5-20 Sequence Diagram

Taking **OptoCoupled Input 0** as **Line Selector** as an example, the principle of trigger debouncer and line inverter is shown below.

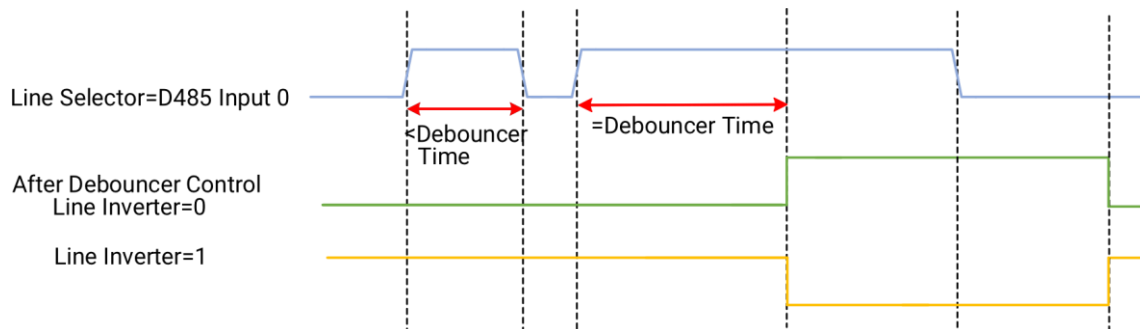


Figure 5-21 Principle

## 5.2.2 Encoder Control

The encoder control is used to select encoder sources and set trigger signal mode sent by signal source A and B. It can also count the outputted signal quantity.

### Steps

1. Select **Encoder 0** or **Encoder 1** as **Encoder Selector**.
2. Select corresponding signal sources or off as **Encoder Source A** and **Encoder Source B**.

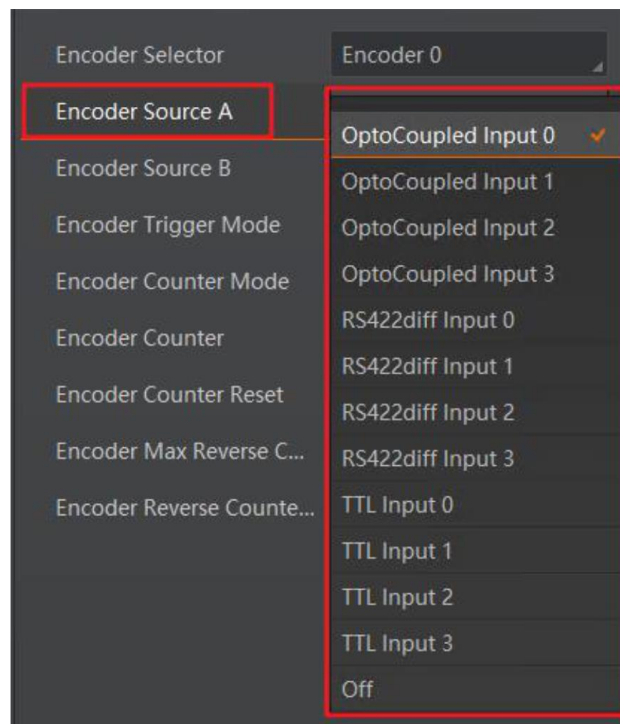


Figure 5-22 Select Encoder Source

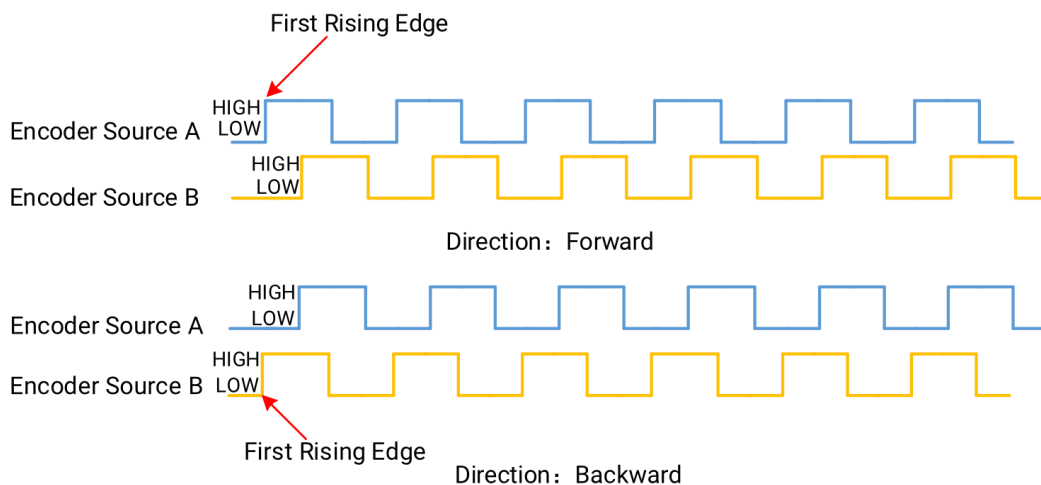
3. Set **Encoder Trigger Mode**.

|                      |               |
|----------------------|---------------|
| Encoder Trigger Mode | Any Direction |
| Encoder Counter Mode | Forward Only  |
| Encoder Counter      | Backward Only |

### Figure 5-23 Select Encoder Trigger Mode

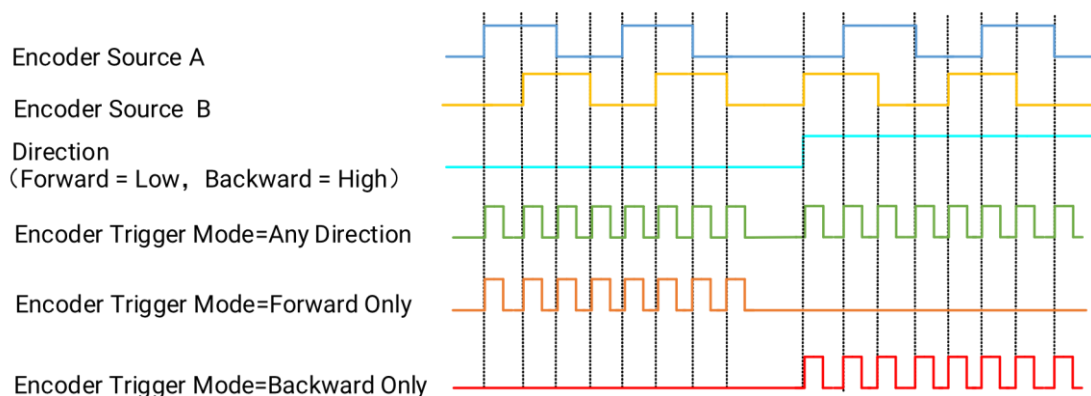
- **Any Direction** means that the frame grabber will output forward and backward signals.
- **Forward Only** means that the frame grabber will output forward signal only.
- **Backward Only** means that the frame grabber will output backward signal only.

The forward and backward signals of the encoder are judged according to the signals of Encoder A and Encoder B, and the principle is shown below.



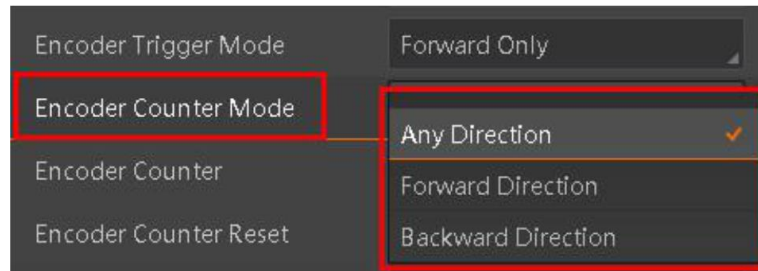
### Figure 5-24 Principle

The output signal of the encoder is different if various trigger modes are selected, and the principle is shown below.



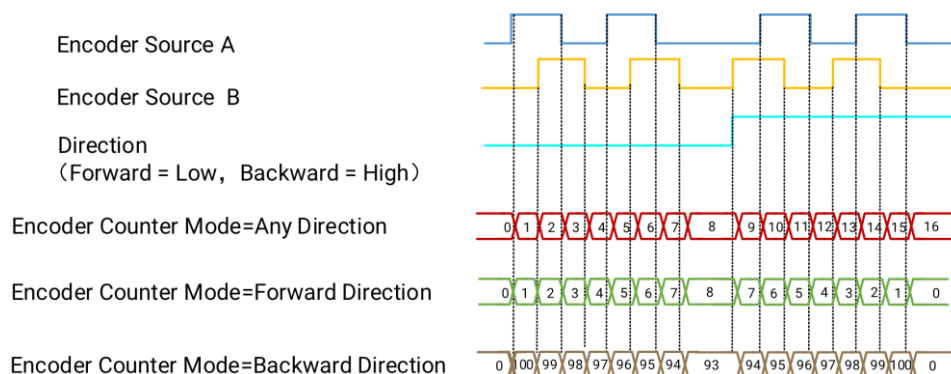
### Figure 5-25 Encoder Trigger Signal Mode Principle

#### 4. Set Encoder Counter Mode.



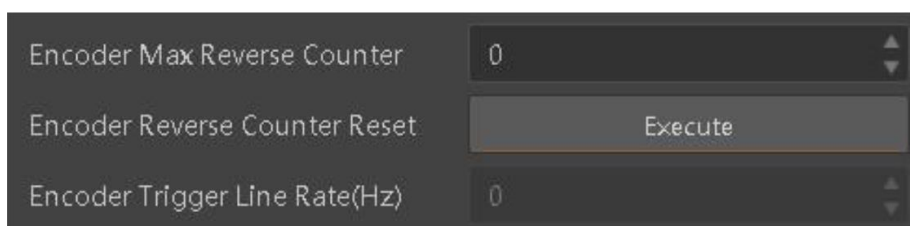
**Figure 5-26 Set Encoder Counter Mode**

- **Ignore Direction** means that both forward and backward signals will count.
  - **Follow Direction** means that only the forward signal will count.
  - **Backward Only** means that only the backward signal will count.
- If the encoder selects different counter modes, and its principle is shown below.



