


# User's Manual

*Digital High Speed*



# MEMRECAM

## HXLink

## SP-642





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**MEMRECAM HXLink**  
**SP-642 User's Manual**

**March 2018**  
**Reference Number 800292-0P**

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# Introduction

Use of HXLink (this software) controls the MEMRECAM HX, GX, fx, Q series through the network and enables recorded images to be saved digitally on a PC.

This user's guide contains information on operations such as the standard settings and applications to use this software.

Carefully read the contents of this manual and any manuals for peripheral equipment before using.



# Please Read Carefully Before Using

## Safety Precautions

Completely read the following precautions before using. The following symbols and warnings are shown for items where safety precautions are required during handling or use. If a safety warning symbol is present, make sure to completely read the warning prior to use.

### **DANGER**

If the indications are ignored, dangerous conditions could result in death or serious injury.

### **WARNING**

If the indications are ignored, potentially dangerous conditions could result in death or serious injury.

### **CAUTION**

If the indications are ignored, potentially dangerous conditions could result in slight or moderate injury. Additionally, this caution sign is a warning of unsafe operation and indicates the potential of damage to this device or peripheral devices.

## Handling Precautions

### **Safety alert symbol**



This is an industry “safety alert symbol”. This symbol alerts you or others to the danger and/or items or operating concerns relating to the use of this device.

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### **Warning**



Turn off the power switch before connecting or disconnecting the cable. If the cables are connected or disconnected with the power switch ON, electrical shock or damage to the equipment may occur



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Unplug the power cable from the outlet when replacing fuses. Do not open the cover. Depending on the device, there may be parts that generate high voltage internally so leaving the cover open could result in electrical shock.

There may be problems with the conditions and circumstances of use for this device that are not indicated above. Therefore, make sure you understand the general provisions noted in the Operating Guide (or User's Manual) before using. Also, if there are any questions about this device, please directly contact the store where purchased.

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# 1

## Overview

## 1.1 Basic Functions

The following can be performed with the HXLink.

- Control of the MEMREACM HX, GX, Q and fx series cameras (preview, recording, playback, download)
- Playback of camera recorded files (MCFF, CIF), image quality adjustment, cropping, superimposition of information and format conversion (AVI, TIFF, BMP, JPEG)
- Playback of image files (AVI, TIFF, BMP, JPEG)
- Image measurement      Coordinate measurement (camera preview images, downloaded images, image files) and LAA measurement (camera image files, image files)

Zooms and scrolls images for display.

Synchronized display is possible to synchronize display of images of multiple specified items (camera or file).

For video playback, the playback range, playback direction and frame rate can be specified. Control of the MEMRECAM ci camera is not performed but the downloaded image (CIF) can be handled in the same manner as MCFF. Also, scene capturing of the ci camera image in the MCFF format can be performed from the data cartridge.

If the optional GX-HUB is used, synchronized high precision photography can be performed with the GX camera.

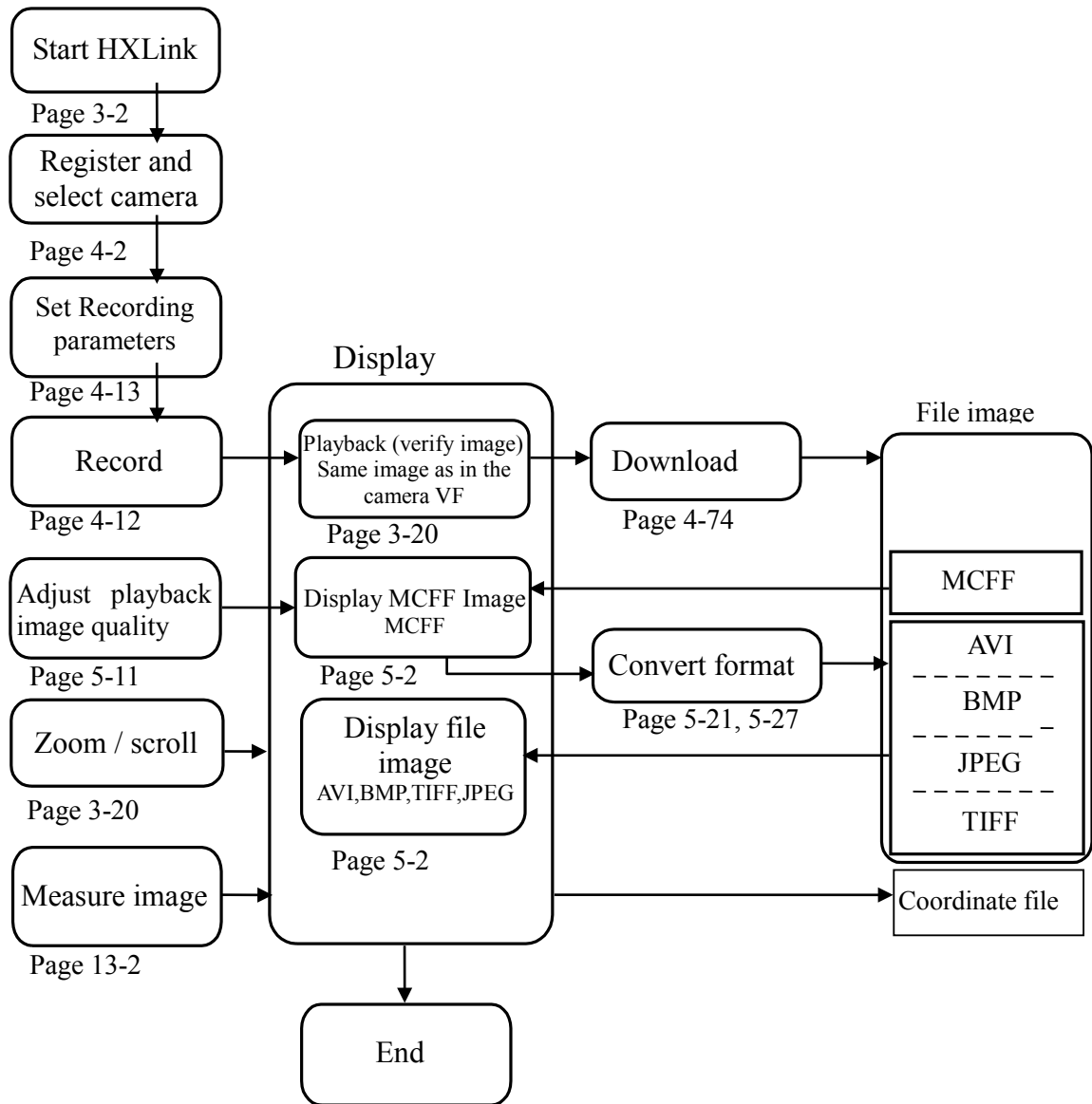
If the optional M-HUB is used, synchronized high precision photography can be performed with the fx camera.

If the optional Q-HUB is used, synchronized high precision photography can be performed with the Q camera.

If only the fx camera is used and the HXLink screen settings are selected for fxLink compatibility, the GUI for the dedicated fx camera can be used. Refer to the GXLink (for fx) user's manual (800238) for details.

## 1.2 Overview of Operations

An overview of the flow of HXLink operations is shown below.



## 1.3 File Types

### 1. Camera Data (IMGE.DAT)

Camera data files are assigned the file name of IMGE.DAT when the MEMRECAM ci series camera recorded images are saved as image files in the data cartridge. Multiple recorded images are saved in IMGE.DAT. The data cartridge rapidly executes the storage format for the MEMRECAM ci recorded image.

With the HXLink, recorded images from the camera data file IMGE.DAT can be captured on the camera image file (MCFF) for each scene.

### 2. Camera Image Files (MCFF, CIF)

Camera image files include MCFF (MEMRECAM Camera File Format) and CIF (CI File).

An MCFF is a single scene image file recorded on a MEMRECAM HX/GX/Q/fx/ci series camera with an extension of mcf.

A CIF is a single scene image file recorded on a MEMRECAM ci series camera with an extension of .cif.

MCFF and CIF contain the image recorded with the camera as well as recording information at the time of recording.

With the HXLink, the image quality of the camera image loaded (MCFF, CIF) is adjusted and can be saved after conversion to a standard image file (AVI, TIFF, BMP, JPEG).

### 3. Video Files (AVI)

AVI files are a type of multimedia file used with Microsoft Video for Windows that have an extension of .avi. The quantity of data on the AVI files can be compressed using a special program (codec).

Codec corresponding to the image compression method is required to display AVI file images. HXLink does not use CODEC, but can save and playback AVI files with the Motion JPEG method.

Additionally, HXLink can conduct AVI file storage/playback using the compression/extension CODEC registered in Windows.

### 4. Still Image Files (TIFF, BMP, JPEG)

With HXLink, images for the designated frame range for the camera image file (MCFF, CIF) can be converted to standard still image files in TIFF, BMP, or JPEG format for each frame and then saved, and the image information or recording information from recording can be saved in a scene information file.

A number can be added to the file name of the still image file designated when converted and saved.

The number added to the file name is increased for each frame, using 0 for the starting frame during conversion and saving.

The HXLink loads the converted and saved still image files and the scene information files for playback as a video.

Also, the snapshot function can save the displayed camera image file as a still image. There is a function to superimpose information while recording, and still image files can be displayed on live images.

### 5. Scene Information Files (TXT)

With HXLink, the conversion settings when converted and saved, as well as the photographic information for MCFF recording, can be saved in the scene information file (text file TXT) with the same name as the image file. HXLink displays the information for the frame range of the scene information file during video playback of the still image file as the loaded frame number.

#### 6. Conversion Settings Files (FCV)

With HXLink, image quality adjustment is performed on the camera image file (MCFF, CIF) and the settings can be saved in the conversion settings file (FCV). With the FCV file settings loaded, the MCFF image quality can be set.

Additionally, the FCV file settings used normally can be registered as the default settings.

When the size of AVI CODEC configuration parameter is 512 characters or more, it will be saved at CODEC Configuration File, and the file name of CODEC Configuration File will be saved at FCV File.

Refer to the description in Appendix B for details on FCV files.

#### 7. Parameter Settings Files (PRM)

With HXLink, the camera parameters can be saved as the file settings (PRM). Details of the parameter files saved can be saved to another camera.

Refer to the description in Appendix C for details on PRM files.

#### 8. Coordinate Point Files (CSV)

With HXLink, the coordinates for the live image displayed or the file image are measured and the measured coordinate data can be output to the CSV file.

Refer to page 13-3 for details

#### 9. Waveform Data Files (NWF)

The HXLink Waveform Input Software option can be used to input analog data (waveform data) during recording and save the waveform data to the file (NWF). HXLink can synchronize and display the graph of the waveform data for this NWF file with the image. Additionally, the waveform data can be printed and the CSV output.

#### 10. Conversion Settings File (INI)

The file specifying the conversion procedures when performing format conversion with batch processing (batch conversion of files).

Procedures created with the conversion settings file output in the format conversion window for the list of HXLink formats can be used for format conversion by loading the BatchConv program for the file.

#### 11. Auto Pilot Sequence Execution File (SEQUENCE.DAT)

File indicating the commands for the HX, GX camera auto pilot function.

Connect the USB media where the sequence conversion file is saved to the HX, GX camera, and restart the HX, GX camera to execute the auto-pilot.

#### 12. Auto Pilot Sequence File (APF)

The sequence file is a file that records the auto pilot sequence for the HX, GX camera.

The sequence file can convert to a sequence execution file.

The file name of the sequence file is the date and time created, with an extension of .APF.

#### 13. Lens Parameter File (LNC)

The lens parameter file is a file that controls the EF lens when the HX camera EF mounted adapter is connected.

The file name of the sequence file is the date and time created, with an extension of .LNC.

#### 14. LUT TABLE (TXT)

File for table data of luminance properties. Individual luminance property files can be created and applied to the HX camera of MCFF file.

The file extension is .TXT.

#### 15. CODEC Configuration File(CSDT)

This is the file to save configuration parameter of AVI CODEC. (Compression program)

The configuration parameter will be saved at CODEC configuration file when the configuration parameter is 512 characters or more.

The file extension is .CSDT.

Refer to the description in Appendix B for details on CODEC Configuration File.

# 2

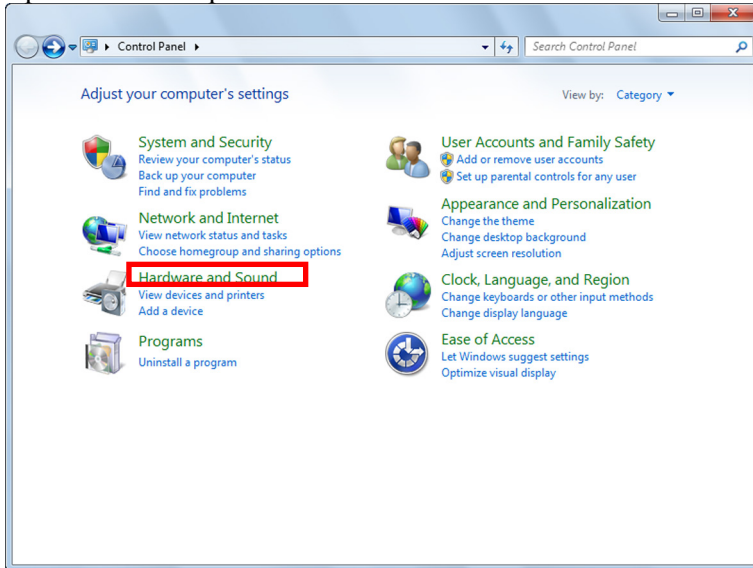
## Installation

## 2.1 PC Settings

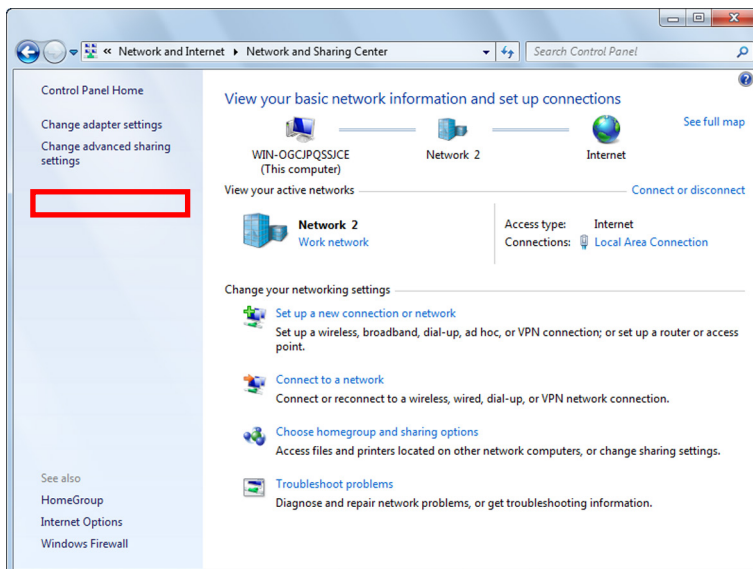
Have the user with Windows Administrators authorization log in.  
Connect the powered up HUB or camera to the LAN port used for camera control.  
This manual describes the setting method for Windows7.

### ■ PC IP Address Settings

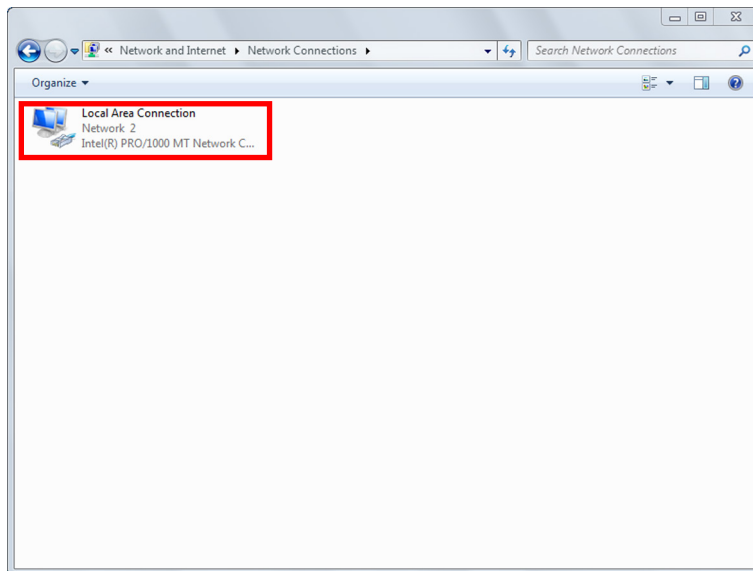
Open the control panel from the Windows start button.



Click to open "View network status and tasks".



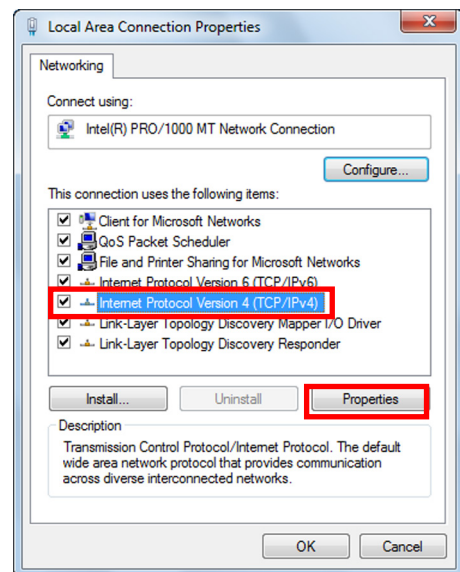
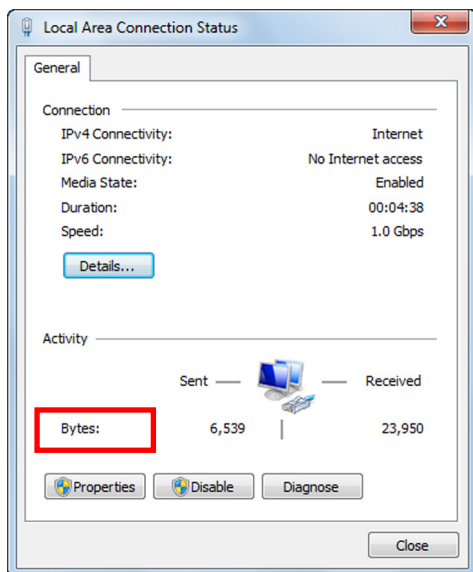
Click to open "Change Adapter Settings".



Double click to open the LAN port connection used for HX camera control.

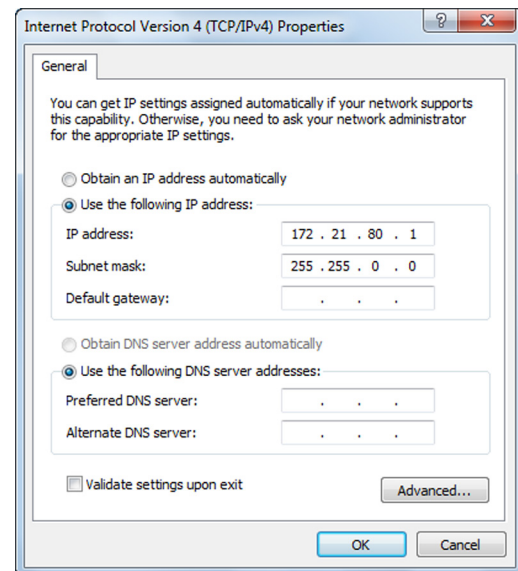
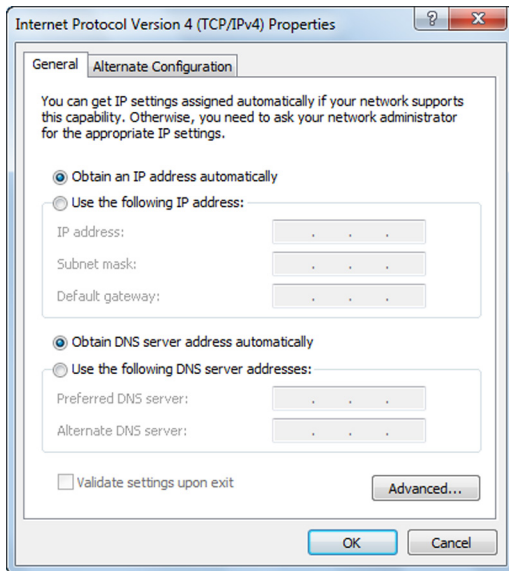
Normally, select "Local Area Connection". This manual describes an example where "Local Area Connection" is selected.

If extending the LAN adapter for camera control, select the name of the connection for "Local Area Connection 2".



Click "Properties" in the "Local Area Connection Status" window to open the "Properties" window for the local area connection.

Select "Internet Protocol Version 4 (TCP/IPv4)" in the items under the "This Connection Uses the Following Items" in "Local Area Connection Properties", and then click on "Properties" immediately under that to open the window for "Internet Protocol Version 4 (TCP/IPv4) Properties".

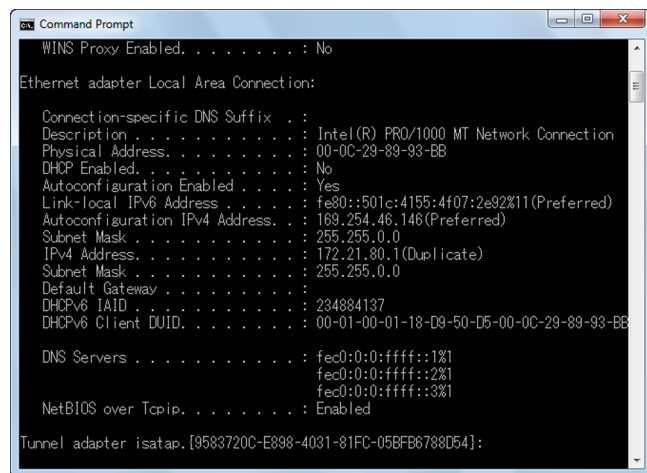
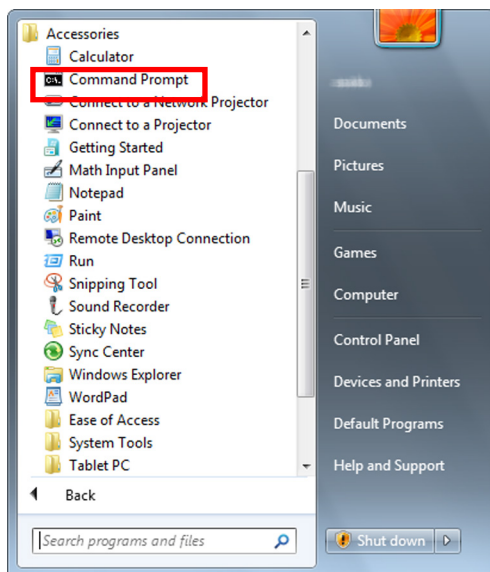


As shown in the figure on the right, set the PC IP address to 172.21.80.1 and set the subnet mask to 255.255.0.0.

Click OK for "Internet Protocol (TCP/IP) Properties", and then click OK for the "Local Area Connection Properties" to confirm the settings. Close the "Local Area Connection Status" window.

Confirm the IP address set for the PC by performing the ipconfig command with the command prompt.

Open accessories from the Windows start button and click "Command Prompts" to open.



Type in ipconfig and press Enter to display the PC IP address.

(\*) If the PC IP address for the IP address setting is set to something other than 172.21.80.1, set the PC IP address the same as that for the camera IP address.

At this point, communication is not possible if the PC and the camera don't have the same LAN IP address set, so in the example, the IP address for both the PC and the camera must be 172.21.\*.\*. If the camera IP address is changed, refer to the user's manual for the camera.

- For an FC-AL connection, before installing the MEMRECAM HXLink, the FC-AL host bus adapter driver should be installed by attaching the FC-AL host bus adapter to the PC.

Refer to Appendix E for Windows8, or later.

## 2.2 Installation Procedures

Have an authorized user of the Windows Administrators group log on.

The following settings can be required prior to installation.

Start the HXLink installation once the settings are complete.

For using Q camera,

Install GenIcam and GigE Vision Filter Driver in accordance with the environment.

Confirm your windows environment prior to HXLink installation.

Open "Control Panel", "all control panel items", "System", check whether 32bit/ 64bit in "System type".

If HXLink and/or GigE Vision Filter Driver are already installed,  
please perform the uninstallation. Refer to page 2-21 for details.

For a TCP/IP MEMRECAM connection,

"TCP/IP Network Optimization" is performed when HXLink is installed.

When using the installer of HXLink Ver 1.95 d or earlier, install to a PC connected to a LAN (Ethernet HUB) or a MEMRECAM that is turned on.

During HXLink installation, if the PC is not connected to a LAN or a MEMRECAM, you will be required to conduct "TCP/IP Network Optimization" again when the MEMRECAM is connected. Click on "TCP/IP Network Optimization" in the Windows start menu and reboot the PC after setting.

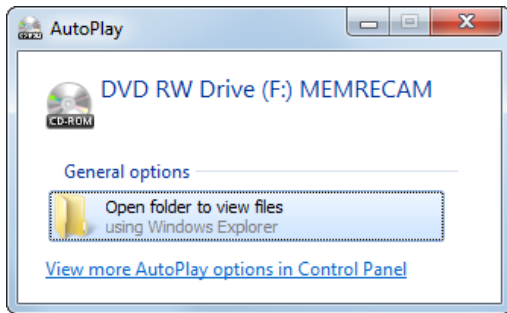
For the installation method when connecting the K5, RX-6G, RX-5G camera for the Gbit (1000BASE-T) connection using Windows XP,

install the the iSCSI Initiator and set the PC network by referencing the supplemental camera manual "1000BASE-T Interface Connections Supplemental User's Manual (800152)". The "1000BASE-T Interface Connections Supplemental User's Manual (800152)" refers to the use of fxLink as the camera control software but with HXLink installed instead of fxLink.

When connecting the K5, RX-6G, RX-5G camera for the Gbit (1000BASE-T) connection using Windows Vista/7/8/8.1/10,

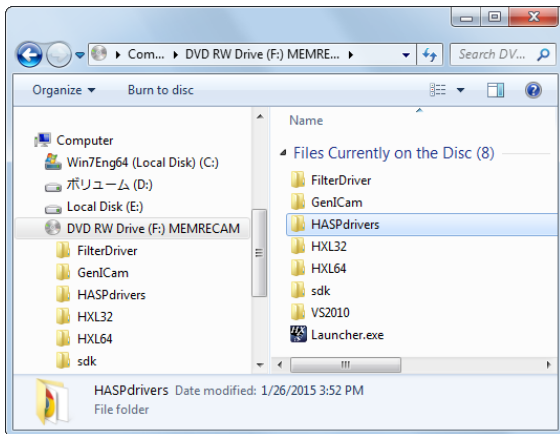
start up the "Microsoft iSCSI Initiator Service" by referencing the procedure on page 2-16.

Insert the HXLink CD into the CD-ROM drive when other applications are not running and the MEMRECAM HXLink installation will start.



Once all of the PC applications have been completed, the "Automatic Playback" window is displayed when the HXLink CD is inserted into the PC CD drive.

Click "Execute setup.exe" to start the installer and installation.



The HXLink CD is displayed in Explorer so double click on "setup.exe" in the "HXLink" folder.

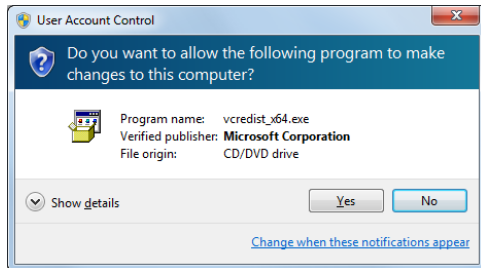
The "CUDA2Setup" and "HASPdrivers" folders on the CD are the various types of program folders for options sold separately. See the manuals for each of the attached options for details.

## ■Install Microsoft Visual C++ 2010

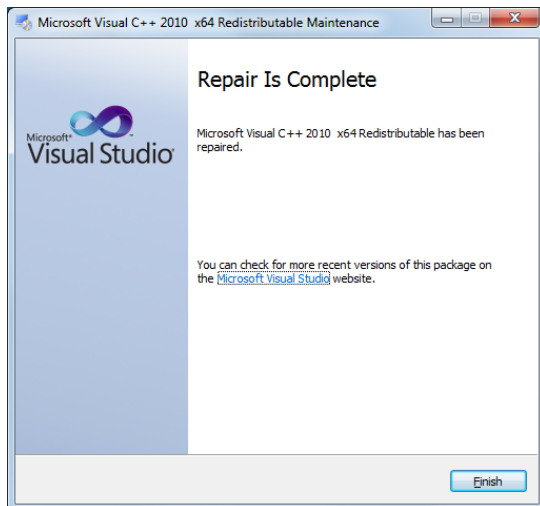
In VS2010 folder, there is a 32bit program installer for vcredist\_x86.exe and 64bit program installer vcredist\_x64.exe.

Please run vcredist\_x86.exe only if you want to install the HXLink 32bit version, both of vcredist\_x86.exe and vcredist\_x64.exe If you are installing the HXLink 64bit version.

Lists the steps to install the HXLink 64bit version.



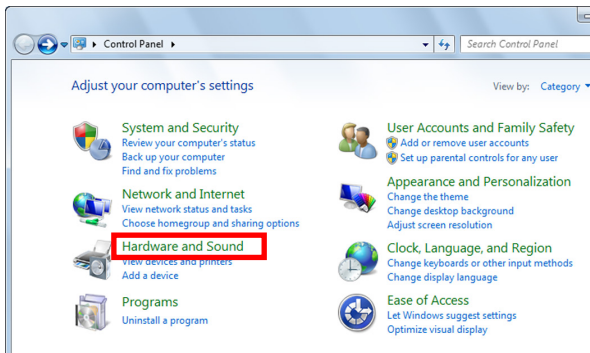
Double-click the vcredist\_x64.exe for VS2010 folder. Then Install the 64bit for Microsoft Visual C++ 2010 wizard.



Completion of installation of vcredist\_x64.exe.

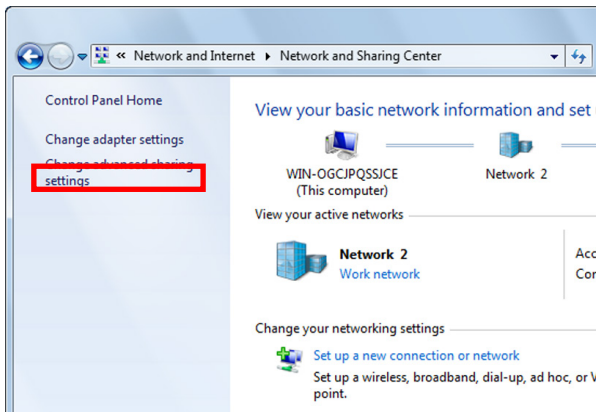
Also install vcredist\_x86.exe as well.

## ■ Install GigE Vision Filter Driver

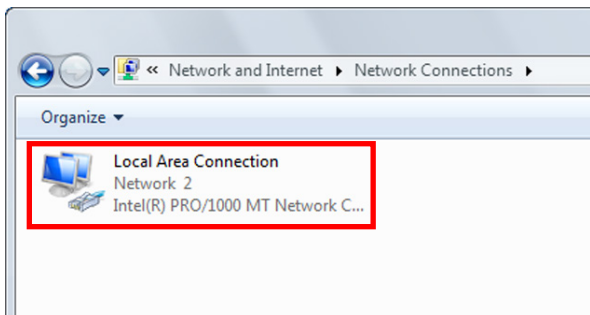


Open the control panel from the Windows start button.

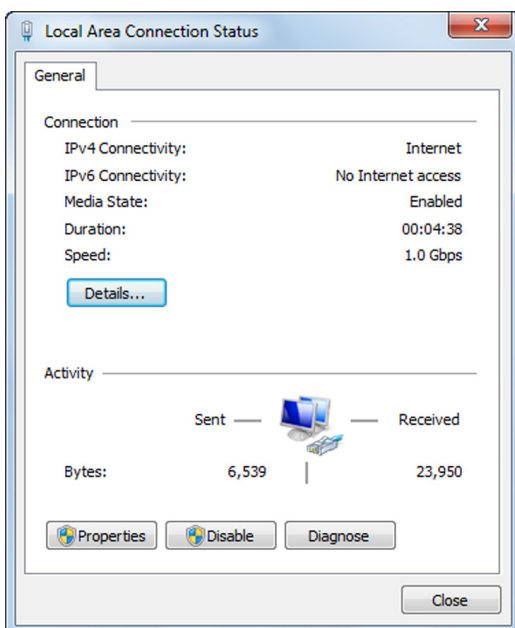
Click to open "View network status and tasks".



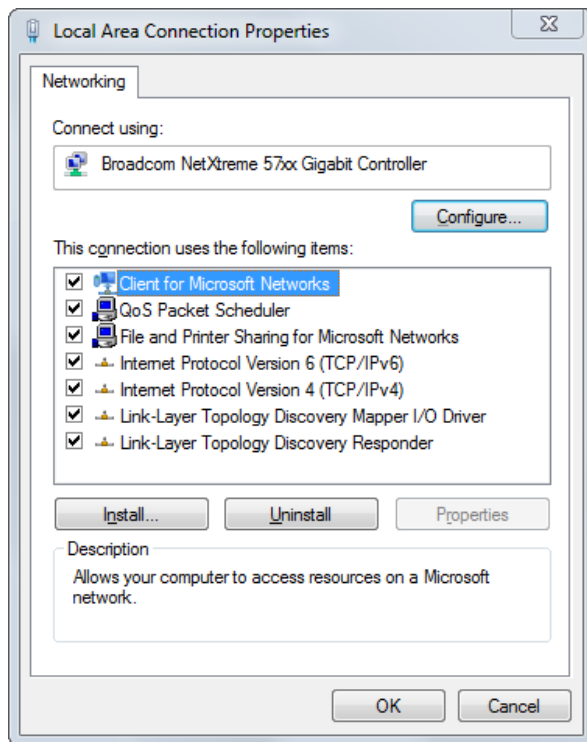
Click to open "Change Adapter Settings".



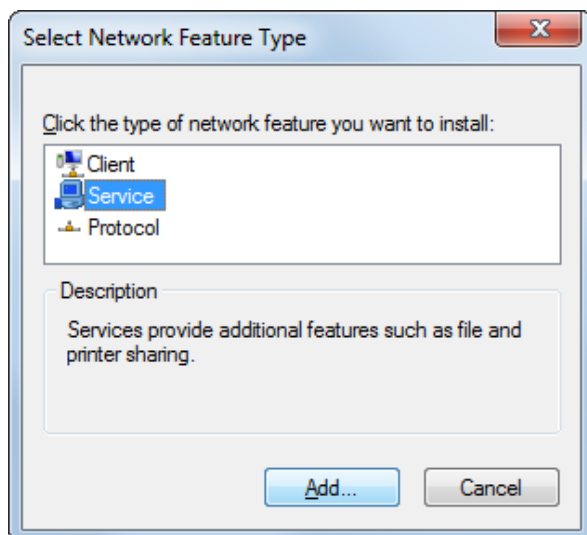
Double click to open the LAN port connection for camera control.



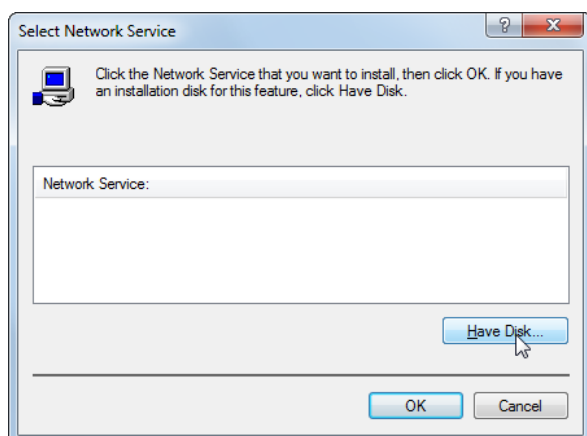
Click "Properties" in the "Local Area Connection Status" window to open the "Properties" window for the local area connection.



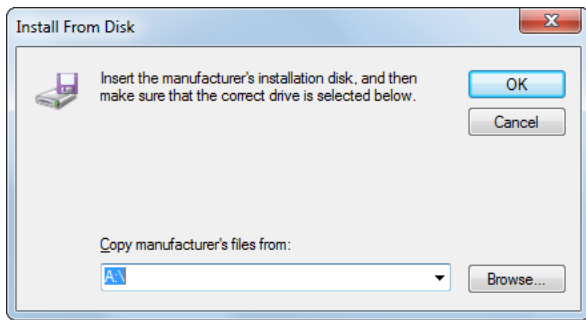
Click “Install” in “Networking” tab.



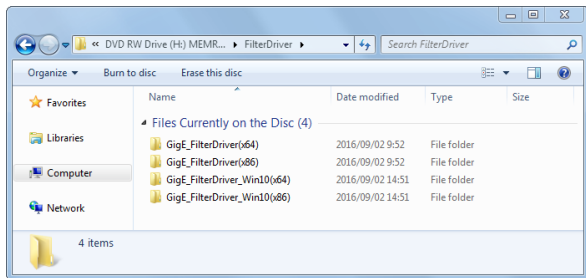
Click “Service” as the type of network feature, and click “Add”.



Click “Have Disk” to set installation disk.



Click “Browse” to insert the manufacturer’s installation disk.



Open explorer and confirm the following folder in install CD according to your OS.

Windows 7/8/8.1 64bit: GigE\_FilterDriver(x64)

Windows 7/8/8.1 32bit: GigE\_FilterDriver(x86)

Windows 10 64bit: GigE\_FilterDriver\_Win10(x64)

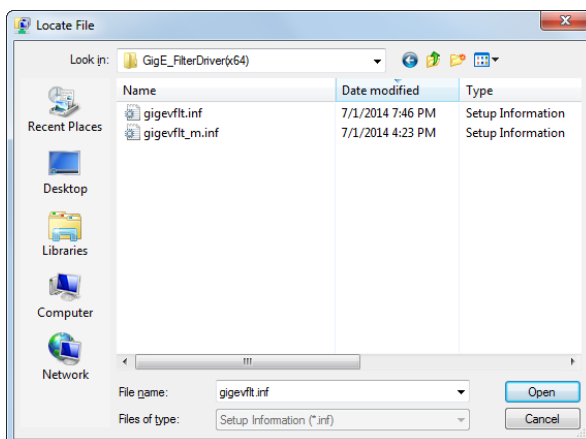
Windows 10 32bit: GigE\_FilterDriver\_Win10(x86)



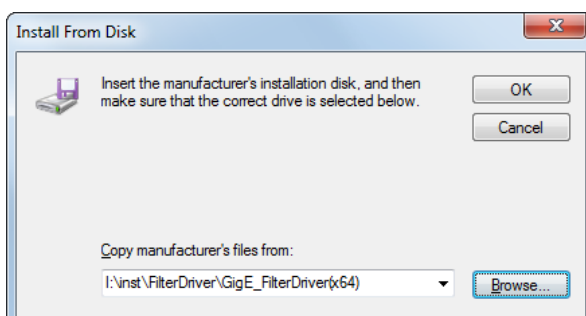
### Caution

Before you install the Filter Driver, check the Windows edition and select the correct "FilterDriver" folder.

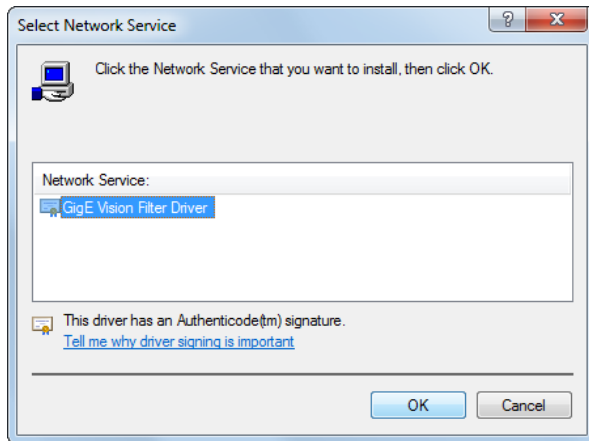
If you install a different driver Windows of the type, you may not be undone.



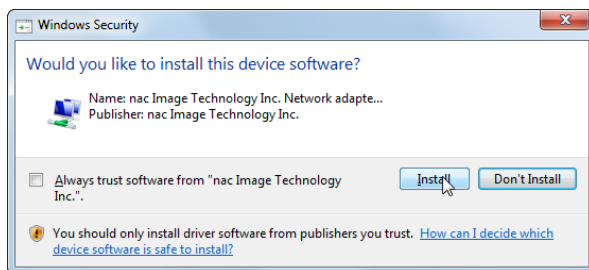
At “File name” dialog, select “gigevflt.inf” in the above folder you confirmed and click “Open”.



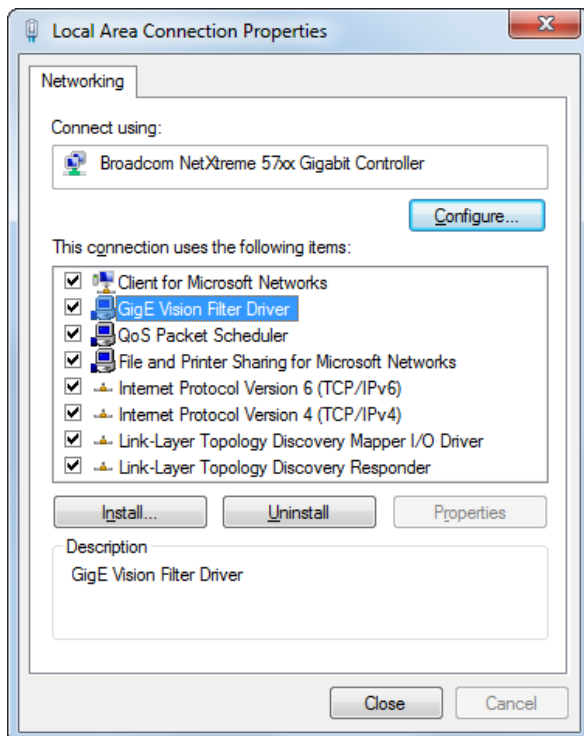
Click “OK”.



Select “GigE Vision Filter Driver” as the Network service you want to install and click “OK”.



If “Windows Security” window is displayed, click “Install”.



Installation completed in a few seconds.

Finally, open “Properties” window for the local area connection again and make sure that “GigE Vision Filter Driver” is added and checked.

Then click “OK”.

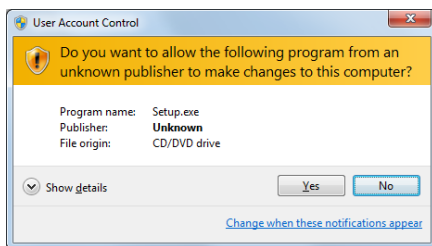
Installation of GigE Vision Filter Driver now completed.

## ■Install HXLink Application

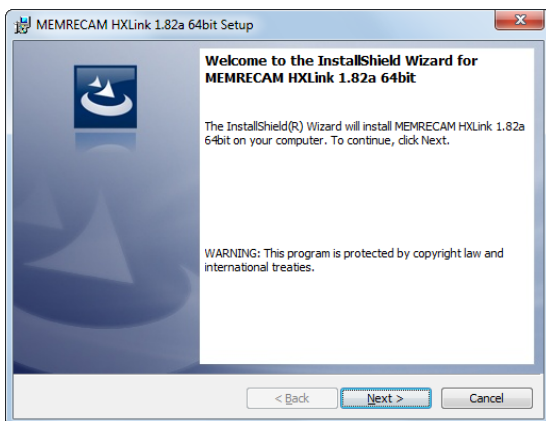


Displays the launcher by double-clicking the Launcher.exe of HXLink installer.

Click the button of HXLink 32bit version / 64bit version to install.



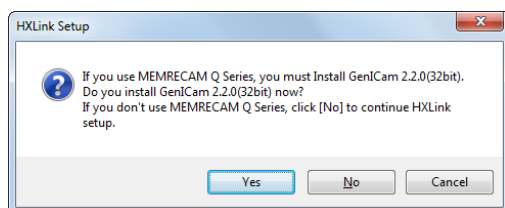
Click "Yes", and then continue with the installation.



Upon starting the installation, "Welcome to the MEMRECAM HXLink Setup" appears.

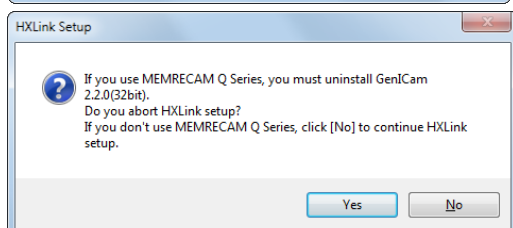
Click "Next" to start the installation.

When environment for using Q camera is not prepared, the following either warning can be displayed. If you do not use Q camera, click "No" and continue HXLink installation



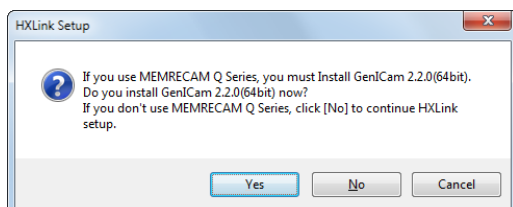
Case1: In 32bit OS,

Click "Yes" to install GenIcam 32bit.  
Follow the wizard instructions to finish GenIcam installation and continue HXLink installation.



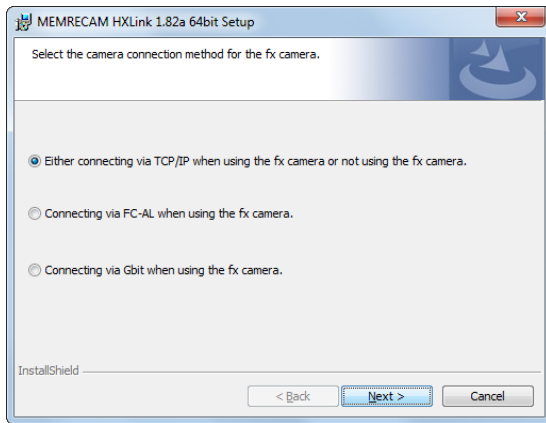
Case2: In 64bit OS,

GenIcam 32bit is unusable.  
Click "Yes" to stop HXLink installation and uninstall GenIcam 32bit.  
Refer to 2-24 for details of uninstallation GenIcam.



Case3: In 64bit OS,

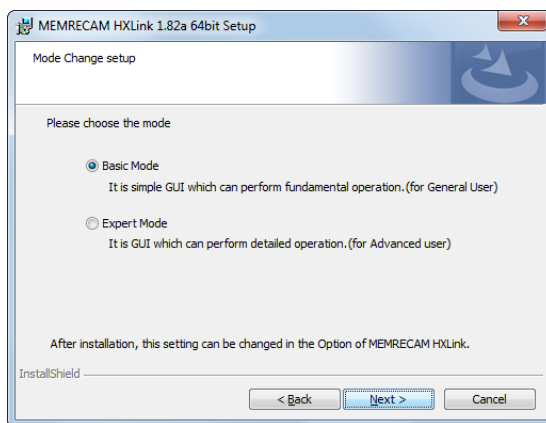
Click "Yes" to install GenIcam 64bit.  
Follow the wizard instructions to finish GenIcam installation and continue HXLink installation.



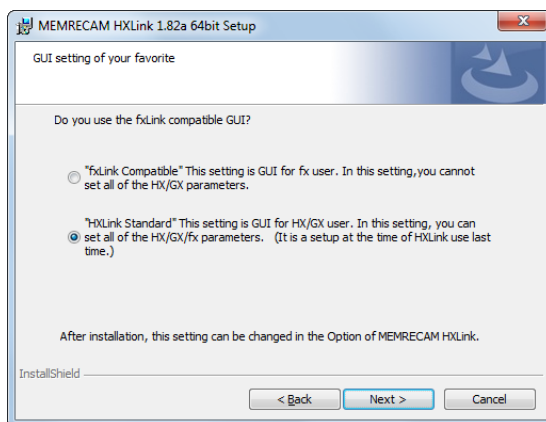
Set the fx camera connection method.  
If not using an fx camera, or if using a TCP/IP connection, simply click "Next".

If using an fx camera with an FC-AL connection, select "Use fx Camera with an FC-AL Connection" and click "Next".

If using an fx camera with a Gbit connection, select "Use fx Camera with Gbit Connection" and click "Next".



Select standard installation and click "Next". The optimal components are installed with standard installation.



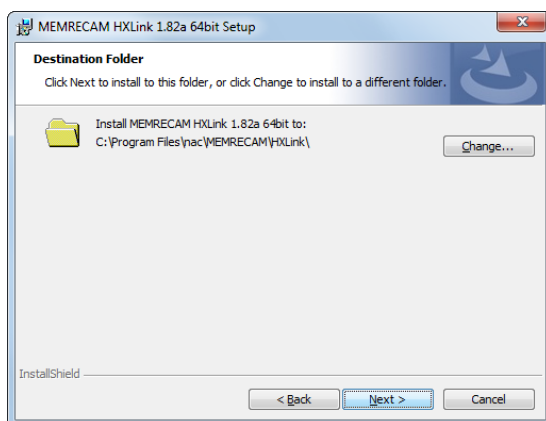
Select an fxLink compatible GUI.

#### Compatible fxLink

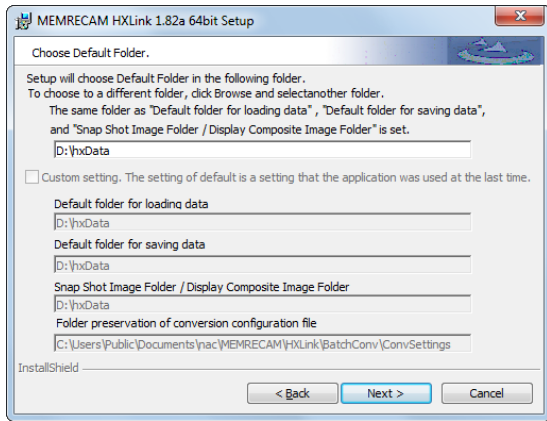
GUI corresponding to the fx camera.  
All of the HX/GX/fx/Q camera functions cannot be used.

#### Standard HXLink

All of the HX/GX/fx/Q camera functions can be used.



If changing the drive or folder for installing the program, click "Browse" and set the folder for installing the program. After designating the folder, click "Next".



Select the previously set folder.

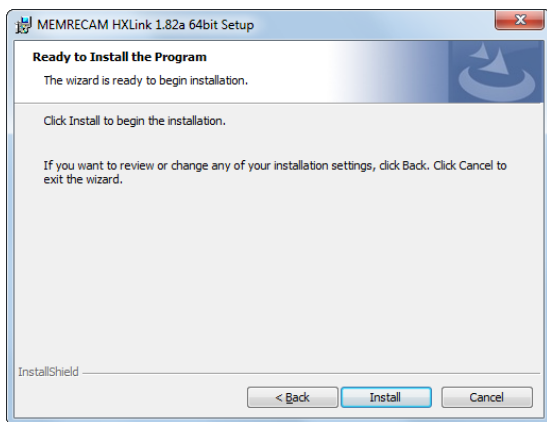
If changing the default settings, select the folder.

After designating the folder, click "Next".

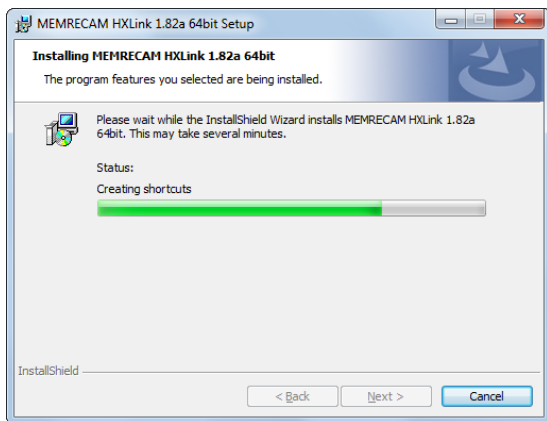
When first installing HXLink, settings for the previously set input folder, save folder, snapshot/cross fade display folder are set in the same folders.

If updating HXLink versions, the previous settings for each folder can be set individually.

Selection of the previously set folders can be changed when executing HXLink.



The installation will start when you click the "Install".



This performs "TCP IP Network Optimization".



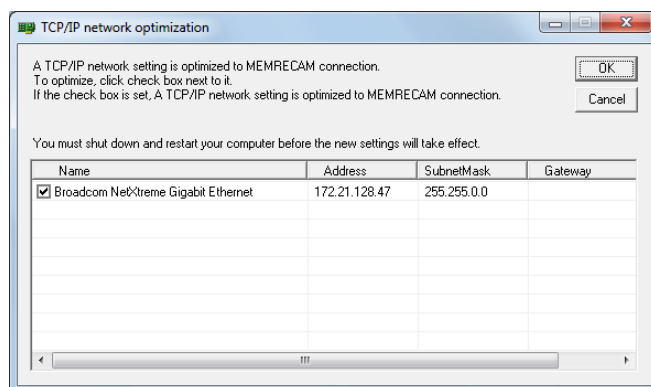
**Caution**

When using the installer of HXLink Ver 1.95 d or earlier, after connecting the PC to the LAN HUB or MEMRECAM, please perform the "TCP IP Network Optimization" operation.

Since HXLink Ver 1.96a and later, there is no need to connect the PC to the LAN HUB or MEMRECAM.

