

Hikrobot Co., Ltd.

10 GigE Fiber Port Frame Grabber

User Manual

HIKROBOT

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Symbol Conventions

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

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

Available Model

This manual is applicable to the 10 GigE Fiber Port Frame Grabber.

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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).
- 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.

Chapter 2 Overview

2.1 Introduction

The 10 GigE fiber port frame grabber provides 4 SFP+ connectors and is applicable to 10 GigE industrial camera with GigE port or fiber port. The host side adopts PCIe Gen2 × 8 bus interface, which can be directly mapped to the host memory through DMA to quickly read the collected image data.

2.2 Key Feature

- Supports GigE Vision V2.0 protocol with each channel accessing up to 10 Gbps data transfer speed.
- Various indicators indicate frame grabber status in real time.
- Adopts multiple I/O connectors for input and output.
- Provides SDK for secondary development.
- Complies with GenIcam standard.

Note

Refer to the specification of the frame grabber for detailed parameters.

Chapter 3 Appearance, Connector, and Indicator

3.1 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.
-

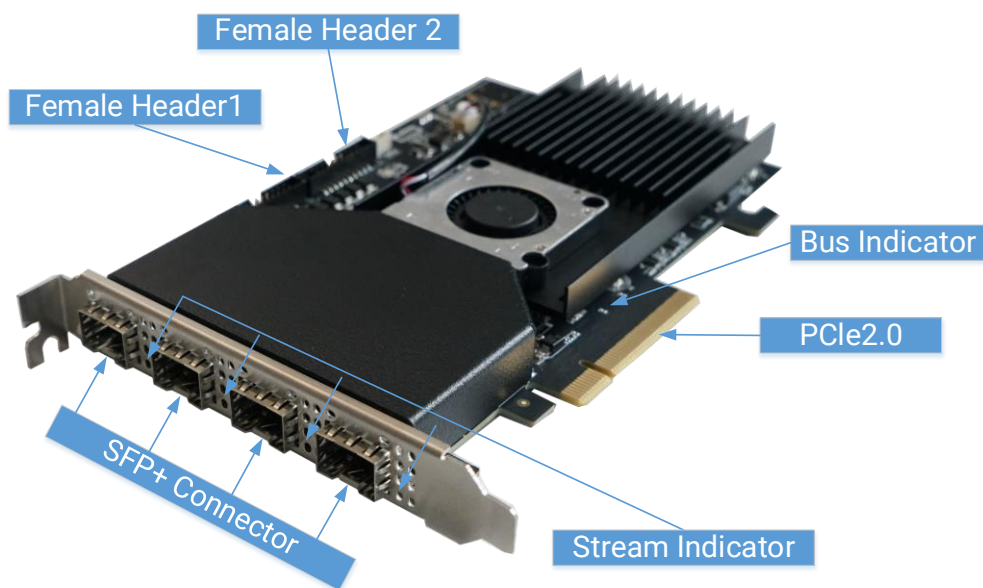


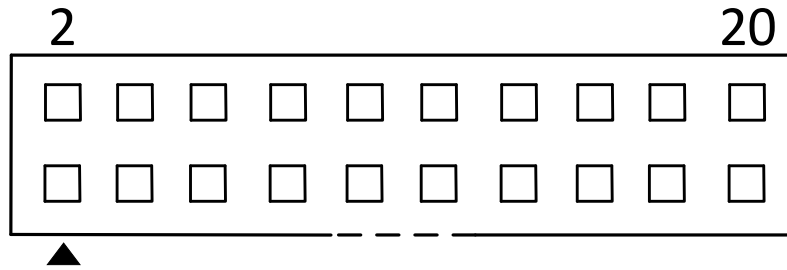
Figure 3-1 Appearance of Frame Grabber

3.2 I/O Connector

The frame grabber has multiple I/O connectors that provide input and output signals. Depending on the actual requirements for I/O usage, external connections can be made via Female Header 1 and Female Header 2 paired with I/O adapter cables.

Female Header 1

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


Figure 3-2 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 3-1 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.

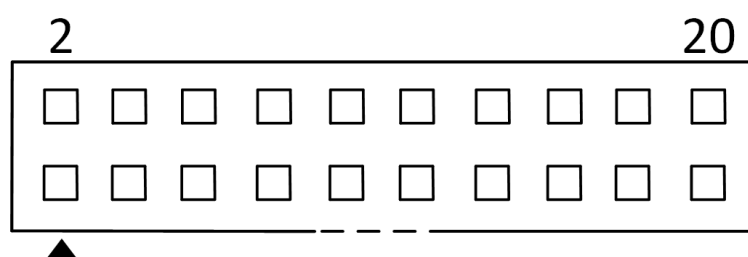


Figure 3-3 Female Header 2

Note

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

Table 3-2 Pin Definition of Female Header 2

No.	Signal	Description	No.	Signal	Description
1	TX422_0P	422 output 0	11	GND	Non-isolated I/O ground
2	TX422_0N	422 output 0	12	TX422_2P	422 output 2
3	GND	Non-isolated I/O ground	13	TX422_2N	422 output 2
4	RX422_0P	422 input 0	14	RX422_2P	422 input 2
5	RX422_0N	422 input 0	15	RX422_2N	422 input 2
6	GND	Non-isolated I/O ground	16	GND	Non-isolated I/O ground
7	TX422_1P	422 output 1	17	TX422_3P	422 output 3
8	TX422_1N	422 output 1	18	TX422_3N	422 output 3
9	RX422_1P	422 input 1	19	RX422_3P	422 input 3
10	RX422_1N	422 input 1	20	RX422_3N	422 input 3

I/O Adapter Cable

The two ends of the I/O adapter cable are DB26 to connect other devices and female header

to connect the frame grabber.

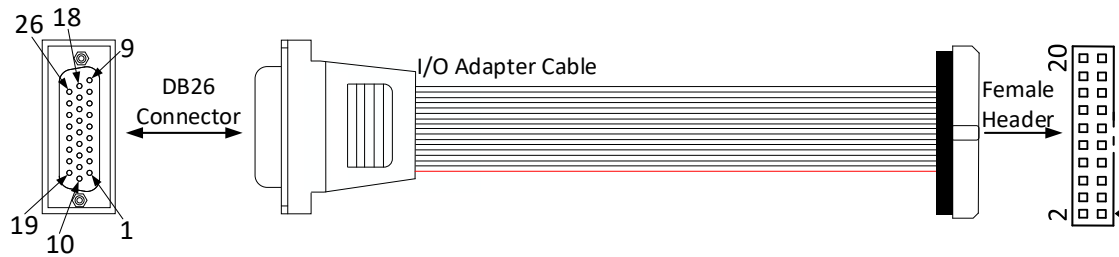


Figure 3-4 I/O Adapter Cable



Figure 3-5 Appearance of I/O Adapter Cable

Note

- I/O adapter cable is sold separately, and you should purchase it according to actual demands.
 - For the pin definition of I/O adapter bracket, see [Frame Grabber Accessories](#).
-

3.3 PCIe2.0 Connector

The frame grabber has a PCIe2.0 connector in x8 mode, which can be connected to the host. When in use, the PCIe2.0 connector of the frame grabber can be inserted into the X8 or X16 slots of the host, as shown below.

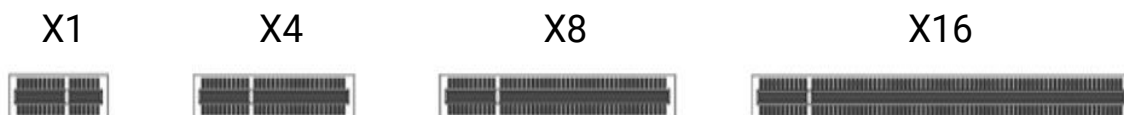


Figure 3-6 PCIe2.0 Connector

3.4 SFP+ Connector

The frame grabber has 4 SFP+ connectors, marked as 0 to 3. The SFP+ connector closest to the PCIe slot is marked as 3, while the SFP+ connector farthest from the PCIe slot is marked as 0. To establish connections, you need to insert an SFP+ module and then connect the module to the device using a fiber patch cable for four 10 GigE fiber port links, or you can insert a copper SFP module and then connect the module to the device using a 10 GigE cable for four 10 GigE links.

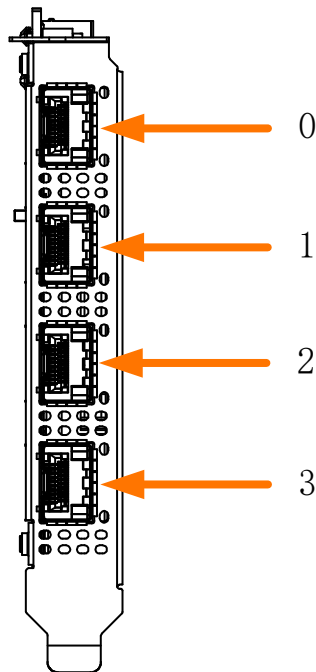


Figure 3-7 SFP+ Connector

3.5 Indicator

The frame grabber provides feedback on various information and status through bus indicator and stream indicator.

Bus Indicator

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

Table 3-3 Bus Indicator Definition

Status	Description
Solid	The PCIe identifies the frame grabber.
Unlit	The PCIe does not identify the frame grabber.

Stream Indicator

Each SFP+ connector on the frame grabber has 2 stream indicators that are used to indicate the status of four 10 GigE fiber ports respectively.

Table 3-4 Stream Indicator Definition

Status	Description
Solid Green	The network connection is successful.
Flashing Yellow	The data is being transmitted.

Chapter 4 Installation

4.1 Installation Preparation

Table 4-1 Installation Preparation

Category	Name	Description
Software	MVS Client Software	It is used to enumerate and set the frame grabber parameters.
	MVS Tool Kit	It is used to provide tool kit for you to finish the frame grabber function configuration.
Hardware	Fiber Patch Cable	They are used to connect the frame grabber and 10 GigE fiber port cameras.
	SFP+ Module	
	10 GigE Cable	They are used to connect the frame grabber and 10 GigE cameras.
	Copper SFP Module	
	I/O Adapter Cable	It is used to connect the frame grabber via female header to other external devices for input/output signals.
API Function Library	SDK	It is used for secondary development.
Firmware Package	MV_GS1004_... .zip	It is used to update the frame grabber firmware.

4.2 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 host's PCIe2.0 × 8 slot or above.
2. Use screws to fix the frame grabber with the host.

3. Connect the fiber module to the SFP+ connector of the frame grabber, and then use fiber patch cable to connect the fiber module and 10 GigE fiber port camera.

Note

Copper SFP module is also supported, with one end connected to the SFP+ connector of the frame grabber and other end connected to the 10 GigE camera via a 10 GigE cable.

4.3 Install MVS Client Software

MVS client software is used to connect and set frame grabber parameters, etc.

Steps

Note

- The MVS client software is compatible with 32/64-bit Windows 7/10, 64-bit Window 11, and 64-bit Linux operating systems, and you can download it from <https://en.hikrobotics.com/>.
 - Make sure that the version of MVS is V3.4.1 and above.
 - Make sure that the MVS is closed before installing or updating it.
 - The graphic user interface may differ by versions of the client software you use.
 - The client integrates the required drivers for the frame grabber, so there is no need to download and install other drivers.
-

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

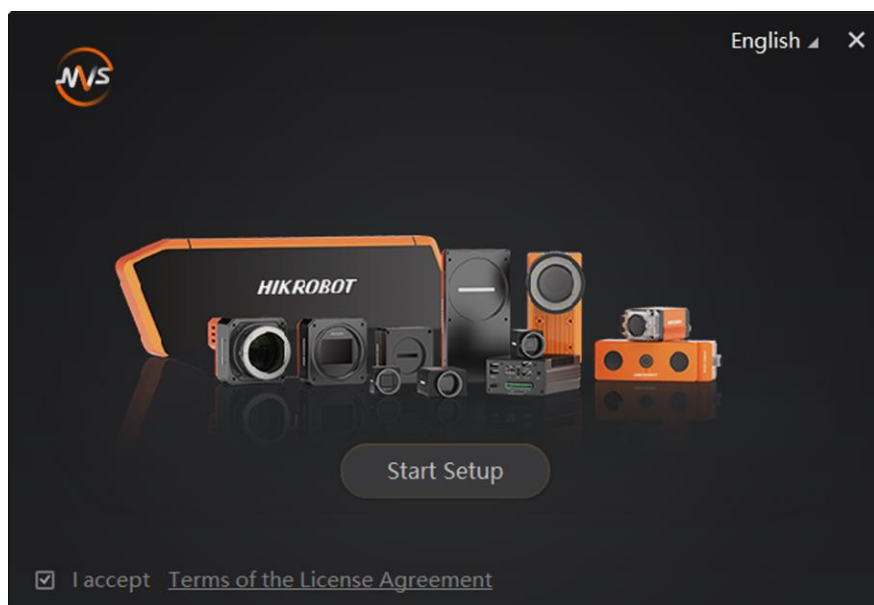


Figure 4-1 Installation Interface

4. Click **Start Setup**.

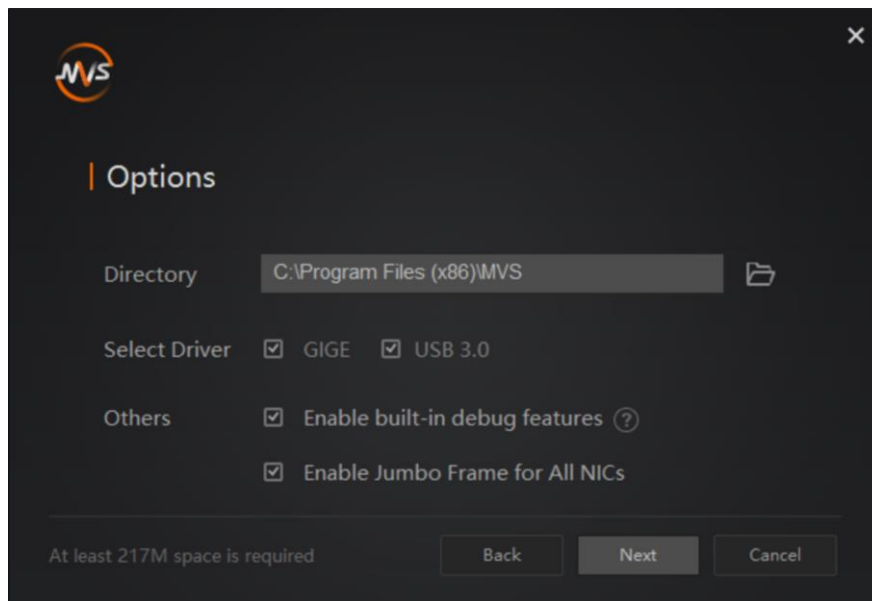


Figure 4-2 Default Settings

5. Keep default settings, and click **Next**.

6. Finish the installation according to the interface prompts.

Chapter 5 Basic Operation of Client Software

5.1 Connect Frame Grabber to Client Software

Steps

Note

Refer to the user manual of the camera and client software for detailed camera operation.

1. Run the MVS software.
 2. Click  in the PCIe, and the client software will enumerate the frame grabber automatically.
 3. Click  in the specific frame grabber name to connect it.
-

Note

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

5.2 Client Software Layout

The main window of the MVS client software is displayed after you connect a frame grabber to it.