**Figure 5-27 Encoder Counter Mode Principle**

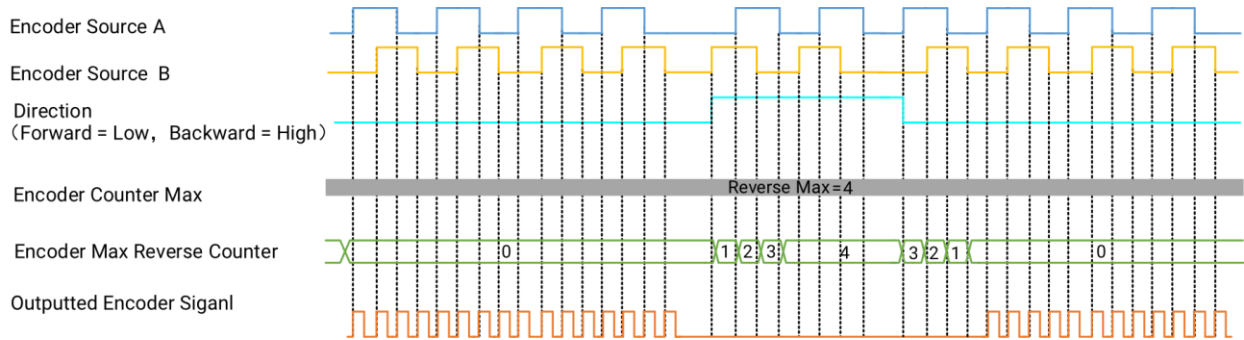
5. View counter value in **Encoder Counter**.
6. (Optional) Click **Execute** in **Encoder Counter Reset** to reset the counter.
7. (Optional) Set **Encoder Max Reverse Counter** to avoid outputting images if the object moves backward accidentally, and click **Execute** in **Encoder Reverse Counter Reset** to let the camera output images again.



**Figure 5-28 Set Encoder Max Reverse Counter**

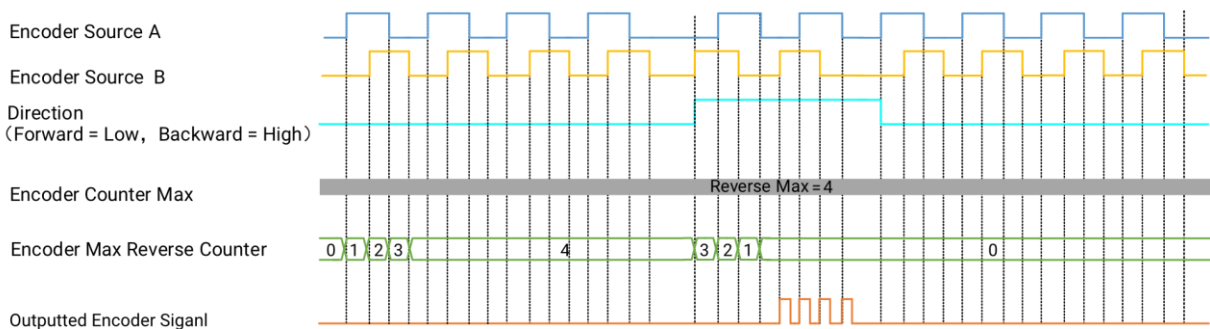
The maximum value for handling encoder reverse can be determined by setting the **Encoder Max Reverse Counter**. By default, the reverse is not handled that is **Encoder Max Reverse Counter = 0**. Taking the **Encoder Max Reverse Counter = 4** as an example, the output of the encoder under different trigger signal modes is introduced.

- If **Encoder Trigger Mode** selects **Forward Only**, the principle is shown below.



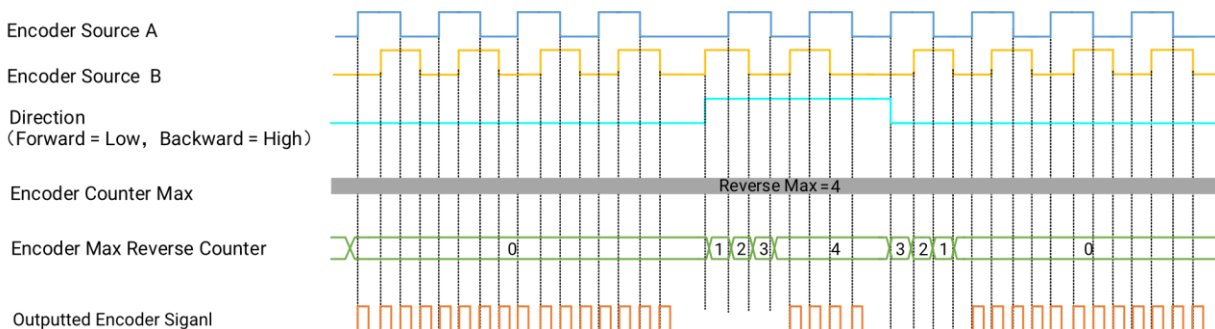
**Figure 5-29 Forward Principle**

- If **Encoder Trigger Mode** selects **Backward Only**, the principle is shown below.



**Figure 5-30 Backward Principle**

- If **Encoder Trigger Mode** selects **Any Direction**, the principle is shown below.



**Figure 5-31 Any Direction Principle**

- Set **Encoder Trigger Line Rate (Hz)** to display the line rate of the encoder.
- The encoder can count the amount of edge trigger received in real time, as shown below.
  - **Encoder Rising Edge Counter** returns the rising edge counter value of selected encoder.
  - **Encoder Edge Counter Reset**: Click **Execute** to reset edge counter of selected encoder.



**Figure 5-32 Encoder Edge Counter**

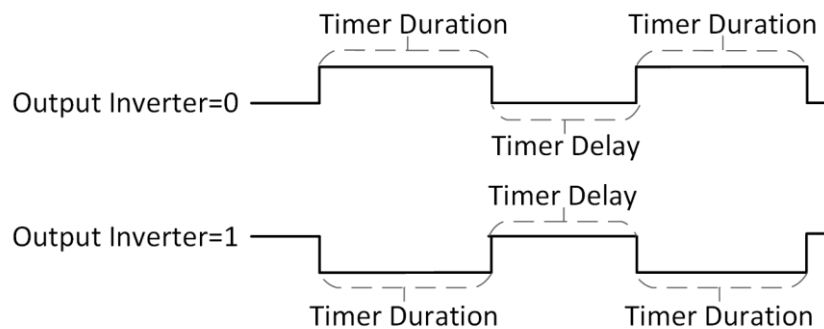


### 5.2.3 Timer Control

The timer control can output the corresponding signal by setting the high level and low level duration of the timer signal under the condition of setting corresponding trigger source and trigger activation.

#### Steps

1. Go to Advanced Setting, and select one timer from **Timer 0** to **Timer 3** as **Timer Selector**.
2. Set **Timer Duration(μs)**, **Timer Delay(μs)**, and **Timer Frequency (HZ)** according to actual demands. The principle of timer output is shown below.

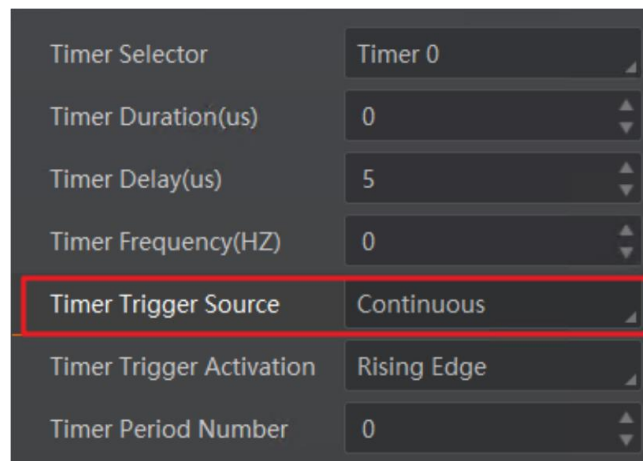


**Figure 5-33 Principle of Timer Output**

3. Select trigger source from **Timer Trigger Source**.

#### Note

- If **Continuous** is selected as **Timer Trigger Source**, the frame grabber will output signal continuously according to configured duration. The trigger activation will not impact this process.



**Figure 5-34 Continuous**

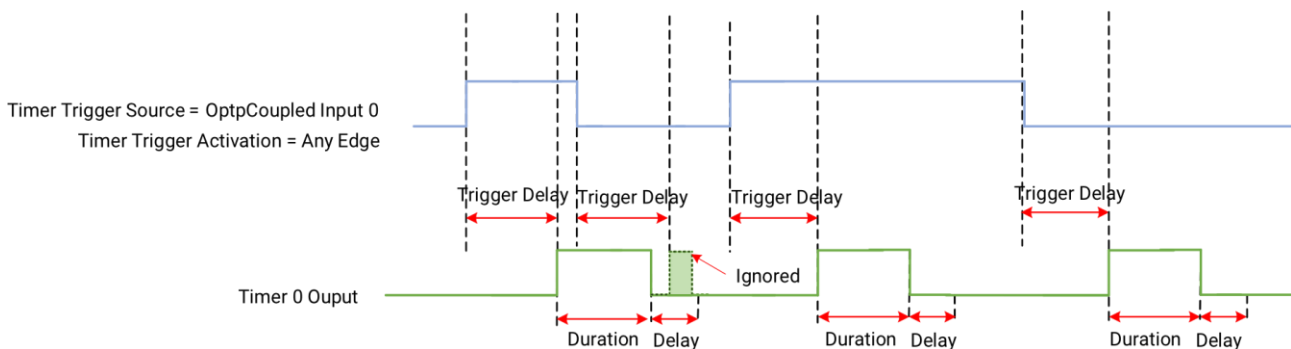
- If other trigger sources are selected as **Timer Trigger Source**, the frame grabber will output signal when receiving the trigger signal.

