



# **MVS Client Software**

**User Manual**

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# Chapter 1 Overview

## 1.1 Introduction

MVS Client (hereafter simplified as “the Client”) is designed by Hikrobot for controlling and managing the machine vision cameras (including GigE Vision cameras and USB3 Vision cameras) in your Vision system.

The Client allows you to batch export and import features of different cameras via multiple methods, providing great convenience for camera feature configuration in different usage scenarios. Not just a controller, it also receives streaming data and allows you to view the live view of cameras. While viewing the live view, you can adjust the image quality, as well as save the captured pictures, recorded videos, and camera feature settings.

With the Client, you can determine the optimal settings for your Vision system.

## 1.2 Key Features

- **Interface for Better User Experience:** Provide clear and simple user interfaces.
- **Multiple Camera Live View:** Support setting window division and viewing the live videos of multiple cameras simultaneously.
- **Multiple Tools:** Integrated with multiple tools for convenient configuration and management of the cameras and the PC system.

## 1.3 System Requirements

### *Purpose:*

Make sure the computer on which you install the Client at least meets the minimum requirements listed below.

### 1.3.1. Recommended

- **Operating System:** Ubuntu 12.04/14.04/16.04/18.04 (32-bit and 64-bit), CentOS 7 (32-bit and 64-bit), Red Hat Enterprise Linux 7 (64-bit)
- **CPU:** Intel Pentium IV 3.0 GHz or above
- **Memory:** 4G or above
- **USB Interface:** USB 3.0
- **Network Adapter:** Intel Pro 1000, I210 or I350 series
- **Display Resolution:** 640 X 480 or above

### 1.3.2. Minimum

- **Operating System:** Ubuntu 12.04/14.04/16.04/18.04 (32-bit and 64-bit), CentOS 7 (32-bit and 64-bit), Red Hat Enterprise Linux 7 (64-bit)
- **CPU:** Intel Pentium IV 2.0 GHz
- **Memory:** 1G
- **USB Interface:** USB 2.0
- **Network Adapter:** Intel Pro 1000, I210 or I350 series
- **Display Resolution:** 640 X 480 or above

## 1.4 Revision History

Doc. ID Number	Date	Version	Changes
UD16808B	17 <sup>th</sup> Oct. 2019	V2.0.0	<ul style="list-style-type: none"> <li>● Supports automatically saving the captured pictures and recorded video footage to the default saving path you configured. See <i>Capture and Recording Settings</i> for details.</li> <li>● Supports configuring packet resending to ensure image quality during acquisition. See <i>Resend Packet</i> for details.</li> <li>● Supports configuring keyboard shortcuts. See <i>Shortcut</i> for details.</li> <li>● Supports connecting camera to the Client by command. See <i>Connect Camera by Command</i> for details.</li> <li>● Supports multicast settings. See <i>Multicast Settings</i> for details.</li> <li>● Supports Event Monitor which is a tool for determine causes of device exception. For details, see <i>Use Event Monitor to Determine Causes of Issues</i>.</li> <li>● Supports displaying feature tree, common features, trigger related features, and image processing features. For details, see <i>Camera Feature Configuration</i>.</li> <li>● Supports displaying exporting or importing camera features. See <i>Export or Import Camera Features</i> and <i>Batch Export or Import Camera Features</i> for details.</li> <li>● Supports file access. For details, see <i>File Access</i>.</li> <li>● Supports customizing window division for the live view window. See <i>Customize</i></li> </ul>

Doc. ID Number	Date	Version	Changes
			<p><i>Window Division</i> for details.</p> <ul style="list-style-type: none"> <li>● Supports acquisition and live view in in multiple-window mode. See <i>Acquisition and Live View in Multiple-Window Mode</i> for details.</li> <li>● Supports multiple cameras acquisition and live view in 1-window mode. See <i>Multiple Cameras Acquisition and Live View in 1-Window Mode</i> for details.</li> <li>● Supports configuring cross line for adjusting the position of the object in the view. See <i>Set Cross Line</i> for details.</li> <li>● Supports GigE Vision action command. See <i>GigE Vision Action Command</i> for details.</li> <li>● Supports viewing PC system information. See <i>View PC System Information</i> for details.</li> <li>● Supports viewing SDK logs via the tool called Log Viewer. See <i>SDK Logs</i> for details.</li> </ul>
UD08115B	17 <sup>th</sup> Nov. 2017	V1.0.0	The first version



# Chapter 2 Installing and Running the Client

## 2.1. Select Installation Package

Before installation, you should select the installation package based on your computer system.

Computer System	Supported Installation Package
Ubuntu 12.04/14.04/16.04/18.04 (32-bit)	<ul style="list-style-type: none"> <li>● CPU Architecture: i386</li> <li>● Installation Package Format: deb</li> </ul> Example: MVS-2.00_i386_20190929.deb
Ubuntu 12.04/14.04/16.04/18.04 (64-bit)	<ul style="list-style-type: none"> <li>● CPU Architecture: amd64</li> <li>● Installation Package Format: deb</li> </ul> Example: MVS-2.00_x86_64_20190929.deb
Ubuntu 12.04/14.04/16.04/18.04 (32-bit), CentOS 7 (32-bit)	<ul style="list-style-type: none"> <li>● CPU Architecture: i386</li> <li>● Installation Package Format: tar.gz</li> </ul> Example: MVS-2.0.0_i386_20190929.tar.gz
Ubuntu 12.04/14.04/16.04/18.04 (64-bit), CentOS 7 (64-bit), Red Hat Enterprise Linux 7 (64-bit)	<ul style="list-style-type: none"> <li>● CPU Architecture: amd64</li> <li>● Installation Package Format: tar.gz</li> </ul> Example: MVS-2.0.0_X86_64_20190929.tar.gz

## 2.2. Install the Client

You can install the Client in two methods:

- **For deb Installation Package**

**Steps:**

1. Get the root permission.
2. Execute the command `dpkg -i *****.deb`.

**Note:** \*\*\*\*\* here represents the name of the installation package. Take the installation package “MVS-2.00\_i386\_20190929.deb” for an example, the command is `dpkg -i MVS-2.00_i386_20190929.deb`.

- **For tar.gz Installation Package**

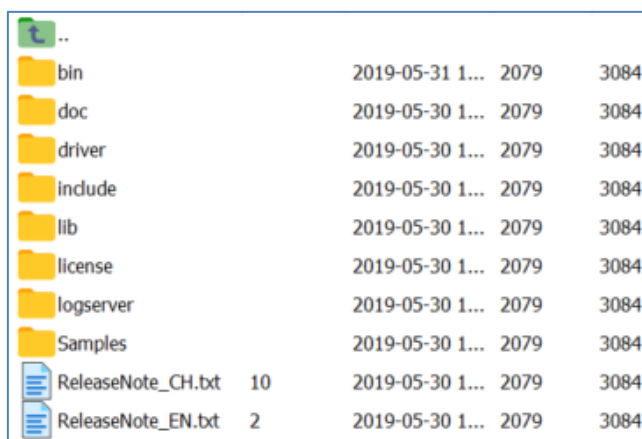
**Steps:**

1. Get the root permission.
2. Decompressing the installation package you select.
3. Execute the command `cd *****`.

**Note:** \*\*\*\*\* here represents the name of the decompressed package.

4. Execute the command `./setup.sh`.

After installation, you can check the files in the installation directory.



..				
bin		2019-05-31 1...	2079	3084
doc		2019-05-30 1...	2079	3084
driver		2019-05-30 1...	2079	3084
include		2019-05-30 1...	2079	3084
lib		2019-05-30 1...	2079	3084
license		2019-05-30 1...	2079	3084
logserver		2019-05-30 1...	2079	3084
Samples		2019-05-30 1...	2079	3084
ReleaseNote_CH.txt	10	2019-05-30 1...	2079	3084
ReleaseNote_EN.txt	2	2019-05-30 1...	2079	3084

The functions of each file in the installation directory is shown below:

File Name	Description
bin	Contain all the executable programs of MVS.
doc	Contain text information about the client software.
driver	Contain driver related information.
Include	Contain all the header files required for software development.
lib	Contain software development library (so file).
license	Contain license related information.
logserver	Contain log service related scripts.
Samples	Contain software development demo.
ReleaseNOTE_CH.txt	Contain the Chinese version release note.
ReleaseNote_EN.txt	Contain the English version release note.

## 2.3. Run the Client

### **Purpose:**

After installation, perform the following steps to run the Client.

### **Steps:**

1. Open the terminal.
2. Execute the command `cd /opt/MVS/bin`.  
**Note:** The Client is installed in the directory /opt/MVS by default. Please do not move the MVS file to other directories.
3. Execute the command `./MVS.sh` to run the Client.

## 2.4. Uninstall the Client

### **Purpose:**

You can uninstall the Client in two methods.

#### ● Method 1

### **Steps:**

1. Execute the script `/opt/MVS/logserver/RemoveServer.sh`.
2. Delete all files in /opt/MVS.

- **Method 2**

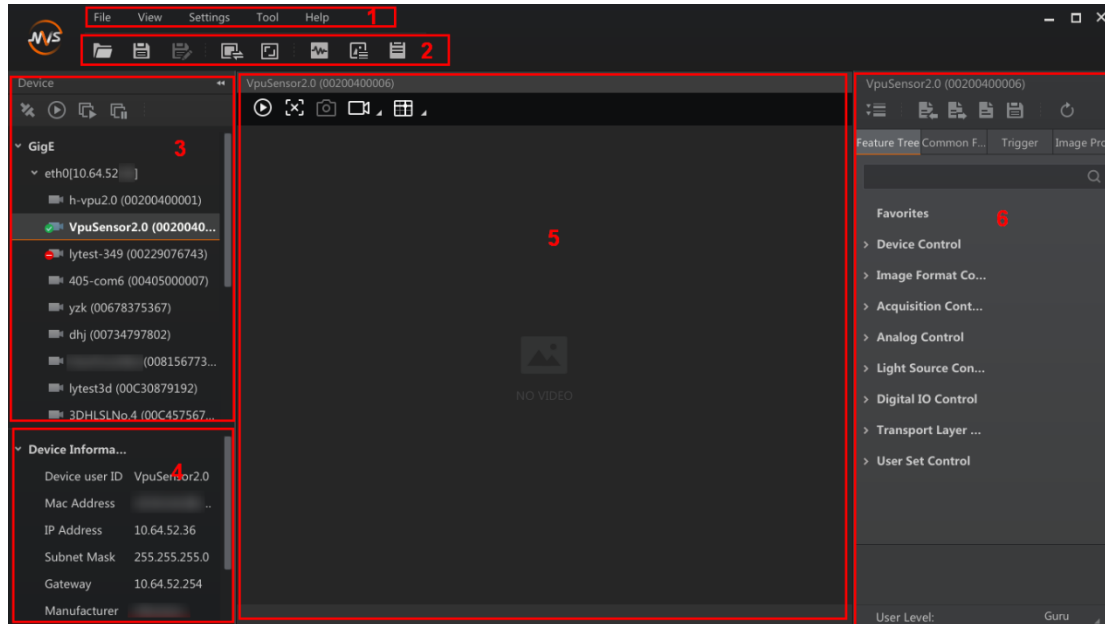
**Note:** The method is only supported by installation package of deb format.

**Steps:**

1. Get the root permission.
2. Execute the command *dpkg -r MVS*.

## Chapter 3 Interface Introduction

The main window of the Client is shown as follows.



No.	Area Name	Description
1	Menu Bar	Function modules including File, View, Camera, Setting, Tool, and Help.
2	Control Toolbar	The control toolbar which provides functions such as window division, full screen mode, and logs.
3	Device List Panel	Display the GigE Vision cameras and USB3 Vision cameras. And provide icons for connecting/disconnecting camera, start/stop acquisition, and refreshing device list.
4	Interface and Device Information Panel	Display the network interface information and the device information.
5	Display Window	View the live video of the selected camera(s).
6	Feature Panel	View and configure features of the selected camera, and perform other operations such as importing, exporting, and saving features.

# Chapter 4 Environment Configuration

## Purpose:

Before further operations such as camera feature configuration, you should configure the running environment for the Client to ensure stability and fluency of Client running and image transmission.

## 4.1 Turn off Firewall

### Purpose:

To ensure the stability of Client running and the enumeration of local cameras, disable the PC's firewall before running the Client.

- For Ubuntu 12.04/14.04/16.04/18.04 (32-bit and 64-bit), execute the command `ufw disable` to turn off the fire wall.
- For CentOS 7 (32-bit and 64-bit) and Red Hat Enterprise Linux 7 (64-bit), execute the command `sudo systemctl stop firewalld` to turn off the firewall temporarily. Or execute the command `sudo systemctl disable firewalld`, and then reboot the system to turn off the firewall permanently.

## 4.2 Configure Local Network Parameters

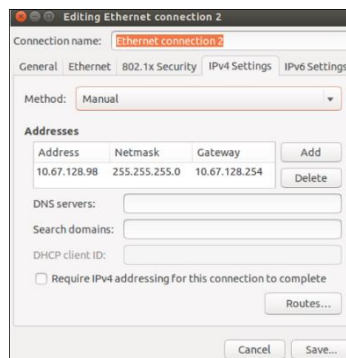
### Purpose:

You should set the IP address of the PC running the Client to the same subnet with the camera, or camera connection may fail. You should also enable Jumbo Frame for the Network Interface Controller (NIC), or packet losses may occur during image data acquisition.

**Note:** As different Linux systems are similar, here we only take configuring local network parameters of Ubuntu system as an example:

### Steps:

1. Configure the local network IP address.
  - 1) Click **System Settings -> Network -> Wired** in the PC.
  - 2) Select a wired network.
  - 3) Click **Option** to open following window.



- 4) In the Method drop-down list, you can select to set the system to obtain IP address

automatically, or set the IP address of the PC to the same subnet with the cameras on the window manually.

- 5) Click **Save** to save the settings.
2. Enable Jumbo Frame
  - 1) Execute the command `sudo su` or `su root` to get the root permission.
  - 2) Execute the command `ifconfig` to check the network status.

```
ipconfig: command not found
root@hik-desktop:/home/ /MVS-1.0.0_x86_64/MVS/bin# ifconfig
eth0      Link encap:Ethernet  HWaddr 00:0a:c4:5d:7b:dd
          UP BROADCAST MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)
          Memory:d0700000-d0780000

eth1      Link encap:Ethernet  HWaddr 00:0a:c4:5d:7b:de
          inet addr:10.67.128.98  Bcast:10.67.128.255  Mask:255.255.255.0
          inet6 addr: fe80::20a:c4ff:fe5d:7bde/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:9000  Metric:1
          RX packets:4359361 errors:0 dropped:0 overruns:0 frame:0
          TX packets:218479 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:12113317746 (12.1 GB)  TX bytes:11801894 (11.8 MB)
          Memory:d0600000-d0680000

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:65536  Metric:1
```

- 3) Enable Jumbo Frame temporally or permanently.

