Hikrobot Co., Ltd.

MVS Toolkit

User Manual

HIKROBOT

Contents

Chapter 1 About This Documentation

The manual guides you to use the Software. To ensure the properness of usage and stability of the Software, refer to the contents below and read the manual carefully before installation and operation.
As GIFs and videos cannot be played in PDF document, you are recommended to read the online document.

1.1 Symbol Conventions

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

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

1.2 Relative Path Conventions

In this document, the conventions for describing relative paths are as follows. The conventions differs based on the operating system (Windows or Linux) on which the Software is running.

- If the Software is running on a Windows system, .*** (for example, .\Development) within the document refers to the relative path, and the parent directory corresponding to the relative path is the "Software Name" folder under the Software installation path.
- If the Software is running on a Linux system, ./*** (for example, ./Development) within the document refers to the relative path, and the parent directory corresponding to the relative path is the "Software Name" folder under the Software installation path.

1.3 Get Support

You can get support from us in the following ways:

- **Official Website**: visit ***https://en.hikrobotics.com/*** to get other related documents.

- **Email**: global.support@hikrobotics.com.

Chapter 2 Release Notes

This chapter introduces the updates and release dates for various versions of the Software.

2.1 V4.5.1

This version was released in February 2025. The tools only iterate with the client and have no new or updated features.

2.2 V4.5.0

This version was released in January 2025. This version supports the **Dead Pixel Correction Tool**.

Note

The following only introduces the new features and optimizations in this version. Those not mentioned only iterate with the client and have no new or updated features.

Defect Pixel Correction Tool

This tool helps you calculate and correct the defect pixels in the camera and local images. See ***Defect Pixel Correction Tool*** for details.

ISP Tool

This version includes new modules for image transformation. You can use them for image flip and rotation. See ***Rotate*** and ***Flip*** for details.

2.3 V4.4.0 and Earlier Versions

This section introduces the new features, updates, and improvements of V4.4.0 and earlier versions.

2.3.1 V4.4.0

This version was released in August 2024.

Note

The following only introduces the new features and optimizations in this version. Those not mentioned only iterate with the client and have no new or updated features.

Firmware Upgrade Tool

- Changed **Camera Link** interface to **Serial Port** and **GenTL** to **PCIe**.
- Added **Fuzzy Matching** to frame grabber upgrade page. See ***Upgrade a Frame Grabber***.

Feature Import/Export Tool

Changed **Camera Link** interface to **Serial Port** and **GenTL** to **PCIe**.

Port Editing Tool

Changed **Camera Link** interface to **Serial Port** and **GenTL** to **PCIe**.

Event Configuration Tool

- Adds **Event Monitor** in the main UI for quick event viewing. For details, see ***Configure the Event***.
- Supports copying node name through keyboard shortcut. For details, see ***Configure the Event***.
- Adds shortcut entry to Event monitor. See ***Event Configuration Tool***.

PCIe Diagnostic Tool

Supports XoFLink frame grabber. See ***PCIe Diagnostics Tool***.

Device Diagnostic Tool

Adds **Stop when occur** and **Timer period type** in exception IO locating. See ***IO WaveForm Detection***.

2.3.2 V4.3.0

This version was released in October 2023.

Note

The following only introduces the new features and optimizations in this version. Those not mentioned only iterate with the client and have no new or updated features.

Firmware Upgrade Tool

Optimized the operations of upgrading and configuring frame grabbers. See ***Upgrade a Frame Grabber***.

Feature Import/Export Tool

Supports importing and exporting parameters of frame grabbers. For details, refer to ***Import/Export Features***.

Event Configuration Tool

Added the function of importing/exporting events.

ISP Tool

- Adds the function of quick correction.
- Adds the button of hue and saturation in the image operation area.
- Supports editing imported images.
- Supports manually drawing a curve line.
- Updates the parameters of CCM.
- LUT supports setting the LUT line type.
- Adds the algorithm of local contrast enhancement.
- Embeds the ISP tool in the MVS Software.

2.3.3 V4.2.0

This version was released in June 2023.

Note

The following only introduces the new features and optimizations in this version. Those not mentioned only iterate with the client and have no new or updated features.

Firmware Upgrade Tool

You can use the Firmware Upgrade Tool to configure firmware upgrading settings and upgrade the firmware of cameras and frame grabbers.

Feature Import/Export Tool

Provides the Feature Import/Export Tool to import/export the device parameters, etc.

Port Editing Tool

Provides the Port Editing Tool to edit the frame grabber's port.

Event Configuration Tool

Provided reference for viewing and configuring frame grabbers' events.

PC Diagnostic Tool

Provides reference for checking the performance of the PC system, drivers, and software environment.

PCIe Diagnostic Tool

Provides PCIe diagnostic tool to check the PCIe running status of frame grabbers.

Device Diagnostic Tool

This is the first version of Device Diagnostic Tool. The following are the main features.

- Supports diagnostic event overview. See ***Event Overview***.
- Supports detailed event diagnosis. See ***Event Diagnostic***.
- Supports viewing IO waveforms. See ***IO WaveForm Detection***.
- Supports log management. See ***Log Management***.

2.3.4 V1.2.0

This version was released in March 2023.

Note

The following is the new features and updates of the ISP Tool.

ISP Tool

- Supports Bayer interpolation method. See ***General Settings***.
- Supports the white balance algorithm. See ***White Balance*** for details.
- Supports Gamma algorithm. See ***Gamma*** for details.
- Supports exporting denoise calibration file. See ***Denoise*** for details.
- Supports CCM calibration. See ***CCM*** for details.

2.3.5 V1.1.0

This version was released in September 2021.

Note

The following is the new features and updates of the ISP Tool.

ISP Tool

- Updated the running environment, see ***System Requirements***.
- Added General Settings, Video And Picture Settings, Tool, and Help on the menu bar. See ***Menu Bar***.
- Added the LSC (Lens Shading Correction) algorithm. See ***Lens Shading Correction (LSC)***.
- Added the DDS algorithm. See ***DDS***.
- The SixAixs algorithm is renamed as Super Palette. See ***Super Palette***.
- Added the purple fringe correction algorithm. See ***Purple Fringe***.
- Updated the parameters of sharpness. See ***Sharpness***.
- Added the super binning algorithm. See ***Super Binning***.

2.3.6 V1.0.0

This version was released in March 2021.

Note

The following is the new features and updates of the ISP Tool.

ISP Tool

Supports online and offline modes, which allows you to process images from local paths

or acquired from cameras.

Chapter 3 Firmware Upgrade Tool

You can use the Tool to upgrade the firmware of GigE cameras, USB cameras, PCIe cameras, CoaXPress cameras, and frame grabbers.

Main Window Introduction

The main window is as below and the descriptions are in the table.

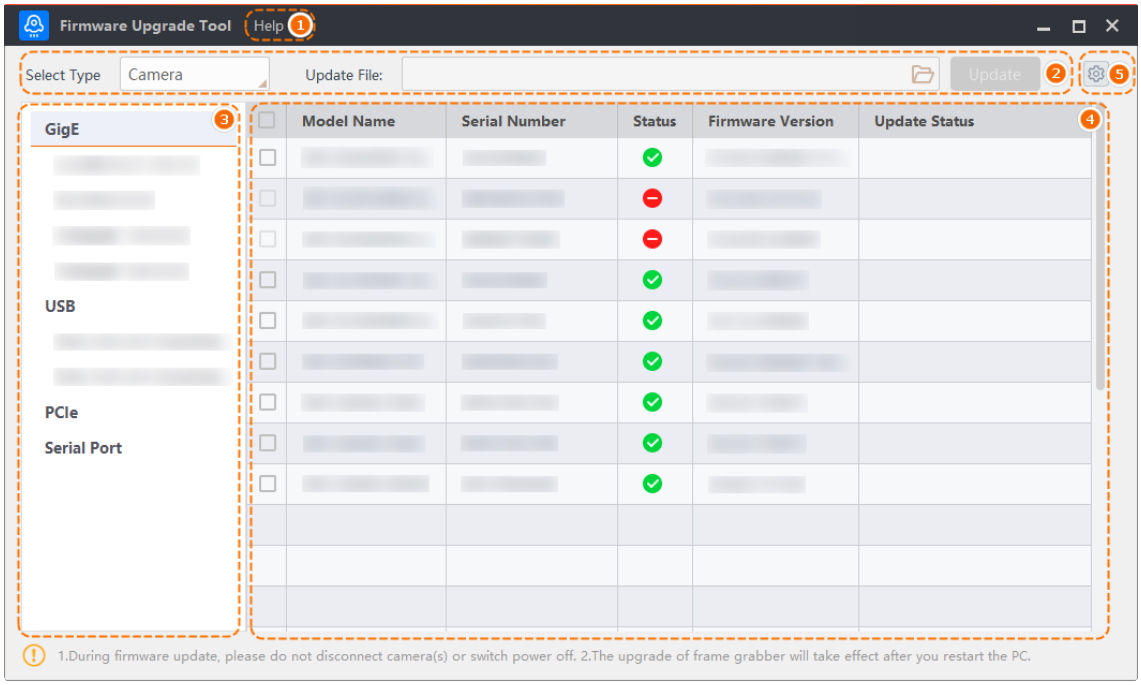


Figure 3-1 Firmware Upgrade Tool

Table 3-1 Main Window Description

Number	Area	Description
1	Help	You can select a language (English or Chinese) and view the version information.
2	Upgrading Configuration	• You can select a camera or frame grabber as the to-be-upgraded device type. • You can select an upgrade package for cameras and perform the upgrade here. **Note** To upgrade a frame grabber, select the upgrade package in Area 4.

Number	Area	Description
3	Interface Information	You can view the interface information of your computer. The available operations may vary according to devices with different interfaces. See ***Upgrade a Camera***.
4	Device Information	You can view devices and related information of different interfaces.
5	Device List Configuration	You can set information categories to display in area 3. The available information may vary according to interfaces.

3.1 Upgrade a Camera

The camera firmware upgrading process mainly contains three parts, and they are Search for Device, Start to Upgrade, and View Upgrading Status.

Search for Devices

After you open the Tool, you can select a camera in the **Select Type** area, and you can see the computer interface information displayed on the left. The available operations may vary according to devices with different interfaces.

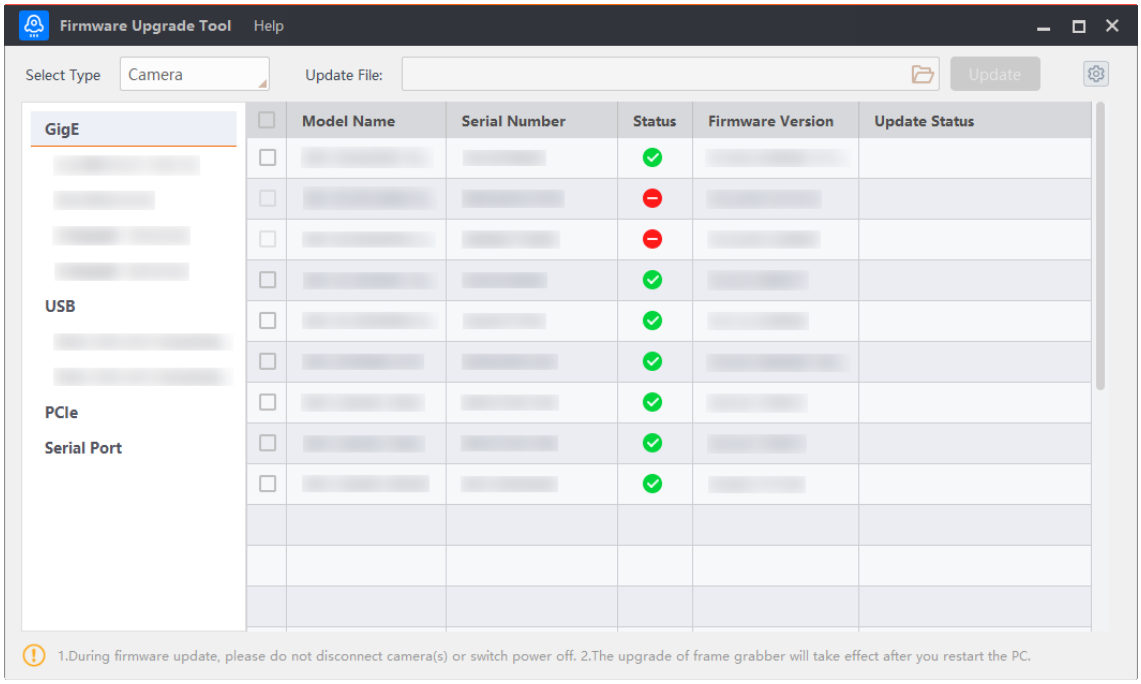


Figure 3-2 Upgrade a Camera

Upgrade Camera Firmware

- GigE and USB Interfaces:
  - Select **GigE** or **USB**, and the devices that can be found will be displayed on the right pane.
  - Select an interface under GigE or USB, and the devices that can be found will be displayed on the right pane.
  - The Tool can automatically refresh the devices under the enumeration of GigE and USB, or click to manually refresh the enumeration.
- PCIe Interface:
  - Select **PCIe**, and the devices that can be found will be displayed on the right pane.
  - Select an interface under PCIe, and the devices that can be found will be displayed on the right pane.
  - The Tool can automatically refresh the devices under the enumeration of PCIe, or click to manually refresh the enumeration.
- Serial Port Interface:
  - Select **Serial Port**, and the available devices will be displayed on the right pane.
  - Select an interface from Serial Port, and the available devices of the interface will be displayed on the right pane.
  - By default, the camera information under Serial Port will not be refreshed automatically. You can click on the right side of the Serial Port to refresh the enumeration manually.

Start to Upgrade

Check if the camera to be upgraded is available. Click to select a firmware upgrade package (dav file) in the upper right side of the Tool.
The Tool can upgrade the firmware of multiple cameras in a batch. Up to 20 cameras can be selected at the same time.

- If the upgrade package is for a specific model, only cameras of the same model can be upgraded in batch. For cameras of other models, the status bar will prompt "Upgrading failed. (Error code: 0x900006500) Firmware mismatch.".
- If the upgrade package is for multiple models, you can upgrade the cameras of multiple models in the upgrade package. For cameras of the other models that are not included in the upgrade package, if you upgrade them, the status bar will prompt "Upgrading Failed. (Error code: 0x900006500) Firmware mismatch.".

After selecting the firmware upgrading package, click **Upgrade**.

Note

- Do not disconnect the camera from the PC during firmware upgrade.
- The camera will reboot automatically after upgrading.

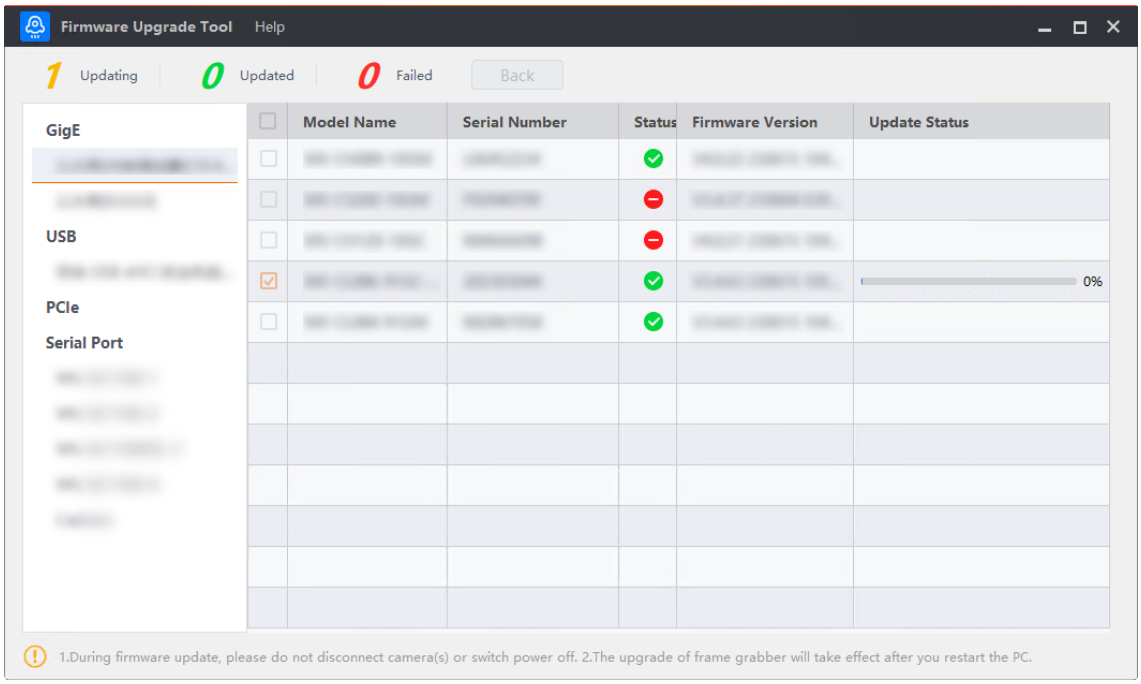


Figure 3-3 Upgrading Process

View Upgrading Status

In the upper-left corner, the upgrading information is displayed as shown below. You can click **Back** on the top of the Tool to go back to the initial interface. Also, on the right of the Tool, the upgrading status information of a selected device is displayed.

3.2 Upgrade a Frame Grabber

The frame grabber firmware upgrading process mainly contains three parts, and they are Search for Device, Start to Upgrade, and View Upgrading Status.

Search for Devices

After you open the tool, select **FrameGrabber** in **Select Type**, and all connected PCIe devices displays on the left.

Note

By default, the Tool automatically enumerates connected frame grabbers every 30 seconds. You can also click ↻ to re-enumerate.

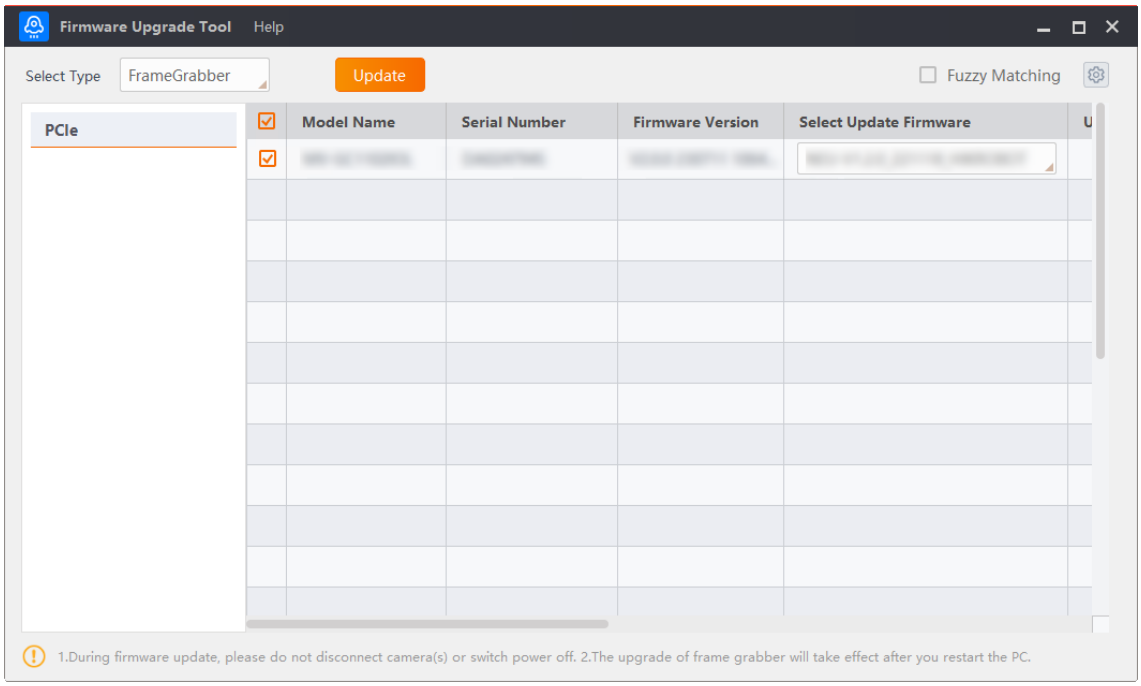


Figure 3-4 Upgrade Frame Grabber Firmware

Start to Upgrade

Please visit Hikrobot official website to get the firmware driver packages of the to-be-upgraded frame grabbers.
Before upgrading, ensure the frame grabber(s) to be upgraded are available during upgrading process.

1. Install the firmware driver under the directory: C:\Program Files (x86)\Common Files\MVS\FirmWare.
   Once installed, the Tool detects and displays available firmwares, as shown below.

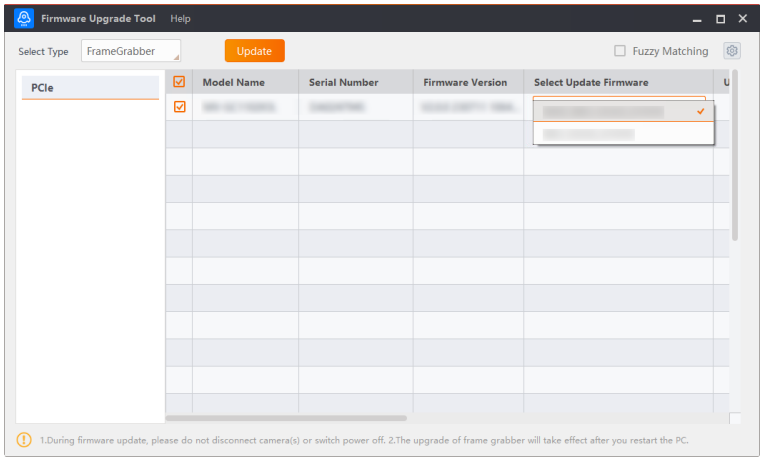


Figure 3-5 Upgrade Frame Grabber

2. Select frame grabber(s) to be upgraded.
3. Select required firmware in **Select Update Firmware** for each frame grabber.

Note

- The Tool supports upgrading up-to-20 frame grabbers in a batch.
- The Tool supports fuzzy searching of firmware files. To enable this functionality, enable **Fuzzy Matching**.

4. Click **Upgrade** to upgrade them.

Note

- Keep the device(s) connected when upgrading.
- The frame grabber(s) will reboot automatically when upgraded.

View Upgrading Status

Once the upgrading starts, you can view the status on top, as shown below. The upgrading progress also displays in **Update Status**.
In case of upgrading failure, you can click **Back** to return to the initial window and redo the upgrading.

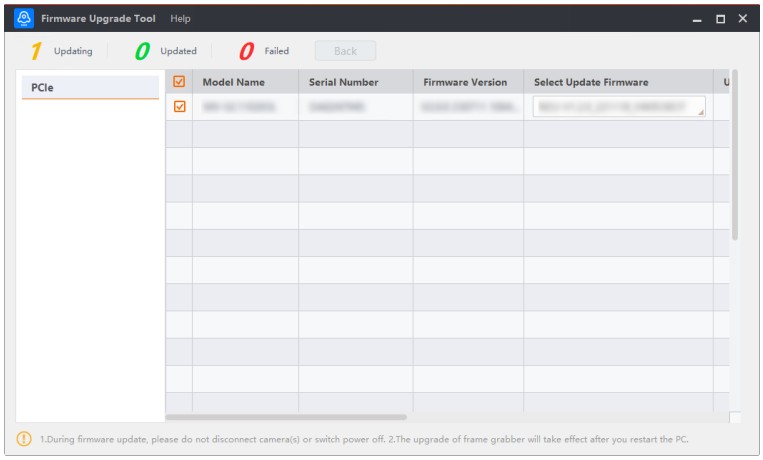


Figure 3-6 Upgrading Frame Grabber

Chapter 4 Feature Import/Export Tool

This tool allows you to import and export the parameters of one or multiple cameras or frame grabbers.