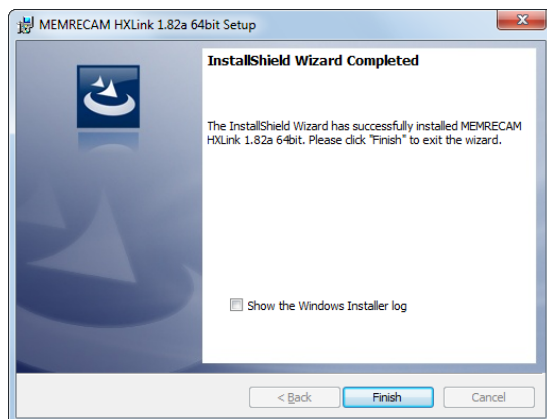
If "TCP IP Network Optimization" is not executed, a message requesting "TCP IP Network Optimization" appears when connecting to MEMRECAM.

At that point, end HXLink and perform "TCP/IP Network Optimization" in "Start Menu" -> "MEMRECAM HXLink" and restart the PC.



Add a check mark to the network board used for camera connection and click the [OK] button.

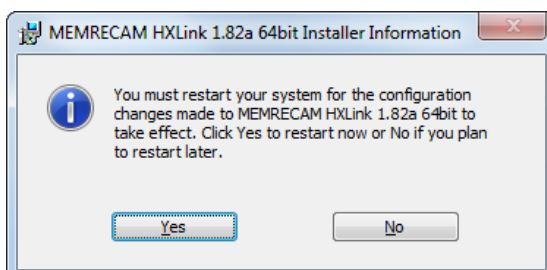
HXLink uses the network board selected here for camera control.



Click "Finish" when the dialog for setup complete is displayed.

Reboot the computer before using the program.

This completes the installation of the HXLink application.

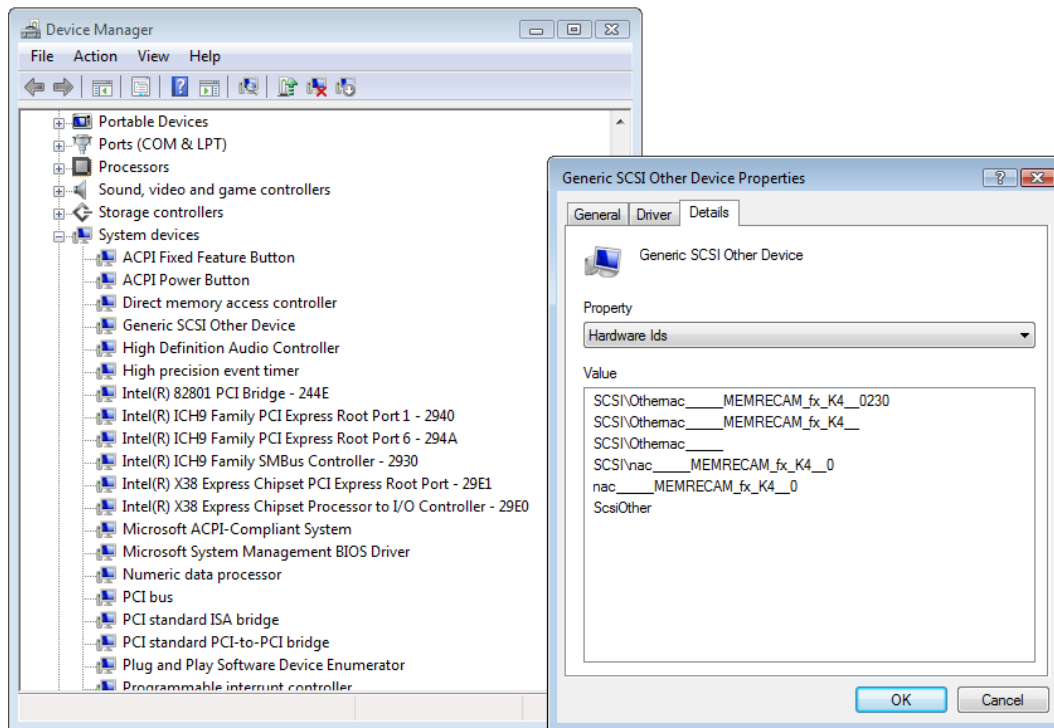


## 2.3 Settings for using fx camera FC-AL/Gbit(iSCSI)

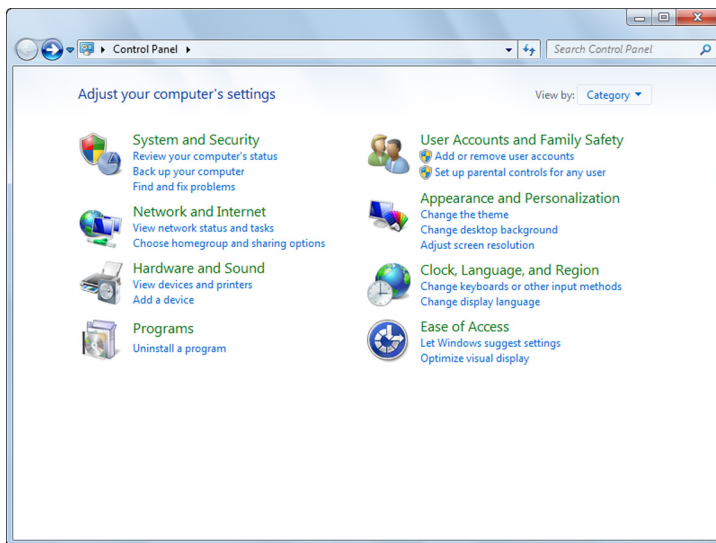
○Windows Vista/7/8/8.1/10

Verify that the camera is connected in the Device Manager. Verify as "Generic SCSI Other Device" under "System Devices".

Open "Property" in "Generic SCSI Other Device" and select "Details". Select "Hardware IDs" in "Property" to display detailed information in "Value" and verify the MEMRECAM camera.



If connecting K5,RX-6G, RX-5G cameras with a Gbit (100BASE-T) connection using Windows Vista/7/8, start up the "Microsoft iSCSI Initiator Service" according to the following procedures.

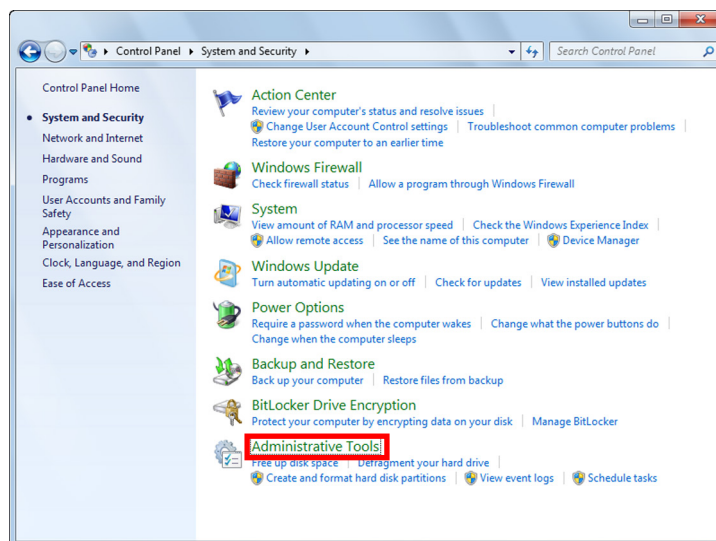


Windows Vista

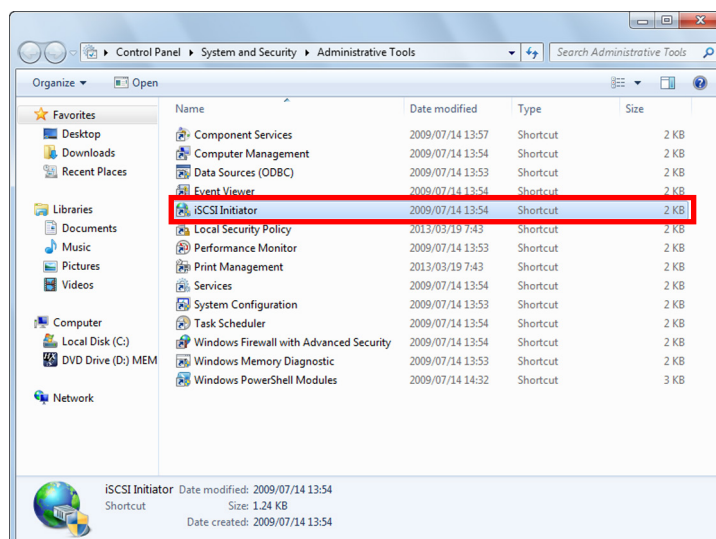
Open the "Control Panel" and double click on "System and Maintenance".

Windows 7/8

Open the "Control Panel" and double click on "System and Security"

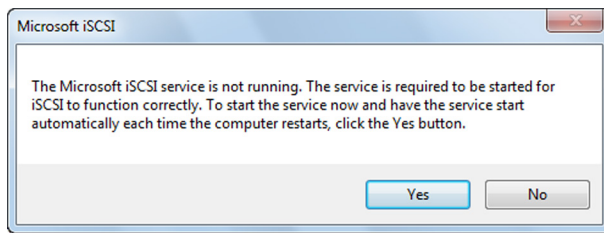


Double click on "Administrative Tools".

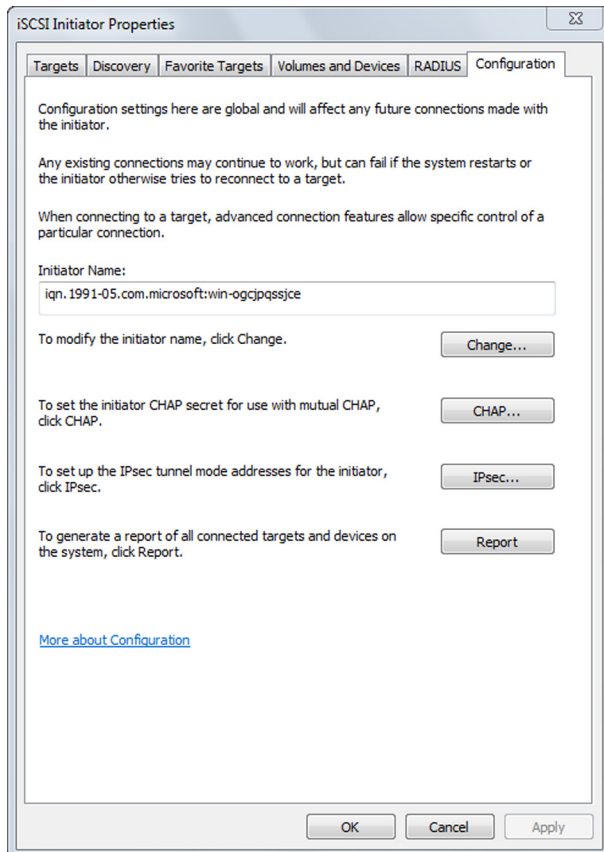


In "Administrative Tools", double click on "iSCSI Initiator".

If the UAC is valid, the "User Account Controls" will be displayed.  
Click on "Continue" in "User Account Controls".



A message will appear to confirm automatic execution of "Microsoft iSCSI Initiator Service" so click "Yes".



Click "OK" when the "iSCSI Initiator Properties" are displayed.

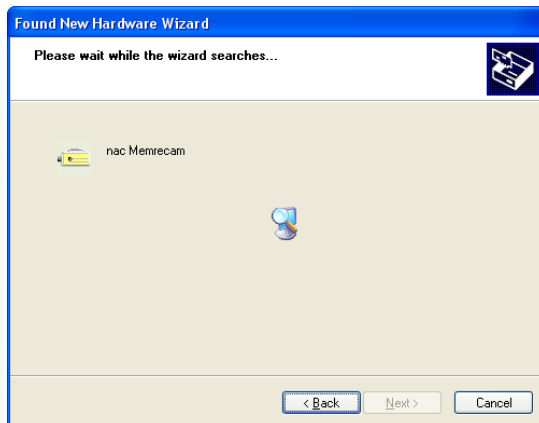
This completes the startup of "Microsoft iSCSI Initiator Service".

○ For using FC-AL connection with Windows XP

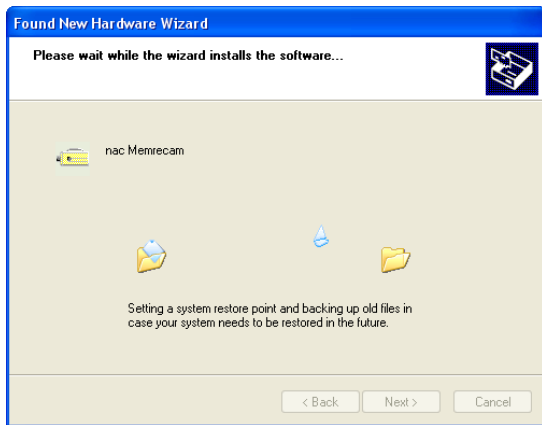
If Windows detects a new camera when the fx camera has a FC-AL connection with Windows XP, the "Found New Hardware Wizard" is displayed to install a driver.



Click "Next" to install the driver on the system.

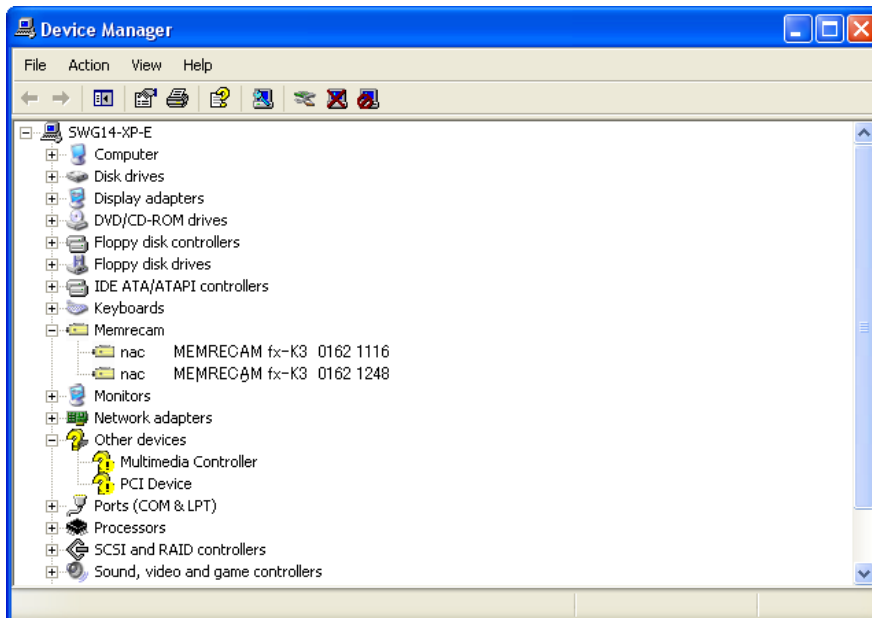


Once installation is complete, "Completing the Found New Hardware Wizard" will be displayed.



If there are two or more new cameras connected, verify all of the cameras.

Use the Device Manager to verify camera connections.  
 In the following screen, verify the two K3 with the PC (OS).  
 fx-K3 (firmware ver1.62, CID 1116)  
 fx-K3 (firmware ver1.62, CID 1248)



## 2.4 Uninstallation Procedures

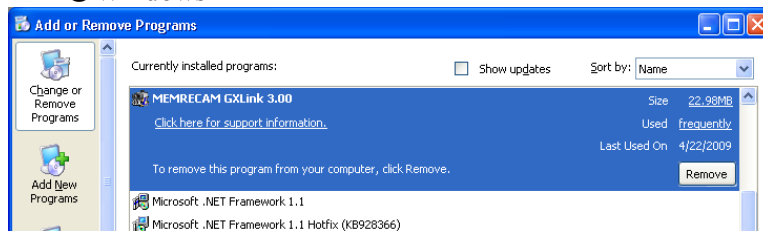
Uninstall the MEMRECAM HXLink if not needed.  
Saved data is not deleted even if HXLink is uninstalled.

An authorized user of the Windows Administrators group should log on.

To uninstall, close other applications, open the "Control Panel" and double click on "Add/Remove Applications" ("Add or Remove Programs and Windows Components" on Windows XP).

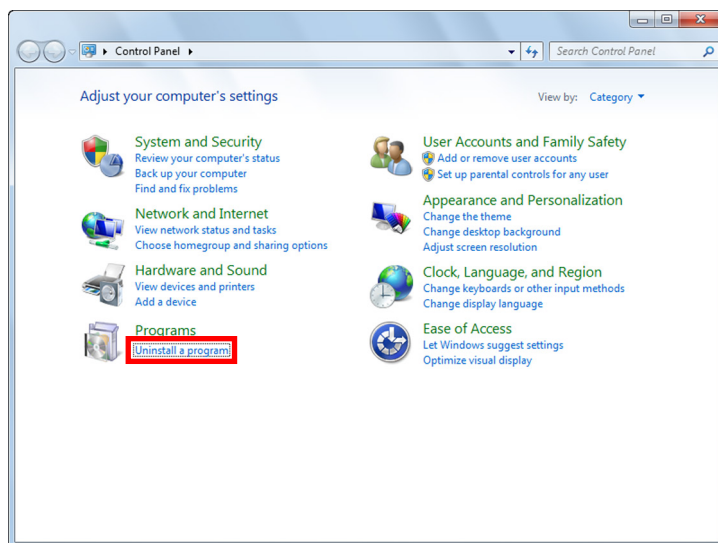
### ■Uninstall HXLink Application

#### ○Windows XP

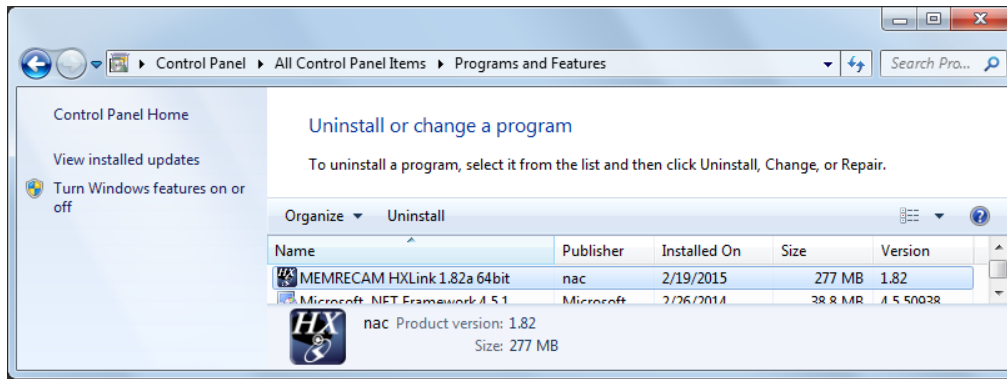


Select MEMRECAM HXLink from the list of currently installed programs and click "Change/Remove" to display the "Uninstall HXLink" dialog box.

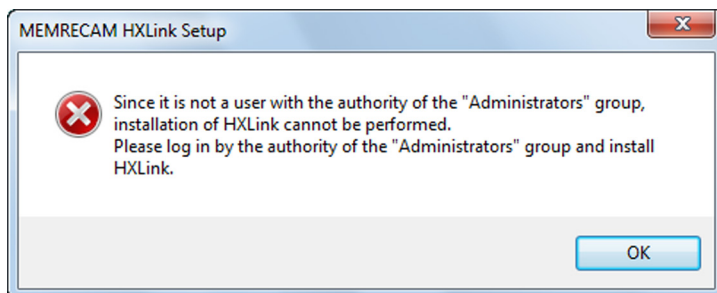
#### ○Windows Vista/7/8/8.1/10



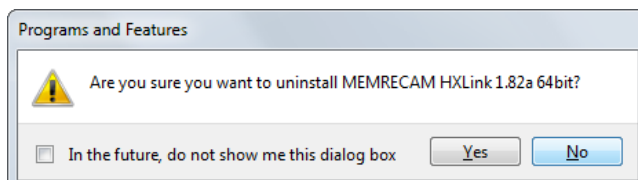
Click "Programs" and "Uninstall Programs" from the "Control Panel".



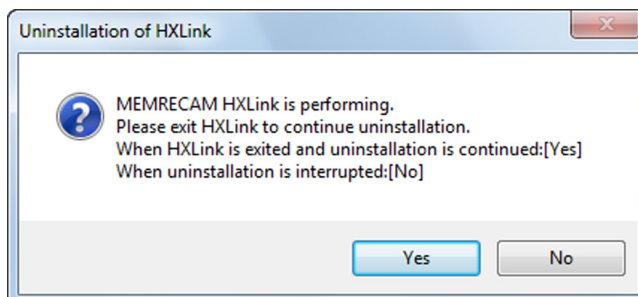
Select MEMRECAM HXLink from the list and double click.  
Click "Continue" when the "User Account Controls" GUI is displayed and the "Uninstall HXLink" appears.



The above message will appear if uninstalled by a user other than one with Administrator authority. Make sure that a user with administrator authority logs on to uninstall HXLink. Once the uninstall starts, a confirmation message appears.



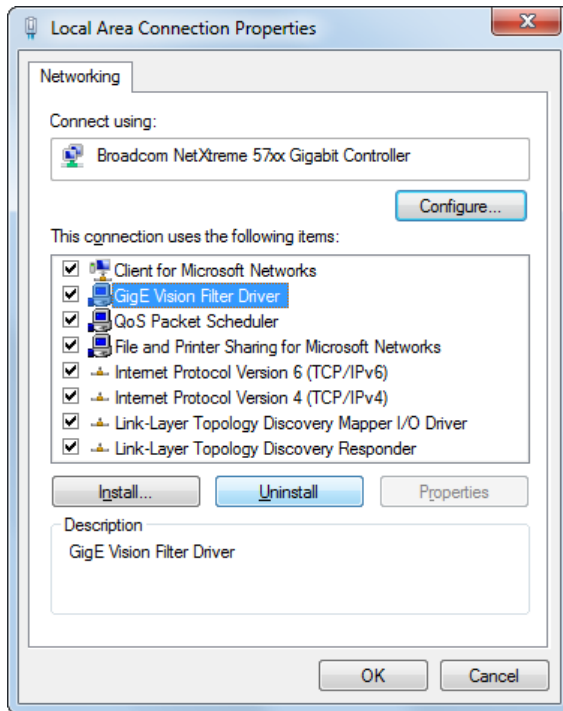
Click "Yes" to start uninstallation.



HXLink cannot be uninstalled if running.  
The dialog shown to the left will appear if HXLink is running, so follow the instructions to proceed.

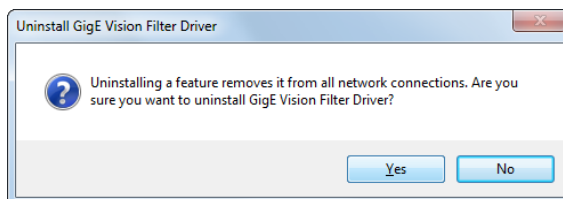
Once the uninstall is complete, the uninstalled program is removed from the "MEMRECAM HXLink" list.

## ■Uninstall GigE Vision Filter Driver



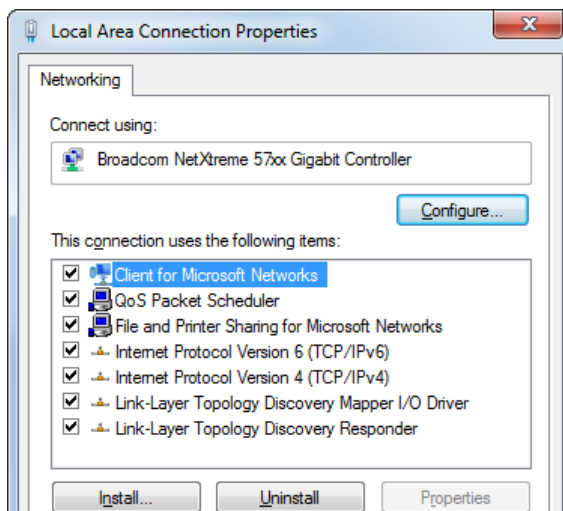
Open “Properties” window for the local area connection. Refer to page 2-8 for details.

Select “GigE Vision Filter Driver” and click “Uninstall”.



Click “Yes”.

Then, uninstallation completed.

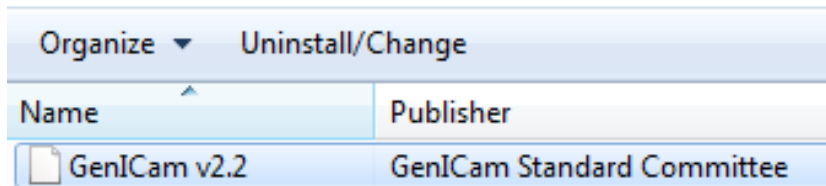


Open “Properties” window for the local area connection again and make sure that “GigE Vision Filter Driver” is deleted.

Then click “Close”.

## ■Uninstall GenICam

Open “Control Panel” and click “Uninstall Programs”.  
Select “GenIcam v2.2” from program list and double-click.



# 3

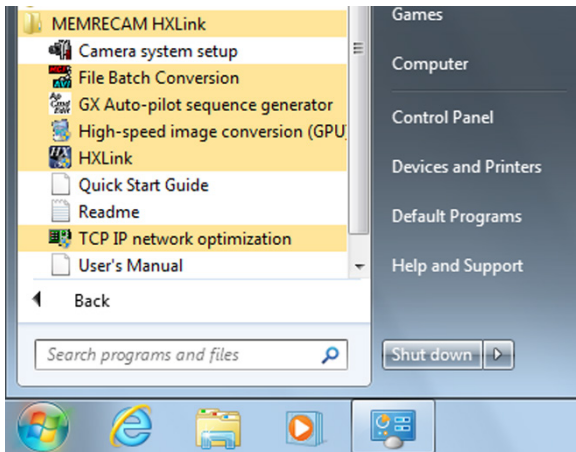
## Basic Operations

## 3.1 Startup

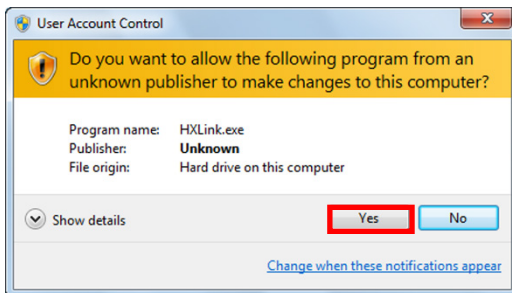
To start up the HXLink application, double click on the HXLink icon on the desktop.



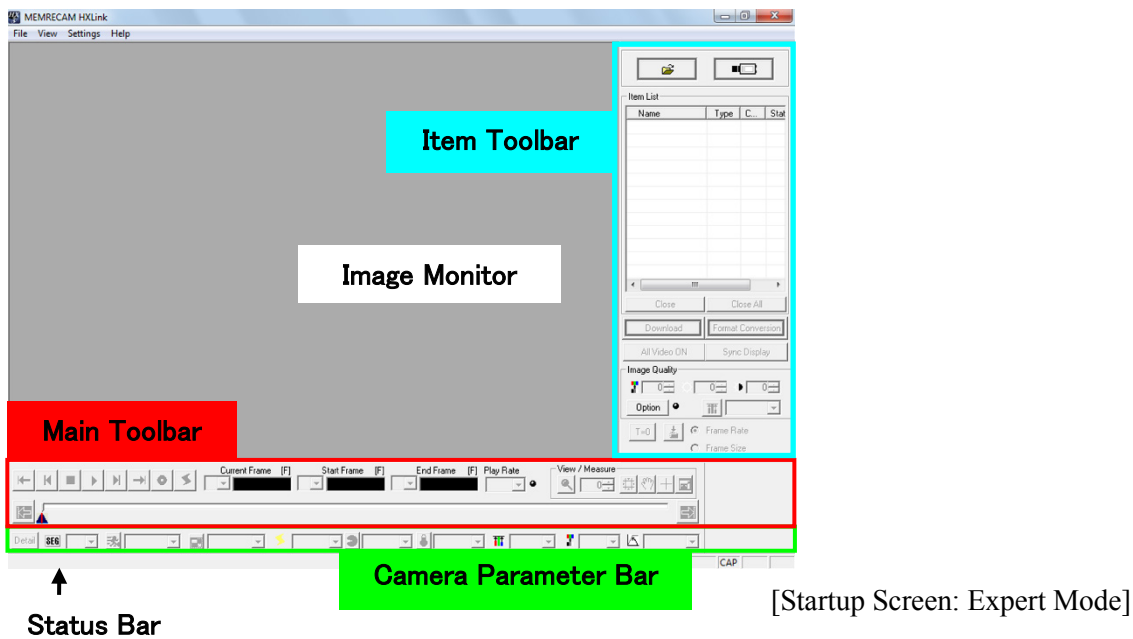
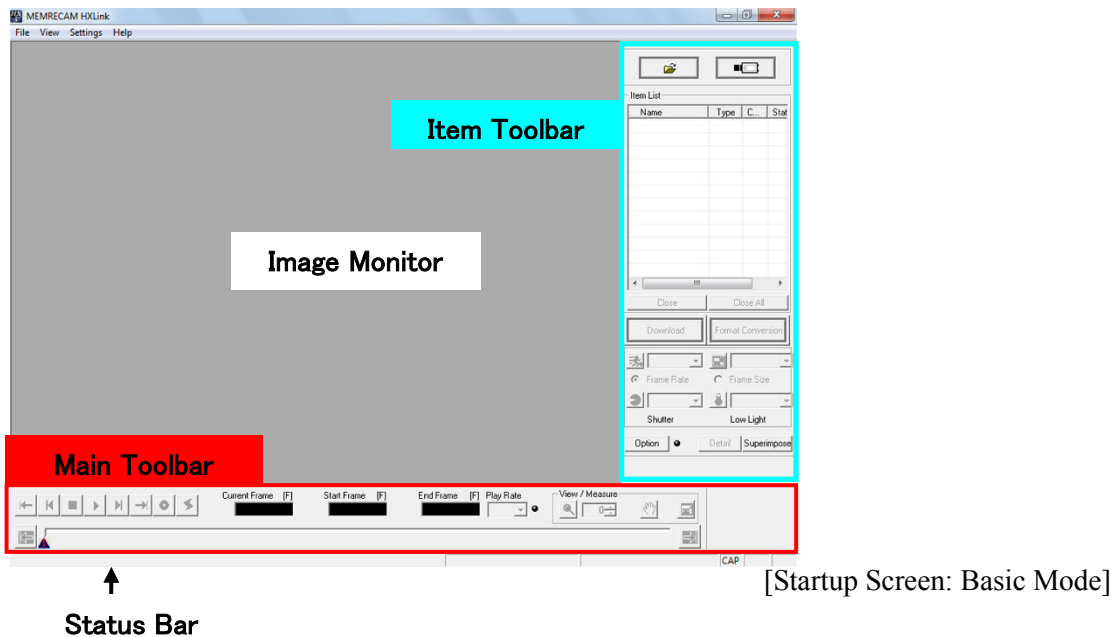
Or, start by clicking All Programs -> MEMRECAM HXLink -> HXLink on the start menu.



If the "User Account Control" dialogue appears, click "Yes".



The HXLink GUI offers a "Basic Mode" for basic operations and an "Expert Mode" for more detailed operations.



Switch to and from the Basic Mode and the Expert Mode using "Options" on the "Settings" menu. Refer to page 7-4 for details.

## 3.2 Names of Each Part and Their Functions

### ■ Item Toolbar (Basic Mode / Expert Mode)



[Item Toolbar: Basic Mode]



[Item Toolbar: Expert Mode]

#### Add Items



- Open Image File  
Opens the image file and adds to the item list as file items.



- Attach Camera  
Starts communication with the camera and adds the camera item to the item list.

#### Item List

Displays items (camera connections, open image files).



Sync display settings check box



Item mark



If a camera, shows the nickname for the camera.  
If a file, shows the image file base name.



If a camera, shows the camera type or memory segment. Memory segments are shown as MEM.  
If a file, shows the image file type (mcf, cif, avi, tif, bmp, jpg).



Camera head number (shown only with the multi camera DRP)



Camera status



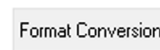
If a camera, disconnects all cameras and deletes all camera items from the item list. If a file, closes the file displayed and deletes the file item from the item list.



Closes all items and deletes them from the item list.



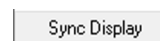
- Download image data (MCFF) from the camera  
Downloads image data recorded on a camera to a PC and creates a MCFF file.



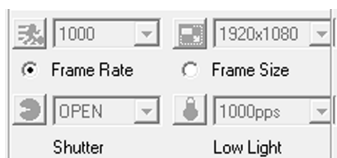
- Converts format of camera image file  
Converts and saves MCFF files in AVI/BMP/TIFF/JPEG format.  
If MCFF is selected as the format for conversion, the specified range of frames is saved to the file.



- All camera video output (Expert Mode)  
If the button is pressed, the video signals for all of the cameras are output.  
If the button is not pressed, only the video signals for the selected camera is output and the video signals for the HX, GX and fx cameras not selected is not output.



- Sync display (Expert Mode)  
Synchronizes display for matching the relative time of the multiple item frames where the synchronized display setting box is checked. Click Sync Display to execute/delete the synchronized display



- Camera Control  
(Basic Mode. In the camera parameter toolbar for expert mode.)

Sets Frame Rate, Frame Size, Shutter Speed (Shutter), Low Light.

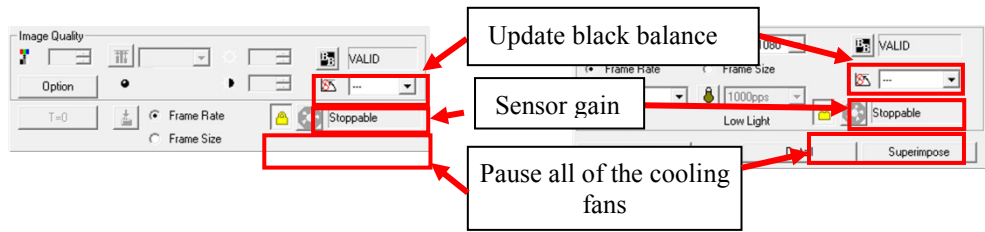
Sets the priority for either frame rate or frame size. For example, if frame rate is selected, all of the camera settings can be selected for the frame rate but the frame size displays only the settings that can be selected for the frame rate.



- Image Quality Adjustment (Expert Mode)  
Sets Chroma, Luminance, Contrast, White Balance. Also performs auto conversion settings and auto display.

If the item toolbar size is "wide", the black balance can be updated. Sensor gain can be used with the HX camera.

The cooling fans for all of the cameras can be paused when using the HX camera.



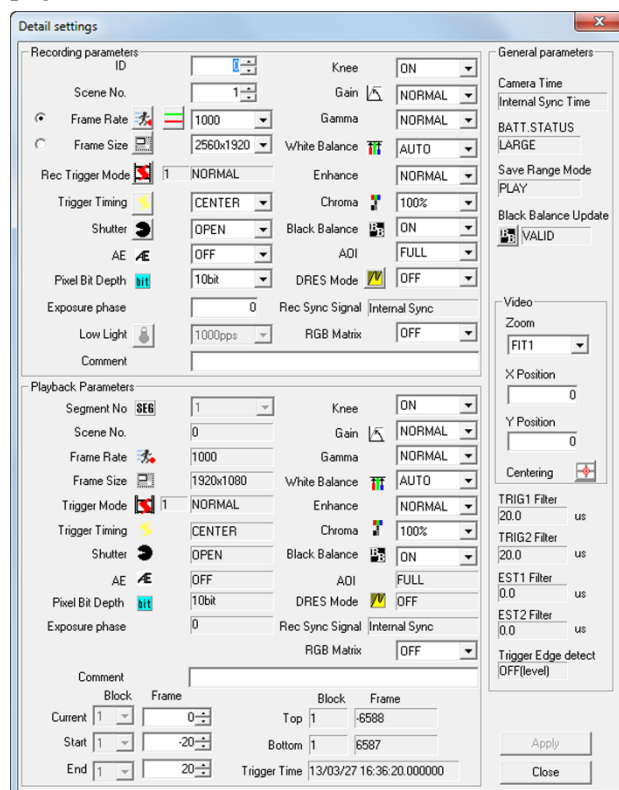
Wide display: Expert mode

Wide display: Basic mode

Use the option "GUI Settings" to make the size of the item toolbar "Wide".  
Refer to 7-4 for details.

### ▪ Detailed Camera Settings (Basic Mode)

The "Detail settings" dialog is displayed when the "GUI settings for single camera control" in the "GUI Settings" in "Options" is "Camera Details (single)". Refer to the description for the "List of Camera Setup" window on page 4-27 for details of this item.



"Detail settings" dialog

Open the "List of Camera Settings" window for multiple camera control. Refer to page 4-27 for details.

ID	機種	コントラクト	Status	現在のカメラ	シーンNo.	録画速度	フォーマット	アナログ数	録画モード	シャッター	ホワイトバランス	AOI	イメージ
1	HK-3	HK3 7777	READY	0	1	1	1000	2560x1920	1	NORMAL	OPEN	LOW	FULL
2	HK-3	HK3 7779	READY	0	1	1	1000	2560x1920	1	NORMAL	OPEN	LOW	FULL

"List of Camera Settings" window

### ▪ Superimpose information settings for format conversion (Basic Mode)

Turns all superimpose settings ON/OFF.

Refer to page 5-22 for details.

### ▪ T=0 Setting (Expert Mode)

T=0 is the standard frame times for image files. Sets the T=0 frame for the image file (MCFF/AVI/TIFF/BMP/JPEG/NWF)

Refer to page 5-5 for details.



### ▪ Auto Download Settings (Expert Mode)

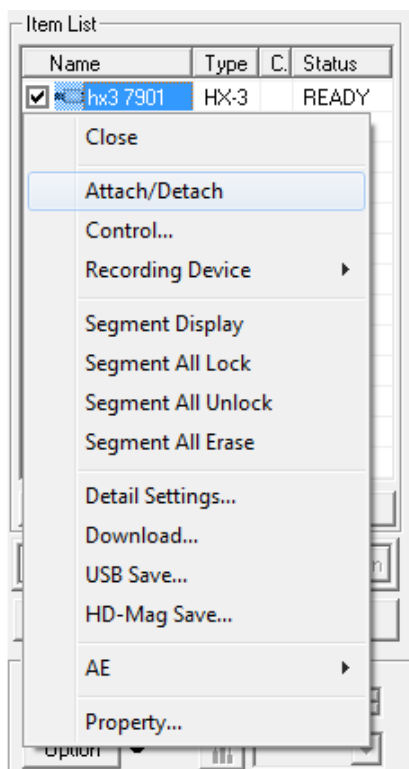
Auto Download function (automatically downloads images after camera recording has been completed) settings (save file name, save range designation).

Refer to page 4-91 for details.

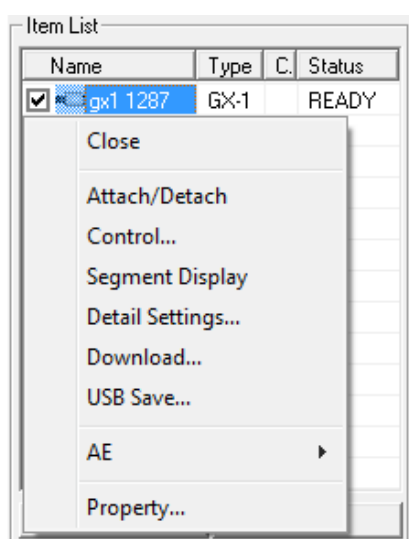
## ■ Right Click Item Menu

Select and right click an item on the item list to display the menu.  
The menu displayed changes according to the type of item selected.

### Camera Item Menu



HX camera connected



GX camera connected

**Close** Disconnects all connected cameras and deletes all camera items from the item list.

**Attach/Detach** Connects/disconnects all connected cameras.

**Control** Displays camera control window.  
Refer to page 4-13 for details

**Segment Display** Display segments in the item list.  
If camera recording memory is not partitioned, this feature is disabled.

**Segment All Lock** Protect all of the segments

**Segment All Unlock** Unprotect all of the segments

**Segment All Erase** Erase all of the segments

**Detailed Settings** Shows the "Camera Details" dialogue.  
Refer to page 4-27 for details.

**Download** Downloads image data from the camera and creates camera image files (MCFF/AVI/TIFF/BMP/JPEG).

**USB Save** Saves image data on the USB media connected to the camera and creates camera image files (MCFF/AVI).

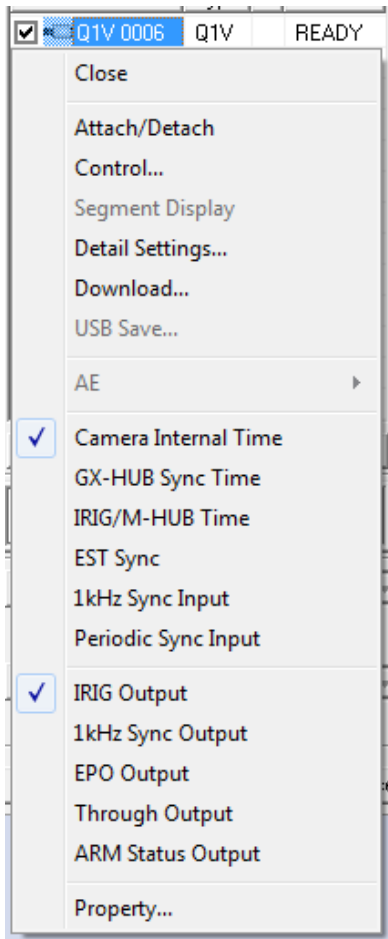
**HD-Mag Save** Saves the image data on the HD-Mag (option) attached to the camera.

**AE** Selects the settings for automatic exposure control (AEC).  
Refer to page 4-44 for details

**Split Display** Multiple camera shots are displayed in the video of GX-5/GX-5F.  
Refer to page 4-68 for details.

**Properties** Displays the camera properties.  
Refer to page 9-2 for details.

**I.I. Properties** Displays the RX-6 I.I. camera properties.  
I.I. properties are shown only when a RX-6 I.I. camera is connected.



The following item is for only Q camera.

#### Input Settings

Select input signal into “SYNC IN” of Q camera from the following items.

- Camera Internal Time
- GX-HUB Sync Time
- IRIG/M-HUB Time
- EST Sync
- 1kHz Sync Input
- Periodic Sync Input

If you select the item of “Camera Time”, “Internal Sync” is set for “Camera Sync”.

If you select the item of “Camera Sync”, “Camera Internal Time” is set for “Camera Time”.

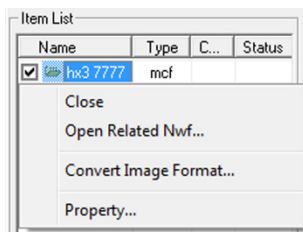
#### Q camera sync output

Select signal output from “SYNC OUT” of Q camera from the following items.

- IRIG Output
- 1kHz Sync Output
- EPO Output
- Through Output      output signal of “SYNC IN” from “SYNC OUT”
- ARM Status Output

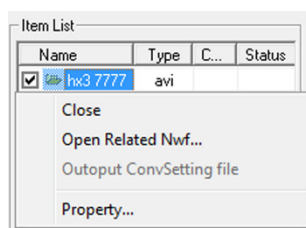
Q camera connected

## MCFF/CIF File Item Menu



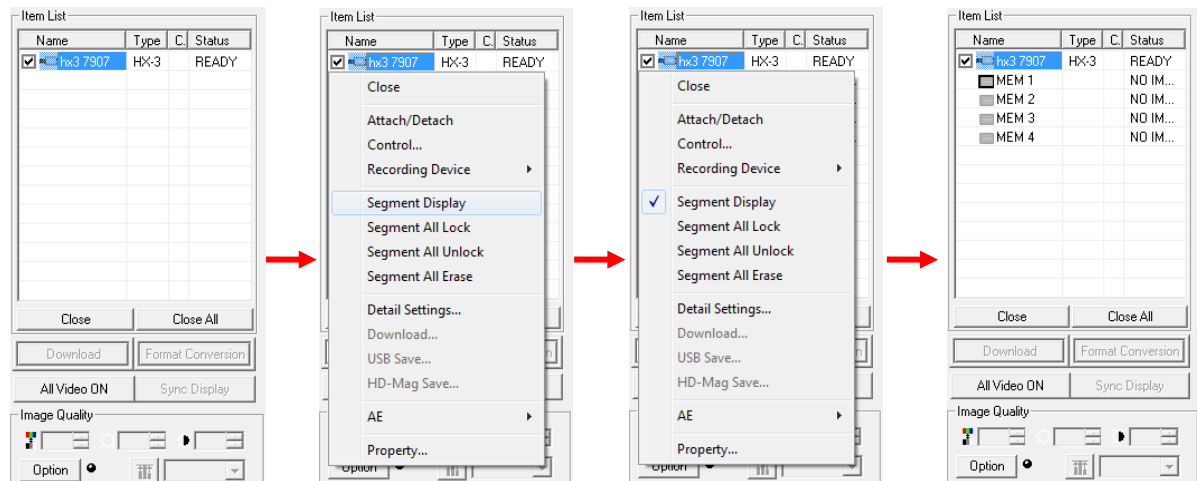
- Close** Closes MCFF/CIF files and deletes items from the item list.
- Open related waveform file** Opens the waveform data file (NWF) related to the selected file item.  
Refer to page 5-32 for details.
- Convert format** Converts formats  
Refer to page 5-26 for details.
- Properties** Displays the MCFF/CIF properties.  
Refer to page 9-2 for details.

## AVI/TIFF/BMP/JPEG File Item Menu



- Close** Closes AVI/TIFF/BMP/JPEG files and deletes items from the item list.
- Close related waveform file** Closes the waveform data file (NWF) related to the selected file item.  
Refer to page 5-32 for details.
- Conversion Settings File Output (only valid with BMP files)** Creates batch conversion settings files for batch converted files (BatchConv).  
Refer to page 11-12 for details.
- Properties** Displays the AVI/TIFF/BMP/JPEG file properties.  
Refer to page 9-2 for details.

## Segment Display



Any of the following can be used for the "Segment Display".

- Click "Segment Display" in the "Control" menu.
- Click "Segment Display All Cameras" in the "Control" menu.
- Select a camera from the "Item List" and click "Segment Display" on the right click menu.

If you do one of the above, while segment is displayed in the item list, segment is hidden.

Icon	Comments	Description
		Segment
		Current Segment
		Protected segment
		Protected current segment
		Not recorded
	REC	Recording
	VALID	Recording finished with images
	PLAY	Playing
	SAVE	Saving locally (USB save, HD-Mag save)
	DOWNLOAD	Downloading
Reservation Mark	Comments	Description
	Recording reservation	Recording reservation
	Saving reservation	Local save reservation (USB save, HD-Mag save)
	Downloading reservation	Download reservation

## Segment Reservations (HX camera)

A segment reservation function has been added to HX cameras to properly perform continuous recording or download multiple HXLink segments by switching HX camera segments in conjunction with the DOWNLOAD REC function.

With a camera in VIEW, a recording reservation is set to the current segment to start recording precisely when ARM operation begins. Recording for the reserved segment can be precisely started at ARM operation since save locally download is not

## Protect Segment (HX camera)

Segment protection settings during segment partitioning are in the segment partition window. If batch selecting, select the segment to set segment protection for each segment.

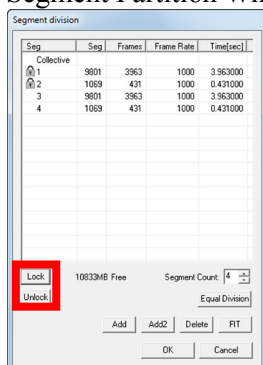
To "protect" the segment, do any of following.

- Click the "Segment Display" from the "Control" menu.
- Click the "Segment Display of all cameras" from the "Control" menu.
- Right click the camera item in the "Item List" and select "Segment Display" from the menu

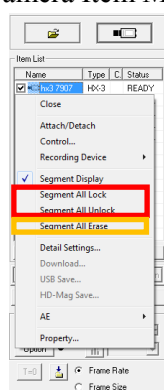
To "unprotect" the segment, do any of following.

- Select the camera in the "Item List" and select from "Recording Trigger Mode, Number of Blocks" from the "Control" menu.
- Select from "Recording Trigger Modes" in "Detailed Settings".
- Select from "Recording Trigger Modes" under the "Recording Parameters" tab in the "List of Camera Settings" window.

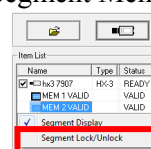
Segment Partition Window



Camera Item Menu



Segment Menu



Segment protection settings during segment partitioning are in the segment partition window. If batch selecting, select the segment to set segment protection for each segment.

The status of segment protection can be verified in the segment display of the item list.

Item List		
Name	Type	Status
✓ hx3 7907	HX-3	ARM
MEM 1 VALID		VALID
MEM 2 VALID		VALID
MEM 3 REC		VALID
MEM 4		NO IMAGE

Protected segment

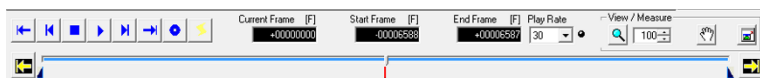
Unprotected segment

## ■Main Toolbar

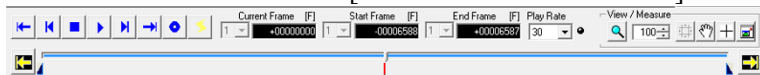
Playback tool for items selected from the item list.

Camera recording and display image zoom / scroll / full screen functions.

Expert Mode includes a measurement function and cutout conversion setting.



[Main Toolbar: Basic Mode]



[Main Toolbar: Expert Mode]

### Recording and Playback











- Camera recording control
- Camera image playback control (playback range, playback speed, frame by frame, forward and reverse)
- Image file (MCFF/AVI/TIFF/BMP/JPEG) playback control (playback range, frame rate, frame by frame, forward and reverse)

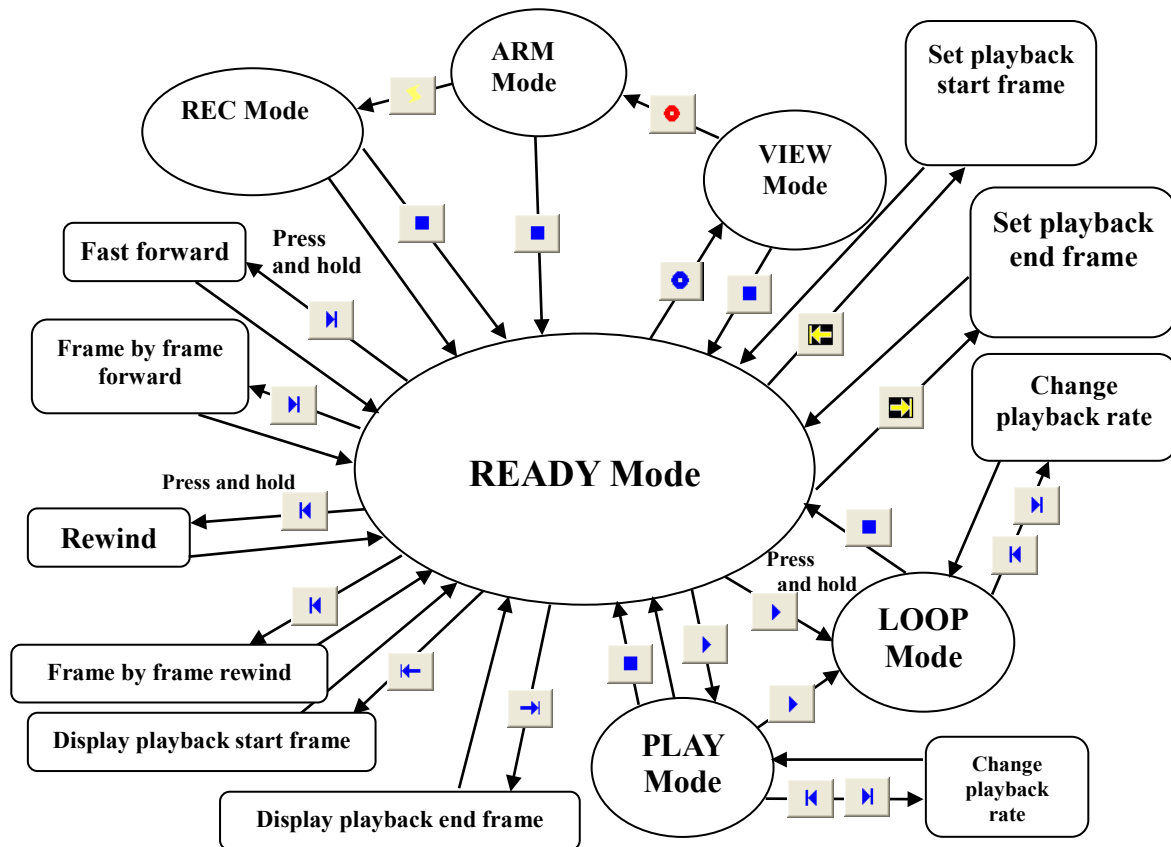
### Operation Buttons

Use the mouse to click on these buttons to control the cameras or files.

The keyboard can also be used to perform these operations.

Move the cursor to display a description of the buttons on the status bar and shortcuts. For details, refer to Appendix A.