**Choose from:**

- **Temporarily:** Execute the command `ifconfig XXXX mtu 9000` to enable Jumbo Frame temporally.
- **Permanently:** Execute the command `echo "9000" >/sys/class/net/XXXX/mtu` to enable Jumbo Frame permanently.

**Notes:**

- XXXX refers to the NIC connected with the camera. For example, you can input the command `echo "9000" >/sys/class/net/eth0/mtu` or `echo "9000" >/sys/class/net/eth1/mtu`.
- Different NIC may have different parameters. If setting Jumbo frame is unavailable on your PC, you can update the NIC driver or change the NIC with the NIC of Intel Pro 1000 series or above.
- For cameras connected to the network via network switch, static IP address is not required. If the camera is connected to the network directly, you should configure the static IP address, or the camera will not be enumerated.

# Chapter 5 Menu Bar

**Purpose:**

The menu bar provides functionalities such as saving and opening project file, setting display mode, software settings, tools (e.g., IP configurator and firmware updater), language settings, as well software information and the user manual.

## 5.1. File

**Purpose:**

The File sub-menu provides functionalities for project file, as well as the functionality for exiting from the Client.

You may need to change features of multiple cameras in different scenarios. For convenience, save the current features of all the CONNECTED camera(s) as a project file (format: mcfg) to the PC, so that you can fast restore the features of all the CONNECTED camera(s) by opening the project file afterwards.

### 5.1.1 Save as Project File in Default Saving Path

**Purpose:**

For the first time saving, you need to select a saving path as the default saving path for project file, so next time you can skip selecting saving path and save the project file in the default path directly.


**Notes:**

- The serial number(s) of the camera(s) are saved as well.
- Network exception, GenICam error, or failure of exporting features will cause the failure of the saving operation.

**Before You Start:**

You should have connected cameras.

**Steps:**

- 1- Click  on the control toolbar or click **File->Save** to open the Save Project File window.
- 2- For the first time saving, select a saving path as the default saving path for saving project file.  
**Note:** Skip this step if you are not saving for the first time.
- 3- Click **Save** on the Save Project File window to save the features as a project file (format: mcfg). A prompt will pop up and you can click **View** on the prompt to view the project file in the saving path.

### 5.1.2 Save as Project File in Custom Saving Path

**Purpose:**

After the first project file being saved in the default saving path, the function of saving in custom path will be available.


**Notes:**

- The serial number(s) of the camera(s) are saved as well.
- Network exception, GenICam error, or failure of exporting features will cause the failure of the saving operation.
- Network exception, GenICam error, or failure of exporting features will cause the failure of the saving operation.

**Before You Start:**

- You should have connected cameras.
- The first project file should have been saved in the default saving path.

**Steps:**

- 1- Click  on the control toolbar or click **File->Save** to open the Save Project File window.
- 2- Select a saving path.
- 3- Click **Save** on the Save Project File window to save the features as a project file (format: mcfg). A prompt will pop up and you can click **View** on the prompt to view the project file in the saving path.

### 5.1.3 Open Project File


**Purpose:**

You can open a project file to restore the feature settings saved in the file to the cameras with matched serial numbers.

**Before You Start:**

- You should have connected cameras.
- The first project file should have been saved in the default saving path.

**Steps:**

- 1- Click  on the control toolbar or click **File->Open** to open the Select Project File window.
- 2- Select a project file from the PC.
- 3- Click **Open** on the Select Project File window to import the feature settings information contained in the file to the cameras with matched serial numbers.

## 5.2. View

**Purpose:**

The View sub-menu provides functionalities for display mode settings.

You can set the display mode to 30 fps or 60 fps, the latter provides better image quality.

## 5.3. Settings

**Purpose:**

You can configure the software settings, including general parameters, recording and capture parameters, buffer size, and packet resending parameters via the Settings sub-menu.



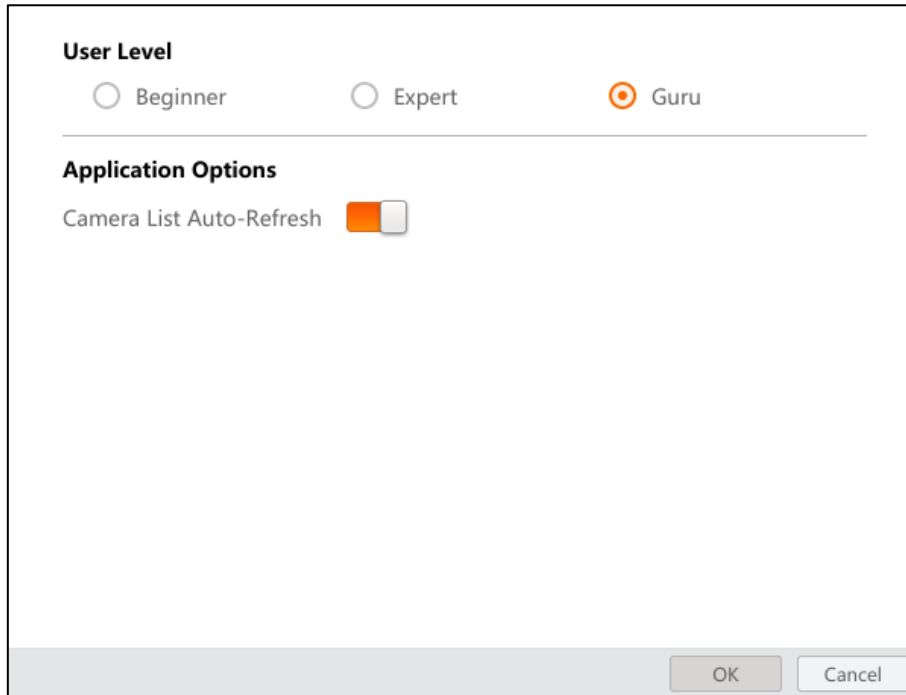
### 5.3.1. General Settings

**Purpose:**

You can set the general parameters, including user level and auto-refresh settings of the device tree.

You can select **Beginner**, **Expert**, or **Guru** as the user level. The higher the user level is, the more camera features will be displayed on the feature panel.


You can also turn on **Camera List Auto-Refresh** to refresh the device list automatically.



### 5.3.2. Capture and Recording Settings

You can set saving path for the recorded videos or captured pictures, and set the recording and capture parameters as required.

**Select Directory**


**Saving Path:** Click  to set a saving path for the recorded video files or captured pictures during live view.

**Auto Save:** When enabled, the recorded video files or the captured pictures during live view will be automatically saved to the saving path you set.

**Note:** The maximum pictures that can be auto saved depends on the the storage space of the saving path you set.

**Recording**

**Vdideo Format:** Set format (AVI or RAW) for the recorded video files.

**Video Quality:** If you set AVI as the video format, you can select **Normal**, **Better**, or **Best** from the drop down list as the video quality, or drag  to adjust the compression ratio to set video quality. The compression ratio for **Normal** is from 0 to 40, for **Better** from 41 to 70, for **Best** from 71 to 100.

**Note:** The higher the compression ratio is, the better the video quality. The better the video quality,

the more image details can be displayed.

**Playback Speed:** If you set AVI as the video format, you can set the playback speed for the recorded video files.

**Original Frame Rate:** Set the original frame rate of the recorded video file as the playback speed.

**Custom:** Enter a frame rate as the playback speed.


**Video Naming Rule:** You can customize a prefix and select **Date and Time** or **Increasing No.** as the naming rule.

**Date and Time:** The suffix will be a number which represents the data and time when the video file is saved. For example, *Video\_20190424051532390*.

**Increasing No.:** The suffix will be an increasing No. For example, if a video file is the second one you saved, the name of it would be *Video\_02*.

## Capturing

**Picture Format:** Set format (BMP, RAW, or JPG) for the captured pictures during live view.

**Picture Quality:** If you set JPG as the picture format, you can select **Normal**, **Better**, or **Best** from the drop down list as the picture quality, or drag  to adjust the compression ratio to set picture quality.

The compression ratio for **Normal** is from 0 to 40, for **Better** from 41 to 70, for **Best** from 71 to 100.

**Note:** The higher the compression ratio is, the better the picture quality.

**File Naming Rule:** You can customize a prefix and select **Date and Time** or **Increasing No.** as the naming rule.

**Date and Time:** The suffix will be a number which represents the data and time when the picture is saved. For example, *Image\_20190424051532390*.

**Increasing No.:** The suffix will be an increasing No. For example, if a picture is the second one you saved, the name of it could be *Image\_02*.

**Continuous Capture:** Set the capture mode.

**Capture by Frame:** The pictures will be captured by frame(s) and the capture will be stopped after the set number of frames. For example, if you set the capture mode as “Capture Every 3 Frame(s)” and “Stop Capturing after 1000 Frame(s)”, a picture will be captured for each 3 frames, and the capture will be stopped after 1000 frames.

**Capture by Time:** The picture will be captured by time and the capture will be stopped after the set time period. For example, if you set the capture mode as “Capture Every 2 Second(s)” and “Stop Capturing after 5 Minute(s)”, a picture will be captured for each 2 seconds and the capture will be stopped after 5 minutes.

The screenshot shows a settings dialog box with the following options:

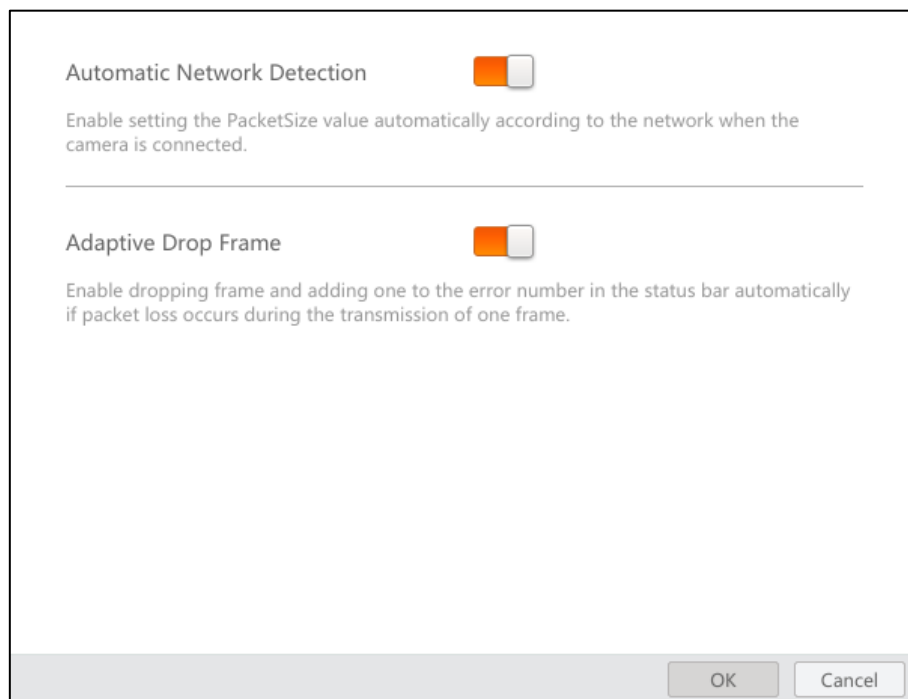
- Playback Speed:** ☒ Original Frame Rate ☐ Custom
- Video Naming Rule:** Video\_ + Increasing No. (Example: Video\_01)
- Capturing Section:**
  - Picture Format:** JPG
  - Image Quality:** Normal (with a slider set to 40)
  - File Naming Rule:** Image\_ + Date and Time (Example: Image\_20190424071904420)
- Continuous Capture:** ☒ Capture by Frame ☐ Capture by Time
- Buttons:** OK and Cancel

### 5.3.3. Network Settings

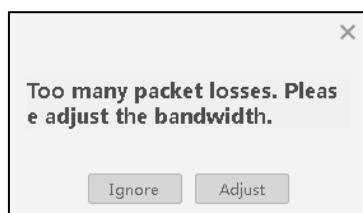
**Purpose:**

You can configure the network settings, including automatic network detection, adaptive dropping frame. You can also adjust bandwidth if packet loss occurs.

You can enable or disable Automatic Network Detection and (or) Adaptive Drop Frame to ensure the fluency of the image data acquisition according to the actual network environment.



During live view, if excessive packet losses occur, the following prompt will pop up to remind you to adjust the bandwidth. In such a case, click **Adjust** to adjust the bandwidth.



**Note:** The smaller the bandwidth, the larger the packet delay will be, and it will be less likely to cause packet loss.

### 5.3.4. Buffer Settings

**Purpose:**

Buffer settings allows you to balance image quality against image fluency.

You can adjust the values of **Buffers for Getting Stream** and (or) **Buffers for Capture and Recording** according to the memory conditions.

- **Buffers for Getting Stream:** The maximum value is 30.
- **Buffers for Capture and Recording:** The maximum value is 10000.

The screenshot shows a configuration window with two sections. The first section is titled 'Buffers for Getting Stream' and has a value of '2' in a spinner box, with the label 'Buffers' to its right. Below this is a descriptive text: 'Increasing the buffer count can make streaming more tolerant to missing frame, but at the expense of using more memory and increasing latency.' The second section is titled 'Buffers for Capture and Recording' and has a value of '3' in a spinner box, also with the label 'Buffers' to its right. Below this is another descriptive text: 'Increasing the buffers can avoid dropping frame under high frame rate and get as many images as possible during capture and recording, which will cost more memory.' At the bottom right of the window are 'OK' and 'Cancel' buttons.

Section	Value	Label	Description
Buffers for Getting Stream	2	Buffers	Increasing the buffer count can make streaming more tolerant to missing frame, but at the expense of using more memory and increasing latency.
Buffers for Capture and Recording	3	Buffers	Increasing the buffers can avoid dropping frame under high frame rate and get as many images as possible during capture and recording, which will cost more memory.