4.1 Main Window Introduction

This section introduces the tool's main window.

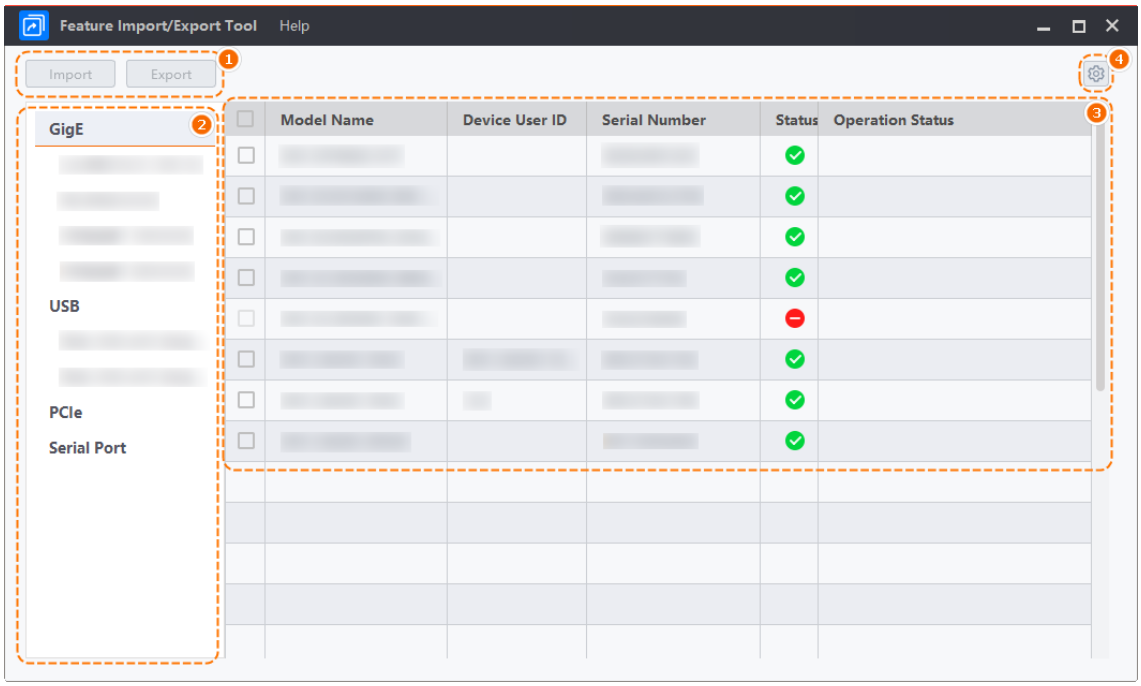


Figure 4-1 Main Page of Tool

Table 4-1 Main Page Description

No.	Function	Description
1	Import/Export	Import/Export the parameters of the selected camera(s) or frame grabber(s).
2	Interface Information	Display the interface information on the current PC.
3	Device Information	Display the cameras or frame grabbers and the related information under different interfaces.
4	Device Information	Set the device information to be displayed in Area 3 as needed. The

No.	Function	Description
	Configuration	information can be different when you select different interfaces.

4.2 Import/Export Features

The tool supports importing or exporting the parameters of one or multiple cameras or frame grabbers.

Before You Start

Make sure the cameras or frame grabbers whose features need to be imported or exported are available.

Steps

1. Optional: Select an interface on the left side of the tool according to actual needs.

   Note

   By default, all cameras or frame grabbers under all interfaces are displayed.

2. Optional: Click in the upper-right corner to set the camera or frame grabber information to be displayed.
3. Select the camera(s) or frame grabber(s) whose features need to be imported or exported.

   Note

   Cameras and frame grabbers can not be imported or exported simultaneously.

4. Import or export features.
   - Click **Import**, select the MFS file from local PC, and click **Open**.

     Note

     When importing multiple cameras, you can only batch import the features of cameras which are of the same model. If there are cameras or frame grabbers which are of different models, the error prompt will pop up.

   - Click **Export**, select the file saving path on your local PC, and click **Select**.

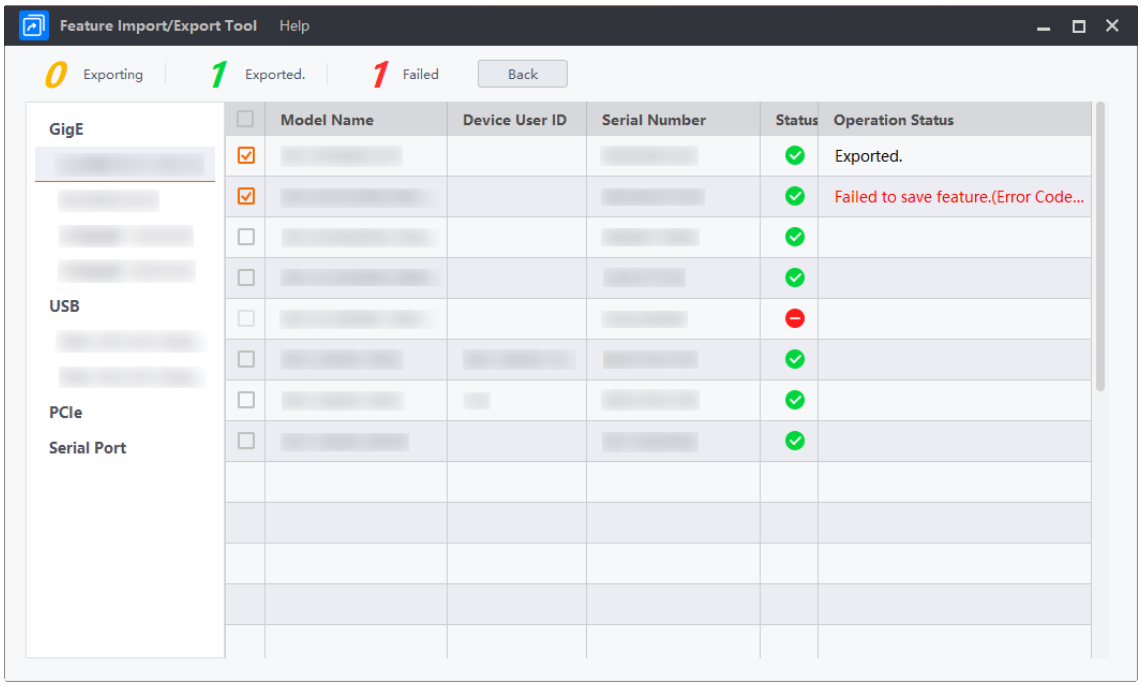


Figure 4-2 Export Features of Multiple Cameras

The tool starts importing or exporting camera or frame grabber features. The overall importing or exporting results will show on the upper side of the page. And you can view the status of the selected camera(s) or frame grabber(s) in the Operation Status column.

5. Optional: Click **Back** to exit the current page.

Chapter 5 Port Editing Tool

The **Port Editing Tool** allows you to customize the frame grabber's port. For now, the tool only supports the Camera Link camera.

Note

Only user accounts with full control of the PC can modify the port.

Tool Introduction

The main page of the tool is shown below, and you can refer to the table for the related description.

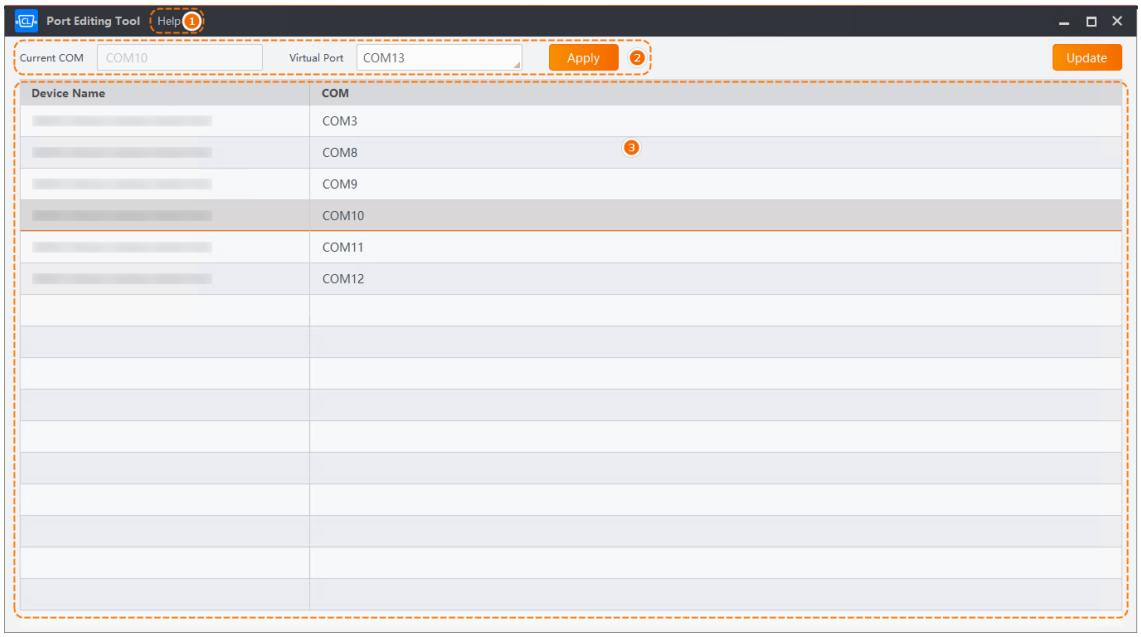


Figure 5-1 Main Page of Tool

Table 5-1 Main Window Description

No.	Function	Description
1	Help	Select the language (Chinese and English) of the tool, and check the version information of the tool.
2	Port Configuration	Display the port of the current device and edit the port if needed.
3	Device Information	Display the connected device(s) and the corresponding COM port(s).

Port Configuration

Note

Currently, the tool only supports configuring the port for the self-developed Serial Port frame grabber.

1. In the connected device list, select the frame grabber to be edited and the COM will be displayed on **Current COM**.

   Note

   You can click **Update** to update the COM information of devices.

2. Click ◢ in the lower right of **Virtual Port** to select a COM port from the drop-down list.
3. Click **Apply**.

Chapter 6 Event Configuration Tool

The **Event Configuration Tool** provides a reference for viewing and configuring frame grabbers' events.
The Tool supports the following types of frame grabbers:

- Camera Link frame grabber
- Coax Press frame grabber
- GigE frame grabber
- 10 GigE frame grabber (supports some models)
- XoFLink Fiber Optic frame grabber

6.1 Main Window Introduction

The section introduces the **Event Configuration Tool**'s main window.

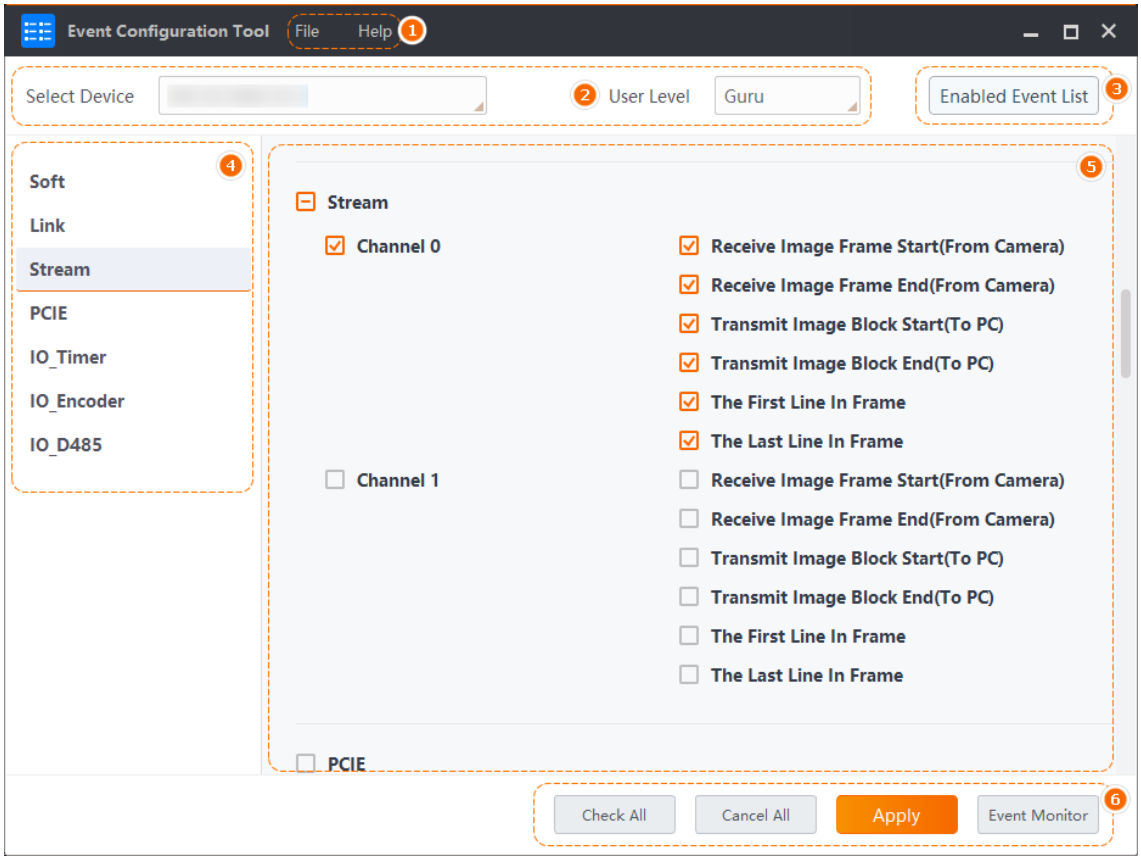


Figure 6-1 Event Configuration Tool Main Window

No.	Name	Description
1	Menu Bar	● Click **Help** to switch the tool language to

No.	Name	Description
		Chinese or English, view the user manual, and view the tool version. ● Click **File** to import/export events of frame grabbers.

2	Basic Configuration	● Select a device to conf ● Set the user level as **Re** **Recommended** is selec
3	Configuring Result	The result of event config
4	Event Type	Display all event types of
5	Event Details	Display channels and all t different types.
6	Operations	Select all events, deselec view events via **Event Mo**

6.2 Configure the Event

With this Tool, you can set frame grabbers displaying, or import/export the events.

Steps

1. On the top left, click **Select Device** to select a frame grabber to configure events.
   Once connected, the Tool displays all available event types on the left pane.
2. Optional: Modify **User Level**.

Note

Guru mode supports more event types than **Recommended**.

3. Select specific required events on the right.

Note

- You can hover on the event to view the node name and enumeration value.
- When you select one event, you can press "ctrl+c" to copy the node name of the event.

- Check a channel of an event type to select all events in the channel.
- Check an event type to check all events in all channels of the type.
- On the lower right, click **Check All** to select all events of the frame grabber; click

Cancel All to cancel selecting all events.

4. Click **Apply** on the lower right.

   For failed attempts, the Tool prompts **Failed Application**.

5. Optional: Click **Enabled Event List** on the top right to view applied events.

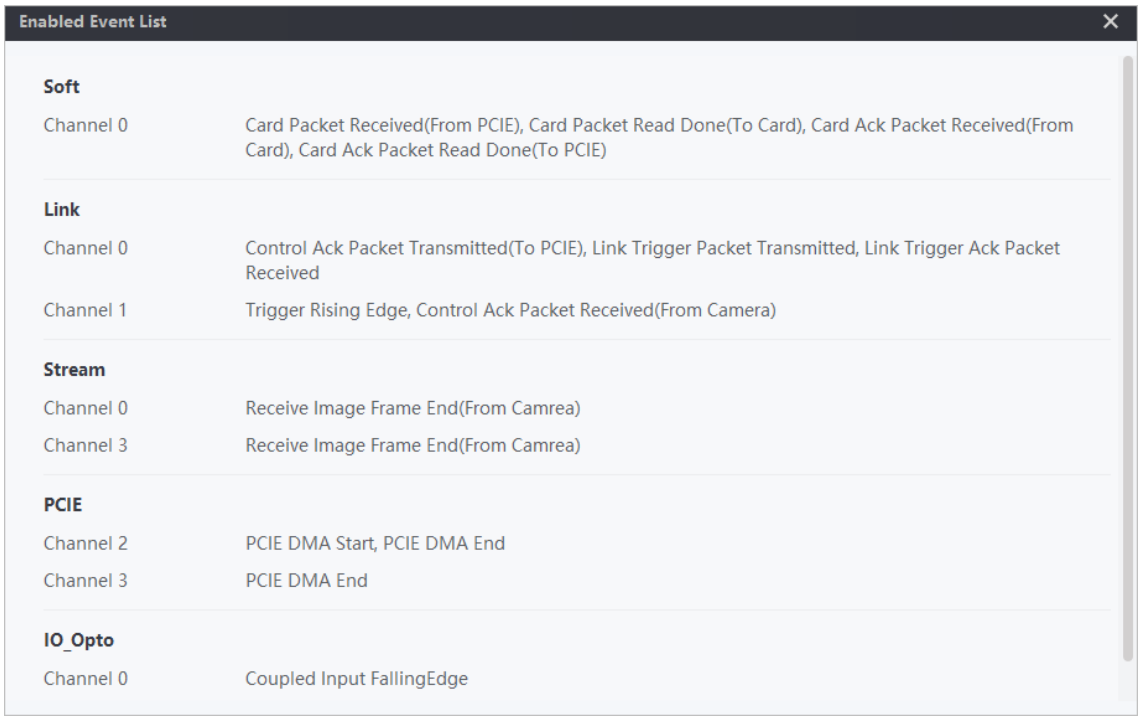


Figure 6-2 Enabled Event List

6. Optional: Import or export events.
   - Click **File** → **Import**, select an etc file to open it.

     Note

     - The tool only supports importing etc files of the same frame grabber model.
     - Once imported, the events' status will be automatically checked and the events will be applied by default.

   - Click **File** → **Export**, select a saving path, and click **Save**. By default, the file will be saved in C:\Users\Administrator\MVS\Data\EventTool.

7. Optional: Click **Event Monitor** to view event results. You can also open the event monitor through MVS Client. For details, see *Event Monitor* in the user manual.

Chapter 7 Defect Pixel Correction Tool

Defect Pixel Correction Tool allows you to calculate and correct defect pixels on the camera and local images.

Note

Currently, this tool is not compatible with the following camera models and types:

- MV-CU020-19GMC GigE Vision Camera
- Infrared Cameras
- Line Scan Cameras

Main Window Introduction

This part introduces the **Defect Pixel Correction Tool**'s main window.

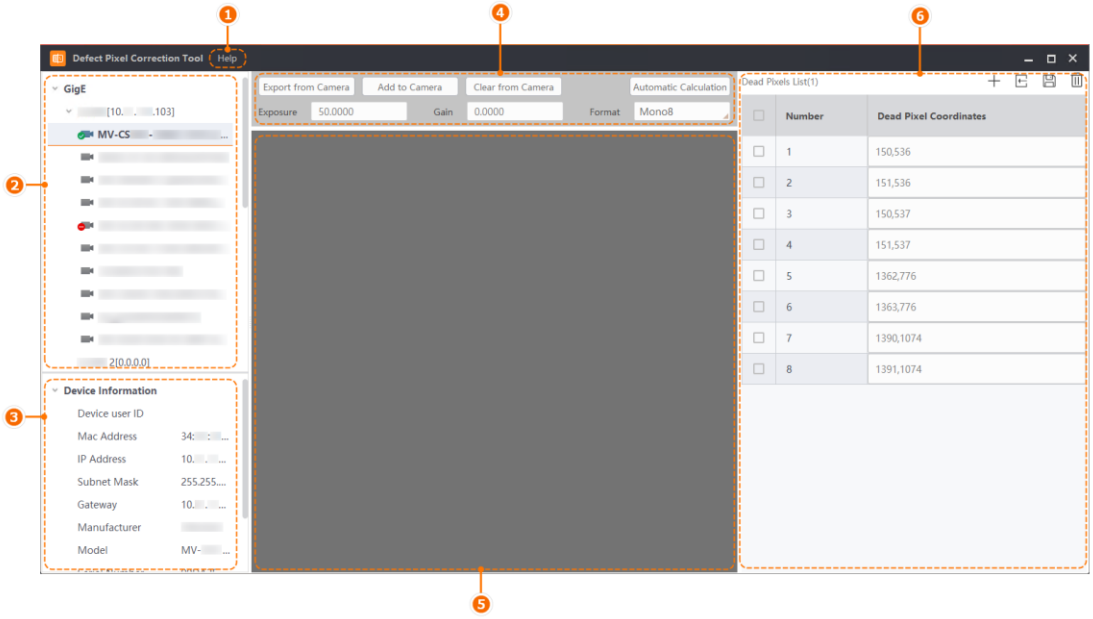


Figure 7-1 Defect Pixel Correction Tool Main Window

Table 7-1 Main Window Introduction

No.	Name	Description
1	Menu Bar	Click **Help** to switch the tool display language to Chinese or English, view the user manual, or view the tool version.
2	Device List	This area displays cameras under each interface type, including GigE, USB, PCIe, and Serial Port. ● This tool automatically refreshes available

No.	Name	Description
		cameras under the GigE interface, the USB interface, and PCIe frame grabbers. To manually refresh, click ↻ to re-find available devices under the corresponding category. ● The Serial Port interface does not support auto-refreshing. To refresh, you need to click ↻.
3	Device Information	This area displays details of the device you selected in the **Device List**.
4	Operation Panel	Use this panel to calculate the defect pixels on local or acquired images. You can also import, export, or clear defect pixel data loaded to the camera. **Caution** Be careful before clearing the defect pixels from the camera. The deletion cannot be undone.
5	Image Display Area	The area displays the image currently under calculation during defect pixel calculation. **Note** After calculation, the area displays the last image the tool calculates, and the image remains until you close the auto-calculation window.
6	Defect Pixels List	This panel allows you to load defect pixels from a local file, save defect pixels to a CSV file, add pieces of defect pixel data, and delete pieces of defect pixel data. See ***Edit Defect Pixel Information*** for details.

7.1 Correct Defect Pixels

The operations and steps for correcting defect pixels on cameras and local images differ.

7.1.1 Correct Defect Pixels on Cameras

This Tool allows you to calculate, edit, import, and export defect pixel data in the camera.

Steps

1. In the **Device List**, select and connect the camera you want to correct its defective pixel data.
2. Optional: Load a dead pixel file (CSV format).

   See ***Edit Defect Pixel Information*** for details.
3. Optional: Configure image quality by configuring **Exposure** and **Gain**.
4. Select an image format by configuring **Format**.

   This tool now supports Mono8, BayerBG8, BayerRG8, BayerGR8, and BayerGB8 image format.

   Note

   The available **Format** displayed here is subject to the camera model.
5. Click **Auto Calculate** and go to the **Auto-calculate Defect Pixel Info**.
6. Set related parameters as required.

   Threshold

   The brightness difference for calculating if a pixel is defective.

   Defect Pixel Type

   Set the defect pixel type for calculation.
   - When set to **Bright Pixel**, the tool recognizes those pixels whose brightness is greater than the sum of the image mean brightness and the **Threshold**.

     Note

     The image's mean brightness should be close to 0.
   - When set to **Dark Pixel**, the tool recognizes the pixels whose mean brightness is less than the difference between the image's mean brightness and the **Threshold**.

     Note

     The image's mean brightness should be 80 to 160.

   Image Source

   Select the image source to calculate defect pixels. Select **Camera** in this case.

Calculation Method

Select the number of images used for calculating defect pixels.

- When set to **One Image**, the tool calculates defective pixels based on one image acquired from the camera.
- When set to **Multiple Images**, the tool calculates defective pixels based on the intersection of defect pixels in ten images acquired from the camera.