	Jump to Start Frame	Displays the playback start frame.
	1 Frame Reverse	In the READY mode, goes back one frame. Press for a long time to go back quickly. In the PLAY/LOOP mode, the playback rate decreases.
	Stop	Stops PLAY/LOOP, VIEW and ARM and switches to READY mode. Deletes the video displayed warning for the GX camera.
	Playback/Loop	Plays back in the READY mode, loop playback when pressed for a long time. Loop playback in the PLAY mode.
	1 Frame Forward	In the READY mode, goes one frame forward. Fast forwards if pressed for a long time. In the PLAY/LOOP mode, the frame rate increases.
	Jump to End Frame	Displays the playback end frame
	View/Record	In the READY mode, switches to the VIEW mode. In the VIEW mode, switches to the ARM mode (recording).
	Trigger	In the ARM mode, enables the manual trigger (ends recording). In the READY mode, displays the trigger frame / event frame.
	Set as Start Frame	Sets the current frame to the playback start frame.
	Set as End Frame	Sets the current frame to the playback end frame.









**Camera Operation Status Figure**

#### Display Measurement

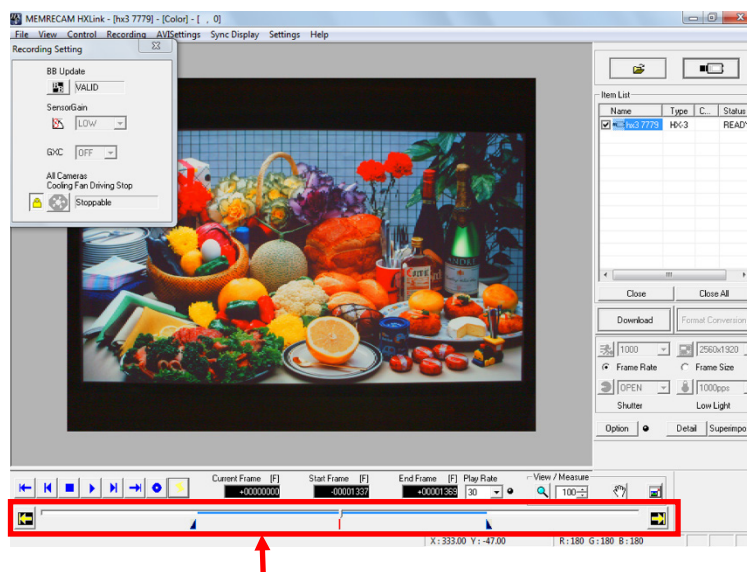
- Zooms, scrolls and displays the entire image
- Displays the coordinates of the points on the image displayed.

#### Operation Buttons

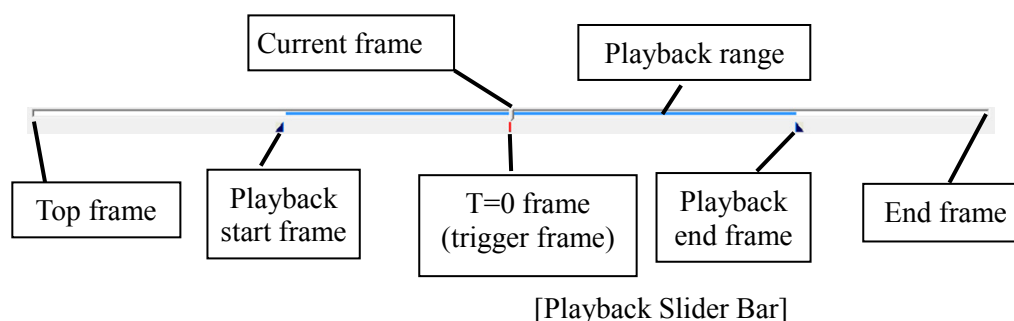
	Zoom Tool	Switch zoom tool
	Zoom Rate	Numerical setting for zoom rate
	Select Cropping	Select the cropping size (expert mode only) For the cropping settings in the basic mode, click on "Select Cropping" in the "Conversion Settings" menu. Refer to page 5-25 for details.
	Hand Tool	Switch the image scroll mode
	Measure	Starts coordinate measurement or LAA measurement (expert mode only) To use the measurement function in the basic mode, click "Measurements" in the "View" menu. Refer to page 13-2 for details.
	Display Entire Image	Set the magnification automatically to match the window size for display.

## □ Playback Slider

Use the playback slider to designate the playback frame or playback range. The current frame, playback start frame and playback end frame is operated by dragging the mouse.



Playback slider



T=0 is the frame of the standard time of the image file.

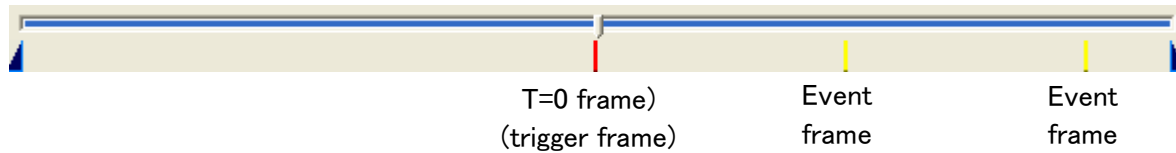
The camera frame number is 0 for the frame where the trigger signal is input during recording (trigger frame), and the image file frame number can be changed with the T=0 setting function.

Refer to page 5-5 for details on T=0 settings.

The playback slider bar display changes according to the recording trigger mode.

(1) Example of Event Frame Display

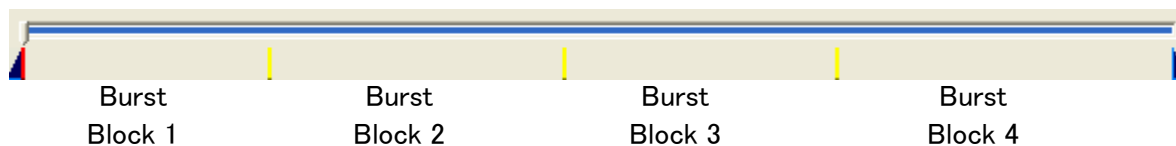
Handles frames where trigger signals are input from the second trigger onwards as an event frame.



(2) Example of BURST, LINEAR Recording Display

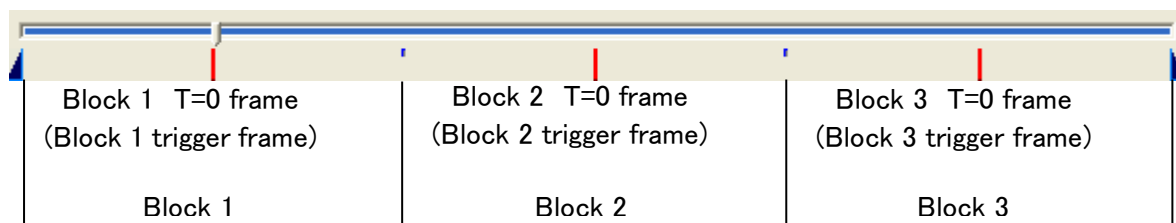
**BURST Recording** Performs the time burst signals are input and recording for the trigger input connector.

**LINEAR Recording** Performs recording according to the pauses in operation.



(3) Example of Multi Trigger Frame Display

Divides the memory segments into 2~64 blocks, and automatically replaces the blocks with recording for each trigger signal input.



### ■ Camera Parameters Toolbar (Expert Mode Only)

Sets the camera recording and playback parameters with the "Camera Parameters Toolbar" buttons or pull down menu.

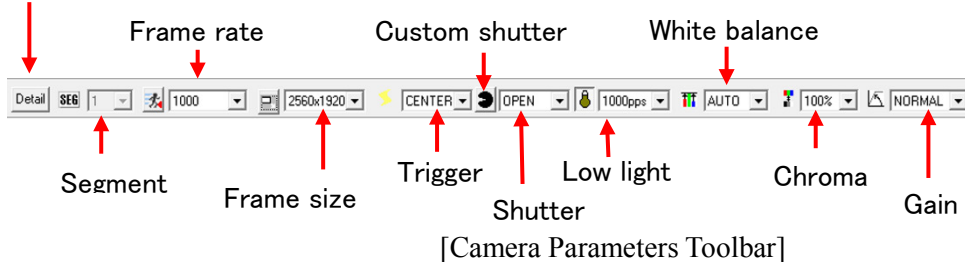
Once the PC and camera connections have been established, the "Camera Parameters Toolbar" is enabled.

If the camera is in the VIEW mode, the recording parameters and playback parameters during READY can be set.

The values of the parameters displayed are the setting values for the camera selected on the item toolbar.

If the parameters are set with the camera parameter toolbar, all of the cameras are batch set.

Opens the "List of Camera Settings" window or "Camera Details"



### ■ Status Bar

Open the camera to attach

If there is a cursor on the toolbar, displays detailed information for that button / display.

X:142.00 Y:234.00

If there is a cursor on the image monitor, the location of the cursor is shown.

R:052 G:042 B:062

If there is a cursor on the image monitor, the RGB value for the image at that location is shown.

### ■ Overexposure Bar

Displays the threshold value for the overexposure display.



Refer to page 3-27 for overexposure.

### ■ Exposure Color Bar

Displays the luminance and color when the exposure color is displayed.



Refer to page 3-27 for overexposure color display..

### ■ I.I. Toolbar (fx RX-6, RX-6G)

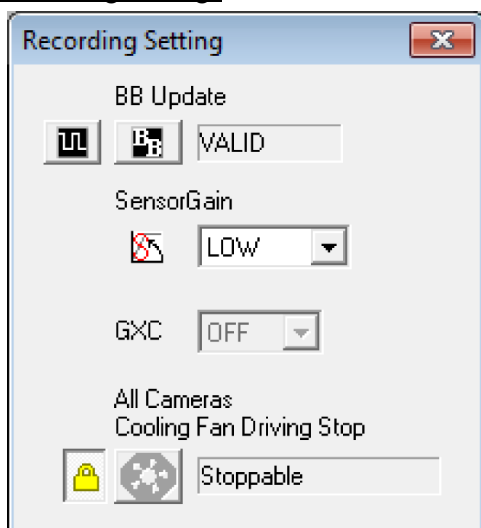
Controls the RX-6 I.I. camera and verifies information.

This I.I. toolbar is shown and used only for a RX-6 I.I. camera connection.

Refer to the MEMRECAM fx RX-6 I.I. camera user's manual for I.I. toolbar details.



## ■ Recording Settings



The "Recording Settings" window is displayed when the HX series camera is connected. If not displayed, select the "Recording Settings (BB/Sensor Gain/GXC/Stop Fan)" from the "Control" menu.

### "BB Update "



Update black balance after changing the shutter or frame size by correcting the black level for each sensor pixel.

The HX camera is set at factory shipment to automatically update the black balance upon camera startup, when starting VIEW, ARM or when ending recording.

### "Black Balance Settings for EST Recording" (Only HX camera)



The black balance data recording rate can be specified for HX camera EST recording.

### "Sensor Gain" (Only HX camera)

The photographic sensor gain (signal amplification) can be changed. The sensitivity increases as the gain increases but the size of the image increases. The sensitivity decreases as the gain decreases and the size of the image decreases.

- LOW: Low sensitivity (High image quality)
- MID: Medium sensitivity (Medium image quality)
- HIGH: High sensitivity (Low image quality)

### "GXC" (Only HX camera)

If using the GXC function, the sensitivity can be approximately quadrupled without increasing the noise. However, the maximum frame size becomes 1/2. For example, with the HX-3, it is limited to 1280x960.

The photographed image angle is double the size of the same frame when not using GXC.

For example, with the GXC function ON, the camera angle is 1280x960, the same as 2560x1920 with the GXC function OFF.

- ON: GXC ON
- OFF: GXC OFF

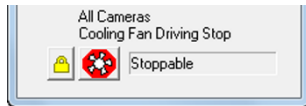
### Caution

If using the GXC function, the "Recording Priority" of the image sensor becomes "Image Quality". If the "Recording Priority" setting is "Sensitivity" (about 8 times brighter than "Image Quality"), the sensitivity of the camera (HX-7S) decreases when you enable the GXC function.

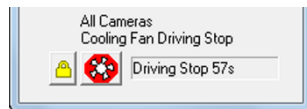
### "All Cameras Cooling Fans Driving Stop" (Only HX camera)

By pausing the cooling fans in the cameras, it is possible to prevent image shaking due to camera vibration.

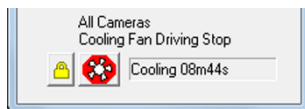
To prevent an increase in the camera temperature, the time the cooling fans are paused varies by camera. Refer to the HX camera user's manual for operations such as cooling times.



- Use Procedures
- 1) Click the pause fan lock  and click  to use the pause all camera cooling fans function.



- 2) The fans are stopped and the number of sections until the pause ends is displayed.



- 3) If the pause cooling time has elapsed, the fan will start and cool the HX cameras. The HX cameras cannot be operated until the cooling display ends.

## 3.3 Display

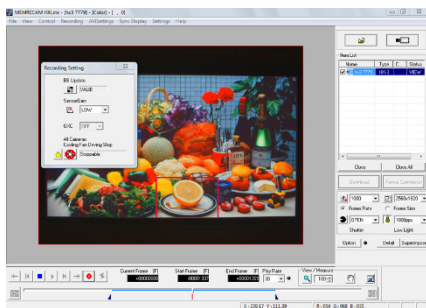
### ■ Zoom Display

Specify the zoom display for designating a point, designating a rectangle and designating the magnification using the mouse.

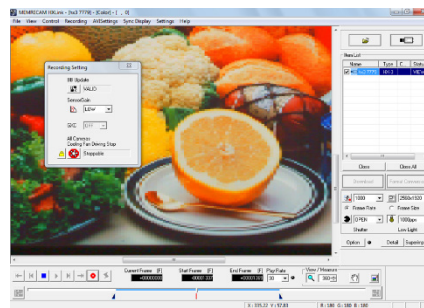
Click the "Zoom Tool" to switch to the zoom mode. In the zoom mode, the cursor is shown as a magnifying glass, and the mouse operation enables a zoomed display of the designated point or rectangle.

Click the "Zoom Tool" again to cancel the zoom mode.

- For zoom designating a point, use the mouse to click on a central point of the image on the image monitor.  
Left click the mouse for an enlarged display and right click for a reduced display.
- For zoom designating a rectangle, use the mouse to click and drag to designate a rectangle in the area of the image monitor.  
The sides of the rectangular area designated will be enlarged for display on the image monitor.



Rectangle is specified



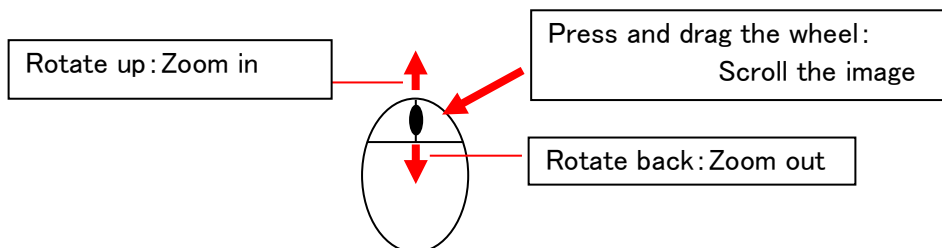
Zoom display

- For zoom designating the magnification, input a numerical value for the zoom magnification.

When enlarging an image using zoom, the displayed image can be scrolled using the hand tool or the scroll bar on the image monitor.

To return the zoomed image to the original magnification, input 100 (%) for the zoom magnification or select "Actual Size" in the "View" menu.

- Use the wheel on the mouse to zoom and scroll the image by operating the wheel while viewing on the monitor.



## ■ Scroll Function

To scroll the displayed image, drag with the mouse wheel, scroll using the scroll bar on the monitor or use the hand tool.

Click "Hand Tool" to switch to the hand tool mode where the cursor changes to the shape of a hand.

Drag the image (move the cursor while pressing the left mouse button) in the hand tool mode and move the image in the cursor position to scroll the image.

The zoom/scroll functions in this section are functions only for images displayed on a PC.



Caution

This is different from the zoom/scroll function for live output on a HX, GX camera. Basically, live camera images displayed with a PC are images that have already been subject to zoom/scroll processing on the camera. However, live camera images need zoom/scroll designations. Refer to 4-68 for details on the zoom/scroll functions on the camera.

Also, the results of the zoom or scroll do not impact the saved image data.

## ■ Reverse Image, Rotate Image

With HXLink, MCFF file images can be reversed or rotated for display.


AVI, BMP, TIFF, JPEG file images cannot be reversed or rotated for display.

If specifying both image reversal and image rotation, the image is rotated after being reversed.


During image reversal and rotation, the HXLink window title bar is displayed.

- Reverse Image                      None:    All white  
   Reverse top/bottom:                      |  
   Reverse left/right:                      -  
   Reverse top/bottom and left/right:                      +
- Rotate Image (rotation angles)                      0, 90, 180, 270

Example) The camera nickname is "hx3 7777", there is no color sensor or image reversal and the image rotation is 0°

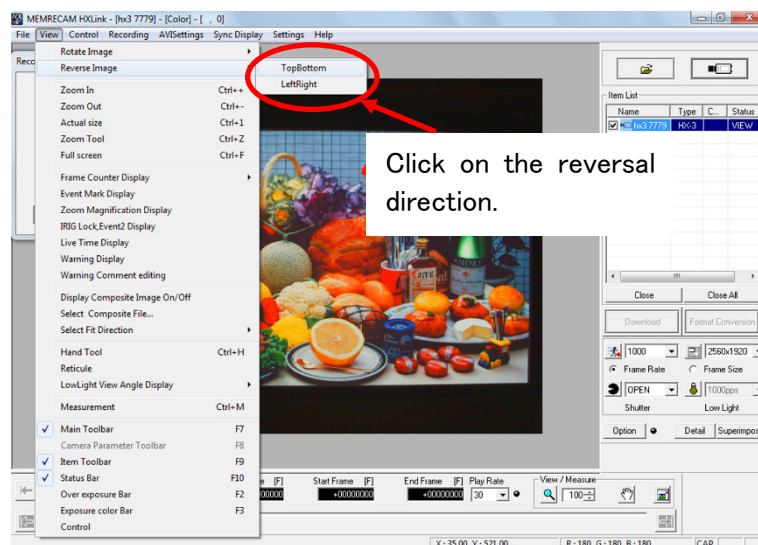
 MEMRECAM HXLink - [hx3 7779] - [Color] - [ , 0]

Example) The file is "hx3 7777.mcf", the color sensor and image reversal is: top/bottom reversal and the image rotation is 90°

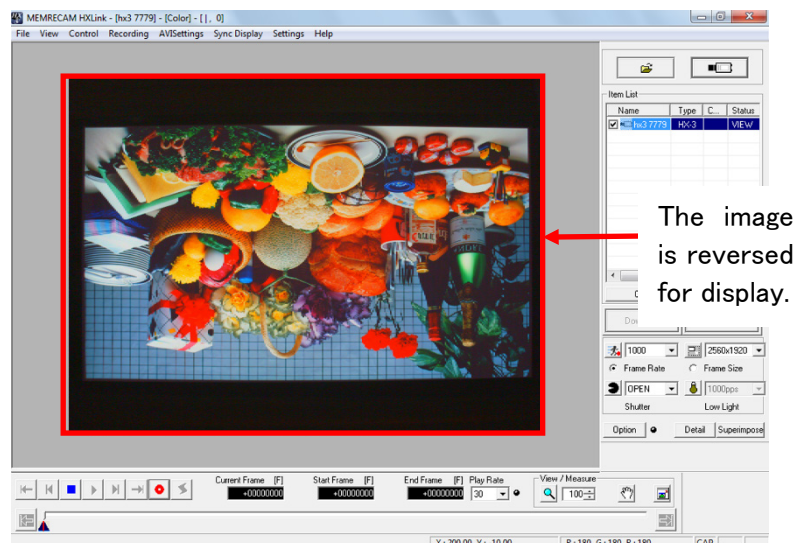
 MEMRECAM HXLink - [hx3 7779] - [Color] - [ | , 90]

## Reverse Camera, MCFF File Image

The display menu opens when the camera and MCFF is selected.  
Select reverse image from the display menu and click on the reversal direction.  
Items that can be selected include reverse top/bottom and reverse left/right.



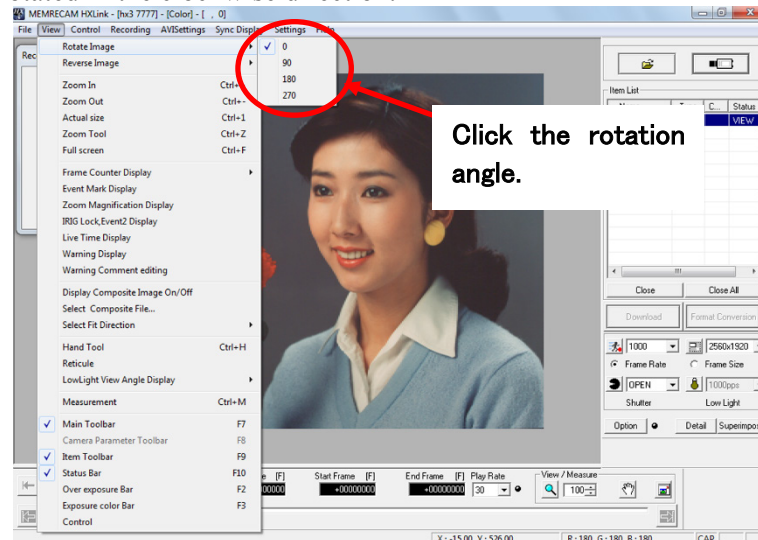
**Reverse Top/bottom**



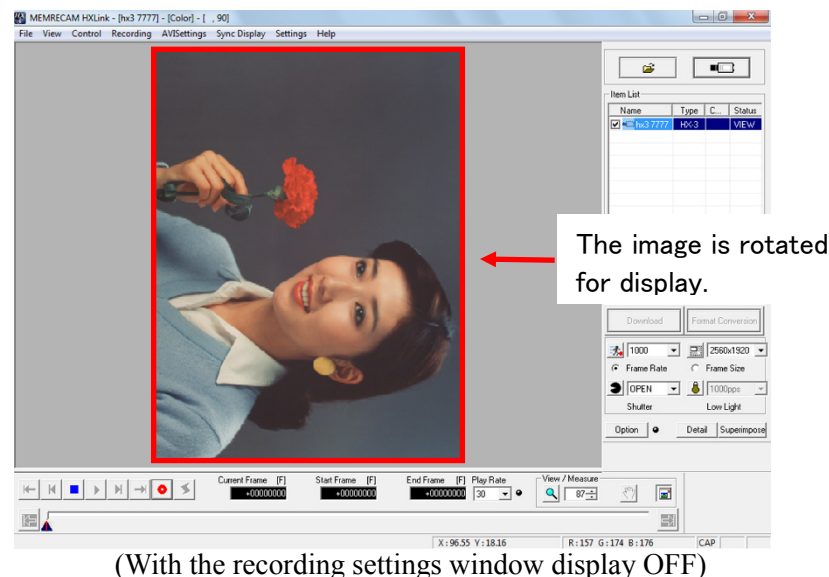
(With the recording settings window display OFF)

## Rotate Camera, MCFF File Image

The display menu opens when the camera and MCFF is selected.  
Select image rotation from the display menu and click on the rotation angle.  
The angles that can be set are 0° (standard), 90°, 180°, 270°.  
Images are rotated in the clockwise direction.



**90° Clockwise Rotation**



### Reverse and Rotate Display of MCFF File Images

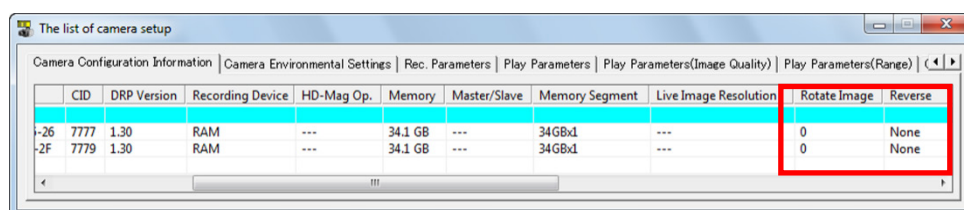
If live camera images from the HX, GX Q series cameras with the rotate /reverse display are downloaded, the image reversal and rotation information is saved in the MCFF file, and when the MCFF file is opened, the reversed or rotated image is displayed. This function is available from GX-5 Ver 1.10, GX-1 Ver 1.30 so when opening MCFF files from previous GX-1, GX-5 versions or those not from the HX, GX series, the image will not be reversed and the rotation angle will be 0°.

### Reverse and Rotate Image for Format Conversion

If MCFF file images with the rotate/reverse display are subject to format conversion, the converted file images (AVI, BMP, TIFF, JPEG) are the displayed rotated/reversed images.

### "List of Camera Settings" Window

Camera image reversal and rotation can be specified from the "Camera Device Information" tab in the "List of Camera Settings". Refer to page 4-14 for the "List of Camera Settings".

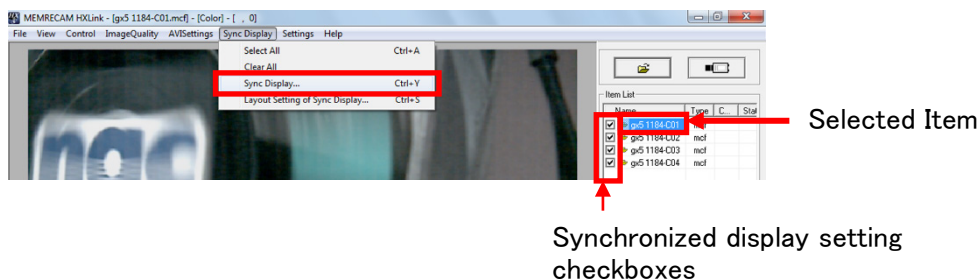


	CID	DRP Version	Recording Device	HD-Mag Op.	Memory	Master/Slave	Memory Segment	Live Image Resolution	Rotate Image	Reverse
→26	7777	1.30	RAM	---	34.1 GB	---	34GBx1	---	0	None
→2F	7779	1.30	RAM	---	34.1 GB	---	34GBx1	---	0	None

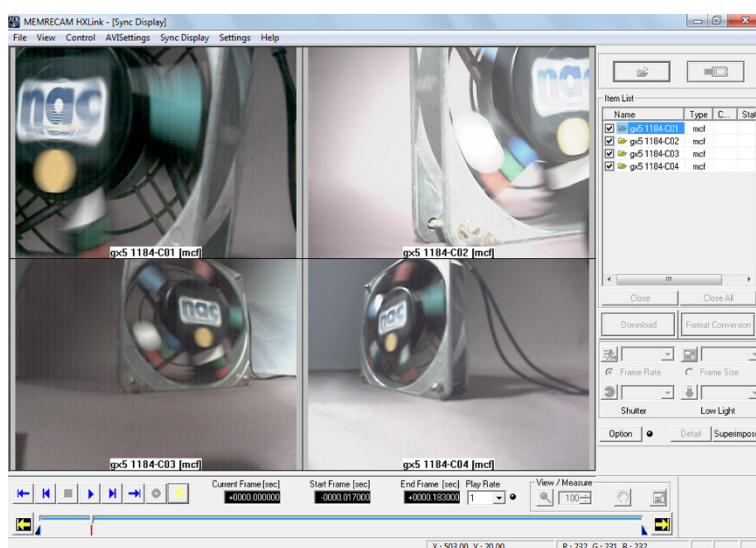
Camera Device Settings

## ■ Sync Display

Open multiple camera connections and image files and check "Sync Display Settings" in the item list and then click on "Sync Display" in the synchronized display menu.



The frame matching the relative time (T=0 frame is the standard time 0) for the image checked is displayed on the monitor simultaneously.



The playback rate can be specified for sync display in the same manner as when playing back a single image.

With sync display, the single frame time unit depends on the frame rate for the selected item. (Example: 0.001sec for 1000pps).

However, if the selected item does not include sync display (not checked), the single frame time unit depends on the highest frame rate on the image for sync display.

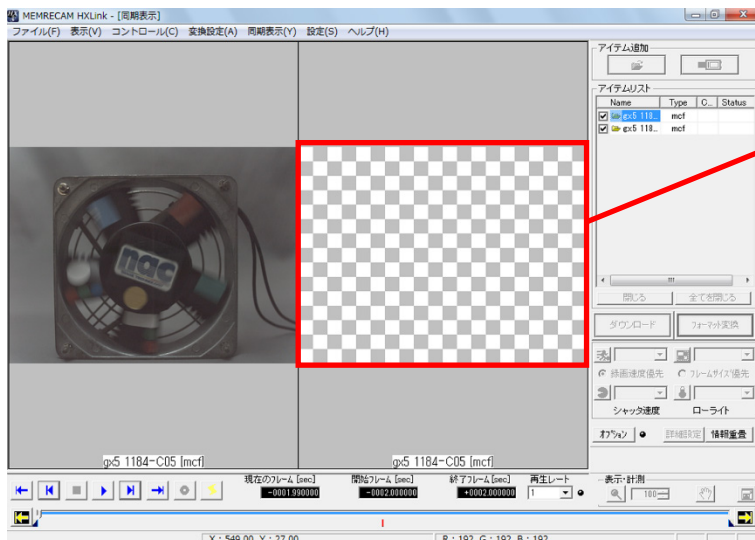
Simultaneous sync display is possible for the camera and file.

If the camera status is VIEW, ARM, or REC, the file becomes a still image display.

Double click on a single image when playback is paused in sync display, and select the image to end sync display. The double clicked image is shown on the monitor.

Items cannot be closed during sync display. Close after deleting the sync display.

If the current frame time is outside the range of the image data, a checkerboard pattern is displayed.

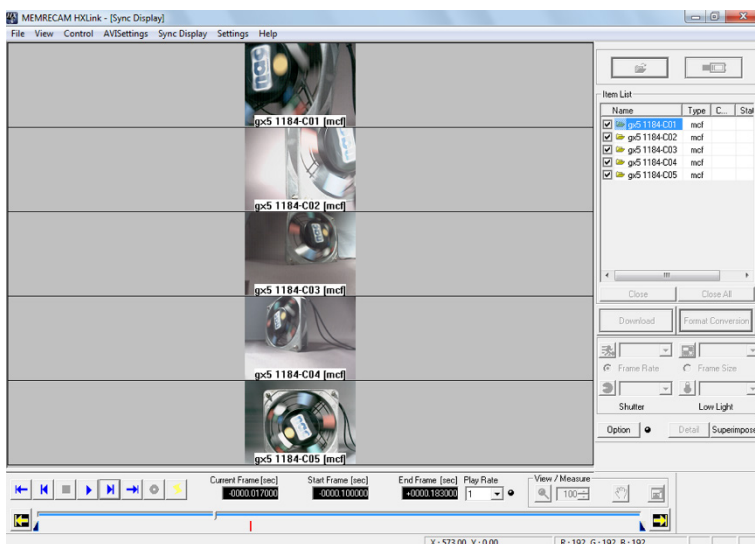
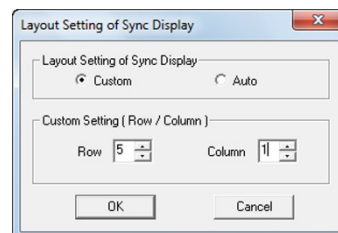


Since the current frame is outside the range, a checkerboard pattern is shown

In "Sync Display Layout" in the "Sync Display" menu, select Custom to specify the image layout.

Each of the custom settings for row/column have a maximum value of 16.

Sync display cannot be performed for images exceeding the number of images designated in the layout settings during custom selection.



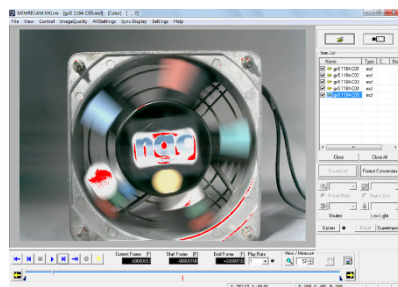
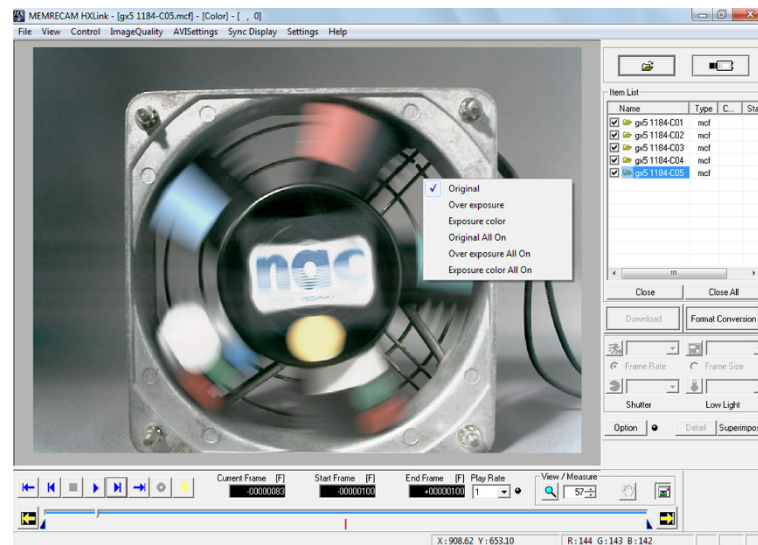
## ■ Overexposure, Exposure Color Display

Depending on the pixel luminance, images in color can be displayed.

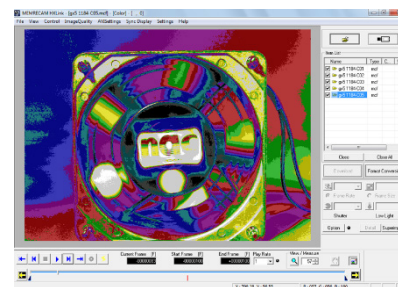
This is a handy function to verify the amount of light during photographing.

On the monitor, use the right mouse button to switch the display.

"Original", "Overexposure" or "Exposure Color" can be selected.

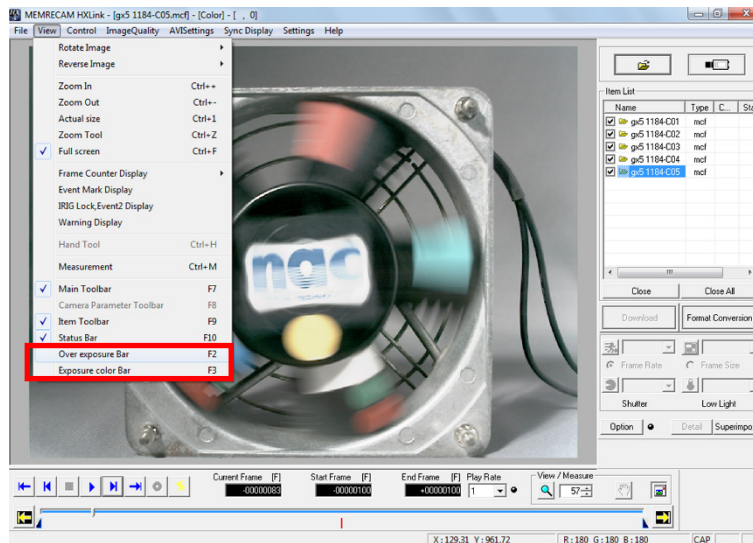


Overexposure Display



Exposure Color Display

Select display/hide in the "View" menu of the overexposure bar and exposure color bar.



**Original** Turn the "Overexposure" and "Exposure Color" OFF to display the camera image.

**Overexposure** Pixels with luminance exceeding the specified threshold value are shown in red. The threshold value for luminance can be changed with the overexposure bar.



Change the threshold value by dragging the mouse.



Use the mouse to click on the red portion of the overexposure bar and the threshold value will increase by 1.

Use the mouse to click on the white portion of the overexposure bar and the threshold value will decrease by 1.

**Exposure color** Displays a synthesized color similar to the luminance of the image. The artificial color and the luminance can be viewed in the Exposure Color Bar. The luminance range and corresponding colors cannot be changed.

**All Original / All Overexposure / All Exposure Color**  
Original / Overexposure / Exposure color can be set for all items on the Item List.

# 4

## Camera Operation

## 4.1 Camera Registration

With HXLink, it is not necessary to register cameras to control the MEMRECAM HX, GX, Q series but camera registration allows a desired nickname to be assigned to a camera.

If an HX, GX, Q camera is not registered, the camera nickname becomes the CID that is 4 characters indicating the type of camera. To control a MEMRECAM fx series camera, the camera used (DRP) must be registered in advance. The registered DRP information is saved in the settings file.

If using GX-5/GX-5F/Q5, also register the camera head and specify the camera used with the camera head name. If the camera head is registered, the camera head itself is specified with the connection settings, so the specified camera head can be used no matter which DRP port is connected.

If controlling the MEMRECAM fx series or the ULTRA Cam, the camera to be used (DRP) must be registered in advance.

The registered DRP information is saved in the settings file.

### Information Set with Camera Registration

With camera registration, the desired nickname, IP address, model and CID are set to the camera (DRP).

With the fx RX-5/RX-5G, GX-5/GX-5F/Q5, the DRP is the camera registered.

The desired nickname for the camera head, model and camera head ID are set during GX-5/GX-5F/Q5 camera head registration.

The CID is a number identifying an individual MEMRECAM cameras or DRP.

The GX-5/GX-5F/Q5 camera head ID is a number identifying individual camera heads.

### ■ Procedures for Camera Registration

- 1) Click "Camera Registration" from the Settings menu.

The camera registration dialogue is displayed.

- 2) Input the Nickname, IP Address, Camera Type and CID on the Camera Registration screen and click "Add". The IP address is registered for the fx camera and ULTRA Cam. Since the ULTRA Cam does not have one, CID 0 is automatically input.

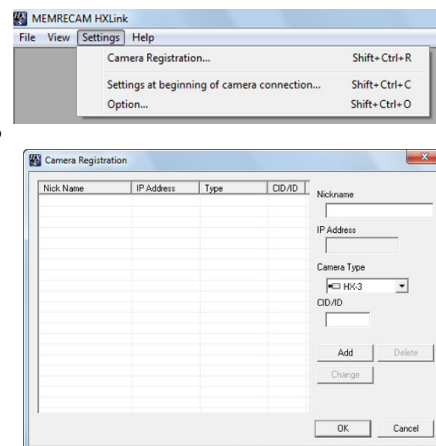
The nickname input is shown on the list on the Camera Registration screen.

With GX-5/GX-5F/Q5 camera head registration, the camera head nickname, model, camera head ID are input to "CID/ID".

If registering pencil cameras P-Cam/P2-Cam or S-Cam/S2-Cam/C-Cam/u-Cam, select the "model" as "P-CAM" and if registering the high resolution camera HR-Cam, select the "model" as "HR-CAM".

If the camera head is not registered, the camera head nickname becomes a 4 character CID matching the DRP nickname or camera model.

- 3) Click "OK" to complete the registration.
- 4) Select the camera on the camera registration screen and click "Delete" to delete a registered camera.  
To change the camera registration information, select the camera in the camera registration screen and then input the camera name, IP address (for fx cameras), model and CID and click "Change".



#### ■ Method of Verifying Camera Information (MEMRECAM HX, GX, fx)

Verification of the HX, GX camera (DRP) "Model and CID" can be made with "INFO" on the "SYS MENU" shown on the startup screen or J-PAD3 (remote control) menu.

Verification of the fx series "IP Address/Model/CID" can be made with "INFORMATION" on the "SYSTEM MENU" shown on the camera menu.

```
> SYS MENU > INFO
MODEL : MEMRECAM
VERSION : 1.13
CID : 0008
MEM SIZE: 2017
REVISION: 1:02-1:04
NETWORK : ETHERNET
```

J-PAD3 INFO

```
nac Image Technology, Inc.
MEMRECAM HX-1 Ver.1.12.
2013/01/17 13:53:32
BOOTING
update blackbalance
CID: 7777 MEMORY: 340B
1:06-2:05-3:05-4:05-5:05-6:07-7:07-8:01
172.21.90.21 / 255.255.0.0
```


HX series "Startup Screen"

```
nac Image Technology Inc.
MEMRECAM GX-1 Ver.1.03
2007/05/08 20:54:09
BOOTING
CID: 1014 MEMORY: 2.1GB
1:02-1:02-2:02-3:02-1:02-5:02
172.21.90.20 / 255.255.0.0
```

GX series "Startup Screen"

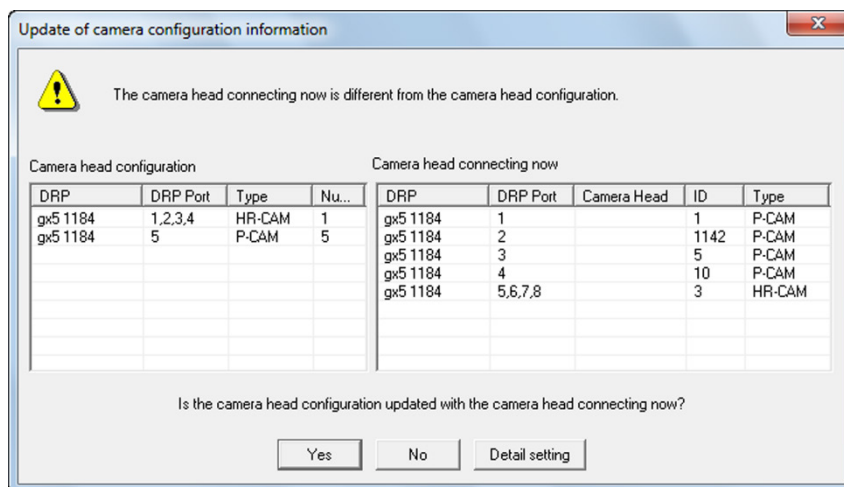
```
TOP MENU < SYSTEM MENU < INFORMATION >
Model MEMRECAM fx-K3
Version 1.90 L7 2004/06/11 18:12:42
CID 1485
MEMORY SIZE 4.0 GB
Hardware Revision EEG-EEB-EFF-CE0
Network Ethernet
IP address 172.21.41.110 / 255.255.0.0
MAC address 00:05:81:10:01:e6
FC NodeName 20:00:00:05:81:10:01:e4
Return to SYSTEM MENU
```

fx series INFORMATION"

- \* The camera (DRP) IP Address is set at factory shipment.
- \* The camera (DRP) IP Address can be changed to the desired IP address using the camera (DRP).
- \* Refer to page 10-3 for the method of changing the HX, GX, Q camera IP address settings.
- \* To verify Q camera IP address and CID, connect PC directly with a camera with LAN cable, and go to "File" → "Open Camera" or simply click "Attached the Camera" (  ) on HXLink. Refer to page 4-4 for details of camera connection.

#### ■ Method of Verifying Camera Information (MEMRECAM GX-5/GX-5F camera heads)

The camera head ID and model are shown in "Camera Configuration Settings". Before registering the camera head, connect the HXLink to the GX-5/GX-5F DRP with the camera head connected to the GX-5/GX-5F and the "Update the Camera Configuration Information" dialogue appears. The camera head ID is shown in the ID column and the camera head model is shown in the type column for the "Currently Connected Camera Heads". Refer to page 4-8 for details on camera configuration settings.



## 4.2 Camera Connection

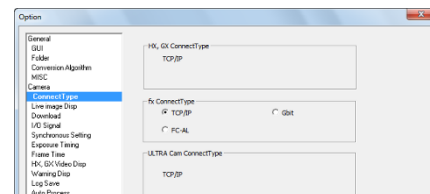
### ■ Connection Procedures



#### Caution

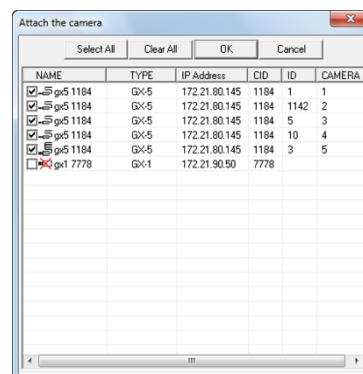
- When connecting fx cameras, confirm that the connections between the camera-PC "100B-TX (Ethernet) / FCAL (fiber channel) / Gbit (1000BASE-T)" and the settings menu connection method match.
- Confirm that the camera and PC are properly connected.
- Confirm that the camera is operational.

HX, GX, Q camera and ULTRA Cam connections are set by TCP/IP but if connecting to an fx camera, first select the camera connection method with the "Connection Type" tab in the "Options" dialogue of the "Settings" menu. Select "TCP/IP Connection" if 100B-TX (Ethernet), "FC-AL Connection" if FCAL (fiber channel) or "Gbit Connection" if Gbit (1000BASE-T).



Click "Connect Camera"  on the Item Toolbar to start connecting to the camera.

The "Connect Camera" dialogue is displayed, and the HX, GX, Q camera connected to the PC and the fx camera and ULTRA Cam registered nickname, model, IP address, CID, camera head ID and camera head number are displayed.



With the MEMRECAM GX-5/GX-5F, the DRP CID (individual identification number) where connected to the computer and the camera head ID and camera head number (the DRP port number for the connected camera head. For HR-CAM, the connected port or the port number, whichever is the smallest) where the camera head is connected is displayed on the "Connect Camera" dialogue list.

The camera heads with the current camera configuration settings are displayed on the list. If the camera heads with the camera configuration settings are registered with the camera, the camera head nickname is displayed in the "NAME" column. Refer to page 4-8 for the Camera Configuration Settings.

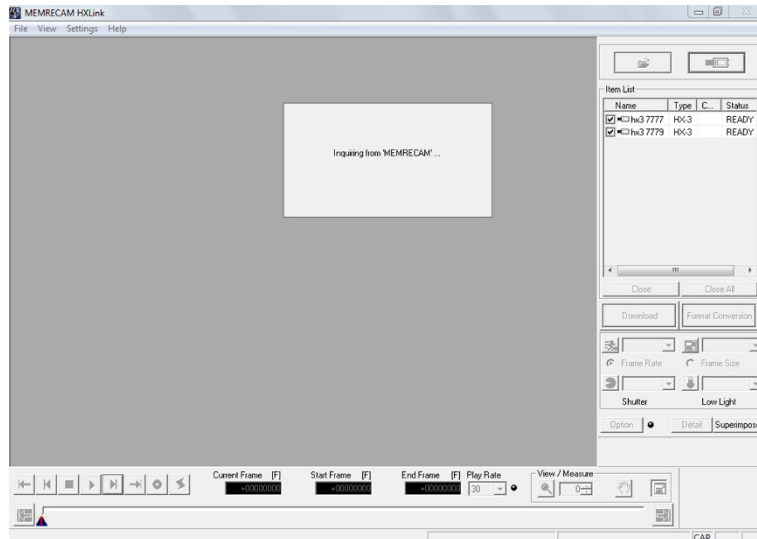
If there is a 0 in the ID column of the GX-5/GX-5F DRP, it indicates the camera head is not connected to the GX-5/GX-5F DRP.

If there is only one camera registered and communication has been established with the registered camera, the "Connect Camera" dialogue is not displayed, but the following page is displayed. However, for DRP (RX-5/RX-5G (RMunit/PMunit/PM3unit), GX-5/GX-5F) with multiple camera heads, even if only one camera is registered, the "Connect Camera" window is displayed without an automatic connection.

Cameras that can be connected will be displayed at the top of the list, and there will be a check in the box to the left of the list.

For "fx camera not connected to a PC" or "fx/GX/HX/Q camera used on another PC", there will be a red X on the camera just before the nickname.

Uncheck any boxes where there is a check on camera not connected. Click "OK" to start connecting the cameras checked.



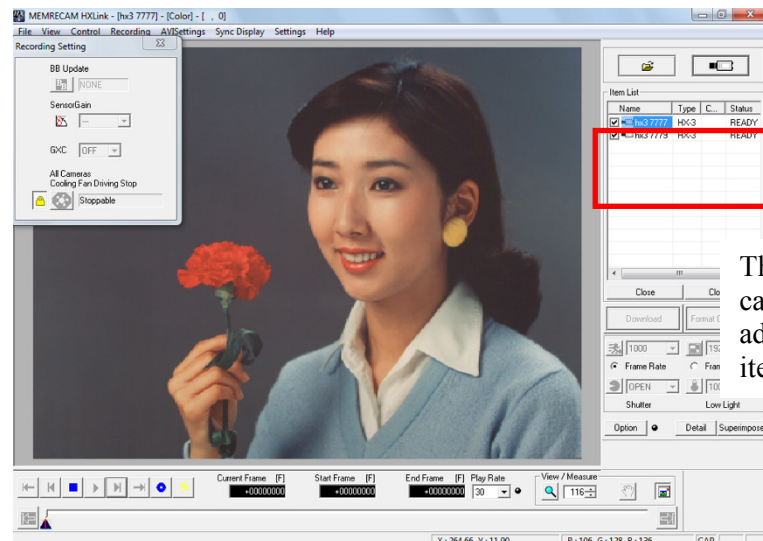
Once "Connect Camera" starts, the specified camera is added to the Item List, and the camera nickname (Name), camera model (Type), camera head number (CAMERA) and camera status are displayed.

The status display for the Item List is updated each time the camera status is changed, and the camera status is displayed.

Once the HX/GX camera connections are completed, the camera live images are displayed on the monitor.

As for Q camera, images are not displayed unless it is recorded at camera connection.

The name of the selected camera and the "Color/ B/W" type are displayed in the title bar of the HXLink window. Refer to page 3-21 for details on the title bar.



**Caution**

Recording parameters of Q camera always returns to default settings whenever re-connected. If preferred to stay with the parameters set, save these parameters into parameter file (prm) and load it after camera connected.

Refer to page 4-13, 7-5, 9-3 for saving and loading parameter file (prm).

#### ■GX-5/GX-5F/Q5 Camera Configuration Settings

The MEMRECAM GX-5/GX-5F/Q5 is configured of a DRP and a camera head with a camera head partitioning system.

The GX-5/GX-5F DRP can be connected to a maximum of 8 camera heads (maximum of 4 for 4ch and Q5), with a VRMS function (variable length recording memory allocation function) that uses the available memory. To use the available DRP memory, when the type of recording camera head is changed, the DRP memory must be split to switch the connected DRP port.

The GX-5/GX-5F/Q5 DRP memory partition is called the "Camera Configuration Settings".

The DRP port connected to the camera head and the memory response is performed in the "Camera Configuration Settings".

The following example uses GX-5/GX-5F 8ch DRP.

- Example) • With two P2-Cam and "Camera Configuration Settings", the DRP memory is split in half and allocated to each camera head.
- With three P2-Cam and "Camera Configuration Settings", the DRP memory is split in thirds and allocated to each camera head.
  - With one HR-Cam, two P2-Cam and "Camera Configuration Settings", the DRP memory is split into six parts, with four allocated to the HR-Cam and two allocated to the two P2-Cam.
  - With two HR-Cam and "Camera Configuration Settings", the DRP memory is split into 8 parts, with four allocated to one HR-Cam and the remaining four allocated to the other HR-Cam.

If using "Camera Configuration Settings", data saved in the memory so far is deleted.

If camera heads are connected to DRP ports that do not have memory partitions, recording is not possible for those camera heads. If even one of the camera head models connected in the "Camera Configuration Settings" set in the DRP matches, the matching camera head can record.

With HXLink, the P-Cam/P2-Cam/S-Cam/S2-Cam/C-Cam/u-Cam are all treated as P-CAM camera heads.

If switching the camera head and using the same type of camera head, the memory allocated to the DRP port does not change so there is no need to use "Camera Configuration Settings".

Also, if there is sufficient recording time in the memory allocated to the camera head, there is no need to use the "Camera Configuration Settings" even if the number of camera heads used for recording is changed. For example, if there are four P-CAM allocated to ports 1~4 in the "Camera Configuration Settings", memory is evenly allocated to each of the four ports so recording is possible if there is at least one P-CAM connected to one of the 1 ~4 ports.

Refer to the GX-5/GX-5F/Q5 user's manual for details of memory size and recording times.

## Manual and Automatic Camera Configuration Settings

The two methods of executing the GX-5/GX-5F "Camera Configuration Settings" includes "MANUAL" that executes by operating the HXLink or J-PAD3, and "AUTO" that automatically performs the "Camera Configuration Settings" after verifying the camera head connected during DRP startup. Use the "Camera System Settings" (HXUtility) and set the camera configuration mode to either "MANUAL" or "AUTO". The camera configuration mode for the GX-5/GX-5F is set to "MANUAL" at factory shipment.

Use the HXUtility to set the camera configuration mode. Refer to page 10-9 for details.



### **Warning**

Turn off the power to the DRP when adding or deleting camera heads on the GX-5/GX-5F/Q5. If the DRP is still powered when attaching or removing camera heads, the DRP and camera head may be damaged. Also, since devices connected to a malfunctioning device may be damaged, do not use the malfunctioning device and have it repaired.



### **Caution**

If implementing the Camera Configuration Settings, the image data recorded in the camera memory will be lost. To keep data, be sure to download the image data before implementing the camera configuration settings.



### **Caution**

If using the "AUTO" camera configuration mode, save the data recorded before turning off the DRP power even if there is a memory backup.

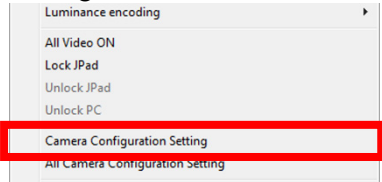
If the camera head cannot be verified during DRP startup due to a camera head connection problem, the image data will be lost during camera configuration setting.