### 5.3.5. Resend Packet

**Purpose:**

Packet resending is a mechanism to ensure image quality by resending the lost or damaged packets during acquisition. You can set the packet-resending for the Client, including maximum packet resending percent and the timeout period for packet resending.

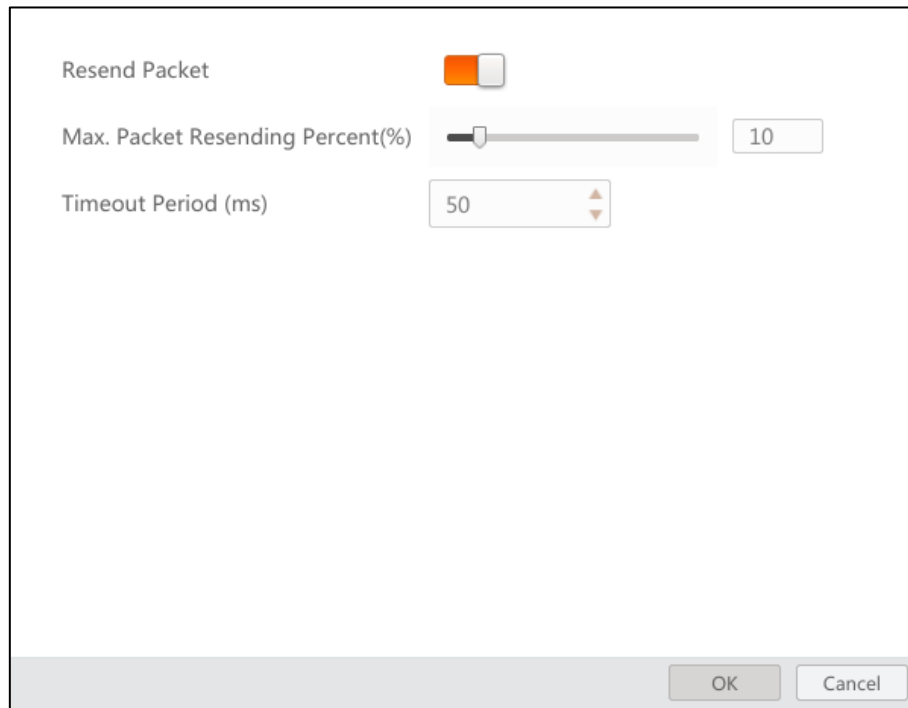
You can enable the Client to resending packets and then configure the parameters.

**Max. Packet Resending Percent (%):** The maximum percent of packets resent within one frame (default value: 10%). With larger packet resending percent, you can get more complete image data. Conversely, you can get more real-time image data.

**Timeout Period(ms):** The maximum time period (default value: 50 ms) that the Client can wait between two packets which requires to be resent (either for the packet is lost or damaged). If the waiting time exceeds the time value set, then the Client will not wait for or resend any packet.

**Notes:**

- You can set a relatively longer timeout period if there're excessive packet losses.
- You can set the value of Timeout Period from 0ms to 1000ms.



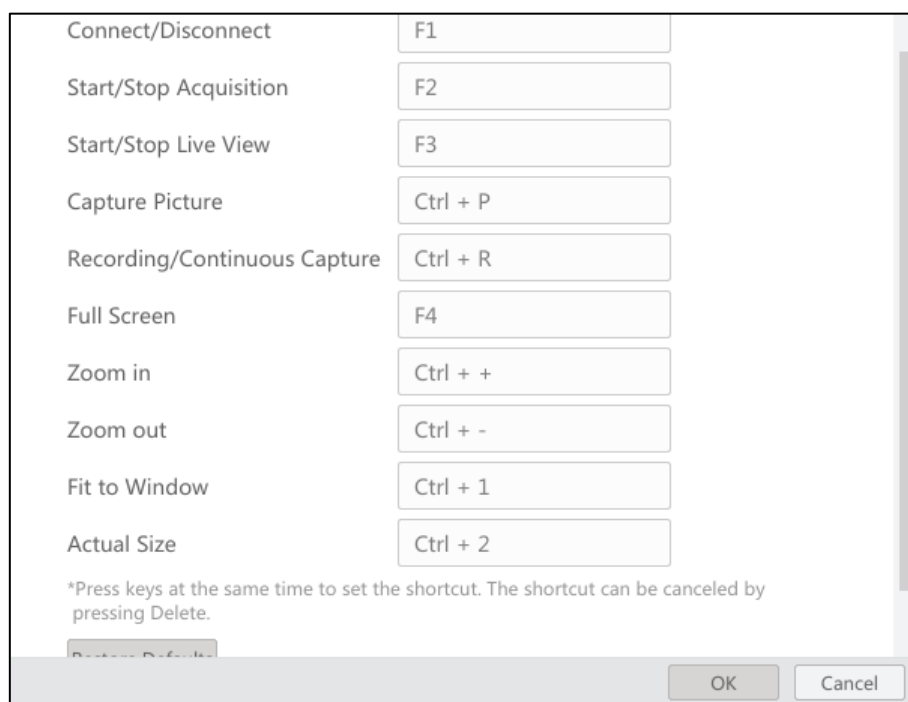
### 5.3.6. Shortcut

**Purpose:**

The Client provides default keyboard shortcuts for some frequently-used functions such as connecting/disconnecting camera and starting and stopping acquisition. You can customize the shortcuts according to your actual needs.

**Note:** The Delete key cannot be used as a keyboard shortcut.

- **Customize a Shortcut:** Select the text field of a function (such as Start/Stop Live View), and then press one or more keys at the same time to set a shortcut for the function.
- **Delete a Shortcut:** Select the text field of a function, and then press the **Delete** key to delete the shortcut.
- **Restore Defaults:** Click **Restore Defaults** to restore the shortcuts for all the listed functions to the default settings.



## 5.4. Tool

### **Purpose:**

The following table shows the description of each tool.

Tool	Description
IP Configurator	Configure the IP address of the GigE Vision cameras. See <i>Modify IP Address of the Camera</i> for details.
Firmware Updater	Update the firmwares of GigE Vision cameras and USB3 Vision cameras. See <i>Firmware Updater</i> for details.
Import/Export Features	Export the selected cameras' feature configuration information as a MFS file to the local PC, or import the MFS file containing camera feature information from the local PC to the selected cameras. See <i>Batch Export or Import Camera Features</i> for details.
Log Viewer	View SDK logs. See <i>SDK Logs</i> for details.
GigE Vision Action Command	Trigger actions in multiple cameras on a network simultaneously. See <i>GigE Vision Action Command</i> for details.

# Chapter 6 Device List

On the device list, the devices are classified into two types, namely, GigE and USB, according to the camera interface. After connecting cameras to the Client, you can also perform operations such as saving GenICam XML for secondary development, and using Event Monitor to determine issues that may occur on your devices.

## 6.1. GigE Vision Camera Management

### ***Purpose:***

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

After connecting GigE Vision cameras to the Client, you can perform operations such as Multicast settings, saving GenICam XML for secondary development, and editing device user ID.

### 6.1.1. Connect GigE Vision Camera


#### ***Purpose:***


You can connect GigE Vision cameras in three ways, i.e., automatically enumerating local cameras, adding remote cameras, and adding camera by command.

#### Automatically Enumerating Local Cameras

##### ***Purpose:***

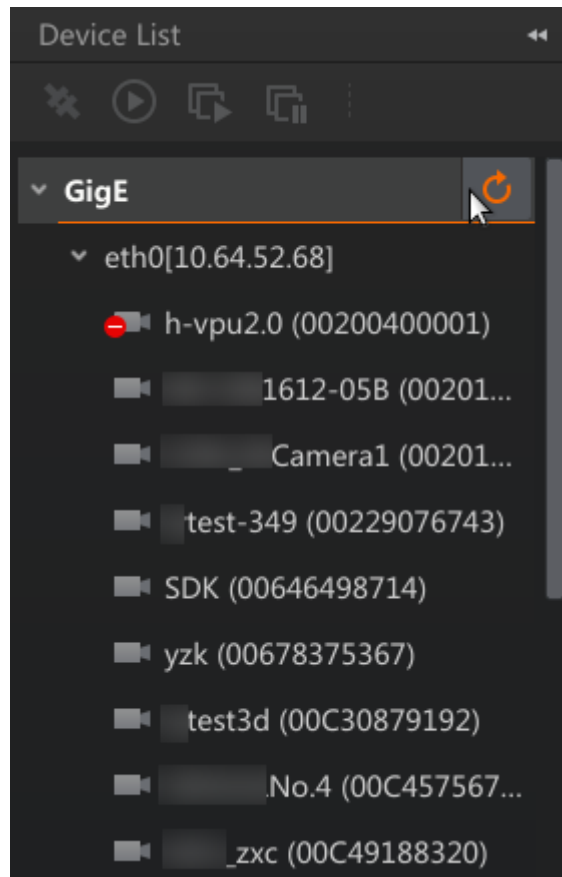
All the GigE Vision cameras in the same local subnet with the Client will be automatically enumerated on the device list.

Select an enumerated camera, and then double-click the camera or click  to connect it to the Client.

You can hover the cursor over the camera interface and then click  to refresh the cameras on the same local subnet.

Or you can enable auto-refreshing device list. See *General Settings* for details.





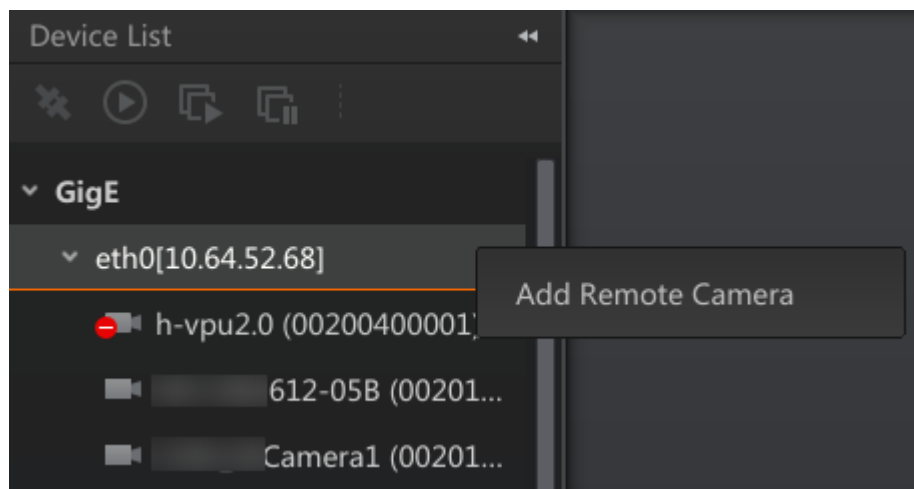
## Add Remote Camera

### **Purpose:**

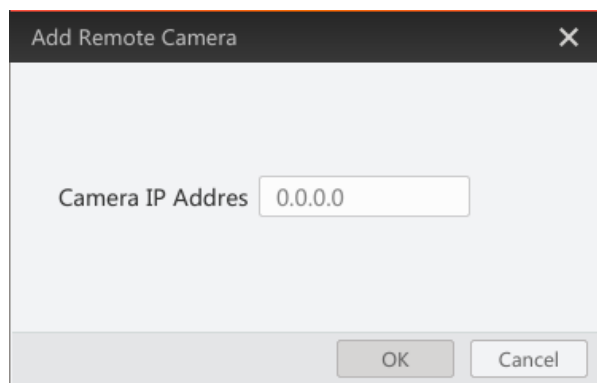
You can add GigE Vision camera NOT in the same local subnet with the Client to the device list.

### **Steps:**

1. Right-click the network interface card (for example, eth0 in the following picture) to open the right-click menu.



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



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

## Connect Camera by Command

### **Purpose:**

You can use command to run the Client and connect a camera to the Client.









Enter the terminal, and then execute the command `./MVS.sh /IP xx.xx.xx.xx` to run the Client and connect the camera. `xx.xx.xx.xx` here refers to the IP address of the to-be-added camera.



## 6.1.2. Status of GigE Vision Camera

### **Purpose:**

The Client provides multiple icons to indicate the status of the GigE Vision cameras. You can do further management according to the status of the cameras.


The following table shows the descriptions of different status.


Camera Staus	Description
	Available and disconnected. You can double-click the camera or select it and click  to connect it to the Client. Once connected,  changes to  .
	Not available. Another Client is accessing the camera.
	The camera is on the same subnet with the PC running the software; however it is 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. You can right-click the camera and then click <b>Modify IP</b> , or click <b>Tool-&gt;IP Configurator</b> to configure the camera's IP address. <b>Note:</b> See <i>Modify Camera IP Address</i> for details about how to configure camera IP address.
	Connected.
	The Multicast feature of the camera is enabled on another Client. And the camera is not connected to the current Client. <b>Note:</b> See <i>Multicast Settings</i> for details.

	The Multicast feature of the camera is enabled on another Client. And the camera is connected to the current Client. <b>Note:</b> See <i>Multicast Settings</i> for details.
	The camera is acquiring streams. <b>Note:</b> See <i>Acquisition and Live View</i> for details about how to start acquisition.

### 6.1.3. Modify Camera IP Address

**Purpose:**

You can modify camera IP address if required. Usually the operation is performed when the camera is displayed as  (on the same subnet with the PC running the software but not in the same network segment).

Right-click a disconnected camera or the camera displayed as , and then click **Modify IP** to modify IP address of the camera. See *Modify Camera IP Address* for details.

### 6.1.4. Multicast Settings

**Purpose:**

By enabling Multicast, a GigE Vision camera can be accessed through multiple MVS Clients. Before that, you need to configure roles for the MVS Clients, so that they can have different permissions to access different cameras.

**Note:** Multicast configuration should be supported by the GigE Vision camera.

For different cameras, a MVS Client can be configured with different roles to access them. In other words, the end user of a MVS Client can have different permissions to access different cameras. The following roles are available in Multicast settings.

Role	Description
Controller and Data Receiver	The camera's features are editable, and the Client can receive camera data to display live image.
Controller	The camera's features are editable, but the Client cannot receive camera data to display live images.
Data Receiver	The camera's features are not editable, but the Client can receive camera data to display live images. <b>Notes:</b> <ul style="list-style-type: none"> <li>You cannot set the role of a MVS client as Data Receiver manually.</li> <li>Multiple Clients can be Data Receivers to a same camera.</li> </ul>

**Notes:**

- To one camera, only one Client can be the role of "Controller and Data Receiver" or "Controller".
- You can configure Multicast for a camera only when the role is set to "Controller and Data Receiver" or "Controller"
- For the Clients running on the same PC, one of them can only be configured as "Controller"

and the others as "Data Receiver".