4. Set **Timer Trigger Activation** according to actual demands.

**Table 5-8 Timer Trigger Activation Parameter**

| Timer Trigger Activation | Description                                                                                                                                                                                 |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Rising Edge              | When the electrical level signal given by external devices is in rising edge, the frame grabber receives the trigger source and starts to output configured counter signal.                 |
| Falling Edge             | When the electrical level signal given by external devices is in falling edge, the frame grabber receives the trigger source and starts to output configured counter signal.                |
| Any Edge                 | When the electrical level signal given by external devices is in rising edge or falling edge, the frame grabber receives the trigger source and starts to output configured counter signal. |
| High Level               | When the electrical level signal given by external devices is in high level, the frame grabber receives the trigger source and starts to output configured counter signal.                  |
| Low Level                | When the electrical level signal given by external devices is in low level, the frame grabber receives the trigger source and starts to output configured counter signal.                   |

Take **OptpCoupled Input 0** as **Timer Trigger Source** and **Any Edge** as **Timer Trigger Activation** as an example, and when the hardware trigger signal given by the external device is on the rising edge or falling edge, and the frame grabber receives the trigger signal and outputs the corresponding timer signal. The principle is shown below.



**Figure 5-35 Principle**

5. (Optional) If it is necessary to set the period of the output timer signal (one rising edge and one falling edge are one period), the number of timer periods can be set via the **Timer Period Number** and the **Timer** of n periods can be continuously output once triggered.

## 5.2.4 Output Signal

The frame grabber supports setting multiple output signals that can be sent to external devices via the frame grabber.

### Steps

1. Go to **Digital IO Control**, and select **Line Selector** according to actual demands.

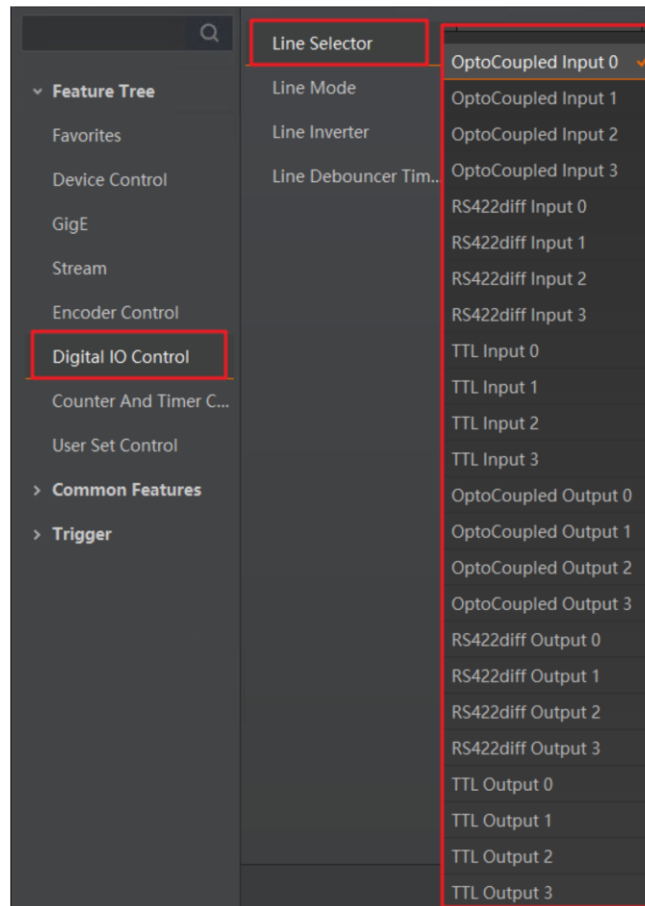


Figure 5-36 Line Selector

2. Select **Output** as **Line Mode**.

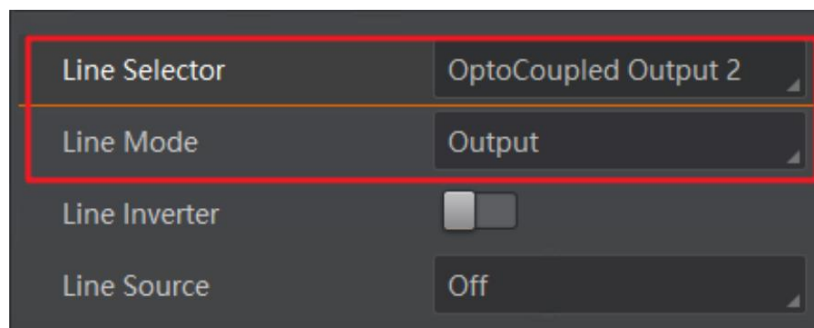
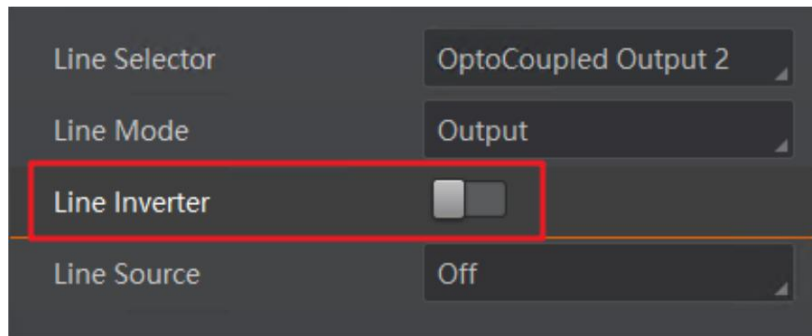


Figure 5-37 Set Output Signal

3. (Optional) Enable **Line Inverter** to invert the electrical level of selected lines.



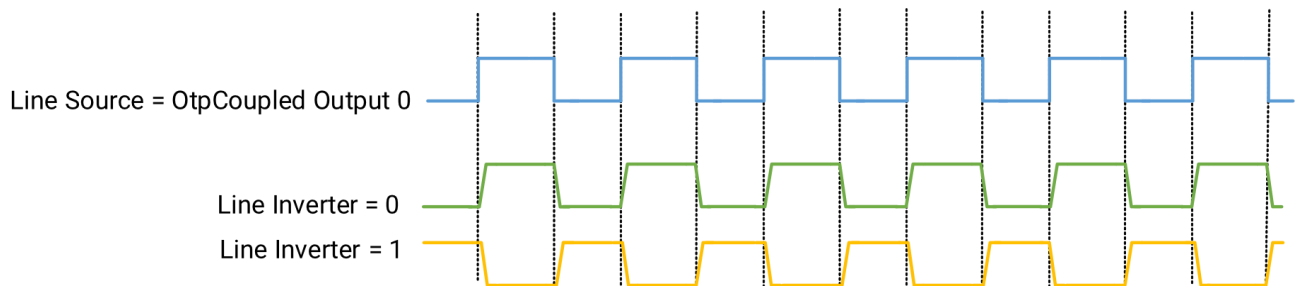
**Figure 5-38 Enable Line Inverter**

---

 **Note**

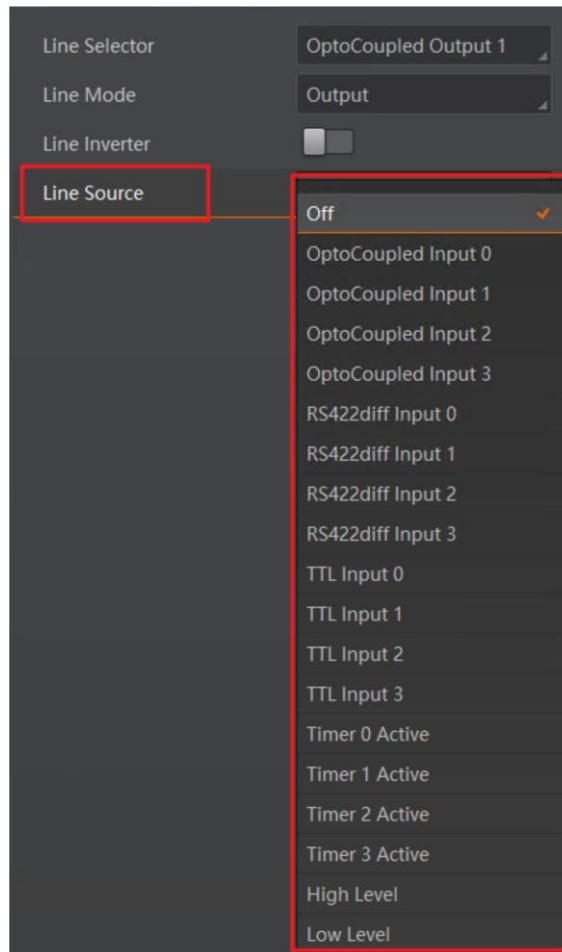
The line inverter is disabled by default.

Take **OptpCoupled Output 0** as **Line Source** as an example and the principle of line inverter is shown below.



**Figure 5-39 Principle**

4. The frame grabber can select multiple output signal sources sent by external devices.



**Figure 5-40 Select Line Source**

## Chapter 6 Other Functions

### 6.1 Device Control

In **Device Control**, you can view device information.