Note

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

10 GigE Fiber Port Frame Grabber User Manual

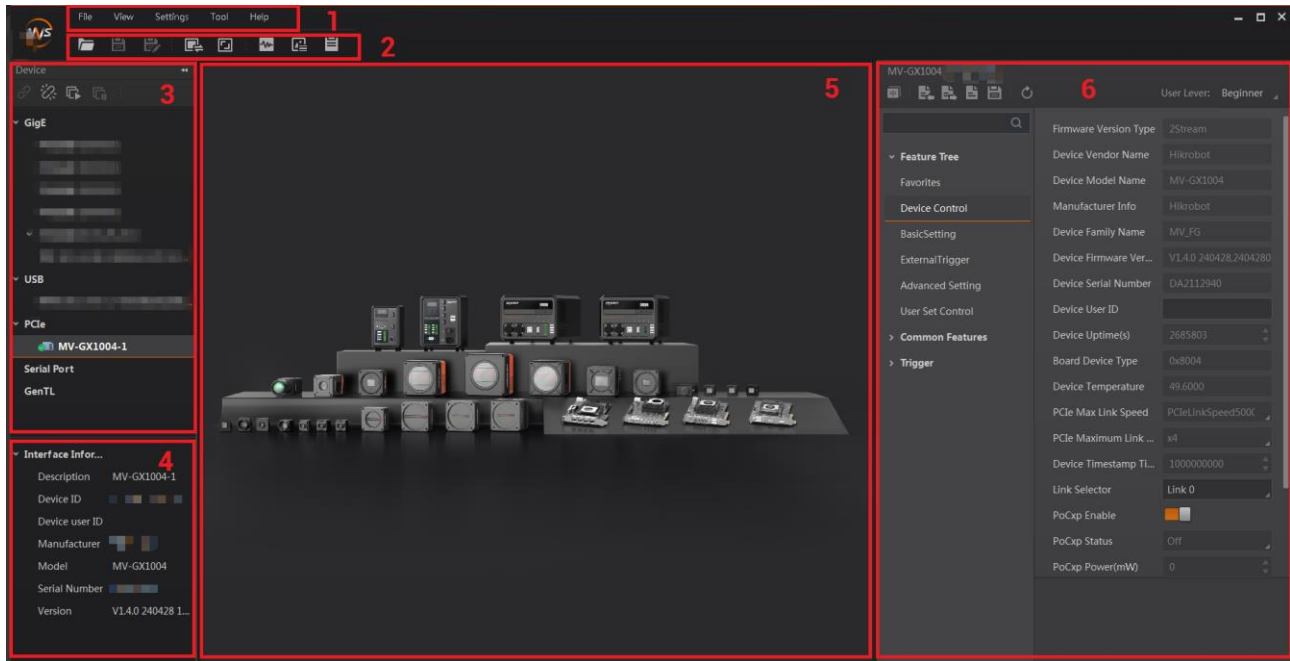


Figure 5-1 Main Window

Table 5-1 Main Window Description

No.	Area Name	Description
1	Menu Bar	The menu bar displays function modules, including File , View , Settings , Tool , and Help .
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.

Table 5-2 Parameter Description

Parameter Name	Description
Device Control	It displays the basic information about the frame grabber.
Stream	It sets the frame signals.
GigE	It controls the trigger signals between the frame grabber and the camera.

Parameter Name	Description
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 and timer.
File Access Control	It sets the framer grabber's file access control related parameters.
User Set Control	It allows loading or saving default or user-defined settings.

5.3 Secondary Development

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

Folder Name	Timestamp	Type
Bin	3/22/2024 10:34 AM	File folder
Documentations	9/9/2024 2:54 PM	File folder
DotNet	3/22/2024 10:34 AM	File folder
Includes	9/20/2024 2:13 PM	File folder
Libraries	3/22/2024 10:34 AM	File folder
MVFG	3/22/2024 10:34 AM	File folder
Samples	3/22/2024 10:34 AM	File folder
ThirdPartyPlatformAdapter	3/22/2024 10:34 AM	File folder

Figure 5-2 Secondary Development

Table 5-3 Folder Description

Folder Name	Content Description
Bin	It is the result of the compilation.
Documentations	It is secondary development documentation, including SDK developer guide and Demo instructions.
DotNet	.NET assembly.
Includes	Header files.
Libraries	Static library.
MVFG	The SDK content of frame grabber, including secondary development documentation, some dynamic libraries developed in C#, header files, static library, sample code, and third-party platform plug-ins.

Folder Name	Content Description
Samples	Sample code for various programming languages.
ThirdPartyPlatformAdapter	Third-party platform plug-ins.

Chapter 6 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 and storage, and transmits the valid image data to the PC side through PCIe.

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

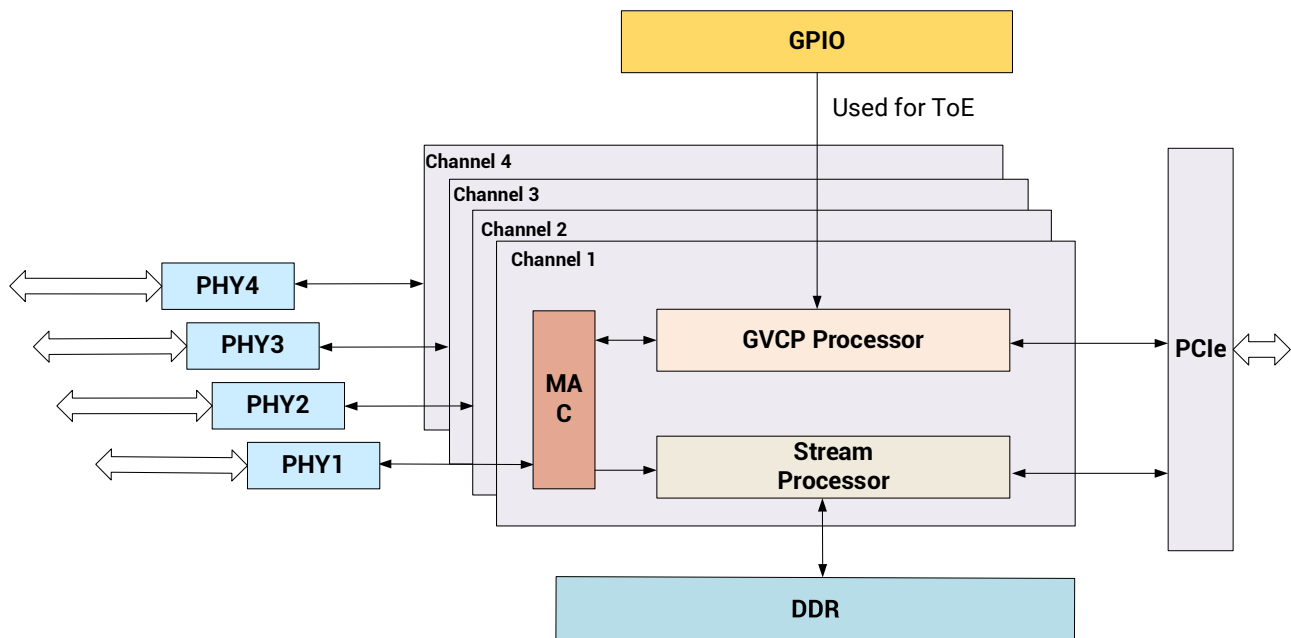


Figure 6-1 Operating Principle

Chapter 7 I/O Introduction

The frame grabber has 24 I/O connectors that provide input and output signals, including opto-isolated input × 4 (OptoCoupled Input 0 to 3), opto-isolated output × 4 (OptoCoupled Output 0 to 3), RS-422 input × 4 (RS422diff Input 0 to 3), RS-422 output × 4 (RS422diff Output 0 to 3), TTL input × 4 (TTL Input 0 to 3), and TTL output × 4 (TTL Output 0 to 3).

7.1 I/O Electrical Feature

7.1.1 Opto Coupler Input

The frame grabber has 4 opto coupler-isolated input signals, and their internal circuit is shown below.

 Note

The max. input current is 25 mA.

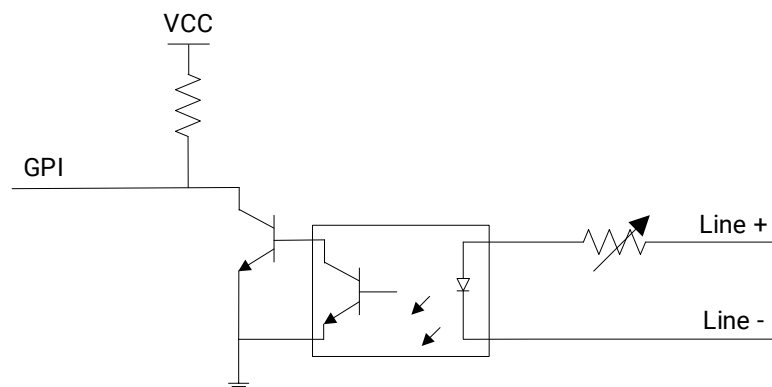


Figure 7-1 Internal Circuit of Opto Coupler Input

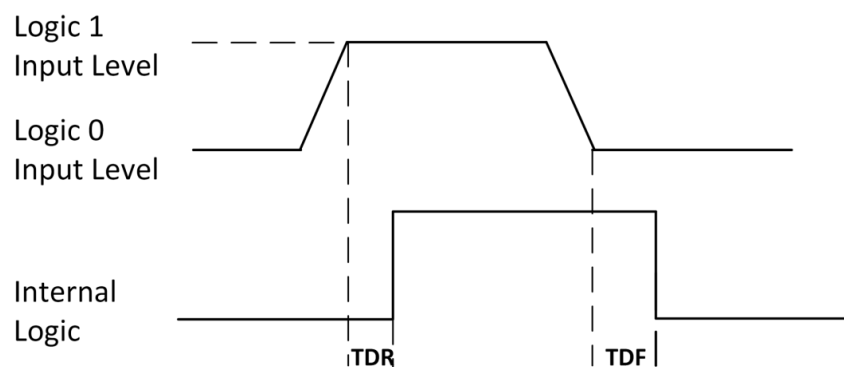


Figure 7-2 Input Logic Level

Note

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

Table 7-1 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 μ s to 4.6 μ s
Input Falling Delay	TDF	16.8 μ s to 22 μ s

7.1.2 Opto Coupler Output

The frame grabber has 4 opto coupler-isolated output signals, and the internal circuit is shown below.

Note

The max. output current is 25 mA.

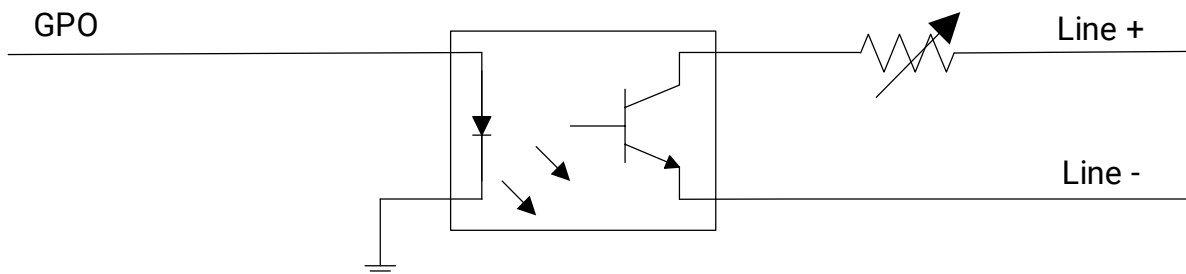


Figure 7-3 Internal Circuit of Opto Coupler Output

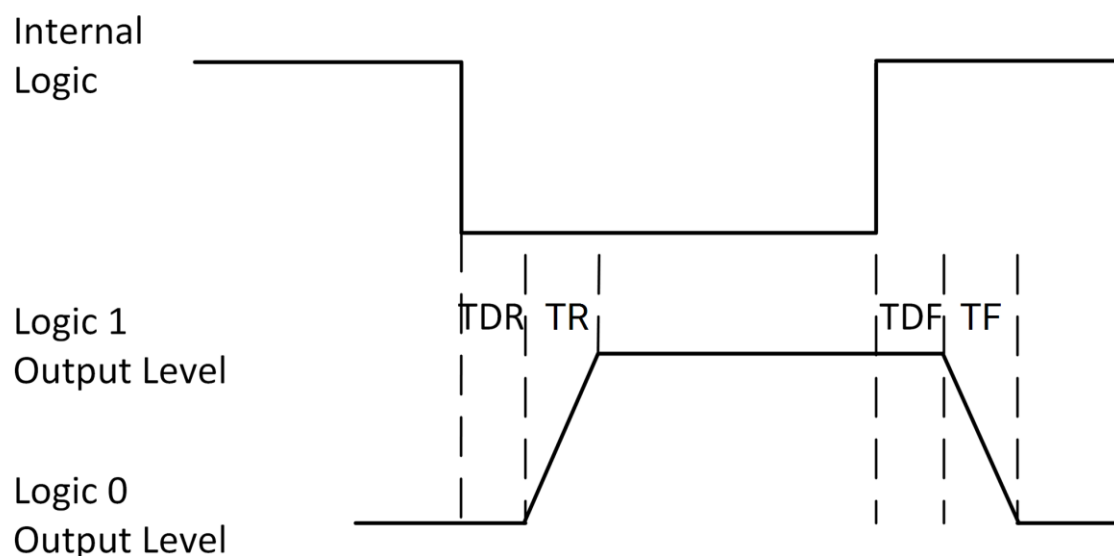


Figure 7-4 Output Logic Level

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

Table 7-2 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 μ s
Output Falling Time	TF	1.9 μ s
Output Rising Delay	TDR	15 μ s to 60 μ s
Output Falling Delay	TDF	3 μ s to 6 μ s

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

Table 7-3 Parameter of Output Logic Level Low

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

7.1.3 TTL Input/Output

The frame grabber has 4 TTL input signals and 4 TTL output signals. Their internal circuit is shown below, and A stands for signal input and Y for signal output.

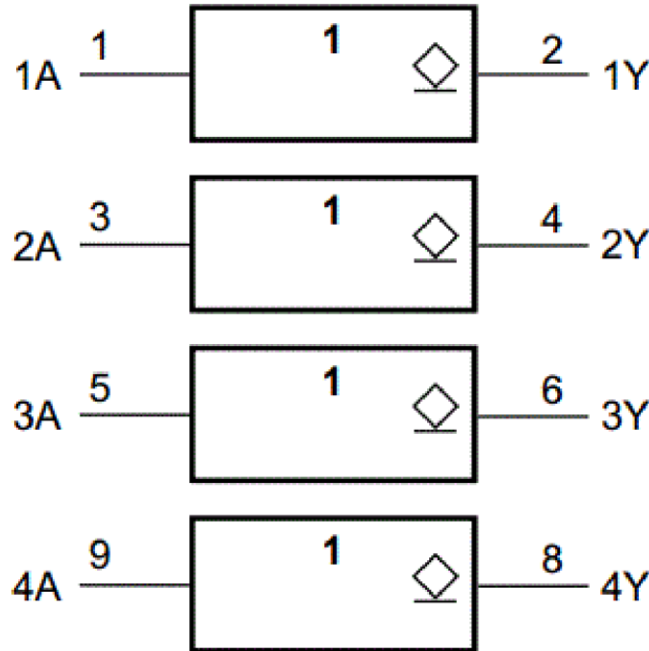


Figure 7-5 Internal Circuit of TTL Input/Output

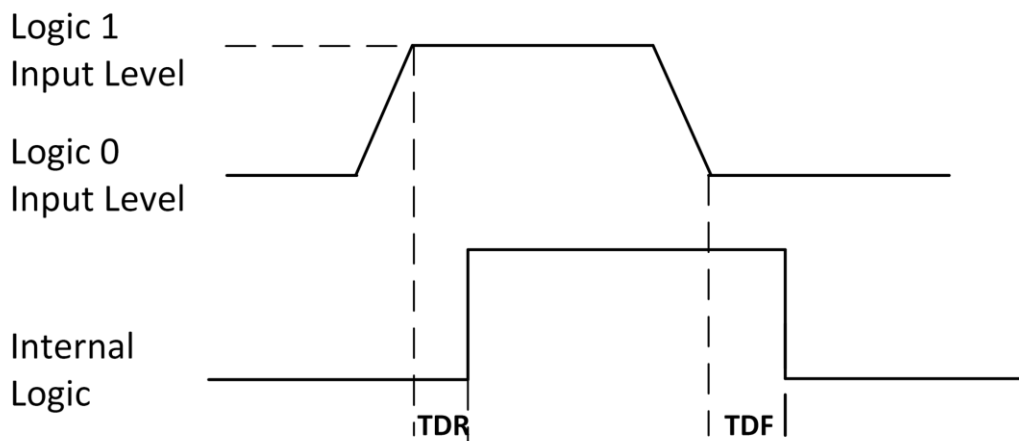


Figure 7-6 Logic Level of TTL Input/Output

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

Table 7-4 TTL Input Electrical Feature

Parameter Name	Parameter Symbol	Value
Input Logic Level Low	VIL	0 VDC to 0.8 VDC

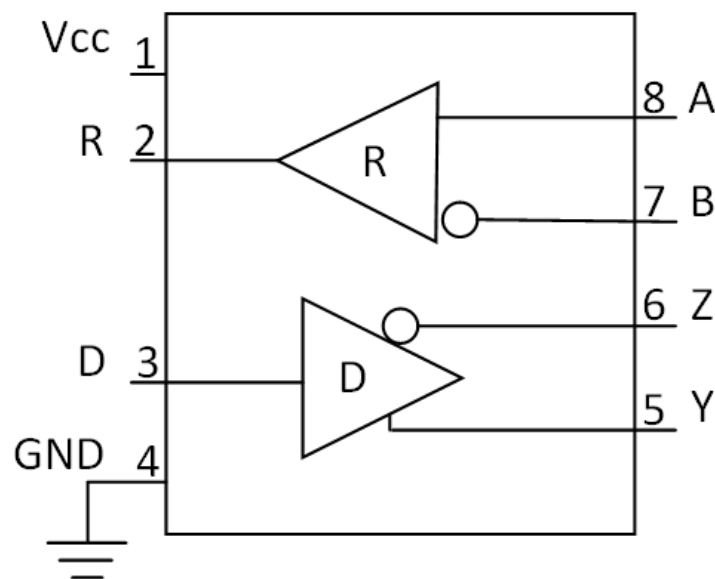
Parameter Name	Parameter Symbol	Value
Input Logic Level High	VIH	2 VDC to 5 VDC
Input Rising Delay	TDR	< 10 ns
Input Falling Delay	TDF	< 10 ns