7. Click **Calculate**.

Result

After the tool calculates the defect pixels, the tool automatically saves the results to the local directory. You can click **View** in the prompt window to view the file.

Note

The file is stored under the installation path of the MVS. The relative path is \Applications\Win64\DeadPixelCorrection.

7.1.2 Correct Defect Pixels on Local Images

You can use the tool to correct defective pixels in local images.

Steps

1. Click **Auto Calculate** and go to the **Auto-calculate Defect Pixel Info**.
2. Set related parameters as required.

Threshold

The brightness difference for calculating if a pixel is defective.

Defect Pixel Type

Set the defect pixel type for calculation.

- When set to **Bright Pixel**, the tool recognizes those pixels whose brightness is greater than the sum of the image mean brightness and the **Threshold**.

  Note

  The image's mean brightness should be close to 0.

- When set to **Dark Pixel**, the tool recognizes the pixels whose mean brightness is less than the difference between the image's mean brightness and the **Threshold**.

  Note

  The image's mean brightness should be 80 to 160.

Image Source

Select the image source for calculating defect pixels. Select **Camera** in this case.

Calculation Method

Select the number of images used for calculating defect pixels.
- When set to **One Image**, the tool calculates defective pixels based on one local image.
- When set to **Multiple Images**, the tool calculates defective pixels based on the intersection of defect pixels in multiple local images.

3. Click **Calculate**.
4. Select the local image(s) and click **Open**.

Result

After the tool calculates the defect pixels, the tool automatically saves the results to the local directory. You can click **View** in the prompt window to view the file.

Note

The file is stored under the installation path of the MVS. The relative path is \Applications\Win64\DeadPixelCorrection.

7.2 Edit Defect Pixel Information

The **Defect Pixel Correction Tool** allows you to customize the coordinates of defect pixels. You can also load a local defect pixel file for further editing.

Add a New Defect Pixel

Click + at the top right corner to add an empty defect pixel data to the list.
You can edit the coordinates of the defect pixel by configuring the **Defect Pixel Coordinates**.

Import Defect Pixels from Local

Click at the top right corner and select the defect pixel file (in CSV format).
The defect pixel list displays all defect pixels in the imported CSV file, and you can edit the defect point coordinates as required.

Save Defect Pixels to Local

Click at the top right corner to save all defect pixels in the list to a CSV file.

Note

You can find the exported file under the installation path of the MVS. The detailed path is .\Applications\Win64\DeadPixelCorrection\PixelList.

Delete Defect Pixels

Select one or more pieces of data in the list and click to remove the selected data from the list.

⚠Caution

Be careful before deleting the defect pixels. The deletion cannot be undone.

Chapter 8 PC Diagnostic Tool

The **PC diagnostic tool** helps you diagnose and repair the running environment when you use the Client and related SDKs.

8.1 Main Window Introduction

This section introduces the **PC Diagnostic Tool**'s main window.

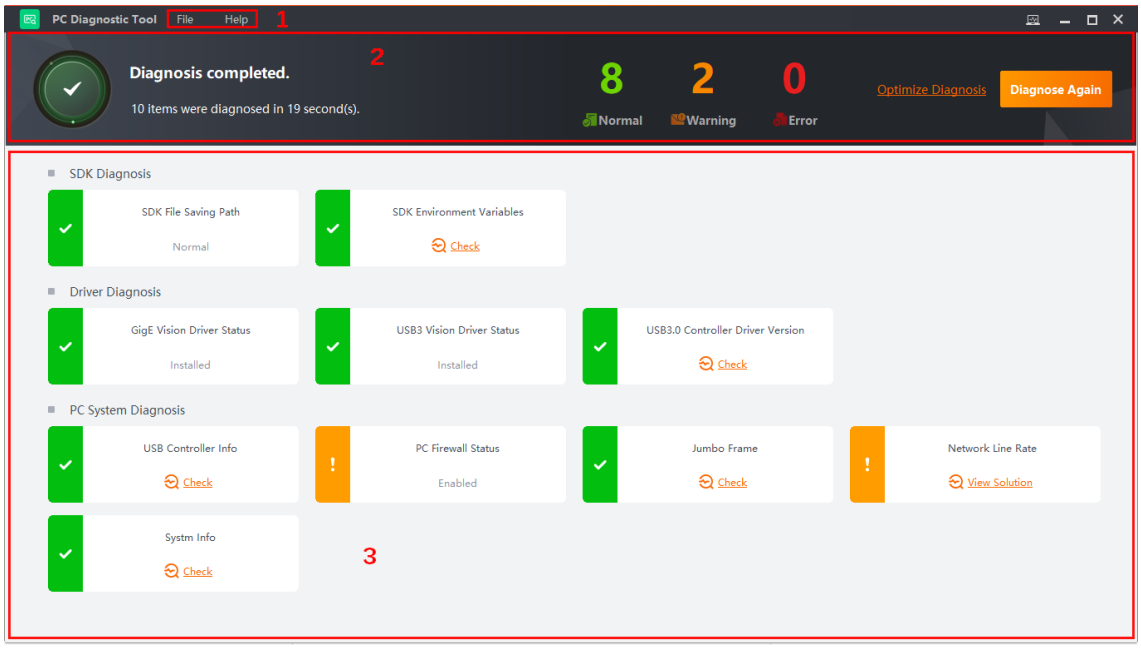


Figure 8-1 Main Page

Table 8-1 Main Page Description

No.	Section	Description
1	Menu Bar	The menu bar provides the log file exporting, user manual, language settings, and tool version. ● File: Click **File** → **Export** to export the log files of the PC diagnostic tool. ● Help: You can change the tool's display language to Chinese or English, view the user manual, and check the tool version.
2	Real-Time Monitoring	According to the severity, the diagnosis results are categorized into three types: normal,

No.	Section	Description
		warning, and error. The number of normal results, warnings, and errors can be displayed in real time during the diagnosis process. See ***Diagnostic Process*** for details.
3	Diagnosis Details	You can check the detailed diagnosis results of the SDK, driver, and PC system. In this section, you can also take actions accordingly to improve their performance. See ***Diagnostic Process*** for details.

Click  on the top right of the tool to check the current memory and CPU usage of the PC.

8.2 Diagnostic Process

You can use the tool to check the performance of the running environment and take actions accordingly to improve the items diagnosed with warnings and errors. The whole process is divided into three stages: starting the diagnosis, checking the diagnostic result, and diagnosing again.

Start Diagnosis

When exceptions of the frame grabber occur, you can use the tool to diagnose the related SDKs, driver, and PC system. Click **Start Diagnosis** to start the diagnosis as shown below.

- SDK Diagnosis: Check if the SDK environment variables are normal and the SDK files are under the following 2 directory: C:\Windows\SysWoW64 and C:\Windows\System32.
- Driver Diagnosis: Check whether the GigE Vision driver and the USB3 Vision driver are normally installed. Check the USB3.0 controller driver version.
- PC System Diagnosis: Check the PC firewall status, network line rate, USB controller information, NIC jumbo frame information, and PC system information.

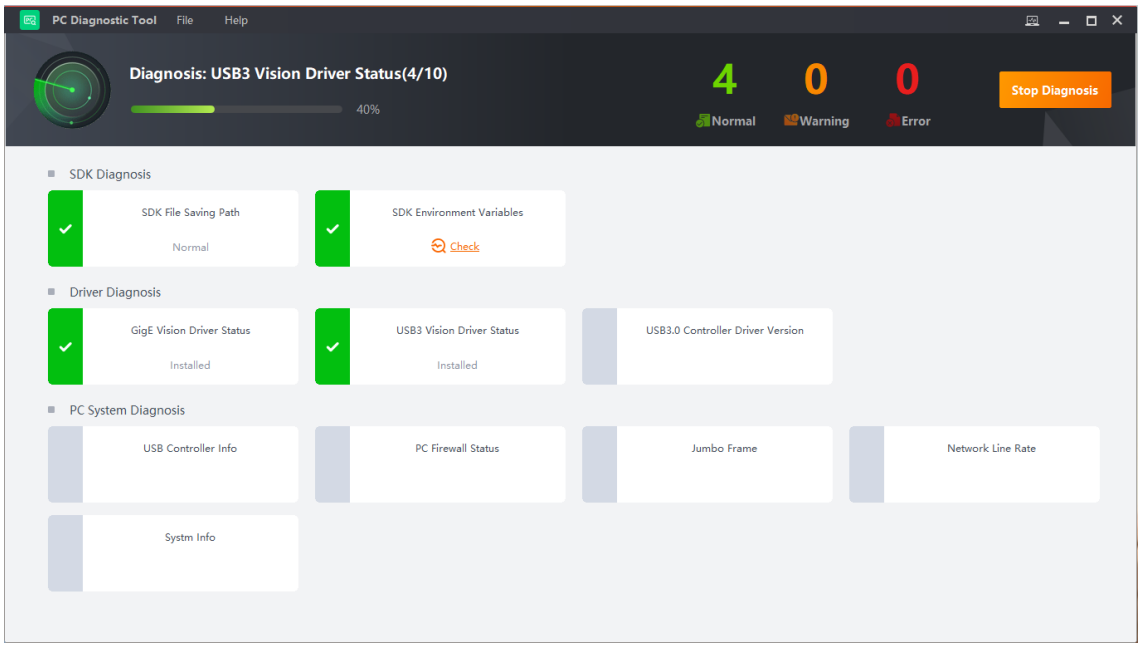


Figure 8-2 Start Diagnosis

Click **Stop Diagnosis** to stop the current diagnosis.

Diagnostic Result

After the diagnosis is completed, the diagnostic results are categorized into three types according to severity: normal, warning, and error.

If there are items to be optimized, click **Check** or **View Solution** to improve them one after one.

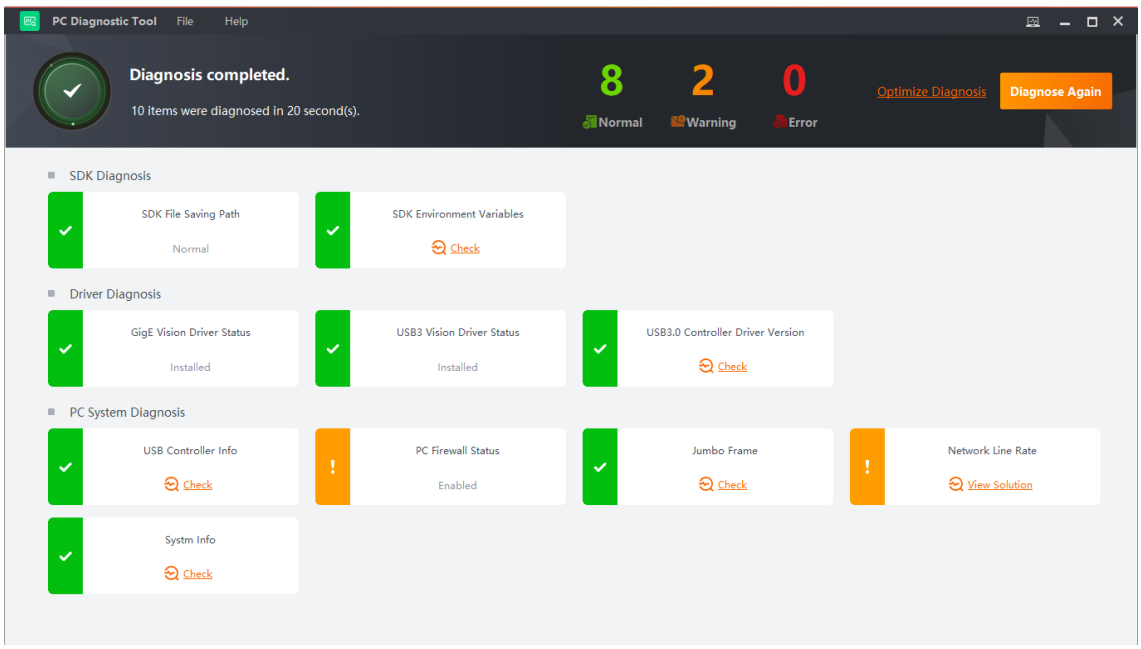


Figure 8-3 Diagnostic Result

Diagnose Again

After you handle the warnings and errors, you can diagnoseall items again or diagnose again only the improved items.

- Optimize Diagnosis: Click **Optimize Diagnose**. Those items diagnosed with warnings and errors will be diagnosed again, and you can also continue to improve these items.
- Diagnose Again: Click **Diagnose Again**, and the tool will diagnose all the items again.

Chapter 9 PCIe Diagnostics Tool

The **PCIe Diagnostics Tool** can read the memory value of the frame grabber's debugging status in real time.
The Tool supports the following types of frame grabbers:

- Camera Link frame grabber
- Coax Press frame grabber
- GigE frame grabber
- 10 GigE frame grabber (support some models)
- XoFLink Fiber Optic frame grabber

9.1 Main Window Introduction

This section introduces the **PCIe Diagnositc Tool**'s main window.

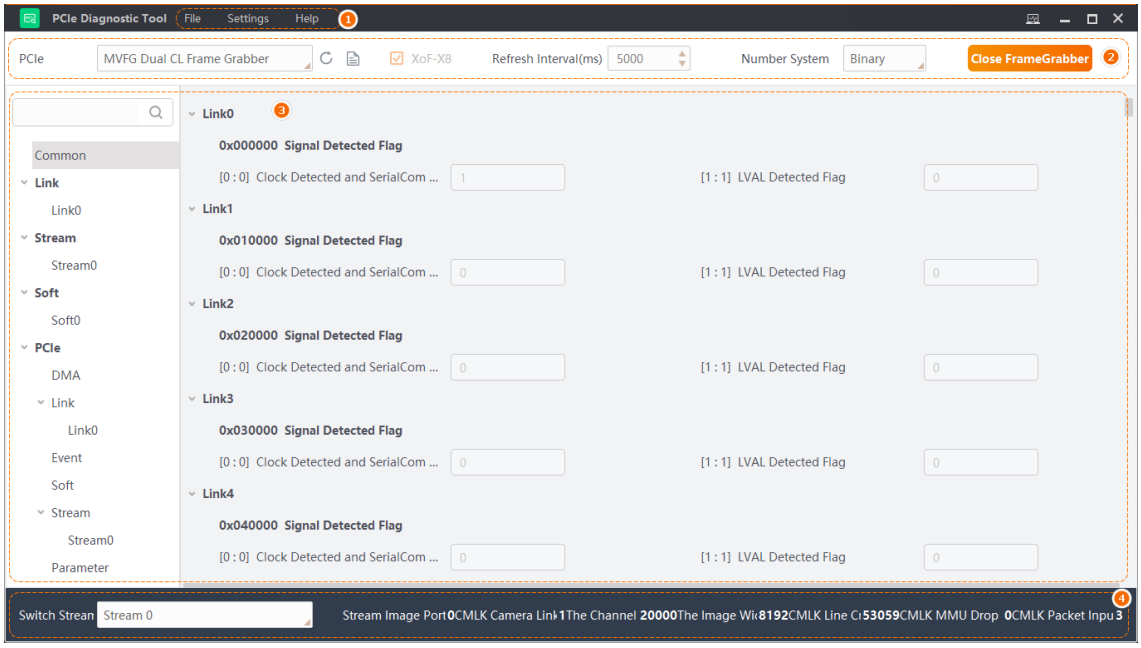


Figure 9-1 Main Interface

Table 9-1 Main Interface Description

No.	Item	Description
1	Menu Bar	The menu bar provides functions of importing/exporting data files, setting general parameters, and other operations for help. ● **File**: You can import external data files or export diagnosis files. ○ Click **File** → **Import** to import external data files to

No.	Item	Description
		the tool. ○ Click **File** → **Export** to export the diagnosis files to the local PC. ● **Settings**: You can configure parameters for the diagnosis files to be exported. ○ **Auto Export**: If enabled, the diagnosis files will be exported automatically. ○ **Export Path**: You can configure the saving path for the diagnosis files to be exported. ○ **File Count**: You can configure the number of diagnosis files to be exported automatically. ● **Help**: You can select the language (Chinese or English) for the use of the tool, view the user manual, and view the tool version information.
2	Frame Grabber Settings	You can select a frame grabber for real-time frame grabbing and perform the following operations in the setting area. ● Refresh Frame Grabber: Click to refresh the frame grabber. ● View Frame Grabber: Click to view the frame grabber information. ● Check Memory and CPU: Click in the upper-right corner to check the memory and CPU usage. ● XoF-X8: Enable this when the connected frame grabber is of the XoF-X8 type. ● Set Refresh Interval: You can set the interval for refreshing the debugging status after the frame grabber starts working. The unit is "ms" and the default interval (5,000 ms) is recommended. ● Set Number System: You can set the number system to **Binary**, **Decimal**, or **Hexadecimal** for displaying debugging status.
3	Diagnostic Monitoring	You can monitor the memory value of the frame grabber's PCIe debugging status in real time in the diagnostic monitoring area. See details in ***Diagnostic Monitoring***.
4	Streaming Monitoring	By selecting a stream type from the drop-down list in the **Switch Stream** area, you can monitor the streaming status of the frame grabber in real time, including the

No.	Item	Description
		stream status and stream transmit status. ● **Stream Transmit Enable**: It refers to the streaming status of the frame grabber and it can be 0 (streaming is disabled) or 1 (streaming is enabled). ● **GVSP Packet Input Sof Cnt**: It refers to the number of lost frames of the frame grabber. ● **GVSP Packet Input Data_last Cnt**: It refers to the number of frames transmitted to the tool. **Note** The interface may vary with the frame grabber types. The actual interface shall prevail.

9.2 Diagnostic Monitoring

By connecting frame grabbers with the tool to grab frames, you can monitor the memory value of the frame grabber's PCIe debugging status in real time.
Select a frame grabber model from the drop-down list in the upper-left corner and click **Open FrameGrabber** in the upper-right corner.
You can enter keywords of debugging status or address in the search box on the left and click to search for the target information. The Common page displays the frequent debugging status information.
The tool can monitor 4 types of debugging status for the frame grabber, including **Link**, **Stream**, **Soft**, and **PCIe**.

- **Link**: Transmitted register data.
- **Stream**: Data stream, etc.
- **Soft**: Registers related with Soft software, SDK, serial port configuration, etc.
- **PCIe**: Transmission protocols, APIs, status, counting, etc.

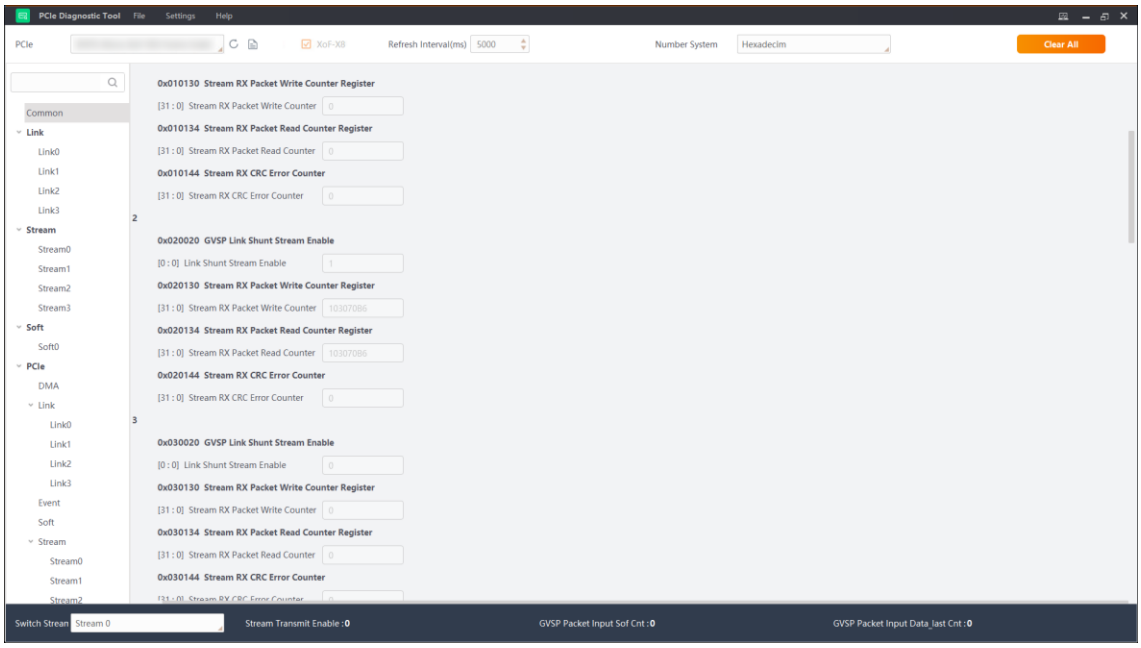


Figure 9-2 Diagnostic Monitoring

Note

Click **Close FrameGrabber** to stop grabbing frames.

Chapter 10 Device Diagnostic Tool

Device Diagnostic Tool can monitor the running status of devices in real time, and display the event overview, event chart, IO waveform, and log records.
The Tool supports the following types of frame grabbers:

- Camera Link frame grabber
- Coax Press frame grabber
- GigE frame grabber
- 10 GigE frame grabber (support some models)
- XoFLink Fiber Optic frame grabber

Main Window Introduction

The main window of the Tool is shown below.

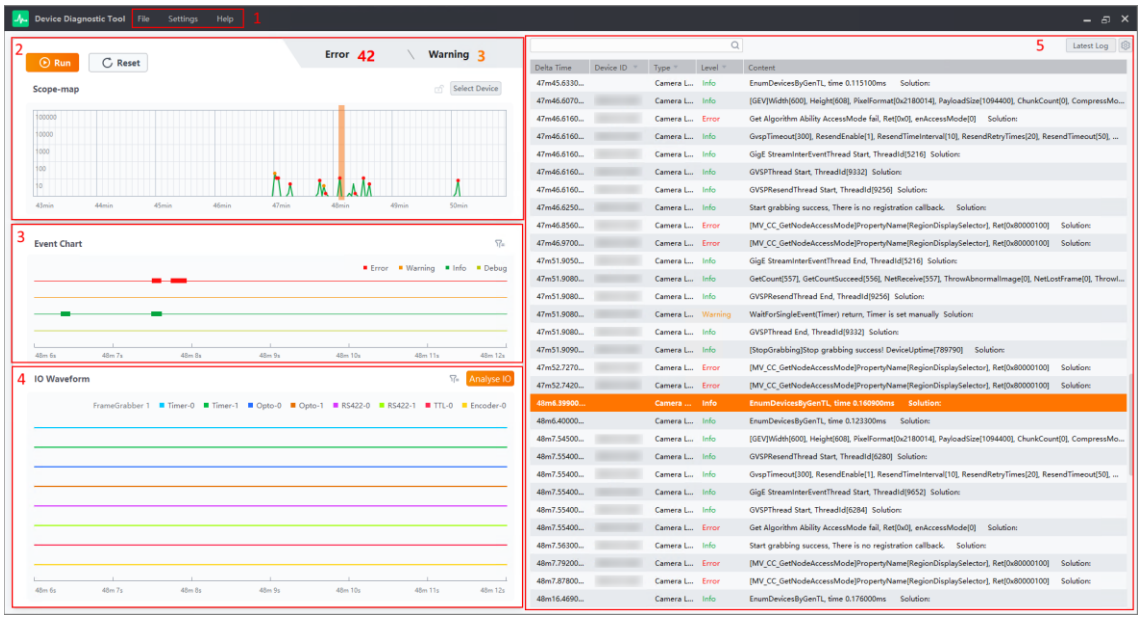


Figure 10-1 Main Interface

No.	Name	Description
1	Menu Bar	View the following functionalities. ● Support importing and exporting log files. ○ Click **File** → **Import** to import a log file from the local PC. ○ Click **File** → **Export** to export a log file to the local PC. **Note** If **Auto Save File** is enabled, exporting log files is not supported. For details, see ***Log Management***.