□ "MANUAL" Procedures in the Camera Configuration Mode

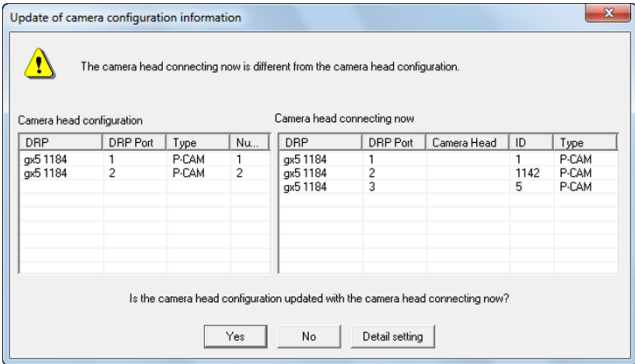
The camera configuration mode must be set to "Manual" for manual camera configuration settings.

● Procedures for Camera Configuration Settings

- 1) Connect to the MEMRECAM GX-5/GX-5F/Q5, and while in the READY mode, click on "Camera Configuration Settings" on the Control menu. (Since the "Camera Configuration Settings" is a function of the GX-5/GX-5F/Q5, it does not work with other DRP.)



The following dialogue is displayed.  
This dialogue is displayed even when the camera configuration and camera head connection status do not match when camera connections are finished or when VIEW has started.



The camera configuration currently set to the DRP is shown on the "Camera Head Composition" list.  
The camera head currently connected to the DRP is shown on the "Camera Head Currently Connecting".

The following items are displayed on the "Camera Head Composition" list.

DRP	DRP nickname
DRP Port	Port number on the DRP side where the camera head is connected
Type	Camera head type
Number	Camera head number (the most recent number of the port numbers for the "DRP Port")

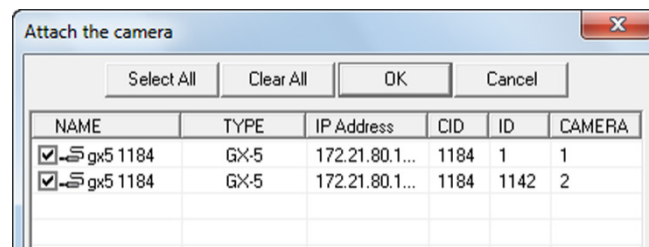
The following items are displayed on the "Camera Head Currently Connected".

DRP	DRP nickname
DRP Port	Port number on the DRP side where the camera head is connected
Camera Head	Camera head nickname If the camera head nickname is registered, the registered nickname is displayed.
ID	Camera head ID. The camera head is needed to register the camera.
Type	Camera head type

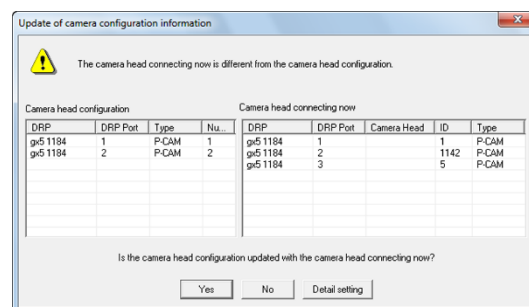
- 2) Verify the list, and if changing the DRP camera head configuration to the camera head currently connected, click "Yes".  
If there is recorded data not yet saved on the DRP, or if using the DRP camera head configuration unchanged, click "No".  
If "Yes" is clicked, communication between the HXLink and the GX-5/GX-5F DRP is temporarily suspended, and automatically reconnected when matched with the camera head currently connected.

● Adding a Camera Head

- 1) With the power to the GX-5/GX-5F/Q5 DRP off, connect the camera head to a free port.
- 2) Turn the power to the GX-5/GX-5F/Q5 DRP on and wait for it to startup.  
Once the DRP starts up, the CM LED turns blue.  
The LED of the port where the camera head was added flashes yellow (or orange) slowly.  
The LED for the port connected to the camera head matching the camera head configuration turns green, and the LED for the port where the camera head is not connected turns yellow (or orange).
- 3) Startup the HXLink and click on "Connect Camera".  
The camera head for the current camera head configuration is shown on the list for the "Connect Camera" dialogue. The DRP port number is shown in the CAMERA column of the list.
- 4) Select the DRP for the camera head added from the list in the following "Connect Camera" dialogue and click "OK".



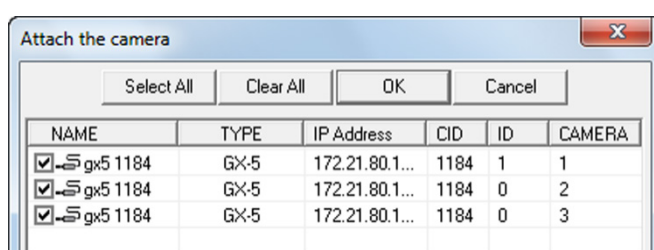
- 5) Click "Camera Configuration Settings" on the control menu to display the following dialogue.



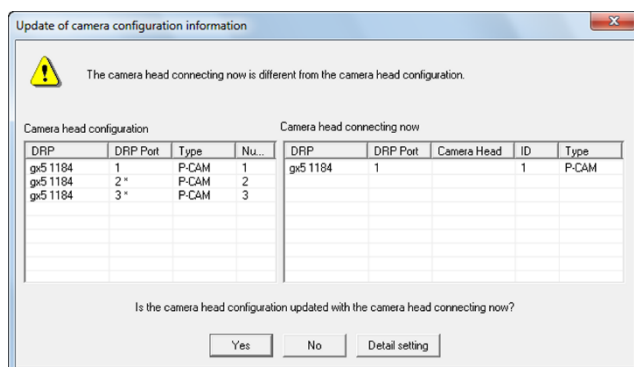
- 6) Click "Yes" to set the camera head configuration.  
Communication between the HXLink and the GX-5/GX-5F DRP is temporarily disconnected, and automatically reconnected when matched with the currently connected camera head.

- Deleting a Camera Head

- 1) With the GX-5/GX-5F DRP power off, remove the camera head from the DRP.
- 2) Turn on the GX-5/GX-5F DRP power and wait for it to restart.  
Once the DRP starts up, the CM LED turns blue.  
The LED of the port where the camera head was removed flashes yellow (or orange) fastly.  
The LED for the port connected to the camera head matching the camera head configuration turns green, and the LED for the port where the camera head is not connected turns yellow (or orange).
- 3) Startup the HXLink and click on "Connect Camera".  
The camera head for the current camera head configuration is shown on the list for the "Connect Camera" dialogue. The DRP port number is shown in the CAMERA column of the list.
- 4) Select the DRP for the camera head deleted from the list in the following "Connect Camera" dialogue and click "OK".



- 5) Click "Camera Configuration Settings" on the Control menu to display the following dialogue.



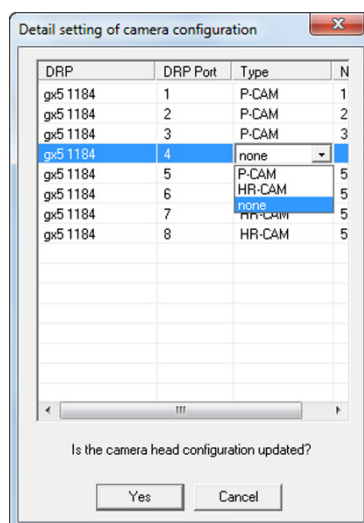
- 6) Click "Yes" to set the camera head configuration.  
Communication between the HXLink and the GX-5/GX-5F DRP is temporarily disconnected, and automatically reconnected when matched with the camera head currently connected.

\* When changing a port connected to a camera head, the procedure is the same as that for adding or deleting.

- Detailed Settings for Camera Configuration

The camera configuration settings can be performed regardless of the camera head connected to the GX-5/GX-5F.

Click on "Detail Settings for Camera Configuration" in the "Update Camera Configuration Information" dialogue.



The ports for all of the GX-5/GX-5F DRP are listed in the "Detailed Setting of Camera Configuration" dialogue. Select the camera head type connected to the DRP in the "Type" column. Select "none" for ports where camera heads are not in use.

The "Type" column cannot be changed on the GX-5/GX-5F DRP where the camera configuration mode is not compatible with "AUTO" or "detailed settings for camera configuration".

After the settings are finished, click "Yes".




**Caution**


Click "Yes" and the changes made in the "detailed settings for camera configuration" dialogue are set to the GX-5/GX-5F DRP.


Close the "Detailed Settings for camera configuration" dialogue and the "Update Camera Configuration Information" dialogue and communication with the cameras connected to the HXLink will be temporarily disconnected.


## 4.3 Recording&Playback

### ■ Recording

While in the READY mode, click  View/Record on the main toolbar to switch the camera from WAIT->VIEW and display the live image recorded by the camera on the image monitor. The image displayed on the image monitor is the same as the image displayed on the video monitor. While in the VIEW mode, the photographic parameters can be set.


After verifying the settings, click  View/Record again to start recording. The camera will access the ARM mode, and writing to the camera image memory will begin, and it will switch to the awaiting trigger state.


Upon receiving trigger signal input, recording ends and it enters the READY mode. (NORMAL recording) (Click  the trigger on the Main Toolbar to manually output trigger signals)

With multiple cameras,  the trigger button on the main toolbar is operational when all cameras are in the ARM mode. The trigger button is not operational for recording with BURST settings.

### ■ Playback (Confirm Image)

Once recording has been completed and the camera status is READY, the recorded images can be played back.

Click "Play"  on the main toolbar and the image in the camera memory are played back. To change the frame rate for the camera image, click "frame forward" or "frame reverse" during camera image playback in the PLAY mode or LOOP mode.

Click "Trigger"  to confirm the images input by the trigger signal. Refer to page 3-13 for playback operation with the main toolbar.

The playback parameters can be set with the "Detailed Settings" dialogue. Additionally, precise settings for the playback range can be made in single frame units.

If there are multiple cameras connected, the playback parameters can be set in the window showing "List of Camera Settings". Parameters for all of the cameras can be set in "Batch".

Specify the playback range to enable forward playback, reverse playback and loop playback and confirm the playback images. Then, verify the data download range.

Detailed image confirmation is possible by displaying the frame for the recorded image.

Use the zoom scroll tool for zoom display and scrolling of the still images shown. Refer to page 3-20 for details of the zoom and scroll tool.

Zoom and scroll set for still images is valid for each playback state (forward, reverse, and loop).

Zoom and scroll are functions of the image display and are unrelated to downloading.

When downloading, the recorded image is saved with no correlation between zoom and scroll display.

The following playback speeds can be set for the GX camera operation.

- Playback Rate (NTSC) -1920,-960,-480,-240,-120,-60,-30,-15,-10,-5,-2,-1,  
1,2,5,10,15,30,60,120,240,480,960,1920 Units:pps
- Playback Rate (PAL) -2000,-1000,-800,-400,-200,-100,-50,-25,-10,-5,-2,-1,  
1,2,5,10,25,50,100,200,400,800,1000,2000 Units:pps
- The >>>>>> in the "Playback Rate" pull-down menu is the actual playback speed.  
Plays back at the same rate as the recording frame rate.
- ->->-> and <-<-<- in the "Playback Rate" pull-down menu during synchronized display  
->->-> is the fastest playback speed that does not drop frames and performs forward playback.  
<-<-<- is the fastest playback speed that does not drop frames and performs reverse playback.

## 4.4 Recording Settings

### ■ Parameter Settings

The parameter can be set from HXLink to the camera while connecting the camera with beginning the camera connection.

Parameters set at the beginning of camera connections are specified in the "Camera Connection Settings" dialogue. Refer to page 6-2 for details.

Perform any of the following for the method to set parameters for the camera during camera connection.

- "Camera Parameters Toolbar" (Refer to page 3-17 for details.)
- "Controls" window
- "List of Camera Settings" window
- "Camera Details" dialogue
- "Recording" menu (Refer to page 8-25 for details.)
- "Options" dialogue (Refer to page 7-2 for details.)

If the camera recording parameters are set, the image displayed on the monitor (camera VIEW image) is updated to the parameters set.

### □ Parameter Setting File (prm file)

Parameters set for the camera can be saved in a file (prm).

Details of the saved parameter file (prm) can be set on the camera.

To save or read the parameter file, select the desired camera from the item list, click "Save Camera Setting /Import Camera Setting" on the file menu and specify the file name.

Refer to Appendix C for details of the parameters file.

### □ "Control" Window

Select a camera on the "Item List" and click "Control" on the right click menu of the mouse to open the "Control" window.

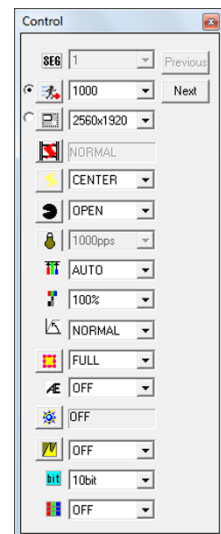
When the camera is in the VIEW mode, recording parameters can be set.

When the camera is in the READY mode, play parameters can be set.

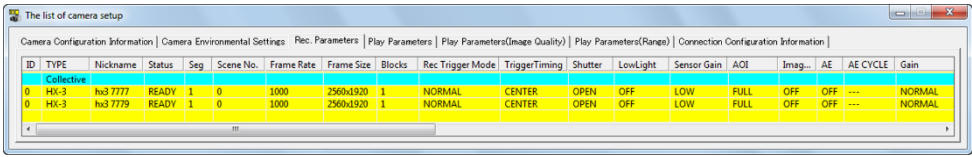
Items that can be set include, from the top, current segment, frame rate (pps), frame size, recording trigger mode, trigger timing, shutter, low light, white balance, chroma, gain, AOI, AE, image trigger, DRES mode, pixel bit depth and RGB matrix correction.

Click "Previous" to move to a camera setting higher on the item list.

Click "Next" to move to a camera setting lower on the item list.



□ "List of Camera Settings" Window



The screenshot shows a window titled "The list of camera setup" with a tabbed interface. The active tab is "Camera Configuration Information". The table below represents the data shown in the screenshot:

ID	TYPE	Nickname	Status	Seg	Scene No.	Frame Rate	Frame Size	Blocks	Rec Trigger Mode	TriggerTiming	Shutter	LowLight	Sensor Gain	AOI	Imag...	AE	AE CYCLE	Gain
0	Collective																	
0	HK-3	hd3 7777	READY	1	0	1000	2560x1920	1	NORMAL	CENTER	OPEN	OFF	LOW	FULL	OFF	OFF	---	NORMAL
0	HK-3	hd3 7779	READY	1	0	1000	2560x1920	1	NORMAL	CENTER	OPEN	OFF	LOW	FULL	OFF	OFF	---	NORMAL

"List of Camera Settings" Window

If there are multiple cameras connected, all of the parameters can be set in the "List of Camera Settings" window.

If there is one camera and "List of Camera Settings" is specified in "GUI Settings for Connecting 1 Camera" under the optional GUI settings tab, the parameters can be set in the "List of Camera Settings" window.

Any of the following can be used to open the "List of Camera Settings" window.

- Click "Detailed Settings" on the "Control" menu.
- Click "Detailed Settings" on the "Item Toolbar". (Basic Mode)
- Click "Detailed Settings" on the "Camera Parameter Toolbar". (Expert Mode)

The "List of Camera Settings" window has 7 tabs.

"Camera Device Information"	Camera, DRP information , settings
"Camera Environment Settings"	Camera, DRP information, settings
"Recording Parameters"	Settings for recording
"Playback Parameters "	Image settings recorded in the memory
"Playback Parameters (Image Quality)"	Settings for the image quality of the image recorded in the memory
"Playback Parameters (Range)"	Settings for the frame range of the image recorded in the memory
"Connection Configuration Information"	Camera connection status (in particular, the connection status of the M-HUB for the fx camera)

Double click on the cell for the parameter to be set to open the setting dialog box and change the setting.

Set parameters using "Batch" at the very top to set parameters for all of the cameras.

Set the segment partition, the live image resolution and image rotation and image reversal in "Camera Configuration Information".

Set synchronous settings, I/O signals, video display, and warning display with "Camera Environment Settings".

Set recording parameters under the "Recording Parameters" tab.

Set playback parameters under the "Playback Parameters" tab, the "Playback Parameters (Image Quality)" tab, and the "Playback Parameters (Range)" tab.

Verify the camera connection status using "Connection Configuration Information".

- "Camera Device Information"

ID	TYPE	Nickname	IP Address	MAC Address	CID	DRP Version	Recording Device	HD-Mag Op.	Memory	Master/Slave	Memory Segment	Live Image Resolution	Rotate Image	Reverse
0	HX-3	hx3 7777	172.21.90.51	70-58-12-0F-05-26	7777	1.30	RAM	---	34.1 GB	---	34GBx1	---	0	None
0	HX-3	hx3 7779	172.21.90.50	08-9E-01-91-88-2F	7779	1.30	RAM	---	34.1 GB	---	34GBx1	---	0	None

Camera Device Information (HX Camera Connection) 1

ID	Live Image Resolution	Rotate Image	Reverse	BATT.STATUS	Video	AllCamera AutoView	PC Lock	Lock /Pad	Black Balance Update	Zoom	X Scroll Position	Y Scroll Position	Video Rotation
---	0	None	None	LARGE	NTSC	OFF	OFF	OFF	NONE	FIT1	0	0	---
---	0	None	None	LARGE	NTSC	OFF	OFF	OFF	NONE	FIT1	0	0	---

Camera Device Information (HX Camera Connection) 2

### "Camera Device Information" Items

(ID, Segment Partition, Live Image Resolution, Rotate Image, Reverse Image, Update Black Balance, Zoom, Scroll Position, Auto View, PC Lock and Lock Remote Control can be set. Other items are for display only and the settings cannot be changed.)

<b>ID</b>	Camera (DRP) ID
<b>TYPE</b>	Camera (DRP) type
<b>Nickname</b>	Camera (DRP) nickname (refer to page 4-2)
<b>FC-AL node</b>	Camera (DRP) fiber channel node name (shown with FC-AL connection)
<b>IP Address</b>	Camera (DRP) IP Address (shown with TCP/IP or Gbit connection)
<b>MAC Address</b>	Camera (DRP) MAC Address (shown with TCP/IP or Gbitconnection)
<b>CID</b>	Camera (DRP) identification number
<b>DRP Version</b>	Camera (DRP) firmware version
<b>Archive</b>	Select the destination to save the HX camera image (RAM/HD-Mag)
<b>HD-Mag</b>	Shows the HD-Mag status for the HX camera option (HX-1 option)
<b>Memory</b>	Maximum recording memory
	If multiple camera heads, the memory used for each camera head.
<b>Master/Slave</b>	Camera synchronization master, synchronization slave settings
<b>Memory Segment</b>	Memory for one segment, and number of segments
<b>Live Image Resolution</b>	Live image resolution (Only fx camera)
<b>Rotate Image</b>	Image rotation angle
<b>Reverse Image</b>	Image reverse direction
<b>BATT.STATUS</b>	Battery status
	(NONE: no battery, SMALL: limited charge, MIDDLE: medium charge, LARGE: high charge)
<b>Video Output</b>	Video output method (NTSC/PAL)
<b>Auto View</b>	Auto View setting
<b>Video Out</b>	Video output method (NTSC/PAL)
<b>All Camera Auto View</b>	Auto View setting (Only indivisal)
<b>PC Lock</b>	Operation locks status from PC(Only indivisal)
<b>Lock Remote Control</b>	Operation lock status from remote control(Only indivisal)
<b>Update Black Balance</b>	Black Balance calculation
<b>Zoom</b>	Video display zoom setting
<b>X Scroll Position</b>	Video display X scroll setting
<b>Y Scroll Position</b>	Video display Y scroll setting
<b>Rotate Video</b>	Rotation angle of video display

▪ "Camera Environment Settings"

ID	TYPE	Nickname	Status	SaveRangeMode	FrameTime	Time Stamp	Camera Time	Camera Sync	EST Select	EST1 Input	EST2 Input	EST1 Filter	EST2 Filter	EST VIEW Sync	Trigger Select
0	Collective														
0	HX-3	hx3 7901	READY	PLAY	Trigger	ON	GX-HUB Time	Internal Sync	EST1	Nega	Nega	0.0	0.0	OFF	TRIG2
0	HX-7	hx7 7909	READY	PLAY	Trigger	ON	GX-HUB Time	Internal Sync	EST1	Nega	Nega	0.0	0.0	OFF	TRIG2
---	Q1m	Q1M1166	READY	PLAY	Trigger	ON	GX-HUB Time	Internal Sync	EST1	Nega	---	0.0	---	OFF	TRIG1
---	Q1m2	Q1M1166	READY	PLAY	Trigger	ON	GX-HUB Time	Internal Sync	EST1	Nega	---	0.0	---	OFF	TRIG1

Camera Environment Settings (HX camera, Q camera connection) 1

TRIG1 Input	TRIG2 Input	TRIG1 Filter	TRIG2 Filter	Trigger delay	Trigger Edge detect	TRIG Output Mode	TRIG Output Polarity	ARM Status	FAULT Status	ARM Command	EPO	Warning	On screen display
Nega	CRNT ON	20.0	20.0	---	OFF(level)	---	---	Nega	Nega	Nega	Nega	ON	ALL
Nega	CRNT ON	20.0	20.0	---	OFF(level)	STATUS	Nega	Nega	Nega	Nega	Nega	ON	ALL
Nega	---	20.0	---	---	---	---	---	---	---	---	---	---	---
Nega	---	20.0	---	---	---	---	---	---	---	---	---	---	---

Camera Environment Settings (HX camera, Q camera connection) 2

Frame Counter...	Reticule	DATETIME Display...	OSD Display Mode	Standard at frame relative time	Auto Black Balance	HX Monitor ...	Qcam Output Sync Signal	G Trigger	G Trigger Level	Recording Priority
FRAME	OFF	Trigger	ALWAYS	Trigger frame time	ON	ON	---	---	---	---
FRAME	OFF	Trigger	ALWAYS	Trigger frame time	ON	ON	---	---	---	---
---	---	---	---	Trigger frame time	---	---	IRIG Output	OFF	4095	Sensitivity
---	---	---	---	Trigger frame time	---	---	IRIG Output	OFF	4095	Image Quality

Camera Environment Settings (HX camera, Q camera connection) 3

Items in the Camera Environment Settings

<b>ID</b>	Camera (DRP) ID
<b>TYPE</b>	Camera (DRP) type (For display only. Setting cannot be changed.)
<b>Nickname</b>	Camera (DRP) nickname (refer to page 4-2) (For display only. Setting cannot be changed.)
<b>Status</b>	Camera (DRP) status (For display only. Setting cannot be changed.)
<b>Save Range Mode</b>	Setting whether or not to continue save range
<b>Frame Time</b>	Select camera frame time
<b>Time Stamp</b>	Time Stamp ON/OFF

The following items are synchronization setting items. Refer to page 6-4 for details.

<b>Camera Time</b>	Camera time setting
<b>Camera Sync Signal</b>	Select synchronized method during recording

The following items are I/O SIGNAL items. Refer to page 6-11 for details.

<b>EST Input Selection</b>	Select the connector for the external synchronization signals (EST) to be input.
<b>EST1 Input Polarity</b>	Select polarity for EST1 Input.
<b>EST2 Input Polarity</b>	Select polarity for EST2 Input.
<b>EST1 Filter</b>	External synchronization signal noise filter
<b>EST2 Filter</b>	External synchronization signal noise filter
<b>HX, GX Synchronized view</b>	Synchronized settings during VIEW for EST recording.
<b>Trigger Selection</b>	Select connector for external trigger signal input.
<b>TRIG1 Input Polarity</b>	Select TRIG1 input polarity.
<b>TRIG2 Input Polarity</b>	Select TRIG2 input polarity.
<b>TRIG1 Filter</b>	External trigger signal noise filter.
<b>TRIG2 Filter</b>	External trigger signal noise filter.
<b>Trigger Delay</b>	Trigger signal delay setting of ULTRA Cam.

**Trigger Edge Detection**

Select trigger detection. OFF: Level, ON: Edge.

**Trigger Output Mode**

Select trigger output mode and TRIG OUT output signal.

STATUS

TRIG OUT signal indicates that trigger was detected.

TRIGOUT

TRIG OUT signal is used as a recording trigger to cameras and other instruments. Refer to page 8-25 for details.

**Trigger Output Polarity**

Select TRIG OUT output polarity.

**ARM Status Output Polarity**

Select ARM status signal polarity output by camera.

**FAULT Status Output Polarity**

Select FAULT status signal polarity output by camera.

**ARM Command Input Polarity**

Select ARM command signal polarity input to camera.

**EPO(Exposure Pulse Output)**

Select EPO signal polarity output by camera.

The following items are HX,GX video display items. Refer to page 6-14 for details

**Warning**

Select whether or not to display HX, GX camera warnings.

**On screen display**

Select items for the on screen display.

**Frame Counter Display**

Set the format for the frame counter displayed in the video.

**Image Center Mark** Select the mark for the center of the image displayed in the video.

**DATETIME Display during Recording**

Select the DATETIME displayed in the video. Trigger/Current

**OSD Display Mode**

Select the mode to display the on screen display.

**Standards for Frame Relative Time**

Select the standard time for the relative time during a frame time exposure.

The following items are HX camera items.

**Auto Black Balance Settings**

Select whether or not to perform black balance automatically.  
(refer to page 4-35)

**HX Monitor Output**

Select whether or not to output videos to the monitor connected to the camera

The following items are Q camera items.

**Sync output signal**

Select signal output from “SYNC OUT” cable.  
(refer to page 3-9)

**G trigger**

Function to detect trigger by G sensor, which is built in camera and sensed by shock. By setting as “ON”, trigger signal is generated by shock given to camera body, in addition to standard trigger signal generated by user’s facility

**G trigger level**

Specify impact level to generate trigger signal.  
The unit is [G] (acceleration).

The following item is for Q1m, Q1v, and HX-7S camera

**Recording Priority**

Select the recording priority setting when the camera is in READY state.  
The setting is set to the image sensor when VIEW starts or ARM starts.

Sensitivity

Image Quality

## ▪ "Recording Parameters"

ID	TYPE	Nickname	Status	Seg	Scene No.	Frame Rate	Frame Size	Blocks	Rec. Trigger Mode	TriggerTiming	Shutter	LowLight	Sensor Gain	AGI	ImageTrigger	AE	AE CYCLE	Gain
0	Collective																	
0	HX-3	h3 7777	READY	1	0	1800	2560x1820	1	NORMAL	CENTER	OPEN	OFF	LOW	FULL	MID	OFF	---	NORMAL
0	HX-3	h3 7775	READY	1	0	1000	2560x1820	1	NORMAL	CENTER	OPEN	OFF	LOW	FULL	MID	OFF	---	NORMAL

Recording Parameters (HX Camera Connection) 1

Gamma	White Balance	Edge Enhance	Knee	Chroma	Comment	Rec possible Frame	Custom Trigger value	DRES Mode	Exposure Timing	Pixel Bit Depth	Black Balance	Camera Sync
NORMAL	AUTO					5558	0	OFF	K4 Compatible	10bit	ON	Internal Sync
NORMAL	AUTO					5558	0	OFF	K4 Compatible	10bit	ON	Internal Sync

Recording Parameters (HX Camera Connection) 2

H Bit Depth	Black Balance	Camera Sync	Exposure phase	RGB Matrix	Luminance encoding	Variable Frame Rate	Speed Ratio	High Speed Recording Frame	Frame Straddling	Frame Straddling Disp
10	ON	Internal Sync	0	OFF	NORMAL	OFF	2	2775	OFF	1st
10	ON	Internal Sync	0	OFF	NORMAL	OFF	2	2775	OFF	1st

Recording Parameters (HX Camera Connection) 3

## "Recording Parameters" Items

<b>ID</b>	Camera (DRP) ID
<b>TYPE</b>	Camera (DRP) type (For display only. Settings cannot be changed.)
<b>Nickname</b>	Camera (DRP) nickname (refer to page 4-2) (For display only. Settings cannot be changed.)
<b>Status</b>	Camera (DRP) status (For display only. Settings cannot be changed.)
<b>Segment</b>	Recording segment number (1~128)
<b>Scene No.</b>	Photograph number (0~65535) +1 for each photograph
<b>Frame Rate</b>	Recording frame rate (pps) (values that can be set vary by model)
<b>Frame Size</b>	Recording frame size (values that can be set vary by model)
<b>Blocks</b>	Select 1~64 (HX), 1~16 (GX) values for the number of blocks for partition recording
<b>Recording Trigger Mode</b>	Sets the recording trigger mode. Refer to page 4-57 for details.
NORMAL	Normal recording
NORMAL(A)	Automatically switches segments and records
NORMAL(L)	Repeated recording until "Stop" is pressed
EVENT	Saves external trigger signals when recording
EVENT(A)	Automatically switches segments and records
EVENT(L)	Repeated recording until "Stop" is pressed
BURST	Records only with external trigger signal input
BURST(A)	Automatically switches segments and records
BURST(L)	Repeated recording until "Stop" is pressed
MULTI(A)	Records the number of blocks
MULTI(C)	Repeated recording until "Stop" is pressed
MULTIS(A)	Automatically switches segments and records the number of blocks
MULTIS(L)	Automatically switches segments and records and repeatedly records until Stop is pressed
MULTI1(A)	Refer to page 4-59.
MULTI1(C)	Refer to page 4-59.
MULTI2(A)	Refer to page 4-60.
MULTI2(C)	Refer to page 4-60.
MULTI3(A)	Refer to page 4-60.
MULTI3(C)	Refer to page 4-60.
LINEAR	Refer to page 4-60.

<b>Trigger Timing</b>	Sets the recording trigger position. Refer to page 4-38 for details. (This setting is not valid when the recording trigger mode is BURST, MULTI1~3 and LINEAR. Change the Rec trigger mode to something other than BURST, MULTI1~3 and LINEAR to set.)
START	Sets the START trigger position.
CENTER	Sets the CENTER trigger position.
END	Sets the END trigger position.
BURST	Displayed when the fx camera is set to BURST recording.
CUSTOM	Sets the CUSTOM trigger position.
<b>Shutter</b>	Shutter Speed (values that can be set vary by model)
OPEN	Record at shutter speed of 1/frame rate.
2k	Record at 2k shutter speed.
5k	Record at 5k shutter speed.
5k	Record at 5k shutter speed.
10k	Record at 10k shutter speed.
20k	Record at 20k shutter speed.
50k	Record at 50k shutter speed.
100k	Record at 100k shutter speed.
200k	Record at 200k shutter speed.
CUSTOM	Record at a speed with a CUSTOM setting.
<b>Low Light</b>	Setting where the low light mode preview brightness corresponds to the frame rate. (If using multiple camera heads with the GX-5/GX-5F, the ON/OFF status for the low light mode is the same for all camera heads. However, if the individual settings are OFF->ON or ON->OFF, all of the camera heads can be switched ON/OFF. Also, if the exposure timing setting is "GX NATIVE", all of the camera heads will have the same frame rate (exposure time) during the low light mode.
OFF	Low light mode is turned OFF.
100pps	Live image displayed corresponding to a frame rate of 100pps.
250pps	Live image displayed corresponding to a frame rate of 250pps.
500pps	Live image displayed corresponding to a frame rate of 500pps.
1000pps	Live image displayed corresponding to a frame rate of 1000pps.
CUSTOM	Live image displayed corresponding to the desired frame rate. Exposure time units can be specified in PPS or microSEC.
<b>Sensor Gain</b>	Select the sensor gain. Can be set with the HX Camera.
<b>AOI</b>	Use the automatic exposure function or the image trigger function and select the range for detecting the brightness. Refer to page 4-45 for details.
<b>Image Trigger</b>	Select the image trigger function. Set with the GX camera. Refer to page 4-49 for details.
<b>AE</b>	Select automatic exposure function. Set with the fx-K5 and GX,HX cameras. Refer to page 4-44 for details.
OFF	No automatic exposure.
LOW	Low average image brightness.
NORMAL	Normal average image brightness.
HIGH	High average image brightness.
<b>AE CYCLE</b>	Designate the automatic exposure cycle. Set with fx-K5 cameras.

<b>Gain</b>	Brightness
	LOW, NORMAL, HIGH can be set with the MEMRECAM HX, GX, Q camera.
LOW	Lower gain by one aperture.
NORMAL	Normal brightness.
HIGH	Raise gain by one aperture.
	Set from 0dB, +6dB, +12dB with the MEMRECAM fx series.
0db	Normal brightness.
+6db	Raise gain by one aperture.
+12 db	Raise gain by two apertures.

<b>Gamma</b>	Gamma correction
OFF	No gamma correction.
LOW	Low gamma correction.
NORMAL	Normal gamma correction.

<b>White Balance</b>	White Balance
AUTO	Auto white balance setting.
3100K	Setting for 3100K color temperature.
5000K	Setting for 5000K color temperature.
9000K	Setting for 9000K color temperature.
REG	Uses the auto white balance setting obtained with SET during the preview.
SET	Calculates the white balance data from the preview image.



#### Caution

With Q camera, white balance is automatically updated when changing white balance settings or other camera settings. White balance is not updated when in VIEW or ARM

<b>Enhance</b>	Enhance profile
OFF	No enhance.
LOW	Low enhance.
NORMAL	Normal enhance.
HIGH	High enhance.

<b>Knee</b>	Turns correction expanding the dynamic range ON/OFF by lowering the gain of the signals exceeding a specific brightness level.
-------------	--

#### ChromaColor depth (chroma)

0%	Sets chroma to 0%. Black and white image.
50%	Sets chroma to 50%.
100%	Sets chroma to 100%. Standard chroma.
150%	Sets chroma to 150%.
200%	Sets chroma to 200%.

<b>Comments</b>	Recording comments. Input setting up to 100 ASCII characters. The three characters of [¥]["]['] as well as two byte Japanese characters cannot be used. Characters can be copy and pasted, with the exception of the restricted characters given above.
-----------------	--

<b>Recordable Frames</b>	Number of frames that can be recorded. (For display only. Settings cannot be changed.)
--------------------------	---

<b>Custom Trigger Values</b>	Displays the number of recording frames before trigger input during CUSTOM trigger timing. (For display only. Settings cannot be changed.)
------------------------------	---

<b>DRES Mode</b>	Dynamic range expansion shutter mode. Set with HX, GX cameras.
OFF	Normal setting.
LOW	Sets the dynamic range to approximately 200%.
MID	Sets the dynamic range to approximately 400%.
HIGH	Sets the dynamic range to approximately 800%.
CUSTOM	Sets the dynamic range to approximately 1600%.
	Refer to page 4-48.
<b>Exposure Timing</b>	Used to match HX, GX, Q camera and fx camera exposure times. Refer to page 4-40 for details.
<b>Pixel Bit Depth</b>	Pixel bit depth setting (Can be set with HX, GX, Q camera. The bit depth to be set varies by camera and DRP.)
8bit	Sets the bit length to 8bit.
10bit	Sets the bit length to 10bit.
12bit	Sets the bit length to 12bit.
<b>Black Balance</b>	Black balance ON/OFF setting. Set with HX, GX, Q camera.
<b>Camera Synchronization</b>	Select EST. Refer to page 6-4 for details.
<b>Exposure Phase</b>	Specify the exposure phase shift with a value 0~359 (°). Set with HX, GX, Q cameras. Refer to page 4-41 for details.
<b>RGB Matrix</b>	Turns RGM matrix correction ON/OFF for the image data. Set with HX, GX, Q cameras.
<b>Luminance Properties</b>	Input/output transfer properties when image data is displayed Set with HX, GX, Q cameras.
NORMAL	Gain , Gamma , Knee used.
LINEAR	Gain , Gamma , Knee settings ignored, data converted to linear for display.
CUSTOM	Displays enhanced even for data with low luminance differences set to display images with specific input/output transfer properties. Refer to page 5-14 for details.
TABLE	Function only for HX camera. Refer to page 5-15.

The following items are “Variable Frame Rate Recording “ function items. (Only HX camera and GX-8)  
Refer to page 4-42 for details.

<b>Variable frame rate</b>	ON/OFF setting for “Variable Frame Rate Recording“ function. (Only indivisal)
<b>Speed Ratio</b>	Setting specifying a low recording rate with the “Variable Frame Rate Recording“ function. Speed ratio for high recording rate / low recording rate (2~100). (Only indivisal)
<b>High Speed Recording Frames</b>	Frames recorded with the high recording rate. (Only indivisal)

The following items are frame straddling function items. (Only HX camera and GX-8)  
Refer to page 8-19 for details.

**Frame Straddling Recording**

ON/OFF setting for the frame straddling function.  
(Batch setting is invalid during VIEW/ARM)

**Frame Straddling Display**

	Video-live image display during frame straddling photography.
ANY	Displays the most recent image without differentiating between the 1st, 2nd
1st	Displays the most recent image in the 1st frame
2nd	Displays the most recent image in the 2nd frame

- "Playback Parameters"

ID	TYPE	Nickname	Status	Frame No.	Seg	Scene No.	Frame Rate	Frame Size	Blocks	Rec Trigger Mode	Shutter	Sensor Gain	AOI	ImageTrigger	AE	AE CYCLE	Comment
0	Collective																
0	HX-3	hd 7777	READY	0	1	0	3000	2960x1920	1	NORMAL	OPEN	LOW	FULL	MID	OFF	---	
0	HX-3	hd 7775	READY	0	1	0	3000	2960x1920	1	NORMAL	OPEN	LOW	FULL	MID	OFF	---	

Playback Parameters (HX camera connection) 1

DRES Mode	Exposure Timing	Pixel Bit Depth	Black Balance	Camera Sync	Exposure phase	Variable Frame Rate	Speed Ratio	High Speed Recording Frame	Frame Straddling	Frame Straddling Disp
OFF	H4 Compatible	10bit	ON	EST Sync	0	OFF	2	3147483647	OFF	3/8
OFF	H4 Compatible	10bit	ON	EST Sync	0	OFF	2	3147483647	OFF	3/8

Playback Parameters (HX camera connection) 2

### "Playback Parameters" Items

(ID, Current Frame, Segments, Comments, Black Balance settings.

Other items are for display only.)

<b>ID</b>	Camera (DRP) ID
<b>TYPE</b>	Camera (DRP) model
<b>Nickname</b>	Camera (DRP) nickname (refer to page 4-2)
<b>Status</b>	Camera status
<b>Current Frame</b>	Current frame
<b>Seg</b>	Segment number
<b>Scene No.</b>	Scene number
<b>Frame Rate</b>	Recording frame rate
<b>Frame Size</b>	Recording frame size
<b>Blocks</b>	Number of blocks for recording
<b>Recording Trigger Mode</b>	Recording trigger mode setting
<b>Shutter</b>	Shutter speed
<b>Sensor Gain</b>	Sensor gain setting
<b>AOI</b>	Automatic exposure or image trigger range
<b>Image Trigger</b>	Image Trigger setting
<b>AE</b>	Automatic exposure setting
<b>AE CYCLE</b>	Automatic exposure cycle
<b>Comments</b>	Recording comments. Input setting up to 100 ASCII characters. The three characters of [¥]["] and all Japanese characters cannot be used. Characters can be copied and pasted, with the exception of the characters given above.
<b>DRES Mode</b>	Dynamic range expansion shutter mode.
<b>Exposure Timing</b>	Exposure timing setting
<b>Pixel Bit Length</b>	Pixel bit length setting
<b>Black Balance</b>	Black Balance ON/OFF
<b>Camera Synchronization</b>	EST setting during recording
<b>Exposure phase</b>	Exposure phase shift setting
<b>Variable frame rate</b>	ON/OFF setting for variable recording speed function.
<b>Speed Ratio</b>	Low/high speed ratio for high recording speed when the variable recording speed function is used.
<b>High Recording Speed Frames</b>	Frames recorded with the high recording speed.
<b>Frame Straddling Recording</b>	ON/OFF setting for the frame straddling function.
<b>Frame Straddling Display</b>	Video and live image display during frame straddling photography.

- "Playback Parameters (Image Quality)"

ID	TYPE	Nickname	Status	Frame No.	Gain	Gamma	White Balance	Edge Enhance	Knee	Chroma	RGB Matrix	Luminance encoding
0	Collective											
0	HX-3	hx3 7777	READY	0	NORMAL	NORMAL	AUTO	NORMAL	ON	100%	OFF	NORMAL
0	HX-3	hx3 7775	READY	0	NORMAL	NORMAL	AUTO	NORMAL	ON	100%	OFF	NORMAL

Playback Parameters (Image Quality)

"Playback Parameters (Image Quality)" Items

<b>ID</b>	Camera (DRP) ID
<b>TYPE</b>	Camera (DRP) model (For display only. The settings cannot be changed. )
<b>Nickname</b>	Camera (DRP) nickname (refer to page 4-2) (For display only. The settings cannot be changed. )
<b>Status</b>	Camera (DRP) status (For display only. The settings cannot be changed. )
<b>Current Frame</b>	Current frame
<b>Gain</b>	Brightness LOW, NORMAL, HIGH can be set with the MEMRECAM HX, GX, Q cameras. <div> <div>LOW</div> <div>Lower gain by one aperture.</div> </div> <div> <div>NORMAL</div> <div>Normal brightness.</div> </div> <div> <div>HIGH</div> <div>Raise gain by one aperture.</div> </div> Set from 0dB, +6dB, +12dB with the MEMRECAM ci, fx series. <div> <div>0db</div> <div>Normal brightness.</div> </div> <div> <div>+6db</div> <div>Raise gain by one aperture.</div> </div> <div> <div>+12 db</div> <div>Raise gain by two apertures.</div> </div>
<b>Gamma</b>	Gamma correction <div> <div>OFF</div> <div>No gamma correction.</div> </div> <div> <div>LOW</div> <div>Low gamma correction.</div> </div> <div> <div>NORMAL</div> <div>Normal gamma correction.</div> </div>
<b>White Balance</b>	White Balance <div> <div>AUTO</div> <div>Auto white balance setting.</div> </div> <div> <div>3100K</div> <div>Setting for 3100K color temperature.</div> </div> <div> <div>5000K</div> <div>Setting for 5000K color temperature.</div> </div> <div> <div>9000K</div> <div>Setting for 9000K color temperature.</div> </div> <div> <div>REG</div> <div>Uses the auto white balance setting obtained with SET during the preview.</div> </div>
<b>Enhance</b>	Enhance profile <div> <div>OFF</div> <div>No enhance.</div> </div> <div> <div>LOW</div> <div>Low enhance.</div> </div> <div> <div>NORMAL</div> <div>Normal enhance.</div> </div> <div> <div>HIGH</div> <div>High enhance.</div> </div>
<b>Knee</b>	Turns correction expanding the dynamic range ON/OFF by lowering the gain of the signals exceeding a specific brightness level.
<b>Chroma</b>	Color depth (chroma) <div> <div>0%</div> <div>Sets chroma to 0%. Black and white image.</div> </div> <div> <div>50%</div> <div>Sets chroma to 50%.</div> </div> <div> <div>100%</div> <div>Sets chroma to 100%. Standard chroma.</div> </div> <div> <div>150%</div> <div>Sets chroma to 150%.</div> </div> <div> <div>200%</div> <div>Sets chroma to 200%.</div> </div>
<b>RGB Matrix</b>	Turns RGB matrix correction for image data ON/OFF. HX, GX, Q camera setting.

## Luminance Properties

Input/output properties when image data is displayed.

HX, GX, Q camera setting.

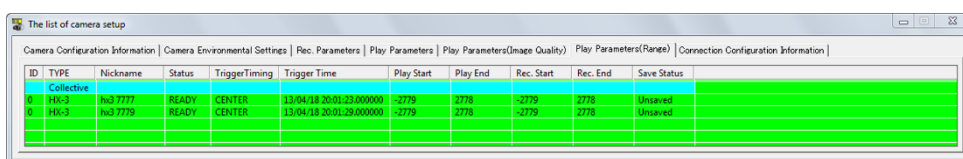
NORMAL Gain, Gamma, Knee used.

LINEAR Gain, Gamma, Knee settings ignored, data transferred to linear for display.

CUSTOM Displays enhanced even for data with low luminance differences set to display images with specific input/output transfer properties. Refer to page 5-14 for details.

TABLE Function only for HX camera. Refer to page 5-15.

## • "Playback Parameters (Range)"



ID	TYPE	Nickname	Status	TriggerTiming	Trigger Time	Play Start	Play End	Rec. Start	Rec. End	Save Status
0	Collective									
1	H4C-3	h4c3 7777	READY	CENTER	13/04/18 20:01:23.000000	-2778	2778	-2778	2778	Unsaved
2	H4C-3	h4c3 7778	READY	CENTER	13/04/18 20:01:29.000000	-2778	2778	-2778	2778	Unsaved

Playback Parameters (Range)

"Playback Parameters (Range)" Items

(ID, Playback Start, Playback End settings only. The other items are for display only.)

<b>ID</b>	Camera (DRP) ID
<b>TYPE</b>	Camera (DRP) model
<b>Nickname</b>	Camera (DRP) nickname (refer to page 4-2)
<b>Status</b>	Camera status
<b>Trigger Timing</b>	Trigger setting
<b>Trigger Time</b>	Trigger signal input time
<b>Playback Start, Playback End</b>	Playback start frame/time, playback end frame/time
<b>Rec. Start, Rec. End</b>	Recording start frame/time, recording end frame/time
<b>Save Status</b>	Save status for camera data

- "Connection Configuration Information" (using GXLink images)

ID	TYPE	Nickname	Sync	IRIG	I-M Sync	M S/N	M Port No.	M Port ID	M-S Connect	M-S Sync	S S/N	S Port No.	S Port ID	S-C Connect	S-C Sync	CID
0	Collective															
0	RX-5(RMunit)	RX5	Sync	None		5440	0	5	connected						Sync	1305
0	RX-5(RMunit)	RX5	Sync	None		5440	0	5	connected						Sync	1305

Connection Configuration Information (during M-Hub use)

"Connection Configuration Information" Items (only the ID can be set. The other items are for display only.)

ID	Camera (DRP) ID
TYPE	Camera (DRP) type
Nickname	Camera (DRP) nickname (refer to page 4-2)
Sync	Camera (DRP) sync status All I-M sync, M-S sync, S-C sync, "Sync" displayed when sync processing on camera (DRP) successful
IRIG	IRIG signal status
I-M SYNC	IRIG and master M-Hub sync status
M S/N	Master M-Hub serial number
M Port No.	Master M-Hub port number
M Port ID	Master M-Hub port ID
M-S Connection	Master M-Hub and slave M-Hub connection status (C:connected, D:disconnected)
M-S Sync	Master M-Hub and slave M-Hub sync status
S S/N	Slave M-Hub serial number
S Port No.	Slave M-Hub port number
S Port ID	Slave M-Hub port ID
S-C Connect	Slave M-Hub and camera connection status (C:connected, D:disconnected)
S-C Sync	Slave M-Hub and camera sync status
CID	Camera (DRP) identification number

## □ "Detail Settings" Dialogue

Parameters for a single camera can be set with the "Detail Settings" dialogue. Display and parameters that can be set in the "Detail Settings" dialogue vary by the camera model.

Any of the following can be used to open the "Detail Settings" dialogue.

- Select a camera from the item list and click "Detail Settings" on the right click menu (the "Camera Details" dialogue opens when a camera in the item list is designated, even if multiple cameras are connected).

With a single camera connection, select "Camera Details (Individual)" for the "GUI Settings for Single Camera Connection" in the "GUI Settings" in "Options".

- Click "Detailed Settings" in the "Control" menu.
- Click "Detailed Settings" in the "Item Toolbar". (Basic Mode only)
- Click "Detailed Settings" in the "Camera Parameter Toolbar". (Expert Mode only)

**Detail settings**

**Recording parameters**

ID: 0

Scene No.: 2

Frame Rate: 1000

Frame Size: 1920x1080

Rec Trigger Mode: 1 NORMAL

Trigger Timing: CENTER

Shutter: OPEN

AE: OFF

Pixel Bit Depth: 10bit

Exposure phase: 0

Low Light: 1000pps

Comment:

Knee: ON

Gain: NORMAL

Gamma: NORMAL

White Balance: AUTO

Enhance: LOW

Chroma: 100%

Black Balance: ON

AOI: FULL

DRES Mode: OFF

Rec Sync Signal: Internal Sync

RGB Matrix: OFF

**Playback Parameters**

Segment No.: 1

Scene No.: 1

Frame Rate: 1000

Frame Size: 1920x1080

Trigger Mode: 1 NORMAL

Trigger Timing: CENTER

Shutter: OPEN

AE: OFF

Pixel Bit Depth: 10bit

Exposure phase: 0

Comment:

Knee: ON

Gain: NORMAL

Gamma: NORMAL

White Balance: AUTO

Enhance: LOW

Chroma: 100%

Black Balance: ON

AOI: FULL

DRES Mode: OFF

Rec Sync Signal: A-EST Sync(High acc)

RGB Matrix: OFF

**General parameters**

Recording Priority

Image Quality

Camera Time

Internal Sync Time

BATT.STATUS: LARGE

Save Range Mode: PLAY

Black Balance Update: VALID

**Video**

Zoom: FIT1

X Position: 0

Y Position: 0

Centering: [Crosshair icon]

TRIG1 Filter: 20.0 us

TRIG2 Filter: 0.0 us

EST1 Filter: 0.0 us

EST2 Filter: 0.0 us

Trigger Edge detect: OFF(level)

Block Frame

Current: 1 0

Start: 1 -6588

End: 1 6587

Top: 1 -6588

Bottom: 1 6587

Trigger Time: 16/12/26 13:42:17.000000

Apply

Close

HX series "Detail Settings" dialog



Detail settings

Recording parameters

ID

Scene No.

2

Frame Rate

1000

Frame Size

1280x1024

Rec Trigger Mode

1

NORMAL

Trigger Timing

CENTER

Shutter

OPEN

Pixel Bit Depth

10bit

Exposure phase

0

Low Light

100pps

Comment

Knee

ON

Gain

NORMAL

Gamma

LOW

White Balance

AUTO

Enhance

NORMAL

Chroma

150%

Black Balance

OFF

DRES Mode

Rec Sync Signal

Internal Sync

RGB Matrix

OFF

General parameters

Recording Priority

Sensitivity

Camera Time

Internal Sync Time

BATT.STATUS

SMALL

Save Range Mode

PLAY

Black Balance Update

VALID

TRIG1 Filter

20.0

us

EST1 Filter

0.0

us

Apply

Close

Playback Parameters

Segment No

SEG 1

Scene No.

1

Frame Rate

1000

Frame Size

1280x1024

Trigger Mode

1

NORMAL

Trigger Timing

CENTER

Shutter

997us

Pixel Bit Depth

10bit

Exposure phase

0

Comment

Knee

ON

Gain

NORMAL

Gamma

LOW

White Balance

AUTO

Enhance

NORMAL

Chroma

150%

Black Balance

OFF

DRES Mode

Rec Sync Signal

Internal Sync

RGB Matrix

OFF

Block

Frame

Current

1

0

Start

1

-2598

End

1

2598

Block

Frame

Top

1

-2598

Bottom

1

2598

Trigger Time

16/12/26 13:42:37.655421

Q series "Detail Settings" dialog

(00292)P

4 - 29

## ■ Frame Rate, Frame Size

Values that can be set for frame rate and frame size vary by model.

The frame rate and frame size are limited by the reciprocal upper values.

Basically, the upper limit for the frame size is limited by the frame rate selected and the upper limit for the frame rate is limited by the frame size selected.

Before setting the frame rate and frame size, specify either the frame rate or the frame size for priority. For example, if "Frame Rate Priority" is selected, the frame rate can be freely selected but the frame size is limited to values possible under the frame rate conditions.

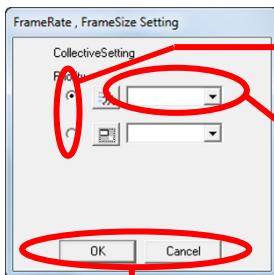
(Example) Changing the Frame Rate with "Batch"

1

ID	TYPE	Nickname	Status	Seg	Scene No.	Frame Rate
Collective						
0	HX-3	hx3 7777	READY	1	0	1000
0	HX-3	hx3 7779	READY	1	0	1000

Double click on the "Frame Rate" cell in "Batch".  
The "Frame Rate, Frame Size Settings" dialogue for setting parameters is displayed.

2



Select either frame rate or frame size with priority.  
If the frame rate has priority, the frame rate for all of the cameras is displayed on the pull down menu, and only the frame sizes that can be selected at the frame rate selected are displayed for selection.

Specify the frame rate to be set.  
Specify to set the parameters for all of the cameras.

Click "OK" to close the "Frame Rate, Frame Size Settings" dialogue. Click "Cancel" to close the dialogue and return to the state prior to changing all of the camera settings.

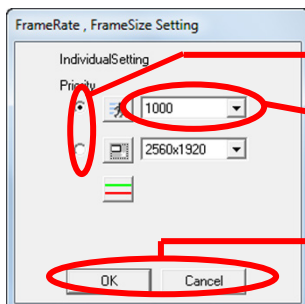
(Example) Setting the Frame Rate by Selecting a Camera

1

ID	TYPE	Nickname	Status	Seg	Scene No.	Frame Rate
Collective						
0	HX-3	hx3 7777	READY	1	0	1000
0	HX-3	hx3 7779	READY	1	0	1000

Double click on the "Frame Rate" cell by selecting the camera row.  
The "Frame Rate, Frame Size Settings" dialogue for setting parameters is displayed.

2



Select either frame rate or frame size with priority.

Specify the frame rate to be set.  
Set the parameters for only the cameras selected.

Click "OK" to close the "Frame Rate, Frame Size Settings" dialogue. Click "Cancel" to close the dialogue and return to the state prior to changing the selected camera settings.