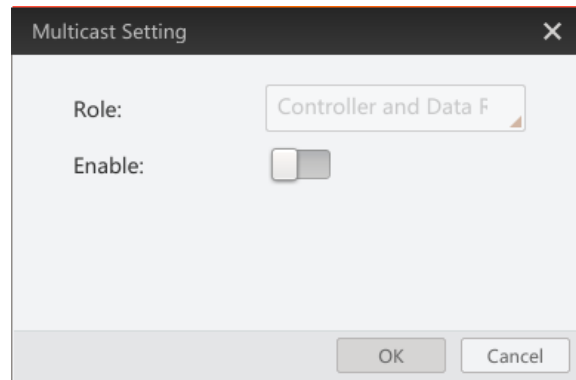
## Enable Multicast When Camera is Connected




### **Purpose:**

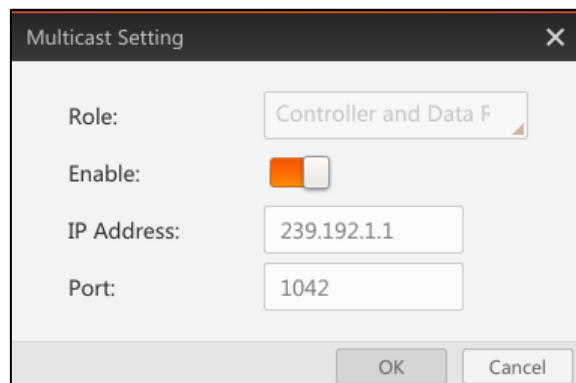
For a connected camera, you can only be set the Client's role to "Controller and Receiver"

### **Steps:**



1. Right-click the camera and then click **Multicast Setting** to open the Multicast Settings window.



2. Click  to enable Multicast.  
 turns to , and then the **IP Address** field and **Port** field appear.



3. (Optional) Edit the IP address and port number.
4. Click **OK** to save the settings.

After enabling multicast of a camera on Client A, if the camera is remotely added to Client B, or the camera is in the same local subnet of the PC running Client C, the camera will be displayed as  (when disconnected) or  (when connected) on Client B or Client C. And the role of Client B and Client C (relative to the camera) will be Data Receiver.

In this scenario, the user has the permission to modify the camera's features, as well as view the live video of the camera on Client A; While on Client B and Client C, the user has no permission to modify the camera feature, but can view the live video and features of the camera.

## Enable Multicast When Camera is Available but Disconnected

### **Purpose:**



If the camera status is available and disconnected, you can set “Controller” or “Controller and Receiver” as the Client’s role.

**Steps:**

1. Right-click a camera (available and disconnected) on the device list to open the right-click menu.
2. Click **Multicast Setting** to open the Multicast Setting window.
3. Select **Controller** from the **Role** drop-down list.
4. Click **OK** to save the role settings.

The camera will be connected and multicast will be enabled automatically.

5. (Optional) Edit the IP address and port.
6. Click **OK** to save the settings.

After enabling multicast of a camera on Client A, if the camera is remotely added to Client B, or the camera is on the same local subnet of the PC running Client C, the camera will be displayed as  (when disconnected) or  (when connected) on the Client B and Client C. And the role of client B and client C (relative to the camera) will be Data Receiver.

## 6.1.5. Other Features

**Purpose:**

You can save GenICam XML for secondary development of a GigE Vision camera and USB3 Vision camera. You can also edit user ID of the GigE Vision camera and USB3 Vision camera.

Right click a connected camera, and then click **Save GenICam XML** to save the camera information as XML file for secondary development.

Right click a connected camera, and then click **Rename User ID** to edit user ID of the camera.

## 6.2. USB3 Vision Camera Management





**Purpose:**








USB3 Vision is an interface standard for machine vision cameras. You can connect USB3 Vision to the Client for further management.

Plug the interface of the USB3 Vision camera into the PC running the Client, and then the USB3 Vision camera will be displayed on the USB section of the device list.

**Note:** Make sure that the USB interface of the PC is USB 3.0 interface. Connecting the camera via USB2 interface may lead to abnormal image during live view and other issues.

The following table shows the descriptions of the status of the USB3 Vision camera on the device list.

Camera Staus	Description
	Available and disconnected You can double-click the camera or select it and click  to connect it to the Client. Once connected,  .
	Not available. Another client software or process on the same PC is accessing the camera.

	USB driver exception. You should reinstall the USB driver.
	Connected.
	The camera is acquiring streams.
	Connected (the USB interface of the PC is USB 2.0 interface).
	Available and disconnected (the USB interface of the PC is USB2.0 interface).
	Not available (the USB interface of the PC is USB 2.0 interface). Another client software or process on the same PC is accessing the camera.
	The camera is acquiring streams (the USB interface of the PC is USB2 interface).


## 6.3. Use Event Monitor to Determine Causes of Issues

### **Purpose:**

The Event Monitor is a tool that you can use to determine causes of issues that may occur during the use of your device. When enabled, you can view all the time-stamped GigE Vision events.

**Note:** The camera should support the Event Control feature, or Event Monitor is not supported by the camera.

### **Steps:**


1. Connect a camera.
  - Double-click a camera to connect it to the Client.
  - Select a camera, and then click  to connect it to the Client.
2. Right-click the camera on the device list and then click **Event Monitor** to open the Event Monitor window.
3. Select event type(s).
4. Search for Event Selector on the feature tree.

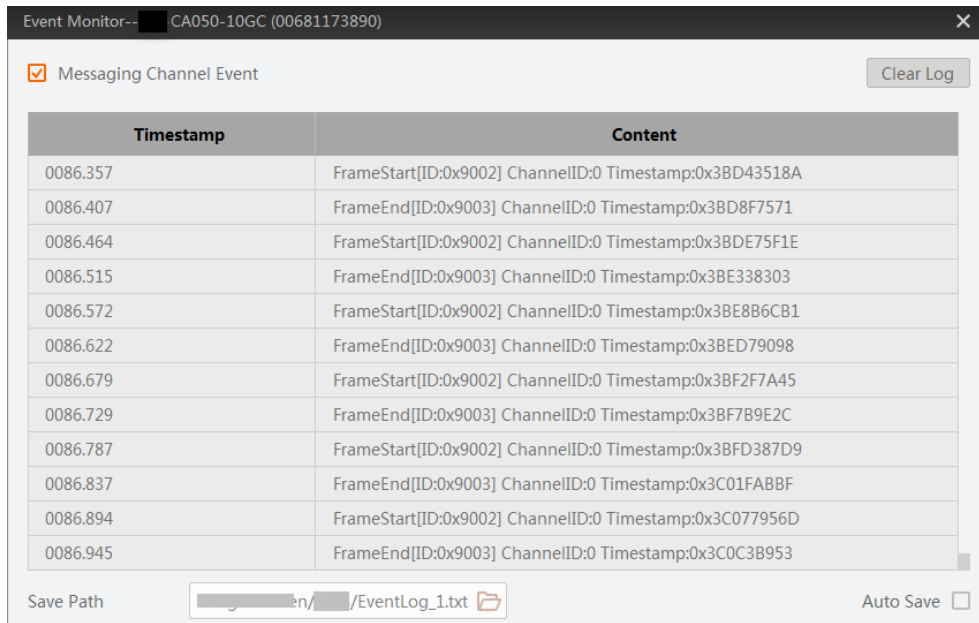
**Note:** For details about feature tree, see *Feature Tree*.

5. Click the value of **Event Selector** to show the drop-down list.
6. Select an event type from the drop-down list.
7. Set **Event Notification** to **ON**.

Events will appear on the Event Monitor window.

### **Notes:**

- Up to 10000 events can be displayed on the Event Monitor window.
  - After checking **Messaging Channel Event**, events will keep being obtained even if you close the Event Monitor window.
8. (Optional) Perform the following operations after events start appearing on the window.
    - Click  to select a saving path, and then check **Auto Save** to save the events generated afterwards as TXT file to the PC.
    - Click **Clear Log** at the upper-right to clear all the displayed events.



# Chapter 7 Camera Feature Configuration

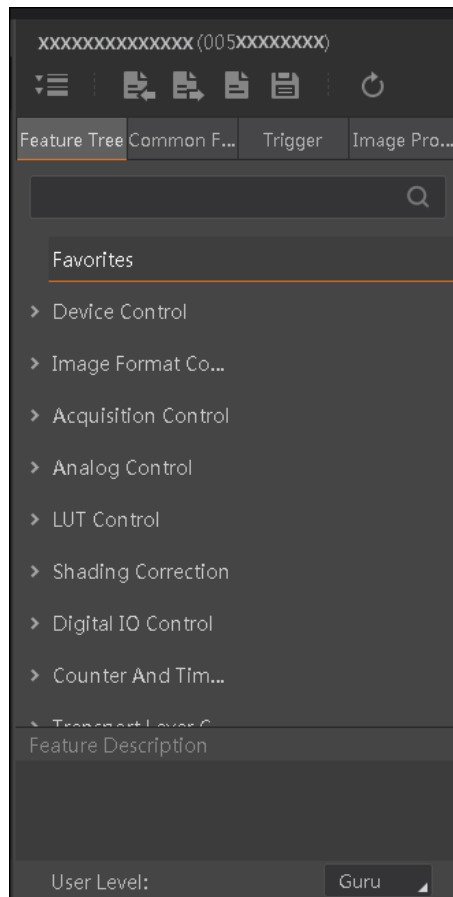
The Client provides multiple methods to configure the camera features, including configuring feature manually via feature tree, configuring via User Set, configuring via File Access, and batch exporting and importing features.

## 7.1. Feature Tree

### **Purpose:**

When a camera is connected, all of the camera's features will be displayed on the feature tree. Click **Feature Tree** tab on the Feature panel to display the feature tree.

**Note:** The features displayed vary with different cameras.



The following table briefly describes the camera features that may list on the feature tree.

Feature Category	Description
Device Control	In the Device Control feature, you can view the camera details including device type, version, manufacturer details, device ID, device temperature, etc. You can modify the alias and reset the device.
Image Format Control	In the Image Format Control feature, you can view the live view image width and height, pixel size, etc. You can set the ROI,



Feature Category	Description
	modify the pixel format, image reverse, test pattern and the embedded information, etc. <b>Note:</b> You should connect the camera (and stop acquisition) before you can modify the pixel format.
Acquisition Control	View and configure features of the selected camera, and perform other operations such as importing, exporting, and saving features.
Analog Control	In the Analog Control feature, you can adjust the parameters of the analog signal including analog gain, black level, brightness, gamma, sharpness, AOI (Auto Function ROI), etc.
LUT Control	In the LUT Control feature, you can view the user lookup table and set the LUT index and value.
Digital IO Control	In the Digital IO Control feature, you can manage the digital input and output.
Counter and Timer Control	In the Counter and Timer Control feature, you can set the counter and timer function, which can be used to count time for triggering signal and control the exposure.
Transport Layer Control	In the Transport Layer Control feature, you can set the parameters of transport layer of the camera.
User Set Control	In the User Set Control feature, you can save or load the parameter configuration set by users.
File Access Control	Category that contains the File Access features. File Access can be used to export and import camera features.
Event Control	Set the features related to Event Monitor, which can be used to view the messaging channel events to determine causes of issues that may occur during the use of your camera. <b>Note:</b> See <i>Use Event Monitor to Determine Causes of Issues</i> for details about Event Monitor.
Chunk Data Control	Control the chunk data. You can enable chunk data, and set the content of the chunk data.

## 7.2. Common Features

### **Purpose:**

The common features include five categories, i.e., basic features, Bayer, embedded information, transport layer control, and white balance.

**Note:** The features vary with different cameras.

The following table shows the descriptions of the five feature categories.

Feature Category	Description
Basic Features	In the Basic Features, you can set basic features like enabling frame rate control, setting frame rate, enabling auto exposure, enabling auto gain, etc.

Feature Category	Description
Bayer	<p>In Bayer feature, you can set <b>Nearest Neighbor</b>, <b>Bilinear</b>, or <b>Optimal</b> from the drop-down list as the interpolation method.</p> <p><b>Notes:</b></p> <ul style="list-style-type: none"> <li>● After enabling the Bayer mode, LUT is not supported.</li> <li>● You can set the Bayer parameters only when the camera supports color image and Bayer format.</li> <li>● If the pixel format of the camera is not Bayer format, you should set its pixel format as Bayer format before you can set the Bayer parameters.</li> <li>● In most occasions, the nearest-neighbor interpolation or bilinear interpolation is enough for displaying quality image. While in occasions when high-quality image is required, you can set the interpolation method as Optimal, at the expense of consuming more time and lowering the display rate.</li> </ul>
Embedded Information	<p>In Embedded Information feature, you can check the checkbox(es) to select the embedded image information, the selected ones will be displayed on the Embedded Information window.</p> <p><b>Note:</b> See <i>View Embedded Information</i> for details about viewing embedded information.</p>
Transport Layer Control	In the Transport Layer Control feature, you can set the parameters of transport layer of the camera.
White Balance	In the White Balance feature, you can set white balance related features for the camera.

## 7.3. Trigger

### **Purpose:**

The Trigger features include two categories, i.e., acquisition control and digital IO control.

**Note:** The features vary with different cameras.

The following table shows the descriptions of the two categories.

Feature Category	Description
Acquisition Control	You can enable trigger mode to let the acquisition of image data occur only when the trigger source is generated. You can also set the trigger source, the activation of the trigger, and the condition to stop the trigger, etc.
Digital IO Control	In the Digital IO Control feature, you can manage the digital input and out.

## 7.4. Image Processing Features

### **Purpose:**

On the Image Processing page, you can configure ROI features, AOI features, HDR features, and Look Up Table (LUT) features.

### 7.4.1. Draw ROI

#### **Purpose:**



After ROI (Region of Interest) being configured, the system only acquires the image data within the ROI.