Table 7-5 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

7.1.4 RS-422 Input/Output

The frame grabber has 4 pairs of 422 input signal and 4 pairs of 422 output signal. 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 7-7 Internal Circuit of 422 Input/Output

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

Table 7-6 422 Input Electrical Feature

Input (A-B)	Output (R)
Higher than +0.2 V	High
Lower than -0.2 V	Low

Table 7-7 422 Output Electrical Feature

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

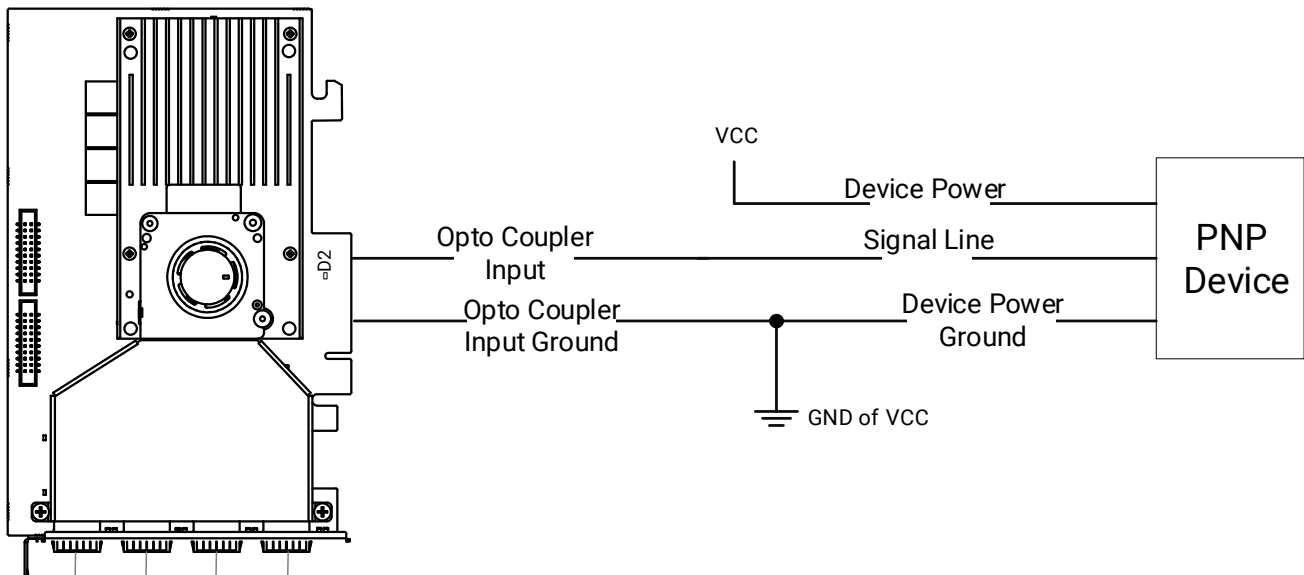
7.2 I/O Wiring

7.2.1 Opto Coupler Input Wiring

Note

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

● PNP Device


Figure 7-8 Opto Coupler Input Connects PNP Device

● NPN Device

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

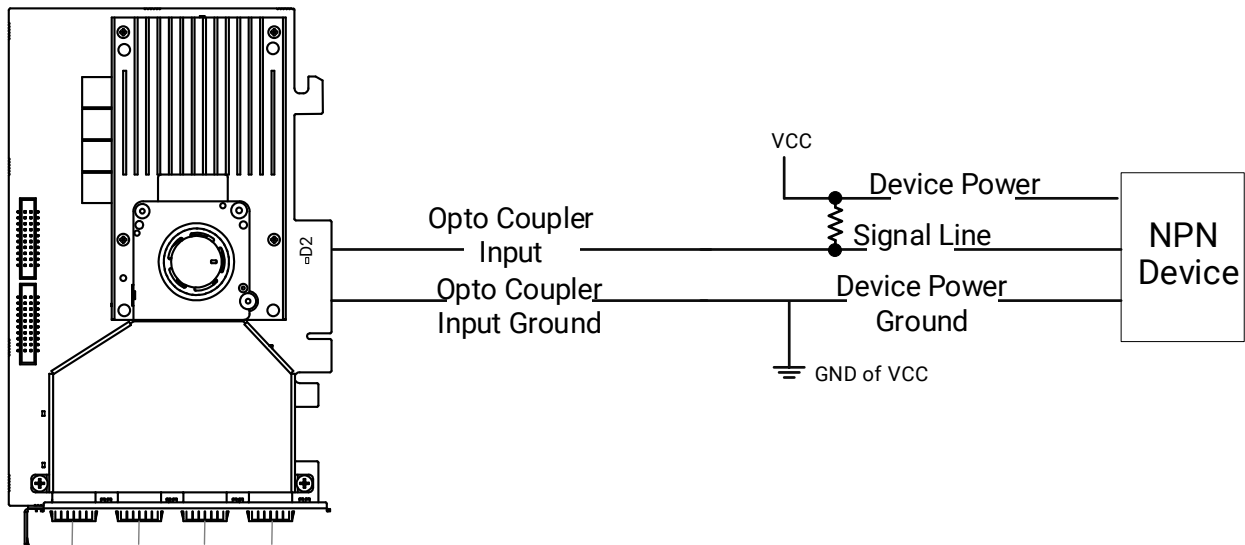


Figure 7-9 Opto Coupler Input Connects NPN Device

● Switch

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

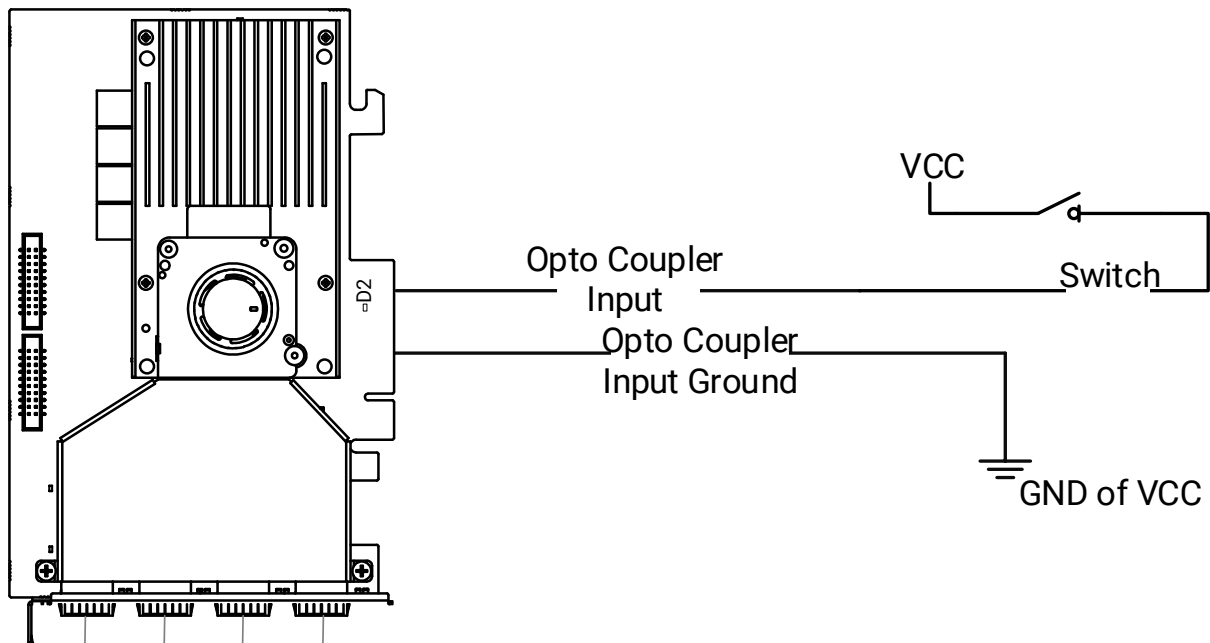


Figure 7-10 Opto Coupler Input Connects a Switch

7.2.2 Opto Coupler Output Wiring

Note

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

● PNP Device

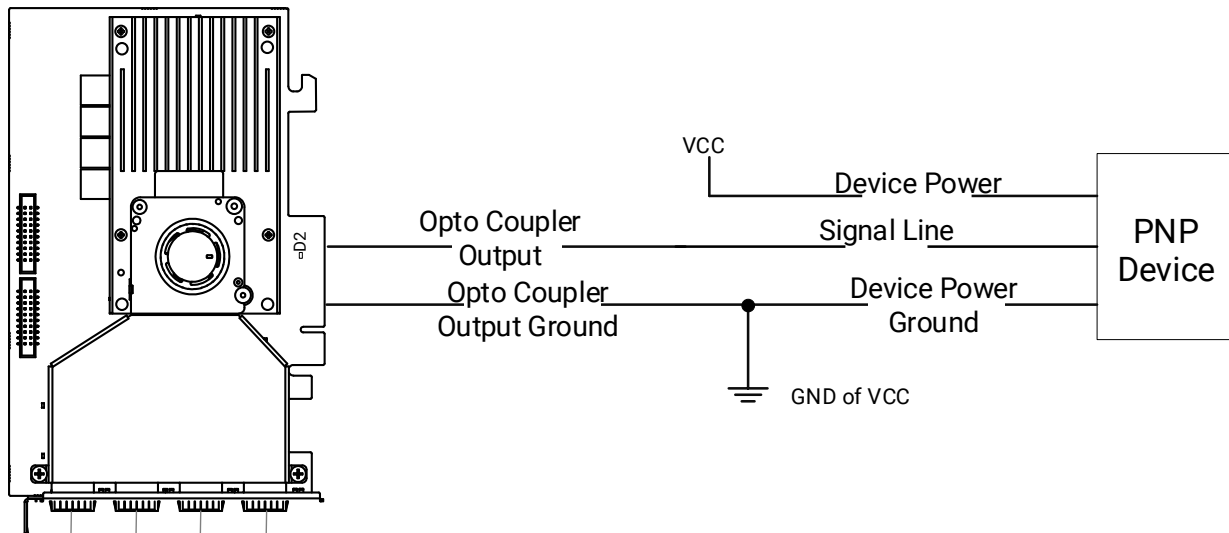


Figure 7-11 Opto Coupler Output Connects PNP Device

● NPN Device

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

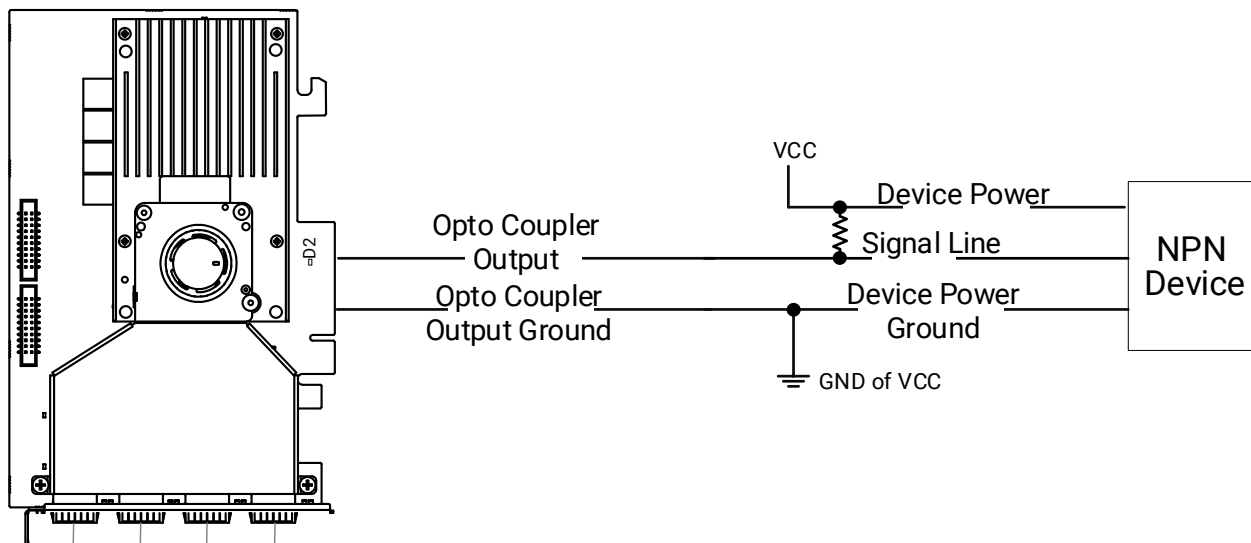


Figure 7-12 Opto Coupler Output Connects NPN Device

7.2.3 Wiring of TTL Input/Output

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

● TTL Input Signal

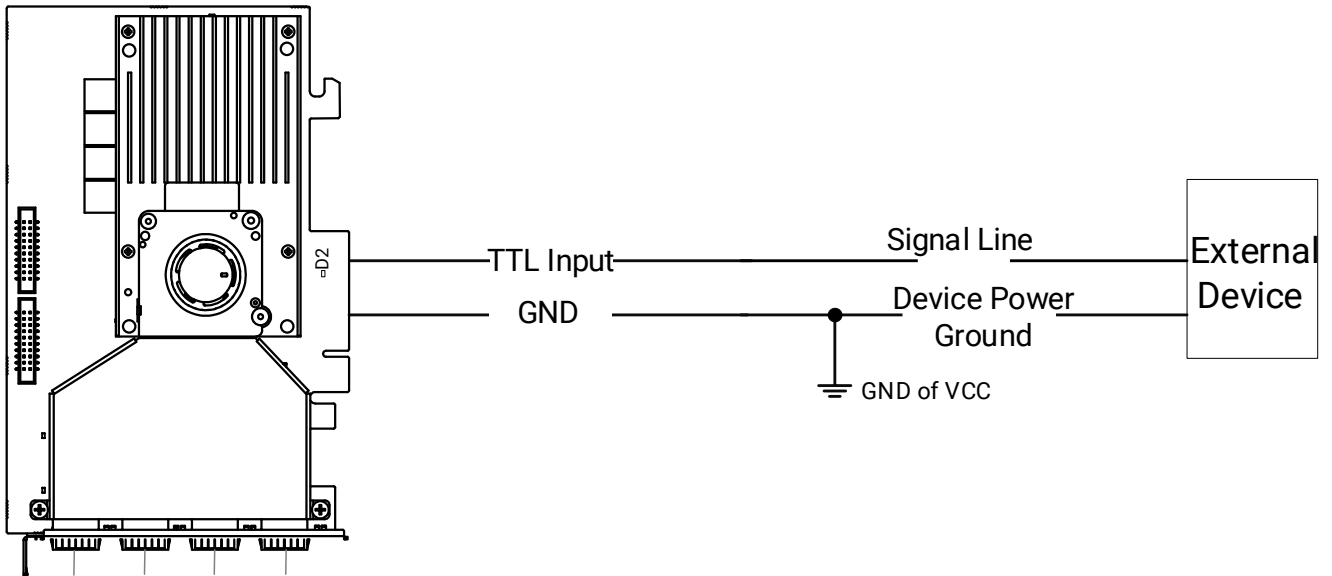


Figure 7-13 TTL Input Connects External Device

● TTL Output Signal

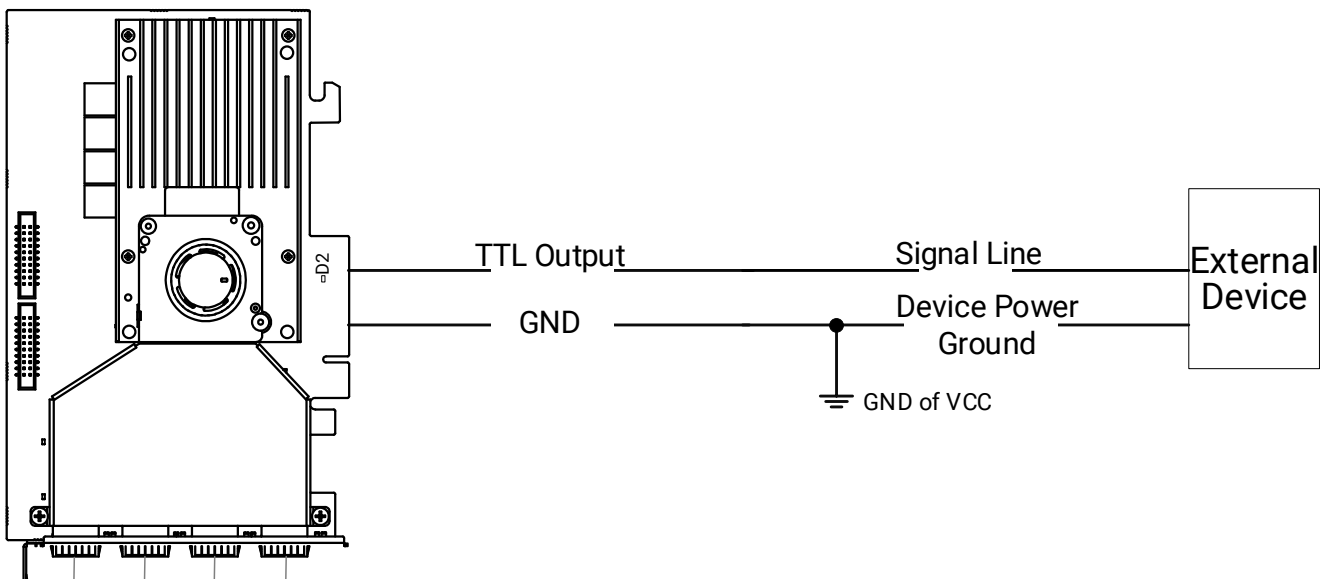


Figure 7-14 TTL Output Connects External Device

7.2.4 Wiring of RS-422 Input/Output

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

- **RS-422 Input Signal**

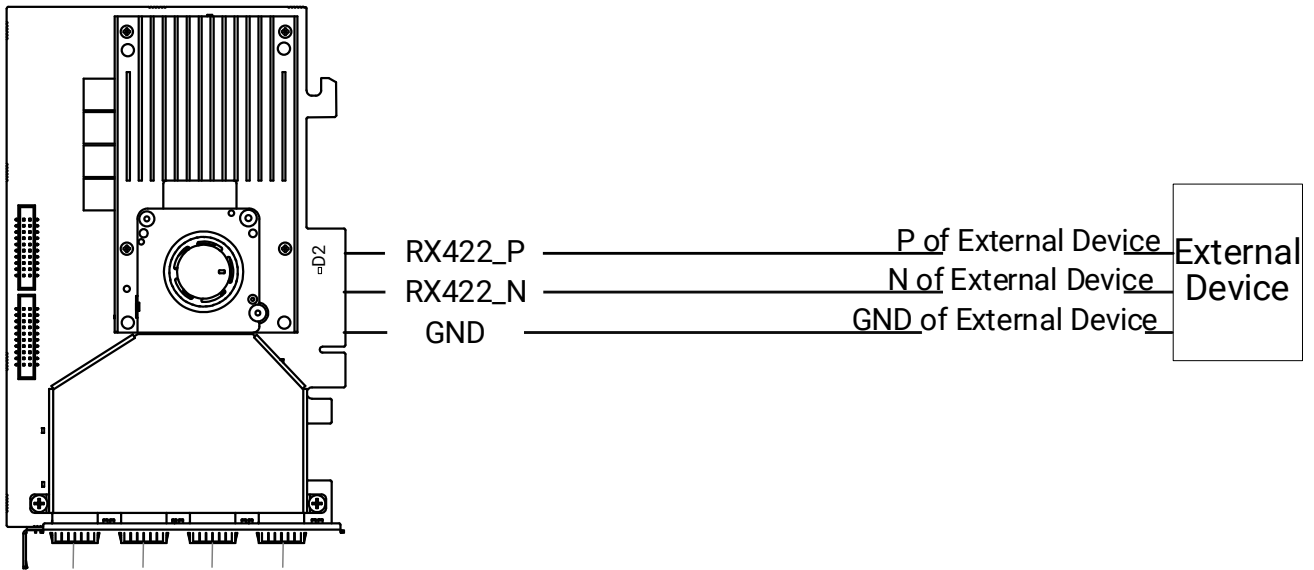


Figure 7-15 RS-422 Input Connects External Device

- **RS-422 Output Signal**

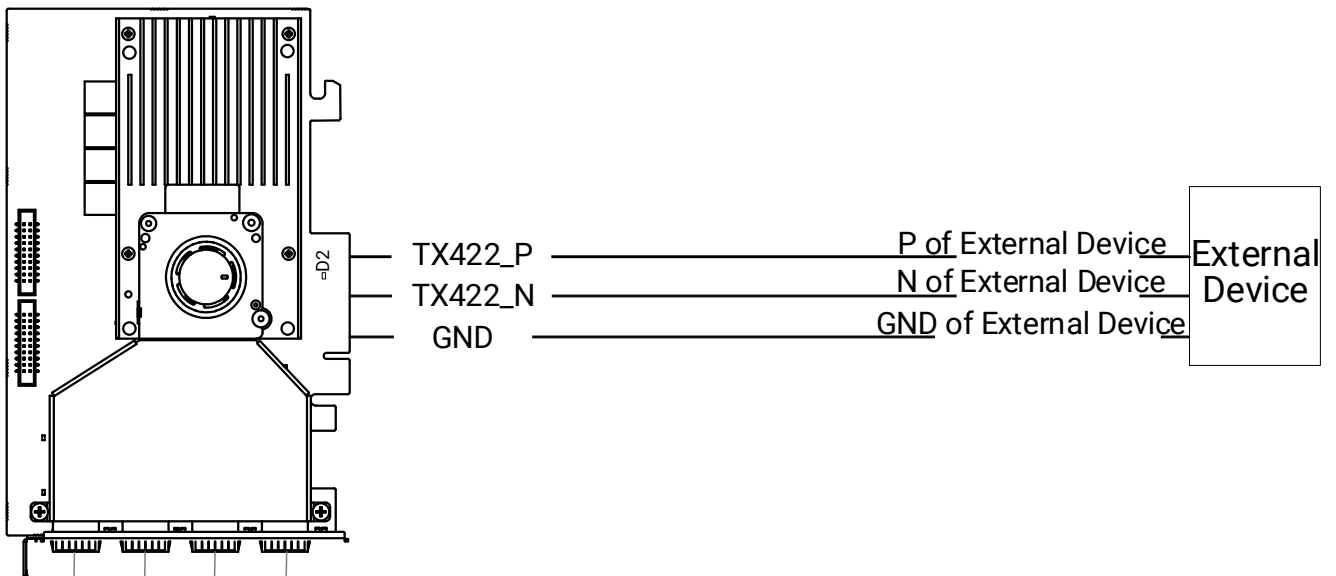


Figure 7-16 RS-422 Output Connects External Device