**Table 6-1 Device Control Parameter Description**

| Parameter                     | Read/Write  | Description                                                                                                            |
|-------------------------------|-------------|------------------------------------------------------------------------------------------------------------------------|
| Device Vendor Name            | Read Only   | It is the name of device manufacturer.                                                                                 |
| Device Model Name             | Read Only   | It is the device model.                                                                                                |
| Manufacture Info.             | Read Only   | It is the manufacturer information.                                                                                    |
| Device Family Name            | Read Only   | It is the device version.                                                                                              |
| Device Version                | Read Only   | It is the device version.                                                                                              |
| Device Firmware Version       | Read Only   | It is the device firmware version.                                                                                     |
| Device Serial Number          | Read Only   | It is the device serial number.                                                                                        |
| Maximum Device Response Time  | Read Only   | It is the device' s max. response time. If the device has no response within this time, it is disconnected.            |
| Device Manifest Table Address | Read Only   | It is the ID of GenICam XML selected.                                                                                  |
| Device SBRM Address           | Read Only   | It is the device' s SBRM address.                                                                                      |
| 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' s type.                                                                                              |
| Device Command Timeout        | Read Only   | It is the device' s timeout. If the device has no response within this time, it is disconnected.                       |
| Device Temperature Selector   | Read &Write | It selects what the device' s components you want to display its temperature in n <b>Device Temperature</b> .          |
| Device Temperature            | Read Only   | It displays the real-time temperature of the device' s components you selected in <b>Device Temperature Selector</b> . |
| PCIe Max Link Speed           | Read Only   | It is the max. link speed that PCIe supports.                                                                          |

| Parameter                            | Read/Write   | Description                                                         |
|--------------------------------------|--------------|---------------------------------------------------------------------|
| PCIe Maximum Link Width              | Read Only    | It is the max. link width that PCIe supports.                       |
| Device Connection Selector           | Read & Write | It selects which Connection of the device to control.               |
| Device Connection Speed (Mbps)       | Read Only    | It indicates the speed of transmission of the specified connection. |
| Device Timestamp Tick Frequency (Hz) | Read Only    | It is the device's timestamp tick frequency.                        |

## 6.2 PoE

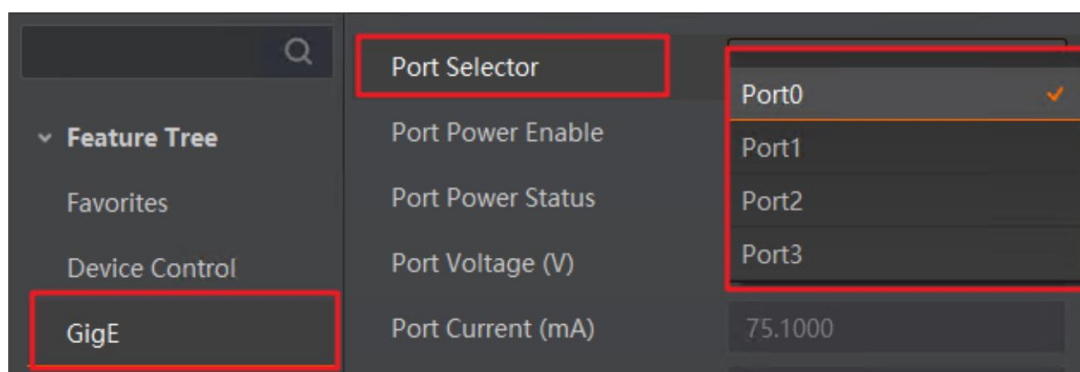
The PoE can control the power supply of cameras connected to the frame grabber, and display voltage, current, and power consumption of connected cameras in real time.

### Steps

#### Note

- Make sure that the cable of 6-pin ATX 12V is connected to the frame grabber's ATX power supply interface with the computer before using the PoE function.
- MV-GE1104 frame grabber does not support PoE function.

1. Go to **GigE** and select one frame grabber connector in **Port Selector**.



**Figure 6-1 Port Selector**

#### Note

Port 0 to Port 3 correspond to 0 to 3 connector of the frame grabber.

2. Enable **Port Power Enable** to let the connector selected in **Port Selector** support PoE.
  - The **Port Power Status** is **On** if the camera connection is detected.
  - The **Port Power Status** is **Off** if the camera connection is not detected.

3. Optional: View the voltage, current, and power consumption of connected cameras in the corresponding connector.
- **Port Voltage (V)** displays the camera's voltage.
  - **Port Current (mA)** displays the camera's current.
  - **Port Power (mW)** displays the camera's power consumption.

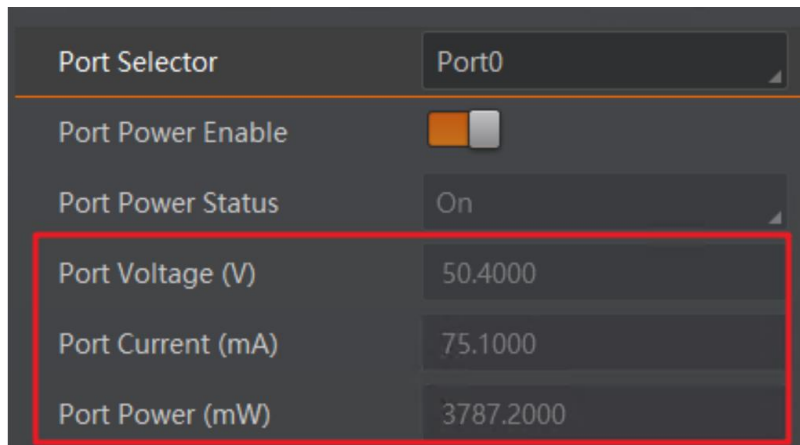


Figure 6-2 Voltage, Current and Power Consumption

## 6.3 Action Control

The action control is used to synchronize parameters of the frame grabber and cameras. The frame grabber sends trigger signals to the camera, and the camera starts to acquire images. You can go to **GigE** → **GigE TOE** to set related parameters.

---

### Note

Make sure that **Action 1** is selected as **Trigger Source** before you use the GigE action control function.

---

### Steps

1. Go to **GigE** and select one frame grabber connector in **Port Selector**.

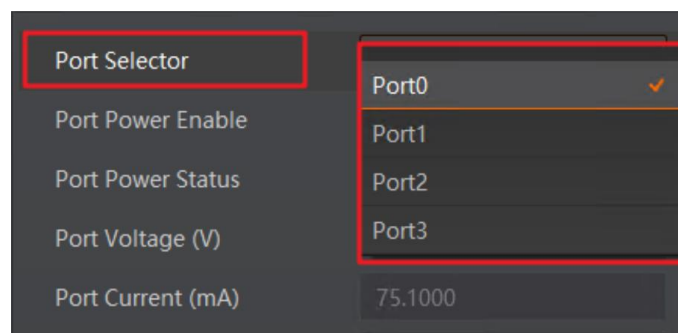


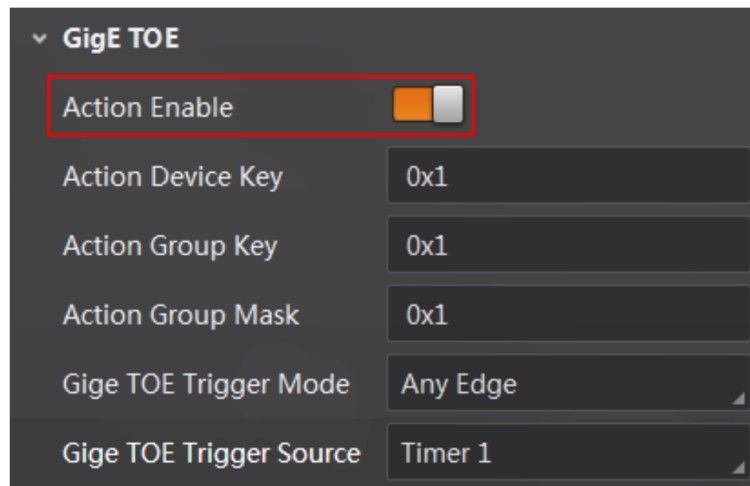
Figure 6-3 Port Selector



## Note

**Port 0** to **Port 3** correspond to 0 to 3 connector of the frame grabber.

2. Unfold **GigE TOE** and enable **Action Enable**.



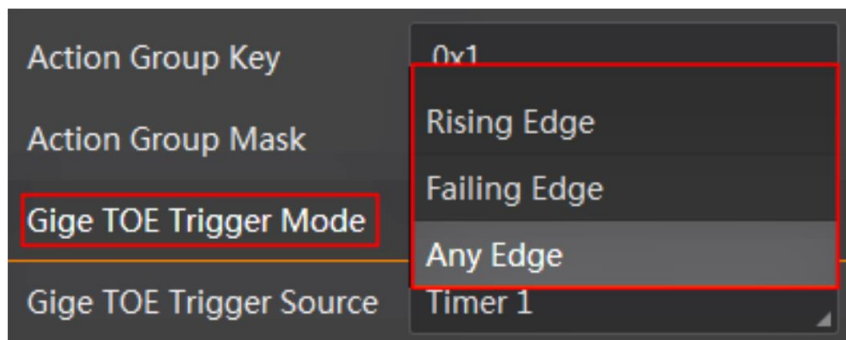
**Figure 6-4 Enable Action Enable**

3. Set **Action Device Key**, **Action Group Key**, and **Action Group Mask**.

## Note

The configured parameters here are displayed in hexadecimal.

4. Set **GigE TOE Trigger Mode** according to actual demands.



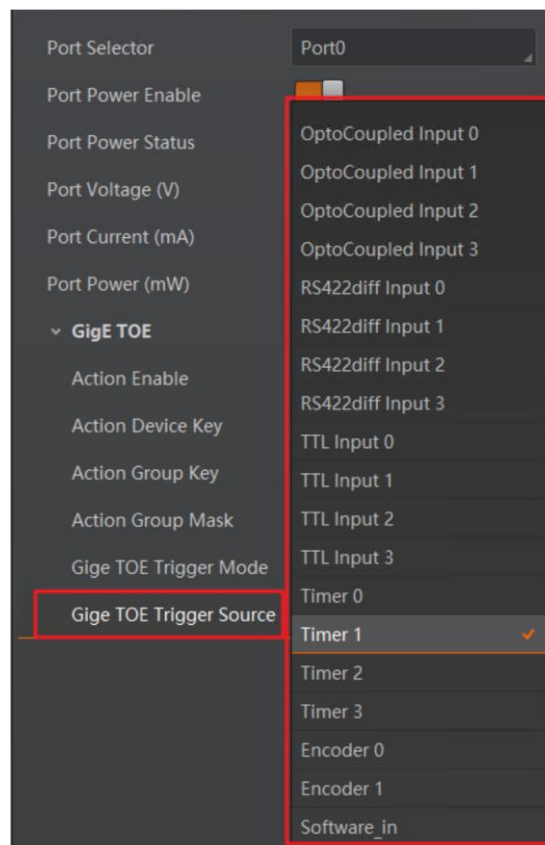
**Figure 6-5 Set GigE TOE Trigger Mode**

**Table 6-2 GigE TOE Trigger Mode**

| Parameter   | Description                                                                                                                                        |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| Rising Edge | When the electrical level signal given by the frame grabber is in rising edge, the camera receives the trigger source and starts to output images. |

| Parameter    | Description                                                                                                                                                        |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Falling Edge | When the electrical level signal given by the frame grabber is in falling edge, the camera receives the trigger source and starts to output images.                |
| Any Edge     | When the electrical level signal given by the frame grabber is in rising edge or falling edge, the camera receives the trigger source and starts to output images. |

5. Set the trigger source of the frame grabber in **GigE TOE Trigger Source**.



**Figure 6-6 Set GigE TOE Trigger Source**

6. (Optional) Click **Execute** in **Action Trigger Software** if **Software\_In** is selected as **GigE TOE Trigger Source** to realize software trigger.