No.	Name	Description
		● Support general settings of log saving. For details, see ***Log Management***. ● Support switching language of the Tool, and viewing the user manual and version information.
2	Event Overview	View the scope-map of frame grabber / camera events. For details, see ***Event Overview***.
3	Event Chart	View the event chart of frame grabber / camera events diagnosed in the selected 6 seconds. For details, see ***Event Diagnostic***.
4	IO Waveform	View the real-time status of IO pulses of frame grabbers / cameras and generate IO analysis. For details, see ***IO WaveForm Detection***.
5	Log Management	View log and event information of frame grabbers / cameras in real time. For details, see ***Log Management***.

How To Diagnose

You can follow these steps to monitor the events and exceptions of specific devices:

1. Open the Tool.
2. In the **Select Device** window, select required devices.
3. Click **Run** to start monitoring.

10.1 Event Overview

You can take an overview of real-time frame grabber and camera events.

Note

Ensure the desired frame grabber(s) and camera(s) are connected.

Click **Run**, and a scoped-map will be generated.

Note

- Click **Pause** to stop monitoring.

  Note

  The Tool will stop receiving data collected from the device.

- Click **Reset** to clear events and restart the monitor with current settings.

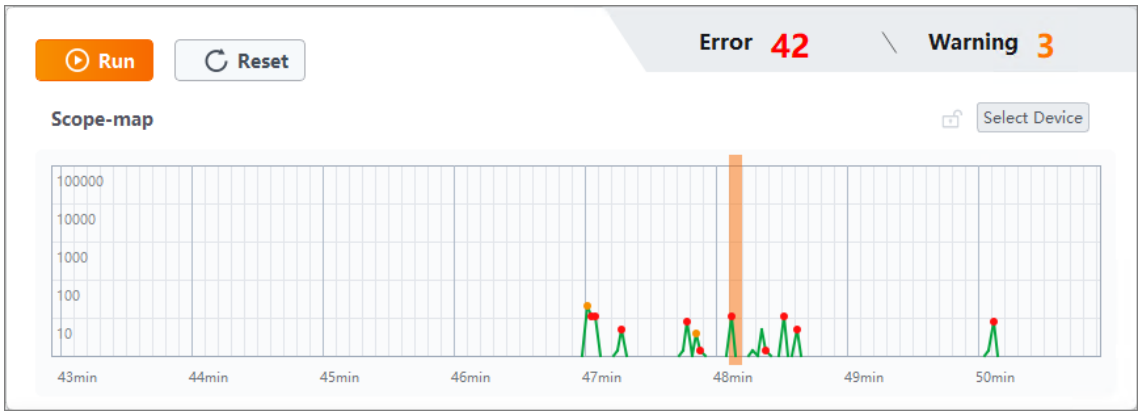


Figure 10-2 Event Overview

You can right-click and drag the cursor on the scope-map to view the events before/after the current time period.
Click to select a time period in the scope-map to view the diagnostic result of events in 6 seconds. For details, see ***Event Diagnostic***.

Area	Description
X-Axis	Timeline. Unit: min.
Y-Axis	Number of events.
Green Point	Normal events.
Red Point	Error events, such as buffer exception, camera offline, and DDR initialization failed. For details, see *Frame Grabber SDK Developer Guide*. **Note** The number of error events is displayed in the upper-right corner.
Orange Point	Warning events such as no parameter collected by frame grabber(s) / camera(s). **Note** The number of warning events is displayed in the upper-right corner.
Select Device	Click **Select Device** to select frame grabber(s) / camera(s) and click **OK**.

Area	Description
	Note If you select multiple devices, the Tool will only generate a broken line containing all device events diagnosed.
Lock/Unlock Scope Map	Click to lock the current scope-map and stop displaying the new timeline and event data. Click to unlock the current scope-map and display the event data received during locking and newly parsed event data.

10.2 Event Diagnostic

You can view the recorded events of the selected time period in an event chart and view event levels of 6-second events.
If you select a time point in the scope-map, you can view the corresponding event chart of the diagnostic events recorded in 6 seconds.

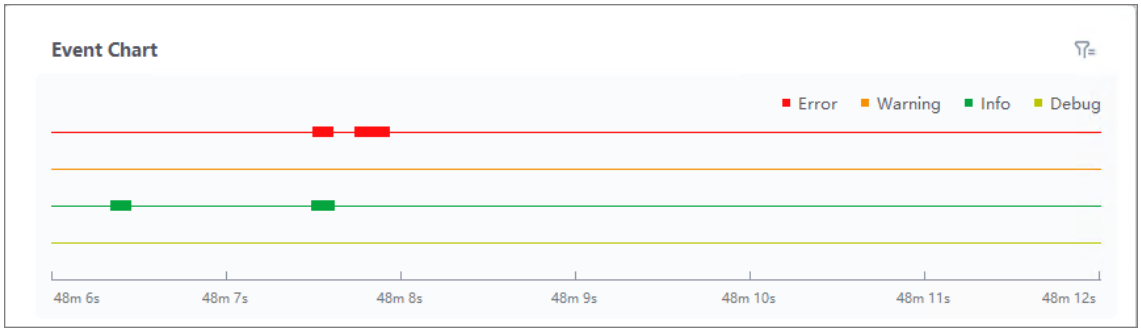


Figure 10-3 Event Chart

Operation	Description
Zoom In/Out	Scroll the mouse to zoom in/out the X axis (timeline) of the event chart.
Adjust Timeline	Right-click and drag the cursor on the event chart to view the events before/after the current timeline.
View Details	Move the cursor on an event point (rectangle in red, orange, green, or yellow) to view the log information. For details, see ***Log Management***.

Operation	Description
Filter by Level	Click to filter the events by Error, Warning, Info, and Debug.

Click to select an event point in the event chart, the corresponding event in IO waveform will also be selected. For details, see***IO WaveForm Detection***.

10.3 IO WaveForm Detection

After an event in the event chart is parsed, you can view the corresponding IO waveform in the IO waveform chart and the number of pulses can be calculated in the real time.

Select IO

For events selected and parsed in the scope map and event chart, you can click in the IO waveform chart to select IO waveform channels and click **OK**.

Note

The IO waveform chart supports displaying maximum 8 channels concurrently.

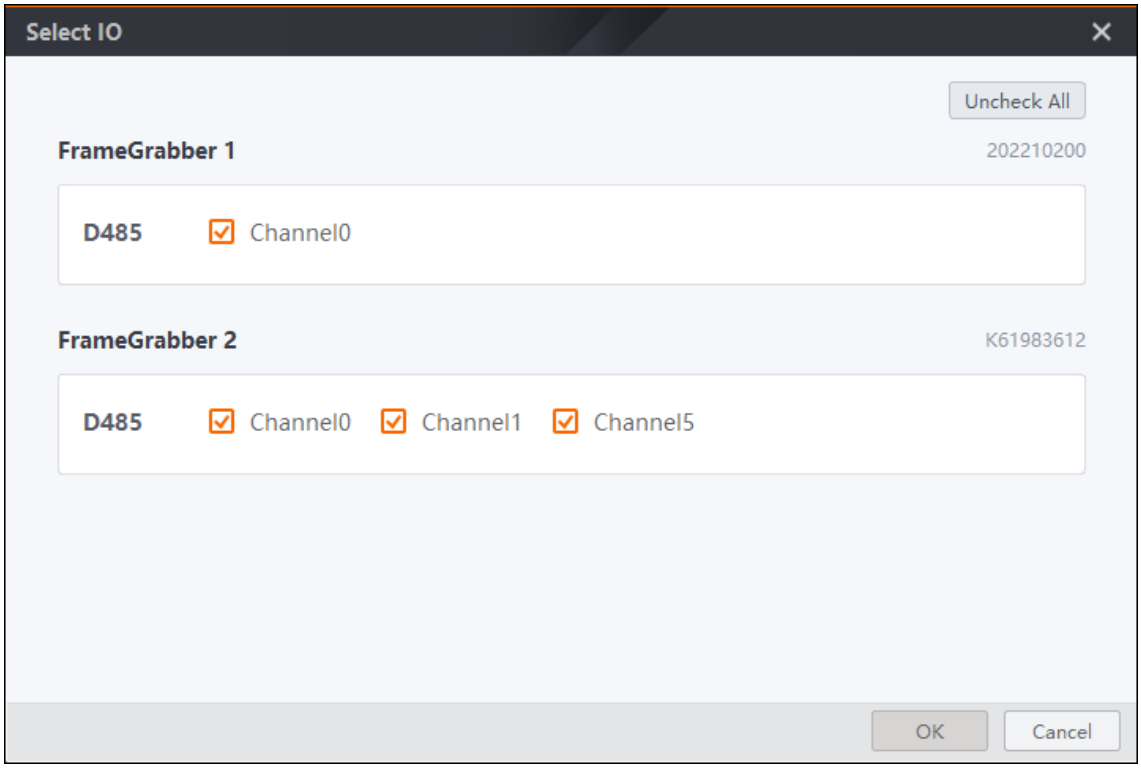


Figure 10-4 Select IO

The IO waveform chart provides a clear view of each IO triggering status. Click **Analyse IO → View Pulse Number** and hover your mouse cursor over the IO waveform to view the

number of pulses and log/event information of the corresponding IO waveform. You can click **Exit** if pulse number statistics is not needed.

View IO Waveform

Click at any time point in the IO waveform chart, and you can drag the mouse wheel up to zoom in the chart and down to restore. You can also hold the right mouse button and drag the mouse to view the IO waveform at an earlier/later time.

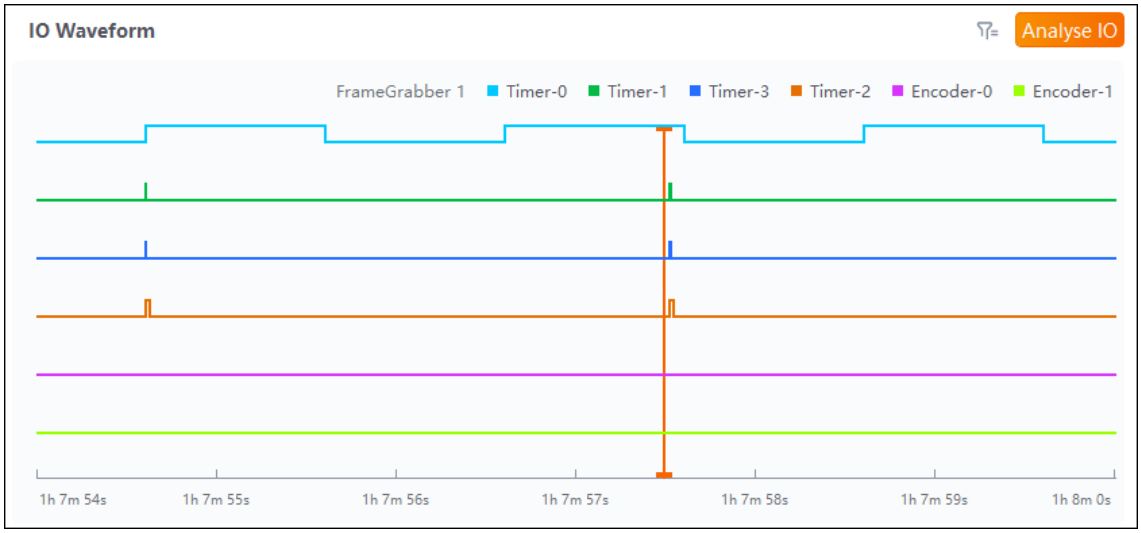


Figure 10-5 IO Waveform Monitoring

Locate Exception IO

Click **Analyse IO** → **Locate Exception IO** to locate the exception IO in the IO waveform chart.

On the **Locate Exception IO** pane, you can specify **Select IO**, **Timer period type** and **Normal Timer period(us)** to locate satisfied exceptions.

Note

After you enable **Stop when occur**, when an exception occurs, the Tool notifies an IO exception occurs with which channel. Then, the Tool pauses logging device status.

To locate one exception IO in the event chart and IO waveform, click **Locate** of the corresponding exception in the Operation column.

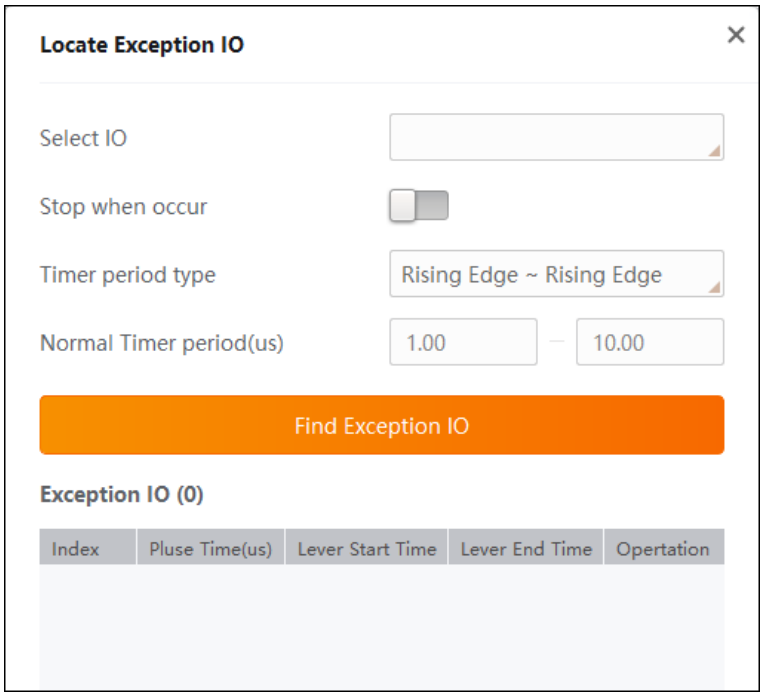


Figure 10-6 Locate Exception IO

10.4 Log Management

After detecting frame grabber / camera events, the Tool can diagnose and accurately locate the abnormal logs in the log list. The tool can be used to monitor and analyze the abnormal events.

General Log Settings

You need to first set log retention period, whether to enable auto save, and auto saving path.

Click **Settings** → **General** in the menu bar.

Log Retention Period

Set the maximum log retention period as the upper limit of log time, which is in minutes. Logs exceeding the set time will not be displayed in the interface.

Note

The parameter should be no more than 100 minutes.

Auto Save File

Enable the parameter to automatically save log files to the set path.

Note

Exporting log file is not allowed when **Auto Save File** is enabled.

Saving Path

You can customize the path of log files. Click to set the path. If no path is selected, files will be saved to the default path: (..\MVS\DeviceDiagnostic\AutoSaveLog).

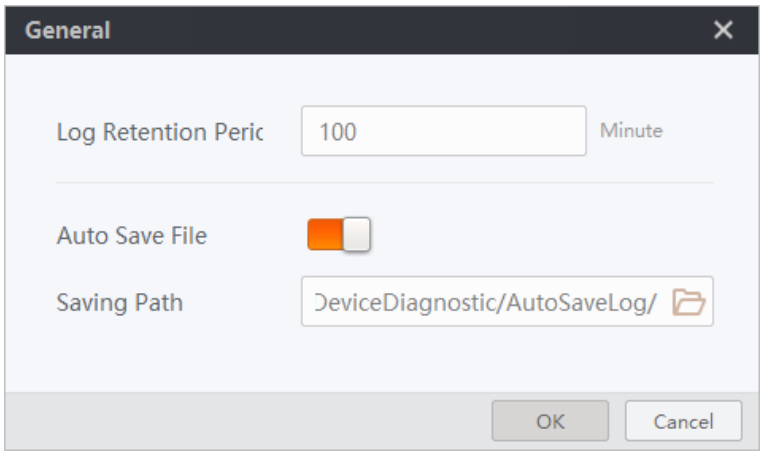


Figure 10-7 General Settings

Log Monitoring

You can monitor real-time log events of frame grabbers / cameras, filter logs, configure log titles, and view all log events within the log retention period.

To quickly locate the events on the scope map, you can click an abnormal event in the scope map, and the corresponding event in the log list can be highlighted (only when the selected "6 Second" event has one exception or warning).

To quickly locate the events on the event chart, you can click any event in the event map to highlight the corresponding event in the log list.

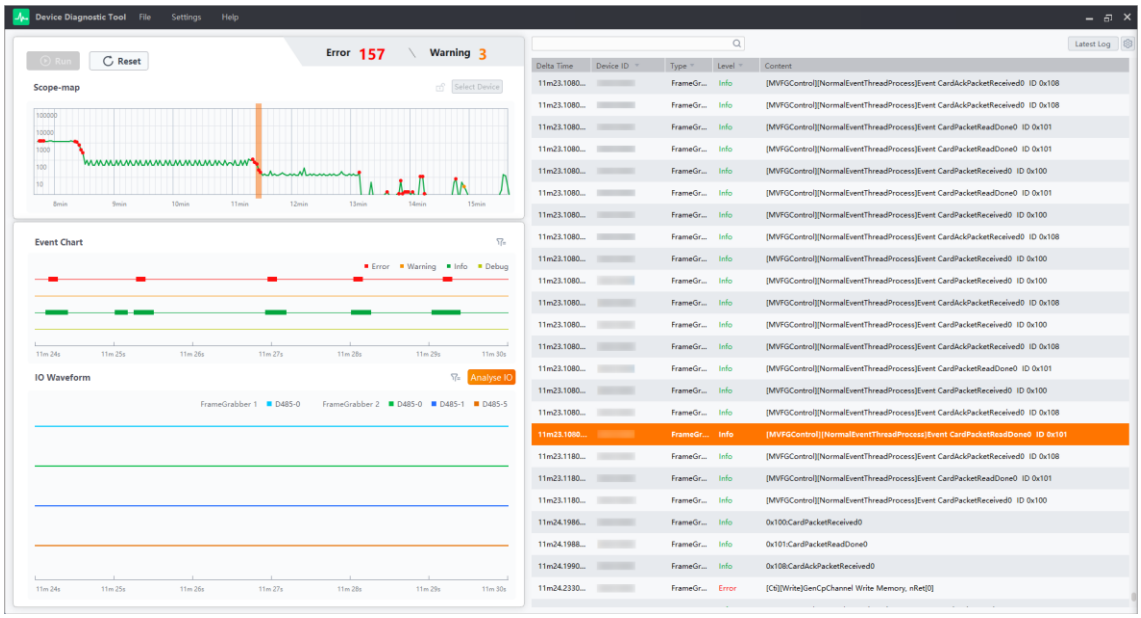


Figure 10-8 View Logs

You can set the columns that will be displayed in the log list.

- Customize the contents of log list: Click to customize the columns that will be displayed in the log list. You can check the item(s) of interest to set the contents.

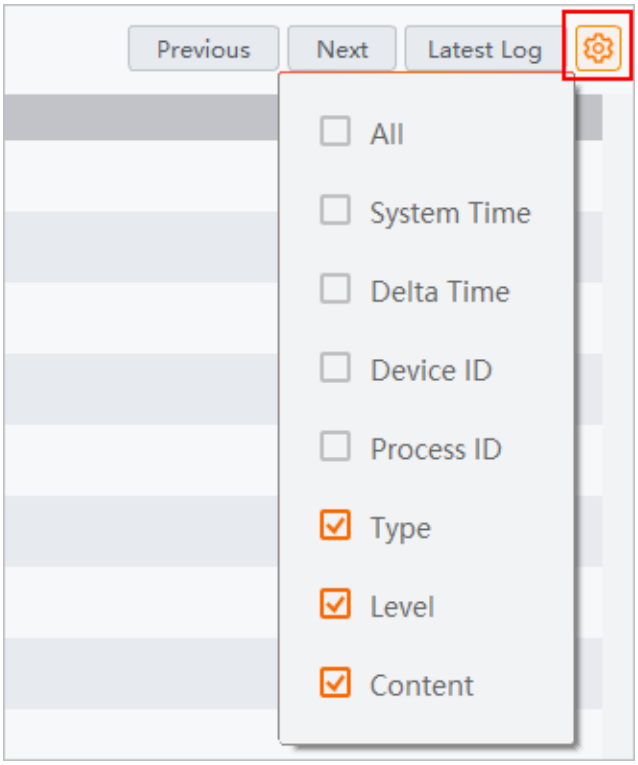


Figure 10-9 Customize Contents of Log List

- Filter log information: You can enter keywords, and click to filter logs. You can also click **Previous**/**Next** to view log information.
- View latest log: Click **Latest Log** to view the latest logs.

Chapter 11 ISP Tool

ISP Tool is developed for correcting images acquired or captured by machine vision cameras. It allows users to customize a correction pipeline via selecting different correction algorithms. The correcting results vary according to the selected algorithms in the pipeline.

11.1 System Requirements

Make sure the computer where you install and run the Software at least meets the minimum requirements.

Note

The compatibility of online mode is subject to camera models.

Recommended Hardware Requirements

- **CPU:** Intel(R) i3-8100T 3.1 GHz and above
- **RAM:** 8 GB and above
- **Graphics Card:** Intel(R) HD Graphics 360
- **Network Adapter:** Intel(R) Pro1000 series
- **USB:** USB 3.0 interface

Minimum Hardware Requirements

- **CPU:** Intel(R) E3845 1.91 GHz
- **RAM:** 4 GB
- **Graphics Card:** 7th Gen Intel(R) Core Process
- **Network Adapter:** Intel(R) Pro1000 series
- **USB:** USB 2.0 interface

Software Requirements

- **Operating System:** Microsoft(R) Windows 7 / 10 (32/64-bit) / 11 (64-bit)
- **SDK Version:** Machine Vision Industrial Camera SDK V3.5.2 and later

11.2 Main Window Introduction

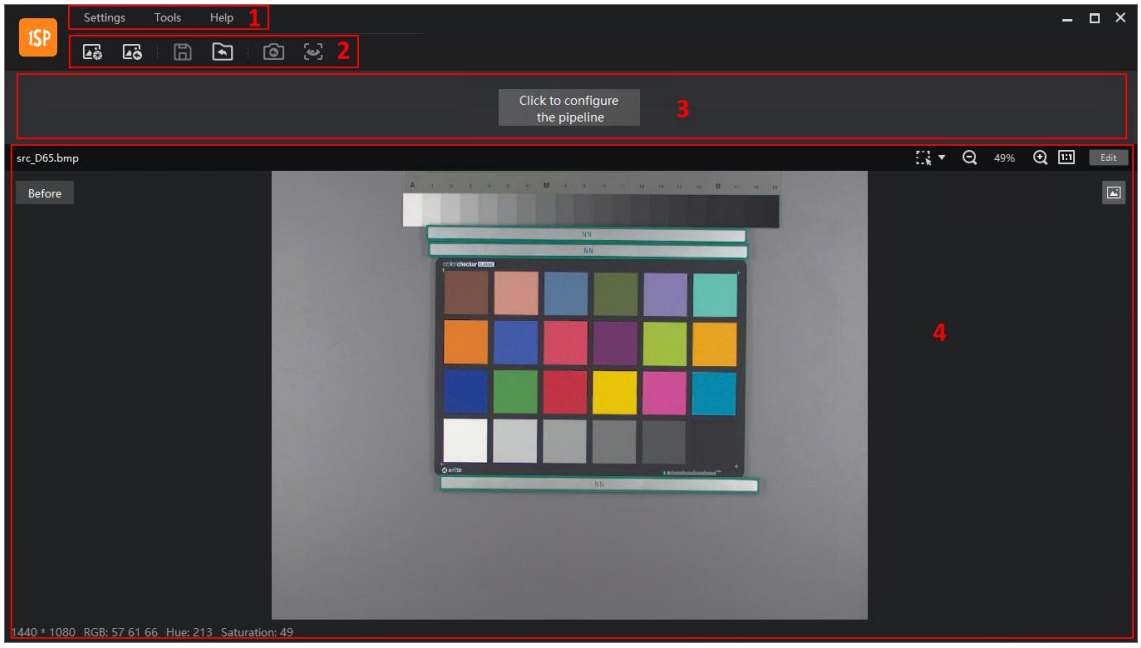


Figure 11-1 Main Window

Table 11-1 Main Window Introduction

Index	Name	Description
1	Menu Bar	The menu bar contains three parts, Setting, Tool, and Help. You can configure the Software here. See details in ***Menu Bar***.
2	Toolbar	You can connect to a camera, import an image, save and import the pipeline, write parameters to the camera, and preview the correction result here.
3	Pipeline	You can select the algorithms you need and configure the pipeline here.
4	Image Window	You can view, control, calibrate, correct, and edit the imported image or the live view image of the connected camera here.