7.3 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 RS-422 input/output signals. You can go to **Digital IO Control** of the MVS client software to configure the input/output signals

according to actual demands.

7.3.1 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 **OptoCoupled Input ***, **RS422diff Input ***, or **TTL Input *** in the **Line Selector** according to actual demands.

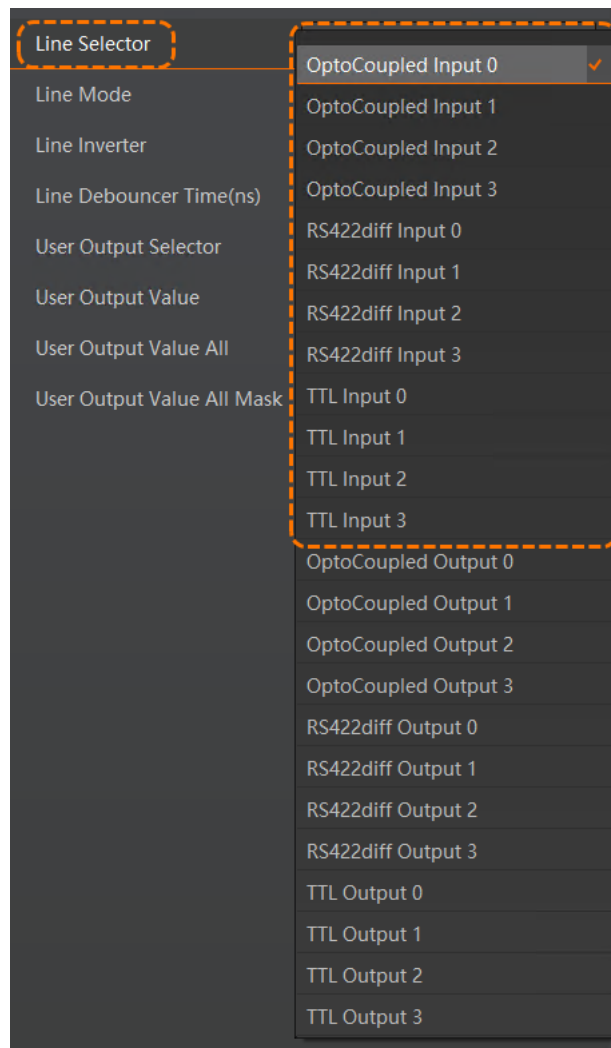


Figure 7-1 Line Selector

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

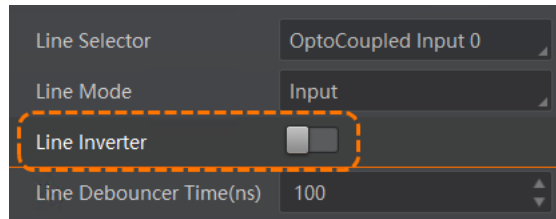


Figure 7-2 Line Inverter

Note

The line inverter is disabled by default.

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

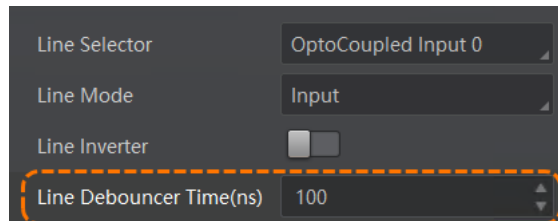


Figure 7-3 Line Debouncer Time

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.

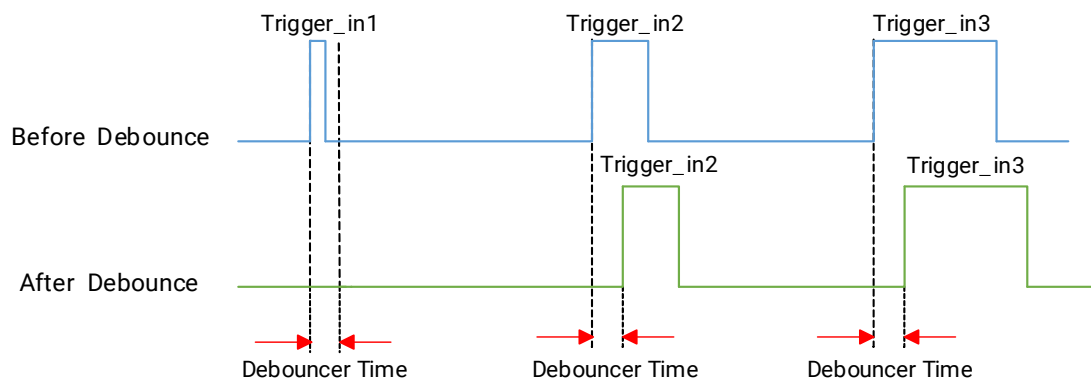


Figure 7-4 Sequence Diagram

Taking **OptoCoupled Input 0** as **Line Selector** as an example, the principle of trigger

debouncer and line inverter is shown below.

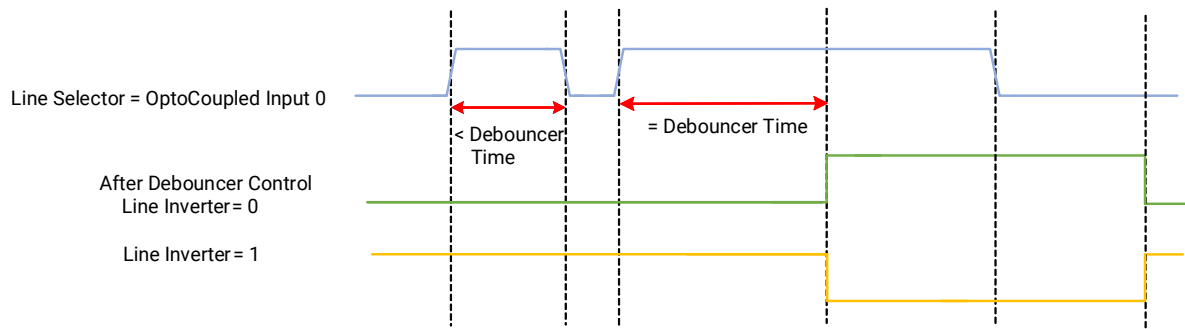


Figure 7-5 Principle

The code below shows the process of setting input signals.

```
MV_INTERFACE_INFO_LIST stInterfaceList = {0};
MV_CC_EnumInterfaces(MV_GIGE_INTERFACE, &stInterfaceList);
unsigned int nInterfaceIndex = 0;
void* hInterface = NULL;
MV_CC_CreateInterface(&hInterface, stInterfaceList.pInterfaceInfos[nInterfaceIndex]);
MV_CC_OpenInterface(hInterface, NULL);

MV_CC_SetEnumValueByString(hInterface, "LineSelector", "OptoCoupledInput0");
MV_CC_SetEnumValueByString(hInterface, "LineMode", "Input");
MV_CC_SetIntValueEx(hInterface, "LineDebouncerTimeNs", 100);

MV_CC_CloseInterface(hInterface);
MV_CC_DestroyInterface(hInterface);
```

7.3.2 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. Go to **Encoder Control**, and select **Encoder 0** or **Encoder 1** as **Encoder Selector**.
2. Select corresponding signal sources or off as **Encoder Source A** and **Encoder Source B**.

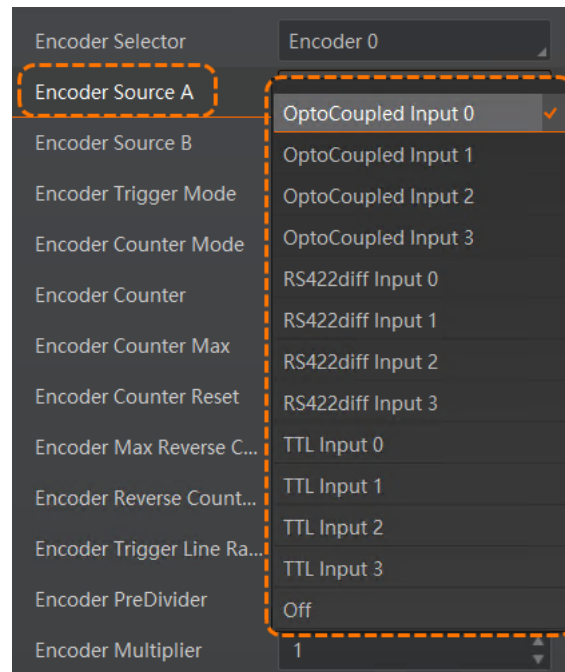


Figure 7-4 Input Signal

3. Set Encoder Trigger Mode.

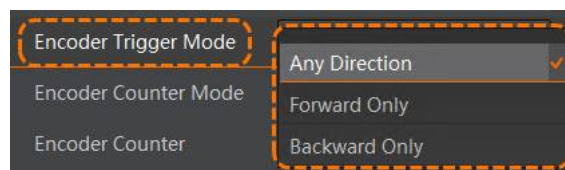


Figure 7-5 Encoder Trigger Mode

- **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.