## 6.4 Stream

The stream allows you to select specific stream, view current stream device, enable frame delay and quick frame mode, etc.

### Steps

1. Go to **Stream** and select **Stream Selector** according to actual demands.

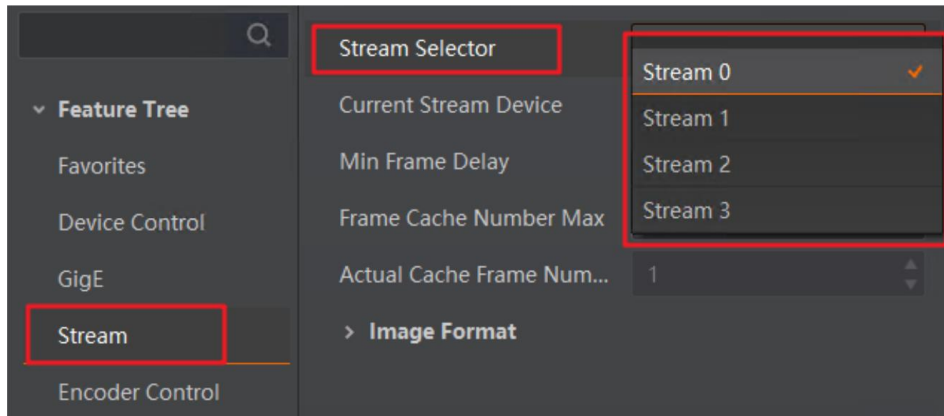


Figure 6-7 Stream Selector

---

### Note

Stream 0 to Stream 3 corresponds to 0 to 3 connector of the frame grabber.

---

2. (Optional) Enable or disable **Min. Frame Delay** according to actual demands.
  - If **Min. Frame Delay** is enabled, the client software will always cache the new image data in the image space to be sent, and discard the unsent image data directly.
  - If **Min. Frame Delay** is disabled, and the latest image data will be cached in the unsent buffer space. If the cached data in the buffer space reaches the upper limit, the old unsent images will be discarded and new images will be cached.

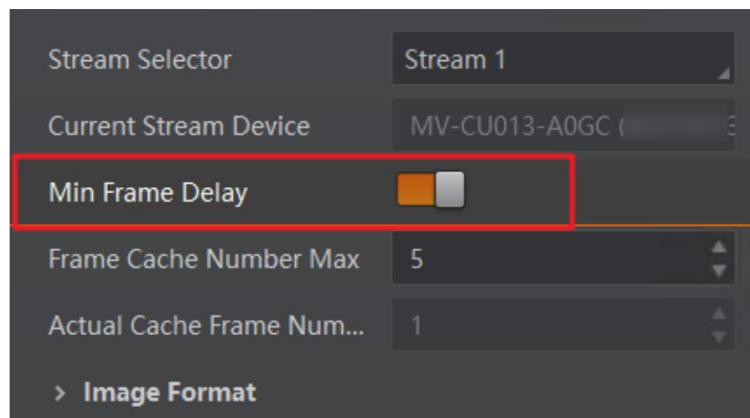


Figure 6-8 Min. Frame Delay

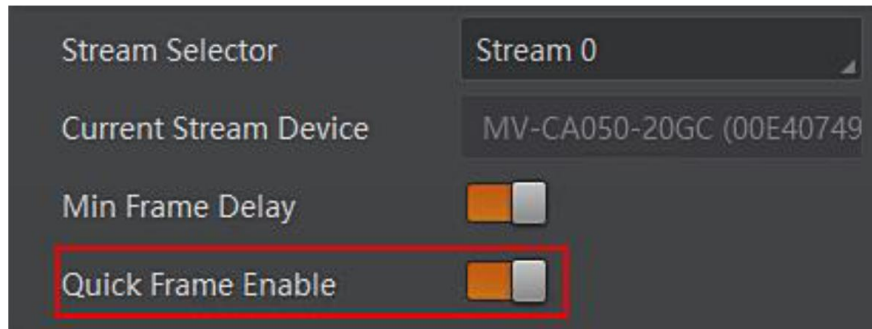
---

### Note

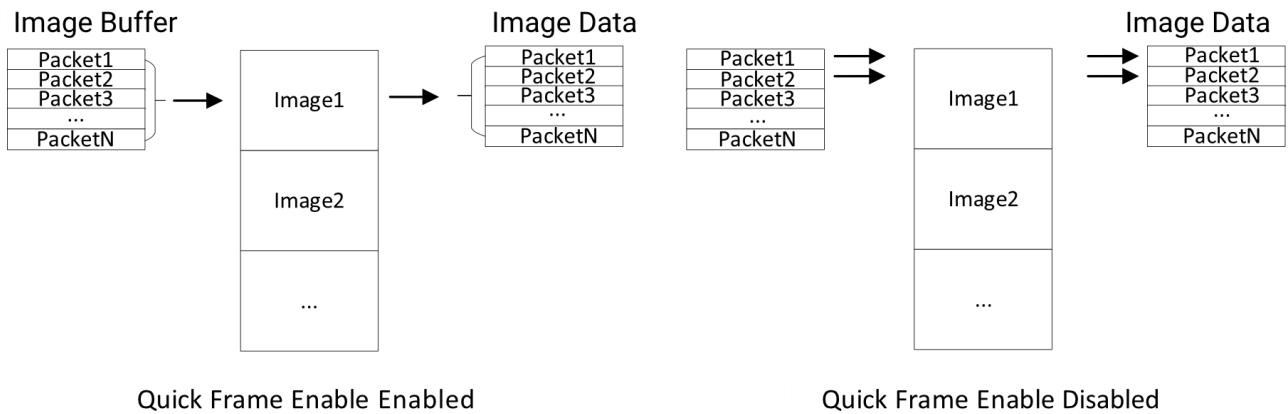
MV-GE1104 frame grabber does not support **Min. Frame Delay**.

---

3. (Optional) Enable **Quick Frame Enable** to speed up image readout speed.
  - If **Quick Frame Enable** is enabled, the client software will cache one packet of image data and output one packet of image data.
  - If **Quick Frame Enable** is disabled, the image will be readout after the whole frame of image data is stored.



**Figure 6-9 Quick Frame Enable**



**Figure 6-10 Principle**

## Note

MV-GE1104 frame grabber supports **Quick Frame Enable** by default.

## 6.5 Set Image Parameters

The frame grabber supports multiple ISP functions, including ROI, mirror acquired images horizontally, image interpolation, Gamma correction, etc.

## Note

MV-GE1104 frame grabber does not support image parameters.

### 6.5.1 Set ROI

When you are only interested in some details in the image, you can use Region of Interest (ROI) function. ROI can be done on the basis of the original image and according to the preset width and height of the frame grabber and the offsets in the X and Y directions.

## Steps

1. Go to **Stream** → **Image Format**, and enable **ISP Enable**.
2. Enable **ISP ROI Enable**, and set following parameters.
  - **Width**: It stands for horizontal width in original image.
  - **Height**: It stands for vertical height in original image.
  - **Offset X**: It stands for horizontal offset.
  - **Offset Y**: It stands for vertical offset.



Figure 6-11 ROI Parameters

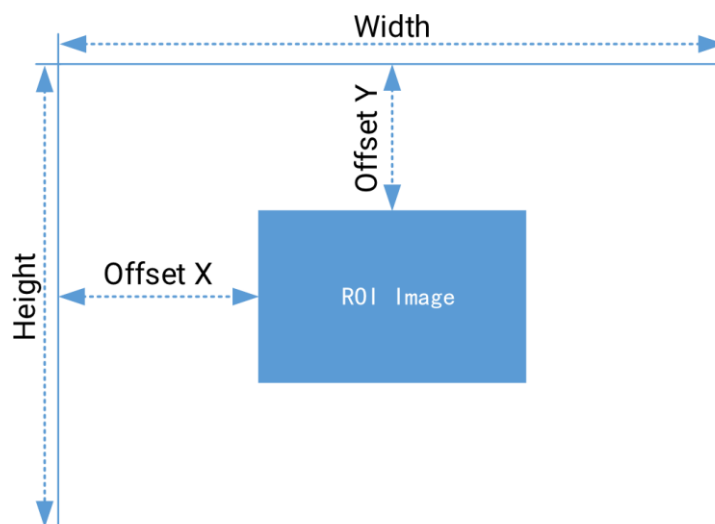


Figure 6-12 ROI Demonstration

## 6.5.2 Set Reverse X

The reverse X function allows you to mirror acquired images horizontally.