11.3 Menu Bar

The menu bar provides accesses for you to perform various operations on the Software, including configuring software settings, viewing software logs, importing images,

correcting images, previewing corrected images, etc.

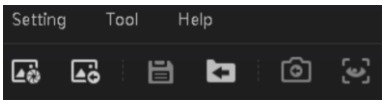


Figure 11-2 Menu Bar

11.3.1 Settings

In Settings, you can configure general parameters and video / picture parameters for the Software.

General Settings

You can set the folder naming rule, cti default path, Bayer interpolation, number of threads, and quick tuning in general settings.

Folder Naming Rule

You can set the serial number or model name of the connected camera as the name of the export folder of configuration files.

cti Default Path

The cti file is used for GenTL management. You can set a default path for the cti file. If you have set and enabled the default path of the cti file, the Software will load it automatically once you start the Software. See ***GenTL Management*** for details about GenTL management.

Bayer Interpolation

Bayer interpolation is an image processing technique used to reconstruct a full-color image from a single-sensor digital camera that uses a color filter array (CFA) known as the Bayer filter. Since the Bayer filter only captures one color component (red, green, or blue) at each pixel location, Bayer interpolation is used to estimate the missing color information for each pixel by analyzing the neighboring pixels that have the missing color information. You set the Bayer Interpolation mode to Optimal, Balance, or Quick. The default mode is Optimal.

Number of Threads

You can set a maximum of 64 threads.

Quick Tuning

If this function is enabled, the image will be automatically corrected when you configure the correction parameters.

Video and Picture Settings

You can set video / picture parameters according to actual needs.
On the top navigation bar, select **Settings** → **Video/Picture** to configure the following

parameters.

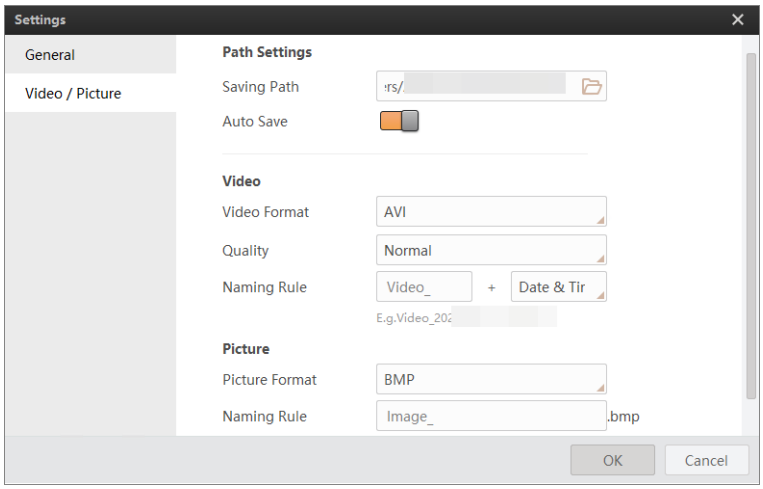


Figure 11-3 Video / Picture Settings

Path Settings

Saving Path

Select a saving path to save video footage and captured pictures.

Auto Save

When enabled, the video footage and captured pictures will be automatically saved to the saving path you select.

Note

The maximum number of pictures and video footage that can be automatically saved depends on the storage space of the saving path you select.

Video

Video Format

Select the format (AVI or RAW) of video footage.

Quality

If you select AVI as the video format, select **Normal**, **Better**, or **Best** as video quality.

Naming Rule

Customize a prefix and select **Date & Time** or **Increasing No.** as the naming rule.

Date & Time

A number which represents the date and time when the video footage is saved. For example, if you set ***Video_*** as the prefix of the name, the full name would be ***Video_20210831051532390***.

Increasing No.

A series of numbers in ascending order. For example, if the video footage is the

second one you save and you set ***Video_*** as the prefix, the full name of the video footage would be ***Video_02***.

Picture

Picture Format

Select **BMP** or **RAW** as the format of captured pictures.

Naming Rule

Customize a prefix as the naming rule for captured pictures.

11.3.2 Tool

Enter a short description of your concept here (optional).
This is the start of your concept.

Tool

You can view and export log information which records your operations on the Software. For each log, you can view its type, time, and event.

Steps

1. Go to **Tool** → **Log** to open the Log Information pane.
2. Select a log type.
3. Select a time period during which the logs were generated.
4. Click **Search**.
5. Optional: Click **Export** to export log information to the PC.

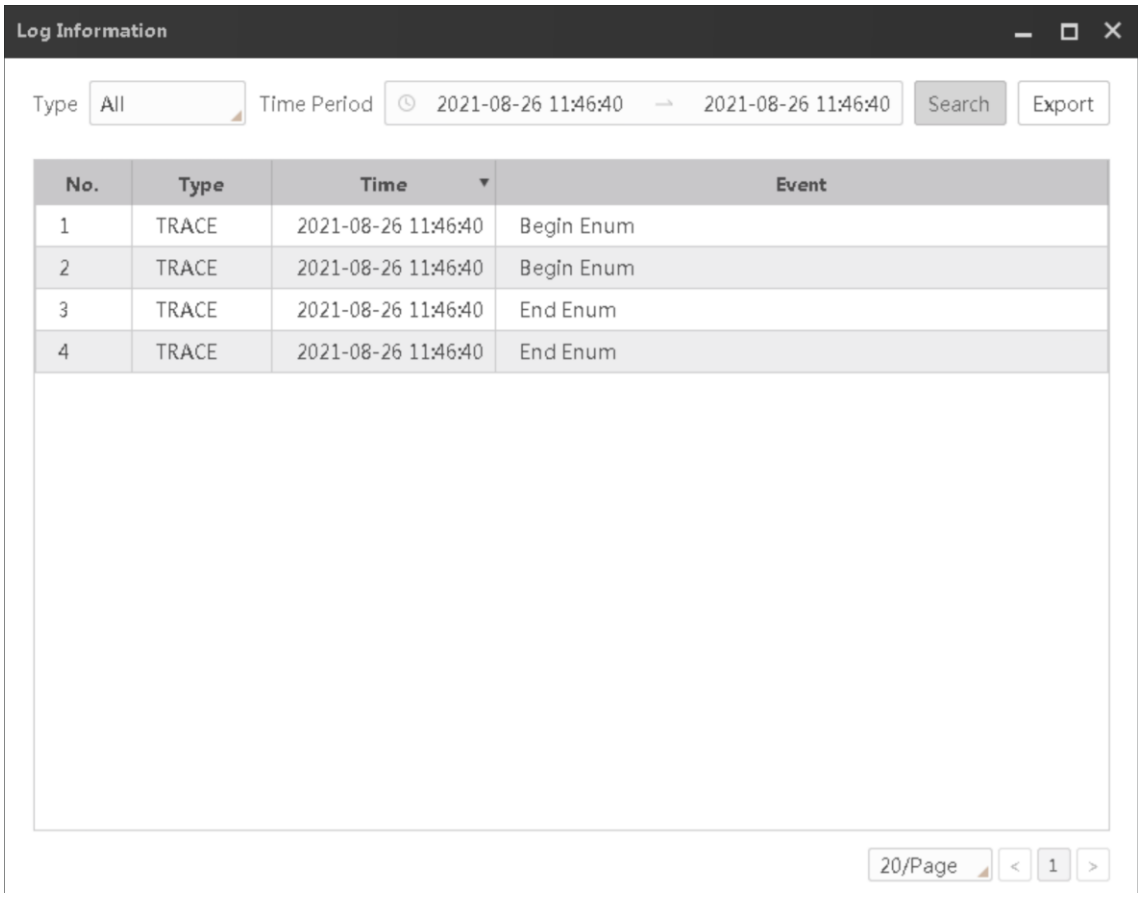


Figure 11-5 Log Information

Quick Color Calibration

Enter a short description of your task here (optional).

Before You Start

Enter the prerequisites here (optional).

Enter the context of your task here (optional).

Steps

1. Enter your first step here.
   Enter the result of your step here (optional).

Example

Enter an example that illustrates the current task (optional).

What to do next

Enter the tasks the user should do after finishing this task (optional).

11.3.3 Help

Onthe Help sub-menu, you can switch the language of the Software, read the user manual, open the Development folder, or view the information about the Software.

Language

Switch the language of the Software. You can set the language of the Software to English or Chinese.

User Manual

Open the User Manual (this document). You can refer to the User Manual for feature introduction and detailed instructions.

About

Check the version of the Software, the SDK, and the algorithms.

11.4 Camera Management

The Software supports connecting to three types of cameras: GigE, USB, and GenTL.

11.4.1 GigE Vision Camera Management

The GigE Vision camera is the camera using GigE Vision interface standard for data transmission. The Software supports connecting GigE Vision cameras and correcting images captured by them.

Note

GigE Vision is an interface standard for machine vision cameras. It provides a framework forhigh-speed transmission of video and related control data over Ethernet networks.

Connect GigE Vision Camera

You can connect a GigE Vision camera to the Software in two ways, i.e., letting the Software automatically enumerating local cameras or adding a remote camera.

Automatically Enumerate Local Cameras

All the GigE Vision cameras in the same local subnet with the Software will be automatically enumerated in the device list.

You can hover the cursor over the camera interface and then click to refresh the enumerated cameras on the same local subnet with the PC on which the Software runs.

Or you can enable the Software to automatically refresh the device list. See ***Settings*** for

details.

When the cameras are enumerated, if the camera status is available, you can double-click the camera or click to connect it to the Software.

Note

For details about status of the GigE Vision cameras, see ***Status of GigE Vision Camera***.

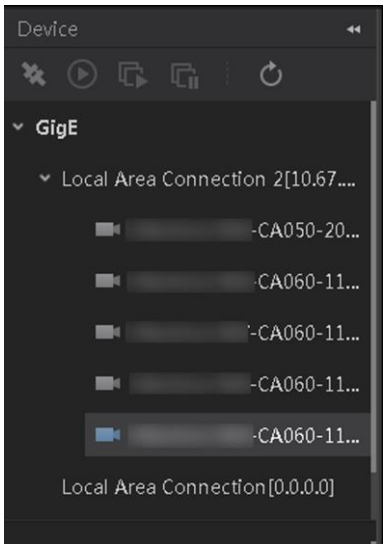


Figure 11-7 Local Camera Enumeration

Add Remote Camera

You can add GigE Vision camera NOT in the same local subnet with the client software to the device list.

Steps

1. Right-click the network interface card (for example, **Local Area Connection** in the following picture) to open the right-click menu.

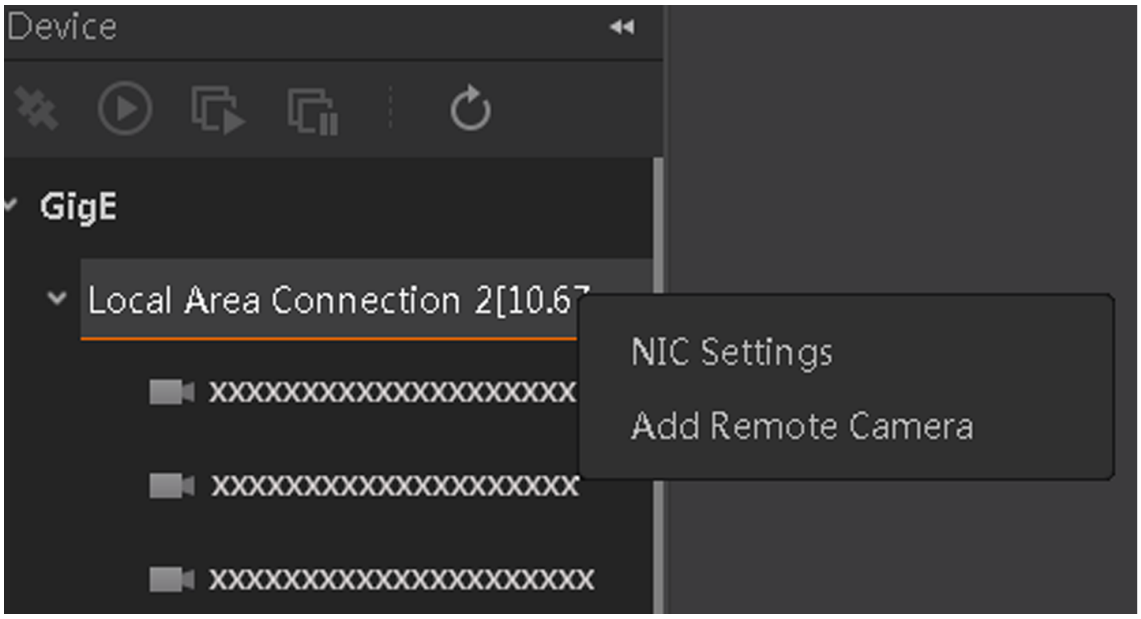


Figure 11-8 Right-click Menu

2. Click **Add Remote Camera** to open the Add Remote Camera window.

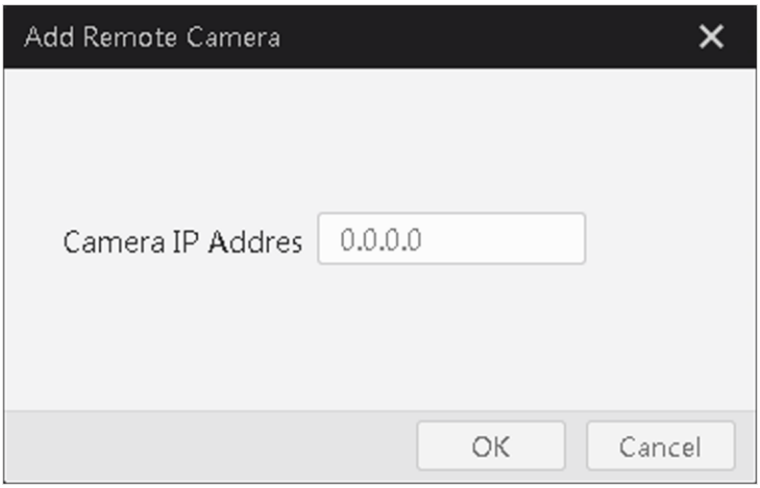


Figure 11-9 Add Remote Camera

3. Enter the camera IP address and then click **OK** to add the camera.

Status of GigE Vision Camera

The Software provides multiple icons to represent different status of GigE Vision cameras. The following table shows the descriptions of the status of the GigE Vision camera on the

device list.

Table 11-2 Status Description

Camera Status	Description
	Available and disconnected. **Note** You can double-click the camera or select it and click on the control toolbar to connect it to the Software. Once connected, changes to .
	Not available. Another Software or process is accessing the camera.
	The camera is on the same subnet with the PC on which the Software runs, but NOT in the same network segment. You should configure its IP address to the same network segment before you can connect and use the camera. **Note** You can double-click the camera or click **Tool** → **IP Configurator** to configure the camera's IP address.
	Connected.
	The camera is acquiring streams. **Note** See ***Live View Control*** for details about how to start acquisition.

Edit Camera IP Address

If the camera is displayed as (not reachable because the camera is on the same subnet with the PC on which the Software runs, but not in the same network segment), you can edit the camera's IP address to make it reachable.

Steps

1. Right-click the camera displayed as to open the right-click menu.

2. Click **Modify IP** on the right-click menu to editthe IP address of the camera.
3. Select **Static IP**, **DHCP**, or **LLA** as the IP type.

Note

You can change the IP type only when the camera status is Free. And if you change the IP type, the camera will be reset to its power up state.

Static IP

For setting the IP type as Static IP, you can modify the IP address, subnet mask, and default gateway.

DHCP

The camera is set to automatically obtain an IP address. This means that the IP address will dynamically change (within a range) every time the camera or computer is restarted.

LLA

The camera uses a default IP address from the link-local address block. Link-local addresses for IPv4 are defined in the address block 169.254.0.0/16 in CIDR notation. In IPv6, they are assigned withthe address block fe80::/10.

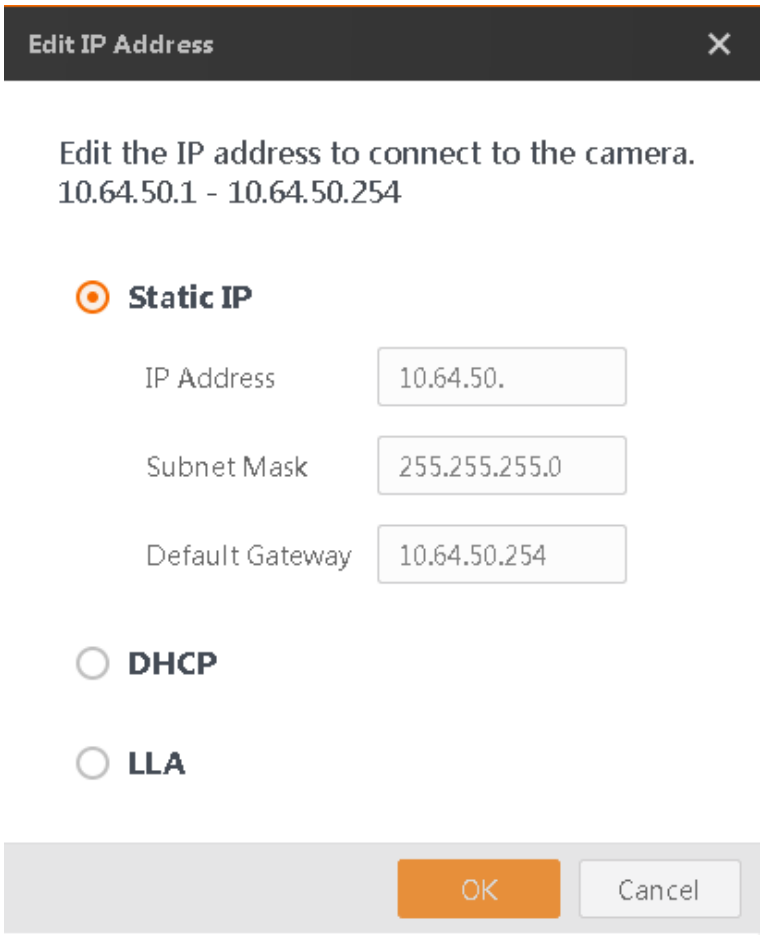


Figure 11-10 Modify IP Address

4. Click **OK** to save the settings.

Note

If the modified IP address conflicts with another device's IP address in the same local subnet, a prompt will pop up to remind you that IP conflict occurs. Change the IP address in this situation.

11.4.2 USB3 Vision Camera Management

USB3 Vision camera is the camera using USB3 Vision interface standard for data transmission. The Software supports connecting USB3 Vision cameras and correcting images captured by USB3 Vision cameras.

11.4.3 GenTL Management

You can use Generic Transport Layer (GenTL) interface to allow the Software to communicate with and control machine vision devices such as cameras, frame grabbers,

and image processing devices in a hardware-independent and vendor-neutral manner.

Before You Start

Make sure you have enabled the cit default path. For details, see ***General Settings***.

Steps

1. Click to open the Camera List.
2. On the upper-right corner of the Camera List, click to display the devices. You can load a CTI file from MVS Client in one of following paths.
   – If you download MVS Client in the default path, the loading path of CTI files is C:\Program Files (x86)\Common Files\MVS\Runtime.
   – If you download MVS Client in the custom path, get a CTI file in the Runtime file fold under the custom download path of MVS Client.

Note

- You can use CTI files based on GenTL standards from other manufacturers. If you cannot open the files, contact the manufacturer's technical support team.
- The following table shows the supported CTI files.

Table 11-4 Supported CTI Files

File Name	Device Type
MvFGProducerCML.cti	Camera Link Frame Grabber
MvFGProducerCXP.cti	CoaXPress Frame Grabber
MvFGProducerGEV.cti	GigE Frame Grabber
MvFGProducerXoF.cti	XoF Frame Grabber (Self-Developed)
MvProducerGEV.cti	NIC Frame Grabber
MvProducerU3V.cti	USB 3.0 Frame Grabber

The device list will display the cameras that can be discovered by the CTI file.

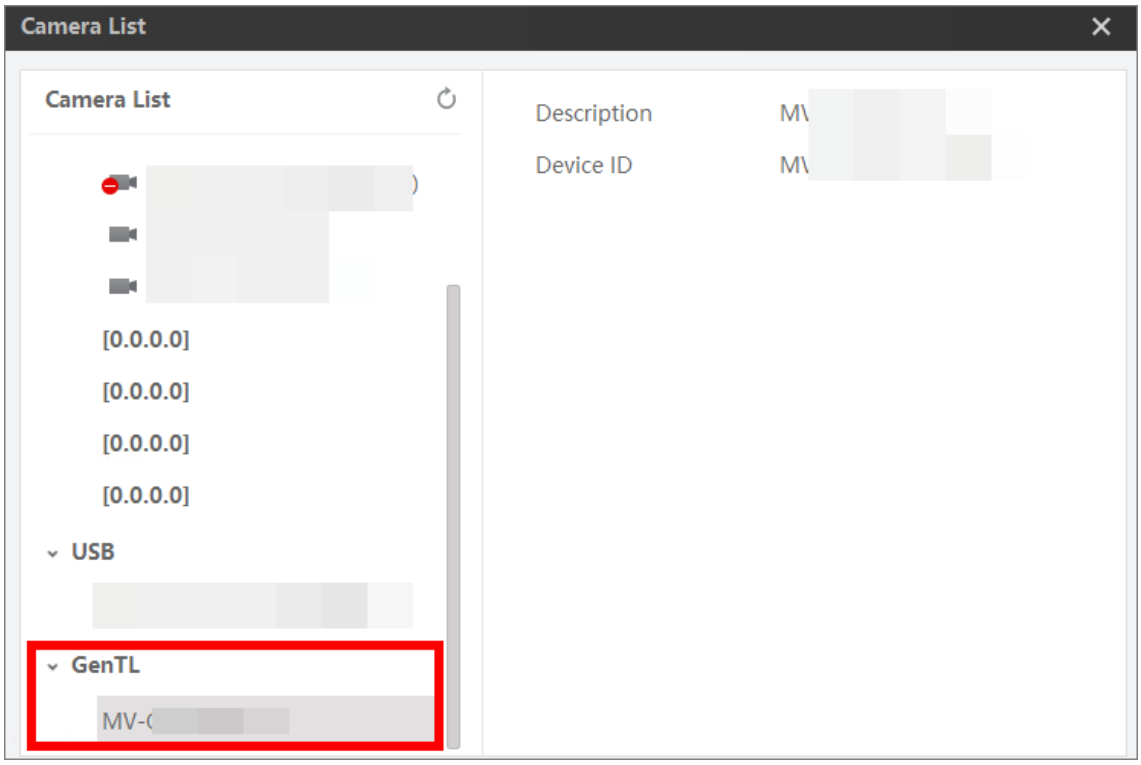


Figure 11-18 Discovered Camera

3. Optional: After the CTI file is loaded, click to refresh cameras.

Note

The following table displays the GenTL-based camera status.