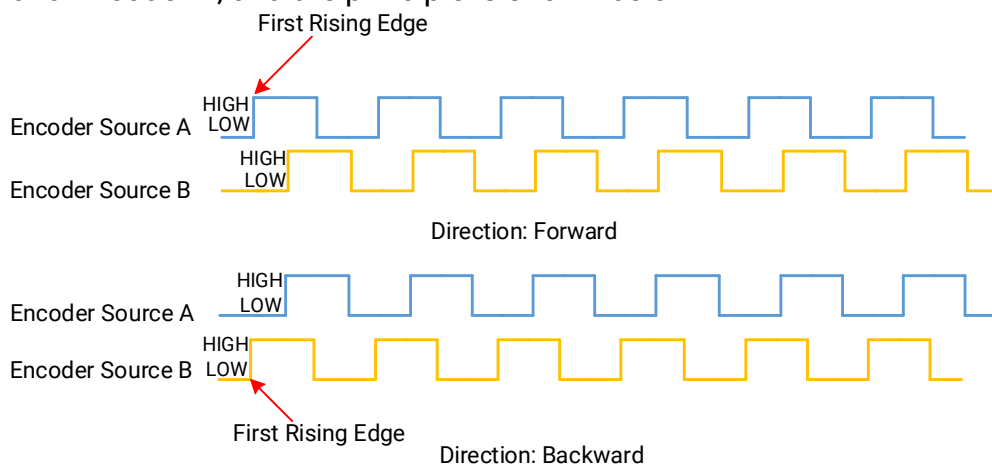


Figure 7-6 Principle

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

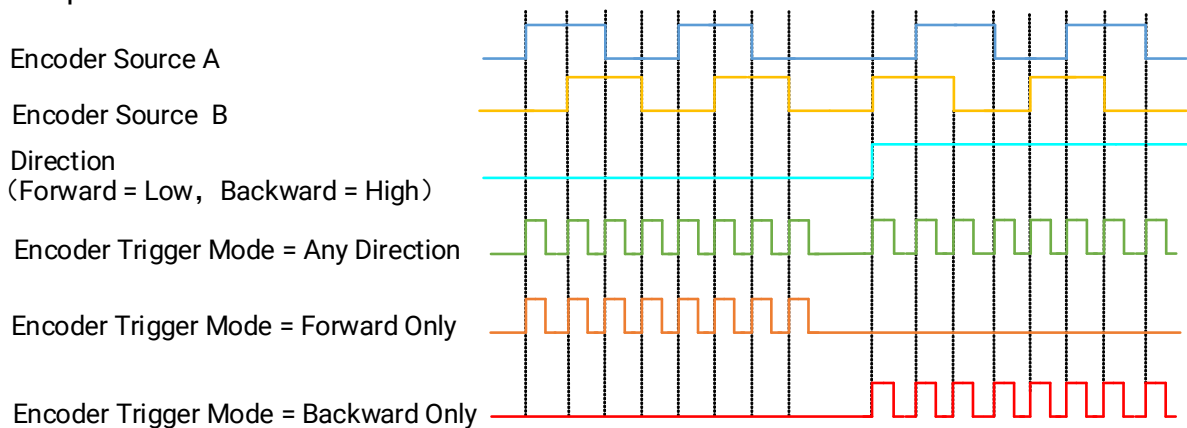


Figure 7-7 Encoder Trigger Signal Mode Principle

4. Set Encoder Counter Mode.

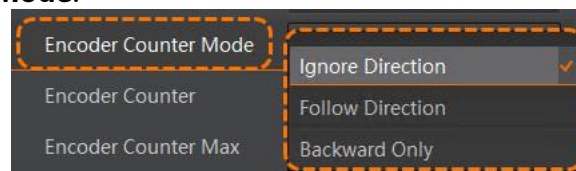


Figure 7-8 Encoder Counter Mode

- **Ignore Direction** means that both forward and backward signals will count.
- **Follow Direction** means that only forward signals will count.
- **Backward Direction** means that only backward signals will count.

Note

The encoder counter mode should correspond to the encoder trigger mode. If **Forward Only** is set as **Encoder Trigger Mode** and **Backward Only** as **Encoder Counter Mode**, the counter will be 0.

If the encoder selects different counter modes, and its principle is shown below.

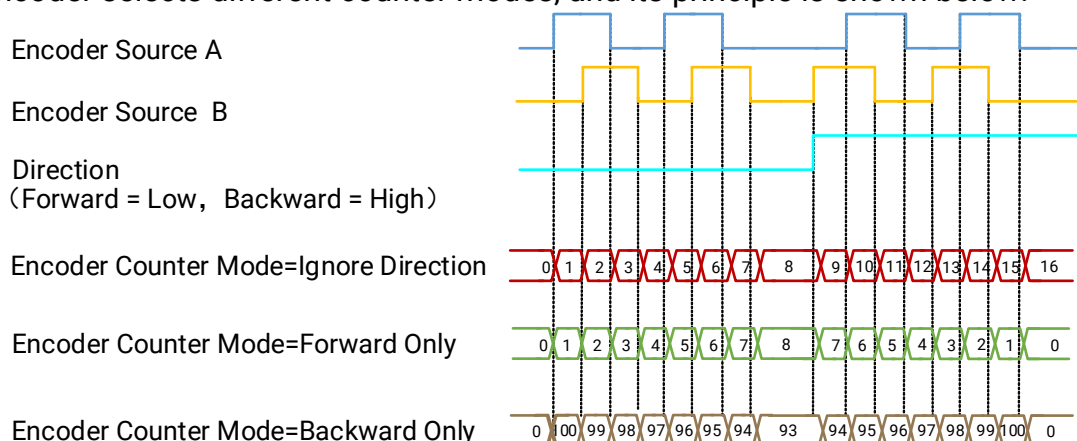


Figure 7-9 Encoder Counter Mode Principle

5. View counter value in **Encoder Counter**.

Note

Set the max. counter value via **Encoder Counter Max**, and the counting will restart after the value exceeds the max. value.

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.

Note

The set value is the max. number of allowed reverse movements without generating images. The camera will only resume image output when the object being measured moves forward and returns to the starting position.

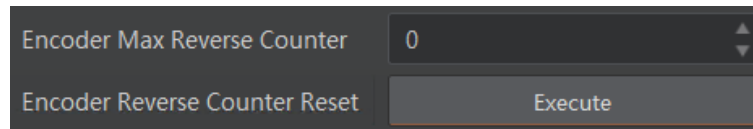


Figure 7-10 Encoder Max Reverse Counter

The max. 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 **Forward Only** is selected in **Encoder Trigger Mode**, the principle is shown below.

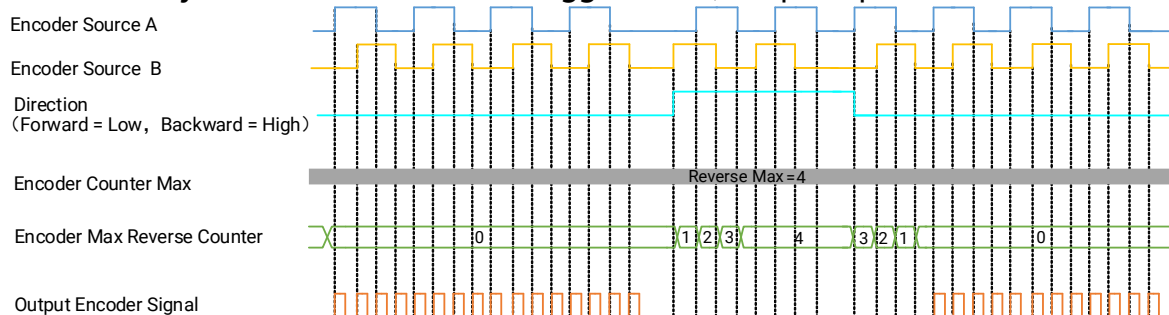


Figure 7-11 Forward Principle

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

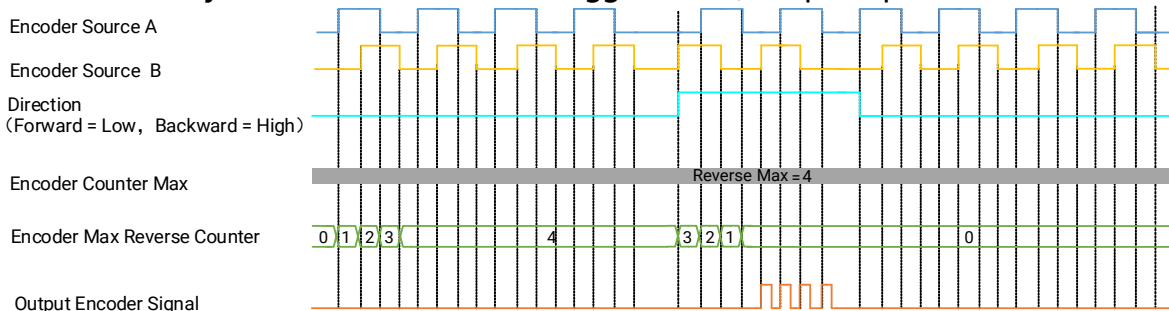


Figure 7-12 Backward Principle

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

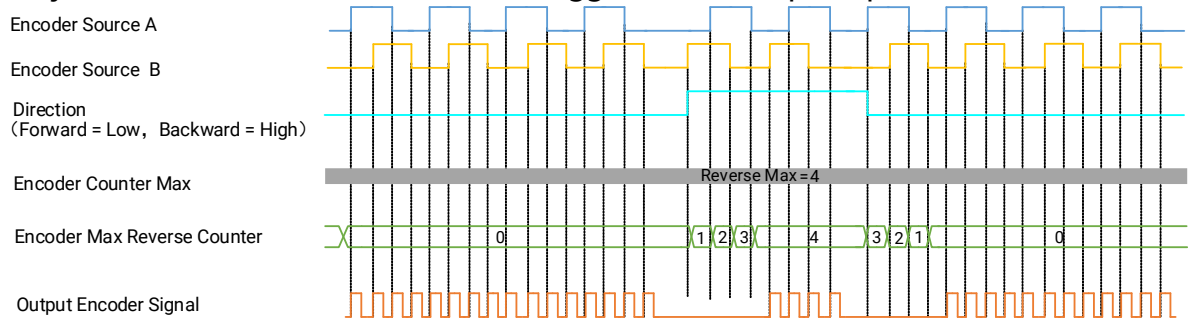


Figure 7-13 Any Direction Principle

8. **Encoder Trigger Line Rate (Hz)** displays the line rate of the encoder.
9. **Resulting Trigger Line Rate (Hz)** displays the actual line rate.

```

MV_INTERFACE_INFO_LIST stInterfaceList = {0};
MV_CC_EnumInterfaces(MV_GIGE_INTERFACE, &stInterfaceList);

unsigned int nInterfaceIndex = 0;
void* hInterface = NULL;
MV_CC_CreateInterface(&hInterface, stInterfaceList.pInterfaceInfos[nInterfaceIndex]);
MV_CC_OpenInterface(hInterface, NULL);

MV_CC_SetEnumValueByString(hInterface, "EncoderSelector", "Encoder0");
MV_CC_SetEnumValueByString(hInterface, "EncoderSourceA", "OptoCoupledInput0");
MV_CC_SetEnumValueByString(hInterface, "EncoderSourceB", "Off");
MV_CC_SetEnumValueByString(hInterface, "EncoderTriggerMode", "AnyDirection");
MV_CC_SetEnumValueByString(hInterface, "EncoderCounterMode", "IgnoreDirection");
MVCC_INTVALUE_EX stIntValue = {0};
MV_CC_GetIntValueEx(hInterface, "EncoderCounter", &stIntValue);
MV_CC_SetIntValueEx(hInterface, "EncoderCounterMax", 10000);
MV_CC_GetIntValueEx(hInterface, "EncoderTriggerLineRate", &stIntValue);
MV_CC_GetIntValueEx(hInterface, "ResultingTriggerLineRate", &stIntValue);

MV_CC_CloseInterface(hInterface);
MV_CC_DestroyInterface(hInterface);
    
```

7.3.3 Encoder Frequency Converter Control

The encoder frequency converter can convert the encoder's signal frequency into the frame trigger signal frequency that the camera needs through the frame grabber's frequency conversion module, thus triggering the camera. The frequency conversion module includes PreDivider, Multiplier and PostDivider.

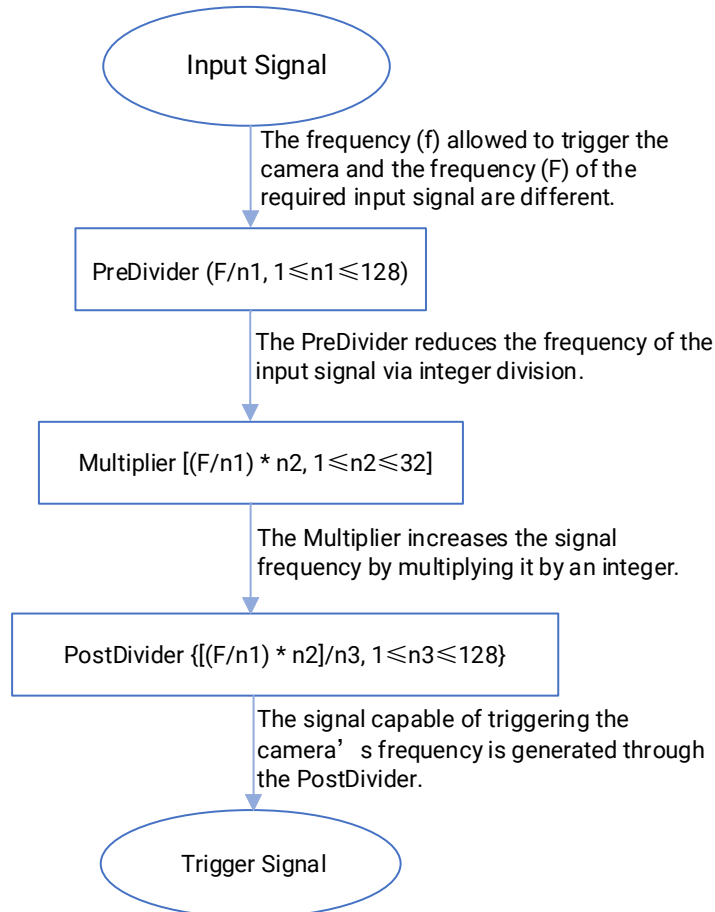


Figure 7-14 Encoder Frequency Converter Control

PreDivider

The input signal first enters the PreDivider module, which reduces source signal frequency via integer division, and then the signal is sent to the Multiplier module.

The PreDivider module reduces periodic jitter on the input signal, and signals above 100 kHz must go through the PreDivider module to reduce the frequency for the Multiplier can only receive signals in the range of 10 Hz to 100 kHz frequency range. The periodic jitter of shaft encoder signal is accepted.

Multiplier

After the signal is processed by the PreDivider, it is sent to the Multiplier. The Multiplier multiplies the signal by an integer to increase its signal frequency, and then the signal is

sent to the PostDivider.

PostDivider

PostDivider reduces signal frequency via an integer factor, and uses the newly generated frequency signal as the device's trigger signal.

The principle of encoder frequency converter is shown below.