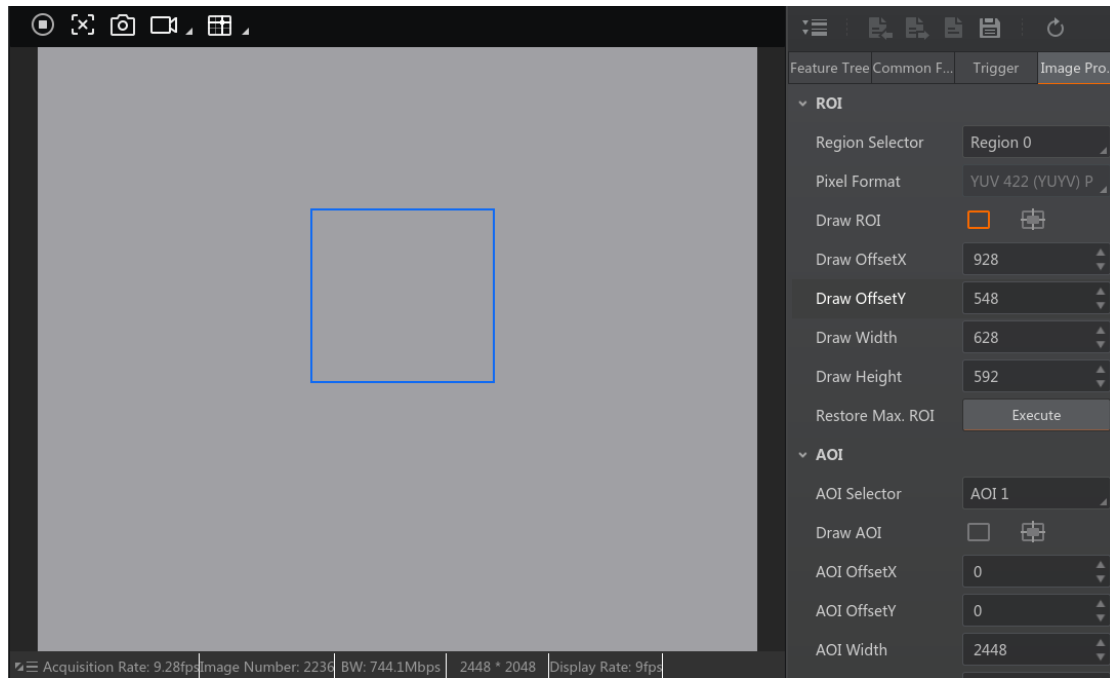
**Note:** You can also go to **Feature Tree->Image Format Control** and then configure Width, Height, Offset X, and Offset Y to set ROI. The value of Width plus the value of Offset X should not be larger than the Max. Width, and the value of Height plus the value of Offset Y should not be larger than the Max. Height.


#### **Before You Start:**

You should have exited the AOI drawing mode.

#### **Steps:**

1. Connect a camera to the Client.
2. Select the connected camera.
3. Click **Image Processing** tab on the Feature panel.
4. Click  to display the ROI features.
5. Select an ROI from the **ROI Selector** drop-down list.
6. Select pixel format from the **Pixel Format** drop-down list.
7. Click  to enable the drawing mode.  
A blue rectangle will appear on the live video image.
8. Perform one of the following operations.
  - Manually adjust the OffsetX, OffsetY, width of ROI, and height of ROI.
  - Move the cursor to the edge of the blue rectangle, and then drag the appearing two-way arrow to adjust the size of the ROI.



9. (Optional) Adjust the position of the ROI.
  - Click  to move the ROI to the center of the live video image.
  - Hover the cursor onto the ROI and then drag the ROI to adjust its position.
10. Right-click the image and then click **Finish**.  
Only the selected ROI will be displayed.
 

**Note:** The image resolution will be lower after setting ROI.
11. (Optional) Click **Restore Max. ROI** to restore the image to the original size.
 





**Note:** The image resolution will also be restored to the original state.

## 7.4.2. Configure AOI

### **Purpose:**

Drawing AOI (Auto Function ROI) is similar to configuring ROI, refer to *Draw ROI* for details about how to draw AOI.

After drawing AOI, you can perform the following operations.

- If you select **AOI1** from the **AOI Selector** drop-down list, you can set  to  to enable AOI Usage Intensity to set the exposure of the whole image to the same as the AOI exposure.
- If you select **AOI2** from the **AOI Option** drop-down list, you can set  to  to enable AOI Usage White Balance to set the white balance of the whole image to the same as the AOI white balance.

**Note:** For mono camera, you can only select **AOI1** from the **AOI Option** drop-down list.

## 7.4.3. Configure HDR




### **Purpose:**

By setting the value of shutter and gain for four sets of HDR configuration and then enabling the

function, you can make the brightness of the live view image change periodically.

**Note:** Both HDR shutter and HDR gain should be supported by the device.

**Steps:**

1. Connect a camera.
2. Select the connected camera.
3. Click Image Processing tab on the Feature panel to enter the Image Processing page.
4. Click  to display the HDR features.
5. Select a value of HDR Selector.
6. You can set the value to 0, 1, 2, and 3, each represents a set of HDR configuration.
7. Set the value of HDR shutter and HDR gain for the selected set of HDR configuration.
8. Repeat step 5 to step 6 to set the shutter value and gain value for the other three sets of HDR configuration.
9. Set  to  to enable HDR.  
During live view, the brightness of the image will change periodically according to the four sets of HDR configuration.


## 7.4.4. Configure LUT

**Purpose:**

You can configure the Look Up Table (LUT) parameters, such as the line type of the Look Up Table.

**Note:** After enabling the Bayer mode, LUT is not supported.

**Steps:**

1. Connect a camera.
2. Select the connected camera.
3. Click **Image Processing** tab on the Feature panel.
4. Click  to display the LUT features.
5. Enable LUT.
6. Select LUT from **LUT Selector** drop-down list.
7. Select **Fold Line**, **Curve**, or **Free Line** from **LUT Line Type** drop-down list.
8. (Optional) Perform the following operations.
  - Click **Execute** in **Load from Camera** field to import the lookup table information of the camera to the chart on the page.
  - Click **Execute** in **Apply to Camera** field to apply the chart information to the lookup table of the camera.
  - Click **Execute** in **Import from File** field to import the lookup table information on TXT files to the chart on the page.
  - Click **Execute** in **Export to File** field to export the chart information to the Local PC as TXT files.
  - Click **Execute** in **Clear** field to clear the settings.

## 7.5. Export or Import Camera Features

### **Purpose:**

You can export the selected cameras' feature configuration as a MFS file to the local PC, or import the MFS file containing camera feature information from the local PC to the selected cameras.

**Note:** The camera should support exporting and importing features.

### 7.5.1. Export Camera Features


#### **Purpose:**

You can export the features of a connected camera to the local PC.

#### **Before You Start:**

You should have connected the camera and stopped acquisition. See *Acquisition and Live View* for details about acquisition.

#### **Steps:**

1. Select the connected camera.
2. Click  and then select a saving path to save the camera's features as MFS file to the local PC.

### 7.5.2. Import Camera Features

#### **Purpose:**


You can import the MFS file containing camera feature information from local PC to the selected camera for convenience.

**Note:** You can import the features to a target camera only when the model of the target camera is same with that of the source camera.

#### **Before You Start:**

You should have connected the camera and stopped acquisition. See *Acquisition and Live View* for details about acquisition.

#### **Steps:**

1. Select the connected camera.
2. Click  and then select a MFS file containing the feature information to the camera.

## 7.6. Batch Export or Import Camera Features

### **Purpose:**

On Import/Export Features window, all the GigE Vision cameras in the same local subnet with the PC running the client software will be displayed automatically. And you can import or export features of multiple GigE Vision cameras simultaneously.



- Only the cameras of Free status can be selected.
5. Click Import to select a feature file and import the features to the selected cameras.  
The progress and results of the operation are displayed on the Operation Status column.  
You can also view the exception information and error code if importing features to a specific camera fails.

## 7.7. Save Features in User Set

### **Purpose:**

A User Set is a group of feature values with all the settings needed to control the device. If you have configured the device features as desired, you can save them into the User Set. After that, you can load the User Set to restore the device to the saved group of feature values again if required.

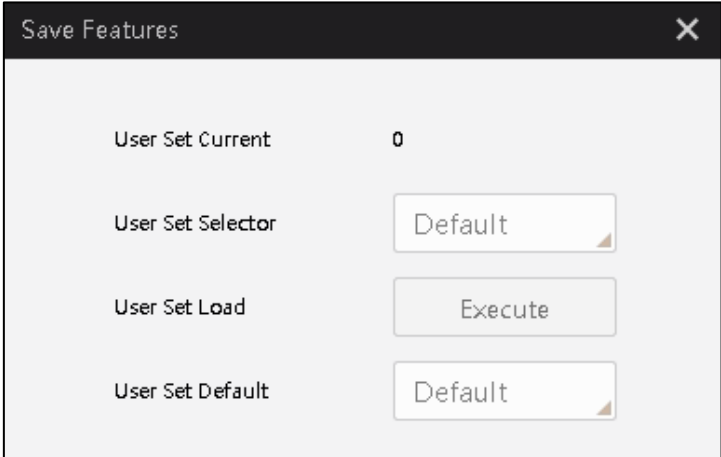
### **Notes:**

- The number of User Sets vary with different camera models. The following task takes the camera model with three User Sets for an example.
- The camera should be connected for saving its features in User Set.

Select a camera, and then click  to open the Save Features window.

The following list shows the descriptions of the parameters on the window.

- **User Set Current:** The current user set. "0" represents "Default", i.e., the factory settings. "1" represents "UserSet1", "2" represents "UserSet2". "3" represents "UserSet3".
- **User Set Selector:** Select User Set. "Default" represents the factory settings.
- **User Set Load:** Load the selected User Set and take effect.
- **User Set Default:** Automatically load the selected user set and take effect when a device is powered on again.

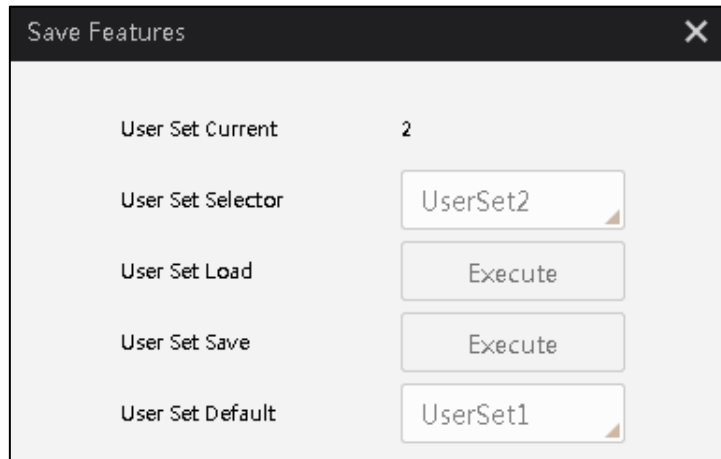


User Set Current	0
User Set Selector	Default
User Set Load	Execute
User Set Default	Default

You can perform the following operations.

- Load the factory settings.
  - 1) Select **Default** from the **User Set Selector** drop-down list.
  - 2) Click **Execute** to load the factory settings to your camera and take effect.
- Save the feature configuration as UserSet1, UserSet2 or UserSet3.
  - 1) Select **UserSet1**, **UserSet2**, or **UserSet3** from the User Set Selector drop-down list.





- 2) Click **Execute** in the **User Set Save** field to save the feature configuration to your camera.
- Load **UserSet1, UserSet2 or UserSet3**.
  - 1) Select **UserSet1, UserSet2, or UserSet3** from the User Set Selector drop-down list.
  - 2) Click **Execute** in the **User Set Load** field to load the selected User Set to your camera and take effect.

## 7.8. File Access

### **Purpose:**

You can export the feature configuration or Defective Pixel Correction (DPC) of a connected camera to the local PC as a binary file, or import a binary file containing the feature configuration information or DPC information from the local PC to a connected device.

### **Notes:**

- The camera should support file access.
- File access is not available if during acquisition.

### 7.8.1. Export User Set


#### **Purpose:**

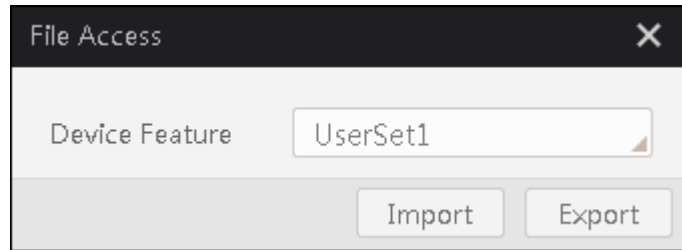
You can export the features saved in User Set to the local PC. User Set can be used for saving information about camera feature configuration.

#### **Before You Start:**

Save the current feature configuration to a specific User Set. See *Save Features in User Set* for details.

#### **Steps:**

1. Connect the camera to the Client.
2. Click  to open the File Access window.



3. Select a User Set (**UserSet1**, **UserSet2**, or **UserSet3**) or DPC from the drop-down list.
4. Click **Export** to export the feature to the PC as a binary file.

**Notes:**


- The file format is mfa by default.
  - The name of the exported file is "Camera Model + Camera Serial Number + Feature Name" by default. Example: MV-CA023-10GC\_00682345470\_UserSet2.mfa
5. (Optional) Click **View** on the appearing prompt to open the folder to which the binary file is saved.

## 7.8.2. Import User Set

**Purpose:**


You can import a binary file from the local PC to the User Set of the camera.

**Steps:**

1. Connect the camera to the Client.
2. Click  to open the File Access window.
3. Select a User Set (**UserSet1**, **UserSet2**, or **UserSet3**) or **DPC** from the drop-down list.
4. Click **Import** to select the corresponding binary file and import it.

**Notes:** DPC can only be imported to the same camera, while User Set can only be imported to the cameras of the same model.

The DPC will be imported and take effect. While for User Set, you should load the User Set to take effect. See Step 5 for details.

5. If you select a User Set in step 3, load the User Set to take effect.
  - 1) Click **Feature Tree**.
  - 2) Click  to display the features under **User Set Control**.
  - 3) Select a User Set from the **User Set Selector** drop-down list.
  - 4) Click **Execute** to execute the User Set Load command.

# Chapter 8 Acquisition and Live View

## Purpose:

You can start acquisition and view the live video of a single machine vision camera or the live videos of multiple machine vision cameras simultaneously. And during the live view, you can determine the optimal image quality and perform operations such as recording video, capturing pictures, and zooming in or out.

## 8.1. Acquisition and Live View in 1-Window Mode

### Purpose:




You can view the live video of a specific camera or the live videos of multiple cameras in 1-window mode. When viewing live videos of multiple cameras, you can switch camera to view live video.