Table 11-5 GenTL-based Camera Status

Icon	Status	Description
	To Be Connected	Double click the camera to connect.
	Connected	You can perform operations on the connected camera.

11.4.4 View and Set Camera Feature Tree

You can open and configure the feature tree of a connected camera.
Click to show the Camera List. In the Camera List, right-click the connected camera and select **Feature Tree** to show the feature tree window where you can view and configure the camera features.

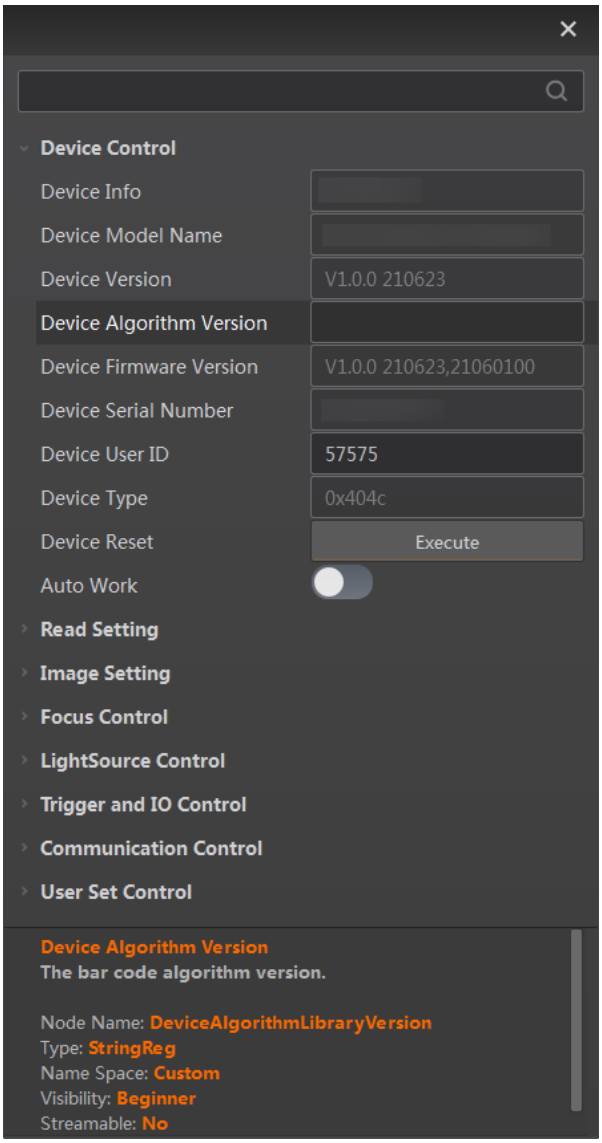


Figure 11-19 Feature Tree

Note

- Select a camera feature, the information about the feature will appear at the bottom.
- You can search for a camera feature in the search box at the top.

11.4.5 Live View Control

You can start the live view of the connected camera to view the real-time image information, including the resolution, RGB values, hue, and saturation.
Before you start the live view, you need to connect to the camera. Click to show the Camera List. In the Camera List, double-click a camera to connect to it.
On the image window, click the buttons to control the live view.

Table 11-6 Icon Description

Icon	Description
	Start the live view (image acquisition) of the camera. Click again to stop the live view.
	Take a snapshot of the live view image. Click this icon once to capture a single image, and this image will then be automatically saved to the default path. To set the saving path of captured images, see .
	Click to start recording the live view video, and click again to stop recording. To set the saving path of the recorded videos, see .
	Zoom in or zoom out on the live view image.
	Show the live view image in its original scale. Or fit the live view image to the size of the window.
	Define a specific area. The average values of RGB, hue, and saturation in that area will be calculated and displayed in the top right corner of the defined area. To adjust the size of the rectangular box, click  .

11.5 Image Correction

To correct an image, you need to operate four tasks, including importing an image, editing an image, configuring the pipeline, correcting the image, and other operations.

Import an Image

You can import an image into the Software from a camera or the local PC. See ***Import an Image*** for details.

Edit an Image (Optional)

Edit imported images in Mono8 and RGB24 formats.

Configure the Pipeline

The pipeline of a camera is the image processing algorithm settings of the camera. You can import an existing pipeline configuration file or configure the pipeline manually. See ***Configure the Pipeline*** for details.

Correct Images

Three ways for correcting the image are provided. The supported correcting modes of different algorithms vary.

- Correct the image by importing parameters from the local PC.
- Correct the image by camera parameters.

- Correct the image by calibration parameters.

See ***Correct Image*** for details.

Other Functions

Besides the above-mentioned tasks, users can also perform other operations according to actual needs, including previewing the corrected image, saving parameters to the camera, and exporting correction parameters. See ***Other Functions*** for details.

11.5.1 Import an Image

You can import an image into the Software from a camera or the PC, and correct the image with camera parameters or local parameters according to actual needs.

Import an Image from PC

You can import an image from the PC into the Software.

Before You Start

Make sure that the name of a BMP image contains its gain value, such as "image_g0.bmp", and that the name of a RAW image contains its gain value, width, height, and joint No., such as "image_g0_w1440_h1080_pBayerRG8.raw".

Note

The joint No. is only valid for the Denoise module.

Steps

1. Click on the toolbar.
2. Select an image.
3. Import the image into the Software.
4. Optional: Perform the following operations if needed.

Zoom Image	Click / to zoom in/out on the image.
Display in Actual Size	Click to display the image in its actual size, and click to fit it to the size of the window.
Configure Pipeline	See ***Configure the Pipeline*** for details.
Import Another Image	Click to import another image to replace the current one.

Import an Image from Camera

You can import an image from a camera into the Software.

Before You Start

Note

The Tool only supports some camera models.

Steps

1. Click to open the Camera List pane.

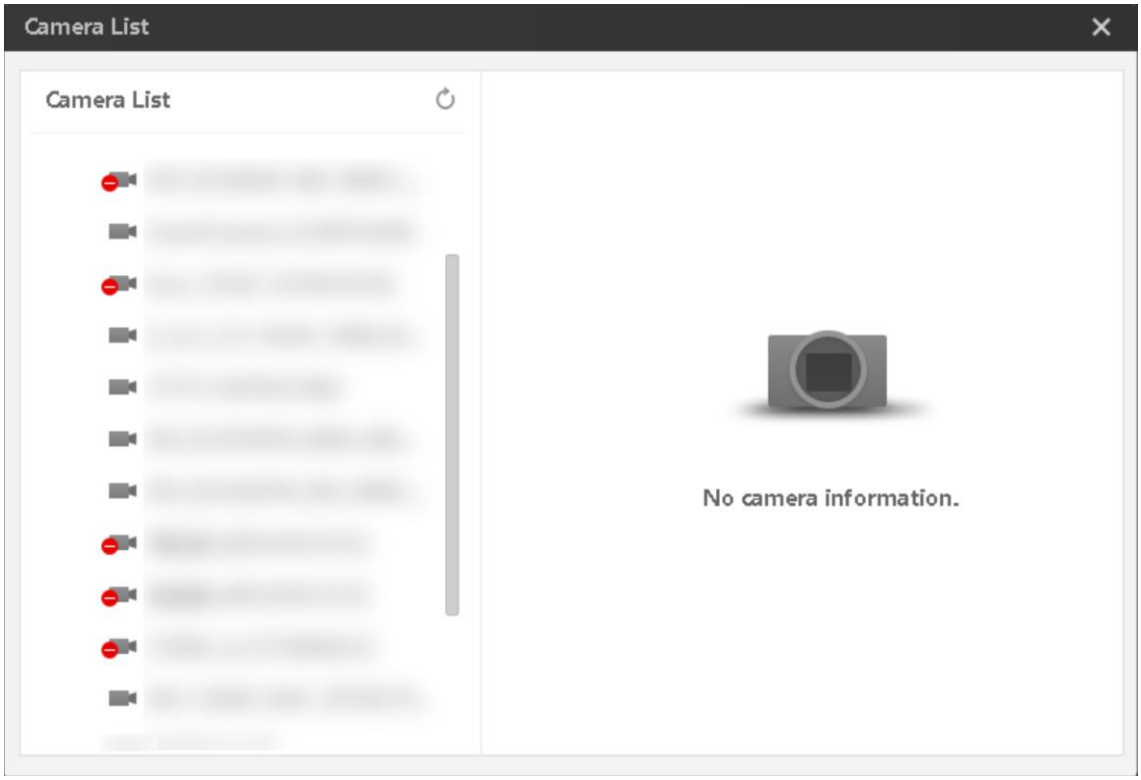


Figure 11-20 Camera List

2. Hover the cursor onto a camera.
3. Click to connect the camera.
   The image from the camera will be displayed.
4. Click to start acquiring an image from the camera.
5. Optional: Perform the following operations if needed.

Capture Image	Click to capture an image.
Start Recording	Click to start recording.
Zoom Image	Click / to zoom in/out on the image.
Display in Actual	Click to display the image in its actual size, and click to

Size	fit it to the size of the window.
Configure Pipeline	See ***Configure the Pipeline*** for details.
Import Another Image	Click to import another image to replace the current one.

11.5.2 Edit an Image

Edit imported images in Mono8 and RGB24 formats.

Before You Start

Make sure you have imported images into the Software.

Steps

1. Click **Edit** on the top right of the image editing area.
2. Click the buttons in the bar to perform the following operations.

Table 11-7 Edit an Image

Operation	Description
	Undo the last operation.
	Redo the last operation.
	Restore the image.
	Clip the image.
	Rotating clip the image, which means you can clip a customized shape.
	Rotate the image for 90°clockwise.
	Rotate the image for 90°anticlockwise.
	Mirror the image vertically.
	Mirror the image horizontally.
	Showthe grid on the image.
	Change the image width to 3200.

3. Click **Finish**.
4. Optional: Click **Save Copy** to duplicate the edited image and select a saving path.

11.5.3 Configure the Pipeline

The pipeline of a camera is the image processing algorithm settings of the camera. You

can import an existing pipeline configuration file or configure the pipeline manually.

Note

Before importing or configuring the pipeline, you should connect to a camera or import a local image.

Import an Local Pipeline

Click on the toolbar and select the pipeline configuration file (in XML format) on your PC.
When the file is imported, the pipeline area of the Software will show the algorithms included in the imported pipeline.

Import the Pipeline from a Camera

If a camera is configured with related algorithms, the pipeline will be imported to the Software automatically.

Note

- If you have configured a pipeline in the Software, when you connect to a camera with a pipeline, you will be asked if you want to replace it with that of the camera.
- If the image format of the pipeline you configured in the Software is not the same with that of the camera you are connecting, the camera's pipeline will replace the pipeline in the Software.

Configure the Pipeline Manually

Click **Click to configure the pipeline** in the pipeline area. Select the algorithms you need. After selecting the algorithms, click **Done** and the selected ones will be shown in the pipeline area.

Note

- Some algorithms cannot be selected at the same time. Algorithms contradict to the selected ones are grayed out.
- Algorithms that are not supported by the camera are marked with the simulation label. Simulation requires that the camera has the simulation algorithm.
- If you need to edit the selection of algorithms, click **Set PIPELINE** in the pipeline area.

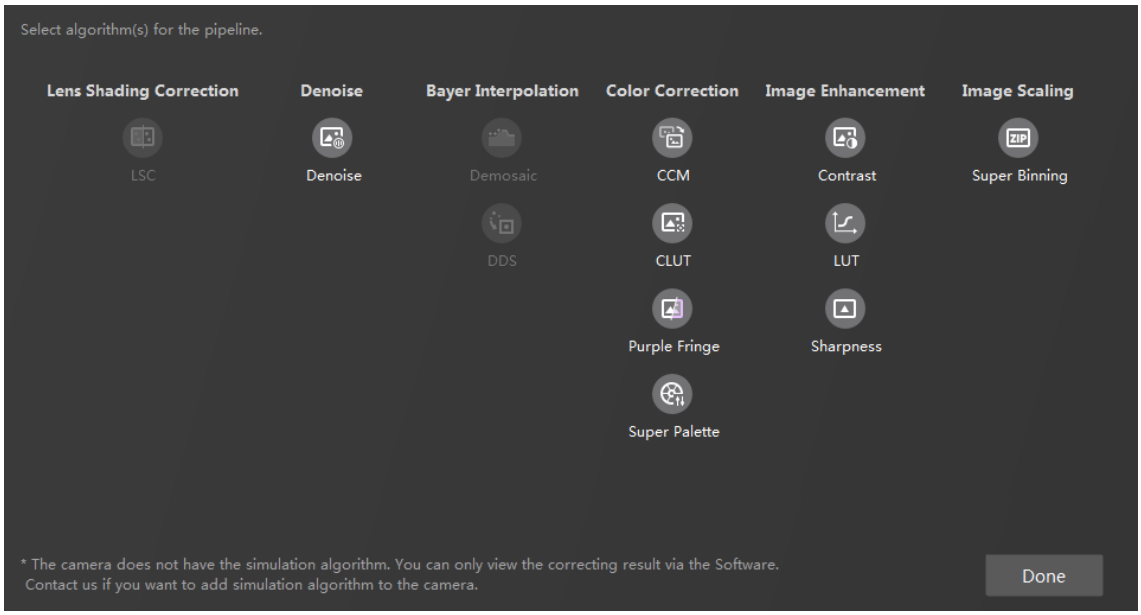


Figure 11-22 Select Algorithms

11.5.4 Correct Image

Three ways for correcting the image are provided: correcting the image by importing parameters from the local PC, correcting the image by camera parameters, and correcting the image by calibration parameters. The supported correction modes of different algorithms vary.

Correct the Image by Local Parameters

You can correct the image by local parameters. For example, you correct images via PC 1 with ISP Tool. Now you are going to use the parameters on PC 1 to correct images via PC 2 with ISP Tool. You can send the parameters to PC 2 and correct images by importing the parameters to the ISP Tool installed on PC 2.

Before You Start

Make sure that you have configured the pipeline for the camera. See ***Configure the Pipeline*** for details.

Steps

1. Click the first algorithm module in the **Set Pipeline** area.
2. Click **Import Local Parameters**.
3. Select a file from the PC and import it into the Software.

Note

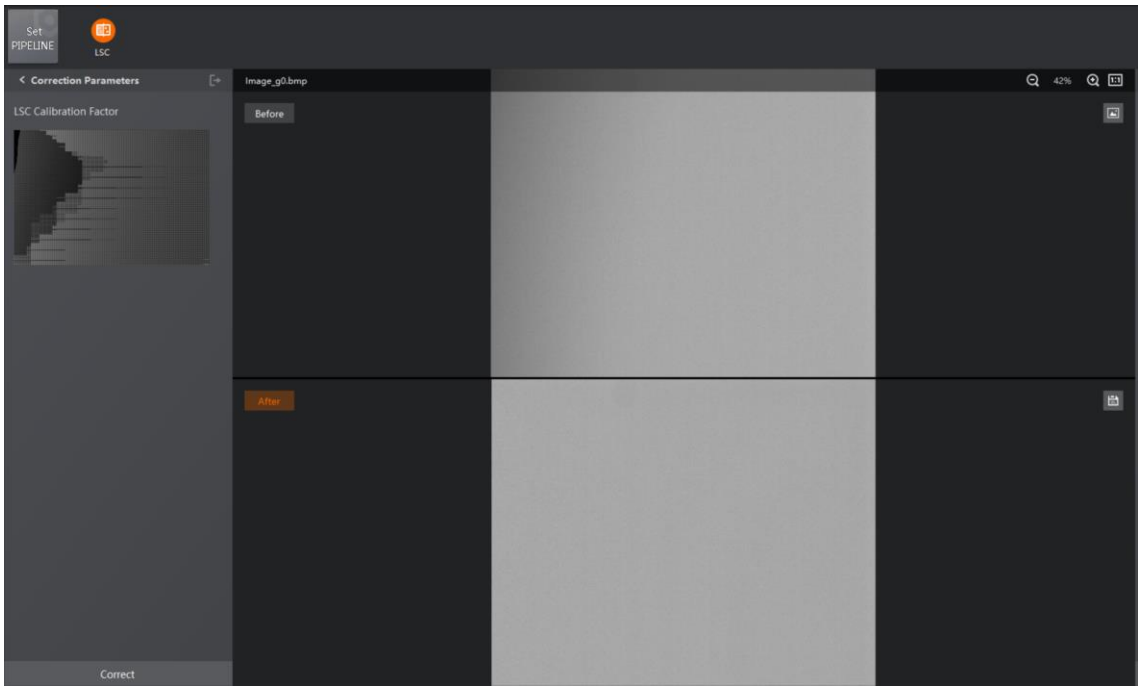
The local parameters will be displayed.

4. Optional: Check if the parameters have been configured correctly. If not, edit them.
5. Click **Correct**.

Note

The original image and its corrected version will be displayed.

6. Click **Next** or the next algorithm module in the **Set Pipeline** area to correct next module.



Correct the Image by Camera Parameters

If there are correction parameters in the camera that do not need changing again, you can correct the image by camera parameters.

Before You Start

Make sure that the camera has been connected to the Software (or an image has been imported into the Software) and the pipeline has been configured. See ***Configure the Pipeline*** for details.

Steps

1. Click the first algorithm module in the **Set Pipeline** area.
2. Click **Import Camera Parameters**.

Note

The camera parameters will be displayed.

3. Optional: Check if the parameters have been configured correctly. If not, edit them.

4. Click **Correct**.

Note

The original image and its corrected version will be displayed.

5. Click **Next** or the next algorithm module in the **Set Pipeline** area to correct next module.

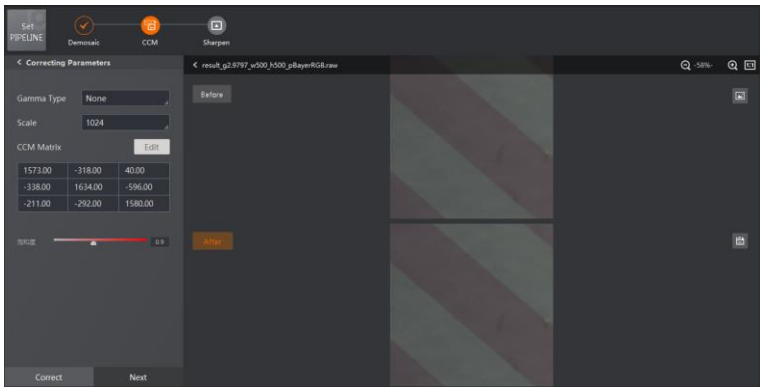


Figure 11-23 Image Correction by Camera Parameters

Correct Image by Calibration Parameters

You can conduct the calibration manually and use the calibration results to correct the image.

Before You Start

Make sure you have imported an image and configured the pipeline.

Steps

1. Select an algorithm in the pipeline.

Note

- You need to configure the algorithms from left to right successively.
- Not all algorithms support calibrating image manually.

2. Click **Manually Calibrate** to show the Calibration Parameters pane.

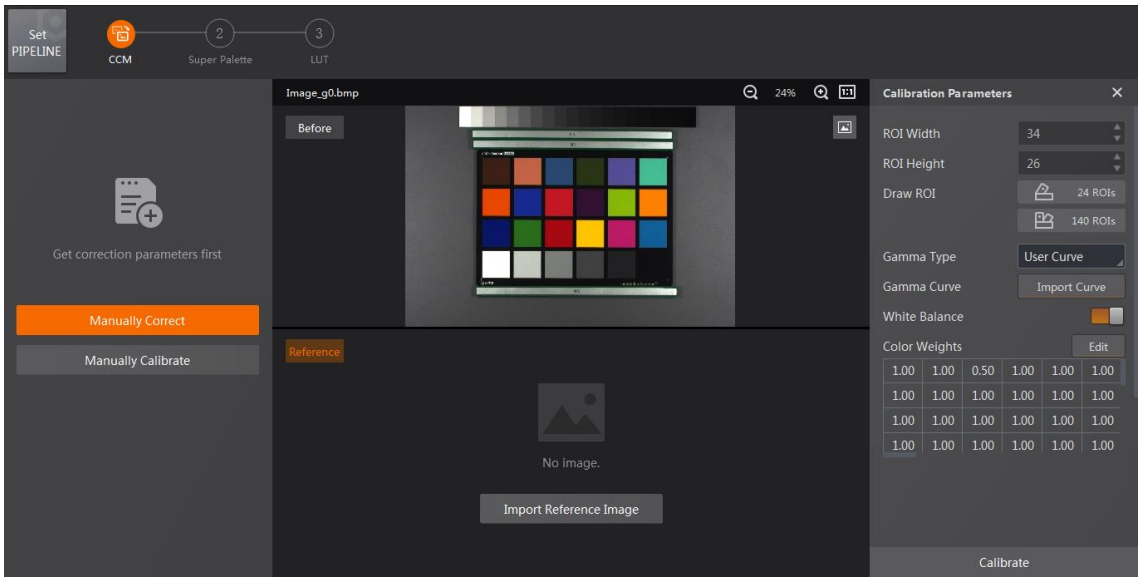


Figure 11-24 Calibration Parameters

3. Optional: Click **Import Reference Image** and select a reference image is needed.
4. Draw ROI(s)on the images.

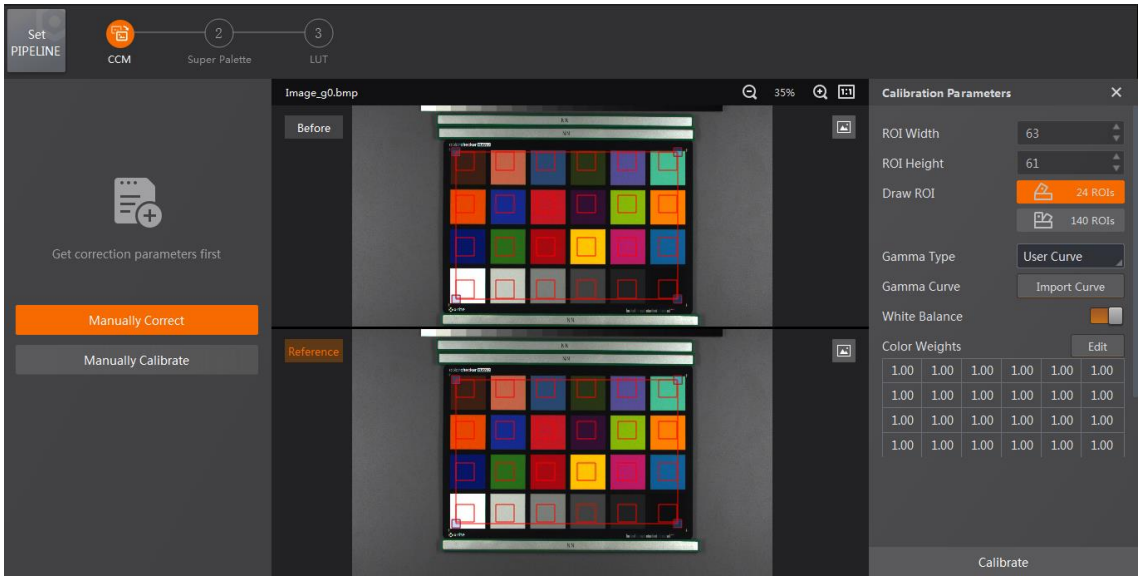


Figure 11-25 Draw ROI

Note

For custom ROI, if you want to change the image's position when drawing the ROIs, you can right-click the image to cause drawing, and then drag the image to change its position. After that, you can right-click the image again to continue drawing the ROIs.

5. Optional: Adjust the parameters according to your actual needs.

Note

Calibration parameters vary with different algorithms. See detailed descriptions in ***Algorithm Introduction***.