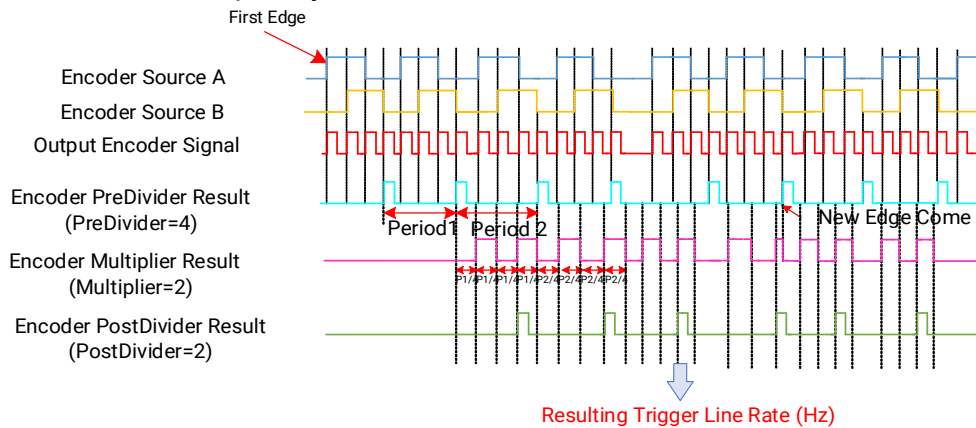


Figure 7-15 Principle of Encoder Frequency Converter

Steps

1. Go to **External Trigger**, and find encoder frequency converter related parameters.
2. Enter **Encoder PreDivider**, **Encoder Multiplier**, and **Encoder PostDivider** according to actual demands.

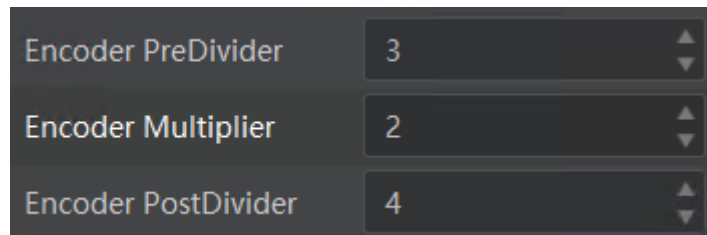


Figure 7-16 Encoder Frequency Converter Control (Before Reduction)

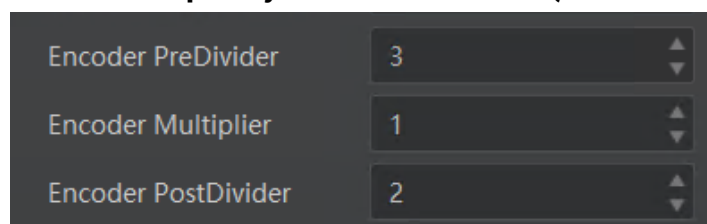


Figure 7-17 Encoder Frequency Converter Control (After Reduction)

The code below shows the process of setting encoder frequency converter.

```
MV_INTERFACE_INFO_LIST stInterfaceList = {0};
MV_CC_EnumInterfaces(MV_GIGE_INTERFACE, &stInterfaceList);
unsigned int nInterfaceIndex = 0;
```

```
void* hInterface = NULL;
MV_CC_CreateInterface(&hInterface, stInterfaceList.pInterfaceInfos[nInterfaceIndex]);
MV_CC_OpenInterface(hInterface, NULL);

MV_CC_SetIntValueEx(hInterface, "EncoderPreDivider", 3);
MV_CC_SetIntValueEx(hInterface, "EncoderMultiplier", 1);
MV_CC_SetIntValueEx(hInterface, "EncoderPostDivider", 2);

MV_CC_CloseInterface(hInterface);
MV_CC_DestroyInterface(hInterface);
```

7.3.4 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 **Counter And Timer Control**, and select one timer from **Timer 0** to **Timer 3** in **Timer Selector**.
2. Set **Timer Duration(μs)** and **Timer Delay(μs)** according to actual demands. The principle of timer output is shown below.

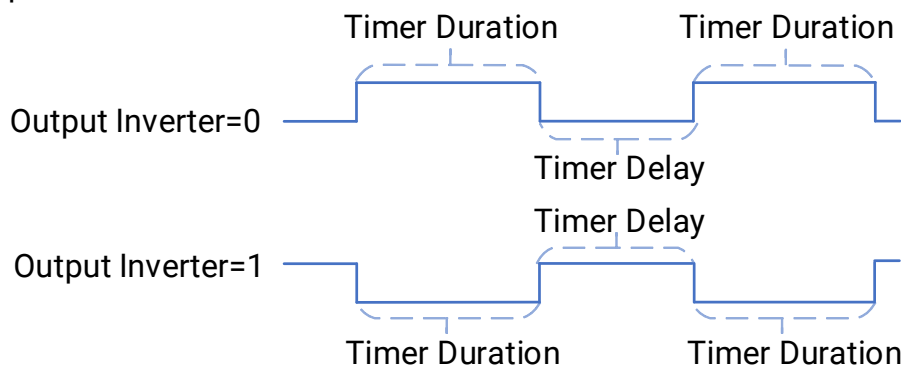


Figure 7-18 Principle of Timer Output

Note

The output signal of the timer is related to the settings of level inversion. Please set according to the demands.

3. Set **Timer Frequency(HZ)** according to actual demands. The timer signal will be outputted in cycles according to the frequency.
4. (Optional) Click **Execute** of **Timer Reset** to reset the output signals.

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

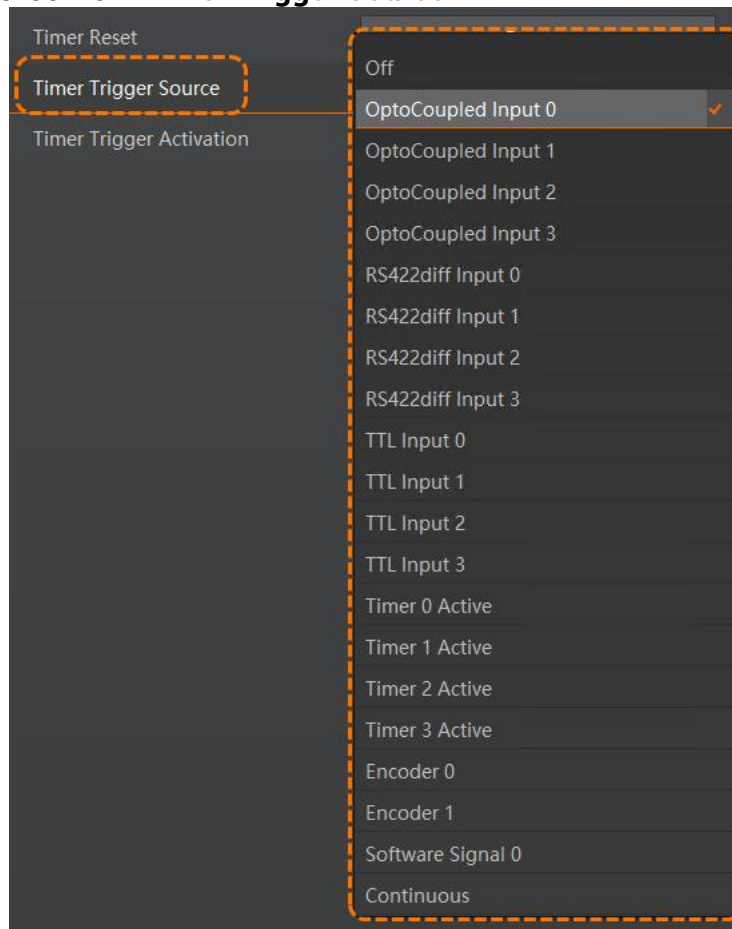


Figure 7-19 Timer Trigger Signal Source

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.

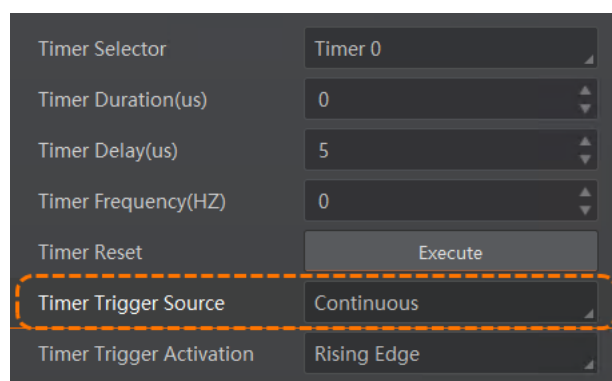


Figure 7-20 Continuous

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

6. Set the response modes to trigger signal via **Timer Trigger Activation** according to actual demands.

Table 7-1 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 timer 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 timer signal.
Any Edge	When the electrical level signal given by external devices is in rising or falling edge, the frame grabber receives the trigger source and starts to output configured timer 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 timer 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 timer signal.

Taking **OptoCoupled Input *** as **Timer Trigger Source** and **Any Edge** as **Timer Trigger Activation** as an example, 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 corresponding timer signal.

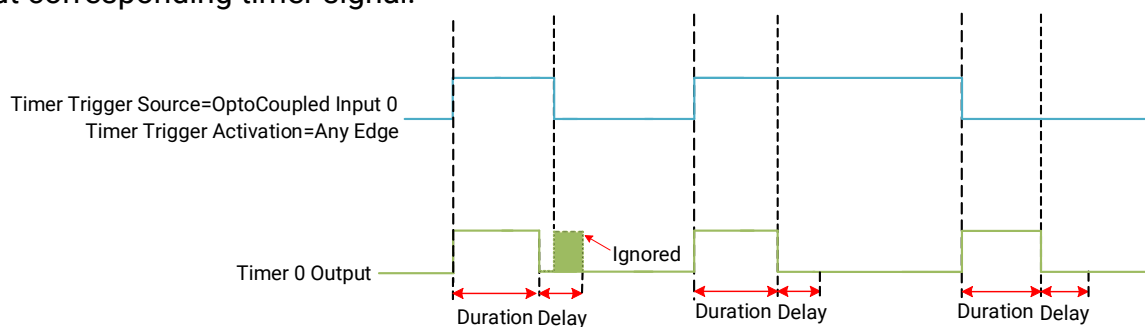


Figure 7-21 Principle

```
MV_INTERFACE_INFO_LIST stInterfaceList = {0};
MV_CC_EnumInterfaces(MV_GIGE_INTERFACE, &stInterfaceList);
unsigned int nInterfaceIndex = 0;
```

```
void* hInterface = NULL;

MV_CC_CreateInterface(&hInterface, stInterfaceList.pInterfaceInfos[nInterfaceIndex]);

MV_CC_OpenInterface(hInterface, NULL);


MV_CC_SetEnumValueByString(hInterface, "TimerSelector", "Timer0");
MV_CC_SetIntValueEx(hInterface, "TimerDuration", 1000);
MV_CC_SetIntValueEx(hInterface, "TimerDelay", 1000);
MV_CC_SetIntValueEx(hInterface, "TimerFrequency", 100);
MV_CC_SetEnumValueByString(hInterface, "TimerTriggerSource", "OptoCoupledInput0");
MV_CC_SetEnumValueByString(hInterface, "TimerTriggerActivation", "RisingEdge");


MV_CC_CloseInterface(hInterface);
MV_CC_DestroyInterface(hInterface);
```

7.3.5 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 **OptoCoupled Output ***, **RS422diff Output ***, or **TTL Output *** in the **Line Selector**.

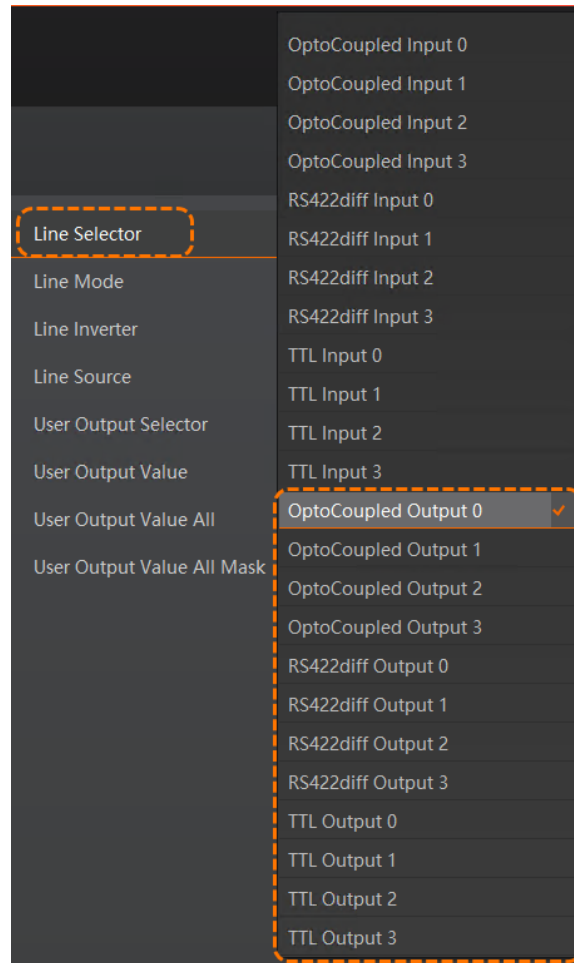


Figure 7-22 Set Input Signal

2. Select **Strobe** as **Line Mode**.

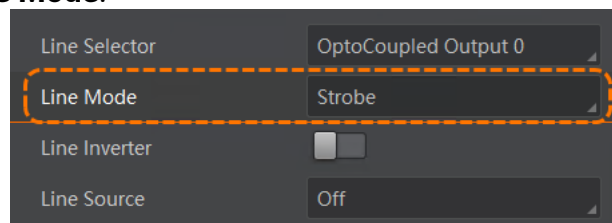


Figure 7-23 Set Output Signal

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

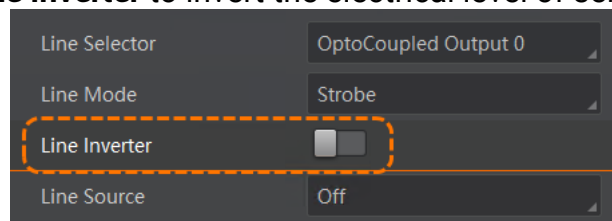


Figure 7-24 Enable Line Inverter

Note

The line inverter is disabled by default.

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

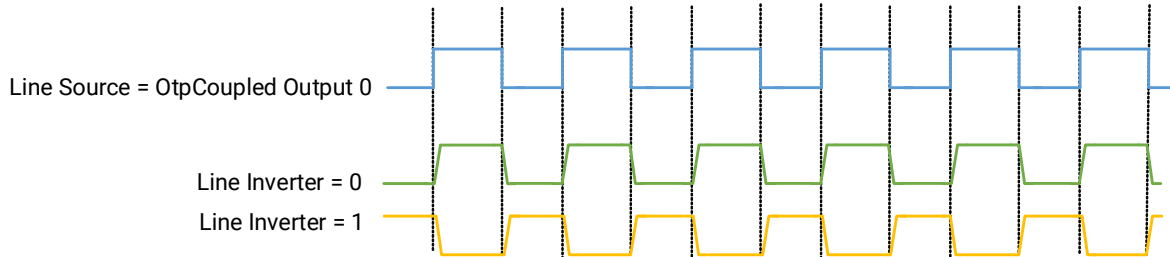


Figure 7-25 Principle

4. The frame grabber supports multiple output signal sources sent by external devices. When the frame grabber receives the trigger signal source sent by external device, it will output corresponding signal. You can select **Off**, **OptoCoupled Input ***, **RS422diff Input ***, **TLL Input ***, **Timer * Active**, or **User Output *** as **Line Source**.