## □ Custom Settings for Frame Rate and Frame Size

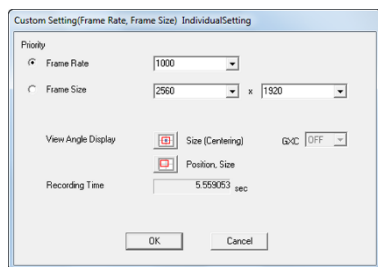
In addition to the predetermined values for the HX, GX camera frame rate and frame size, the image width, height and frame rate can be set to the desired values.

The parameters of HX-3 cameras are restricted, with the width a factor of 64 less than 2560, the height a factor of 8 less than 1920 and the frame rate an integer 50 or greater.

To increase the value for the frame rate, the upper limit for the frame size will be reduced.

In this case, an adjustment is made using the priority for the frame rate and frame size.

Open the "Camera Parameter" toolbar, the "Camera Details" dialogue or the "Control" dialogue, and click on  Frame Rate or  Frame Size to display the "Custom Settings" dialogue.



CUSTOM Settings Dialogue (HX camera connection)

Select the frame rate and frame size priority. Select the frame rate and frame size width and height, or enter a number. After setting, click "OK" to set the parameters to the camera. Or, use "Display Angle" to select the two types of settings, depending on the camera connected.

Specify size (center): HX, GX camera position ▪ specify size: HX camera

Click to open the display angle dialogue and the entire image and frame for the frame size is displayed.

### <Specify Size (Center)>

In the angle display dialogue, the camera live image (still image) and the currently set frame size area (white border) are displayed.

Change the frame size corresponding to the position by clicking or dragging the image. At this point, the changed frame size is shown with a red border.

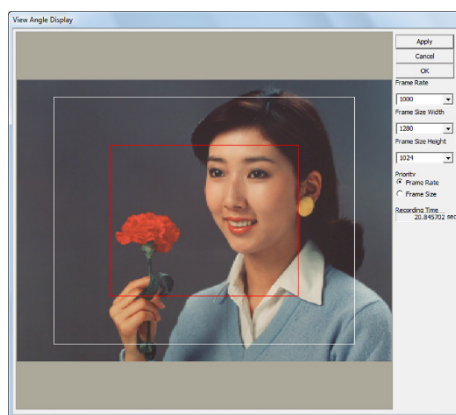
If the priority is the frame rate, it isn't possible to drag to an area that exceeds the upper limit of the frame size.

If the priority is the frame rate, it isn't possible to drag in a range that exceeds the upper limit of the frame size relative to the frame rate.

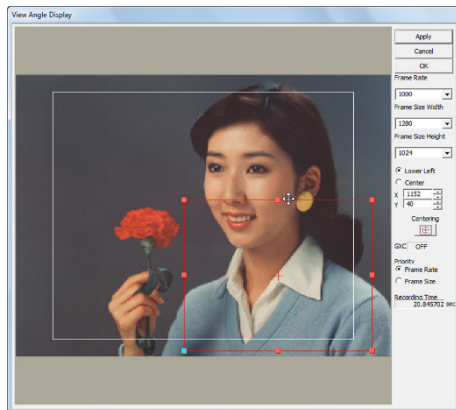
If the priority is the frame size, the frame rate will automatically be reduced if the upper limit of the frame size is exceeded when dragged.

Numerical input is also possible. Input the parameter to be changed and click "Apply" to update the frame size (red frame) and frame rate.

After updating the settings, click "OK" to set the parameters to the camera.



Field angle display  
Size specification (Center)



Specify Position , Size

#### <Specify Position , Size>

In the angle display dialogue, the camera live image (still image) and the currently set frame size area (white border) are displayed.

Change the frame size and frame position by dragging the image. At this point, the changed frame size is shown with a red border.

Click inside the red border to change the position. Drag the edge of the red border (corner mark) to change the size.

If the priority is the frame rate, it won't be possible to drag in a range that exceeds the upper limit of the frame size relative to the frame rate.

If the priority is the frame size, the frame rate will automatically be reduced if the upper limit of the frame size is exceeded when dragged.

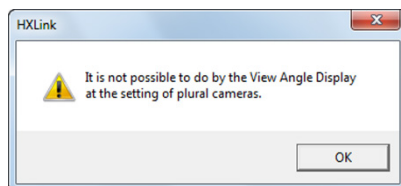
Numerical input is also possible. Input the parameter to be changed and click "Apply" to update the frame size (red frame) and frame rate.

For positioning (X, Y), the bottom left is considered the starting point (0, 0).

Click "Centering" and the center of the frame is adjusted so the subject (image sensor) is in the center position.

However, if precisely matching the center, the width of the frame size for the HX camera must be a multiple of 128 and a height a multiple of 16.

After updating the settings, click "OK" to set the parameters to the camera.



Warning when Multiple Cameras are Connected

The display angle dialogue is for a single camera, so batch setting of multiple cameras is not possible.

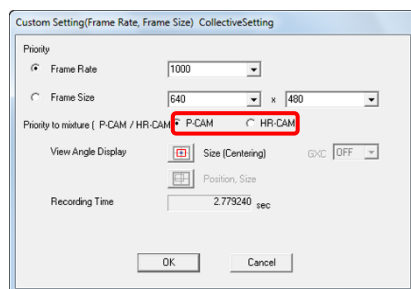
## □ Restrictions on GX-5/GX-5F Camera Head Use

The recording method for frame rate and trigger timing is the same for all camera heads connected to the GX-5/GX-5F DRP.

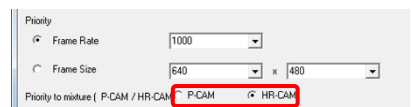
The frame size for the HR-CAM connected to a single GX-5/GX-5F DRP is about double the P-CAM frame size, vertically and horizontally.

If changing the frame size with the HR-CAM, the P-CAM frame size automatically becomes ½ the HR-CAM, vertically and horizontally. On the other hand, if changing the frame size with the P-CAM, the HR-CAM frame size automatically becomes double the P-CAM, vertically and horizontally.

When combining HR-CAM/P-CAM and batch changing the frame size in the list, specify the type of camera head and set the frame size.



In the example to the left, the P-CAM frame size is 640x480 and the HR-CAM frame size is 1280x960.



In the example to the left, the P-CAM frame size is 320x240 and the HR-CAM frame size is 640x480.

If setting shutters for each of the camera heads, select either "K4 compatible" or "K3 compatible".

## ■ Pixel Bit Length

HX, GX, Q cameras can change the bit length per pixel of photographic images.

If the number of bits is large, the depth per pixel increases and it becomes a high quality image.

If the number of bits is small, the depth per pixel decreases and the image quality drops, but the recording memory and recording time is extended.

If changing the pixel bit length, perform any of the following operations.

- Select "Pixel Bit Length" from the "Control" window.
- Select "Pixel Bit Length" from the "Camera Details" dialogue.
- Select "Pixel Bit Length" under the "Recording Parameters" tab in the "List of Camera Settings" window.

Select any of the following for the pixel bit length.

- |       |   |
|-------|---|
| 8bit  | Set the bit length to 8 bits. Setting increases the recording time. |
| 10bit | Set the bit length to 10 bits. Standard image quality.              |
| 12bit | Set the bit length to 12 bits. High quality image.                  |

The pixel bit length for the fx camera is fixed at 10bit.

## ■ Shutter

The shutter speed can be changed when in VIEW.


The shutter speed can be selected from predetermined values or set at a desired value.

Values that can be set vary by model.

[Example of Shutter Speed and Exposure Time]

OPEN	1/frame rate sec
1 k	1/1,000 sec
2 k	1/2,000 sec
5 k	1/5,000 sec
10 k	1/10,000 sec
20 k	1/20,000 sec
50 k	1/50,000 sec
100 k	1/100,000 sec
200 k	1/200,000 sec

It is not possible to set the exposure time longer than the 1/frame rate.

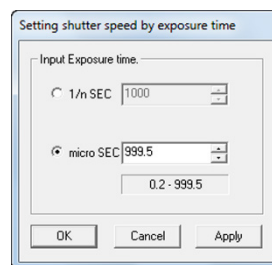
Click the custom shutter button  or select CUSTOM from "Shutter" in the "Recording Parameters" tab in the "List of Camera Settings" window to set the desired shutter speed.

The custom shutter button is in the following GUI.

- Item Toolbar (Basic Mode Only)
- Camera Parameters Toolbar (Expert Mode only)
- "Control" window
- "Camera Details" dialogue

Specify the shutter speed in the "Custom Shutter Settings" dialogue or specify the exposure time in  $\mu\text{sec}$ .

The numbers under the dialogue refer to the range for the exposure time that can be specified. In the example to the right with the HX-3, the exposure time can be set in a range of 0.2 $\mu\text{sec}$ ~999.5 $\mu\text{sec}$ .



## ■ Black Balance

Black Balance is a function that corrects the HX, GX and Q camera sensor pixel dependent noise. With the GX and Q camera, applying black balance immediately before or after recording is recommended when conducting high precision photography.

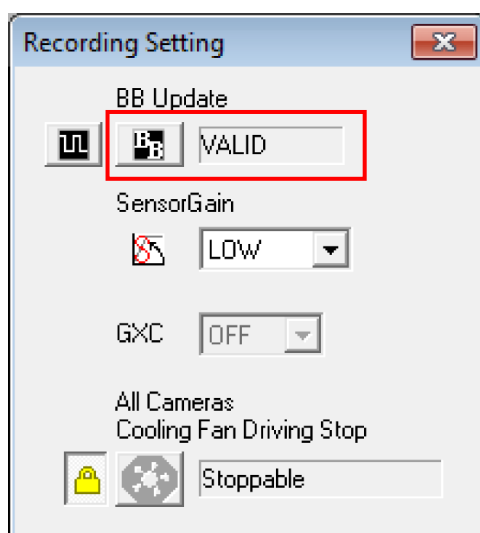
Black Balance removes sensor noise with the frame rate and frame size settings so if the frame rate or frame size is altered when the black balance is ON, a warning encouraging black balance correction is displayed on the video monitor or the warning window. When using the black balance function, calculate the black balance using the same frame rate and frame size settings as those for recording.

The Black Balance warning can be set ON/OFF with the GX WARNING DISP settings (Option/Settings at camera connection) .

To calculate the black balance, first set the "Frame Rate" and "Frame Size" to that used for recording. Next, place the cap on the camera lens for cameras other than the HX so light does not reach the sensor.

Perform any of the following.

- Conduct "Update Black Balance" in the camera configuration information in the "Camera Details" dialogue
- Conduct "Update Black Balance" in the "Camera Configuration Information" tab in the "List of Camera Settings".
- Conduct "Update Black Balance" in the wide display of the item toolbar.
- Conduct "Update Black Balance" in the "Recording Settings" window.



At this point, the camera status will show one of the following, and the correction data will be created.

The definitions of the status are shown below.

NONE	Black Balance is not ready.
BUSY	Black Balance is busy.
VALID	Black Balance has been completed.

To enable/disable the black balance, select ON/OFF for the black balance in the recording parameters found in the "Camera Details" dialogue.

ON	Uses black balance corrected data.
OFF	Does not use black balance corrected data, corrects internal camera data.

With multiple camera heads DRP on the GX-5/GX-5F cameras, even if black balance calculations are conducted in a batch, in reality, they are conducted sequentially for each camera head.

It is possible to conduct black balance at a later time for images that have already been recorded. In this case, to conduct the black balance calculation, select ON for the Black Balance in the play parameters found in the "Camera Details" dialogue.

The following precautions apply when using black balance.

- If the frame rate or frame size settings are changed after conducting the black balance calculations, make sure the black balance is recalculated. If this is not done, the image will not be properly displayed.
- Calculate the black balance immediately before or after recording. If a long period of time has elapsed between the black balance calculation and recording, the noise may not be adequately removed.
- With the GX-1/GX-3, data corrected for black balance will be lost if the power to the camera is turned off.
- The black balance cannot be turned ON/OFF for downloaded MCFF.

#### ■GX Cameras

Corrected black balance data for GX cameras are saved only as data for all of the segments. Individual corrected black balance data cannot be retained in each segment.

The black balance must be updated during STOP.

#### ■HX Cameras

Corrected black balance data for HX cameras are saved in each segment.

Also, corrected black balance data is saved once in VIEW/ARM/REC, and a manual update of the black balance must be performed during VIEW or STOP.

The black balance correction during VIEW applies to images recorded (VIEW/ARM/REC) in the future. Once REC ends, it is applied to that segment.

The black balance correction during STOP applies to images recorded (not reflected in images recorded in the future) .

If the images in the current segment are not saved, the black balance update cannot be performed during STOP.

#### ■Q Cameras

Corrected black balance data for Q cameras are saved only as data for all of the segments.

Calculated black balance data is saved in control PC.

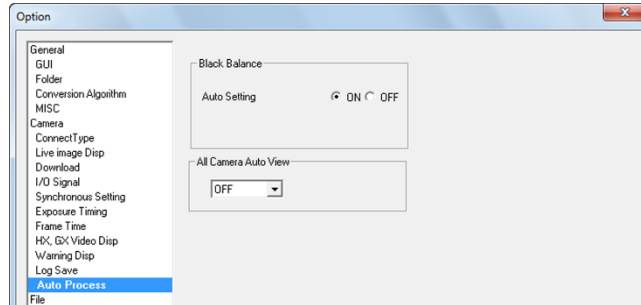
So, when you change control PC, you need to update black balance.

The black balance must be updated during STOP.

### Auto Black Balance (HX cameras only)

HX cameras can automatically perform black balance.

The settings for automatic black balance updates can be set ON/OFF in “Auto Processing” in options.



Black balance is automatically updated at the timing given below.

- When the camera is started up
- When switched to VIEW
- When switched to ARM
- When REC ends
- When switched to low light
- When all angle of views are displayed with the custom frame rate settings

Auto black balance updates are not performing in the following cases.

- When changing the recording parameters during VIEW

After changing the settings during VIEW, if immediate confirmation is made that there is no noise, manually update the black balance.

## ■ Trigger Input Selection

With GX cameras, select either TRIG1 / TRIG2 for the trigger input to be used during recording.

With HX and GX-8 cameras, TRIG1 / TRIG2 can be combined for use.

With HX and GX-8 cameras, select the trigger input from the following.

- TRIG1 TRIG1 connector signal ON as the trigger
- TRIG2 TRIG2 connector signal ON as the trigger
- ANY Either the TRIG1, TRIG2 connector signal ON as the trigger
- BOTH Both the TRIG1, TRIG2 connector signal ON simultaneously as the trigger

Refer to page 6-11 for setting details.

## ■ Trigger Timing

Trigger is used to determine the number of frames recorded from the start of recording to the trigger input and the number of frames recorded from the trigger input to the end of recording.

The trigger timing can be changing in the following GUI.

- “Camera Parameters Toolbar” (Expert Mode only. When the camera is in VIEW)
- “Camera Details” dialogue
- “Recording Parameters” tab of the “List of Camera Settings” window
- “Control” window (When the camera is in VIEW)

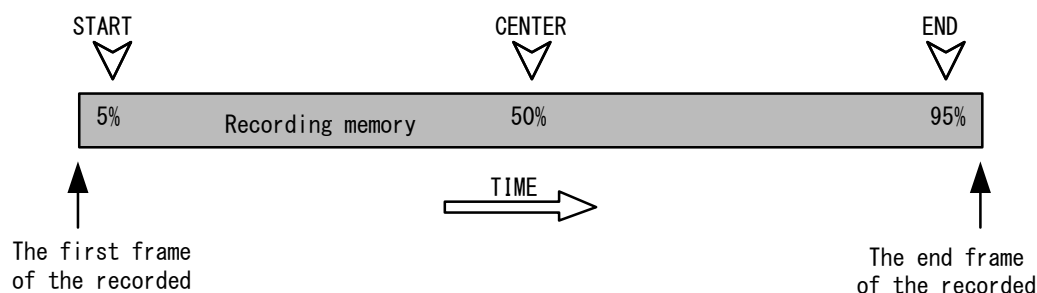
The following trigger timings can be specified.

START The trigger frame is about 5% of the frames from the beginning of the recording memory.

CENTER The trigger frame is the center (about 50%) of the recording memory.

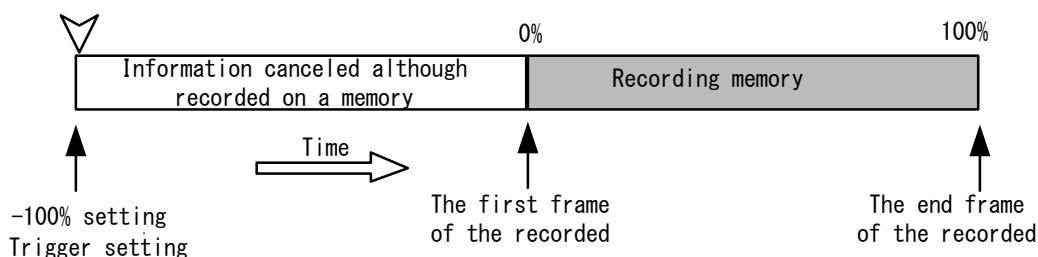
END The trigger frame is the frame about 5% before the end of the recording memory.

CUSTOM The trigger frame is the frame that is numerically preset (corresponding to -100~100%).



Recording Memory and Trigger Positions (START, CENTER, END)



### CUSTOM TRIGGER



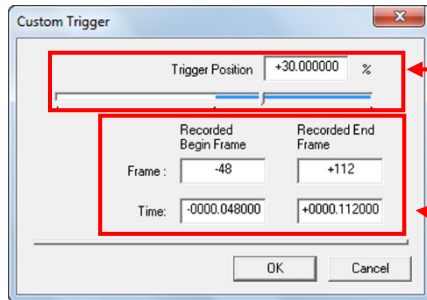
Recording Memory and Trigger Positions (CUSTOM:-100% example)

## ■ Custom Trigger

Use any of the following to set the custom trigger.

- Click the “Trigger Timing” button  in the “Controls” window.
- Click the “Trigger Timing” button  in the “Camera Details” dialogue.
- Select “CUSTOM” for individual cameras from “Trigger Timing” under the “Recording Parameters” tab in the “List of Camera Settings” window.

Specify the custom trigger with the “Custom Trigger” dialogue.



Specify the trigger position in the recording memory in percentages.

The range is -100~+100%.

The trigger position can also be set with the slider.

Specify the start frame/end frame in the recording memory with frame numbers or relative time.

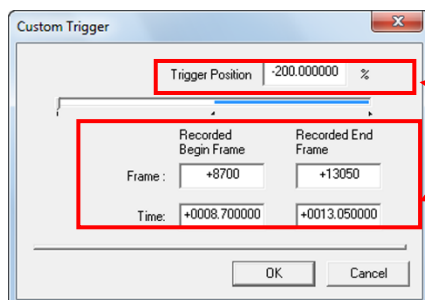
Since the memory segment size and number of recordable frames differs by camera, custom trigger settings cannot be batch set on multiple cameras.

Furthermore, changes to custom trigger settings cannot be batch set with the following.

- “Batch” in the “Recording Parameters” tab of the “List of Camera Settings” window
- Camera parameters toolbar (but the trigger timing can be selected as CUSTOM)

With the HX cameras and the GX-8, the range of custom trigger positions is expanded.

The time from trigger input to the recording start frame is the maximum value for the number of frames corresponding to the memory “-100%” ▪ “65536 frames” ▪ “10 minutes” (600 seconds).



Just as with other cameras, the custom trigger can be specified with the GX-8 using numerical input in “Trigger Location”, “First Recorded Frame” or “Last Recorded Frame”. The slider can only be set to -100%.



### Caution

- The number of frames that can be recorded changes when the frame size, time stamp or pixel bit length are changed. If specifying the custom trigger in frames, confirm the recording range with the “Custom Trigger” dialogue and correct to the proper range.
- Event recording is not possible if the trigger position is less than 0%.

## ■ Exposure Timing

The exposure timing setting selects the timing for the sensor exposure relative to the recording synchronization signals.

With the HX, GX and fx cameras, there are differences in the sensor exposure timing relative to the recording synchronization signals. If performing synchronized recording with the HX, GX and fx cameras, the exposure timing for all of the cameras must match.

There are three types of exposure timing, as follows.

**GX Native** Exposure starts with the synchronization signal. Exposure timing for HX, GX and Q cameras.

**K4 Compatible** Exposure ends with the synchronization signal. Exposure timing for fx-K4, fx-K5.

The same exposure timing as the fx-K4, fx-K5 when recording 100/250/500pps.

**K3 Compatible** Exposure ends with the synchronization signal. Exposure timing for fx-K3, fx RX-5/RX-5G.

The same exposure timing as the fx-K3 when recording 100/250/500pps.

**GX Exposure Timing** (exposure timing that can be selected with HX and GX cameras)

GX Native

K4 Compatible

K3 Compatible

**fx Exposure Timing** (exposure timing that can be selected with fx cameras)

K4 Compatible

K3 Compatible

**Q Exposure Timing** (exposure timing that can be selected with Q cameras)

GX Native

K4 Compatible

If recording at 1000pps with the fx camera, the “K4 Compatible” and “K3 Compatible” exposure time is the same.

If the frame rate with the fx camera is 100/250/500pps, match the exposure timing with the “fx Exposure Timing” settings.

If the frame rate and shutter settings match, the exposure time for the fx-K4, fx-K5 are “K3 Compatible” and 100/250/500pps recording can be the same as that for fx-K3, fx RX-5/RX-5G/ and fx RX-6.

Also, with fx-K3, fx RX-5/RX-5G, fx RX-6 versions are 2.30 or higher, “K4 Compatible” can be selected.

If performing synchronous photography only with HX, GX and Q cameras, we recommend that GX native be selected but if recording with HX, GX, Q and fx cameras, select the compatible mode if coordinating the camera exposure timing.

If changing the shutter settings for each camera head with GX-5/GX-5F, the compatible mode must be selected.



**Caution**

The “Exposure Timing” settings are disabled when the HX and GX-8 camera frame straddling function is disabled.

**Caution**

With the HX and GX-8 cameras, the “Exposure Timing” settings are disabled under the following conditions and the “Exposure Timing” functions as “GX Native”.

- When the trigger reset function is enabled. (Set “GX Camera Time” to “Set Trigger”)
- When the high performance external synchronization function is enabled. (Set “GX Camera Synchronization” to “A-EST Synchronization”)

**Caution**

“GX Exposure Timing” Compatible Mode Selection Limitations

- With “K4 Compatible”, the “Exposure Phase” is 0 when the “Exposure Timing” setting is disabled.
- With “K3 Compatible”, the “Exposure Phase” is  $360 - (\text{frame rate (pps)} * 360) / 1000$  when the “Exposure Phase” setting is disabled.

### ■ Exposure Phase

The HX, GX and Q cameras can shift the exposure timing (phase) during recording.

The “Exposure Phase” setting is enabled only when the “Exposure Timing” is “GX Native”.

However, the exposure phase should be kept at 0 when not conducting exposure phase shift recording.

To change the exposure phase, select “Exposure Phase” from the “Camera Details” dialogue or “Exposure Phase” from the “Recording Parameters” tab of the “List of Camera Settings” and specify the value in single degree units from 0~359 (°).

Exposure phase	RGB Matrix	Luminance encoding	Variable Frame Rate	Speed Ratio	High Speed Recording Frame	Frame Straddling	Frame Straddling Disp
0	OFF	NORMAL	OFF	3	2176	OFF	1st
0	OFF	NORMAL	OFF	2	6588	OFF	1st

**Exposure phase**

OnlineSetup(Collective)

Exposure phase

0

0 - 359

OK Cancel

Refer to page 8-16 for details regarding exposure phase shift recording.

**Caution**


With HX and GX-8 cameras, if the frame straddling function is enabled or the trigger reset function is enabled, the “Exposure Phase” settings are disabled and the “Exposure Phase” becomes 0.

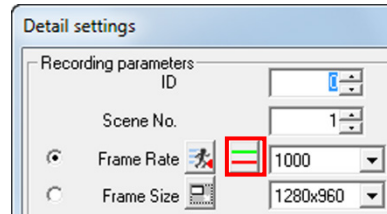
## ■ Variable Frame Rate Recording (HX and GX-8 Cameras)





The recording speed of the HX camera and GX-8 can be changed during recording. Low speed recording is possible before and after high speed recording is required, which enables longer recording times.

Settings for Variable frame rate recording are made in the “Variable Frame Rate Settings” dialogue.

Any of the following operations can be used to open the “Variable Frame Rate Settings” dialogue.

- Open the “Camera Details” dialogue and click  in the section for frame rate.



- Open the “Frame Rate” under the “Recording Parameters” tab in the “List of Camera Settings” window or open the “Frame Rate and Frame Size Settings” dialogue from “Frame Size” and click .
- Click  or  in the “Item Toolbar” (Basic Mode), “Camera Parameter Toolbar” (Expert Mode), “Control” window, “Camera Details” dialogue or “Frame Rate, Frame Size Settings” dialogue, then open the “Custom Settings (Frame Rate, Frame Size Settings)” dialogue and click .

The buttons show the ON/OFF status of the variable frame rate.



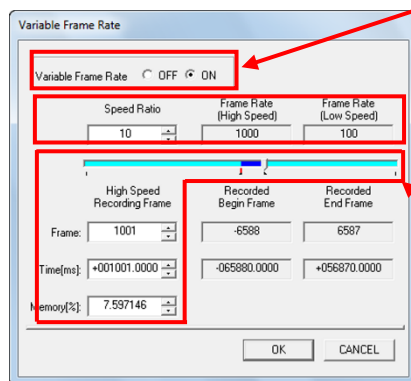
When the button is pressed, the variable frame rate setting is ON.

Use the variable frame rate recording function to record.



When the button is not pressed, the variable frame rate setting is OFF.

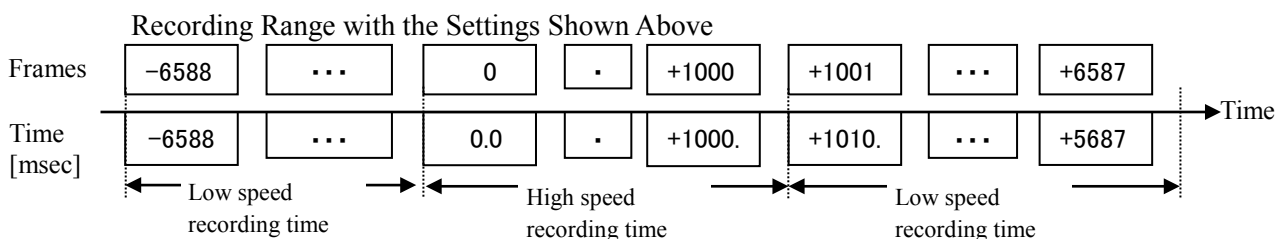
Select ON/OFF for the variable frame rate.



The “Speed Ratio” is a ratio of the currently selected frame rate to the low speed frame rate. Specify numbers from 2~100 as the “Speed Ratio”.

In the example to the left, the frame rate is 1000pps and since the low speed frame rate is 100ps, the speed ratio is 10.

Specify the “Number of Frames”, “Time (msec)”, “Recording Memory Ratio (%)” or use the slider for the “High Speed Recording Frames” for the frame recorded at the currently selected frame rate.



For the data or MCFF for the cameras recording at variable frame rates, the properties and relative time superimposed on the converted image are shown with the correct time.

**Caution** The following GUI frame relative times show numbers when high speed recording to all ranges.

- Sync display
- Main toolbar frame counter
- “Camera Details” dialogue frame counter
- “List of Camera Settings” window frame counter
- “Download” dialogue (individual list)
- “USB Save” dialogue (individual list)
- Format conversion (individual list)
- Playback slider

**Caution** The “Variable Frame Rate” setting is disabled for burst recording and linear recording.

**Caution** The “Frame Straddling” setting is disabled when the “Variable Frame Rate” setting is disabled.

## ■ AE Control

HX cameras, GX-1/GX-3, GX-8 cameras and fx-K5 cameras have an AEC function (automatic exposure). The AEC function measures light in the specific area of an image to be photographed and changes the shutter speed so the average brightness of the measured area is a specific value.

While it is possible to set the lens aperture or the shutter settings to match the brightness for indoor photography, it is difficult to change the settings each time the brightness changes when outdoors. The AEC function is useful in this type of situation.

Since the constant varies when the shutter speed is changed, it takes several seconds to focus to the appropriate value when the brightness changes suddenly.

Any of the following can be used to specify AE.

- Right click the camera item in the "Item List" and select "AE" from the menu.
- Select the camera in the "Item List" and select "AE" from the "Control" menu.
- Select "AE" from the "Control" window.
- Select "AE" from the recording parameters in the "Camera Details" dialogue.
- Select "AE" from the "Recording Parameters" in the "List of Camera Settings".

Select any of the following for AE.

OFF	AE not used.
LOW	Adjust to a low level of average brightness.
NORMAL	Adjust to a normal level of average brightness.
HIGH	Adjust to a high level of average brightness.

The upper limit for the AE exposure time is up to the shutter speed set for the recording parameters. For example, if the shutter speed is set to 5K, the exposure time with AEC control is up to a maximum of 200[μs].

Also, when using AE, the range subject to the AE (AOI) must be specified.

With HX cameras and GX-1/GX-3/GX-8 cameras, in addition to selecting from predetermined ranges, custom ranges can be set. Refer to page 4-45 for AOI details.

AEC for fx-K5 includes settings determining the cycle that changes the shutter speed (AE CYCLE). This setting should not be used to change the shutter speed frequently.

HX and GX cameras do not have this setting.

To designate the AE CYCLE, enter an integer from the "AE CYCLE" in the recording parameters of the "Camera Details" dialogue in millisecond units.

When using AEC, the exposure time for the recorded frames will change for each frame.

Since HX and GX cameras have a time stamp function, when that function is employed, it is possible to know the frame exposure time from the information saved for each frame.

The fx-K5 does not have a time stamp function but instead, the final 8 shutter speeds during recording and their frame range is saved. If the shutter setting is set not to change frequently, it is possible to know the fx-K5 exposure time for each frame.

Caution	When the "Frame Straddling" function is disabled in the HX camera and GX-8, the AE control settings are disabled and AE controls are turned OFF.
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Caution	When AE controls are ON, the "Image Trigger" function settings are disabled and the "Image Trigger" is turned OFF.
---------	--

## ■AOI(Brightness Detection Area, Area Of Interest)

With AE control or image trigger, the subject range (AOI) must be specified. To specify the AOI, use any of the following.


- Select the camera in the “Item List” and select "AOI" from the "Control" menu.
- Select "AOI" from the "Control" window.
- Select "AOI" from the "Camera Details" dialogue.
- Select "AOI" from the "Recording Parameters" in the "List of Camera Settings".

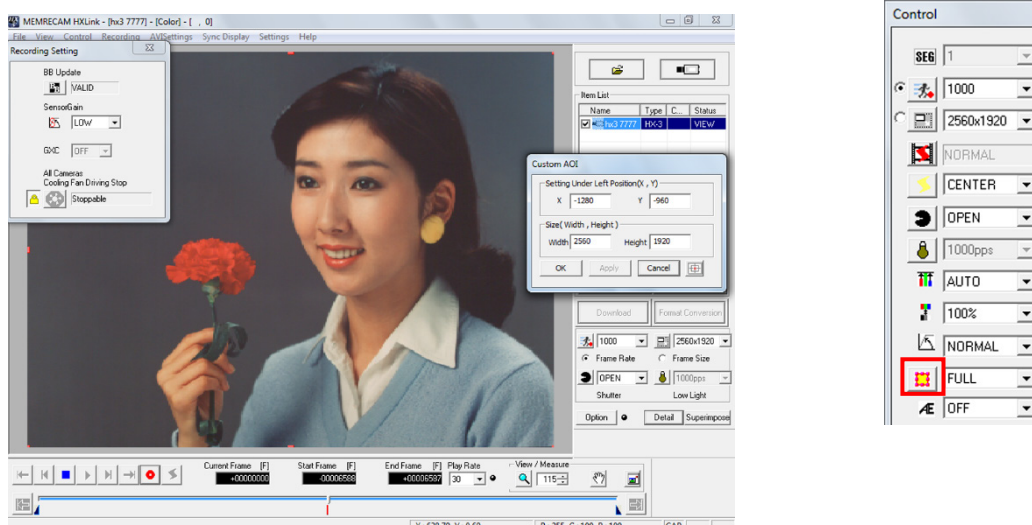
Select any of the following for AOI.

FULL	The entire frame is the range.
CENTER	50% of a rectangle (area of 25%) from the center of the frame is the range.
UPPER	The upper half of the frame is the range.
LOWER	The lower half of the frame is the range.
LEFT	The left half of the frame is the range.
RIGHT	The right half of the frame is the range.
CUSTOM	The rectangle specified is the range.

## Custom AOI Designation Method

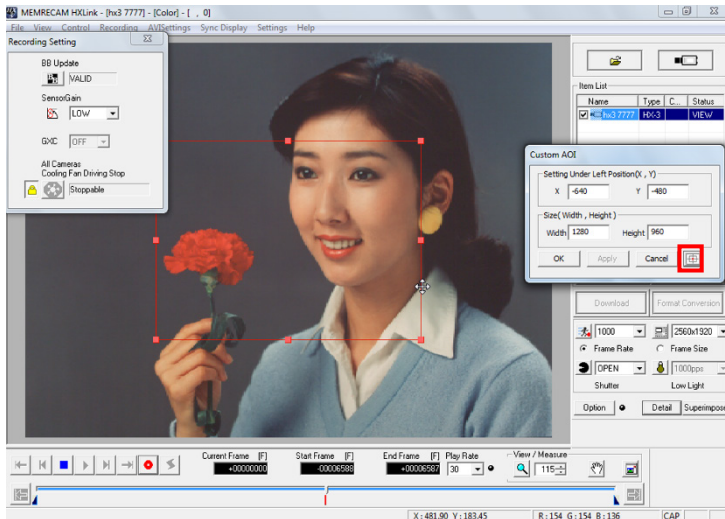
Click “Control” in the “View” menu to display the “Control” window.


Click “Custom AOI”  in the Control window to display the “Custom AOI” window.



With the Custom AOI window displayed, drag the live image on the monitor to designate the rectangle for the light measurement area AOI. While being dragged, the lines of the rectangle are displayed in red (dotted lines) and when the AOI is determined, the lines of the rectangle are displayed in red (solid lines). After determining the AOI, it is possible to change the AOI whenever desired by dragging on the live image to modify.

Drag inside the AOI rectangle to move the AOI. Drag the corner or the periphery of the AOI rectangle to change the size of the AOI. Drag the outside of the AOI rectangle to eliminate the current AOI and designate a new AOI. Coordinates can be designated in the Custom AOI window (starting point X, starting point Y, width, and height). Click “OK” in the Custom AOI window to finalize the settings.



Use the  button in the “Custom AOI” window to set centering for a size half of the current frame size.

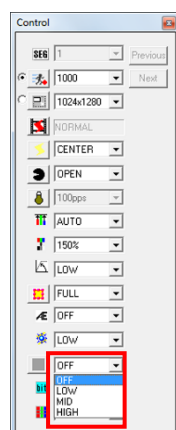
Custom AOI settings are enabled when “AOI” in the control window is set to “CUSTOM”.

## ■ DRES Mode (Dynamic Range Expansion)

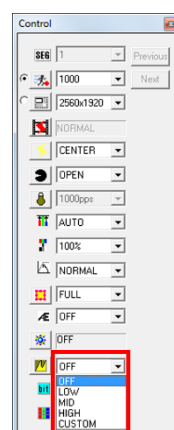
If the DRES mode (dynamic range expansion shutter mode) is used on the HX, GX cameras, the camera sensor compresses the high luminance areas and the dynamic range can be expanded.

Any of the following can be used to select the DRES Mode.

- Select " DRES Mode " in the "Control" window.
- Select " DRES Mode " in the "Camera Details" dialogue.
- Select " DRES Mode " from the "Recording Parameters" in the "List of Camera Settings" window.



GX Cameras



HX Cameras

Any of the following can be used to select the DRES Mode.

OFF	Sets the dynamic range to approximately 200%. Normal setting.
LOW	Sets the dynamic range to approximately 400%.
MID	Sets the dynamic range to approximately 800%.
HIGH	Sets the dynamic range to approximately 1600%.
CUSTOM	Custom setting for the dynamic range (only HX cameras)

If the DRES mode is enabled, the "Gain" and "Knee" settings are not applied, the gain will be LOW and the knee will be OFF.

### •LOW, MID, HIGH

In the DRES mode with photographed or downloaded MCFF data, set the image quality luminance properties to LINEAR, and if converted to TIFF16 (Monochrome 16bit) / TIFF48 (48bit), it is possible to return the luminance compressed for dynamic range expansion to the current luminance data and output to a TIFF file (Monochrome 16bit / TIFF48). Refer to page 5-26 for details.

#### Caution

When the Frame Straddling function is enabled in the HX camera and GX-8, the DRES mode are disabled.

Since the DRES mode presumes luminance during single frame exposure will not have much change, there is no dynamic range expansion effect with instantaneous laser illumination photography such as that with frame straddling.

#### Caution

When the AEC function is enabled, the DRES mode are disabled.  
When using DRES mode, please turn off AEC.

#### Caution

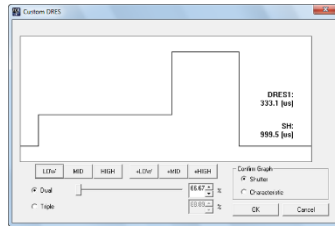
When the "Recording priority" is "Sensitivity" in the HX-7S camera, the DRES mode are disabled. When using DRES mode, please select the "Recording priority" to "Image Quality".

## Custom DRES (for HX cameras)

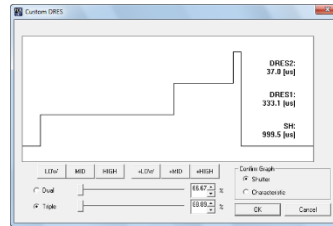
The HX camera can have custom settings in the DRES mode.

Dual : Method using a two stage shutter (dual slope).

Triple : Method using a three stage shutter (triple slope).



Dual



Triple

Each type of exposure time is shown on the graph for numerical confirmation (0.1µ sec units).

SH : Exposure time for low brightness. The same value as the shutter setting.

DRES1: Exposure time for high brightness. Set shorter than the normal shutter.

DERS2: Exposure time set even shorter for high brightness portions. Can be used when triple is selected.

Also, the graph corresponding to the shutter/property selection is shown on the confirmation graph.

Shutter: Graph showing each type of exposure time and the timing.

Properties: Graph showing the properties of the values for the brightness of the light source.

Check the fit display and the display range of the light source brightness is automatically adjusted.

Select Dual/Triple for slider operation or numerical input of each exposure time.

Dual values adjust the SH and DRES1 ratio.

Triple values adjust the DRES1 and DRES2 ratio.

Press the button below the confirmation graph to easily set the exposure time.

LOW Ratio corresponding to about 400% of the dynamic range.

MID Ratio corresponding to about 800% of the dynamic range.

HIGH Ratio corresponding to about 1600% of the dynamic range.

+LOW Ratio corresponding to about 3200% of the dynamic range.

+MID Ratio corresponding to about 6400% of the dynamic range.

+HIGH Ratio corresponding to about 12800% of the dynamic range.

Select Dual/Triple and specify each exposure time with the slider or numerical input.

Dual Adjust the SH and DRES1 ratio.

Triple Adjust the DRES1 and DRES2 ratio.

### Caution

If the exposure time on the confirmation graph is shown in red, the DRES mode cannot be used properly.

The following settings must be changed.

- Lower the frame rate
- Extend the shutter settings
- Extend the DRES1 and DRES2 times

### ■HX, GX Camera Image Trigger (Brightness Detection Trigger)

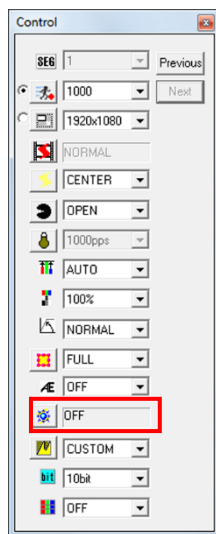
The image trigger function measures the light in the brightness detection area (AOI) specifying the image to be photographed, and is the function that automatically issues the trigger when the brightness within the area changes.


#### Caution

With the GX camera image trigger, the time interval for measuring light with NTSC settings is 7.5Hz and with PAL settings 6.25Hz. For example, a trigger may not be issued when the time from a strobe light is 0.2 seconds or less.

Use any of the following to specify the image trigger.

- Select the camera in the “Item List” and select from “Image Trigger” in the “Control” menu.
- Select from “Image Trigger” in the “Control” window.
- Select from “Image Trigger” under the “Recording Parameters” tab of the “List of Camera Settings” window.



Press  to open the image trigger window.

- Select from “Image Trigger” in the recording parameters of the “List of Camera Settings” window.

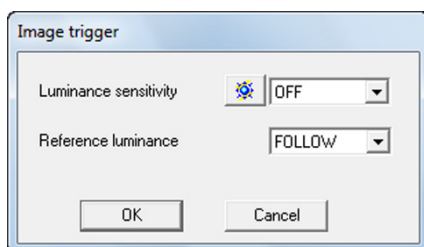


Image trigger window

Select any of the following for the image trigger.

Level of Brightness Change

OFF	Image trigger function not used
LOW	(Low) trigger issued with large changes in brightness
MID	(Standard) trigger issued with medium changes in brightness
HIGH	(High) trigger issued with small changes in brightness
CUSTOM	Fine adjustments of the trigger issuing conditions (HX camera only)

Brightness Standards (HX camera only)

Tracking	Sets the camera corresponding to the photographic environment as the standard. (GX compatible) Prevents trigger from issuing for phenomenon with gradual changes in brightness (clouds, time, changes in standby status) .
ARM start	Brightness at the start of ARM is the reference
Manual	Brightness after the start of ARM is the manually set reference

If the image trigger set value does not match the recording conditions, there is a possibility that an unexpected trigger is issued [A] or a trigger isn't issued in the required location [B]. Determine the appropriate value after conducting a test photograph. The criteria is shown below.


Set Value	Matching Photographic Environments	Non-conforming Photographic Environments	Unusable Photographic Environments
LOW	<ul style="list-style-type: none"> <li>Recording in an environment where there are flickering elements due to fluorescent lighting</li> </ul>	<ul style="list-style-type: none"> <li>Recording where large changes in the brightness are not expected [B]</li> </ul>	
MID	<ul style="list-style-type: none"> <li>Recording where the brightness of the general lighted area does not change, such as with flashes</li> </ul>	<ul style="list-style-type: none"> <li>Recording where the subjects cross the lighted area due a lack of size [B]</li> </ul>	<ul style="list-style-type: none"> <li>Recording in an environment where there are flickering elements due to fluorescent lighting [A]</li> </ul>
HIGH	<ul style="list-style-type: none"> <li>Recording where the subjects cross the lighted area</li> </ul>	<ul style="list-style-type: none"> <li>Recording in an environment where there are elements in motion, other than subjects within the lighted area [A]</li> </ul>	

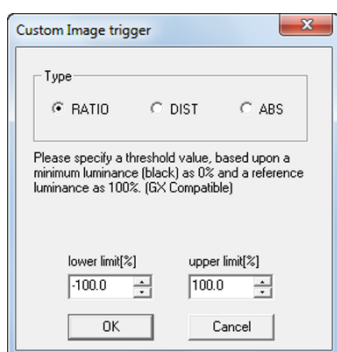
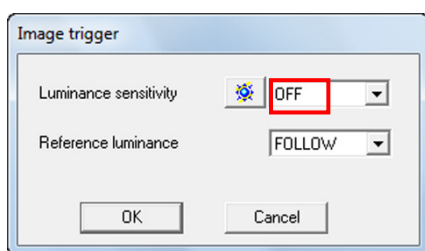
**Caution**

The image trigger function cannot be used simultaneously with the automatic exposure function (AE). To enable the image trigger function while using the AE function, a confirmation message will be displayed to disable AE. Click "OK" and disable AE (OFF) and then use the image trigger function.

Also, when using the image trigger, the range (AOI) must be specified. Refer to page 4-45 for details of AOI.

## Custom Image Trigger (HX camera only)

Press  in the image trigger window to open the custom image trigger window.



## Custom Image Trigger Window

There are three types of custom image triggers, so select according to the application.

- **RATIO** Specify the threshold value using 0% as the minimum brightness value (black) and 100% as the standard brightness. (GX compatible)
- **DIST** Specify the threshold value using 0% as the standard brightness and 100% as a range from the minimum brightness value (black) to the maximum brightness value (white).
- **ABS** Specify the threshold value using 0% as the minimum brightness value (black) and 100% as the maximum brightness value (white). Does not depend on the standard brightness.

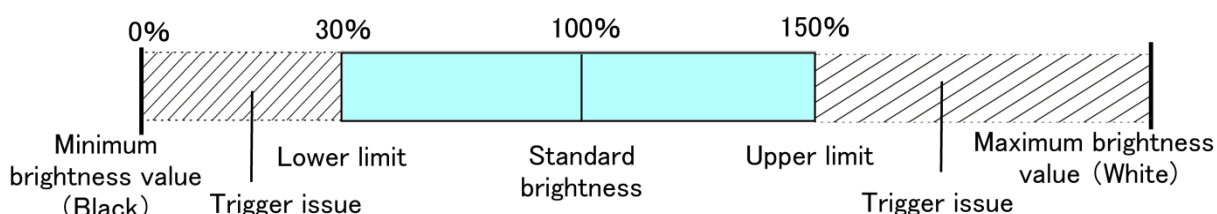
RATIO and DIST can be used outdoors where the standard brightness changes.

ABS can be used in environments not impacted by outside light, such as indoors.

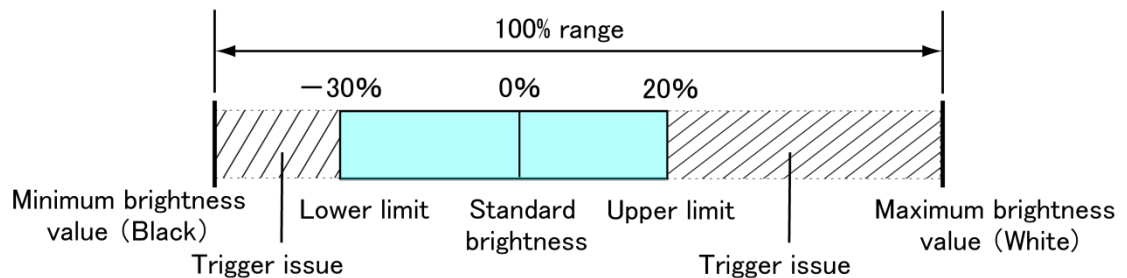
If the upper limit or lower limit for brightness is exceeded, the custom trigger can still issue a trigger.

- **RATIO** Range of input -3276.8 ~-3276.7% (input limitation)  
Practical range 0 ~100% or higher

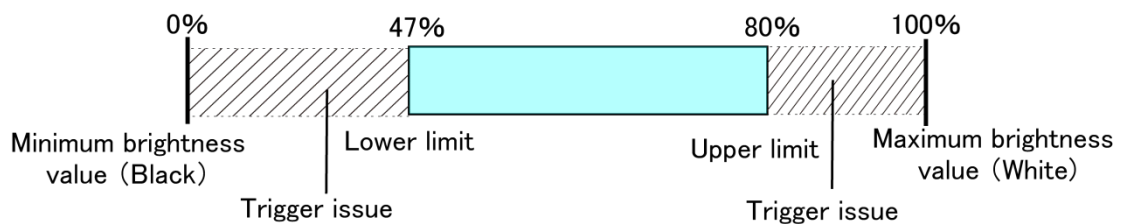
Input example Lower limit of 30%, upper limit of 150%



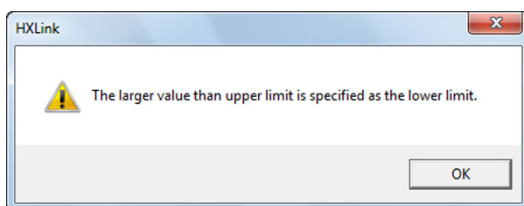
- DIST      Range of input      -3276.8 ~-3276.7% (input limitation)  
              Practical range   -100 ~100%  
  
              Input example      Lower limit of -30%, upper limit of 20%



- ABS      Range of input      -3276.8 ~-3276.7% (input limitation)  
              Practical range    0 ~100%  
  
              Input example      Lower limit of 47%, upper limit of 80%

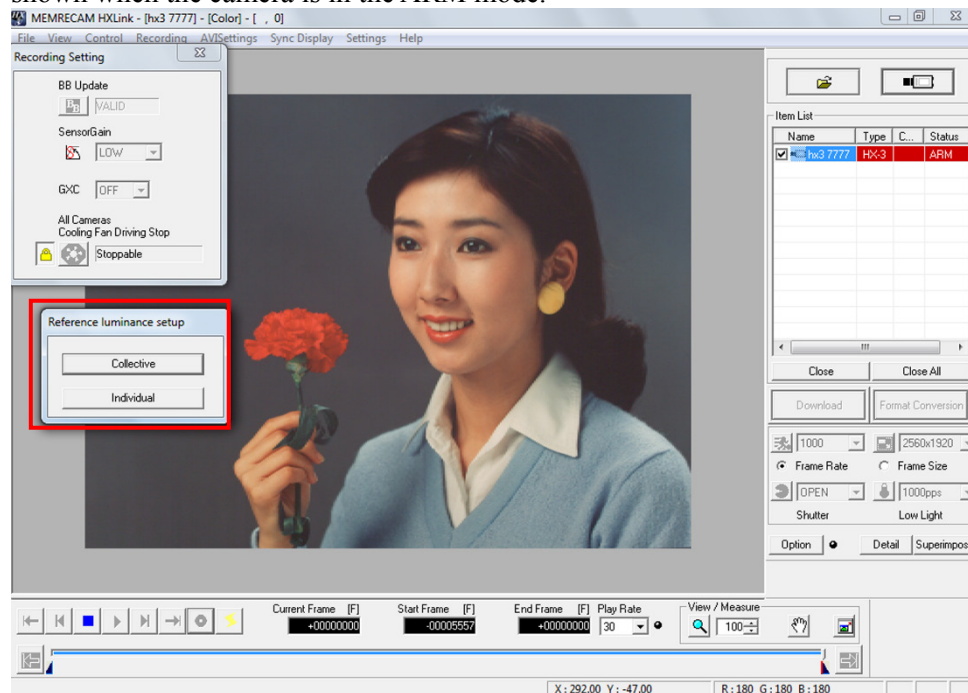


Input the upper and lower limits and click  to display a warning message that the (lower limit) > (upper limit) . Correct so the (lower limit) < (upper limit) . (3 common types)



- Manual Setting of Brightness Standards (HX camera only)

When manually setting the brightness standards, the “Standard Brightness Settings” window is shown when the camera is in the ARM mode.



Collective

Manually set the standard brightness and set the standard brightness for all of the HX cameras on the item list.

Individual

Set the standard brightness for the HX camera selected on the item list.

The “Standard Brightness Settings” window is only shown when the HX camera is in the ARM mode.

## ■ Reset Trigger (HX and GX-8 Cameras)

The exposure timing of the HX cameras and the GX-8 camera can be synchronized with external devices using trigger signals. Set the GX camera time to trigger reset and as soon as the trigger signals are detected during recording, the exposure up to that time is stopped, and exposure of a new trigger frame is started so subsequent recording is performed at the specified frame rate.

**Caution** If performing external synchronous recording when the “HX, GX camera synchronization” is “EST Synchronization” or “A-EST Synchronization”, the trigger reset function is disabled. If “GX Camera Time” is set to “Trigger Reset”, that setting is disabled and the “GX Camera Time” operates as “Internal Camera Time”.

**Caution** The following functions are disabled when the trigger reset function is used.

- Operates as “GX Native” when the “Exposure Timing” setting is disabled.
- Operates with “Exposure Phase” of 0 when the “Exposure Phase” setting is disabled.
- The “Frame Straddling” function is disabled.
- Operates as “Time Stamp” OFF when the “Time Stamp” setting is disabled.

## ■ Frame Straddling Recording (HX and GX-8 Cameras)

The HX and GX-8 cameras have a frame straddling function that enables recording two images with a very short time separation that is used with PIV (Particle Image Velocimetry). Frame straddling photography is a method of recording a group of two images that involves shining a laser at a very short time interval before and after the frame. These two frames are called the 1<sup>st</sup> frame and the 2<sup>nd</sup> frame, respectively.

Refer to page 8-19 for frame straddling settings.

Refer to the HX camera user’s manual and the GX-8 user’s manual for details regarding frame straddling.

**Caution** If the “Trigger Reset” function is enabled, the “Frame Straddling” function is disabled.

**Caution** If the “Variable Frame Rate Recording” function is enabled, the “Frame Straddling” function is disabled.

**Caution** If the “Frame Straddling” function is enabled, the “Exposure Timing” and “Exposure Phase” settings are disabled and the “AEC”, “DRES Mode” and “Low Light” functions are disabled.

## ■ Recording Priority (Q1m, Q1v and HX-7S Cameras)

For Q1m, Q1v, HX-7S, you can select the “Recording Priority” setting (“Sensitivity”/ “Image Quality”) when the camera is in READY state.

The setting is set to the image sensor when VIEW starts or ARM starts.

The “Recording Priority” is the recording setting of the image sensor, you can not change the “Recording Priority” of the recorded image.