6. Click **Calibrate** and the correction parameters will be returned on the left.

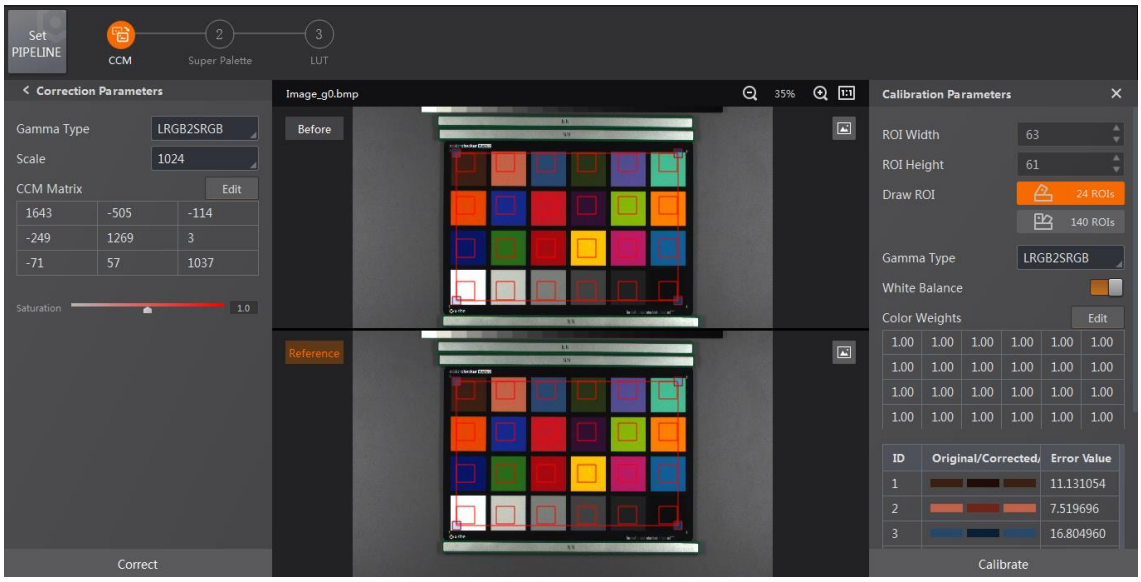


Figure 11-26 Correction Parameters

- The Software will generate correction parameters on the left panel.
- The Software will generate several images for calibration on the left of the calibration parameters.

7. Optional: Click to export the calibration file to the PC.
8. Optional: For DDS and denoise algorithms, click to add the original image as the first image for calibration.

Note

The Software will get the images' gain values via their names. If the name format of the images for calibration is not right, you should enter their gain values. You can click **Edit Gain** on the Calibration Parameters pane to edit the images' gain values.

9. Optional: Adjust the correction parameters according to your actual needs.
10. Click **Correct** and then you can see the original image, reference image, and corrected image altogether.

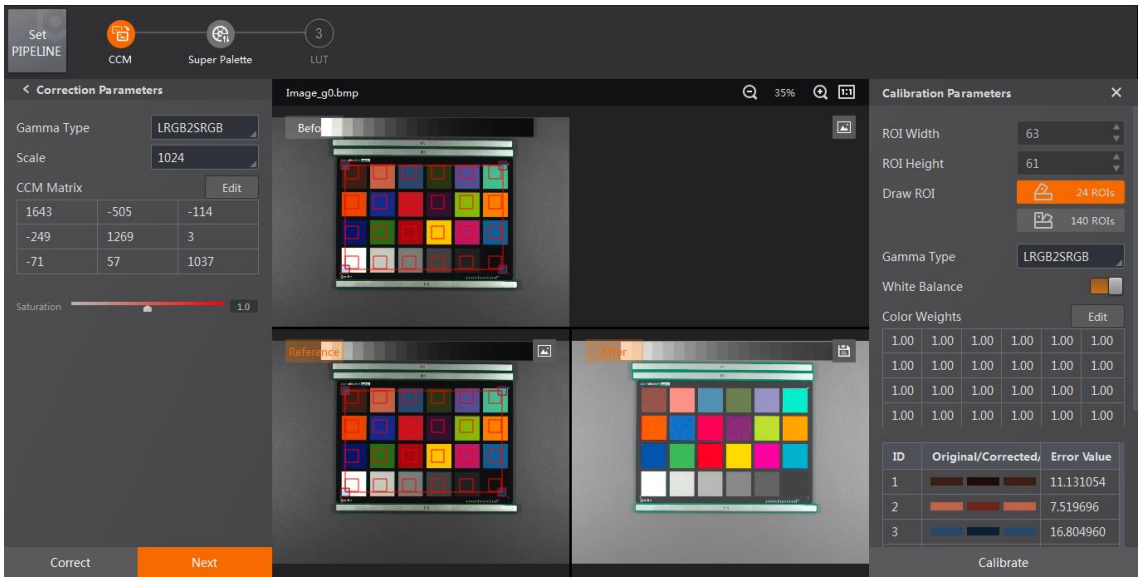


Figure 11-27 Correction Result

11. Optional: Click of the corrected image to save it to the PC.
12. Click **Next** to move on to the next algorithm downthe pipeline.

11.5.5 Other Functions

After correcting an image, you can preview the corrected image, save its correction parameters to the camera, and export the calibration parameters to the PC.

Export Correction Parameters

You can export the correction parameters (pipeline configuration) to the PC as an XML file.
Click on the tool bar to export the current pipeline configuration to the PC as an XML file.
You can quick configure the correction parameters of another camera by importing the pipeline configuration file.

Preview the Corrected Image

After correcting an image, you can preview its corrected version.
Once you configured all modules in the **Pipeline**, you can click in the quick access toolbar to preview the corrected image.
In the preview window, you can perform the following operations if needed.

Operation	How
Zoom Image	Click / to zoom in/out the image.
Display in Actual Size	Click to display the image in its actual size, and click to fit it to the size of the

Operation	How
	window.
Disable Modules	Cancel the selection of modules as required to see the corrected version only with the enabled modules.
Exit Preview	Click **Exit Preview** to return to the main window.
Save Parameters to Camera	Click **Save Parameters to Camera** and save the current pipeline and configurations into the connected camera.

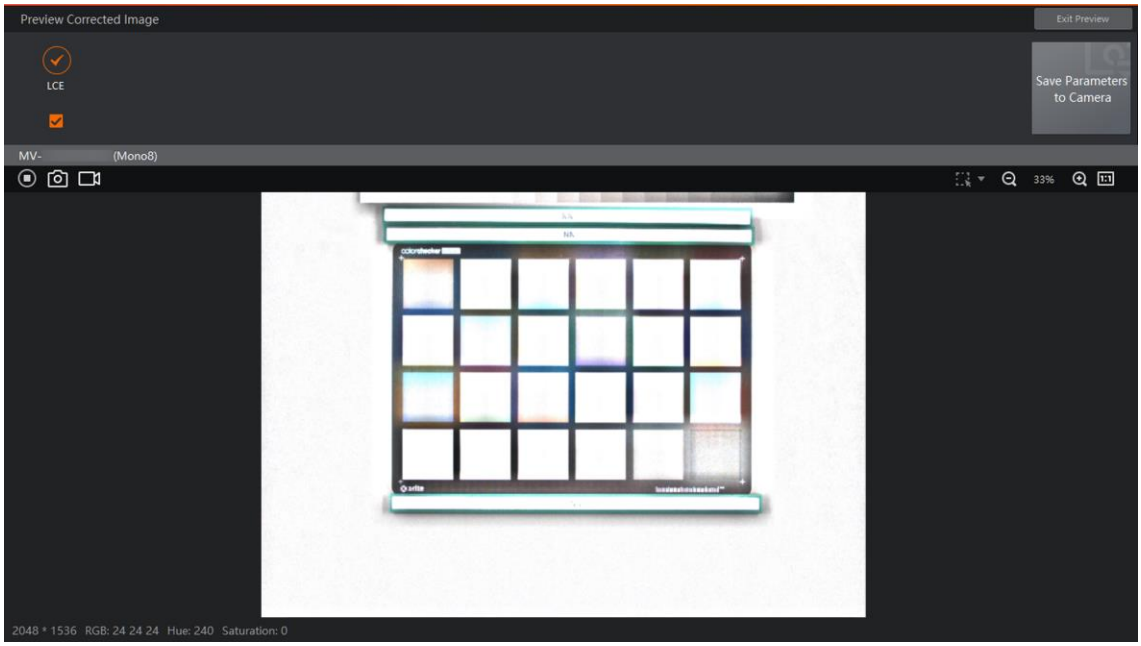


Figure 11-33 Preview the Corrected Image

Save Parameters to Camera

When you complete the correction process of the entire pipeline, you can save the parameters to the connected camera.
Click on the toolbar to write all parameters to the connected camera.

Note

The parameters of the simulated algorithms cannot be saved to the camera.

In the pop-up prompt, click **Confirm** to import all ISP configurations into the camera. Unsupported parameters will be saved to a local XML file.
Or click **Cancel** to save all ISP configurations to a local XML file.

Note

Modules marked with **Sim** cannot be imported to the camera.

11.6 Algorithm Introduction

The Software supports correcting an image by the following algorithms: lens shading correction (LSC), denoise, bayer interpolation (demosaic, DDS), color correction (CCM, CLUT, super palette, purple fringe correction), image enhancement (sharpness, LUT, contrast), and image scaling.

Note

The algorithms should be supported by the camera. If an algorithm is not supported by a camera, there will be a blue "Sim" tag in the upper right corner of the algorithm icon as is shown in the figure below.

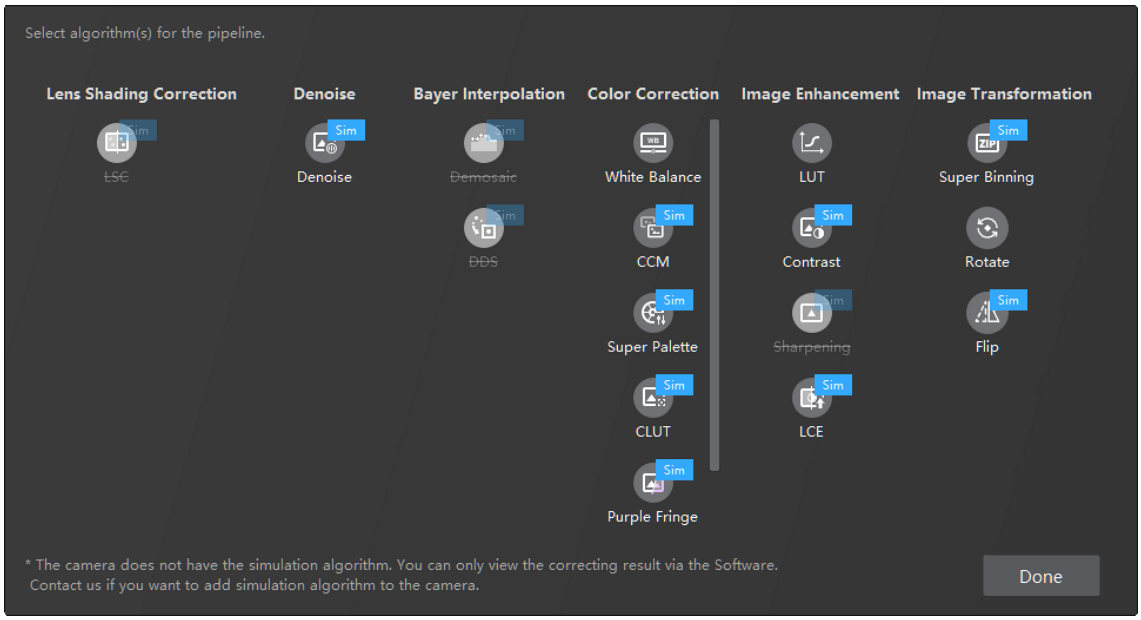


Figure 11-35 Pipeline Pane

Some algorithms supports encrypted cameras, while some supports unencrypted cameras. See the following table.

Algorithms Supporting Encrypted Cameras	Algorithms Supporting Unencrypted Cameras
DDS, CCM, CLUT, Purple Fringe, Super Palette, Noise Estimation, Denoise, SuperBinning	CFA, Sharpness, Contrast, LUT, LSC, Rotate, Flip

11.6.1 Lens Shading Correction (LSC)

Lens shading correction (LSC) is also known as vignetting correction. It is used to adjust an image's brightness or saturation toward the periphery compared to the center of the image.
You can do lens shading correction by uploading local parameters or manual calibration. If you choose the latter, you'll need to configure the following calibration parameters.

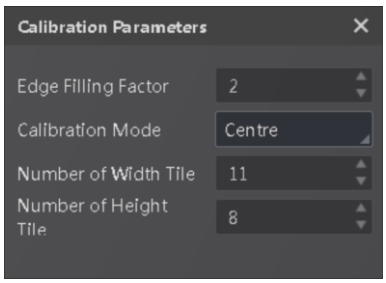


Figure 11-36 Lens Shading Correction

Edge Filtering Factor

Pad the edge around a pixel according to the configured coefficient.

Calibration Mode

The basis for lens shading correction. You can choose to correct the lens shading based on that of the center, the brightest area, or the target gray value.

Number of Width Tile / Number of Height Tile

These two parameters determine the accuracy of calibration. The greater the value, the higher the accuracy.

11.6.2 Denoise

You need to calibrate and correct the image when using the denoise algorithm.

Calibration Parameters

You can import multiple images of different gain values. You need to draw ROI for every image.

Draw ROI

You can select the type of ROI according to your actual needs.

: 24 ROIs

An ROI consists of 24 small ROIs in 6*4 format.

: 140 ROIs

An ROI consists of 140 small ROIs in 14*10 format.

: Single ROI

A single and rectangular ROI.

ROI Width/Height

When the size of 24 ROIs and 140 ROIs changes, the gap between each small ROI will also change but the width and height of the small ROIs will not change.

Correction Parameters

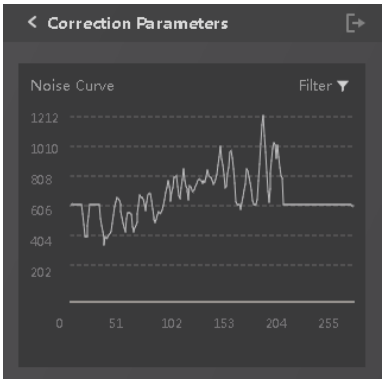


Figure 11-37 Denoise Correction Parameters

The noise calibration curve will be displayed. When calibrating multiple images, noise curves of different gain values will also be displayed at the same time. You can click **Filter** to hide or show the curves of certain gain values.
You can also draw a noise calibration curve manually. Click the red/green/blue lines to select a line; double-click a line to add a point to the line; drag the point to change the line's shape.

Note

The noise reduction parameters for the Bayer image and RGB image are different.

For Bayer Images

Noise Correction Factor

The fusion level of the noise reduction result and the original image. Range: 0 to 100.

Denoise Intensity

The higher the value, the stronger the noise reduction. Range: 0 to 32.

Sharpen Intensity

The higher the value, the higher the sharpness. Range: 0 to 1,280.

For RGB Images

Brightness Denoise Intensity

The higher the value, the stronger the brightness noise reduction. Range: 0 to 12,800.

Color Denoise Intensity

The higher the value, the stronger the chroma noise reduction. Range: 0 to 12,800.

Brightness

The fusion level of the brightness noise reduction result and the original image. Range: 0 to 128.

Color

The fusion level of the chroma noise reduction result and the original image. Range: 0 to 128.

11.6.3 Bayer Interpolation

Bayer Interpolation includes two algorithms: demosaic and DDS.

Demosaic

Demosaic corrects images by importing local parameters without calibration.
Click **Import Local Parameters**, and select a interpolation method according to your actual needs. **NEAREST** corrects images with the highest speed. **CFA_NH_II** provides the best correction quality.

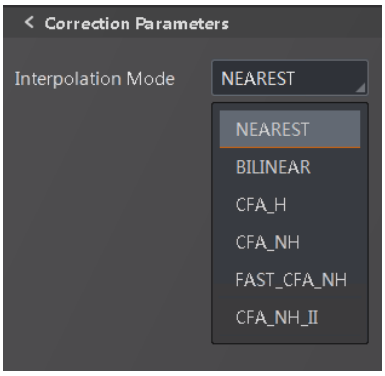


Figure 11-38 Select a Method

DDS

DDS refers to the combination algorithm of demosaic, denoise, and sharpeness. DDS supports correcting the image by local parameters or correcting the image by calibration

parameters.

Calibration Parameters

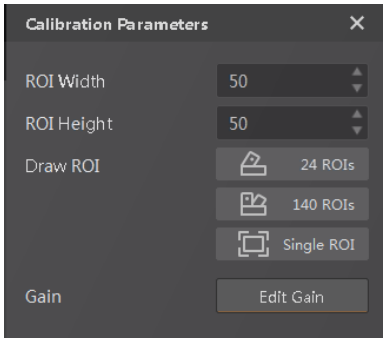


Figure 11-39 Calibration Parameters

Draw ROI

The Software provides two types of ROI, users can select according to their actual needs.

24 ROIs

An ROI consists of 24 small ROIs in 6*4 format.

140 ROIs

An ROI consists of 140 small ROIs in 14*10 format.

Single ROI

One ROI in rectangle. Users can drag its edge to change its size.

ROI Width/Height

The width or height of a single ROI or the small ROIs in the 24 ROIs and 140 ROIs. When the size of 24 ROIs and 140 ROIs changes, the gap between each small ROI will also change but the width and height of the small ROIs will not change.

Gain

Click **Edit Gain** to edit the gain values of the images for calibration.

Correction Parameters

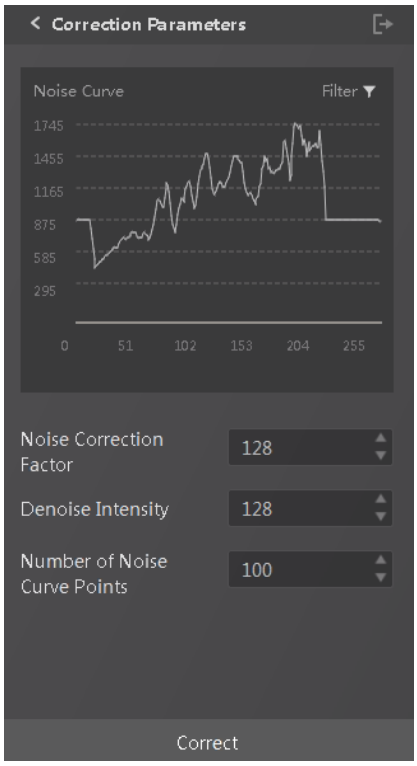


Figure 11-40 Correction Parameters

On the Correction Parameters page, the noise curve is displayed. When multiple images are used when calibratingan image manually, multiple noise curves with different gain values will be displayed. You can click **Filter** to select gain values for filtering different noise curves.

Noise Correction Factor

The combination of the denoise result with the original image. It should range from 0 to 12800.

Denoise Intensity

The higher the denoise strength, the moreobvious the denoise result.

Number of Noise Curve Points

The number of points consisting the noise curve.

11.6.4 Color Correction

The color correction includes the following algorithms: CCM, CLUT, super palette, and purple fringe.
The color correction only supports correcting images in RGB format. When the image format is Bayer, you can convert the image into RGB format by the Bayer Interpolation first.

White Balance

The White Balance module supports correcting the color cast of images, and making colors of images similar to what human eyes observe.
Correct the image after calibration, or click **Correct** to skip the calibration and set the correction parameters.

Calibration Parameters

Click **24 ROI**, draw the ROI on the picture, and set **ROI Width** and **ROI Height** to adjust the ROI.
Set more parameters:

Manually Color Set

None

Disable the color set.

Original Color

Click **Original Color** and select a file in TXT format to import. Or click **Add Row** to add more original colors.

Note

- For the file in TXT format, you should enter a color in a row in RGB format, and no empty row is allowed.
- Click **Delete Row** to delete the needed row.

Cali Method

Select from AVG and SOLVE.

Scale

For easier calculation, set the scale to change the corresponding integer RBG in the **Matrix**.

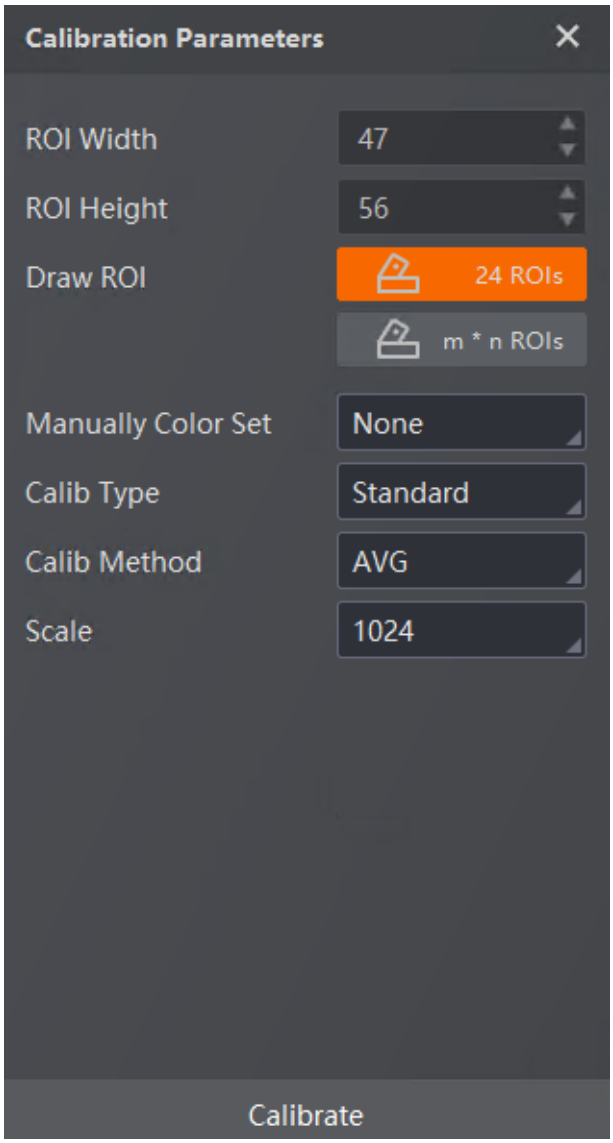


Figure 11-44 Calibration Parameters of White Balance

Correction Parameters

Scale

The same as that of the calibration parameters.

Matrix

Click **Edit** to edit the values of R, G, and B.

Note

If you set the **Scale** to 1, the values of R, G, and B in the **Matrix** can be float numbers.

Figure 11-45 Correction Parameters of White Balance

CCM

CCM (color correction matrix) supports correcting the image by local parameters or correcting the image by calibration parameters.

Calibration Parameters

Click **24 ROI**, draw the ROI on the picture, and set **ROI Width** and **ROI Height** to adjust the ROI.