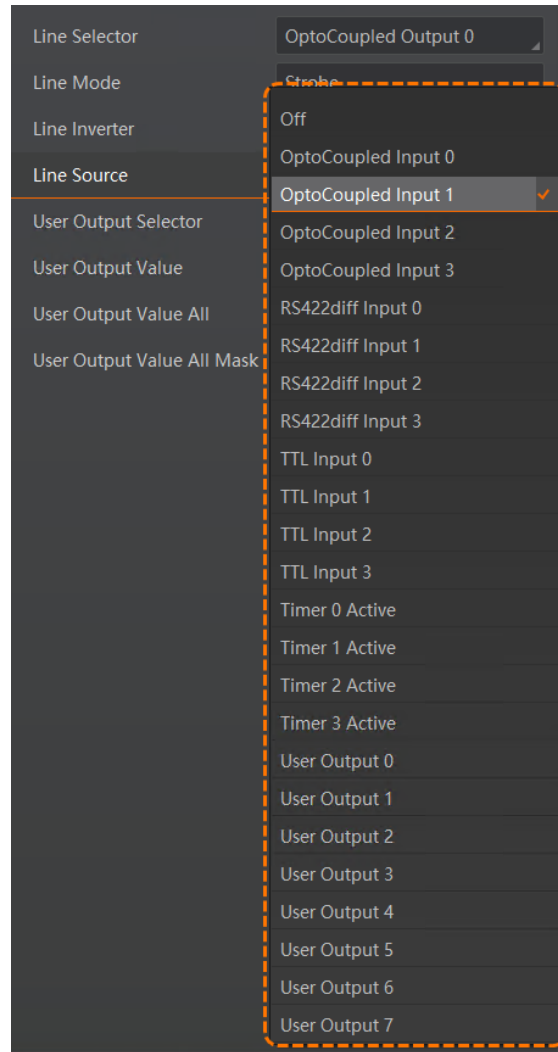


Figure 7-26 Set Output Signal Source

The code below shows the process of setting the output signal.

```
MV_INTERFACE_INFO_LIST stInterfaceList = {0};
MV_CC_EnumInterfaces(MV_GIGE_INTERFACE, &stInterfaceList);
unsigned int nInterfaceIndex = 0;
void* hInterface = NULL;
MV_CC_CreateInterface(&hInterface, stInterfaceList.pInterfaceInfos[nInterfaceIndex]);
MV_CC_OpenInterface(hInterface, NULL);

MV_CC_SetEnumValueByString(hInterface, "LineSelector", "OptoCoupledOutput0");
MV_CC_SetEnumValueByString(hInterface, "LineMode", "Strobe");
MV_CC_SetEnumValueByString(hInterface, "LineSource", "Timer0Active");
```

```
MV_CC_CloseInterface(hInterface);
MV_CC_DestroyInterface(hInterface);
```

7.3.6 User Output

The frame grabber supports configuration of 8 user output signals, allowing enabling or disabling each output signal individually.

Steps

1. Go to **Digital IO Control**, and select **User Output 0 to User Output 7** in **User Output Selector**.

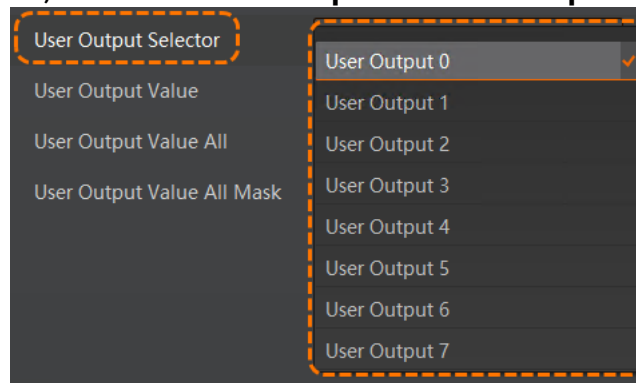


Figure 7-27 Set User Output Signal

2. Enable **User Output Value**.

Note

You can switch the user output signal in **User Output Selector**, and enable multiple user output signals at the same time.

3. View the enabled user output signals in **User Output Value All**, as shown below. There are 15 possible outcomes when different user output signals are enabled. The corresponding hexadecimal numbers and parameter values for each enabled user output signal are detailed in the table below.

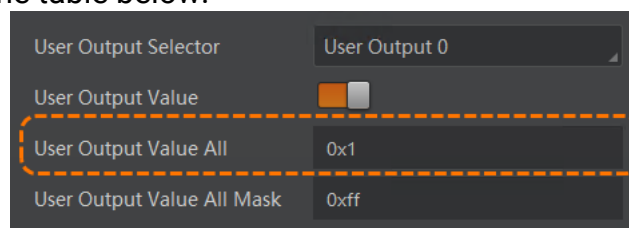


Figure 7-28 Enable User Output Signal

4. (Optional) Enable user output signal via **User Output Value All Mask**. If the signal is currently enabled or disabled, the corresponding parameter value can be configured according to the table below. The values of other signals cannot be reconfigured and are enabled by default.
For example, if you enter a in **User Output Value All Mask** and it displays as 0xa, then you can configure the output signals **User Output 1** and **User Output 3**, while **User Output 0**

and **User Output 2** cannot be configured.

Table 7-2 User Output Signals Corresponding to Parameter Values

User Output Signal	Hexadecimal Value	Parameter Value	Enabling Configuration
/	0	0x0	0
User Output 0	2^0	0x1	1
User Output 1	2^1	0x2	2
User Output 0, User Output 1	2^0+2^1	0x3	3
User Output 2	2^2	0x4	4
User Output 0, User Output 2	2^0+2^2	0x5	5
User Output 1, User Output 2	2^1+2^2	0x6	6
User Output 0, User Output 1, User Output 2	$2^0+2^1+2^2$	0x7	7
User Output 3	2^3	0x8	8
User Output 0, User Output 3	2^0+2^3	0x9	9
User Output 1, User Output 3	2^1+2^3	0xa	a
User Output 0, User Output 1, User Output 3	$2^0+2^1+2^3$	0xb	b
User Output 2, User Output 3	2^2+2^3	0xc	c
User Output 0, User Output 2, User Output 3	$2^0+2^2+2^3$	0xd	d
User Output 1, User Output 2, User Output 3	$2^1+2^2+2^3$	0xe	e
User Output 0, User Output 1, User Output 2、 User Output 3	$2^1+2^2+2^3+2^4$	0xf	f

The code below shows the process of setting the user output signal.

```

MV_INTERFACE_INFO_LIST stInterfaceList = {0};
MV_CC_EnumInterfaces(MV_GIGE_INTERFACE, &stInterfaceList);
unsigned int nInterfaceIndex = 0;
void* hInterface = NULL;
MV_CC_CreateInterface(&hInterface, stInterfaceList.pInterfaceInfos[nInterfaceIndex]);
MV_CC_OpenInterface(hInterface, NULL);

```

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```
MV_CC_SetEnumValueByString(hInterface, "UserOutputSelector", "UserOutput0");  
MV_CC_SetBoolValue(hInterface, "UserOutputValue", true);  
MVCC_INTVALUE_EX stIntValue = {0};  
MV_CC_GetIntValueEx(hInterface, "UserOutputValueAll", &stIntValue);  
  
MV_CC_CloseInterface(hInterface);  
MV_CC_DestroyInterface(hInterface);
```

Chapter 8 Other Functions

8.1 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 action control function.

Steps

1. Go to **GigE** and select **Port 0** to **Port 3** in **Port Selector**.

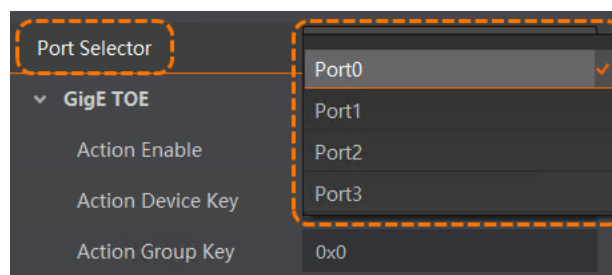


Figure 8-1 Port Selector

Note

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

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

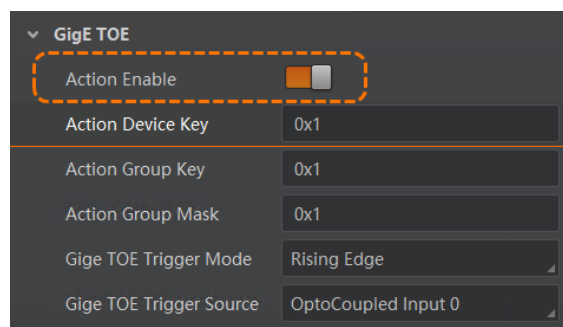


Figure 8-2 Enable Action Enable

3. Set **Action Device Key**, **Action Group Key**, **Action Group Mask**, and **Gige TOE Trigger Mode**.

Note

The configured parameters here are displayed in hexadecimal.

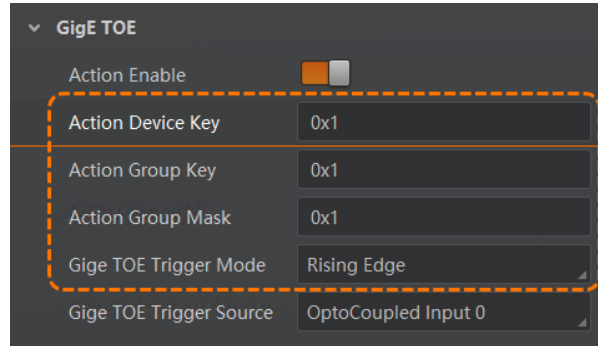


Figure 8-3 Set Action Control Parameters

Table 8-1 Action Command Parameter Requirements

Frame Grabber Parameter Name	Camera Parameter Name	Requirement
GigE > GigE TOE > Action Device Key	Action Control > Action Device Key	Parameter values should be consistent.
GigE > GigE TOE > Action Group Key	Action Control > Action Group Key	Parameter values should be consistent.
GigE > GigE TOE > Action Group Mask	Action Control > Action Group Mask	Perform a bitwise AND operation, with the result being valid if it is non-zero.

- Set the trigger response mode of frame grabber via **GigE TOE Trigger Mode** according to actual demands.

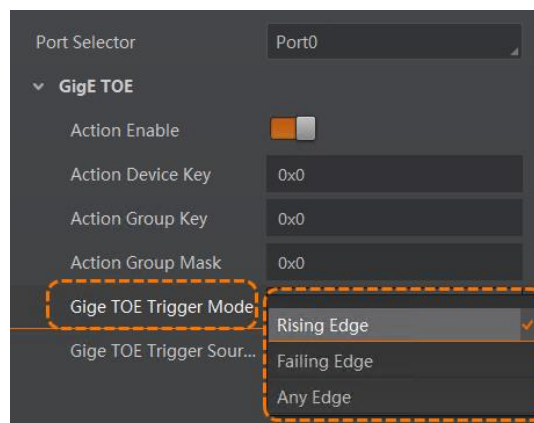
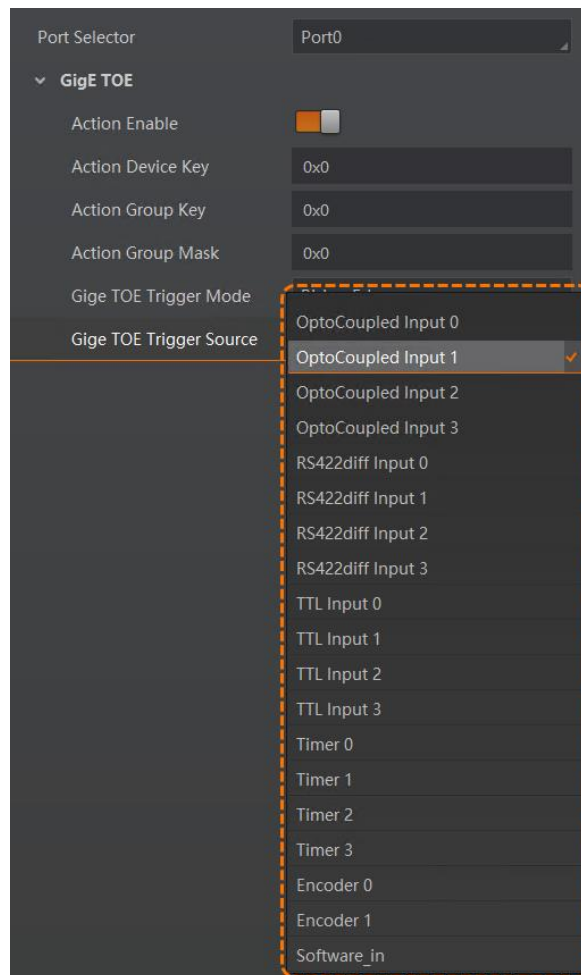


Figure 8-4 Set GigE TOE Trigger Source

Table 8-2 Trigger Response 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.
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 via **GigE TOE Trigger Source**. When the action control related parameter value is the same as that of the camera, the trigger source can be set for sending action control signal.


Figure 8-5 Set GigE TOE Trigger Source

8.2 Frame Processing

Frame processing is used to configure the image output method of the camera connected to the frame grabber, including the caching mechanism and fast readout of image data.

Steps

1. Go to **Stream**, and select the channel according to the actual needs in **Stream Selector**.

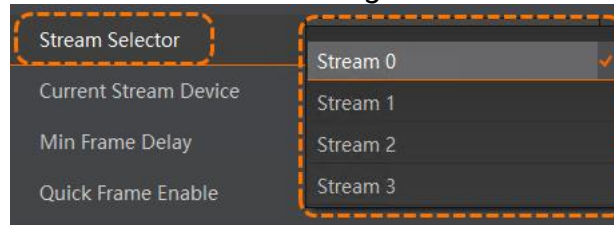


Figure 8-6 Stream Selector

Note

Stream 0 to **Stream 3** correspond to cameras connected to CH0 to CH3 connector of the frame grabber.

2. (Optional) Set the caching mechanism for images via **Min Frame Delay**.

- Enable **Min Frame Delay** to always cache the latest image data in the space for the image to be sent next, and any unsent image data is directly discarded.
- Disabled **Min Frame Delay** to cache the latest image data in the space for unsent images. If the cache space reaches its upper limit, the oldest unsent image data is discarded.

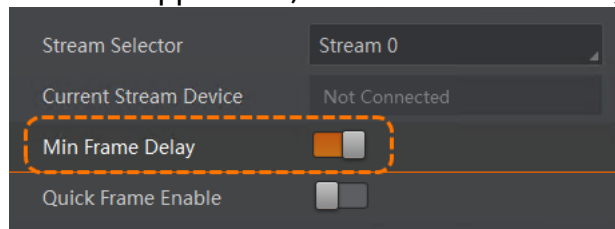


Figure 8-7 Min. Frame Delay

3. (Optional) Enable **Quick Frame Enable** to speed up image readout.

- 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.

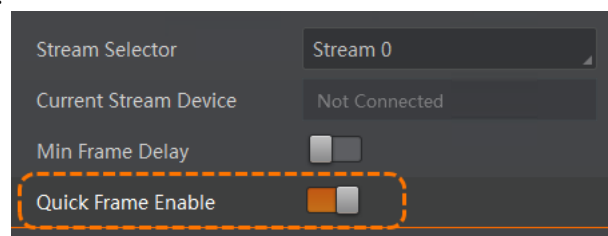


Figure 8-8 Quick Frame Enable

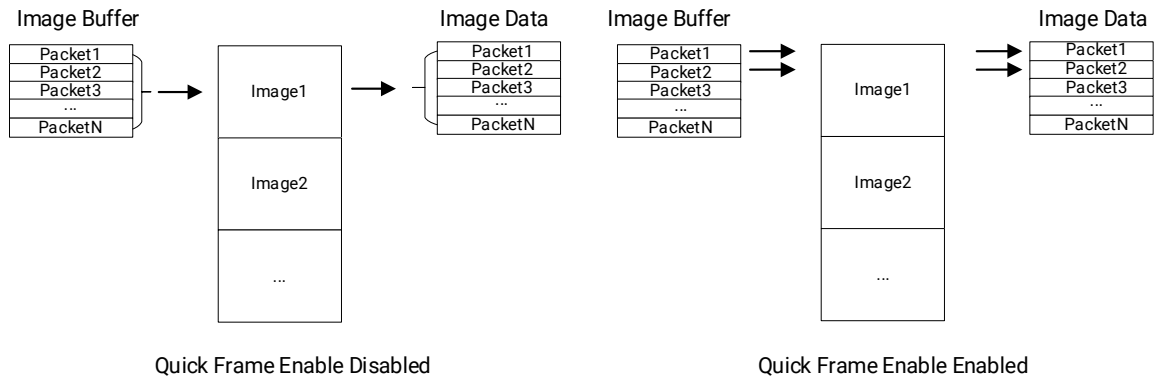


Figure 8-9 Principle

8.3 Device Control

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

Table 8-1 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 product name.
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.
Device User ID	Read and write	Device name and it is empty by default. You can set according to your preference. ● If User ID is empty, the client software displays the device model. ● If you set it, the client software displays the User ID you set.
Maximum Device Response Time	Read only	It is the max. response time of the device. 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 SBRM address of the device.
Device Uptime (s)	Read only	It is the period of time when device is

Parameter	Read/Write	Description
		powered up.
Board Device Type	Read only	It is the device type.
Device Command Timeout	Read only	It is the device timeout duration. If the device has no response within this time, it is disconnected.
Device Temperature Selector	Read & Write	It selects what the device components you want to display its temperature in Device Temperature .
Device Temperature	Read only	It displays the real-time temperature of the device components you selected in Device Temperature Selector .
PCIe Max Link Speed	Read only	It is the max. link speed that PCIe supports.
PCIe Maximum Link Width	Read only	It is the max. link width that PCIe supports.
Device Connection Selector	Read & Write	It is the port for device connection.
Device Connection Speed (Mbps)	Read only	It is the device connection speed.

8.4 Firmware Update

You can use the MVS client software to update the firmware of frame grabber.

Steps

1. Run MVS client software and click  in the PCIe connector to enumerate the frame grabbers..
2. Right-click the device to be updated, and click **Upgrade Firmware**.
3. Click  to select the corresponding firmware package (.dav) from the local PC.

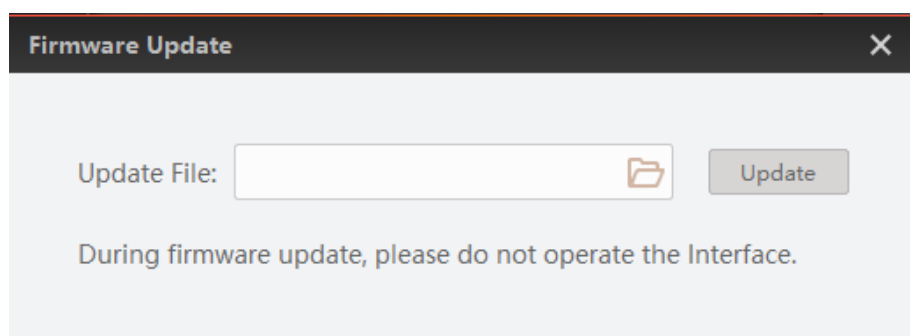


Figure 8-10 Select Update File

4. Click **Update** to start updating.

Note

- Do not power off the frame grabber during updating.
- Restart the computer to check the frame grabber function after updating.

8.5 User Parameter Settings

This function allows loading or saving default or user-defined settings. The frame grabber supports four sets of parameters, including 1 default set and 3 user sets, and the relation among four sets of parameters is shown below.

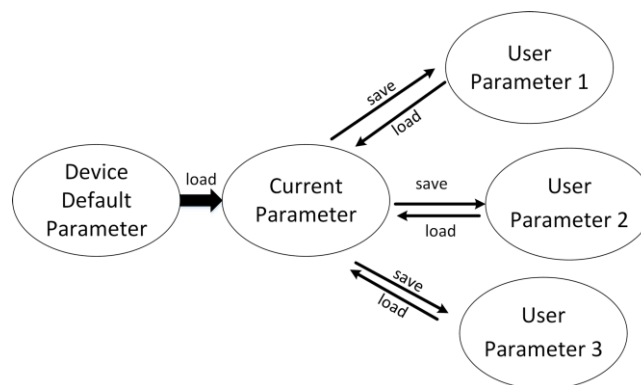


Figure 8-11 Parameter Relation

8.5.1 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.

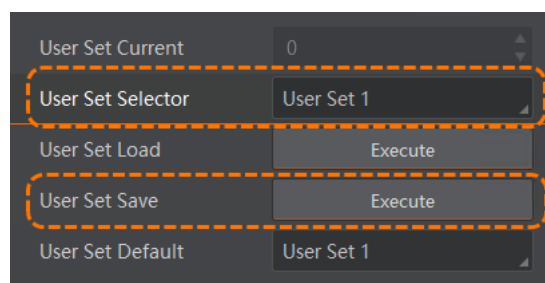


Figure 8-12 Save User Set

8.5.2 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.

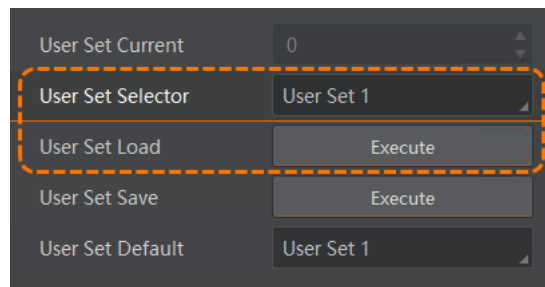


Figure 8-13 Load User Set

8.5.3 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.

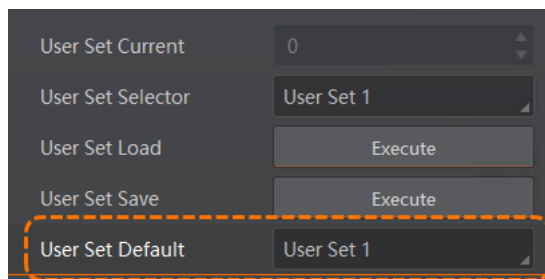


Figure 8-14 Set User Default

The code below shows the process of setting the user parameters.