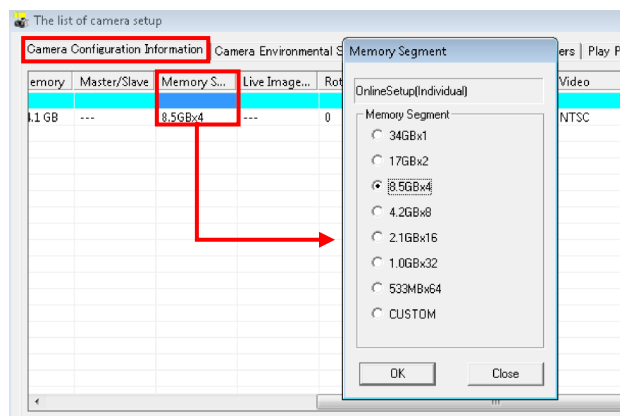
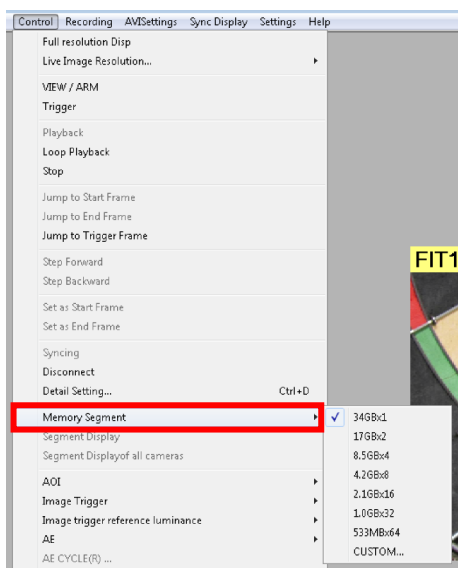
**Caution** Even if “Sensitivity” is selected, the “Recording Priority” of the image sensor becomes “Image Quality” when you enable the GXC function in the HX-7S.

**Caution** If the “Recording Priority” is “Sensitivity” in the HX-7S, the “DRES mode” function is disabled.

## ■ Memory Segments

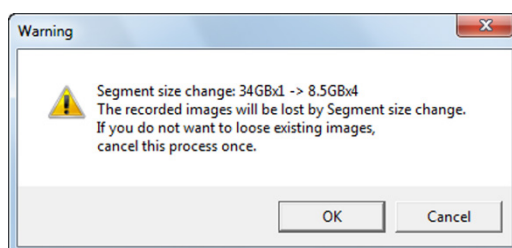
Camera recording memory can be partitioned for use. The recording time for the partitioned memory segments shortens according to the number of partitions but different scenes can be recorded in the partitioned memory.

To partition memory segments, select the number of partitions with "Segment Partitions" in the "Control" menu. If multiple cameras are connected, double click on the "Segment Partitions" cell under the "Camera Configuration Information" tab in "List of Camera Settings" window to change the number of segments.



Caution

Partitioning memory segments will result in the loss of image data saved in the camera memory. If essential data remains, be sure to download the image data before partitioning the memory segments.



Warning

\*GX, Q and fx camera can be set segment division number and capacity from fixed value.  
HX camera can be set to optional value in "Segment Division" window.

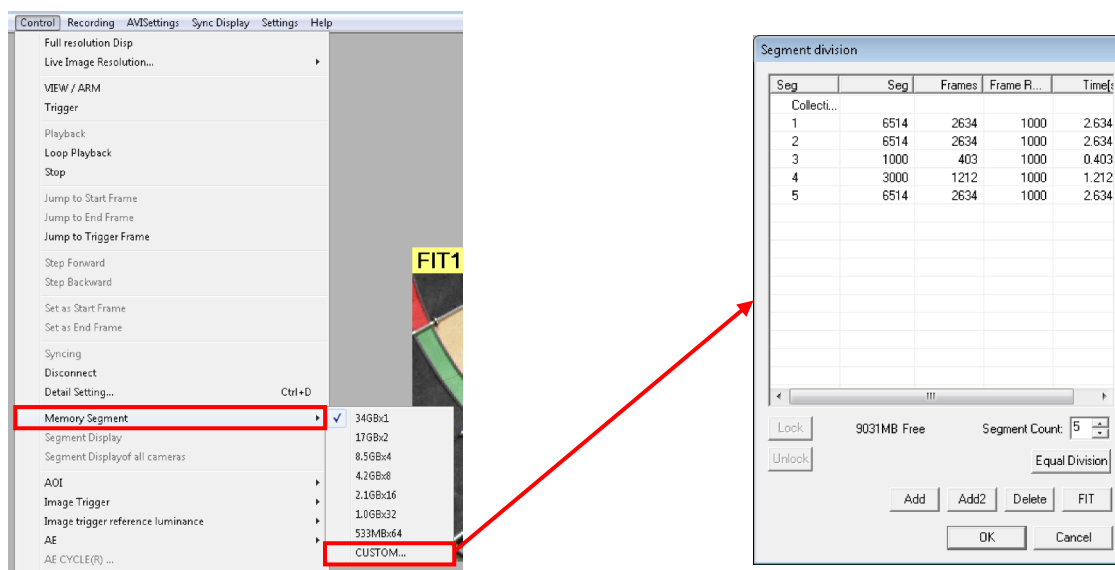
## Custom Partition Segments

Segments can be partitioned to the desired size corresponding to the custom segment partitioning of the HX camera.

With an HX camera frame size recording setting, the settings for frame size and recording time can be set.

The object of the segment partition is the HX camera internal memory or the optional HD-Mag. When attaching the HD-Mag, confirm the destination in the right click menu of the camera item and then perform segment partitioning.

Select CUSTOM for segment partitions in the control menu to show the segment partition menu and the current partition status.



The frame rate for the camera recording settings is shown in under "Frame Rate". (display only, cannot be set)

All of the segments can be batch set with the settings under "Size (MB)", "Number of Frames", "Time (Sec)".

- |                  |   |
|------------------|---|
| Lock             | Protects the selected segments (prohibits recording over).  |
| Unlock           | Cancels the selected protected segments (prohibits recording over).   |
| Show Free Memory | Displays the size of the free memory (segment size - segment list).<br>Shown in red if the amount free is less than 0.  |
| Segment Count    | Displays the number of segments with the size setting.<br>Specify the number of partitions if fitting the memory.   |
| Equal Division   | Set a value that divides the size of the memory by the number of segments so that all segments have the largest but identical size.   |
| Add              | Adds a segment with the same setting as the selected segment at the end of the list.  |
| Add 2            | Adds two rows (1-2, 3-4, 5-6 etc) containing the selected segment to the list with the same settings.   |
| Delete           | Function to optimize the DUAL recording settings.<br>Deletes the selected segment.  |
| FIT              | If the amount free is less than 0, the amount in excess of the segment is cut and the free memory becomes 0.<br>If the amount free is > the minimum size, memory that can be allocated is added as a segment. |
| OK               | Sets the list setting to the camera. Segment partitioning is not performed if the sum of the list segment size is greater than the segment range.   |

## ■ Recording Trigger Mode

The following types are available in the recording trigger mode.

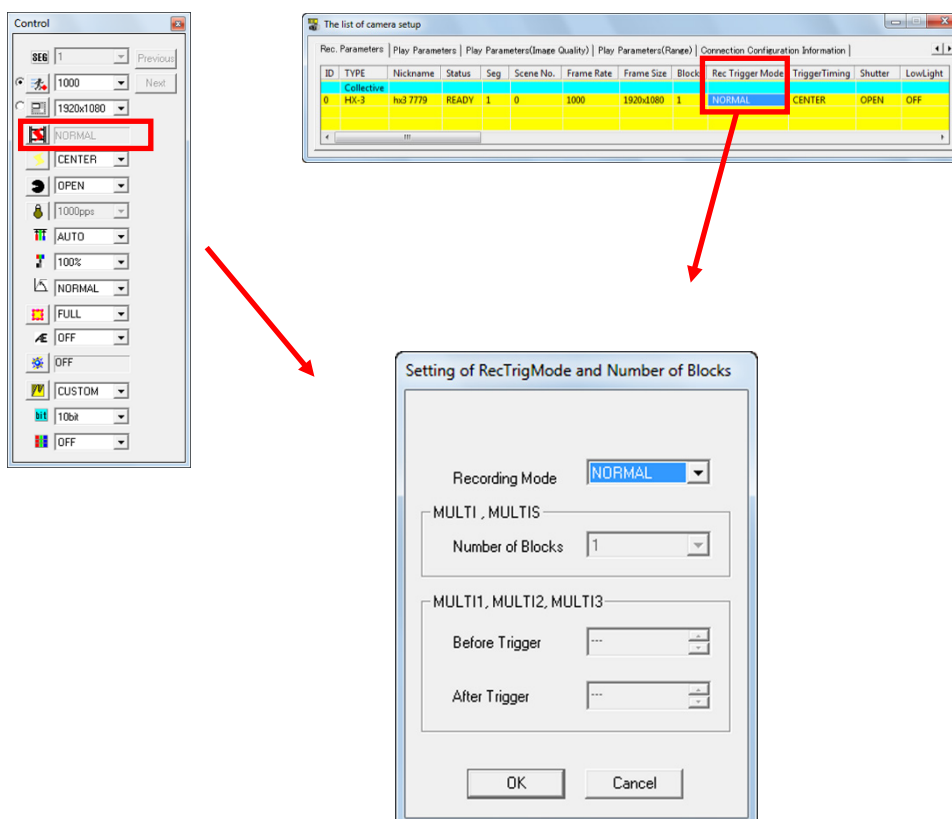
- (1) NORMAL recording
- (2) Event recording (EVENT)
- (3) Burst recording (BURST)
- (4) Multi trigger recording (MULTI/MULTIS)
- (5) Multi manual recording (MULTI1/MULTI2/MULTI3)
- (6) Linear recording (LINEAR)
- (7) DUAL recording

A combination of these seven types of recording trigger modes cannot be use. Select only one recording trigger mode.

Refer to the HX and GX camera user's manuals for recording trigger modes.

Use any of the following to specify the recording trigger mode.

- Select the camera in the “Item List” and select from “Recording Trigger Mode, Number of Blocks” from the “Control” menu.
- Select from “Recording Trigger Modes” in “Detailed Settings”.
- Select from “Recording Trigger Modes” under the “Recording Parameters” tab in the “List of Camera Settings” window.



### (1) NORMAL Recording

NORMAL recording is a recording method where trigger signals can only be received once during segment recording.

HX and GX camera NORMAL recording includes NORMAL / NORMAL (A) / NORMAL (L).

In NORMAL, once the current segment recording has been completed, it switches to READY.

NORMAL (A) refers to the AUTO mode where recording ends at trigger signal input for the number of segments.

NORMAL (L) refers to the "LOOP" mode where the segment is switched and repeatedly recorded until "STOP" is clicked.

### \* AUTO Mode and LOOP Mode

AUTO mode and LOOP mode refers to the mode where the automatic segment switch and ARM set by the GX camera is repeated. fx cameras do not have this function.

Cameras in the "AUTO" mode automatically switch the segments to ARM when recording has been completed.

The conditions for ending automatic segment switching and ARM start include when the current segment is the final segment (if the memory is split into 4 sections, when the current segment is 4<sup>th</sup>) and when there is an ARM failure due to a memory protect function.

In the "AUTO" mode, if the switched segment recording has been completed, recording of that segment cannot be performed. (memory protection function)

In this case, since ARM fails, a warning is displayed, and the FAULT signal from the camera is turned ON. Click "STOP" to delete the warning and the FAULT signal.

In the "LOOP" mode, the camera automatically switches the next segment to ARM after camera recording has been completed. This differs from the "AUTO" mode, and it accesses ARM even when the switched segments have completed recording.

Click "STOP" for the ending conditions for automatic segment switching ARM start.

### (2) Event Recording

When there is multiple input of external trigger signals during recording, the first external trigger signal is treated as the original trigger signal and the subsequent external trigger signals are recorded as generated events.

Perform any of the following operations for event recording.

- Set "Recording Trigger Mode" in the "Camera Details" dialogue to EVENT.
- Set "Recording Trigger Mode" in "Recording Parameters" in "List of Camera Settings" to EVENT.

HX and GX camera event recordings include EVENT/ EVENT (A) / EVENT (L).

An EVENT is a recording of only one segment but in "AUTO" and "LOOP" modes, when recording of one segment ends, recording of the next segment begins.

EVENT (A) refers to the "AUTO" mode that ends recording when recording of all segments has been completed.

EVENT (L) refers to the "LOOP" mode where the segments are switched and repeatedly recorded until "STOP" is clicked.

### (3) Burst Recording

This is a recording method for only the period when there is external trigger signal input.

Perform any of the following operations for burst recording.

- Set the “Recording Trigger Mode” in the “Camera Details” dialogue to BURST.
- Set the “Recording Trigger Mode” in the recording parameters in the “List of Camera Settings” window.

The GX camera burst recordings include BURST/BURST (A) /BURST (L).

A BURST is a recording of only one segment but in “AUTO” and “LOOP” modes, when recording of one segment ends, recording of the next segment begins.

BURST (A) refers to the “AUTO” mode that ends recording when recording of all segments has been completed.

BURST (L) refers to the “LOOP” mode where the segments are switched and repeatedly recorded until “STOP” is clicked.

#### Caution

The “Variable Frame Rate Recording” function is disabled with burst recording.

### (4) Multi Trigger Recording

Partitions the selected memory segments into 2 - 64 blocks, and automatically switches blocks for each trigger signal input for recording.

There is an “All Blocks” mode (MULTI (A) ) that ends recording with trigger signal input for the number of blocks and a “Continuous” mode (MULTI (C) ) that repeatedly records until “STOP” is clicked. The HX and GX cameras have an “AUTO” mode and a “LOOP” mode that moves segments using trigger input for the number of blocks in the “All Blocks” mode.

Perform any of the following operations for multi trigger recording.

- Set “Recording Trigger Modes” in the “Camera Details” dialogue to MULTI and simultaneously specify the number of partition blocks.
- Set “Recording Trigger Modes” under the recording parameter tab of the “List of Camera Settings” window to MULTI and simultaneously specify the number of partition blocks.

Multi trigger recordings include MULTI (A) /MULTI (C) /MULTIS (A) /MULTIS (L).

MULTI (A) refers to the “All Blocks” mode that ends recording with trigger signal input for the number of blocks.

MULTI (C) refers to the “Continuous” mode that performs repeated recording until the stop button is clicked.

MULTIS (A) refers to the “AUTO” mode that ends recording with trigger signal input for the number of segments.

MULTIS (L) refers to the “LOOP” mode where the segments are switched and repeatedly recorded until the stop button is clicked.

### (5) Multi Manual Recording (HX camera only)

Recording method where the number of frames per block is specified and images are repeatedly generated.

Multi manual recordings include MULTI1 (A), MULTI1 (C), MULTI2 (A), MULTI2 (C), MULTI3 (A), MULTI3 (C).

#### Caution

There are no settings for automatic segment switching.

#### •MULTI1

This is a recording method that synchronizes with the timing trigger signals at the start of exposure for the trigger frame and sets the trigger frames thereafter. The number of blocks (number of possible trigger inputs) corresponding to the number of frames per block is determined.

MULTI1 (A) “All Blocks” mode for automatic block switching.

MULTI1 (C) “Continuous” mode to perform repeated recording until “STOP” is clicked.

- MULTI2

Method to input trigger signals where synchronous recording is performed with internal synchronization/IRIG signals/EST signals.

Also, it is possible to combine with the frame straddling function.

For each block, the trigger frames before and after can be recorded.

**Caution**

The maximum number of blocks (number of possible trigger inputs) is 64.

Therefore, if the number of frames per block is small, the entire segment range cannot be recorded.

MULTI2 (A) “All Blocks” mode for automatic block switching.

MULTI2 (C) “Continuous” mode to perform repeated recording until “STOP” is clicked.

- MULTI3

Method identical to that in MULTI2 but there are no limitations to the number of trigger inputs.

The number of blocks (number of possible trigger inputs) corresponding to the number of frames per block is determined.

However, recording is not possible prior to the trigger frame.

MULTI3 (A) “All Blocks” mode for automatic block switching.

MULTI3 (C) “Continuous” mode to perform repeated recording until “STOP” is clicked.

#### (6) Linear Recording

With linear recording, after switching to ARM, it automatically switches to REC. If “Trigger” is clicked during the REC mode, block partitioning is paused.

If “View/Record” is clicked during the PAUSE mode, recording is started in REC.

Recording ends at the end of the segment, and then it switches to READY.

**Caution**

- There are no settings for automatic segment switching.
- External trigger input is not available with the linear recording method.
- There are no limits to the number of pauses but the number of blocks that can be partitioned (the first frame is recorded, jumping during playback is possible) is 64.

#### (7) DUAL recording

DUAL recording is a function of the HX cameras and is a recording method that uses two segments to simultaneously record high and low speeds.

##### Restrictions for DUAL Recording

- The frame size for high speed and low speed DUAL recording is the same.
- The ratio for the frame rate for high speed and low speed DUAL recording is in whole numbers.
- The maximum frame rate for DUAL recording is ½ the normal recording.
- The DUAL recording shutter OPEN exposure time is ½ the normal recording.
- If switching from normal recording to DUAL recording, ½ of the normal recording frame rate is set for high speed recording.

Refer to page 8-13 for details.

## ■ Auto View

Auto View is a function for HX and GX cameras that automatically starts VIEW when recording has been completed.

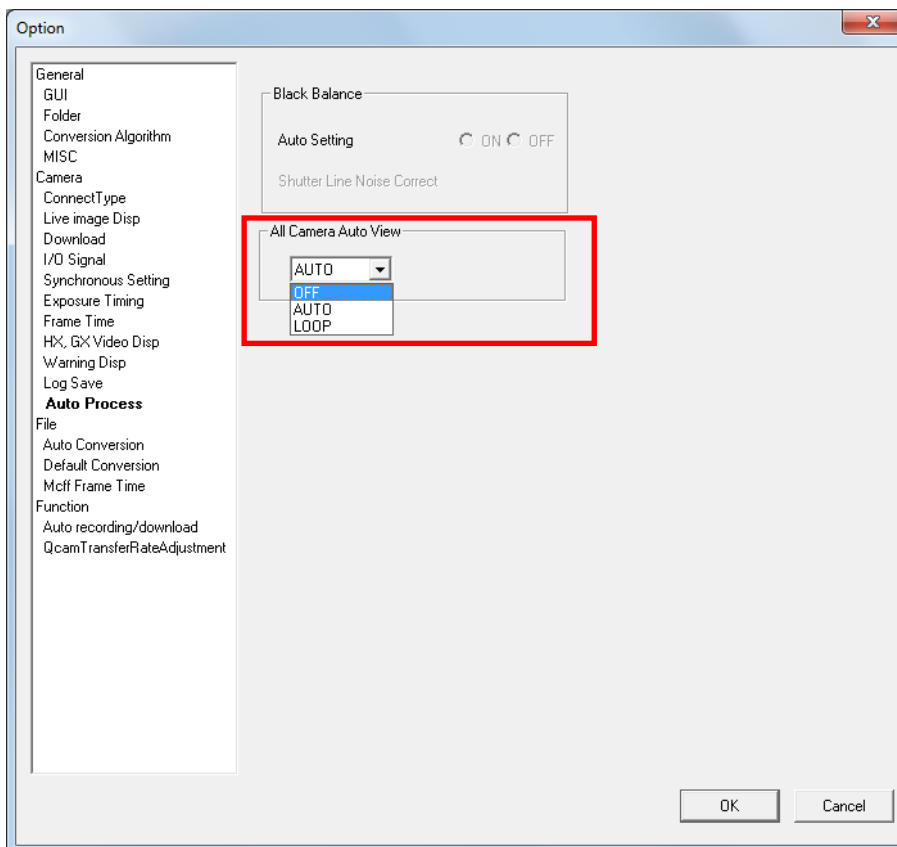
If images are recorded to the current segment, it automatically switches to the next segment when ARM is started.

The auto view settings are made in “All Camera Auto View” in the “Option” dialogue and are set to all of the connected HX and GX cameras. Auto view settings cannot be set individually for each camera.

OFF Auto View not used.

AUTO Records to the last segment. Images after recording is done are not overwritten.

LOOP Returns to the first segment and switches to the VIEW mode after recording the last segment. Overwrites even recorded segments when ARM is started.



Auto View cannot be used together with the recording trigger mode (NORMAL (L)) that automatically switches segments for recording. In this case, the recording trigger mode settings take priority.

## ■ Low Light

There may be cases when a clear monitor image cannot be obtained in the VIEW mode with temporary low levels of lighting during recording. During VIEW with the low light mode ON, images brighter than the frame rate and shutter settings are displayed on the monitor, which can be used to confirm the angle of view and focus. Start recording in the ARM mode and the low light mode display disappears, and the image with the set brightness is shown on the monitor.

With low light mode display, in addition to the angle of view for the recorded frame size, the image for the maximum angle of view of the camera is displayed, and the border is shown around the recorded angle of view. Since the area around the recorded image is also displayed, it is handy for matching the angle of view when the frame size is small.

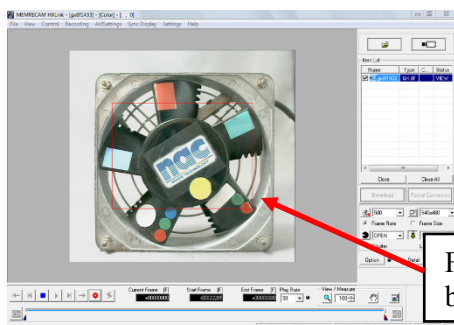
(Confirm the aperture for the amount of light corresponding to the frame rate parameters actually set in the step for image recording. Also, adjust the position to fit the subject recorded inside the frame for the angle of view.)

Low Light can be set with the "Low Light" button in the "Item Toolbar" (Basic Mode) or the "Camera Parameters Toolbar" (Expert Mode).

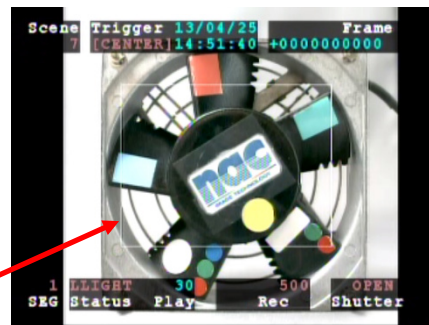
Low light can also be set with the "Camera Details" dialogue of the "Control" window under the "Recording Parameters" tab of the "List of Camera Settings" window.

Brightness settings for the low light mode use a low light frame rate of 100/250/500/1000 pps in the right pull-down menu of "Low Light", or can be selected from CUSTOM.

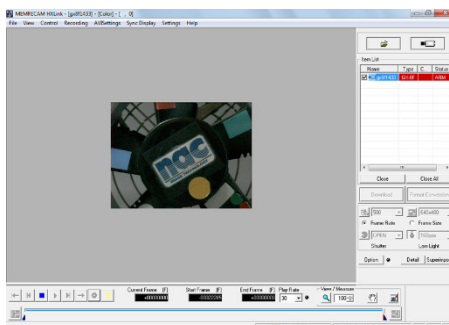
Settings using the low light button only apply to image display in the VIEW mode, and do not affect image display in the ARM, REC modes or actual recording. Verification of the images during VIEW can be performed with the "Low Light" settings but the actual recording is implemented with the set recording parameters.



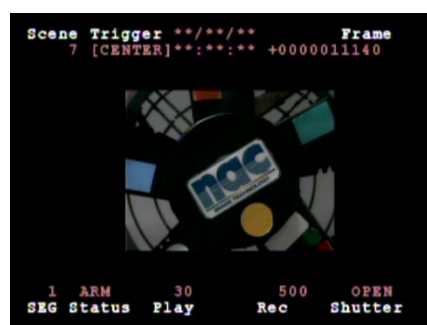
VIEW (Low Light Mode) Live Display



VIEW (Low Light Mode) Video Display

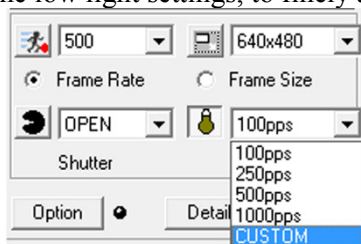


ARM Live Display

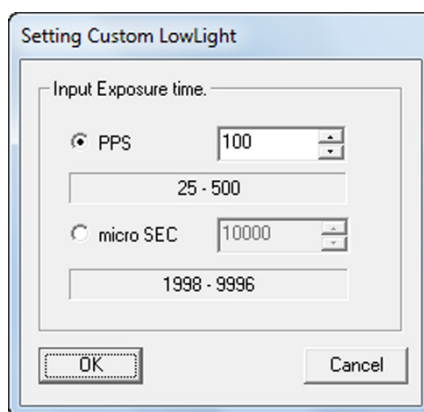


ARM Video Display

Select CUSTOM in the low light settings, to finely adjust the brightness.



During VIEW, click “Low Light” and select “CUSTOM” in the pull down menu to display the “Setting Custom Low Light” dialogue.



The units for the exposure time include PPS and micro-SEC.  
The ranges of the settings are as follows (with GX-1cameras).

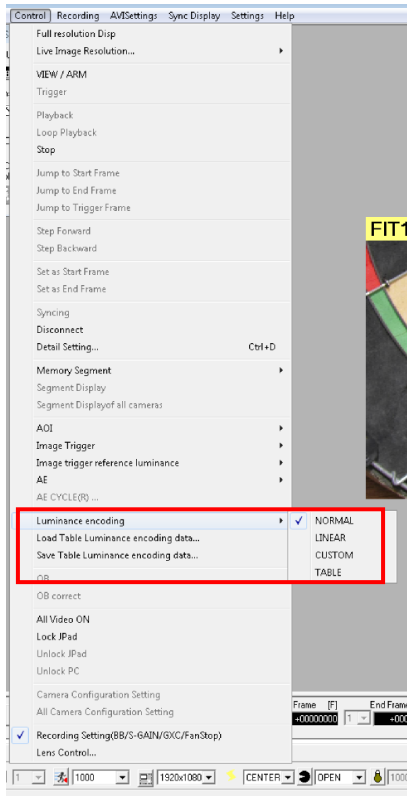
PPS	100pps ~ recording speed
μ SEC	shutter setting value ~ 9996micro-sec

The set values (pps) displayed during custom low light use are recalculated from the exposure time [micro-sec]. As a result, there may be cases when the set exposure time [pps] differs from the actually displayed value [pps].

**Caution** The HX and GX-8 camera “Frame Straddling” function does not work when the “Low Light” function is used.

■HX, GX and Q Camera Luminance

The input/output transfer properties for displaying HX, GX and Q camera image data can be selected.



HX Camera Connection

NORMAL	Standard setting to display images with input/output transfer characteristics matching the dynamic range of the camera. Uses gain / gamma / knee.
LINEAR	Gain / Gamma / Knee settings ignored, data converted to linear for display.
CUSTOM	Setting to display camera data with the specified input/output transfer properties. Specify the minimum brightness input value, maximum brightness input value and gamma value to adjust data with low amounts of brightness differences for display. Select CUSTOM to show the “Custom Luminance” dialogue. Refer to page 5-14 for details of the “Custom Luminance” dialogue.
TABLE	HX cameras only Function to import/export the luminance of the recorded data transferred to the image. Create a user specific luminance file and apply to the HX camera and MCFF files.
Luminance	Import TABLE data Imports the saved file of the luminance.
Luminance	Save TABLE data Saves the file of the luminance for the displayed image.

## Zoom/Scroll HX, GX Cameras

- HX camera connection (Live:High speed)

Displays with the number of pixels (maximum 1920x1080) corresponding to the monitor resolution settings (refer to page 10-16) on the camera video monitor (display).

When the photographed image is zoomed, the part exceeding the aforementioned size is not displayed on the image.

Use scroll to move the position where displayed. If the HX camera live method (refer to page 7-11) is "high speed", the range shown on the video is displayed on the live camera image.

- GX camera connection

With NTSC settings, a maximum of 640x480 pixels are displayed on the video monitor.

With PAL settings, a maximum of 768x576 pixels are displayed on the video monitor.

When the photographed image is zoomed, the portion outside the size mentioned above is not displayed on the screen.

Use scroll to move the position where displayed.

For the GX camera live image, the range shown on the video is displayed on the live camera image.

- Q and fx Camera Connection

The Q and fx camera live image is the image for all angles of view of the camera.

To zoom, select any of the following in "Zoom" in the camera configuration information in the "Camera Details" dialogue or the "List of Camera Settings" window.

FIT1 Displays the entire screen image at the maximum resolution for the video monitor.

Displays the entire image on an over scan compatible video monitor.

- GX camera connection

With NTSC settings, displays at a maximum of 640x480

With PAL settings, displays at a maximum of 768x576

FIT2 Displays the entire screen image at about 80% of the maximum resolution for the video monitor.

Displays the entire image on a standard video monitor at a ratio that can be confirmed.

- GX camera connection

With NTSC settings, displays at a maximum of 512x384

With PAL settings, displays at a maximum of 640x480

1/2 Reduces the image photographed to 1/2 for display.

x1 Neither enlarges nor reduces the image photographed for display.

x2 Enlarges the image photographed two times for display.

x4 Enlarges the image photographed four times for display.

With settings other than FIT1 and FIT2, the entire camera image may not be displayed on the monitor. To scroll an image, input a numerical value in the "X Scroll Position" or the "Y Scroll Position" in the camera configuration information in the "Camera Details" dialogue.

"Photographed image pixels" is the standard scroll unit. For example,

If the zoom setting is "x4" and the X scroll position is change by +1, the image on the video monitor and the live PC is shifted 4 pixels to the left.

If the zoom setting is "1/2" and the Y scroll position is change by +1, the image on the video monitor and the live PC is shifted 1/2 pixels lower.

## ■ Rotate Camera Video (GX-8)

The maximum frame size for the GX-8 camera is 1024x1280.

The GX-8 viewfinder and video monitor is landscape oriented so to display the entire camera image, the left and right of the monitor can be blank and the image displayed is shrunk.

The GX-8 video rotation function rotates the video output 90° in the counter clockwise direction, and by positioning the viewfinder rotated 90° in the clockwise direction, the portrait oriented image can be displayed in the entire screen.

To rotate the video, select any of the following with “Rotate Video” in the camera configuration information in the “Camera Details” dialogue or the “List of Camera Settings” window.

- |     |  |
|-----|--|
| 0   | The video is displayed without rotating the image.                                   |
| 270 | The video is displayed by rotating the image 90° in the counter clockwise direction. |

The PC live image is not rotated with the video rotation function.

Refer to page 3-21 for PC live image rotation.

## ■ Composite Display

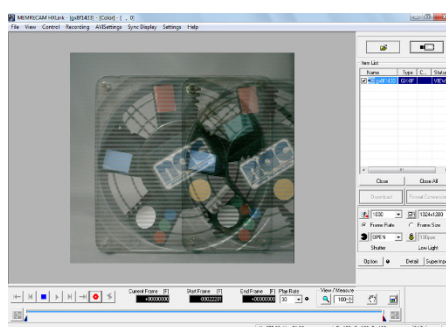
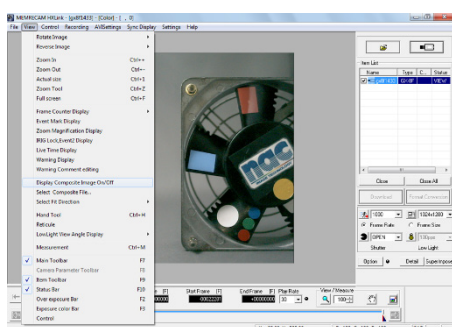
While a camera is connected, a live camera image and a specific image file can be combined for display.

Composite display is a function for comparison with previously photographed images and is useful when coordinating the camera angle or the position of photographed subjects. A snapshot image of a previously saved live display is used for comparing the photographed position or subject position so adjustments can be made.

Click “Snapshot” in the file menu and save the live image or file image currently displayed as a still image file (TIFF,BMP,and JPEG).

### Procedures for Composite Display

- (1) Specify the composite image file in “Select Composite File” in the view menu.
- (2) Select the standard (height/width) for the still image magnification with “Fit Direction (Portrait, Landscape)” in the view menu.
- (3) Click “Composite Display ON/OFF” in the view menu to display the composite image of the live camera image and the still file image.



If the height/width ratio for the frame size and the height/width ratio for the image file differ, match the height or width using "Fit Direction (Portrait, Landscape)" in the view menu.

Select any of the following.

In any of these cases, if the center of the image matches, the height/width ratio is not changed.

Fit Height	Adjusts the display of the image file to match the height of the frame size and the height of the image file.
Fit Width	Adjusts the display of the image file to match the width of the frame size and the width of the image file.

Set the zoom magnification to a multiple of 100% using the zoom tool to enable the composite display to function properly. If displaying a reduced image of a composite display, depending on the magnification, the image may not appear correctly.

Also, right click on the mouse for the menus of “Composite Display ON/OFF”, “Select Composite File” and “Fit Direction (Portrait, Landscape)”.

## ■ Composite Display of Multiple GX-5/GX-5F Camera Heads (Split Screen Display)

If there are multiple camera heads connected to the GX-5/GX-5F DRP, the video screen can be split to display multiple camera images on the video. As a result, it is possible to confirm all of the camera images in the viewfinder video monitor during STOP / VIEW / ARM / REC / PLAY / LOOP.

Use any of the following to display the split display menu.

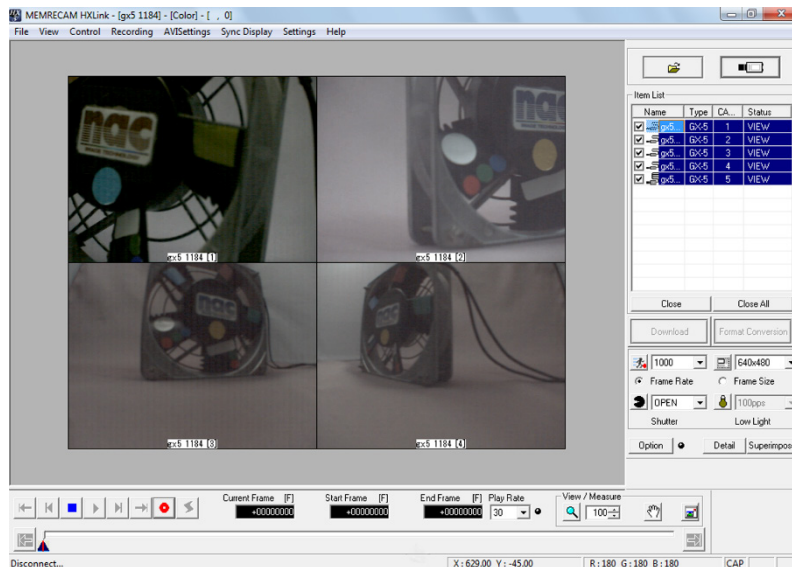
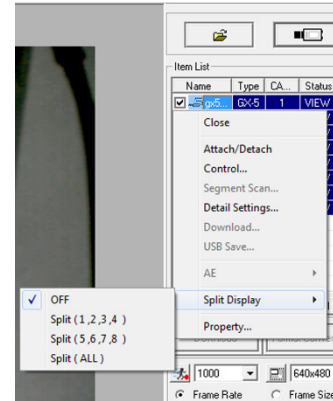
- Right click on the GX-5/GX-5F camera item displayed in the item list and select from the “Split Display” on the menu.
- Select the GX-5/GX-5F camera and right click on the monitor, and select from the “Split Display” on the menu.

Items that can be selected with “Split Display” differ according to the camera configuration setting. Camera heads displayed on a four-part screen are displayed in the order of the camera number.

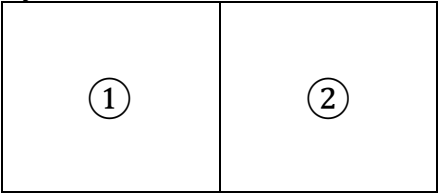
For example, when using 8 P-CAM camera heads with GX-5/GX-5F DRP, select any of the following.

OFF	No split screen, displays the camera heads selected in the item list.
Split (1, 2, 3, 4)	Screen split into four sections, displays the images from camera 1, 2, 3, 4.
Split (5, 6, 7, 8)	Screen split into four sections, displays the images from camera 5, 6, 7, 8.
Split (ALL)	Screen split into nine sections, displays the images from all eight of the cameras.

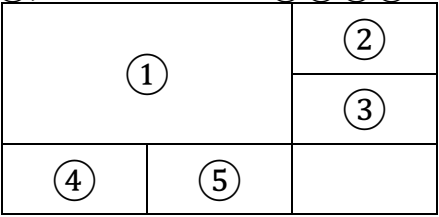
When selecting the split display, the camera heads for HXLink live images are also subject to split display in the same manner as the video screen.



Connect two HR-CAM to the GX-5/GX-5F DRP and select “Split (ALL)” from the “Split Display” menu to display on the screens from the left to the right in order of the port number.



Combine HR-CAM and P-CAM to the GX-5/GX-5F DRP and select “Split (ALL)” from the “Split Display” menu to display in the order of the port number, as shown in the figure below, with the HR-CAM in ①, and the P-CAM in ②③④⑤.



Connect a mix of HR-CAM and P-CAM to GX-5/GX-5F DRP to batch display the P-CAM images in a four part display.  
The “Split Display” layout is determined by the camera heads connected to the DRP ports so the position of the camera head images cannot be arbitrarily changed.

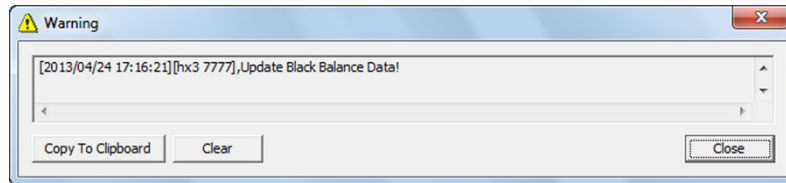
The GX-5/GX-5F DRP stores the values of the playback range for split display set separately from the playback range of each camera head. To change the range, set the playback range during split display.  
The playback range of each camera head cannot be changed, even if the playback range is set during split display.

## ■ Display Warnings

To use the HXLink warning window display, the warnings that the HX and GX cameras display on the video include the warnings of “Abnormal Status”, “Abnormal Setting”, which can be verified with the HXLink.

Also, when opening an MCFF, if operational limitations occur, the details of the warning are shown in the warning window.

HXLink can be operated even when the warning window is displayed.



Warning Window

To display the warning window, select “Display Warning” from the view menu when the camera item or MCFF item is selected in the item list.

Also, by selecting “Open Warning Window for Warnings” in display of the option setting, the warning window is automatically displayed when warning conditions are generated on the HX, GX and Q cameras, even if the warning window is closed.

Depending on the type of warning, the warning message may not be displayed. For warnings under the “Display Warning” tab in the options settings, only the selected warnings are displayed in the warning window.

The warning window displays a history of the warnings generated.

Click “Copy to Clipboard” to copy the history of all of the warnings displayed to the clipboard.

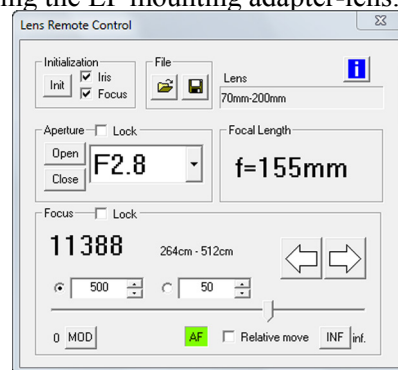
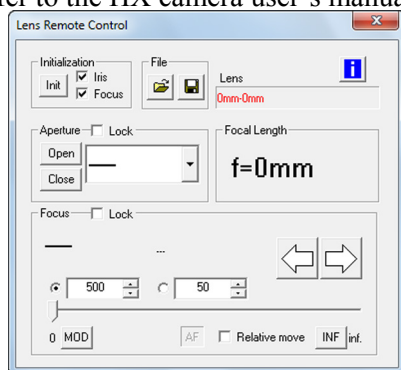
Click “Clear” to delete the history of all of the warnings currently displayed.

Click “Close” to close the warning window.

## ■ EF Lens Control (Using the HX Camera and EF Mounting Adapter)

If the optional EF mounting adapter is installed on the HX camera, the aperture and focus of the EF mounted lens can be controlled from HXLink.

Refer to the HX camera user's manual for the method of mounting the EF mounting adapter-lens.



Connection with only the EF mounting adapter

EF mounting adapter+EF mounted lens

When controlling the focus with HXLink, make sure the lens focus switch is set to AF (Auto Focus). If the focus switch is set to MF (Manual Focus), the focus cannot be operated from HXLink.

When operating the lens from HXLink, first initialize the aperture and focus. After starting up the camera, if not initialized once, the aperture-focus cannot be controlled.

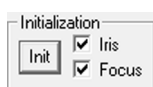
### Adjusting the focus with manual lens operation

Focal adjustment can be done manually with the lens, but with manual operation, the proper lens focal position cannot be retrieved from HXLink.

If adjusting the focus with HXLink after manually adjusting the focus, perform relative displacement or control the focal position after initializing the focus.

Once the focus is initialized, the lens focus position cannot be returned to the state prior to initialization.

### Description of Each Item



Click "Init" to specify either Aperture-focus or both to perform initialization for lens control.

With initialization, the focus can be changed from close range to infinity but cannot be returned to the original position. The aperture is (Open).



Save/open settings (aperture, focus, lens control window position).



File selection settings are reflected in the lens.

If there are multiple settings for the selected file, the settings are only reflected for the camera lens where those settings are saved.



Saves the file with the current lens control window settings.

If saving existing file selections and there are existing file settings for the currently controlled camera, the file with the current settings is overwritten, otherwise the current camera settings are added to the file.



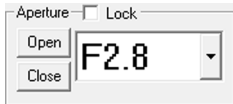
### Lens information

Displays the lens and the lens controller information.



### Lens information (focal distance)

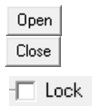
Black when the lens is attached, and red when removed.



### Lens aperture control

Select the aperture from the pull down menu.

The EF mounted lens aperture cannot be changed manually.



Open

Maximum light aperture.

Close

Minimum light aperture.

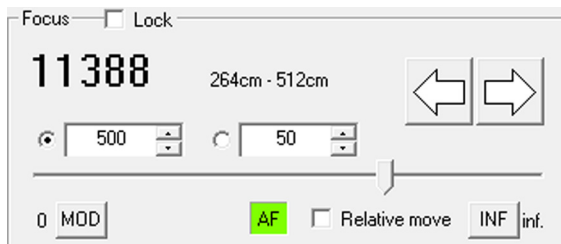
Lock/Unlock

Prohibits aperture operation to prevent erroneous operation.



### Lens focal length (zoom).

Zoom adjustment is only available with manual operation of the lens, and cannot be controlled from HXLink.



Performs lens focal control and shows the focal position.

If the focal position “Control Position” is specified with the slider, the focal position is moved “Relative Movement” in the MOD/INF direction from the current position.

(MOD: close range, INF: infinity)

If performing micro adjustment with HXLink after manually operating the focal adjustment of the lens, select “Relative Movement” and use the change focus button to perform focal adjustment.

To adjust the focus with “Control Position”, the focus must be initialized to retrieve the correct focal position for the lens from HXLink and once the focal position of the lens changes, it can't be reverted to the state prior to initialization.



### Lock / Unlock

If ON, prohibits focal operation to prevent erroneous operation.

11388

### Show focal position

Enabled with “Control Position”.

Shows the correct lens focal position after focal initialization.

Disabled with “Control Position” in “Control Position”.

264cm - 512cm

### Show film distance Movement”.

Enabled with “Control Position”, “Relative

Shows the filming distance for the lens focus settings.

“---“ shown if a lens is attached that doesn't correspond to the filming distance.

After manually operating the focus, the correct film distance is displayed.



Change focus

Used with “Control Position”, “Relative Movement”.  
Click <-/-> to move the focal position in the MOD/INF direction.  
Focal adjustment can be performed with the mouse wheel or keyboard.  
Click once and the amount of movement is specified in “Amount of Focal Movement”.  
Press continuously to repeated change the focus and temporarily increase the amount of movement.



Amount of focal movement  
Movement”.

Used with “Control Position”, “Relative

Click the change focus button once to specify the amount of movement.  
There are two settings to switch between rough and fine adjustment.  
Press the Shift key on the keyboard to switch the movement on the left side.



Focus slider

Used with “Control Position”.  
Specify/display the current focal position of the lens.



Relative movement control

Check for relative movement control.



Close range

Used with “Control Position”, “Relative Movement”.  
Close range focal position.



Infinity

Used with “Control Position”, “Relative Movement”.  
Infinity focal position.



AF/MF Display



Lens focal control with AF mode



Lens in AF mode but focus not initialized



Lens in MF mode but focus control prohibited from HXLink

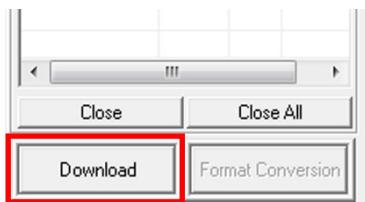
## 4.5 Saving Images

Determine the file name and save range of the data to be downloaded and download the camera images.

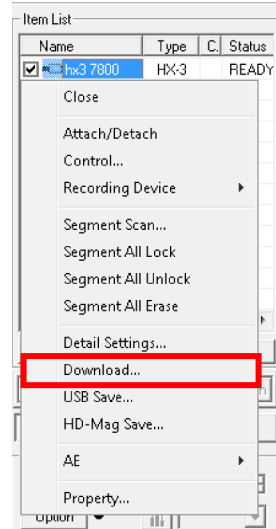
When the camera is connected, use any of the following methods to display the download dialogue and start downloading.

- Click "Download" on the item toolbar. (\*)
- Click "Download" on the file menu. (\*)
- Click "Download" on the right click menu and select a camera shown on the item list.

(\*) The download dialogue may differ depending on the “Option” dialogue GUI settings.



“Download”



Right click menu on the item

Depending on the type of file other than MCFF, AVI/BMP/JPEG/TIFF can be set. If setting AVI/BMP/JPEG/TIFF, they can be created without an MCFF download and format conversion. The initial settings for the type of file are specified in “Previous Download Format” under the “View/Download Live Camera” tab of options.

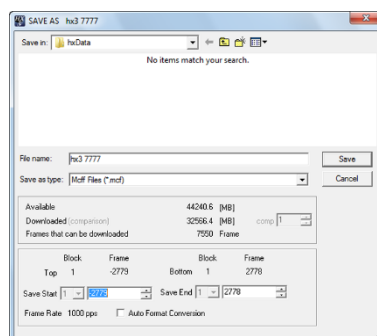
### Caution

The saved AVI/BMP/JPEG/TIFF format image cannot be subject to image adjustment with HXLink or cut. ,

### ■ Individual Downloads

Any of the following methods can be used to display the "Save As" dialogue and perform individual downloads.

- Click "Download".
- Click "Download" from the “File” menu.
- Click "Download" on the right click menu on the item list.



## "Save As" dialogue

Displays the free space in the drive, the file size after saving and the number of frames available for saving.

If selecting the file format (AVI, JPEG) to compress the image, the "Compression Ratio" is used to calculate the file size. The size of the saved file is the value of the "Compression Ratio" for the file size created without compression.

When starting to save, the size of the saved file is shown in "Saved Size (Target)" and HXLink determines whether or not there is free space is sufficient.

**Caution** The file size subject to the "Compression Ratio" is a target. The actual file size varies according to the CODEC used for compression.

Set the folder for the download, the file name and the frame to save/relative time and then click "Save" to download.

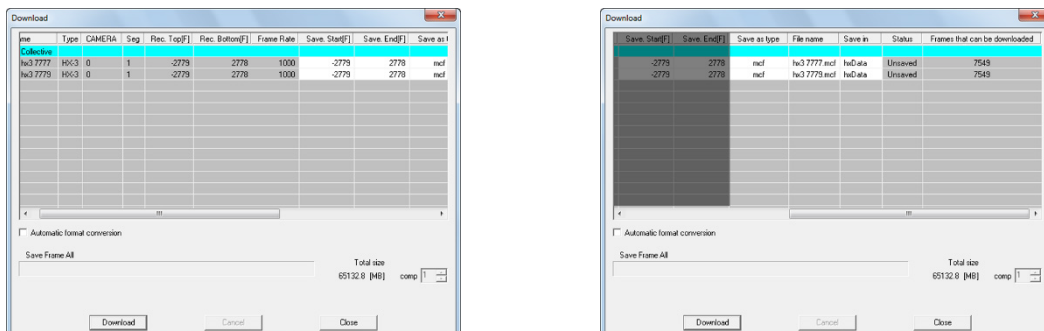
With multi trigger recording, designate the block and download the continuous range displayed on the slider bar. Refer to page 8-14 for details.

Depending on the frame counter display settings, the setting format for the save range can be either the frame or the relative time.

### ■ Batch Downloads

Any of the following methods can be used to display the "Download" dialogue (list) and perform batch downloads.

- Click "Download".
- Click "Download" from the file menu.



"Download" Dialogue

Download settings for all of the connected cameras and segments can be made in "Batch".

Download settings for the selected camera and segment can be made in the camera row.

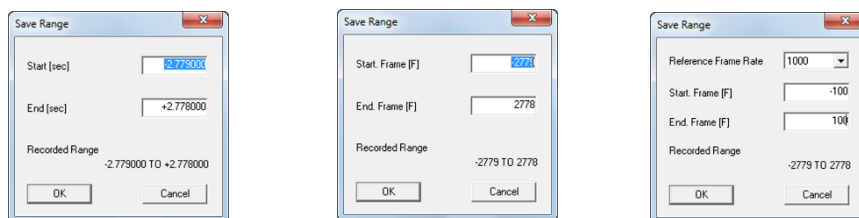
The range can be designated by the frame/relative time. Areas not shown in gray can be set.

With burst recording, the download range can be set by the frame number or the relative time from the frame input for the burst signals.

With multi trigger recording, the download range can be set by the frame number or relative time using the trigger frame for each block as the standard. With multi trigger batch downloads, download the range designated for all of the blocks.

The following items can be set in the "Download" dialogue.

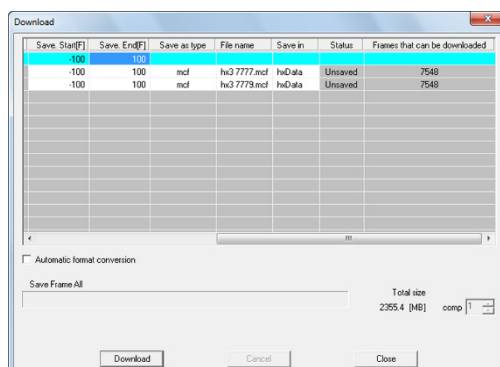
- ☒ Data checked are subject to batch settings and downloads. If not downloading, remove the check.
- Start Save [sec] Start time for the save range.  
 Start Save [F] Start frame for the save range.  
 The unit for relative time settings is seconds. Specify up to 1 microsecond.  
 The unit for frame settings is a single frame.  
 With multi trigger recording, the start save frame/time is set for all blocks.
- End Save [sec] End time for the save range.  
 End Save [F] End frame for the save range.  
 The unit for relative time settings is seconds. Specify up to 1 microsecond.  
 The unit for frame settings is a single frame.  
 With multi trigger recording, the start save frame/time is set for all blocks.  
 Double click on a cell to either start a save or end a save when specifying the save range.  
 Double click to display the "Save Range" dialogue.



Set a range for downloading to a start time/frame and end time/frame, and press OK.

If "Save Range" in "Batch" is selected when the frame counter display indicates "Frame", the "Reference Frame Rate" must be selected. Set the time corresponding to the "Reference Frame Rate" save the start frame and end frame for each camera.

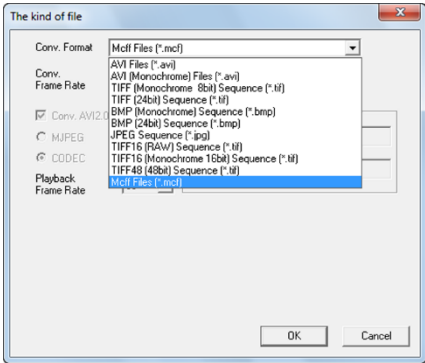
The figure below shows an example when the reference frame rate is set to 2000, and the start and end frame is -200~200. In this case, the save range for each camera is the frame corresponding to -0.1 ~ 0.1[sec].



Double click on the cell for the save format to display the “File Type” dialogue. Specify the type of file with “Conversion Format”. Refer to page 5-26 and 7-21 for the other settings.

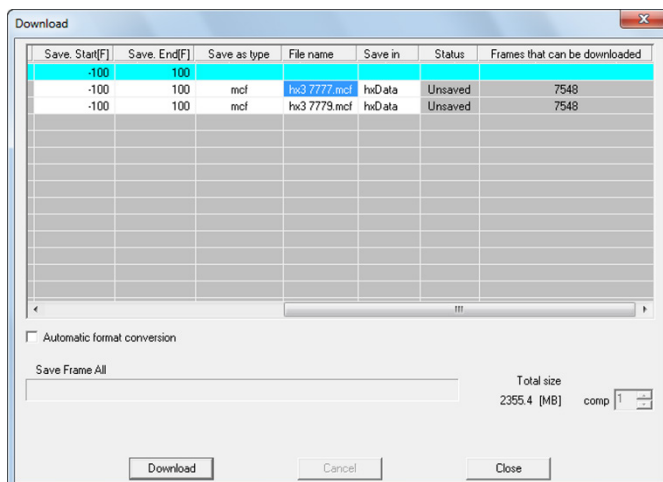
**Save Format** If the compression file format (AVI, JPEG) is selected, “Compression Ratio” is used for the file size calculation. The size of the saved file is the value of the “Compression Ratio” for the file size created without compression. When starting to save, the size of the saved file is shown in “Saved Size (Target)” and HXLink determines whether or not there is free space is sufficient.