### 8.1.1. Single Camera Acquisition and Live View in 1-Window Mode

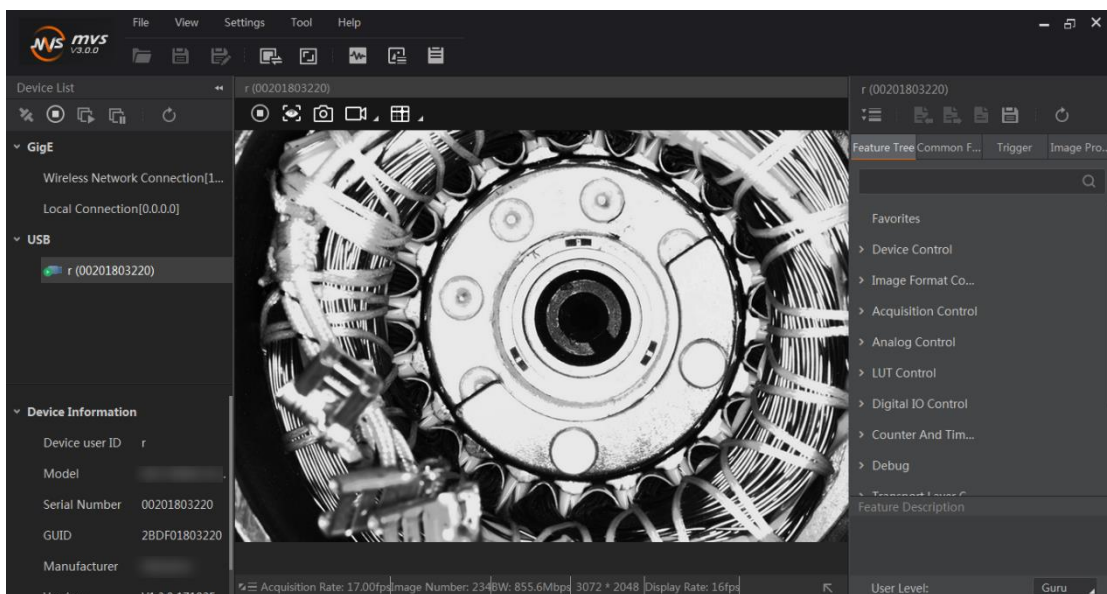
#### Purpose:

You can acquire streams from a camera in 1-window mode, and view the camera's live video.

#### Steps:

1. Connect a camera to the Client.
2. Click  to start acquiring streams.  
The live video of the camera will be displayed.
3. (Optional) Click  to stop live view, and click  to resume live view.

**Note:** After stopping live view, acquisition still goes on.






4. (Optional) Click  to stop acquisition.



## 8.1.2. Multiple Cameras Acquisition and Live View in 1-Window Mode

### **Purpose:**

You can acquire streams from multiple cameras simultaneously in 1-window mode. During acquisition, you can switch camera to view the live video.

### **Steps:**

- 1- Connect cameras to the Client.
- 2- Click  to batch start acquiring streams from the connected cameras.  
The live video of the camera dragged into the live view window will be displayed.
- 3- (Optional) Perform the following operations.
  - Double-click the connected camera on the device list to switch camera for live video.
  - Click  to stop live view of the currently-selected camera, and click  to resume live view.

**Note:** After stopping live view, acquisition still goes on.
- 4- Stop acquisition.
  - Click  to batch stop acquisition for all the connected cameras.
  - Click  to stop acquisition for the camera dragged into the live view window.




## 8.2. Acquisition and Live View in Multiple-Window Mode

### **Purpose:**

You can view the live video of a specific camera or the live videos of multiple cameras in multiple-window mode. In this mode, you can view the live videos of multiple cameras simultaneously.



**Note:** You can acquire streams from up to 8 cameras simultaneously.

### **Steps:**

- 1- Connect camera(s) to the Client.
- 2- Click , and then select a multiple-division mode.
- 3- Drag the connected camera(s) from the device list to the display window(s) to view the camera's live video.
- 4- Start acquisition.
  - If only one camera is connected, click  to start acquiring streams from the camera.
  - If multiple cameras is connected, click  to start acquiring streams from the connected cameras.
- 5- (Optional) Perform the following operations after starting live view.
  - Drag the title bar of a display window under live view to adjust its position.
  - Double-click the live video image or click the Maximize button to switch to 1-window mode, and then perform the same operation again to restore to multiple-window mode.



**Note:** When switching from multiple-window mode to 1-window mode, the live video of the first live-viewed camera in multiple-window mode will be displayed. You can drag the

camera from the device list to the display window or double-click to camera to switch camera for live view.

- Move the cursor to the lower part of the live video image, and then click  on the appearing toolbar to stop live view of the selected camera. And click  to resume live view.

**Note:** After stopping live view, acquisition still goes on.


6- Stop acquisition.

- Move the cursor the lower part of the live video image, and then click  on the appearing toolbar to stop acquisition of the selected camera.
- Click  to batch stop acquisition.

## 8.3. Full Screen Live View

### **Purpose:**

You can view live view in full screen in both 1-window mode or multiple-window mode

During live view, you can click , or right-click the live video image and then click **Full Screen** to enter the full screen mode.


And you can click **Esc** key to exit the full screen mode, or right-click the live video image and then click **Exit Full Screen** to exit.

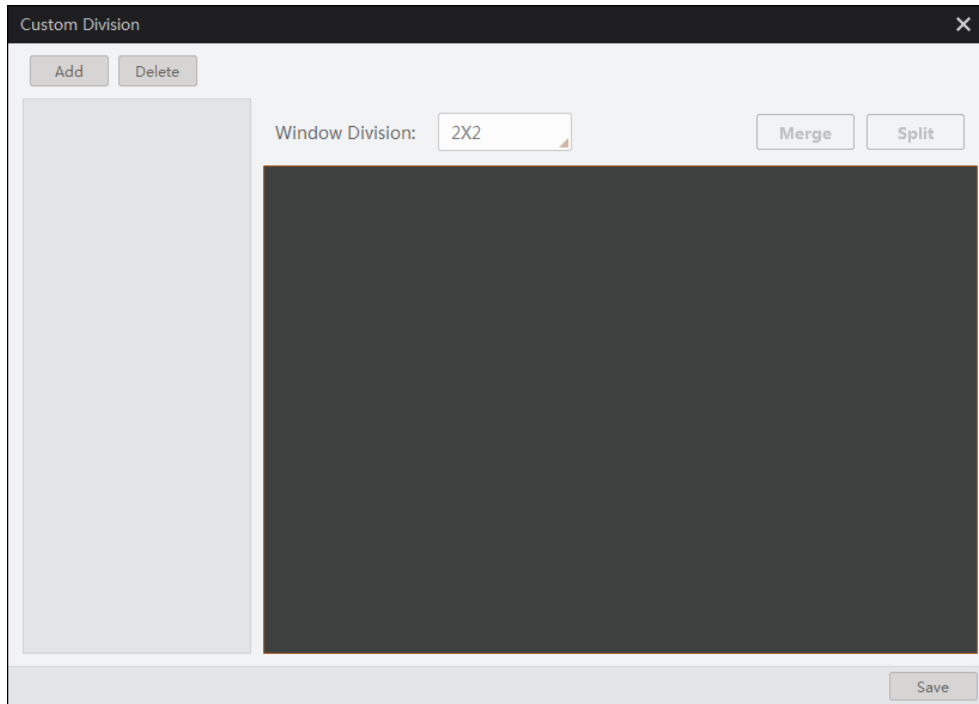
## 8.4. Customize Window Division

### **Purpose:**

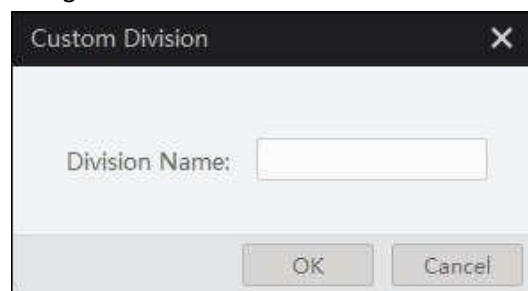
Three default window division modes are provided in Custom Division module, i.e., 2 X 2 (4-Window), 3 X 3 (9-Window), and 4 X 4 (16-Window). You can add the three modes to the Window Division panel, or merge (or split) windows based on the three modes.

### **Steps:**

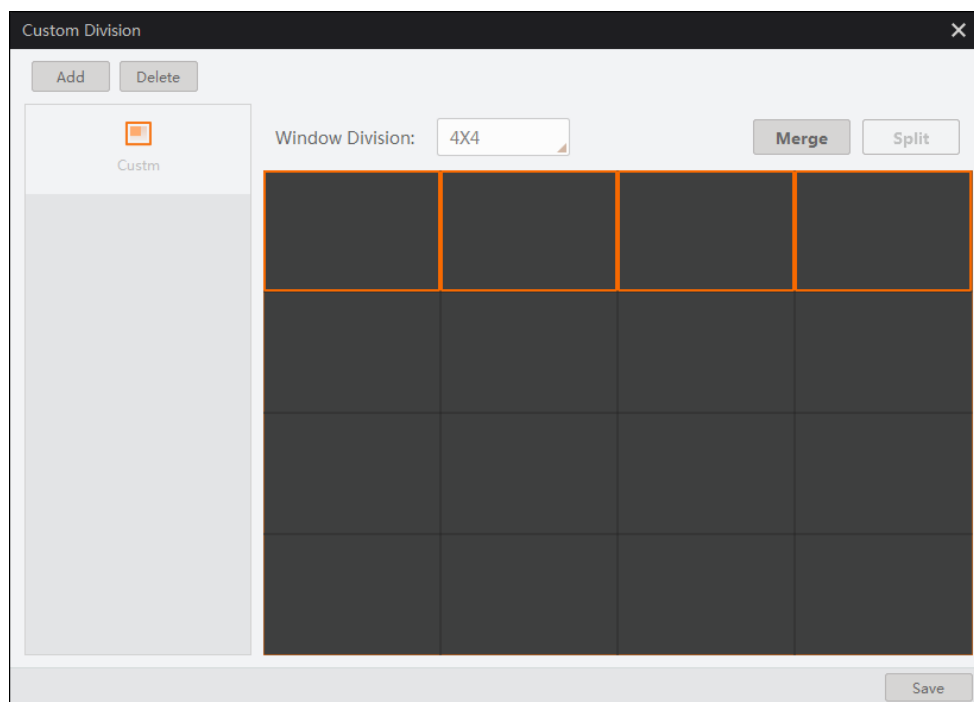
- 1- Click  to display the window division panel.
- 2- Click **Custom** to open the Custom Division window.



- 3- Click **Add** to open the following window.



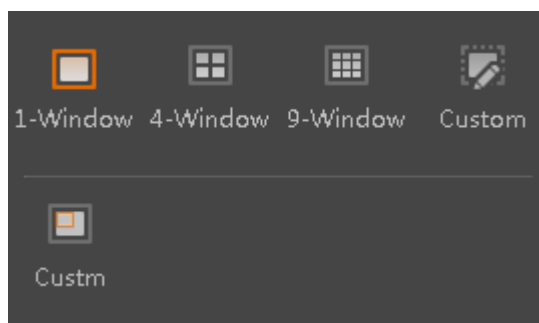
- 4- Create a name for the window division mode and then click **Confirm**.
- 5- Select a window division mode from the **Window Division** drop-down list.
- 6- (Optional) Merge or Split windows.
- 1) Select windows.



- 2) Click **Merge** to merge the selected windows into a larger one.  
**Note:** You can merge the selected windows only when the combination of the selected windows is of rectangle shape.
- 3) (Optional) Select the merged window and then click Split to split it into the original windows.

7- Click **Save**.

The custom window division mode will be displayed on the window division panel.





## 8.5. Capture and Recording


**Purpose:**

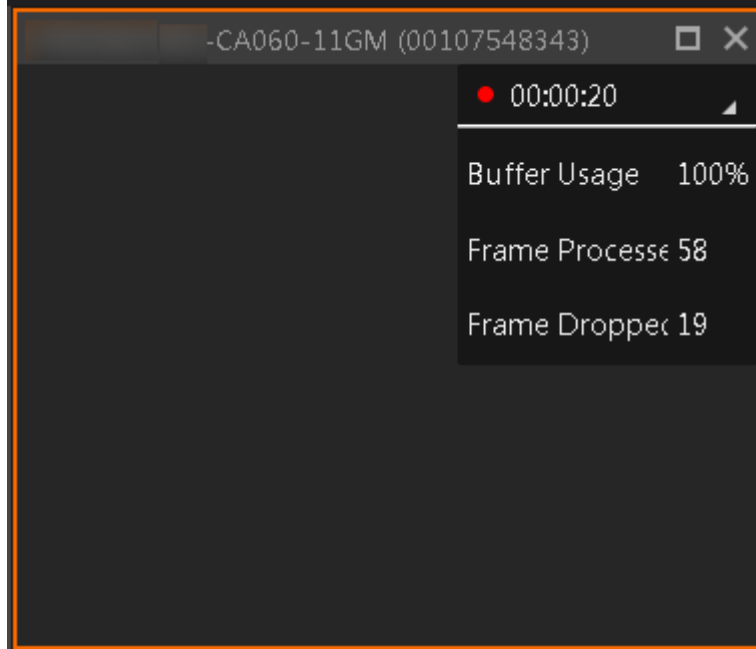
During live view, you can capture pictures and record video files (or continuously capture pictures).




**Steps:**


1. Start live view.  
**Note:** See *Acquisition and Live View in 1-Window Mode* and *Acquisition and Live View in Multiple-Window Mode* for details.
2. Perform the following operations.  
**Note:** In multi-window mode, you should move the cursor to the lower part of the live video image to show the hover toolbar.

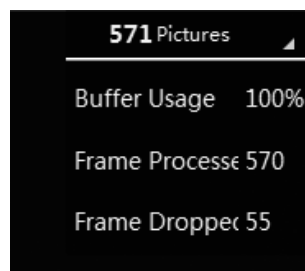
- Click  to capture a picture and save the picture to the local PC.
- Click  to start recording, click the icon again to stop recording.

**Note:** During recording, the recording time will be displayed, and you can click  at the upper-right of the display window to view the buffer usage, number of frame processed and frame dropped.



- Click  (beside ) and then click  to continuously capture pictures of the live view, and click the icon again to stop capturing.