```
MV_INTERFACE_INFO_LIST stInterfaceList = {0};  
MV_CC_EnumInterfaces(MV_GIGE_INTERFACE, &stInterfaceList);  
unsigned int nInterfaceIndex = 0;  
void* hInterface = NULL;
```

```
MV_CC_CreateInterface(&hInterface, stInterfaceList.pInterfaceInfos[nInterfaceIndex]);  
MV_CC_OpenInterface(hInterface, NULL);  
  
MV_CC_SetEnumValueByString(hInterface, "UserSetSelector", "UserSet1");  
MV_CC_SetCommandValue(hInterface, "UserSetSave");  
MV_CC_SetCommandValue(hInterface, "UserSetLoad");  
MV_CC_SetEnumValueByString(hInterface, "UserSetDefault", "UserSet1");  
  
MV_CC_CloseInterface(hInterface);  
MV_CC_DestroyInterface(hInterface);
```

8.6 File Access

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.

Steps

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

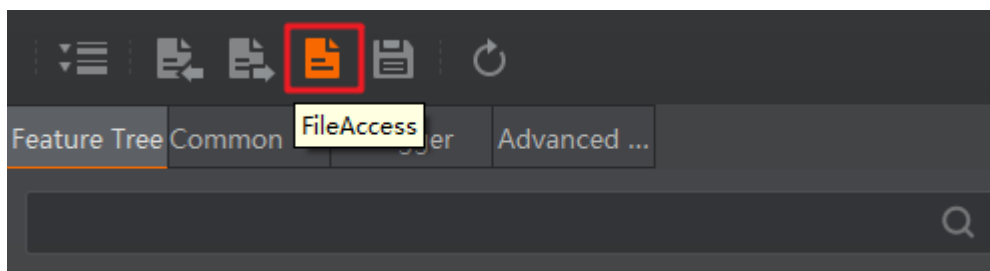


Figure 8-14 File Access

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

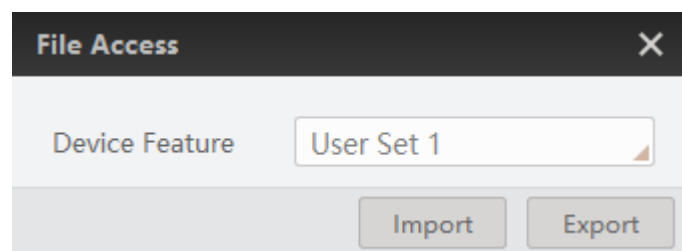


Figure 8-15 Import or Export

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 Parameter Setting** for details.
 - Importing and exporting the device feature among the same model of frame grabbers are supported.
-

The code below shows the process of importing or exporting the frame grabber's feature files.

```
MV_INTERFACE_INFO_LIST stInterfaceList = {0};
MV_CC_EnumInterfaces(MV_GIGE_INTERFACE, &stInterfaceList);
unsigned int nInterfaceIndex = 0;
void* hInterface = NULL;
MV_CC_CreateInterface(&hInterface, stInterfaceList.pInterfaceInfos[nInterfaceIndex]);
MV_CC_OpenInterface(hInterface, NULL);

MV_CC_FILE_ACCESS stFileAccess = {0};
stFileAccess.pUserFileName = "UserSet1.mfa";
stFileAccess.pDevFileName = "UserSet1";
MV_CC_FileAccessRead(hInterface, &stFileAccess);
MV_CC_FileAccessWrite(hInterface, &stFileAccess);

MV_CC_CloseInterface(hInterface);
MV_CC_DestroyInterface(hInterface);
```

Chapter 9 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.

9.1 Why the frame grabber cannot be enumerated?

Table 9-1 Question 1

Possible Cause	Solution
Improper installation of the driver.	Make sure that MVS 3.4.1 or later is installed correctly. If the client is installed correctly, uninstall and reinstall it. Anti-virus software or firewall may intercept the driver. You can disable the firewall and uninstall the anti-virus software. If it is required to enable the firewall and anti-virus software, make sure that the MVS client software is on the allowlist before uninstalling and reinstalling it.
The MVS client software or other software is using the frame grabber.	Close the MVS client software or other software that is 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 unsearchable. 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.
Insufficient power supply of the mainboard.	Power the frame grabber independently.

9.2 Why the camera connected to the frame grabber cannot be enumerated?

Table 9-2 Question 2

Possible Cause	Solution
The camera is not working normally.	Check whether the camera is working normally.
Improper wiring of the data cable.	Check the wiring of the data cable.

9.3 Why the camera's frame rate is not stable?

Table 9-3 Question 3

Possible Cause	Solution
Insufficient PCIe bandwidth.	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.
Low CPU performance.	Use high performance CPU.

Chapter 10 Revision History

Table 10-1 Revision History

Version	Document No.	Date	Revision Details
V1.0.0	UD43660B	July 7, 2025	Original version.

Appendix A Frame Grabber Accessories

When using the frame grabber, you need to prepare these cables: 10 GigE network cable and I/O adapter cable. The appearance of accessories is shown below.

Optical Fiber Patch Cord

The optical fiber patch cord is used to establish the data transmission between the frame grabber and the 10 GigE fiber port camera. It can provide five lengths of 3 m, 5 m, 7 m, 10 m and 15 m, which can be selected as required.



Figure A-1 Optical Fiber Patch Cord

Note

Refer to the datasheet of the corresponding product for the specific size and parameter of the optical fiber patch cord.

SFP+ Module

The SFP+ module can be used with optical fiber patch cord and frame grabber.



Figure A-2 SFP+ Module

10 GigE Network Cable

The 10 GigE network cable is used to establish the data transmission between the frame grabber and the camera. It can provide three lengths of 3 m, 5 m, and 10 m, which can be

selected as required.



Figure A-3 10 GigE Network Cable

Note

Refer to the datasheet of the corresponding product for the specific size and parameter of the 10 GigE network cable.

Copper SFP Module

The copper SFP module can be used with 10 GigE network cable and frame grabber.



Figure A-4 Copper SFP Module

I/O Adapter Cable

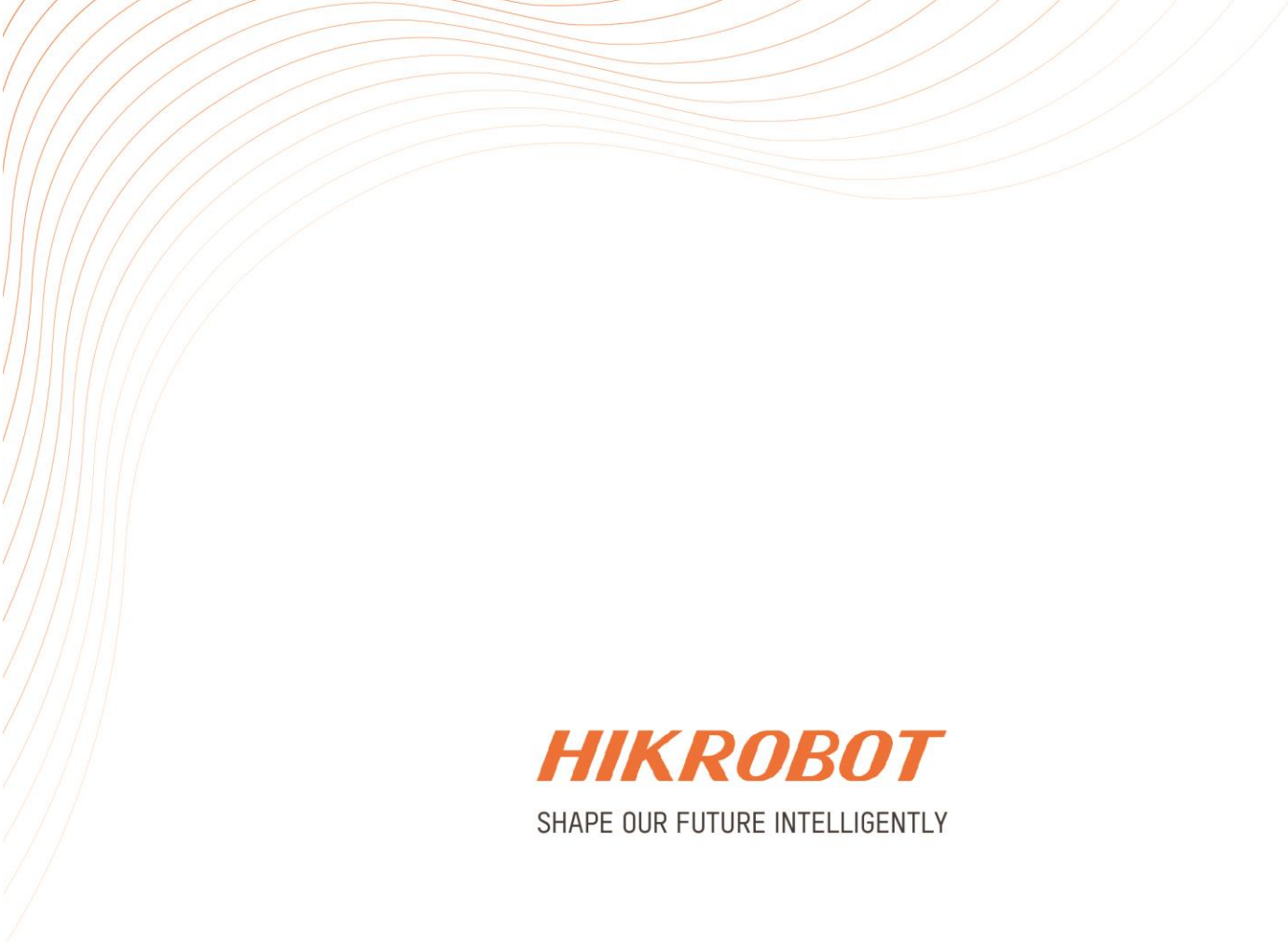
The I/O adapter cable (DB26 to female header) is used for I/O trigger signal wiring of female header 1 and female header 2 on the frame grabber, as shown below. Refer to the following table for pin definition. The cable has shielding protection, providing two lengths of 3 m and 5 m, which can be selected as required.



Figure A-5 I/O Adapter Cable

Table A-1 Pin Definition of Open End

Pin No.	Cable Color	Signal	Pin No.	Cable Color	Signal
1	Brown	OPTO_IN0	14	White/Blue	TTL_OUTPUT0
2	Orange	OPTO_IN1	15	White/Black	TTL_OUTPUT1
3	Yellow	OPTO_IN2	16	White/Purple	TTL_OUTPUT2
4	Green	OPTO_IN3	17	White/Brown	TTL_OUTPUT3
5	Blue	IN_COM	18	Black/Red	OUT_COM
6	Purple	OPTO_OUT0	19	Black/Orange	GND
7	Grey	OPTO_OUT1	20	Black/Yellow	GND
8	White	OPTO_OUT2	21	Black/Green	TX422_0N
9	Black	OPTO_OUT3	22	Black/Brown	TX422_0P
10	Red	TTL_INPUT0	23	Black/Blue	GND
11	White/Red	TTL_INPUT1	24	Blue/Orange	RX422_0N
12	White/Orange	TTL_INPUT2	25	Blue/Red	RX422_0P
13	White/Green	TTL_INPUT3	26	Blue/Yellow	GND



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