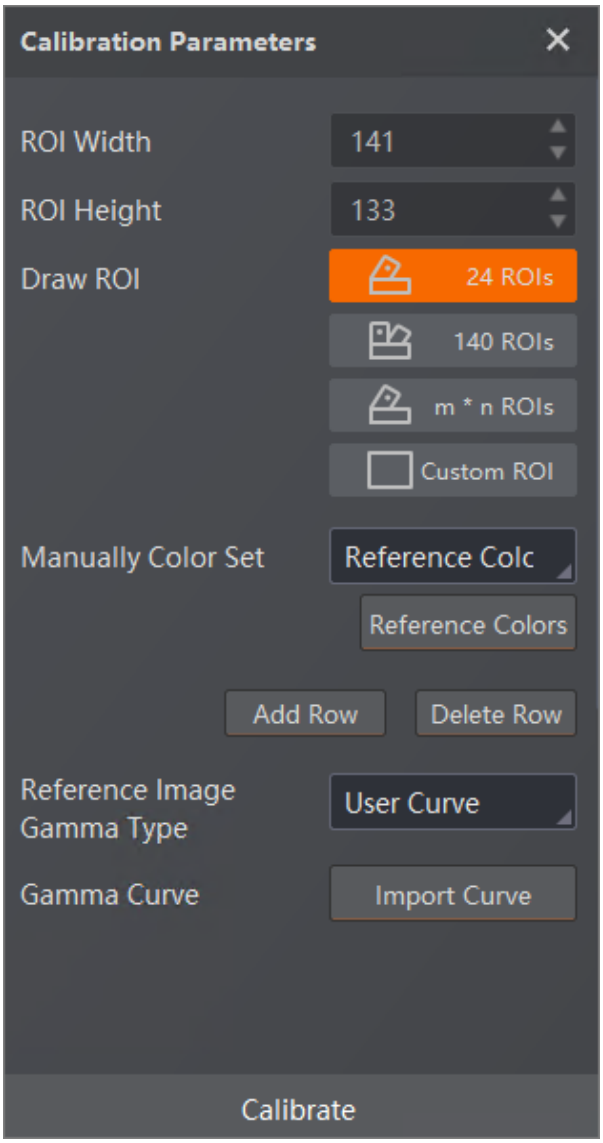


Figure 11-46 Calibration Parameters

Draw ROI

The Software provides two types of ROI, you can select according to their actual needs.

24 ROIs

An ROI consists of 24 small ROIs in 6*4 format.

140 ROIs

An ROI consists of 140 small ROIs in 14*10 format.

ROI Width/Height

The width or height of a small ROI in the 24 ROIs and 140 ROIs. When the size of 24 ROIs and 140 ROIs changes, the gap between each small ROI will also change but the width and height of the small ROIs will not change.

Gamma Type

None

Disable Gamma.

User Value

Customize the value of Gamma.

User Curve

Import a Gamma curve file into the Software.

LRGB2SRGB

The value of Gamma is generated by the Software's algorithm.

Gamma Value

If you select **User Value** as the Gamma type, you should enter the Gamma value here. The value should range from 0.1 to 3.9.

Gamma Curve

If you select **User Curve** as the Gamma type, you should click **Import** to import a local Gamma curve file into the Software.

White Balance

If you enable this, the Software will adjust the white balance of the image automatically.

Color Weight

Click **Edit** to edit the weight of different colors.

Correction Parameters

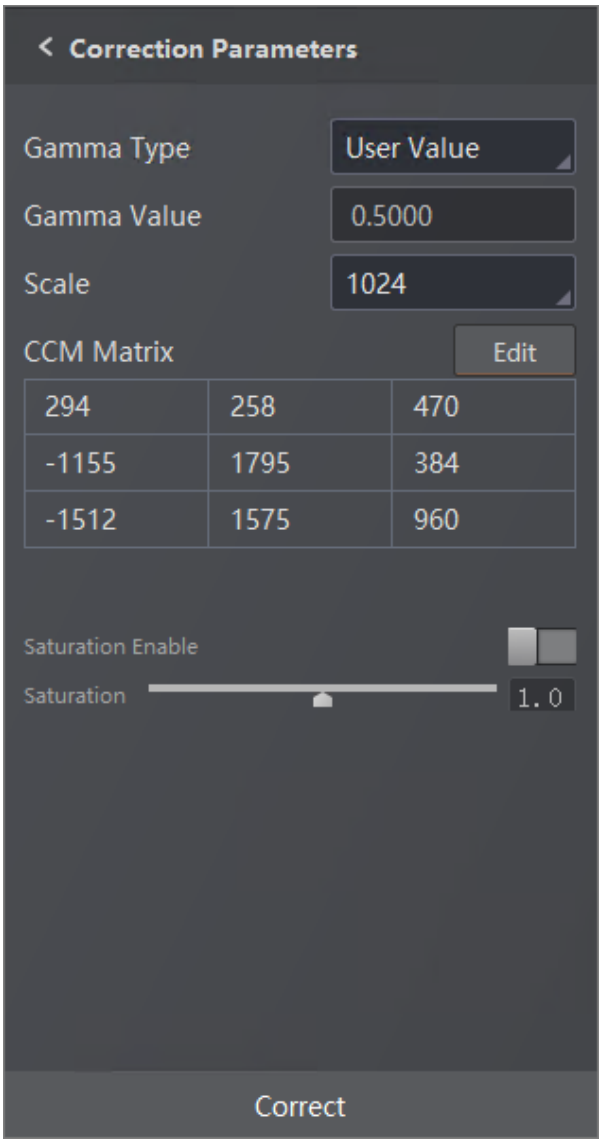


Figure 11-47 Correction Parameters

Gamma Type

None

Disable Gamma.

User Value

Customize the value of Gamma.

User Curve

Import a Gamma curve file into the Software.

LRGB2SRGB

The value of Gamma is generated by the Software's algorithm.

Scale

It changes the values in the CCM matrix into integers for a quick calculation. After you enter the Scale, the values in the CCM matrix will change into integers.

CCM Matrix

Click **Edit** to edit the values of R, G, and B.

Note

If you set the **Scale** to 1, the values of R, B, and G in the **Matrix** can be float numbers.

Saturation Enable

After it is enabled, you cannot edit **Scale** and **CCM Matrix**. You can drag the slider to change the saturation of the whole image. When the saturation changes, the values in the CCM matrix will also change.

Super Palette

You need to calibrate and correct the image when using the super palette algorithm.

Calibration Parameters

Draw ROI

You can select the type of ROI according to your actual needs.

: 24 ROIs

An ROI consists of 24 small ROIs in 6*4 format.

: 140 ROIs

An ROI consists of 140 small ROIs in 14*10 format.

: Custom ROI

Multiple rectangular ROIs.

Correction Parameters

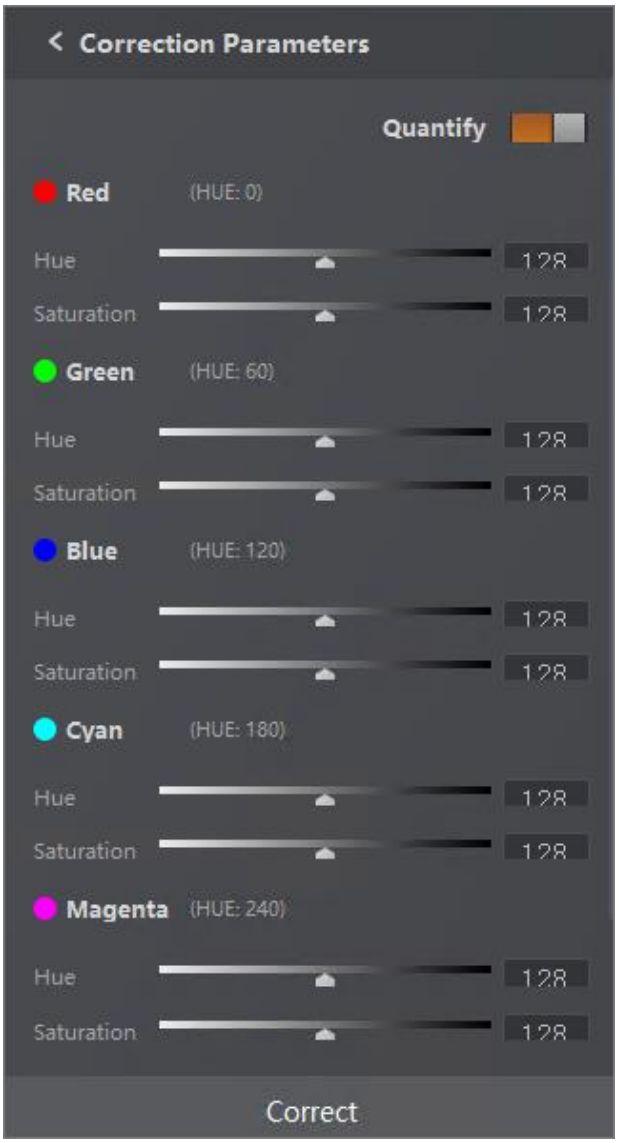


Figure 11-48 Correction Parameters of Super Palette

You can adjust the tone and saturation of each color.

CLUT

You need to calibrate and correct the image when using the CLUT algorithm.

Calibration Parameters

Draw ROI

You can select the type of ROI according to your actual needs.

: 24 ROIs

An ROI consists of 24 small ROIs in 6*4 format.

: 140 ROIs

An ROI consists of 140 small ROIs in 14*10 format.

: Custom ROI

Multiple rectangular ROIs.

Gamma Type

None

Disable Gamma.

User Value

Customize the value of Gamma.

User Curve

Import a Gamma curve file into the Software.

LRGB2SRGB

The value of Gamma is generated by the Software's algorithm.

Gamma Value

If you select **User Value** as the Gamma type, you should enter the Gamma value here. Range: 0.1 to 3.9.

Gamma Curve

If you select **User Curve** as the Gamma type, click **Import** to import a local Gamma curve file into the Software.

Scale

Convert the values in the CLUT matrix into integers.

Smooth Factor

The value will affect the CLUT correction range. Range: 1 to 100.

Correction Parameters

Gamma Type

Refer to the description in the Calibration Parameters.

Purple Fringe

Purple fringe is used to correct the purple color in high contrast boundary areas in an image.
Click **Import Local Parameters** to set the following parameters.

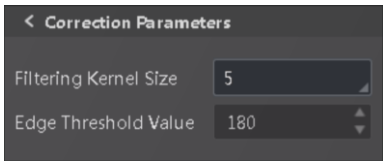


Figure 11-49 Purple Fringe Correction

Filtering Kemel Size

The range of pixels for purple fringe correction.

Edge Threshold Value

Pixels outside the configured edge threshold will not be corrected.

Gamma

The Gamma module supports setting nonlinear tone-mapping for images.
Calibration is not necessary for the Gamma module, click **Correct** to start.

Correction Parameters

Gamma Type

None

Disable Gamma.

User Value

Customize the value of Gamma.

User Curve

Import a Gamma curve file into the Software.

Gamma Curve

Click **Import Curve** to import a Gamma curve file from the local PC.

Note

Contact the technical supports to get the Gamma curve file.

LRGB2SRGB

The value of Gamma is generated by the Software's algorithm.

SRGB2LRGB

The value of Gamma is generated by the Software's algorithm.

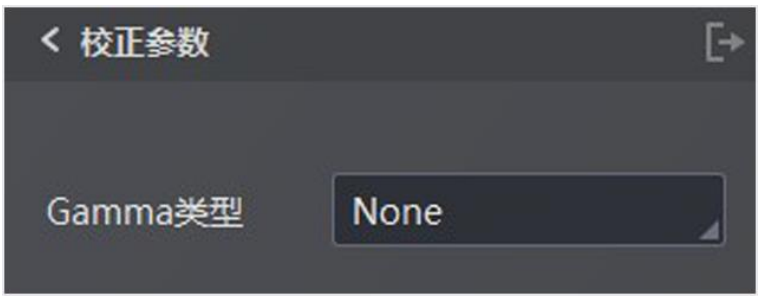


Figure 11-50 Correction Parameters of Gamma

11.6.5 Image Enhancement

The image enhancement algorithms include LUT, sharpness correction, and contrast correction.

LUT

You can use Look-Up Table (LUT) to map the input gray scale values to corresponding output values based on a predefined gray scale mapping.

Gamma

Set the Gamma value to achieve nonlinear color mapping. The value ranges from 0 to 100.

Contrast

It ranges from ***-1*** to ***1***. ***0*** indicates that the contrast does not change. The value less than 0 indicates that the contrast is lowering. The value greater than 0 indicates that the contrast is increasing.

Brightness

It ranges from ***-1*** to ***1***. ***0*** indicates that the brightness does not change. The value less than 0 indicates that the reduced brightness. The value greater than 0 indicates that the increased brightness.

LUT Line Type

There are four LUT line types: Adaptive, Fold Line, Curve, and Free Line. For the Adaptive type, a LUT line will be generated according to **Gamma**, **Contrast**, **Brightness** you enter, and you cannot customize the adaptive LUT line. For the Fold Line and Curve types, double click on the point you want to edit and drag. For the Free Line type, simply click on the desired point and drag.

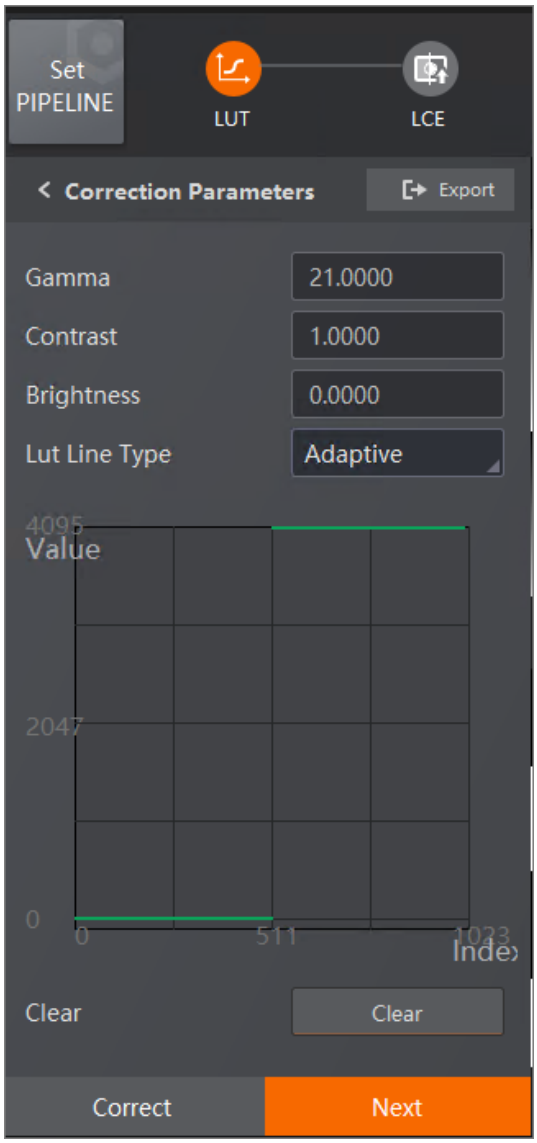


Figure 11-58 Correction Parameters

Contrast

You can correct the contrast of an image.
Click **Import Local Parameters** to set the following parameter.

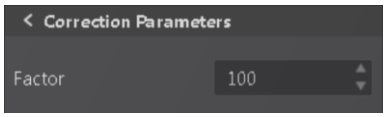


Figure 11-59 Contrast Correction

Factor

The value of this parameter ranges from 1 to 10,000. The greater the value, the stronger the contrast.

Sharpness

You can correct the sharpness of an image.
Click **Import Local Parameters** to set the following parameters.

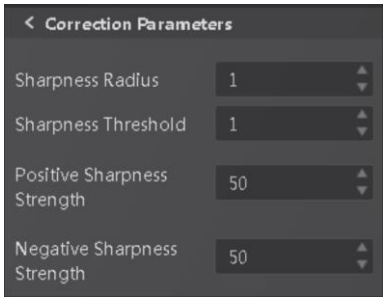


Figure 11-60 Sharpness Correction

Sharpness Radius

The value of this parameter ranges from 1 to 21. The greater the value, the longer it takes for correction.

Sharpness Threshold

The value of this parameter ranges from 0 to 255. Any value exceeding this range will not be processed.

Positive Sharpness Strength / Negative Sharpness Strength

The intensity level of positive/negative sharpness correction.

Local Contrast Enhancement

To improve the overall balance of light and dark tones in an image in low-light and uneven lighting situations, you can use adaptive local contrast enhancement to enhance the brightness of darker areas while maintaining the brightness of brighter areas unchanged. The parameters of Local Contrast Enhancement (LCE) are as follows.

Bilateral Filtering Size

This parameter is a technique used for local contrast enhancement by combining bilateral filtering with contrast enhancement. In this method, a filter is applied to each pixel of the image, taking into account both spatial distance and intensity similarity. The filter calculates the average contrast of the pixels within a defined window around each pixel and adjusts the brightness of the pixels based on this average contrast value. The value ranges from 3 to 41.

LCE SigmaD

It refers to the standard deviation of Gaussian blur, which ranges from 100 to 10,000. It means the amount of blur or smoothing applied to an image when using a Gaussian filter. It controls the size of the blur kernel and determines how much neighboring pixels contribute to each pixel during the blurring process. A higher standard deviation leads to a more pronounced blurring effect, which can be useful in reducing noise or creating a

softer appearance. Conversely, a lower standard deviation preserves more image details and produces a less pronounced blur.

LCE SigmaR

A larger standard deviation makes the bilateral filter's range weights more expansive, considering a wider range of color differences. Conversely, a smaller standard deviation makes the filter's weights more localized to nearby colors. This value ranges from 1,000 to 20,0000.

Gamma

A higher gamma value may be suitable for images with low contrast or dull appearance, while a lower gamma value can be useful for reducing harsh contrast or preserving fine details in high-contrast images. This value ranges from 1 to 10,000.

Texture Enhancement Level

This parameter is used to control the degree of texture enhancement when applying the LCE algorithm on a texture image. A higher value will enhance the contrast of the texture, making the details more distinct and prominent. Conversely, a lower value will weaken the enhancement effect, resulting in a more soft and natural image. This value ranges from 0 to 1,280.

LCE FuseSP

This parameter refers to a point on a curve where the left and right sides have the same weight value and are symmetrically positioned. In brightness adjustment, if the weight value of a symmetric point increases, the pixel values on the left and right sides of that point will be enhanced with weighted value, thereby increasing the brightness of the image. The value ranges from 0 to 4,095.

Brightness Enhancement Level

This parameter is used to control the level of brightness enhancement in an image. A smaller value will result in a greater increase in image brightness. The value ranges from 0 to 256.

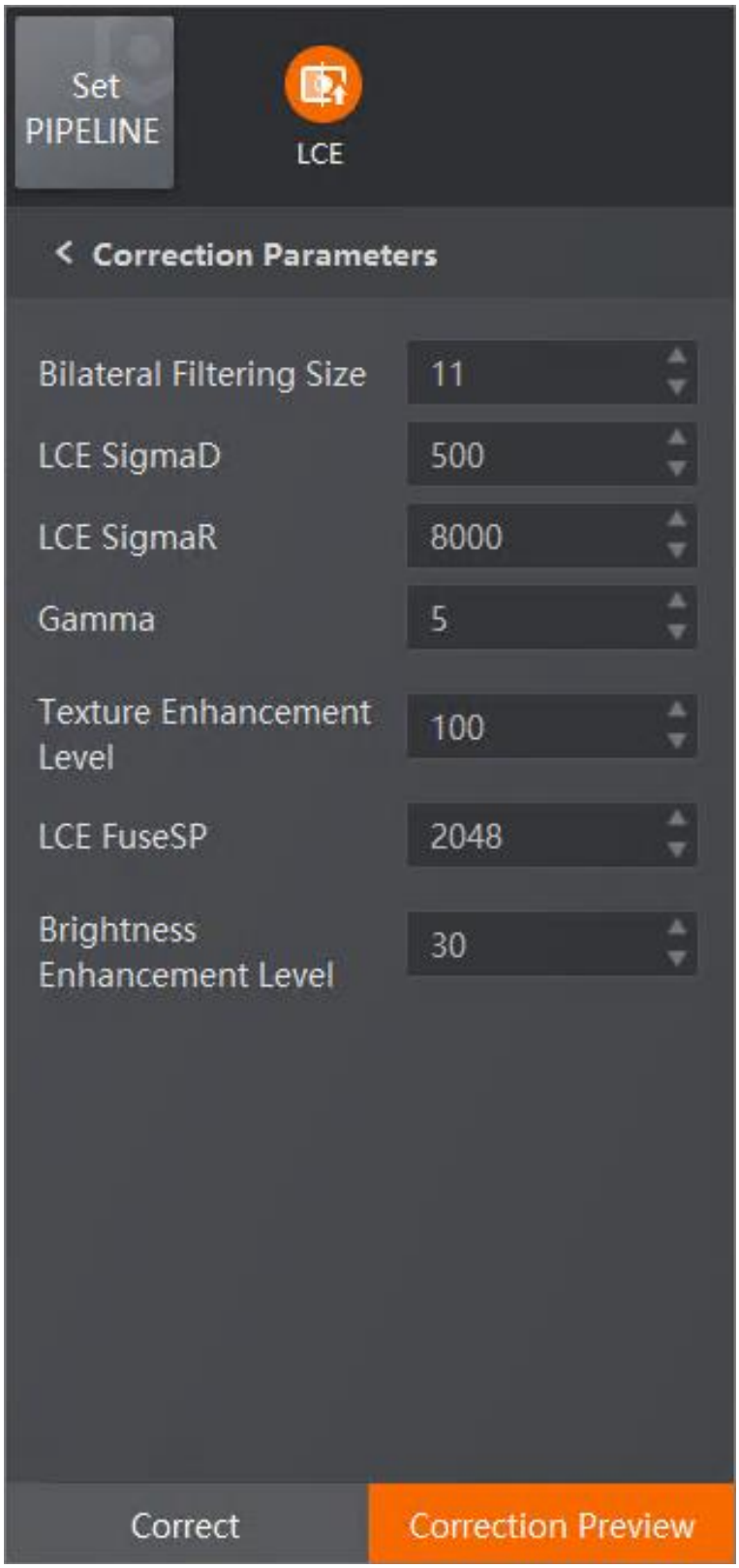


Figure 11-61 LCE Parameters

11.6.6 Image Transformation

Modules in image transformation are for image preprocessing. You can use the module as required to modify the display of the acquired image.

Super Binning

You can use the **Super Binning** algorithm to combine the adjacent pixels of the image to create a smaller version while keeping the overall image quality.

Scale

Range: 1,000 (original size) to 2,800 (minimum size).

Rotate

You can use the **Rotate** module to rotate the acquired images.

Rotation Angle

Set the rotation angle degree of the image.

Flip

You can use the **Flip** module to rotate the acquired images.

Flip Type

Select to flip the image horizontally or vertically.

Note

The module only supports Mono8, RGB24 and BGR24 image format.

11.7 FAQ

You can refer to the topics below if you encounter the problems described in the following frequently asked questions.

11.7.1 No GigE Vision camera is enumerated after running the Software.

Question

What can I do if no GigE Vision camera is enumerated after running the Software?

Possible Cause

The camera is not properly started or the network cable not properly connected.

Solution

Check the power supply of the camera (by checking PWR indicator) and network connection (by checking Link light in LAN interface).

11.7.2 No USB3 Vision camera is enumerated after running the Software.

Question

What should I do if no USB3 Vision camera is enumerated after running the Software?

Possible Cause

The camera is not properly started or USB line wiring exception.

Solution

Check if the LED indicator of the camera is in normal status.

11.7.3 Live view shows black image.

Question

What should I do if live view shows black image?

Possible Causes

- Cause 1: Iris of the camera lens is closed.
- Cause 2: Camera exception.

Solutions

- For Cause 1, open the aperture of the lens.
- For Cause 2, power off and reboot the camera.

11.7.4 Acquisition works fine. But when the trigger signals are provided by external device, no image is triggered.

Question

What should I do if no image is triggered (although acquisition works fine) when the trigger signals are provided by external device?

Possible Causes

- Cause 1: Certain trigger mode is not activated, or the rigger source is incorrectly selected.
- Cause 2: External device wiring error.

Solutions

For Cause 1, check if the camera trigger mode of the current application scenario and the related line input is normal.
For Cause 2, make sure that the wiring of the external device is normal.

11.7.5 All the parameters on each algorithm page are displayed as -1, and the default range of the parameters is -1 to 1.

Question

All the parameters on each algorithm page are displayed as -1, and the default range of the parameters is -1 to 1.

Possible Cause

An error occurs in the imported pipeline file.

Solution

Import the pipeline again.

Chapter 12 Legal Information

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.

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