**Note:** During recording, the number of the captured pictures will be displayed in real time, and you can click  at the upper-right side of the display window to view the buffer usage, number of frame processed and frame dropped.



A prompt will pop up once you finish capturing picture(s) or recording.

- (Optional) Click **View** on the prompt to view the picture(s) or video file(s) in the saving path.

**Note:** You can set the saving path of the captured picture(s) and recorded video file(s). You can also set other parameters for recording or continuous capture. See *Capture and Recording Settings* for details.

## 8.6. Set Cross Line

### **Purpose:**

During live view, you can display a cross line on the live view image to adjust the position of the object in the view.







**Note:** The function is only available during the live view of a single camera under 1-division mode.

**Steps:**

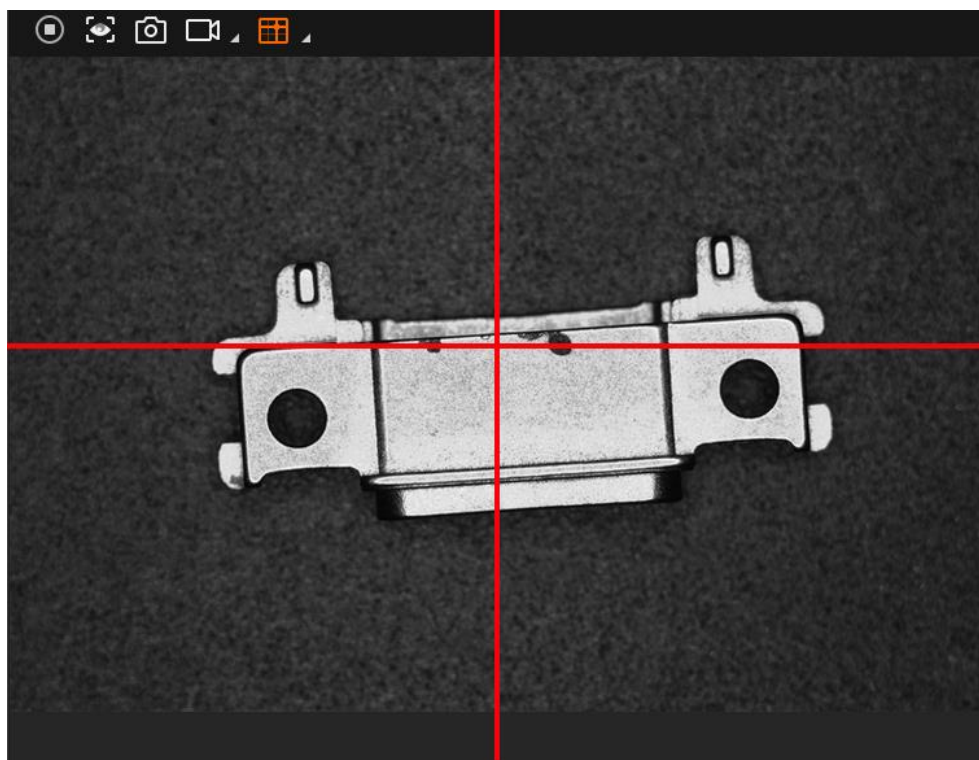
1. Select a camera and start live view.

**Note:** See *Acquisition and Live View in 1-Window Mode* and *Acquisition and Live View in Multiple-Window Mode* for details.

2. Click  to display the cross line on the live view image.
3. Click  (beside ) to open the following window.

Width	100	%	Height	100	%
Offset X	0	px	Offset Y	0	px
Color			Thickness	1	px

4. Set the parameters on the window, including width, height, offset X, offset Y, color, and thickness.
5. The cross line will change simultaneously when you change the parameters



## 8.7. View Acquisition Status


**Purpose:**

During acquisition or live view, you can view the acquisition status of the camera(s), including the acquisition rate, image number, bandwidth, resolution, errors, packets lost and display rate.

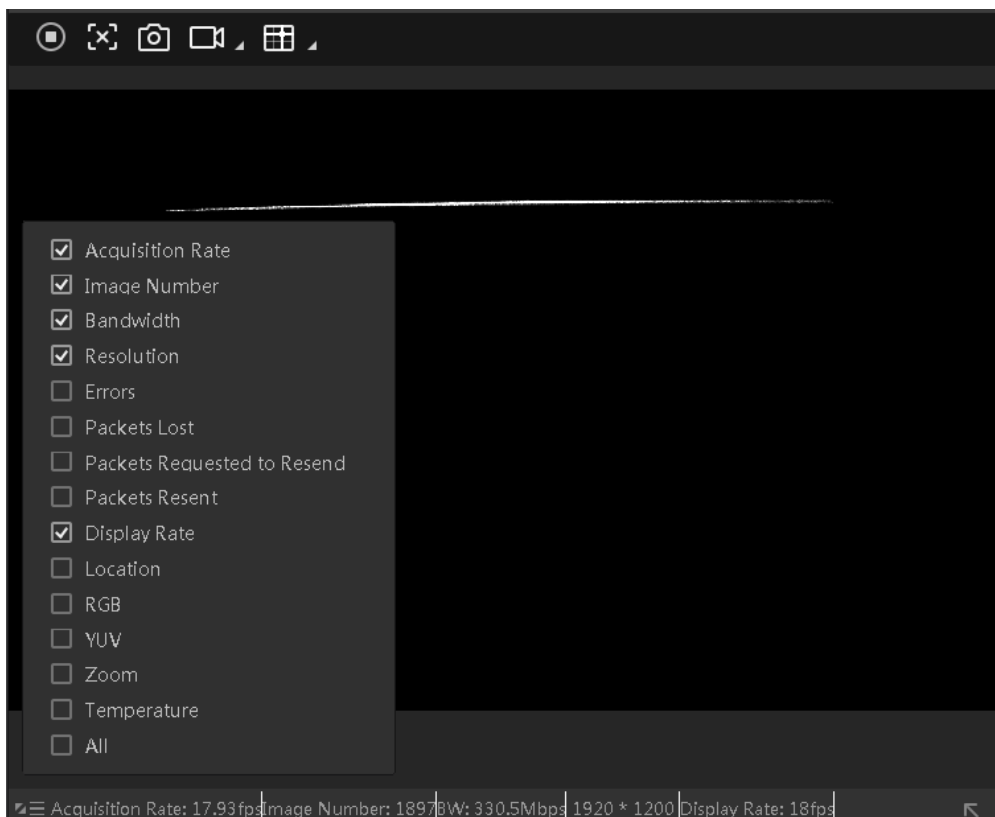
### 8.7.1. View Acquisition Status in 1-Window Mode

**Purpose:**

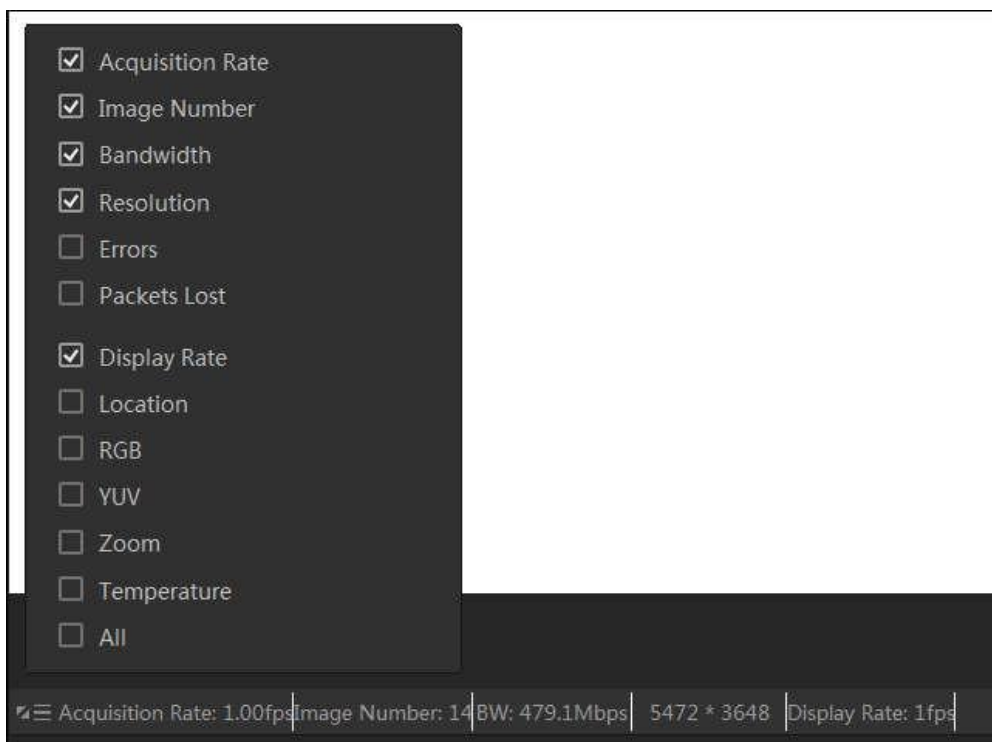
During acquisition or live view (in 1-Window mode), a status bar appears at the bottom of the display window to display in real time the acquisition status of the selected camera. You can select status parameters to display them on the status bar.

During live view in 1-window mode, you can click  at the lower-right corner of the display window to open the parameter panel. And then you can check the checkbox(es) to select the parameter(s) to be displayed on the status bar.

- For GigE Vision cameras, you can select the followings: acquisition rate, image number, bandwidth, resolution, errors, packet lost, packets requested to resend, packets resent, display rate, location, RGB, YUV, zoom, and temperature.




- For USB3 Vision cameras, you can select the followings: acquisition rate, image number, bandwidth, resolution, errors, packet lost, display rate, location, RGB, YUV, zoom, and temperature,



### 8.7.2. View Acquisition Status of Multiple Cameras Simultaneously

**Purpose:**

On the Status window, you can view the acquisition status of multiple cameras at the same time. You can also select status parameters to display them on the Status window or status bar.


During live view of multiple cameras, you can click  to open the Status window to view the acquisition status of these cameras. After that, you can click **More** to open the parameter panel, and then select parameters to be displayed on the Status window or status bar.

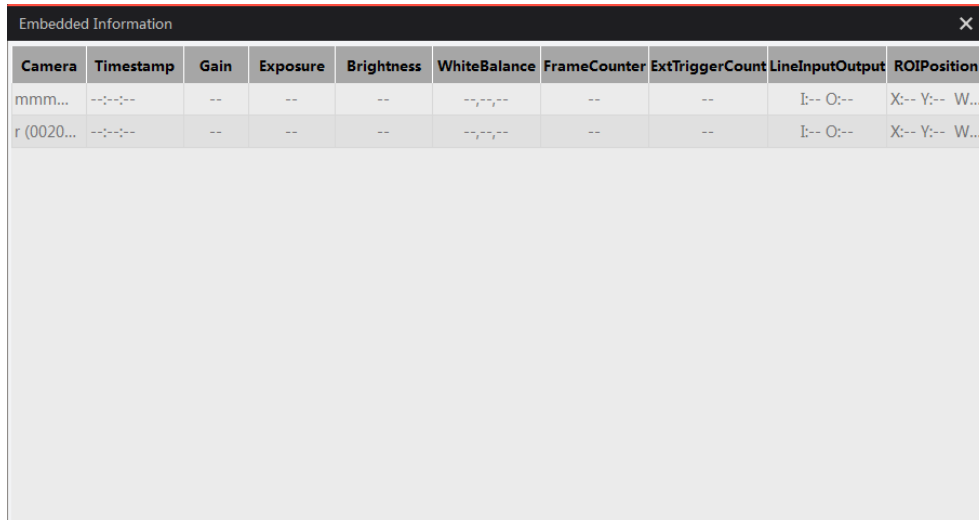
Status <span>✕</span>							
Camera	Acquisition Rate	Frame Number	Bandwidth	Resolution	Errors	Packets Lost	Display Rate
CA01...	0.00fps	1473	0.0Mbps	1280 * 1024	0	206943	0fps
CA06...	--fps	0	0.0Mbps		0	11883	0fps

## 8.8. View Embedded Information

### **Purpose:**

During live view, you can view the embedded image information, including timestamp, gain, exposure, brightness, external trigger number, etc.

During live view, click  to open the Embedded Information window.



Camera	Timestamp	Gain	Exposure	Brightness	WhiteBalance	FrameCounter	ExtTriggerCount	LineInputOutput	ROIPosition
mmm...	--:--:--	--	--	--	--_--_--	--	--	I:-- O:--	X:-- Y:-- W...
r (0020...	--:--:--	--	--	--	--_--_--	--	--	I:-- O:--	X:-- Y:-- W...

## 8.9. Zoom in/out

### **Purpose:**

You can zoom in or out the live video image.

During Live view, right-click the live video image and then click **Zoom in/Zoom out**, or move the cursor to the live video image and scroll the mouse wheel to zoom in or zoom out.

# Chapter 9 Tool Management

## **Purpose:**

The Client provide multiple tools for configuration and management of the connected cameras, such as IP configurator, firmware updater, and GigE Vision action command.

## 9.1. IP Configurator

### **Purpose:**

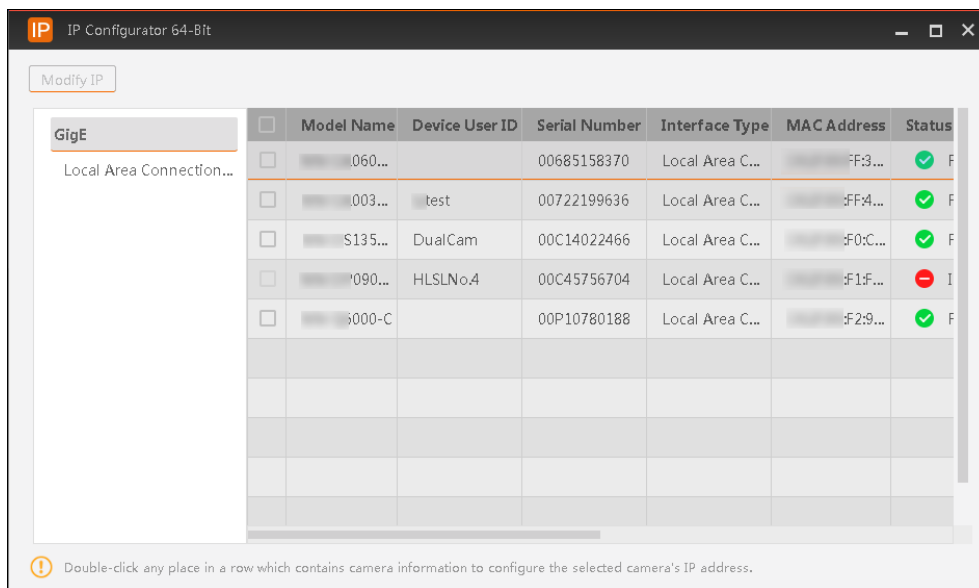
The online GigE Vision cameras in the same local subnet with the PC running the software will be detected and displayed in the device list. You can configure the IP addresses and other network parameters of these cameras.