### Steps

1. Go to **Stream** → **Image Format**, and enable **ISP Enable**.
2. Enable **ISP Mirror X Enable**.

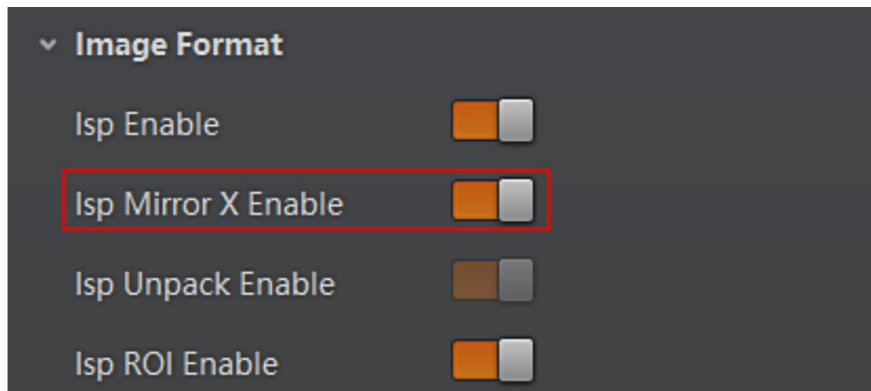


Figure 6-13 Enable ISP Mirror X Enable

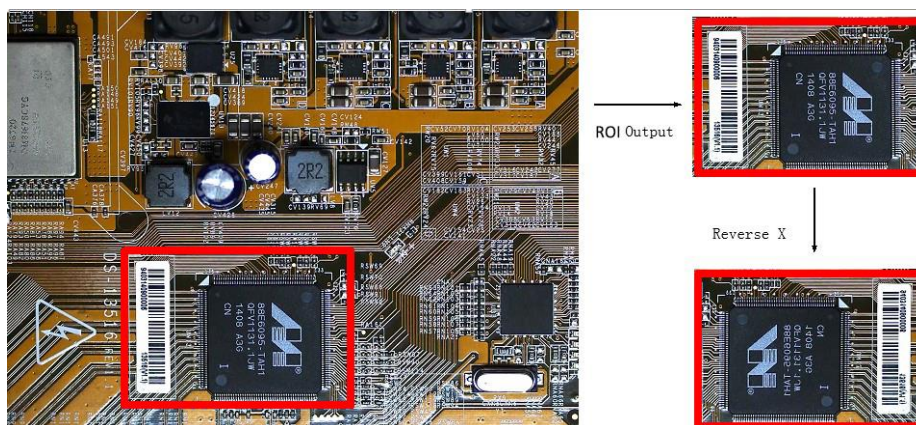


Figure 6-14 Reverse Demonstration

## 6.5.3 Set Image Interpolation

You can transform Bayer 8 pixel format to RGB 8 format by enabling **ISP Hamilton Enable**.



Figure 6-15 Set Image Interpolation

### Note

You should enable **ISP Enable** first before setting image interpolation.

## 6.5.4 Set Gamma Correction

The frame grabber supports Gamma correction function for images outputted by the camera. Generally, the output of the camera's sensor is linear with the photons that are illuminated on the photosensitive surface of the sensor. Gamma correction provides a non-

linear mapping mechanism as shown below.

- Gamma value between 0.5 and 1: image brightness increases, dark area becomes brighter.
- Gamma value between 1 and 4: image brightness decreases, dark area becomes darker.

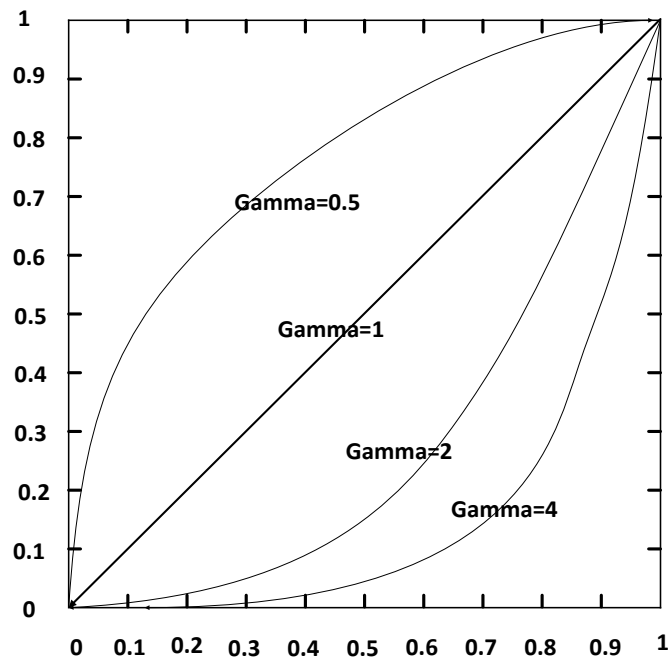


Figure 6-16 Gamma Curve

### Steps

1. Go to **Stream** → **Image Format**, and enable **ISP Enable**.
2. Enable **ISP Gamma Enable**, and enter **ISP Gamma**.

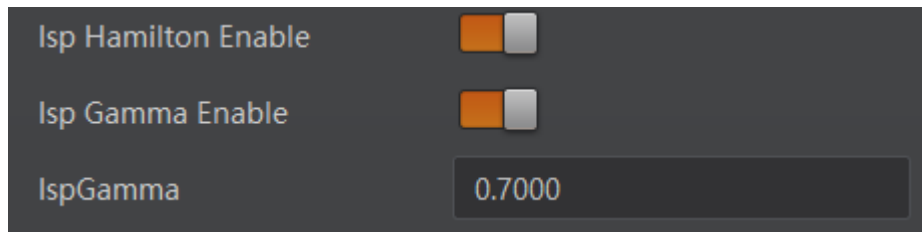


Figure 6-17 Set Gamma Correction

## 6.6 Update Firmware

You can use the MVS Tool Kit to update the frame grabber's firmware.

### Note

The MVS Tool Kit is installed by default when you install the MVS client software.

### Steps

1. Go to **All** → **Configuration Tool** → **Firmware Upgrade Tool** after running MVS Tool Kit.
2. Click  → **Default Loading** or **Import CTI File**. You can check the automatically loaded CTI file or manually select a CTI file, and click **Open** to enumerate the frame grabbers.
3. Check if the frame grabber to be upgraded is available, and check the frame grabber that need updating.
4. Click  to select a firmware upgrade package (dav file) in upper right side of the Tool.

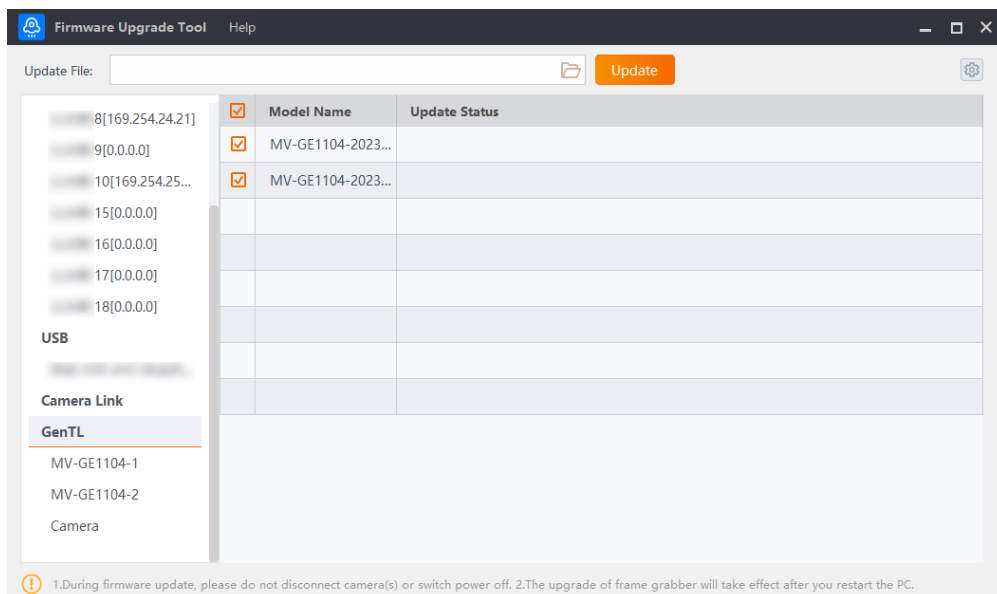


Figure 6-18 Update Firmware

5. Click **Update** to start updating.

### Note

- The used firmware package varies depending on the number of cameras connected to the frame grabber. The firmware package with Base in file name supports connecting two cameras, and supports connecting one camera without Base.
- Do not power off the frame grabber during updating.
- Restart the computer to check the frame grabber's function after updating.



## 6.7 User Set Control

This function allows loading or saving default or user-defined settings. The frame grabber supports four sets of parameters, including one default set and three user sets, and the relation among four sets of parameters is shown below.

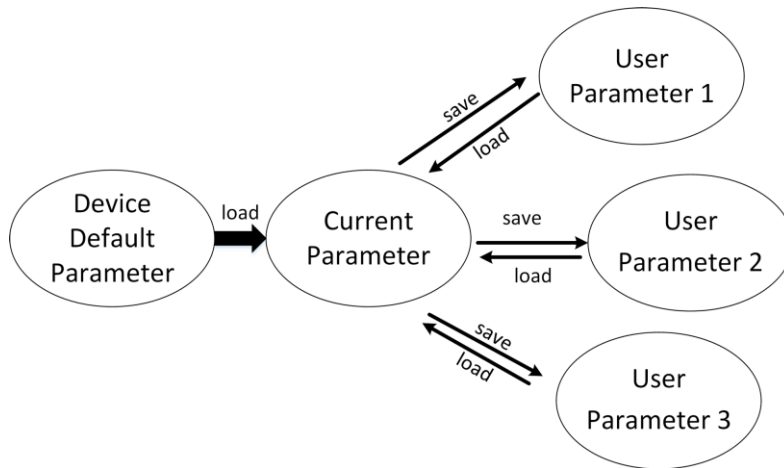


Figure 6-19 Parameter Relation

### 6.7.1 Save User Set

#### Steps

1. Click **User Set Control**, and select a user set in **User Set Selector**.

#### Note

Here we take selecting **User Set 1** as an example.

2. Click **Execute** in **User Set Save** to save parameter.

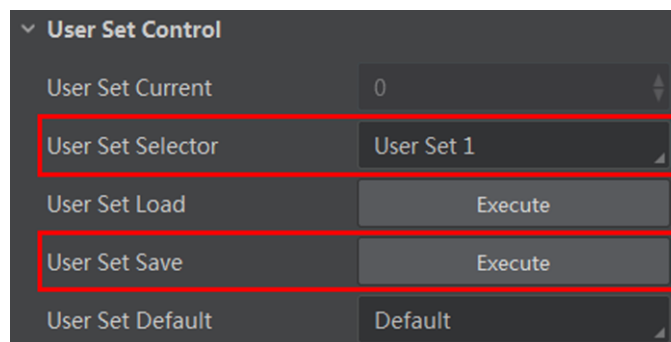


Figure 6-20 Save User Set

## 6.7.2 Load User Set

### Steps

1. Click **User Set Control**, and select a user set in **User Set Selector**.

---

#### Note

Here we take selecting **User Set 1** as an example.