**Caution** The file size subject to the “Compression Ratio” is a target. The actual file size varies according to the CODEC used for compression.

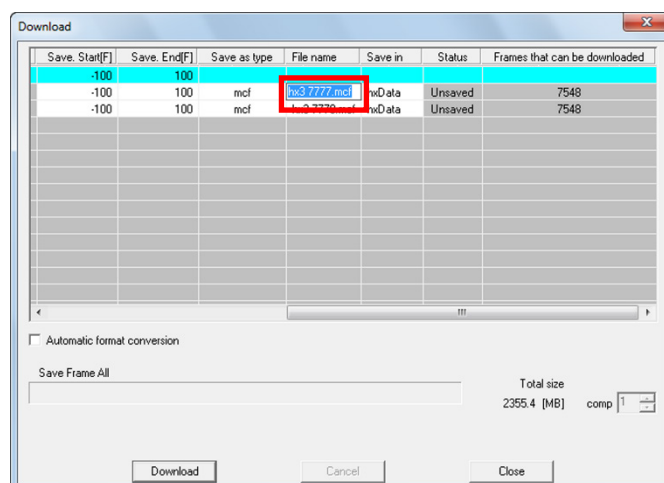


Save File Name     Displays the file name for the data to be downloaded.  
Perform the following when changing the save file name.

1. Select the camera to change the save file name.



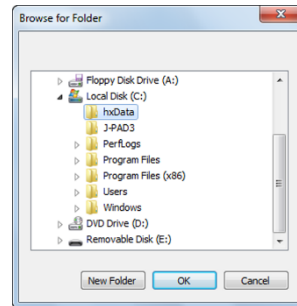
2. Click the cell for the save file name to change the name.



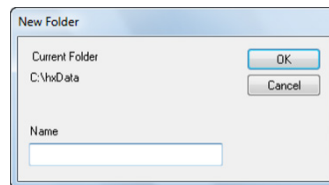
## Save Folder

Displays the folder for the data to be downloaded.  
Perform the following when changing the save folder.

1. Double click to select the save folder cell (batch cell during batches) corresponding to the camera that changes the save folder
2. After the “Reference Folder” dialogue appears, select the folder for the download and press OK.



3. If creating a new folder, press “Create Folder” and input the folder name in the “New Folder Name” dialogue and press OK to create a folder.



## ☐ Automatic format conversion

If checked, converts the format after downloading has finished.  
Refer to page 4-93 for automatic format conversion.

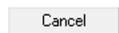
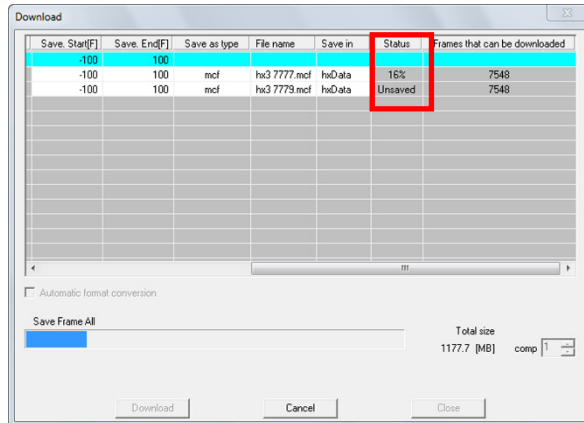
Perform the following with each button in the “Download” dialogue.



Downloads the checked data.

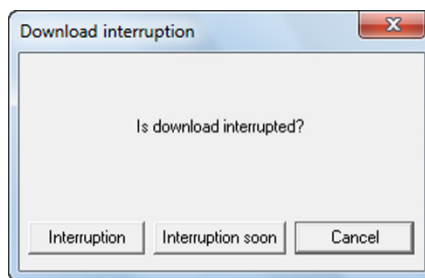
The progress of the downloads for each camera is shown in % in “Save Status”. The overall progress is shown on the progress bar.

During the downloads, the status of the download progress is shown.



Interrupts the download.

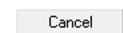
Select the interruption method when the “Interrupt Download” dialogue appears.



The data download in progress continues and then the download is suspended.



Interrupts the download soon. Subsequent data downloaded is suspended.

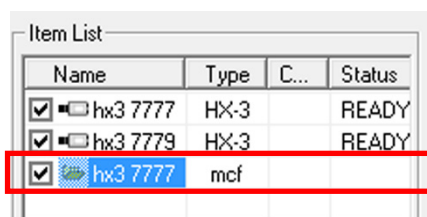


Does not interrupt the download.



Closes the “Download” dialogue.

- Download an image and the downloaded data (MCFF) is shown on the item list and the “Convert Format” button is enabled.



## •DOWNLOAD REC

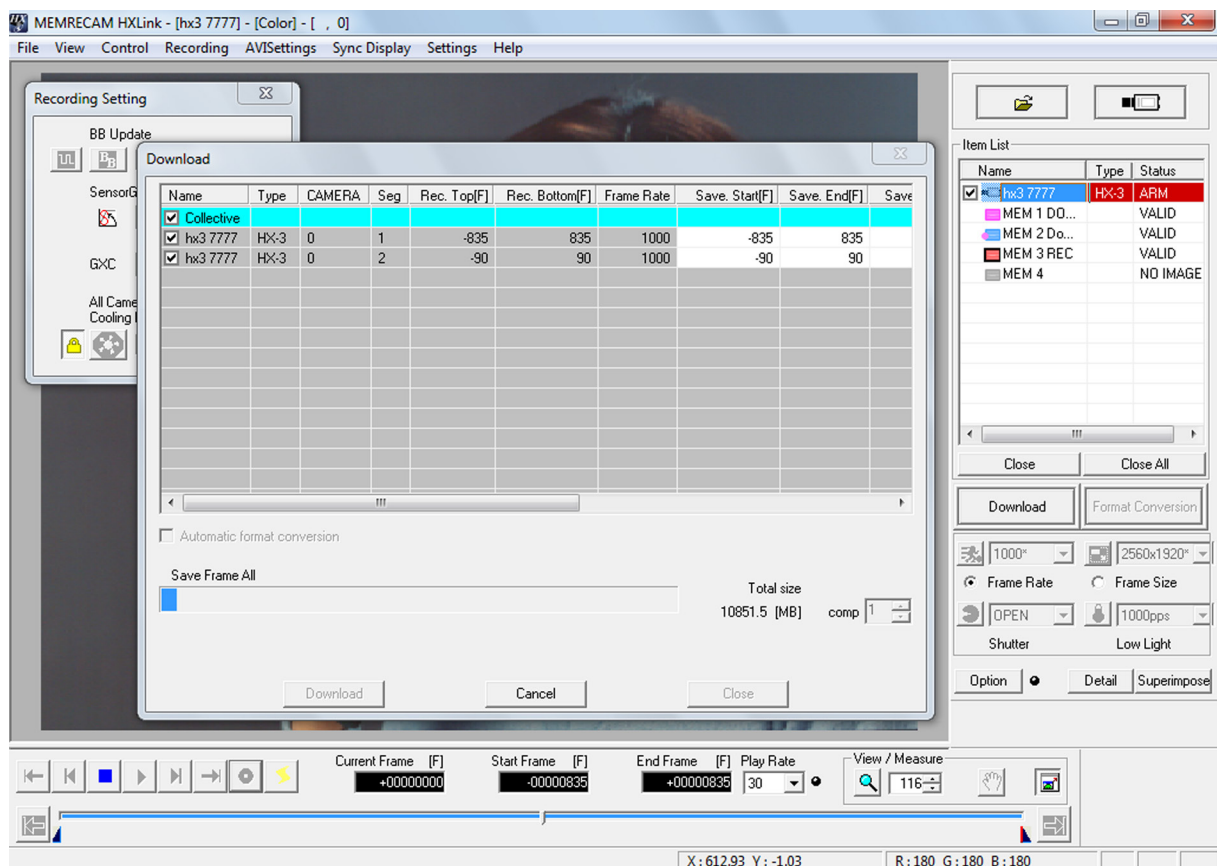
DOWNLOAD REC is an HX camera function where recorded segments can be downloaded during VIEW / recording. However, the live image update rate slows down during downloading.

HXLink can download recorded segments during recording only when controlled by the HX camera containing the DOWNLOAD REC function.

If both HX and GX cameras are connected, since there is no DOWNLOAD REC function on the GX camera, the HXLink download function is disabled during VIEW / recording.

Download Rec is only enable in Batch Downloads.In "Individual Download", DownLoad Rec is disabled.

### Example of Downloading during Recording



In the example given above, HX-3 is divided into four segments 1~4, with recording completed on segments 1 and 2, which are downloaded by HXLink screen operation while segment 3 is recorded. The trigger ready state can be seen from the segment display on the item list, where segment 1 is downloading, segment 2 is waiting to be downloaded and segment 3 is being recorded.

Connection with the camera and would have been cut, the state of the segment will be reserved even after reconnecting.

To cancel Segment Reservations,open push "download" button and open Download dialog again.

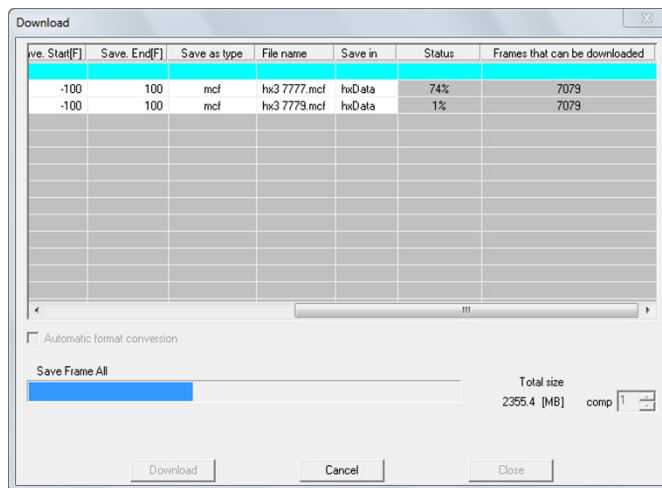
### ■ Simultaneous Downloads

To shorten the image download time from the camera, if the HX or GX camera is included as one of 2 or more cameras, images from multiple cameras can be simultaneously downloaded. If there are multiple GX cameras in use, the shortened download time depends on the PC performance.

The number of cameras that can download simultaneously is determined by the type of camera.

- |              |  |
|--------------|--|
| • Q          | Downloads are sequential.  |
| • HX, GX     | Can download from multiple cameras simultaneously.   |
| • GX-5/GX-5F | Can download from multiple DRP simultaneously but the data from multiple heads from a single DRP is sequentially downloaded. , |
| • fx         | With multiple fx cameras, downloads are sequential but with other types of cameras, simultaneous downloads are possible. ,     |

When downloading from multiple cameras, the overall camera progress and the progress for each camera are shown in the download dialogue. The progress for all of the cameras is shown on the progress bar, and progress for each camera is shown as a percentage (%) under “Status”.



Specify the number of cameras for simultaneous downloading in the option dialogue. Refer to page 7-12 for details.

If there are multiple cameras downloading, the overall download time can be shortened by adjusting the number downloading simultaneously to match the PC performance.

■ **HD-mag Save** Can be used when the HD-mag (option) is connect to the HX-1 camera.

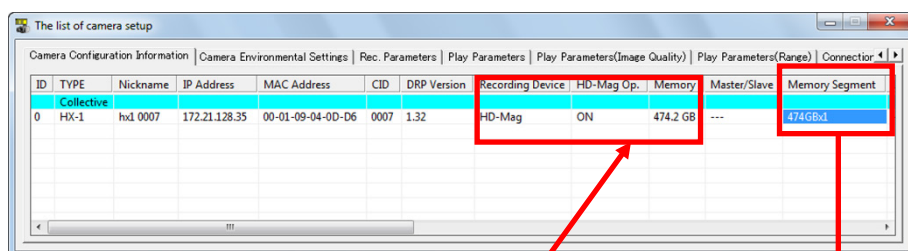
Recorded image data can be saved on the large capacity HD-mag.  
Refer to the HD-mag user's manual for the installation of the HD-mag.

**Caution** The entire HX-1 camera segment is saved to the HD-mag segment.  
Save may not be possible due to the segment size of the HD-mag.

▪ **HD-mag Segment Partitioning**

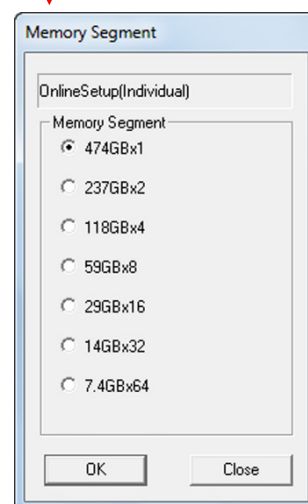
HD-mag segment partitioning can be performed from the HXLink. Make a size larger than the HX-1 camera unit fittings.

**Caution** Perform HD-mag segment partitioning and the HD-mag image data is deleted so make sure to download the required data in advance.



ID	TYPE	Nickname	IP Address	MAC Address	CID	DRP Version	Recording Device	HD-Mag Op.	Memory	Master/Slave	Memory Segment
0	HX-1	hxd 0007	172.21.128.35	00-01-09-04-00-D6	0007	1.32	HD-Mag	ON	474.2 GB	---	474GBx1

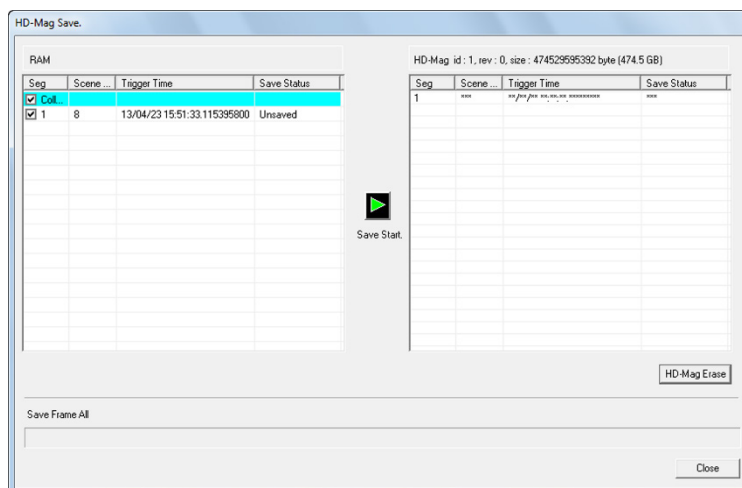
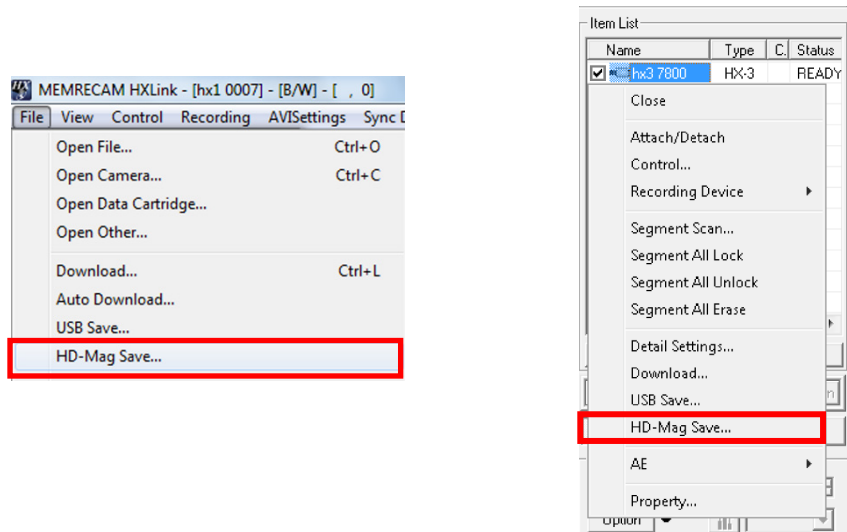
Use of the HD-mag is shown in this manner.



HD-mag (512GB)

- Saving

Select HD-mag save from the file menu or the camera item right click menu.



#### Save Start



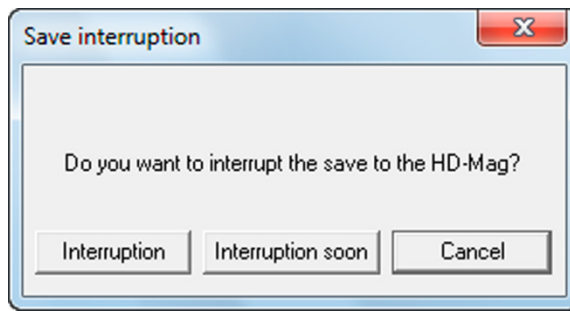
Saves the data to the HD-mag checked. The progress of the save for each segment is shown in % under "Save Status". The overall progress is shown on the progress bar.

During the save, the button  switches to an interrupt save button.



#### Interrupt Save

Interrupts the save in process. Click to display the message.



Interruption

The data save in progress continues and then is suspended.

Interruption soon

Interrupts the save soon.  
Subsequent data saves are suspended.

Cancel

Does not interrupt the save.

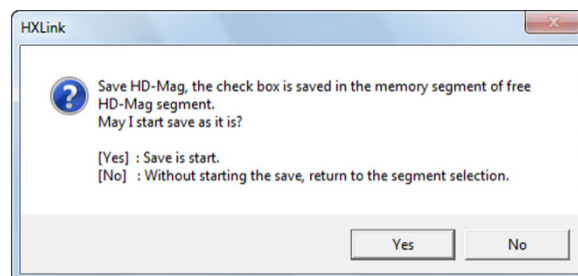
HD-Mag Erase

Deletes the data saved in the HD-mag shown in the individual window by segment.

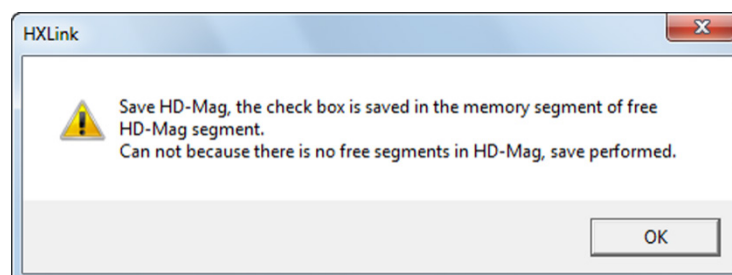
**Caution**

Deletion of data by segment is a function only of the HD-mag. This function is not available in the HX camera main memory.

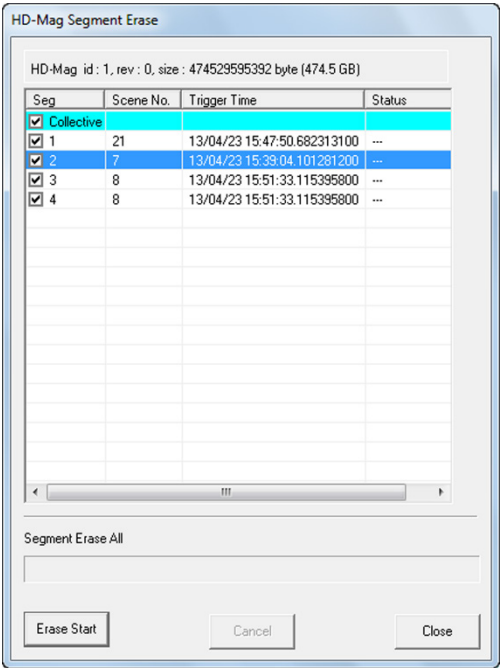
If there are free segments that can be saved in the HD-Mag, a message is displayed and the save can be started.



If there are no segments that can be saved, a message is displayed and save is not possible.



•Delete HD-mag segments



Erase Start

Deletes the data checked. The progress of the save for each segment is shown in % under “Status”. The overall progress is shown on the progress bar.

Cancel

Deletes all of the data when batch is checked.

Close

The data deletion in progress continues and then is suspended.

Closes the “Delete HD-mag segment” dialogue.

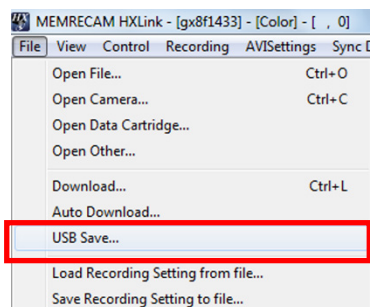
## ■ Saving Images on USB

Determine the save range for the data to be saved on USB media connected to the HX or GX cameras and save the camera image.

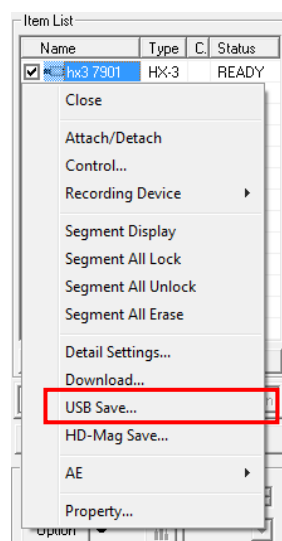
Perform the following procedures before connecting the USB media to the HX or GX camera.

Either click "USB Save" on the file menu or click "USB Save" on the right click menu for the camera selected in the item list to display the download dialogue and start downloading.

The download dialogue shown may differ depending on the number of cameras and the status shown on the item list.



File Menu "USB Save"

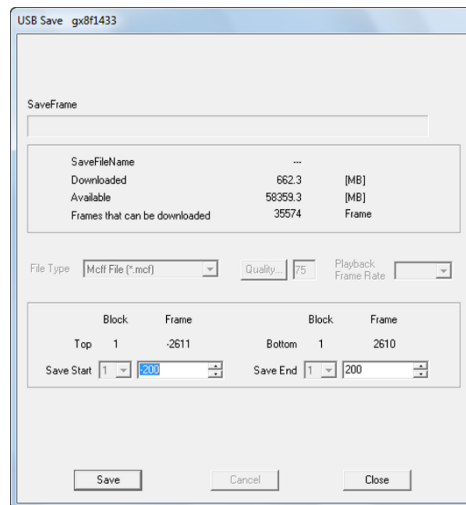


Right Click Menu of the Item

With HX cameras, in addition to MCFF, AVI (not compressed)/AVI (MJPEG) can be specified as the file type. The product quality settings are used when saving AVI (MJPEG). The playback rate is used when saving AVI (not compressed)/AVI (MJPEG).

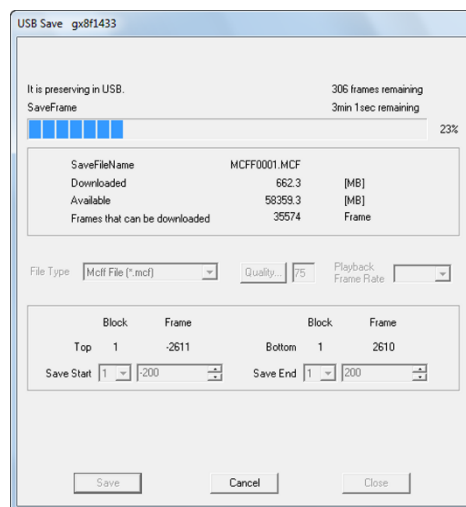
- "USB Save" Dialogue (Individual)

Displayed when one camera is connected or when specifying cameras from the item list and saving an image from one camera on USB media.



USB Save" Dialogue (Individual)

Displays the free space on the USB media (MB) and the number of frames that can be saved. Set the save range (frame/relative time) and click "Start Save" to save on the USB media.



"USB Save" Dialogue (Individual) Start Save

For MCFF, the file name is automatically assigned a sequence of MCFF0000.MCF ~ MCFF9999.MCF.

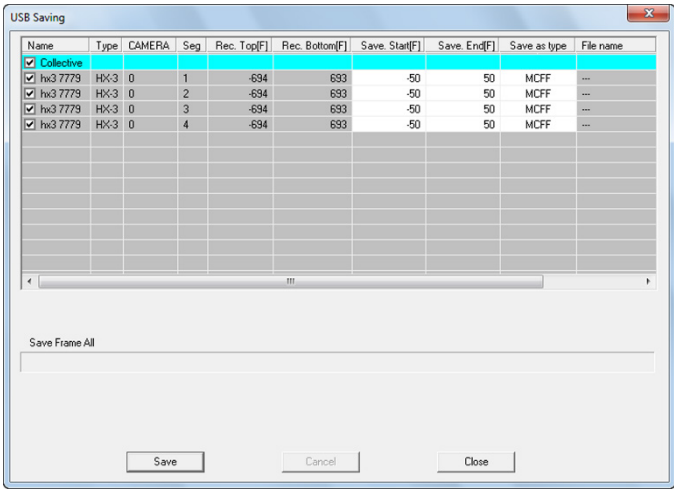
For AVI, the sequence is MCAV0000.AVI ~ MCAV9999.AVI.

While saving, the progress will be displayed in real time on the progress bar and the "Frames Remaining".

If "Cancel" is pressed while saving, saving to the USB media is immediately suspended.

▪ "Save to USB" Dialogue (List)

Displayed when there are multiple cameras connected or when a memory segment item is shown for a single connected camera.



"Save to USB" Dialogue (List)

Settings for all of the connected cameras and the USB save segment can be made in "Batch".  
Settings for the USB save for the selected camera and segment can be made in the camera row.  
The range is set in frame/relative time. Areas not shown in gray can be set.

With burst recording, the save range is set by the frame number or the relative time from the frames input for the burst signals.

With multi trigger recording, the save range is set by the frame number or relative time using the trigger frame for each block as the standard.

The following items can be set in the "Save to USB" dialogue.

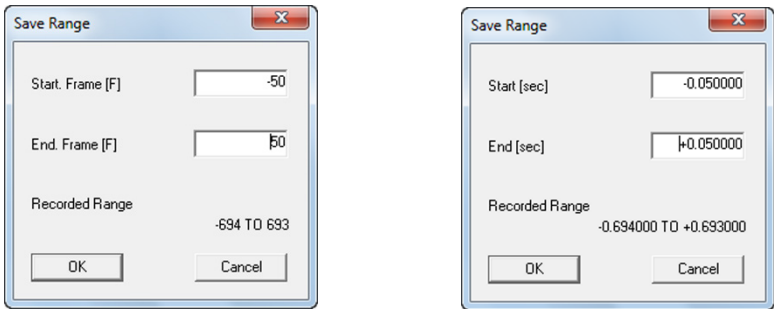


Checked data is saved.  
If not downloading, remove the check.

Start Save [sec] Start time for the save range.  
Start Save [F] Start frame for the save range.  
The unit for relative time settings is seconds. Specify up to 1 microsecond.  
The unit for frame settings is a single frame.  
With multi trigger recording, the start save frame/time is set for all blocks.

End Save [sec] End time for the save range.  
End Save [F] End frame for the save range.  
The unit for relative time settings is seconds. Specify up to 1 microsecond.  
The unit for frame settings is a single frame.  
With multi trigger recording, the start save frame/time is set for all blocks.

Double click on a cell to either start a save or end a save when specifying the save range.  
 Double click to display the "Save Range" dialogue.



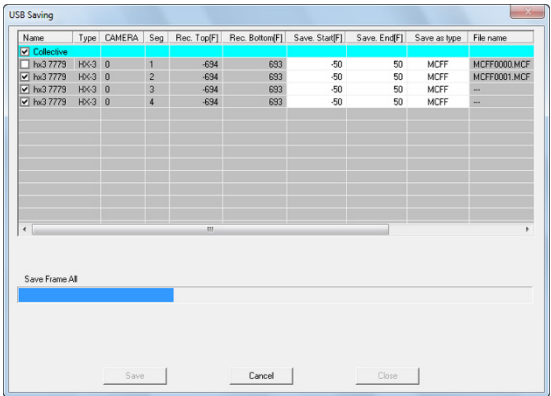
Set a range for downloading to a start time/frame and end time/frame, and press OK.

With HX cameras, in addition to MCFF, AVI (not compressed)/AVI (MJPEG) can be specified as the file type. The product quality settings are used when saving AVI (MJPEG).  
 The playback rate is used when saving AVI (not compressed)/AVI (MJPEG).

Each button in the "Save to USB" dialogue functions as follows.

Save

Saves the checked data on the USB media.



"Save to USB " Dialogue (List)

Start Save

Once the save has started, the save progress for each camera is displayed, and the overall progress is shown on the progress bar.  
 For MCFF, the file name is automatically assigned a sequence of MCFF0000.MCF ~ MCFF9999.MCF. For AVI, the sequence is MCAV0000.AVI ~ MCAV9999.AVI.

Cancel

Immediately cancels the save.

Close

Closes the “Download” dialogue.

## ■ Partitioned Saved MCFF

With the GX series camera DRP, a single scene larger than 4GB is saved on USB media by first partitioning into multiple MCFF files less than 4GB.

This is due to the fact that the FAT32 used by the GX series as the USB media file format cannot create files larger than 4GB.

With HX series cameras, the same operation applies when using FAT32 file formatted USB media.

When saving to USB, if the save file name is “MCFF0000.MCF”, the two partitioned MCFF file names saved will be as follows.

First MCFF file name	MCFF0000.MCF
Second MCFF file name)	MCFF0000-V2.MCF

“-Vn” is added to the second and subsequent partitioned file names (n is 2~16).

HXLink opens the partitioned saved MCFF as a single scene that can be converted into AVI/TIFF/BMP/JPEG. With HXLink, once the partitioned saved MCFF is opened, a MCFF file that can be linked within the same folder is opened, automatically linking as a single scene. The following limitations apply.

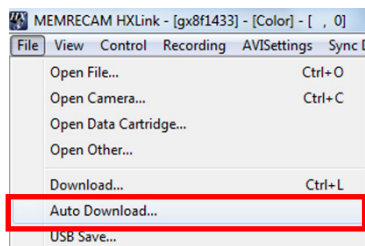
- Cannot be converted to the MCFF format.
- T=0 Setting/Frame number setting is not possible.
- If more than the maximum number (20 files) of MCFF are opened simultaneously, they cannot be opened as a single scene. Open one file as a single scene, but files exceeding the maximum cannot be opened.

## ■ Auto Download Function

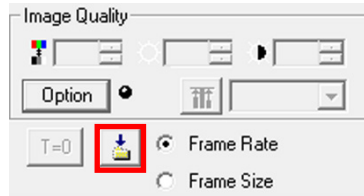
Function that automatically downloads images recorded when recording has been completed and saves the MCFF file.

To set the auto download, first connect a camera, test record and download, and then perform one of the following.

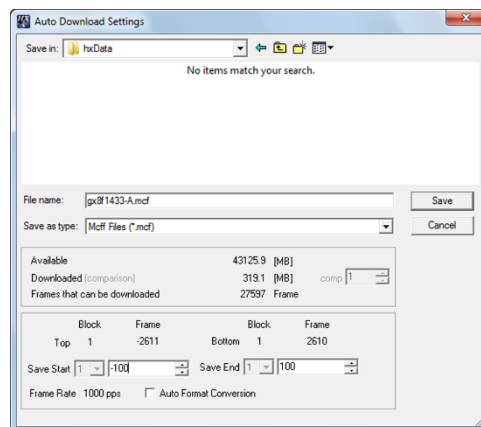
- Select a camera in the "Item List" and click "Auto Download" in the “File” menu.



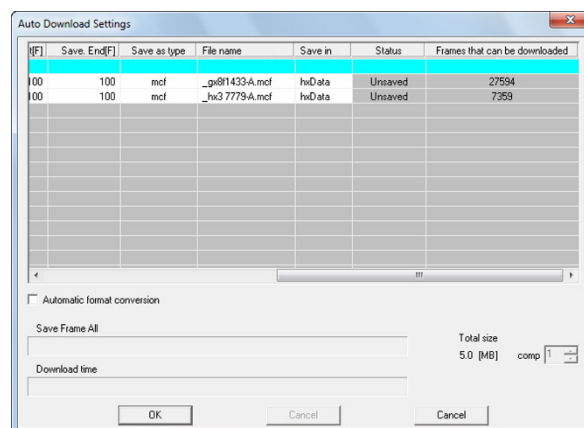
- Click "Auto Download" on the “Item Toolbar”. (Expert Mode only)



When the item to download under "GUI Setup" on the option menu is "Individual Save", the "Save As" dialogue is displayed.



When the item to download under "GUI Setup" on the "Option" menu is "Batch (List)", the "Download" dialogue for the table is displayed.



The initial value for the file name to be downloaded has "-A" added to the end of the camera nickname.

Set the file name and save range for the download and click "OK". This setting is used to download after camera recording has been completed.

The save range saves at the time when the trigger frame is 0.

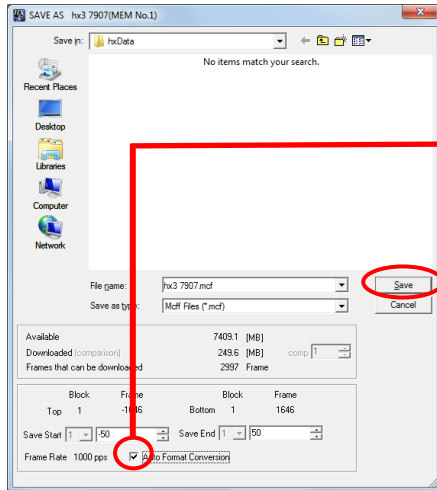
To specify "---" as the Save Start/Save End, the Rec. Start/Rec. End becomes the Save Start/Save End so all of the recorded range is downloaded. Also, if the saved range is not included in the recorded range, the saved range and the recorded range are downloaded as an overlapped range.

Upon completion of the camera recording, the download is automatically performed, and when that is completed, the data is saved in the file with the established name.

## ■ Automatic Format Conversion Function

Function to automatically convert the format after downloading according to conditions set in advance.

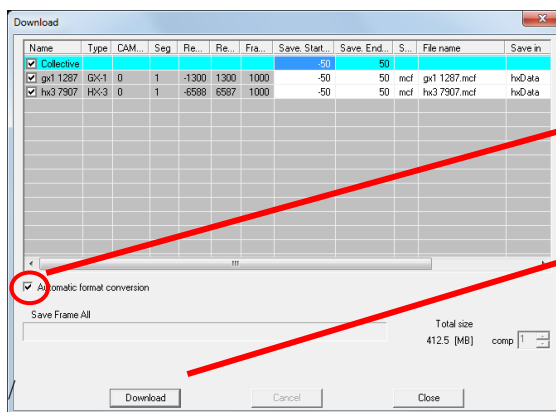
To set auto format conversion, first connect a camera and record, check "Auto Format Conversion" in either the "Download" dialogue or the "Save As" dialogue, and then click "Save" or "Start Download" ("OK" if an automatic download).



1. Check

2. After specifying the download, click "Save".

When the "GUI Setting" download item is "Individual Save"



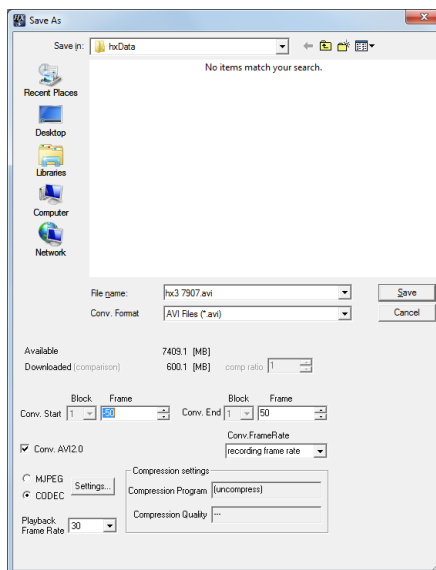
1. Check

2. After setting the download, click "Start Download" ("OK" if an automatic download.)

When the "GUI Setting" download item is "Batch Save"

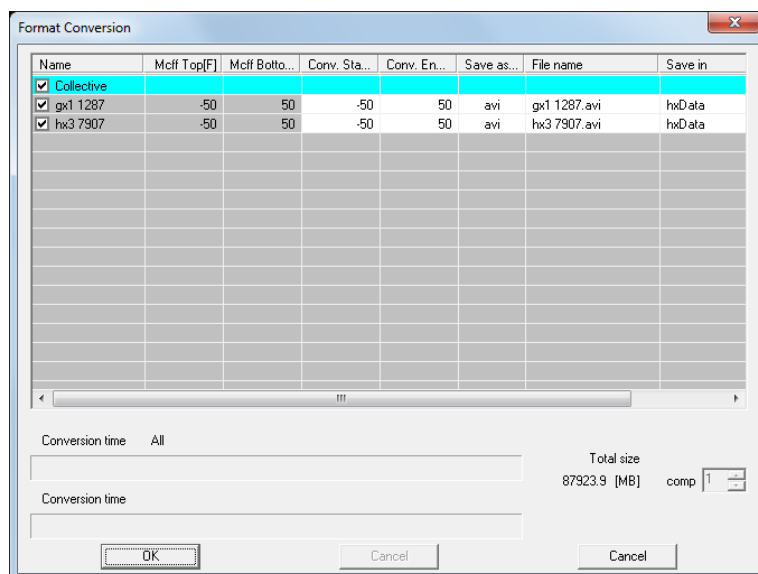
Next, the "Format Conversion" dialogue is displayed to set the location and the file name for the format converted file.

/



When the “GUI Setting” download item is “Individual Save”

/



When the “GUI Setting” download item is “Batch Save” (list)

After setting items such as the type of file and compression settings, click "OK".  
Refer to page 5-26 for details on each setting.

To specify “---” as the Convert Start/Convert End, the Save Start/Save End becomes the Convert Start/Convert End. Also, if the converted range is not included in the saved range, the converted range and the saved range are converted as an overlapped range.

Click “Save” (“OK” for batch saving) to start the download and once the download is complete, the format conversion automatically starts.

If combined with an auto download, clicking “OK” or “Save” will not start the download.

## ■ Automatic Camera Control

This is a function where by setting the camera connected, the save range and the number of times to record/save in advance, after the HXLink is started up, the camera is automatically connected and the record/download is repeated a prescribed number of times.

Refer to page 7-23 for the setting method.

**Caution** With the following settings, in the HX and GX camera recording trigger mode, the camera switches segments when recording is finished so the auto camera control does not function.

NORMAL(A)

NORMAL(L)

EVENT(A)

EVENT(L)

BURST(A)

BURST(L)





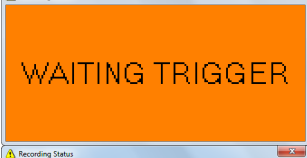



MULTIS(A)

MULTIS(L)

**Caution** If using auto camera control, turn the “All Camera Auto View” to OFF. Downloading with auto camera control is not possible if the “All Camera Auto View” setting is AUTO or LOOP.

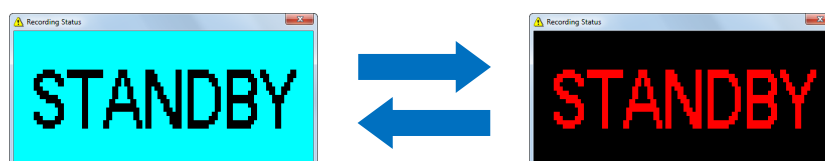
## ■ Recording Status Display

Recording status display window shows the status of the camera when recording.  
To display “Recording Status” window, check “Recording Status” in the “View” menu.  
The size of “Recording Status” window is changeable, so you can enlarge the window size and confirm camera status in controlling PC monitor such as shown in the following displays.

	NO IMAGE:	All cameras are READY status not recording
	VIEW:	One or more cameras are VIEW status.
	ARM:	One or more cameras are ARM status.
	STANDBY:	All cameras are ARM status and waiting for recording trigger.
	WAITING TRIGGER:	One or more cameras are REC(detect trigger) status.
	TRIGGERED:	All cameras are REC status.
	VALID:	One or more cameras are recorded and READY Status.
	DETATCH:	Cameras are disconnected by operation

If one or more cameras are disconnected, the alarm sounds and “Recording Status” window starts to blink.

If camera is disconnected when waiting for recording trigger, window starts to blink as follow.



# 5

## File Operation

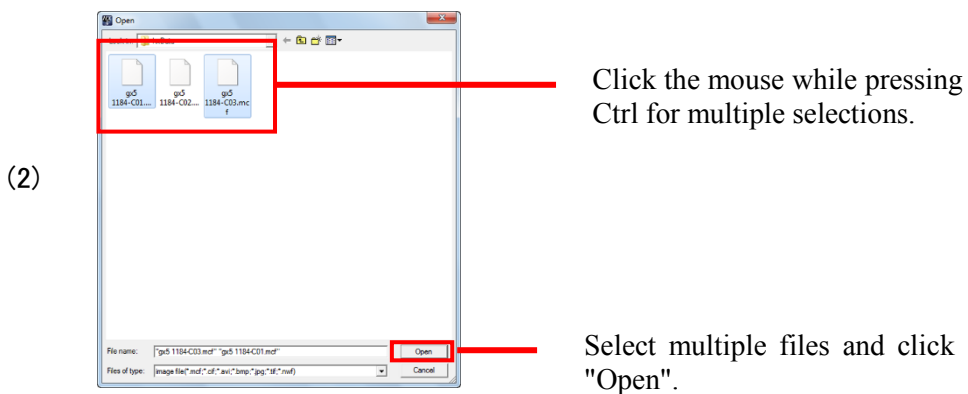
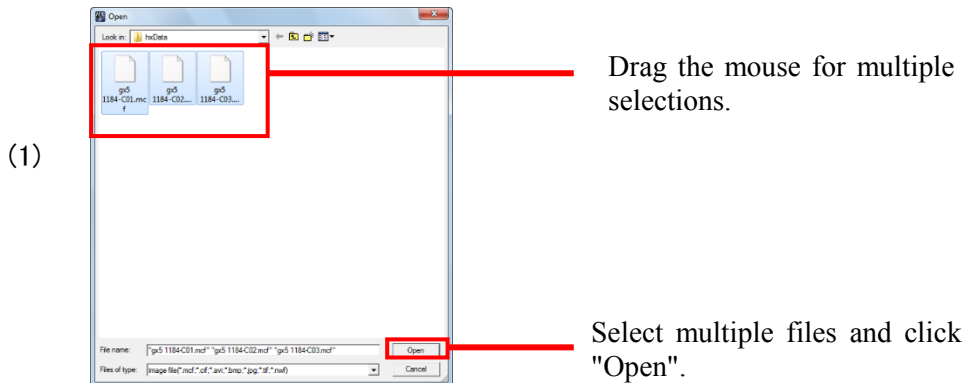
## 5.1 Play File Images

(MCFF, CIF, AVI, BMP/TIFF/JPEG)

Open MCFF, CIF, AVI, BMP/TIFF/JPEG to display and play the images. Multiple files can be selected and opened simultaneously. This does not apply to 16bitTIFF (B/W), 48bitTIFF (color).

Any of the following can be used to open MCFF, CIF, AVI, BMP/TIFF/JPEG files.

- Click "Open/Image File" in the "File" menu and select a file in the "Open File" dialogue. Refer to (1) and (2) below.

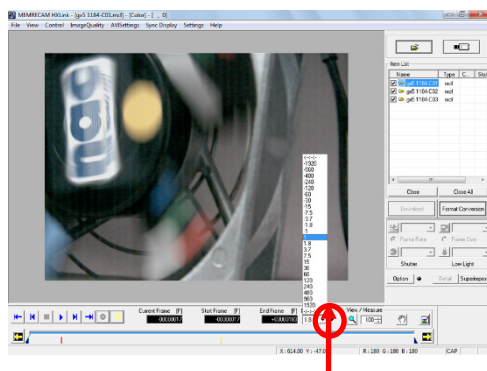


Open an image file and the file name selected in the HXLink window title bar and the type of camera “Color/ B/W” of the camera used in recording are displayed.  
Refer to page 3-21 for details of the title bar.  
If an MCFF file identified for image reversal or rotation is opened, the image is displayed in the reversed or rotated state.



The following reproduction speeds can be specified the time of file image operation.

- Playback Rate -1920,-960,-480,-240,-120,-60,-30,-15,-7.5,-3.7,-1.8,-1,  
1,1.8,3.7,7.5,15,30,60,120,240,480,960,1920 Unit:pps
- In “->->->” and “<-<-<-” in the “Playback Rate” pull-down menu  
“->->->” is the fastest frame rate that does not drop frames and plays in the forward direction.  
“<-<-<-” is the fastest frame rate that does not drop frames and plays in the reverse direction.



Dropped frame verification indicator

Use the frame by frame button to change the frame rate during playback.

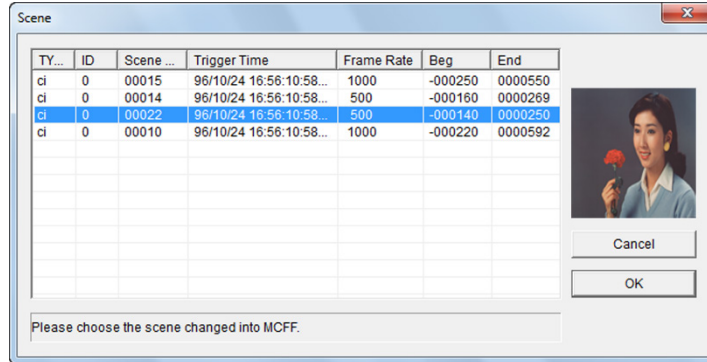
- Dropped Frame Verification Indicator  
Verifies dropped frames by the color of the indicator.  
(green: no dropped frames; yellow: dropped frames; black: disabled)

## ■ Data Cartridge Image Input

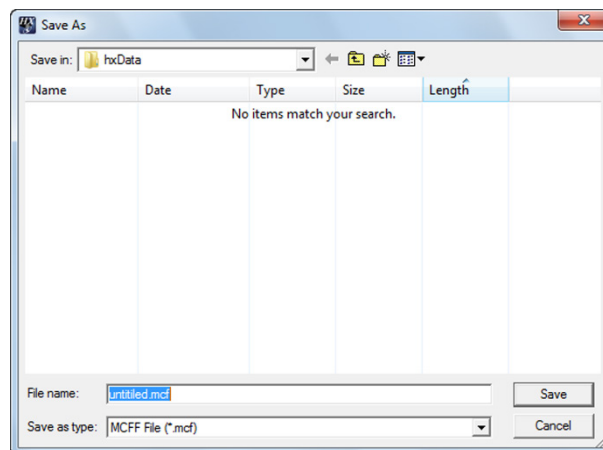
HXLink can convert scene images from a data cartridge where ci series camera data has been saved into MCFF files that can be retrieved.

Click "Open/Data Cartridge" on the "File" menu to display the scene list found on the data cartridge.

Select images to input while referencing the image preview.



Click "OK" to display the dialogue to specify the location and file name of the image.



Enter the file name. Click "Save" to save the data cartridge image as an MCFF file and the image automatically added to the item list is displayed.


## 5.2 Set T=0

The T=0 setting is the setting for frame selected to be the standard for the image file time.

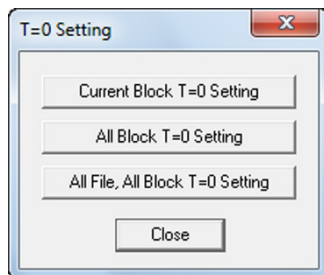
The camera frame number uses the frame input by the trigger signal (trigger frame) during recording as 0. The image file frame number verifies the photographed image and sets the T=0 setting so the frame number for the desired frame can be set to 0.

The frame with the number 0 is called the T=0 frame.

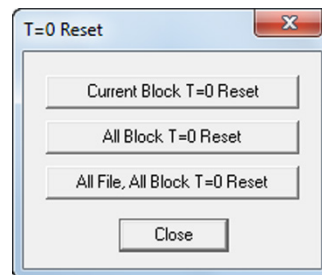
This function is useful if there are no synchronized trigger signals currently photographed, or if there is a time difference with the frame that should be the standard time for the current photograph.

In Expert Mode, click  to display the "T=0 Setting" dialogue.

In Basic Mode, click "Set T=0" in the "Control" menu to open the "Set T=0" dialogue.



"Set T=0" dialogue



"Reset T=0" dialogue

### • "Set T=0" Dialogue

Current Block T=0 Setting

All Block T=0 Setting

All File, All Block T=0 Setting

Changes the frame displayed to the T=0 frame.

(only when multi trigger recorded files are open) Changes the frame displayed to the T=0 frame, and the difference between the T=0 frame and the trigger frame is reflected on other blocks in the file.

Changes the frame displayed to the T=0 frame and reflects the difference between the T=0 frame and the trigger frame on all of the blocks in all of the open files.

### • "Reset T=0" dialogue

Current Block T=0 Reset

All Block T=0 Reset

All File, All Block T=0 Reset

Sets the trigger frame for blocks containing the frame displayed to the T=0 frame

(only when multi trigger recorded files are open)

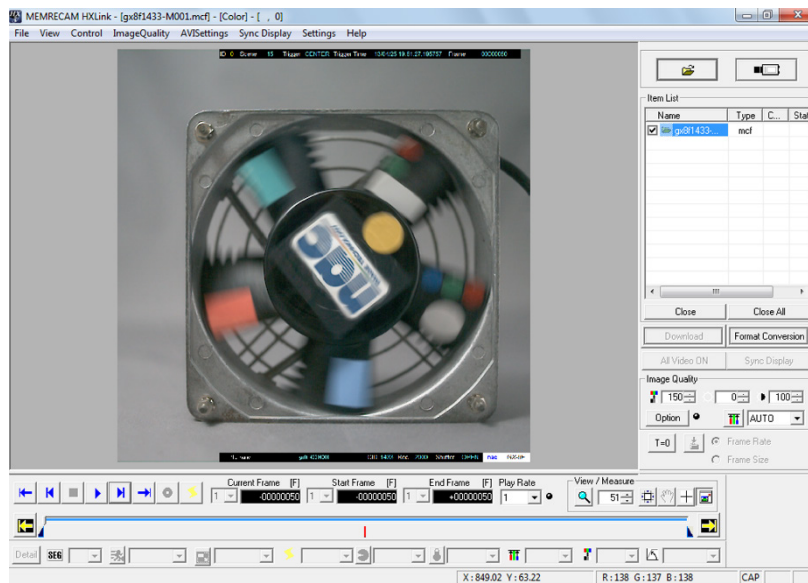
Sets the T=0 frame for all blocks in the displayed files to each trigger frame.

Sets the T=0 frame for all files displayed in the item list to each trigger frame.

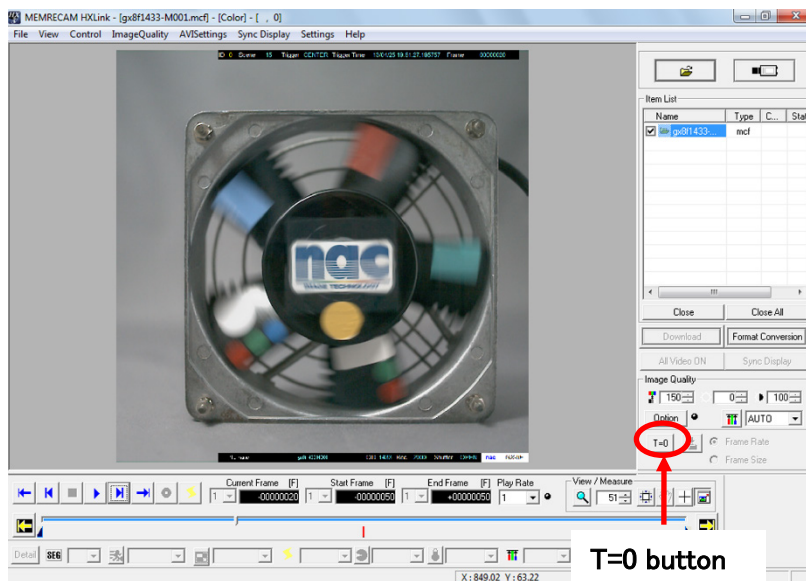
Close

Closes the "Set T=0" and "Reset T=0" dialogues.

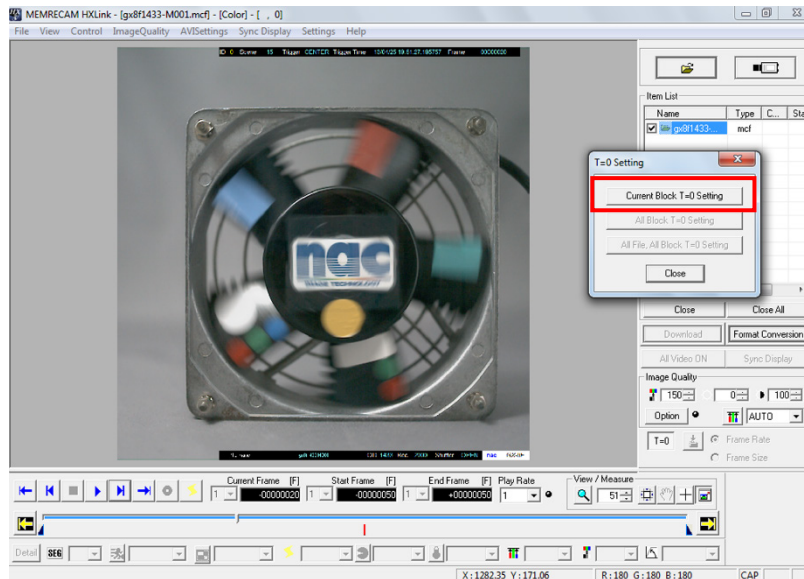
- Procedure to Revise T=0 (Expert mode only)
  - 1) Open file (MCFF,AVI,BMP,TIFF,JPEG).