### 9.1.1. Status of the Detected Camera

#### **Purpose:**

All the detected cameras in the same subnet will be displayed on the list. You can view the camera status.

Click **Tool > IP Configurator** to open the IP Configurator.



The following list shows the description for each status.

- **Free:** If the camera status is Free, the camera is available and you can edit its IP address
- **In Use:** If the camera status is In Use, it means the Client or other processes are accessing the camera. You need to disconnect the camera, or terminate other processes from accessing the camera.
- **Unreachable:** If a camera's status is unreachable,
  - ◆ the network of the camera is abnormal. Check the camera networks.
  - ◆ the camera is on the same subnet with the PC running the Client, but not in the same

network segment. To make the camera reachable, you should modify its IP address to the same network segment with the PC. See *Modify IP Address of the Camera*.

### 9.1.2. Modify IP Address of the Camera

**Purpose:**

You can modify the IP address of a camera if its status is Free or Unreachable.

**Note:** You should have disconnected the camera.

**Steps:**

1. Click **Tool->IP Configurator** to open the IP Configurator.
2. Select a network interface from the list on the left.
3. Open the Modify IP Address window.
  - Double-click any place in the camera row to open the Modify IP Address window.
  - Select a camera, and then click **Modify IP**.
4. Select the 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 reboot.

**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 PC 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 the address block fe80::/10.

5. (Optional) Edit the camera name in Device User ID field.
6. 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.

## 9.2. Firmware Updater

### Purpose:

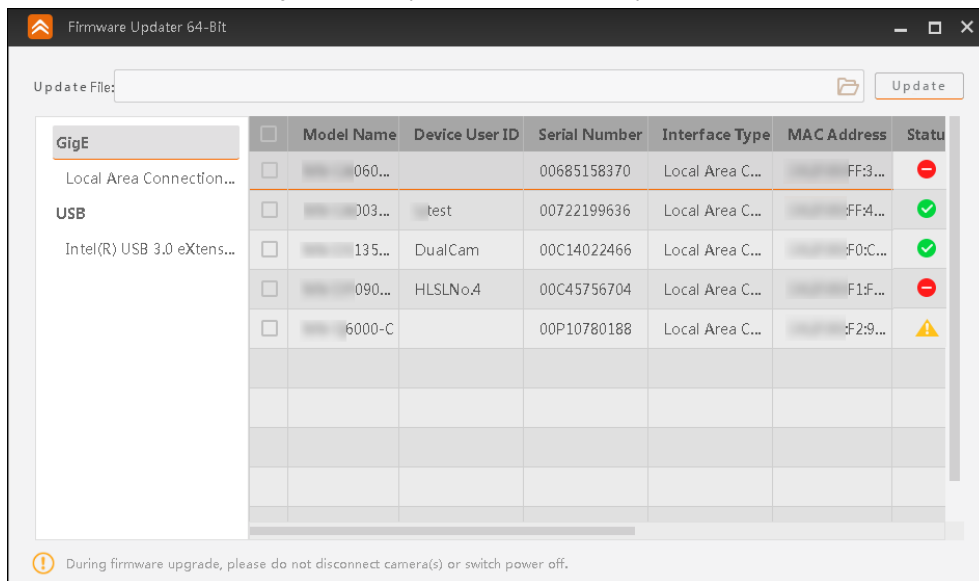
You can update the firmware(s) of the camera(s) via the Firmware Updater.


### Notes:

- You should stop acquisition and disconnect the camera(s) before updating the firmware(s).
- Cameras of different types of interfaces cannot be updated at the same time.
- The firmware update file should match the camera model.

### Steps:

1. Click **Tool -> Firmware Updater** to open the Firmware Updater window.



2. Click an interface to display cameras under it.
3. Click  to select the update file in the local PC.  
The matched updatable cameras will be selected automatically.
4. Click **Update**.

## 9.3. GigE Vision Action Command

### Purpose:

The Action Command is used to trigger actions in multiple cameras on a network simultaneously. When Action Command is configured, the Client can send commands across the network and have devices in a pre-defined group respond based on how they have been configured to respond to certain commands. In this way, a single command can trigger actions such as Frame Start in multiple cameras with a minimum of latency and configuration effort.

In MVS, action command is usually used for generating images in multiple cameras simultaneously, and the generated images can be used for image fusion.

**Note:** The camera should support this function

### Before You Start:

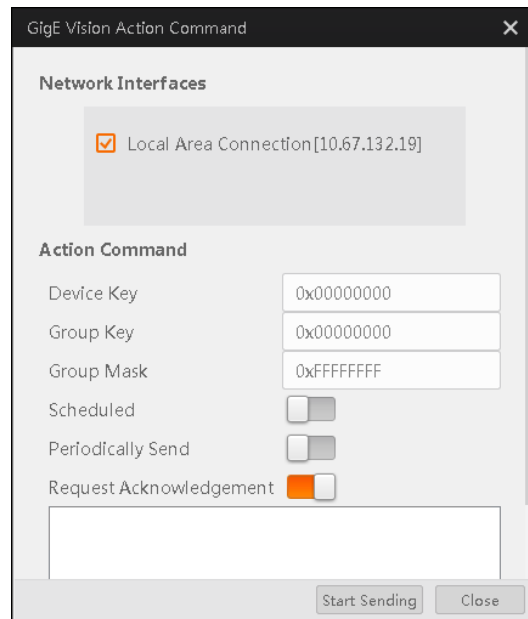
Search for the following features in the feature tree and configure them for each camera that needs

to receive commands.

Feature	Description
ActionDeviceKey	A kind of password which enables the camera to check the validity of the commands.
ActionGroupKey	Used to specify a group of cameras to perform actions.
Action Group Mask	Used to filter out some cameras from the specified group.

**Steps:**

1. Go to **Tool->GigE Vision Action Command**.



2. Select network interface(s) to set the subnet(s) that the command to be sent to.
3. Enter the device key, group key, and group mask.

**Note:** The value should be hexadecimal.

Parameter	Requirement
Device Key	Its value should be the same with the value of the ActionDeviceKey feature.
Group Key	Its value should be the same with the ActionGroupKey feature.
Group Mask	The bitwise AND operation of the Group Mask against the ActionGroupMask feature should results in non-zero.

4. (Optional) Turn on the **Scheduled** switch to enable scheduled action command.  
**Benchmark Camera:** The value of the GevTimestampValue feature of the selected camera will be automatically acquired and be used as the start time point for the delay.  
**Delay Time:** The delay time should NOT be shorter than the maximum time required to transmit the command across the network.  
 When the benchmark camera receives the command, all the cameras will trigger certain actions simultaneously after the specified delay time.
5. (Optional) Enable the Client to send commands periodically.
  - 1) Turn on the **Periodically Send** switch.
  - 2) Enter the interval for sending the commands.  
**Note:** The default value is 1000ms, and valid value range is from 1ms to 3600000ms.
6. (Optional) Turn on the **Request Acknowledgement** switch to display the acknowledgement



messages.

**Note:** Up to 50 messages can be displayed. Once the message number exceeds 50, the earliest message will be automatically deleted.

7. Click **Start Sending**.

## 9.4. View PC System Information

### **Purpose:**

You can view the PC system information by the tool called System Info. The system information includes CPU information, CPU core number, available memory, screen resolution, etc.

Perform the following task to open the System Info window.

### **Steps:**

1. Enter the terminal.
2. Execute the command `cd /opt/MVS/bin`.
3. Execute the command `./System_Info.sh` to open the System Info window.

You can click **Save as File** to save the PC system information as txt file to the local PC.

# Chapter 10 Logs

## Purpose:

On the Client, you view the logs of the client, as well as the SDK (Software Development Kit) logs via a tool called the Log Viewer.

## 10.1. Client Logs

### Purpose:

You can view the logs about operations and progresses on the Client.

Click  to open the Log Information window.

You can perform the following operations:

- View the level, date, content, and source of the logs.
- Click **Clear Logs** to clear all the logs.



Level	Date	Content	Source
Information	2018-07-04 17:20:52...	-CA050-20GM (00572673209) is c...	-CA050-20GM (00572...
Information	2018-07-04 17:20:54...	The GEV driver is enabled.	-CA050-20GM (00572...
Information	2018-07-04 17:20:57...	-CA013-20GC (00603310074) is co...	-CA013-20GC (006033...
Information	2018-07-04 17:21:00...	The GEV driver is enabled.	-CA013-20GC (006033...
Information	2018-07-04 17:21:08...	-CA060-11GM (00607929293) is c...	-CA060-11GM (00607...
Information	2018-07-04 17:21:10...	The GEV driver is enabled.	-CA060-11GM (00607...
Information	2018-07-04 17:21:22...	-CA050-20GM (00572673209) star...	-CA050-20GM (00572...
Information	2018-07-04 17:21:22...	-CA013-20GC (00603310074) start...	-CA013-20GC (006033...
Critical	2018-07-04 17:21:38...	CA060-11GM (00607929293) fail...	-CA060-11GM (00607...
Critical	2018-07-04 17:22:09...	" -CA050-20GM (00572673209)" is ...	-CA050-20GM (00572...

## 10.2. SDK Logs

### Purpose:

You can view the logs about Software Development Kit (SDK) via Log Viewer. You can also configure log settings such as the maximum number of displayed logs.

**Note:** You can uninstall the SDK Log service in the directory *opt/mvs/logserver*.

### 10.2.1. View SDK Logs

#### Purpose:

You can view the SDK log information, such as log type, log content, and source.

Click **Tool > Log Viewer** to open the Log Viewer window.

You can perform the following operations.

- **Export All SDK Logs:** Right-click the log list and then click **Export All Logs**.
- **Export Selected SDK Logs:** Hold down the **Shift** key and left-click the mouse to select multiple SDK logs continuously, and then right-click the log list and click **Export Selected Logs**.  
Or hold down the **Ctrl** key and left-click the mouse to select multiple SDK logs, and then right-click the log list and click **Export Selected Logs**.
- **Copy All SDK Logs:** Right-click the log list and then click **Copy All Logs**.
- **Copy Selected SDK Logs:** Hold down the **Shift** key and left-click the mouse to select multiple SDK logs continuously, and then right-click the log list and click **Copy Selected Logs**.  
Or hold down the **Ctrl** key and left-click the mouse to select multiple SDK logs, and then right-click the log list and click **Copy Selected Logs**.
- **Clear All SDK Logs:** Right-click the log list and then click **Clear Logs**.
- **View SDK Logs in Default Saving Path:** Go to the directory `var/log/MVS/MvSdkLog` to view SDK logs saved in the default saving path.

## 10.2.2. Configure SDK Log

### **Purpose:**

You can filter logs by DLLs and set the maximum number of the displayed logs and the interval for updating the log list.

### **Steps:**

1. Click **Tool >Log Viewer** to open the Log Viewer window.
2. Click **More > Settings** to open the Log Settings window.
3. Select so(s).  
Logs from the selected DLL(s) will be displayed.
4. Configure other settings in the Other Settings section.  
**Max. Displayed Logs:** maximum number of displayed logs.  
**Interval for Update (ms):** interval for updating the log list.

### **Notes:**

- Range of maximum displayed logs: 1 to 100,000 (default value: 1000).
  - Range of interval for update (ms): 100 to 1000,000 (default value: 1000).
5. Click **OK**.

# Chapter 11 FAQ

## 11.1. Check Running Environment

If the Client fails to enumerate cameras in the same local subnet or you can't view the live videos of cameras, check if the running environment meets the following requirements.

- Check if the NIC of the PC running the Client is a gigabit NIC.
- Check if the Jumbo Frame function of the NIC is enabled.
- Check if the network link between the GigE vision camera and the PC is of gigabit.
- Check if the USB interface of the PC running the Client is a USB 3.0 interface.
- Check if the USB cable connecting the camera and the PC meets USB 3.0 standard.

## 11.2. FAQ List

No.	Problem	Possible Causes	Solution
1	No GigE Vision camera is enumerated after running the Client.	The GigE Vision camera does not start properly or the network cable is connected properly.	Check the power supply of the camera (check LED indicator) and the network connection.
2	No USB3 Vision camera is detected after running the Client.	The USB3 Vision camera does not start properly or USB cable is not connected properly.	Check the LED indicator of the USB3 Vision camera.
3	The Client enumerates a GigE Vision camera, but fails to connect it.	The camera and the Client are not in the same network segment.	Use IP Configurator to modify the IP address of the camera. See <i>Modify IP Address of the Camera</i> for details.
		The camera has been accessed by another Client or program.	Disconnect the camera from any other Client or program, and then connect it to your Client again.
4	The Client enumerates a USB3 Vision camera, but fails to connect it	The camera has been accessed by another Client or program.	Disconnect the camera from any other Client or program, and then connect it to your Client again.
5	Live view shows black image.	Iris of lens is closed.	Open the iris of the lens.
		Camera exception.	Power off and reboot the camera.

6	Live view works fine. But when the trigger signals are provided by external trigger device, no image is triggered.	Certain trigger mode is not activated, or the trigger source is incorrectly selected.	Check if the camera triggering mode of current application scenario and the related triggering signal input is normal.
		Trigger wiring error.	Make sure that the wiring of the certain trigger is normal.
7	The USB3 Vision camera fails to start acquisition.	Insufficient USB cache.	Set the USB cache to a larger value in the Linux X86 system.

## Chapter 12 Get Support

### ***Purpose:***

If you can't solve your problems with the help of the user manual, please contact us to get support. Before contacting us, please check the detailed information of your current software version and PC system.

You can click **Help-> About** on the menu bar to view the current MVS Client version, and view the PC system information via System Info.

**Note:** For details about System Info, see *View PC System Information*.

Our Contacts:

- Official Website: Visit <http://en.hikrobotics.com/> to get other related documents or inquire us online.
- Email: [tech\\_support@hikrobotics.com](mailto:tech_support@hikrobotics.com)



See Far, Go Further