---

2. Click **Execute** in **User Set Load** to load parameter.

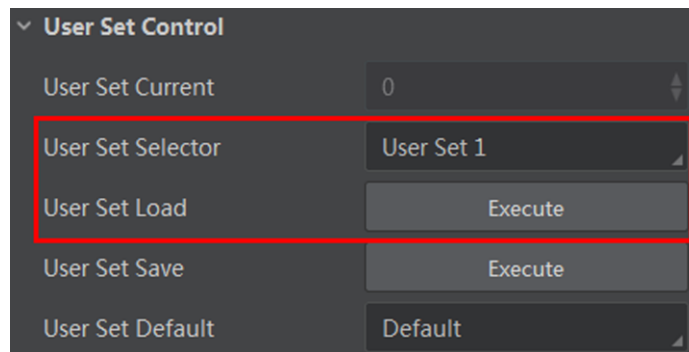


Figure 6-21 Load User Set

## 6.7.3 Set User Default

You can also set default parameter by clicking **User Set Control**, and select a user set in **User Set Default**.

---

#### Note

Here we take selecting **User Set 1** as an example.

---

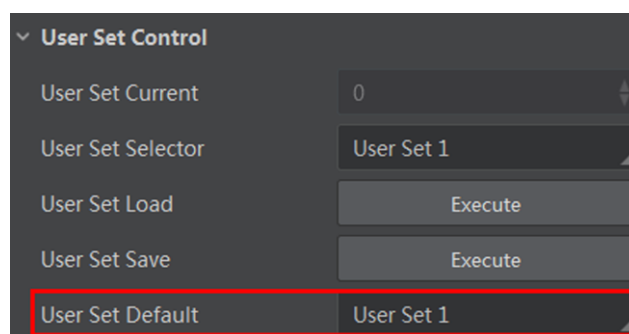


Figure 6-22 Set User Default

## 6.8 File Access Control

The file access function can import or export the frame grabber's feature files and save them in mfa format. Currently, only **User Set 1/2/3** are supported.

---

### Note

MV-GE1104 frame grabber does not support file access control.

---

### Steps

1. Go to the feature tree, and click  to open the file access dialogue box.

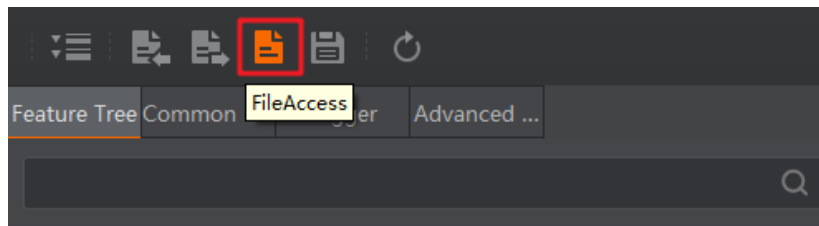


Figure 6-23 File Access

2. Select **Device Feature** and click **Import** or **Export**.

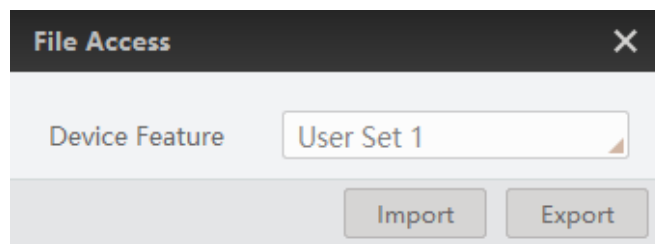


Figure 6-24 Import or Export

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

---

### Note

- If User Set 1/2/3 is selected as device feature, you need to load the corresponding user set you selected to take effect. Refer to section **User Set Control** for details.
  - Importing and exporting the device feature among the same model of frame grabbers are supported.
-

## Chapter 7 FAQ (Frequently Asked Questions)

There may be some problems when using the frame grabber. If the problems below occur, follow the guidance to solve by yourself. If you cannot solve them or have other problems, contact the technical support in time.

### 7.1 Why the frame grabber cannot be enumerated?

#### Reason

- Improper installation of the driver.
- The MVS client software or other software is using the frame grabber.
- Insufficient power supply of the motherboard.

#### Solution

- Make sure that MVS 3.4.1 or later is installed correctly. If the MVS 3.4.1 or later is installed correctly, uninstall and reinstall it. Pay attention to anti-virus software or firewall, there may be interception of the driver. You can turn off the firewall and uninstall the anti-virus software. If you must turn on the firewall and anti-virus software, you must make sure that the MVS client software is on the allow list before uninstalling and reinstalling it.
- Close the MVS client software or other software using the frame grabber. It should be noted that there may be processes after the MVS client software or the software using the frame grabber is closed, causing the frame grabber to be occupied and unable to search. You can shut down the MVS process or the process of the software that uses the frame grabber in the task manager. If you cannot confirm whether there are processes occupying the frame grabber, you can try to restart the PC.
- Power the frame grabber independently.

### 7.2 Why the camera connected to the frame grabber cannot be enumerated?

#### Reason

- The camera is not working normally.
- Improper wiring of the data cable.
- Network circuitry speed is not 100 Mbps.

#### Solution

- Check whether the camera is working normally.
- Check the wiring of the data cable.
- Check whether the network transit speed is 100 Mbps or not.



MV-GE1104 frame grabber does not support fast Ethernet.

---

### 7.3 Why the camera's frame rate is not stable?

#### Reason

- Insufficient PCIe bandwidth.
- Low CPU performance.

#### Solution

- Replace PCIe slot to meet PCIe 2.0 x4 bandwidth. It should be noted that some PCIe slots designed by the PC share a bandwidth for several slots, which may cause insufficient bandwidth. If the ROI can meet the application requirements, you can use the ROI function to increase the frame rate.
- Use high performance CPU.

### 7.4 How to deal with the packet loss?

#### Reason

Jumbo frame is not enabled.

#### Solution

- Go to NIC Configurator to enable jumbo frame.
- Go to **Settings** → **Resend Packet** in the menu bar of the client software, enable **Resend Packet**, and increase **Max. Packet Resending Percent** and **Timeout Period** properly.

## Chapter 8 Revision History

**Table 8-1 Revision History**

| Version | Document No. | Date          | Revision Details                                                                                                                                                                                                                                                                                                                                                                   |
|---------|--------------|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| V2.0.0  | UD35009B     | Sep. 14, 2023 | <ul style="list-style-type: none"><li>• Modify section Overview.</li><li>• Add section Basic Operation of MVS Client Software.</li><li>• Add section Operating Principle.</li><li>• Add section Frame Grabber Accessories.</li></ul>                                                                                                                                               |
| V1.1.1  | UD30026B     | Aug. 31, 2022 | <ul style="list-style-type: none"><li>• Modify section Client Software Layout.</li><li>• Modify section Timer Control.</li><li>• Add section GigE Action Control.</li><li>• Add section Stream.</li><li>• Add section Set Image Parameters.</li><li>• Modify section Update Firmware.</li><li>• Add section User Set Control.</li><li>• Add section File Access Control.</li></ul> |
| V1.0.1  | UD28139B     | Apr. 18, 2022 | <ul style="list-style-type: none"><li>• Modify section Install MVS Client Software.</li><li>• Add section Basic Operation of MVS Client Software.</li><li>• Modify section Update Firmware.</li></ul>                                                                                                                                                                              |
| V1.0.0  | UD25464B     | Sep. 27, 2021 | Original version.                                                                                                                                                                                                                                                                                                                                                                  |

## Appendix A Frame Grabber Accessories

When using the frame grabber, you need to prepare these cables: GigE network cable, I/O cable. The appearance of accessories is shown below.

---

### Note

You need to purchase frame grabber accessories separately and they are not included in the package.

---

### GigE Network Cable

The GigE network cable is used to establish the data transmission between the frame grabber and the camera. It provides two lengths of 3 m or 5 m, which can be selected as required.



Figure A-1 GigE Network Cable

### Note

Refer to the datasheet of the corresponding product for the specific size and parameter of the GigE network cable.

---

### I/O Cable

I/O extension cable (DB26 to open) is used for I/O trigger signal wiring of DB26 connector of the frame grabber, as shown below. Refer to the section **2.3.2 I/O Connector** for pin definition. The cable has shielding protection, providing two lengths of 3 m or 5 m, which can be selected as required.



**Figure A-2 I/O Cable**

---

**Note**

Refer to the datasheet of the corresponding product for the specific size and parameter of the I/O cable.

---



## Appendix B Frame Grabber Fields

Table B-1 Pin Definition

| Field Name                    | Value Description                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Stream Field</b>           |                                                                                                                                                                                                                                                                                                                                                                   |
| Stream Selector               | <ul style="list-style-type: none"> <li>• 0: Stream 0</li> <li>• 1: Stream 1</li> <li>• 2: Stream 2</li> <li>• 3: Stream 3</li> </ul>                                                                                                                                                                                                                              |
| Current Stream Device         | Display the camera's name.                                                                                                                                                                                                                                                                                                                                        |
| Min. Frame Delay              | <ul style="list-style-type: none"> <li>• 0: Disable</li> <li>• 1: Enable</li> </ul>                                                                                                                                                                                                                                                                               |
| <b>Encoder Field</b>          |                                                                                                                                                                                                                                                                                                                                                                   |
| Encoder Selector              | <ul style="list-style-type: none"> <li>• 0: Encoder 0</li> <li>• 1: Encoder 1</li> </ul>                                                                                                                                                                                                                                                                          |
| Encoder Source A              | /                                                                                                                                                                                                                                                                                                                                                                 |
| Encoder Source B              | /                                                                                                                                                                                                                                                                                                                                                                 |
| Encoder Trigger Mode          | <ul style="list-style-type: none"> <li>• 0: Any Direction</li> <li>• 1: Forward Only</li> <li>• 2: Backward Only</li> </ul>                                                                                                                                                                                                                                       |
| Encoder Counter Mode          | <ul style="list-style-type: none"> <li>• 0: Any Direction</li> <li>• 1: Forward Direction</li> <li>• 2: Backward Direction</li> </ul>                                                                                                                                                                                                                             |
| Encoder Counter               | 0 to 4294967295                                                                                                                                                                                                                                                                                                                                                   |
| Encoder Counter Reset         | 1: Execute                                                                                                                                                                                                                                                                                                                                                        |
| Encoder Max Reverse Counter   | 0 to 32767                                                                                                                                                                                                                                                                                                                                                        |
| Encoder Reverse Counter Reset | 1: Execute                                                                                                                                                                                                                                                                                                                                                        |
| <b>Digital I/O Field</b>      |                                                                                                                                                                                                                                                                                                                                                                   |
| Line Selector                 | <ul style="list-style-type: none"> <li>• 0: OptoCoupled Input 0</li> <li>• 1: OptoCoupled Input 1</li> <li>• 2: OptoCoupled Input 2</li> <li>• 3: OptoCoupled Input 3</li> <li>• 16: OptoCoupled Output 0</li> <li>• 17: OptoCoupled Output 1</li> <li>• 18: OptoCoupled Output 2</li> <li>• 19: OptoCoupled Output 3</li> <li>• 32: RS422diff Input 0</li> </ul> |

|                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                         | <ul style="list-style-type: none"> <li>• 33: RS422diff Input 1</li> <li>• 34: RS422diff Input 2</li> <li>• 35: RS422diff Input 3</li> <li>• 48: RS422diff Output 0</li> <li>• 49: RS422diff Output 1</li> <li>• 50: RS422diff Output 2</li> <li>• 51: RS422diff Output 3</li> <li>• 64 TTL Input 0</li> <li>• 65: TTL Input 1</li> <li>• 66: TTL Input 2</li> <li>• 67: TTL Input 3</li> <li>• 80: TTL Output 0</li> <li>• 81: TTL Output 1</li> <li>• 82: TTL Output 2</li> <li>• 83: TTL Output 3</li> </ul>                                                                                                                                                                                       |
| Line Mode               | <ul style="list-style-type: none"> <li>• 0: Input Mode</li> <li>• 1: Output Mode</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Line Input Polarity     | <ul style="list-style-type: none"> <li>• 0: Single-Ended Signal</li> <li>• 1: Differential Signal</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Line Inverter           | <ul style="list-style-type: none"> <li>• 0: Disable</li> <li>• 1: Enable</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Line Debouncer Time(ns) | 0 to 400000000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Line Source             | <ul style="list-style-type: none"> <li>• 0: OptoCoupled Input 0</li> <li>• 1: OptoCoupled Input 1</li> <li>• 2: OptoCoupled Input 2</li> <li>• 3: OptoCoupled Input 3</li> <li>• 16: RS422diff Input 0</li> <li>• 17: RS422diff Input 1</li> <li>• 18: RS422diff Input 2</li> <li>• 19: RS422diff Input 3</li> <li>• 32: TTL Input 0</li> <li>• 33: TTL Input 1</li> <li>• 34: TTL Input 2</li> <li>• 35: TTL Input 3</li> <li>• 48: Timer 0</li> <li>• 49: Timer 1</li> <li>• 50: Timer 2</li> <li>• 51: Timer 3</li> <li>• 64: Useroutput 0</li> <li>• 65: Useroutput 1</li> <li>• 66: Useroutput 2</li> <li>• 67: Useroutput 3</li> <li>• 68: Useroutput 4</li> <li>• 69: Useroutput 5</li> </ul> |

|                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                        | <ul style="list-style-type: none"> <li>• 70: Useroutput 6</li> <li>• 71: Useroutput 7</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| UserOutputSelector     | <ul style="list-style-type: none"> <li>• 0: Useroutput 0</li> <li>• 1: Useroutput 1</li> <li>• 2: Useroutput 2</li> <li>• 3: Useroutput 3</li> <li>• 4: Useroutput 4</li> <li>• 5: Useroutput 5</li> <li>• 6: Useroutput 6</li> <li>• 7: Useroutput 7</li> </ul>                                                                                                                                                                                                                                                                                                               |
| UserOutputValue        | <ul style="list-style-type: none"> <li>• 0: Low Level</li> <li>• 1: High Level</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| UserOutputValueAll     | 0 to 0xff                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| UserOutputValueAllMask | 0 to 0xff                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Timer Field</b>     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Timer Selector         | <ul style="list-style-type: none"> <li>• 0: Timer 0</li> <li>• 1: Timer 1</li> <li>• 2: Timer 2</li> <li>• 3: Timer 3</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Timer Duration         | 0 to 34000000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Timer Delay            | 0 to 34000000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Timer Frequency        | 0 to 1000000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Timer Reset            | 1: Execute                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Timer Trigger Source   | <ul style="list-style-type: none"> <li>• 0: OptoCoupled Input 0</li> <li>• 1: OptoCoupled Input 1</li> <li>• 2: OptoCoupled Input 2</li> <li>• 3: OptoCoupled Input 3</li> <li>• 16: RS422diff Input 0</li> <li>• 17: RS422diff Input 1</li> <li>• 18: RS422diff Input 2</li> <li>• 19: RS422diff Input 3</li> <li>• 32: TTL Input 0</li> <li>• 33: TTL Input 1</li> <li>• 34: TTL Input 2</li> <li>• 35: TTL Input 3</li> <li>• 48: Timer 0</li> <li>• 49: Timer 1</li> <li>• 50: Timer 2</li> <li>• 51: Timer 3</li> <li>• 64: Encoder 0</li> <li>• 65: Encoder 1</li> </ul> |

## GigE Frame Grabber User Manual

---

|                             |                                                                                                                                                                       |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                             | <ul style="list-style-type: none"> <li>● 80: Software</li> <li>● 81: Continuous</li> </ul>                                                                            |
| Timer Trigger Activation    | <ul style="list-style-type: none"> <li>● 0: Rising Edge</li> <li>● 1: Falling Edge</li> <li>● 2: Any Edge</li> <li>● 3: High Level</li> <li>● 4: Low Level</li> </ul> |
| <b>User Set Field</b>       |                                                                                                                                                                       |
| User Set Current            | <ul style="list-style-type: none"> <li>● 0: Default User Set</li> <li>● 1: User Set 1</li> <li>● 2: User Set 2</li> <li>● 3: User Set 3</li> </ul>                    |
| User Set Selector           | <ul style="list-style-type: none"> <li>● 0: Default User Set</li> <li>● 1: User Set 1</li> <li>● 2: User Set 2</li> <li>● 3: User Set 3</li> </ul>                    |
| User Set Load               | 1: Execute                                                                                                                                                            |
| User Set Save               | 1: Execute                                                                                                                                                            |
| User Set Default            | <ul style="list-style-type: none"> <li>● 0: Default User Set</li> <li>● 1: User Set 1</li> <li>● 2: User Set 2</li> <li>● 3: User Set 3</li> </ul>                    |
| <b>GigE Field</b>           |                                                                                                                                                                       |
| Port Selector               | <ul style="list-style-type: none"> <li>● 0: Link 0</li> <li>● 1: Link 1</li> <li>● 2: Link 2</li> <li>● 3: Link 3</li> </ul>                                          |
| Port Power Enable           | 1: Execute                                                                                                                                                            |
| Port Power Status           | <ul style="list-style-type: none"> <li>● 0: Off</li> <li>● 1: On</li> </ul>                                                                                           |
| Port Voltage (V)            | 0 to 4294967295                                                                                                                                                       |
| Port Current (mA)           | 0 to 4294967295                                                                                                                                                       |
| Port Power (mW)             | 0 to 4294967295                                                                                                                                                       |
| <b>Action Control Field</b> |                                                                                                                                                                       |
| Action Enable               | <ul style="list-style-type: none"> <li>● 0: Disable</li> <li>● 1: Enable</li> </ul>                                                                                   |
| Action Device Key           | 0 to 0xffffffff                                                                                                                                                       |
| Action Group Key            | 0 to 0xffffffff                                                                                                                                                       |
| Action Group Mask           | 0 to 0xffffffff                                                                                                                                                       |

| Trigger Field           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Gige TOE Trigger Mode   | <ul style="list-style-type: none"> <li>• 2: Rising Edge</li> <li>• 3: Falling Edge</li> <li>• 4: Any Edge</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Gige TOE Trigger Source | <ul style="list-style-type: none"> <li>• 0: OptoCoupled Input 0</li> <li>• 1: OptoCoupled Input 1</li> <li>• 2: OptoCoupled Input 2</li> <li>• 3: OptoCoupled Input 3</li> <li>• 16: RS422diff Input 0</li> <li>• 17: RS422diff Input 1</li> <li>• 18: RS422diff Input 2</li> <li>• 19: RS422diff Input 3</li> <li>• 32: TTL Input 0</li> <li>• 33: TTL Input 1</li> <li>• 34: TTL Input 2</li> <li>• 35: TTL Input 3</li> <li>• 48: Timer 0</li> <li>• 49: Timer 1</li> <li>• 50: Timer 2</li> <li>• 51: Timer 3</li> <li>• 64: Encoder 0</li> <li>• 65: Encoder 1</li> <li>• 80: Software</li> </ul> |
| Image Debugging Field   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Isp Enable              | <ul style="list-style-type: none"> <li>• 0: ISP Disabled</li> <li>• 1: ISP Enabled</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Isp Mirror X Enable     | <ul style="list-style-type: none"> <li>• 0: Mirror X Disabled</li> <li>• 1: Mirror X Enabled</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Isp Unpack Enable       | <ul style="list-style-type: none"> <li>• 0: Pack Format Parsing Disabled</li> <li>• 1: Pack Format Parsing Enabled</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Isp ROI Enable          | <ul style="list-style-type: none"> <li>• 0: ROI Disabled</li> <li>• 1: ROI Enabled</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Width                   | 32 to 8192, step 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Height                  | 32 to 8192, step 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Offset X                | 32 to 8192, step 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Offset Y                | 32 to 8192, step 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Isp Hamilton Enable     | <ul style="list-style-type: none"> <li>• 0: Bayer Interpolation Disabled</li> <li>• 1: Bayer Interpolation Enabled</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Isp Gamma Enable        | <ul style="list-style-type: none"> <li>• 0: Gamma Disabled</li> <li>• 1: Gamma Enabled</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |



See Far, Go Further