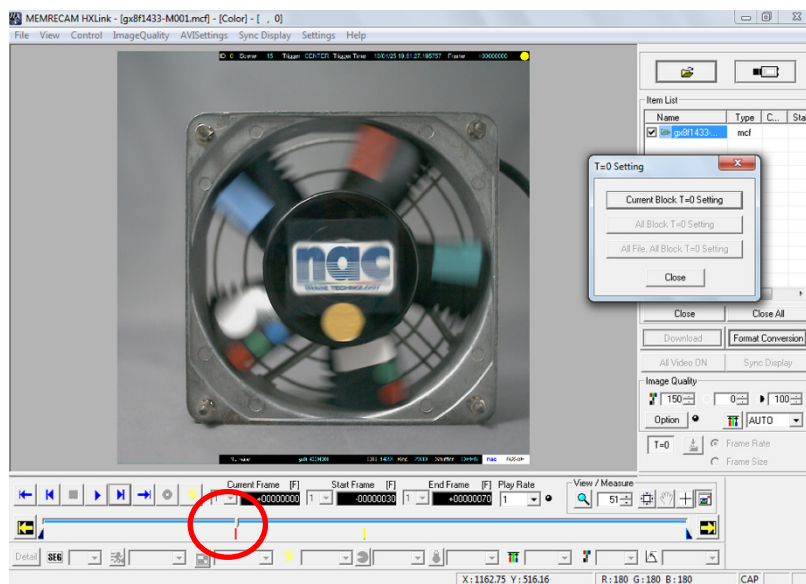
- 2) Move frame by frame to the frame where the T=0 frame is set and click "T=0".



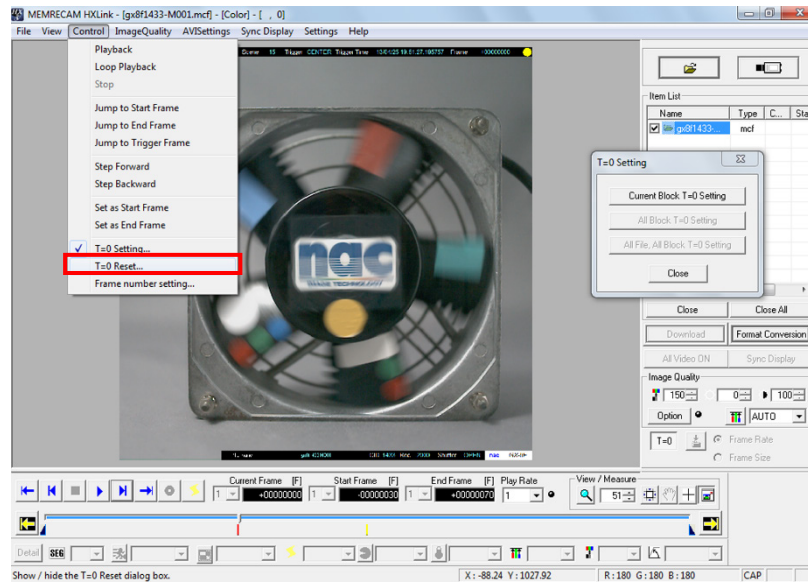
3) After the "Set T=0" dialogue is displayed, click "Set Current Block T=0".



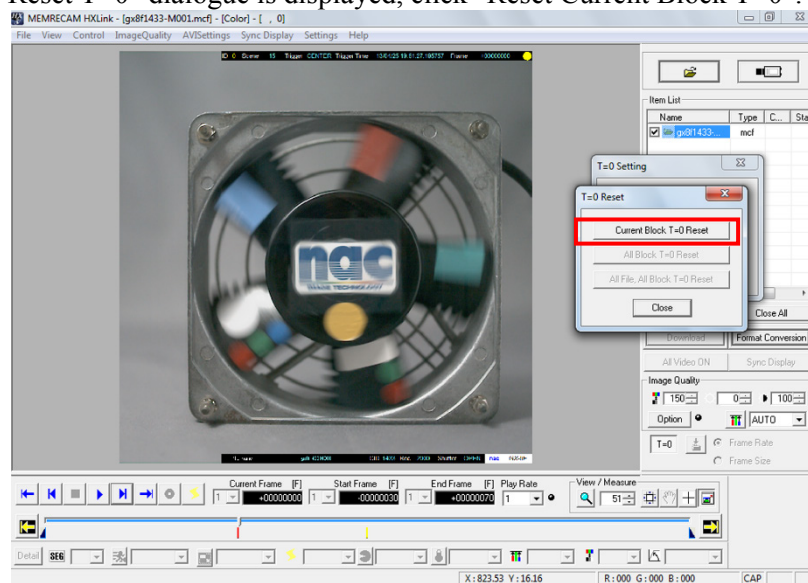
4) The T=0 frame is updated.



5) When resetting T=0, select "Reset T=0" on the "Control" menu.



6) After the "Reset T=0" dialogue is displayed, click "Reset Current Block T=0".



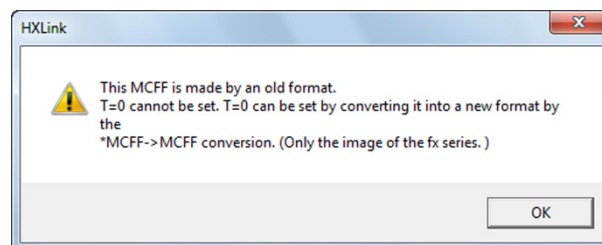
- 7) The changes to the T=0 frame made with set T=0 are disabled and it returns to the original T=0 trigger frame.



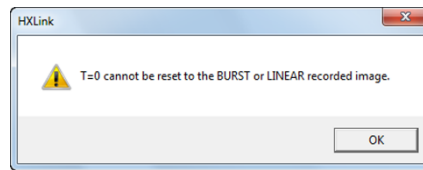
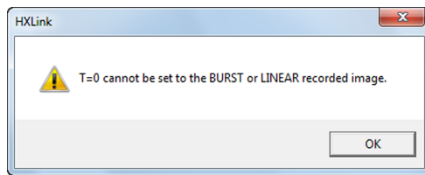
The following warning is shown for set T=0.

With fx series camera image files (MCFF), if format conversion is MCFF->MCFF, set T=0 can be used.

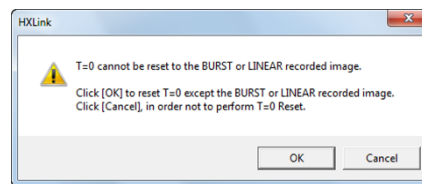
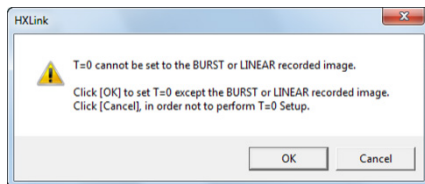
With ci series camera image files (CIF, MCFF), set T=0 is not supported.



With BURST or LINEAR recorded files, the Set T=0 / Reset T=0/ Frame number cannot be performed. With BURST or LINEAR recorded files, if Set T=0/ Reset T=0/ Frame number is performed, the following warnings are displayed.



When multiple files are open and Set T=0 / Reset T=0/ Frame number setting is performed, if there is a BURST or LINEAR recorded file, the following warnings are displayed. Click the buttons as directed in the messages.



#### ■ Set Frame Number

The current frame number can be changed.

Click "Set Frame Number" in the file "Control" menu to open the "Set Frame Number" dialogue and set the frame number.

In "Set Frame Numbers for All Files, All Blocks", if setting frame numbers for files with different frame rates, the current frame for the file displayed and the time difference for the trigger frame are newly set so all of the blocks of all of the files opened reflect the frame number and trigger frame time difference.

Set frame number has the same limitations as Set T=0.

Set frame number cannot be performed on BURST/LINEAR recorded MCFF files.

fx series camera recorded files (MCFF) must be MCFF converted.

Set frame number cannot be performed on ci series camera recorded files (CIF, MCFF).

## 5.3 Adjusting the Quality of Camera Image Files

Use the "Adjust the Image Quality" menu for images displayed on the image monitor in the MCFF format and CIF format to adjust the quality of the images displayed.

In the expert mode, use the "Item Toolbar" to set the chroma, brightness, contrast and white balance.

Image quality adjustment applies to images displayed on the image monitor and images with converted formats, and does not impact MCFF image files.

To convert the format after adjusting the quality of MCFF images, convert the quality adjusted image to the formats of AVI, TIFF or the like and then save.

Previously specified image quality parameters can be applied to image display and conversion.

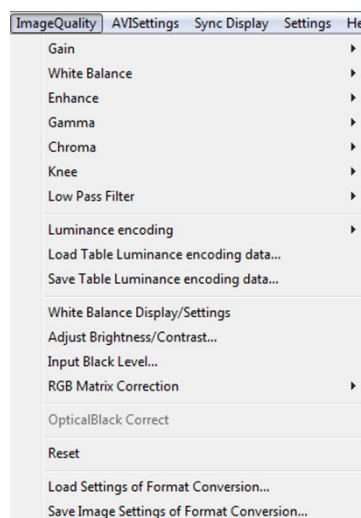
Click "Options" in the "Item Toolbar" or open the "Options" dialogue from the "Settings" menu to specify file conversion files (FCV) for automatic conversion settings.

Refer to page 7-20 for details.

When specifying the file conversion files for automatic conversion settings, "Auto Apply" turns green and once the camera image file (MCFF) is opened, the conversion files specified in the automatic conversion settings are automatically applied.



Details of image quality adjustment can be set from the "Adjust the Image Quality" menu below.



"Adjust the Image Quality" menu

## ■ "Adjust Image Quality" Menu

Items that can be set with the "Adjust Image Quality" menu are described below.

### ▪ Gain

This function supports the MEMRECAM Gain function. (\*)

Set LOW, NORMAL, HIGH in the MEMRECAM HX, GX, Q.

LOW Lower gain by one aperture.

NORMAL Normal brightness.

HIGH Raise gain by one aperture.

Set 0dB, +6dB, +12dB in the MEMRECAM ci, fx series.

0db Normal brightness.

+6db Raise gain by one aperture.

+12db Raise gain by two apertures.

\* The luminance are only enabled with NORMAL.

\* The gain cannot be changed for image files recorded when the DRES mode (dynamic range expansion shutter mode) is selected.

### ▪ White Balance

This function supports the MEMRECAM white balance function.

REG The white balance value saved in the MEMRECAM SET REG function while recording.

3100 3100K setting for lighting color temperature.

5000 5000K setting for lighting color temperature.

9000 9000K setting for lighting color temperature.

CUSTOM CUSTOM white balance setting.

Select CUSTOM for the previously set white balance value.

Select "Change Settings" to display the "White Balance" dialogue and set the white balance with pointer settings, range specification and numerical input.

Refer to page 5-18 for details.

AUTO Auto White Balance setting

Select "Select AUTO" for the value calculated in advance for white balance.

Select "Change Settings" for the calculated white balance value for the frame displayed.

Refer to page 5-20 for details.

### ▪ Enhance

This function supports the MEMRECAM Enhance function.

OFF Setting for the image as recorded.

LOW Low enhance setting.

NORMAL Normal enhance setting.

HIGH High enhance setting.

#### • Gamma

This function supports the MEMRECAM gamma correction function.

To reproduce the true image, gamma correction is conducted to correct the image data to the optimal curve corresponding to the properties of the input/output device

OFF	Setting for the image as recorded.
LOW	Low gamma correction setting.
NORMAL	Normal gamma correction setting.

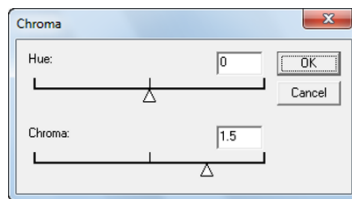
#### • Chroma

This function supports the MEMRECAM chroma adjustment function.

Adjusts the color depth of the image.

0%	Black and white setting (brightness signal only)
25%	Color depth setting of 25%.
50%	Color depth setting of 50%.
75%	Color depth setting of 75%.
100%	Setting for the image as recorded.
150%	Color depth setting of 150%.
200%	Color depth setting of 200%.
CUSTOM	CUSTOM setting for the "Adjust Color" function.

Select CUSTOM under "Chroma" in the "Image Quality" menu to display the "Chroma" dialogue and adjust the hue and chroma.



Change the settings to automatically redraw and verify the results. Click "OK" to apply.

#### • Knee

This function supports the MEMRECAM knee correction function.

Knee correction is performed to compress data in excess of the 100% level (whitewashed) for the dynamic range of the image. (\*)

ON	Knee correction setting. (normal setting)
OFF	Setting for the camera image data as displayed.

- \* The luminance is only enabled with NORMAL.
- \* Knee correction can be performed when the luminance for the image files recorded in the DRES mode(dynamic range expansion shutter mode) is NORMAL and the knee settings are OFF.

#### • Low Pass Filter

Smoothes out the image by performing low pass filter processing on the image data.

ON	Setting displaying the image subject to low pass filter processing. (normal setting)
OFF	Setting for the camera image data as displayed.

Can be used only with black/white camera images.

## • Luminance

Input/output transfer properties when the image data is displayed. Luminance cannot be set to fx cameras. Luminance cannot be set on MCFF files on ci cameras, fx RX-5 PM units and fx RX-5G PM units but luminance can be set on other HX, GX, Q and fx cameras.

NORMAL	Normal setting, image displayed with the input/output transfer properties matching the dynamic range of the camera. Gain, gamma and knee can be used.
LINEAR	Ignores gain, gamma and knee settings, and converts the camera data to linear display.
CUSTOM	Setting displaying the camera data with the specified input/output transfer properties. Specify the maximum and minimum brightness input values and gamma value to emphasize data with low luminance variance for display. Select to display the “Custom Luminance” dialogue.
TABLE	Setting to apply to a file with user specific luminance.

In the “Custom Luminance” dialogue, the brightness graph corresponding to the maximum and minimum brightness input values and gamma is displayed, which are reflected on the preview image on the monitor.

With a gamma value of 1.00, the input data for the range from the minimum brightness input value to the maximum brightness input value is converted to maximum output data values using linear properties.

Use the mouse to drag the “■” symbol on the graph to change the graph properties.

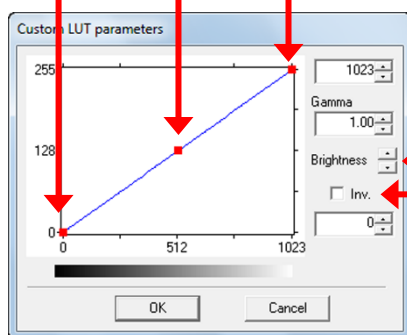
Also, each value can be directly input as a numerical value.

Drag with the left mouse button to specify the minimum

Drag with the left mouse button to adjust the Gamma value.

Drag with the right mouse button to adjust the brightness (maximum and minimum brightness input values).

Drag with the left mouse button to specify the maximum brightness input value.



Numerically specify the maximum brightness

Specify the gamma value.

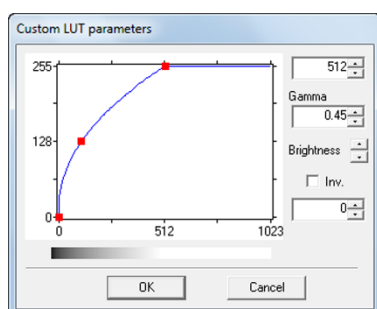
Change the brightness.

Reverse negative and positive.

Specify the minimum brightness input

Click “OK” to see the settings and close the window.

Click “Cancel” to close the window without changing the settings.



If the gamma value is changed, non-linear input/output transfer characteristics can be specified.

With the GX camera, the normal gamma settings are matched with the TV standards to create a gamma value of 0.45.

If the custom luminance are set to that shown in the figure to the left, the dark sections can be displayed brighter.

- Load the Luminance TABLE Data  
Loads the saved luminance TABLE data.
- Save the Luminance TABLE Data  
Saves the saved luminance TABLE data.

#### Luminance TABLE Data

The file becomes a text file.

The header is the amount of data, followed by the data.

	A	B	C	D	E
1	4086				
2	64				
3	65				
4	66				
5	67				
6	68				
7	69				
8	70				
9	71				
10	72				
11	73				
12	74				
13	75				
14	76				
15	77				



	A	B	C	D	E
4087	4085				
4088	4085				
4089	4085				
4090	4085				
4091	4085				
4092	4085				
4093	4085				
4094	4085				
4095	4085				
4096	4085				
4097	4085				
4098					
4099					

Example of an EXCEL TABLE Data File

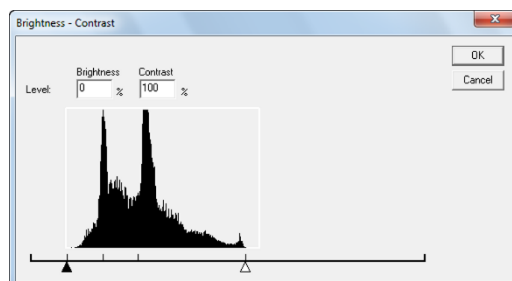
#### ▪ Adjust Brightness

Image Brightness : Function to adjust the brightness and contrast.

Click "Adjust Brightness" on the "Adjust Image Quality" menu for the "Adjust Brightness" dialogue to adjust the brightness.

Use "Adjust Image Quality" in the main tool bar to adjust the brightness  and contrast  .  
(Expert Mode only)

There is a method to numerically input brightness (black level: 0% position) and contrast (gain) and a method of specifying by using the mouse to drag the ▲:black level : 0% position and the △:white level: 100% position.



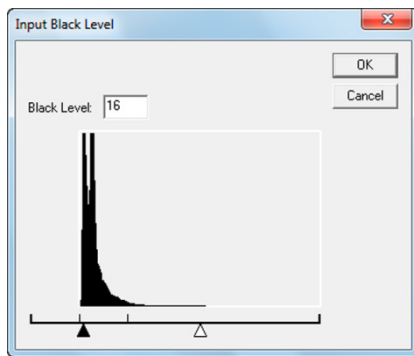
Change the value to redraw the image and confirm the effect.  
Click "OK" to apply the set brightness and contrast.

- Adjust Input Black Level

This is a function to adjust the black level of the input image.

Click "Adjust Input Black Level" on the "Adjust Image Quality" menu for the "Adjust Input Black Level" dialogue to adjust the input black level.

There is a method to numerically input the black level (0% position) and a method of specifying in the "Adjust Input Black Level" by using the mouse to drag the ▲: black level:0% position and the △: white level:100% position.



Change the settings to automatically redraw the image and verify the results. Click "OK" to apply the set brightness.

- RGB Matrix Correction

Conducts RGB matrix correction on the image data.

ON	RGB matrix correction setting.
OFF	Setting for no RGB matrix correction.

- Reset

Click "Reset" on the "Adjust Image Quality" menu to reset the image quality adjustment settings to the settings saved in the MCFF file (image quality settings when the camera image was saved as a scene).

- Save Conversion Settings

Saves the settings and conversion range for image quality adjustment set for the MCFF displayed in the "File Conversion Settings (FCV)".

Refer to Appendix B for details of "File Conversion Settings (FCV)".

- Load Conversion Settings

To set the saved conversion settings for the MCFF image, click "Load Conversion Settings" in the "Adjust Image Quality" menu to load the conversion settings specified in "File Conversion Settings (FCV)".

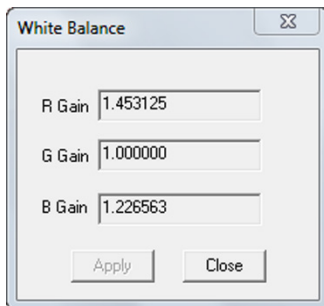
Refer to Appendix B for details of "File Conversion Settings (FCV)".

#### ▪ White Balance Display/Settings

Open the "White Balance" window.

When "White Balance" is selected in CUSTOM, the RGB gain for the white balance gain can be set. Otherwise, the RGB gain value can only be set for display.

Refer to 5-18 ~ 5-20 for details on the CUSTOM white balance and the auto white balance.




#### ■ Custom White Balance Function

Function to obtain the white balance by specifying the range of the displayed image or the white balance RGB gain value.

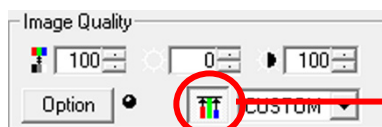
Any of the following can be used to set the white balance using "Custom White Balance".

- Click White Balance ->CUSTOM ->Change Setup on the "Adjust Image Quality" menu.

- Select "CUSTOM" and click  "Start Custom White Balance" in the "White Balance" pull-down menu for the image quality adjustment section of the "Item Toolbar".

(Expert Mode only)

In the Custom White Balance mode, check "White Balance" -> "CUSTOM" -> "Change Settings" in the "Adjust Image Quality" menu to access the mode where the display of the "Start Custom White Balance" for the image quality adjustment section of the "Item Toolbar" has been pressed.



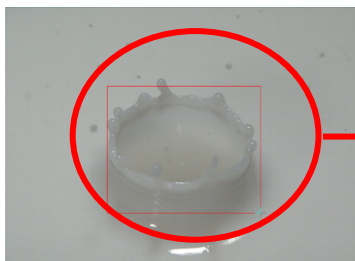
"Start Custom White Balance" has been pressed.

## Custom White Balance Specification Method

### ▪ Point Setting

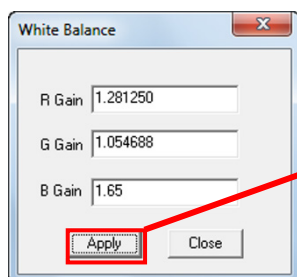
In the Custom White Balance mode, move the cursor to the white section of the image being displayed and click the left mouse button to obtain the white balance value for the point at the center of the cross-hatched cursor and then the entire image displayed will be redrawn.

### ▪ Specify Region



Drag the mouse to a specific region to obtain the white balance value for that specific region and then the entire image displayed will be redrawn.

### ▪ Numerical Input




Input the RGB gain value in the "White Balance" window and press "Apply" to obtain the white balance value for the RGB gain value input and then the entire image displayed will be redrawn.

Click "White Balance" -> "CUSTOM" -> "Select CUSTOM" in the "Adjust Image Quality" menu and the white balance value will be the value set in Custom White Balance.

Click "Select CUSTOM" when the CUSTOM white balance setting hasn't been changed and the CUSTOM white balance value will be the white balance value equivalent to 5000K, and then the entire image displayed will be redrawn.

Click "Select CUSTOM" when the CUSTOM white balance setting has been changed and the CUSTOM white balance value will be the changed white balance value and then the entire image displayed will be redrawn.


The CUSTOM white balance value is saved until the MCFF is closed.

To cancel the CUSTOM White Balance mode, either select something other than "CUSTOM" for "White Balance" in the "Adjust Image Quality" menu or click  "Start White Balance" for the image quality adjustment section of the "Item Toolbar".

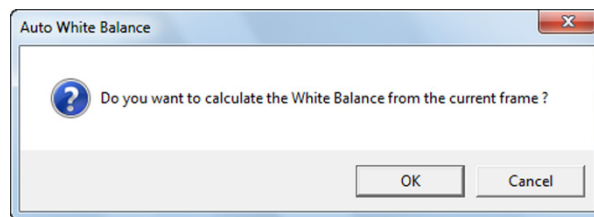
### ■ Auto White Balance Function

The auto white balance function calculates the appropriate RGB gain value from image currently displayed.

Any of the following can be used to calculate the appropriate RGB gain value using the auto white balance.

- Click "White Balance" -> "AUTO" -> "Change Settings" on the "Adjust Image Quality" menu.
- Select "White Balance" in the image quality adjustment section of the "Item Toolbar", select AUTO, and then click  "Start White Balance".

Click "AUTO" -> "Change Settings" in the "Adjust Image Quality" menu to display the following confirmation dialogue.



Click "OK" to calculate the proper RGB gain value from the currently displayed image, which will be reflected on the image.

If the auto white balance hasn't been set, click "White Balance" -> "AUTO" -> "Select AUTO" on the "Adjust Image Quality" menu to calculate the proper RGB gain value from the auto white balance value of the MCFF top frame and display on the image.

If the AUTO settings are changed, click "Select AUTO" to display the RGB gain image from the previous "AUTO" selection.

### ■ Auto Conversion Settings

When opening a MCFF format or a CIF format, files can be opened to reference the file conversion settings (FCV) for the image quality adjustment, conversion settings and specified range settings and the image is displayed with the details in the conversion setting file.

Click "Options" on the "Setting" menu to specify the automatic conversion settings ON/OFF under the auto conversion settings tab in the "Options" dialogue. Automatic conversion settings can be specified even when "Options" is clicked in the image quality adjustment section of the "Item Toolbar". Refer to page 7-20 for details.

### ■ File Conversion Settings (FCV File)

Save the settings for image quality adjustment and conversion settings for saving the converted range in "File Conversion Settings (FCV)" and these settings can be reused.

Load the FCV file and the item settings in the file can be employed.

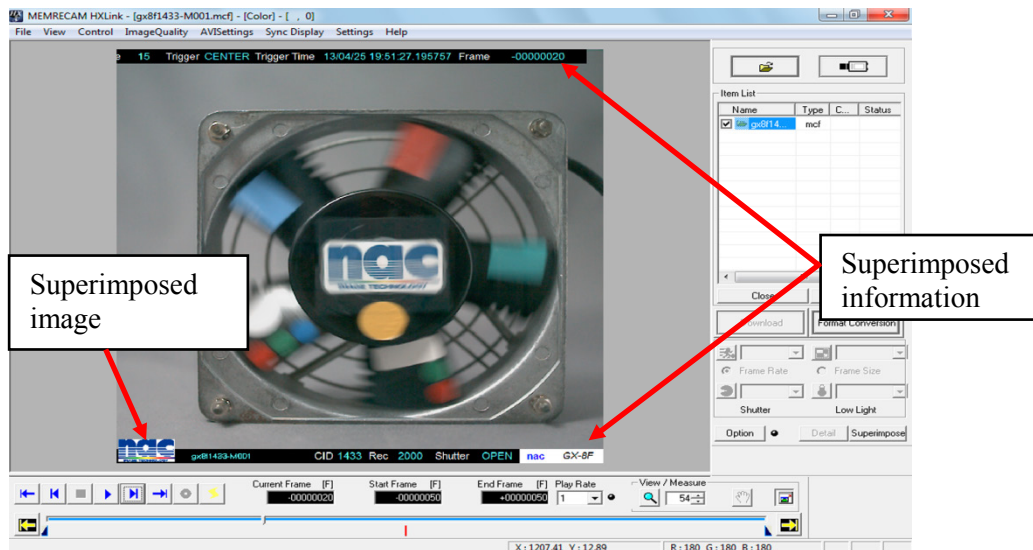
Items not requiring setting should be disabled or deleted.

Refer to Appendix B for FCV details.

The FCV files may be changed without prior notice.

## 5.4 Conversion Settings

Camera images can be cropped to the desired image, and recorded information or images can be superimposed for display and conversion.



Superimposed information refers to photographic information on the camera that is superimposed on the converted image.

Superimposed images refers to superimposing a selected image file such as a logo on the converted image.

Cropping refers to cutting out a portion of the MCFF file.

The MCFF image displayed on the image monitor is the image that reflects the conversion settings. Conversion settings work for images displayed on the image monitor but do not impact the MCFF image file.

The superimposed information function is set with the conversion settings menu or with "Superimpose Information" on the "Item Toolbar" (Basic Mode only).

Superimposed information and display settings cannot be applied to each MCFF for settings that are common to all MCFF.

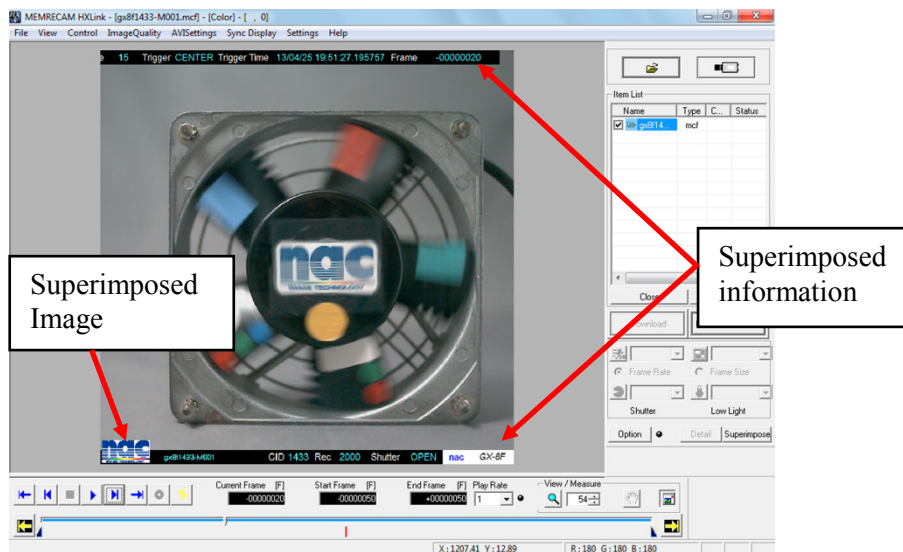
Changing the superimposed information settings by using the menu or by conversion file settings (FCV files) applies the settings to all of the MCFF that are open.

The font size for the superimposed information can be set for each MCFF.




Cropping is set for each MCFF.

## ■ Superimpose Information

Specify the information to be superimposed in "Conversion Settings".

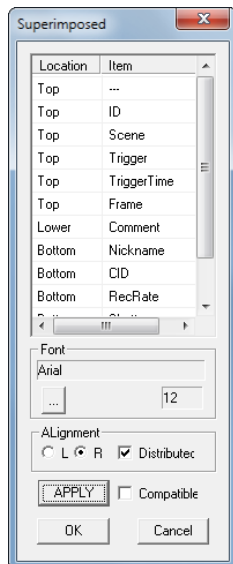


Items related to "Superimpose Information" on the "Conversion Settings" menu

Superimpose	<p>Select information to be superimposed on the converted image. (None, Frame, All, Custom)</p> <p>If "All" is selected, the "ID", "Scene", "Trigger Timing", "Trigger Time", "Frame Number", "Nickname", "CID" (camera identification number), "Frame Rate", "Shutter Speed", "Event Frame" and "Camera Type" are superimposed on the image.</p> <p>If "CUSTOM" is selected, you can specify the superimposed items, their locations and a character font of the items. Refer to the next page for details.</p>
Frame Display	<p>Select the format for the frame number. (Frame, Relative Time (sec), Relative Time (msec), Absolute Time, Relative Time (CUSTOM))</p> <p>If Relative Time (CUSTOM)" is selected, the unit of the time and the number of digits on decimal part can be specified.</p>
Comment Display	Select the recording comments to be superimposed on the converted image.
Comment Position	Select the position where the recording comments are superimposed. (Top left, bottom left, top right, bottom right)
IRIG Lock, Event 2 Display	<p>Check it to superimpose "IRIG lock status" and "EST2 signal ON/OFF status" for the current frame.</p> <div style="display: flex; align-items: center;"> <div style="margin-right: 10px;">      </div> <div> <p>IRIG signal locked (green)</p> <p>IRIG signal not locked or M-HUB in use (red)</p> <p>EST2 signal ON</p> </div> </div>

FontSize	Select the font size for the superimposed information.	
	Small	For image sizes of 512x512 and 640x480.
	Medium	For image sizes of 768x592
	Large	For image sizes of 1280x1024
	Extra Large	For image sizes of 2560x1920

### The superimposed item selection window



**Location:** Specifies the line of the superimposed item.  
**Top:** superimposed on the top line of the image.  
**Upper:** superimposed on the next line of the Top.  
**Lower:** superimposed on top of the previous line of the Bottom.  
**Bottom:** superimposed on the bottom line of the image.  
 Items specified in the same line are superimposed from left to right.

**Item:** Select the superimposed item.  
 When you click the table pull-down menu will appear.  
 Select the item in the menu.  
 One of the items cannot be superimposed multiple times.  
 If you specify twice the item, the top item in the table is enabled.

**Font button:** Open the window to specify the font.  
 Specify the font type, size, style and color.

**L button:** superimpose the items in the left-justified.  
**R button:** superimpose the items in the right-justified.  
**Distributed:** If the multiple items specified on a single line, it aligns both ends.

**compatible:** superimpose the items in the conventional arrangement.

**Apply:** superimpose the items on the image.

**OK:** superimpose the items on the image, and then close the window.

**Cancel:** return to the state before opening the superimposed item selection window, and then close the window.

■ "Superimpose Information" on the "Item Toolbar" (Basic Mode only)

When using the "Basic Mode", if "Superimpose Information" on the "Item Toolbar" is pressed, select "All" in "Select Superimpose Information" to enable "Recording Comments".

To cancel, select "None" in "Select Superimpose Information" to disable "Recording Comments".

■ Superimpose Image

Specify the image to be superimposed in the "Conversion Settings" menu.

Items related to "Superimpose Image" in the "Conversion Settings" menu.

Superimpose Image	Check to superimpose the image for the specified file on the converted image.
-------------------	---

Select File to Superimpose Image

Select the image file (BMP, JPG) to be superimposed on the converted image.

Click to display the "Open File" dialogue, select the file to be used and then click "OK".

Superimposed Image Size

Select the superimposed image size that corresponds to the image size.

Small	Enlarges/reduces the width of the superimposed image to about 80 pixels.
Medium	Enlarges/reduces the width of the superimposed image to about 120 pixels.
Large	Enlarges/reduces the width of the superimposed image to about 180 pixels.
Actual Size	Superimposes without enlarging/reducing the superimposed image.

Superimposed Image Position

Select the superimposed image position to be superimposed on the converted image.

Upper Left/Lower Left/Upper Right/Lower Right

## ■ Cropping

“Crop” cuts the camera image to the desired range so the image can be shrunk.

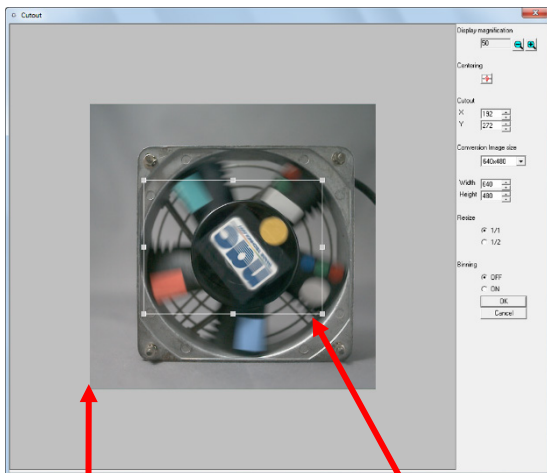
Click “ON” in “Crop” in the “Conversion Settings” to crop.

Click  on the “Main Toolbar” to crop. (Expert Mode only)

If “Crop” is ON, the window for cropping opens to specify the area to be cropped.

In the “Crop” window, specify the range of the image to be cropped and resizing settings to reduce the image after conversion. If the converted image size is larger than the cropped image, a gray area is shown on the cropped image, and information can be superimposed without blocking the image.

If “Crop” is OFF, the settings are disabled and the original image is shown.




Coordinate origin specified  
for the cropping

### ▪ Display Magnification

Select a display magnification from 50,100,200,400%

(This display magnification is not reflected on the converted image)

### ▪ Center

Click  to move the center of the image to the center of the cropped range

### ▪ Crop Position

Numerically specify the coordinates for the lower left corner of the range to be cropped.

(the coordinate origin is the lower left corner of the image shown)

### ▪ Converted Image Size

Select the converted image size from previously set sizes

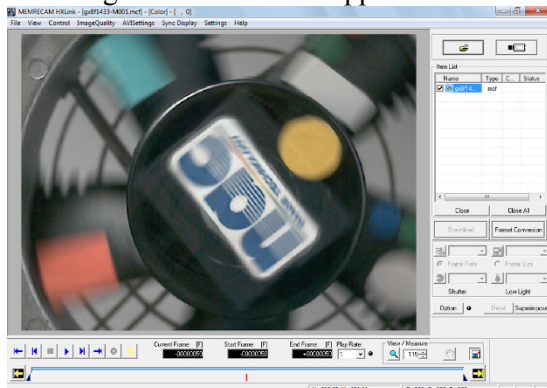
Numerically specify the width and height of the converted image size

### ▪ Resize

Select the resize settings for the cropping and conversion.

Specify the range to be cropped by dragging the frame with the mouse. Right click the mouse in the “Crop” window to change the frame color.

The image shown for the cropped converted image is as follows.



### Caution

If cropping, reversing and rotating the image, select the crop settings.

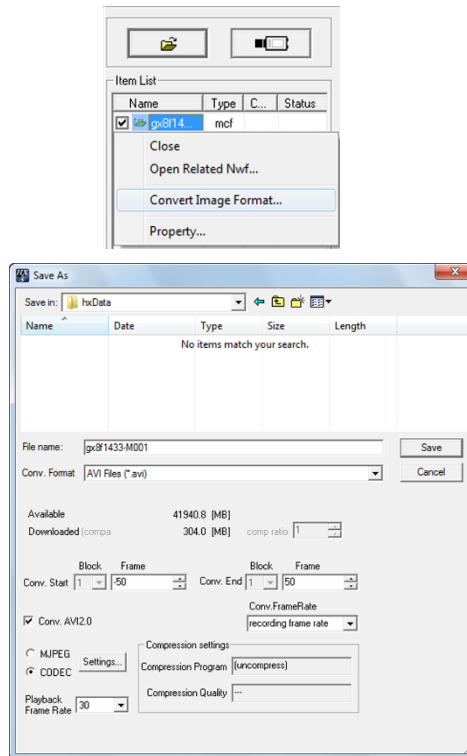
If reversing or rotating the image after cropping, the cropping settings are disabled after setting.

## 5.5 Format Conversion

### • Conversion from MCFF, CIF

Camera images (MCFF format, CIF) can be converted to AVI, BMP, TIFF, JPEG and MCFF formats.

Either select MCFF data displayed on the "Item List" and then select "Convert Format" on the right click menu or click "Options" on the "Setting" menu to set the format conversion display on the "GUI Settings" tab to "Individual Conversion" and display the "Save As" window to save the converted file.



Set the type of file, save folder for the converted file and file name, and then click "Save" to convert.

The conversion frame rate saved is the specified frame rate that culls frames during format conversion. Refer to page 5-31 for details.

The playback rate is effective when the type of converted file is an AVI file.

There is no correlation with the image quality of the AVI file created during format conversion.

The playback frame rate is the AVI file frame rate used with the Windows Media Player and Adobe Premiere.

If file formats (AVI, JPEG) to compress the image are selected, "Compression Rate" is used to calculate the file size. The size of the file to be saved is the value from the "Compression Rate" for the file size created without compression.

### Conversion with AVI2.0

Check to save an AVI file using the "AVI 2.0" format.

Remove the check to save the AVI file using the "AVI 1.0" format.

Since the AVI 1.0 format has a file size limitation of 2GB, if converting images for long recording times, select AVI 2.0.

The saved file is shown in "Saved Sizes (Target)" and when saving starts, HXLink checks to see if there is free space in the memory.

**Caution** With "Compression Rate", the file size is a target. The actual file size varies according to the CODEC used for compression.

The types of files where the format can be converted are as follows.

AVI	Color 24bit AVI
TIFF (Monochrome 8bit)	Monochrome 8bit TIFF
TIFF (24bit)	Color 24bit TIFF
BMP (Monochrome)	Monochrome 8bit BMP
BMP (24bit)	Color 24bit BMP
JPEG	Color 24bit JPEG
Meff	MCFF
TIFF16 (RAW)	Monochrome 16bit TIFF
TIFF16 (Monochrome 16bit)	Monochrome 16bit TIFF
TIFF48 (48bit)	Color 48bit TIFF

Conversion to MCFF is used with the objective of reducing the range to be saved. Settings such as adjusting the image quality and image cropping are not reflected.

Open the recorded MCFF in the DRES Mode and set the image quality luminance to LINEAR. Convert to TIFF16 (Monochrome 16bit) or TIFF48 (48bit) and use the DRES mode to convert to the current brightness data before compressing with dynamic range expansion.

Select TIFF16 (RAW) to output the MCFF data not subject to image quality adjustment in 16bitTIFF. This applies to measuring brightness with a black/white camera.

To specify TIFF (Monochrome 8bit), BMP (Monochrome), TIFF16 (Monochrome 16bit) and convert to the color camera image converted format, convert to Chroma0% black and white images.

Black/white16bit TIFF and color 48bit TIFF are converted to a black level of 128.

**Caution** With HXLink, TIFF16 (Monochrome 16bit), and TIFF48 (48bit) cannot be opened. The images can be viewed with Adobe PhotoShop.

**Caution** With GXLink, TIFF16 (Monochrome 16bit), and TIFF48 (48bit) cannot be opened. The images can be viewed with Adobe PhotoShop.

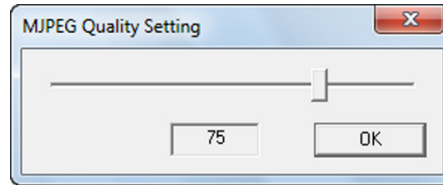
- Cropping, superimpose information, superimpose images, image reversal and image rotation are not possible.
- Format conversion cannot be performed on ci series image files.
- Format conversion to TIFF16 (Monochrome 16bit), TIFF48 (48bit) is not possible with conversion algorithm methods A and C. Select method B.

When converting to AVI, the compression/decompression codec can be selected. Compression settings include "MJPEG" and "CODEC".

- "MJPEG"

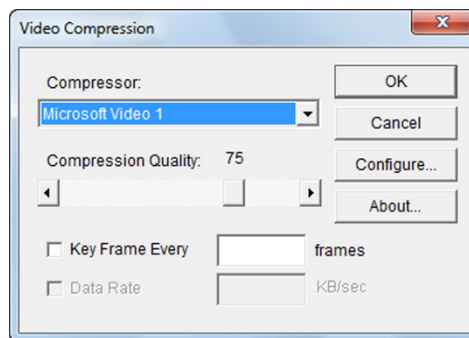
Converts to Motion JPEG AVI files without using codec.

Press "Setting" to display the "MJPEG Quality Setting" dialogue and change the magnification.



- "CODEC"

Converts to AVI files using codec.



"Compression Program"

Select codec used for conversion.

"Compression Quality"

Changes the magnification.

"Key Frame"

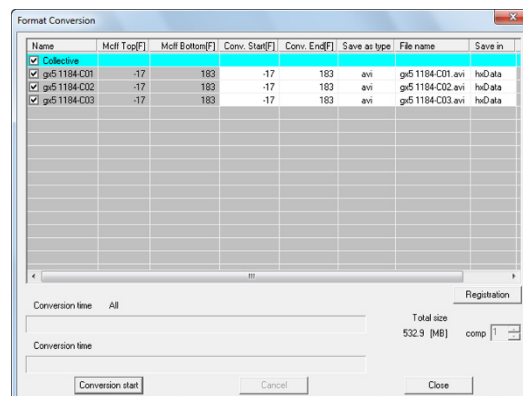
The entire screen is converted at each frame set. That frame becomes the standard, with the subsequent frames recording only that portion so the size needed for recording is reduced. This is not performed unless the box is checked.

"Data Rate"

Sets the data transfer rate. In the same manner as "Key Frame", this is not set unless the box is checked.

Codec may not allow changes to "Key Frame" and "Data Rate".  
Also, press "Configure" for codec with more detailed settings.  
Contact the codec manufacturer for questions relating to codec.

Click options on the "Settings" menu and if the "List" is selected for format conversion on the "GUI Settings" tab, select the MCFF data to be converted from the item list and click on "Format Conversion" to display the "Format Conversion" dialogue for saving converted files.



"Format Conversion" dialogue

Double click on each cell of the table to change the settings.  
 Settings can only be made for those items not shown in gray.  
 Parameters can be set for all of the MCFF in the "Batch" row.  
 Parameters can be set for the selected MCFF in each MCFF row.  
 The following five items can be set in the "Format Conversion" dialogue.



Format conversion for the MCFF checked.  
 Remove the check if there will be no format conversion.

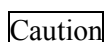
Start Conversion [sec]  
 [F] Start time/frame for the conversion range.  
 Units for the absolute time setting are seconds. Can be specified up to one microsecond. The frame setting can be set at single frame units.  
 With multi trigger recording, the conversion start time/frame is set for all blocks.

End Conversion [sec]  
 [F] End time/frame for the conversion range.  
 Units for the absolute time setting are seconds. Can be specified up to one microsecond. The frame setting can be set at single frame units.  
 With multi trigger recording, the conversion end time/frame is set for all blocks.

Save As Specifies the type of file after conversion (AVI, TIFF, JPEG, BMP, MCFF). The default setting can be made from "Options" in the "Settings" menu. Refer to page 7-21 for details.

If selecting the compression file format (AVI, JPEG) for the image, the "Compression Rate" is used to calculate the file size. The size of the file to be saved is the "Compression Rate" value of the file size created without compression.

The total for the saved file is show in the "Total Saved Size" and HXLink checks for free space in the memory when starting the conversion.



With "Compression Rate", the file size is a target. The actual file size varies according to the CODEC used for compression.

File name                      File name after format conversion

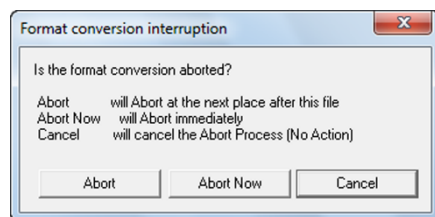
Save Folder                      If specifying either TIFF, JPEG or BMP in the "File Type" folder where the files with the converted format are saved, a folder for "Save File As" will be created under the specified folder, and the TIFF, JPEG or BMP will be created in that folder.

Conversion start

Start MCFF format conversion for those checked.

Cancel

Select the abort process from the dialogue shown below.



Abort

Formatting in progress continues but subsequent format conversions are cancelled.

Abort Now

Immediately aborts format conversions.  
Cancels subsequent format conversions.

Cancel

Does not abort format conversion.

Cancel

Closes the "Format Conversion" dialogue.

Registration

Create a batch conversion setting file for "Batch File Conversion".  
Refer to page 11-3 for details.

With the default settings, if the format converted data is saved in a file, the files will be automatically registered in the item list for selection. This format converted image is shown on the monitor. (To prevent the converted file from being opened after format conversion, set with "Default Conversion Settings" in "Options" on the "Settings" menu)  
However, when converting to 16bit/48bit TIFF files, the TIFF files cannot be opened. HXLink cannot open 16bit/48bit TIFF files for display.

#### Setting Fixed Values during Format Conversion

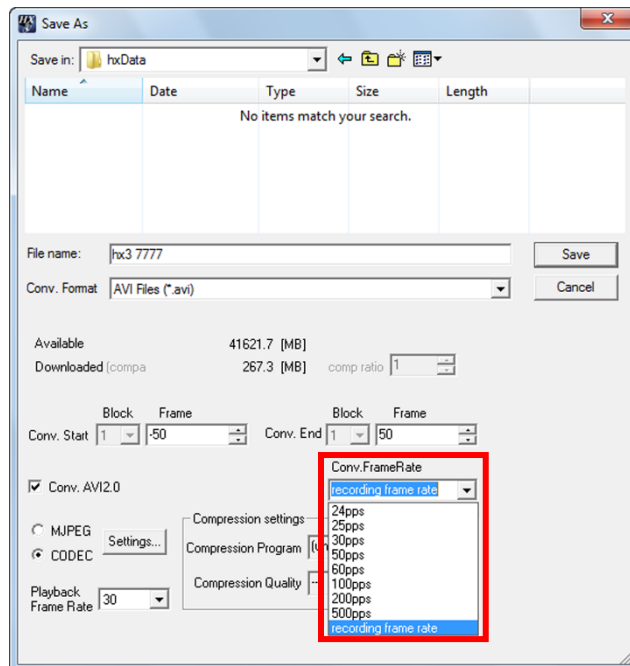
Click "Options" on the "Settings" menu to set fixed parameters used for format conversion. Refer to page 7-21 for details.

#### • BMP Conversion

Use "Batch File Conversion" to convert from image files (BMP) to AVI format. Refer to page 11-12 for details.

- Frame Rate Conversion

During format conversion, the frame is culled and is converted to the image file for the specified frame rate.



Culling is performed with the T=0 frame as the standard frame, and is subject to frame rate conversion.

When converting the frame rate for 1000pps camera images (frames -100~100) to 500pps, MCFF frames -100, -98, -96, ..., -4, -2, 0, +2, +4, ..., +96, +98, +100 are converted.

The specified frame rate for frame rate conversion can be set using the following two methods.

- Specify with the "Default Conversion" tab in "Options".
- Specify the frame rate with the abovementioned "Individual Conversion" GUI.

The frame rate can be selected from the pull-down menu for "Conversion Frame Rate" or by setting a value in "Conversion Frame Rate".

When converting the frame rate, the frame counter display of the relative time or the absolute time shown by the superimposed information may vary.

The superimposed time is the time read from the file for video recorded, prior to conversion while the frame counter display is the time calculated from the converted frame rate.

**Caution**

When converting formats to MCFF, the frame rate is not converted.

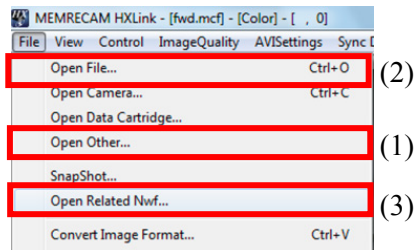
## 5.6 Waveform Data

If the optional “MEMRECAM Waveform Input Software” (reference number: 584350-1) is used, it is possible to input analog data (waveform data) during recording, and save the waveform data in files (NWF). HXLink can display a graph of this NWF file or CSV file waveform data with an image. Also, waveform data printing and CSV output is possible.

### ■ Open Waveform Data

The following three methods are available for opening waveform data files.

- (1) Open a waveform file
- (2) Open an image file and a waveform file simultaneously (automatic)
- (3) Open an image file and a waveform data file not in the same folder simultaneously (manual)



#### ▪ Open a Waveform File Independently

Select “Open Other” from the “File” menu and specify a waveform file.

If opening a waveform file independently, none of the image display area is displayed.

#### ▪ Open an Image File and a Waveform File Simultaneously (Automatic)

When HXLink opens an image file and if there is a waveform file in the image file folder, the image file and the waveform file are opened and displayed.

HXLink searches for a folder with the specified image file and opens the file with the extension of nwf as a waveform data file. The file name for the searched waveform data file has the same name as that of the image file, the same file name as the prefix of the image file name and has a file name that includes \_all on the files. NWF files with file names of \_all indicate that all of the recorded range has been saved.

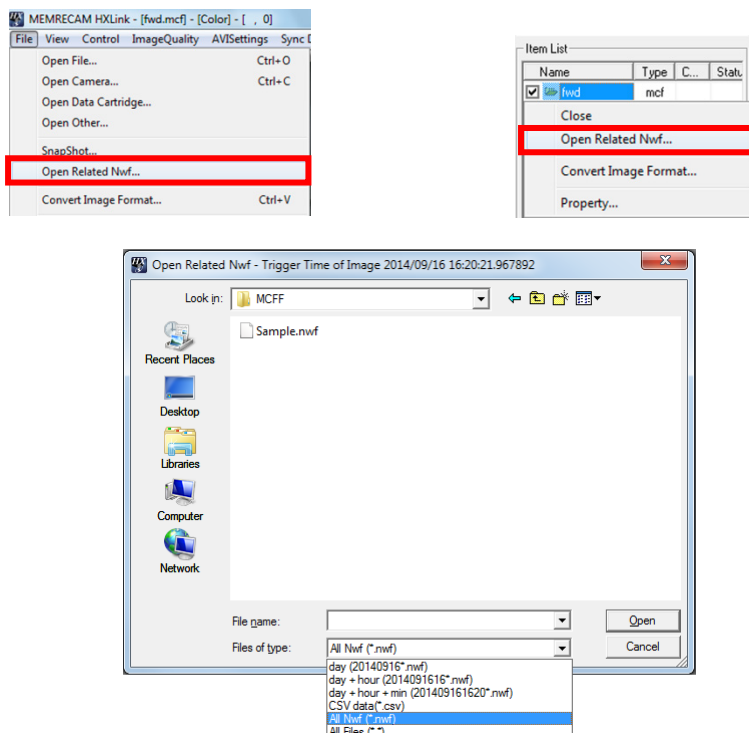
The waveform input software that saves NWF files adds \_all to the waveform file name if the waveform data in the entire recorded range has been saved. Also, the waveform input software adds \_ as a prefix to the name of the downloaded camera image file if there are two or more cameras recording.

Example)

- An image file name containing \_ (file name when recording with multiple cameras)  
(The specified prefix when the waveform data file was saved was Sample)  
Image file name      Waveform file name  
Sample\_file.mcf      Sample.nwf      or      Sample\_all.nwf
- An image file name not containing \_ (file name when recording with one camera)  
Image file name      Waveform file name  
file.mcf      file.nwf      or      file\_all.nwf

#### (4) Open an Image File and a Waveform Data File not in the Same Folder Simultaneously (Manual)

If saving MCFF waveform data saved on a USB to a PC, if the image file and the waveform data file are not in the same folder, or if the file name and prefix are not the same, to simultaneously display the image and the waveform, right click the file menu or item list to display the “Open Related Waveform Files” dialogue and specify the waveform data file.



The waveform data file can be opened in year/month/day of the trigger time, time in year/month/day or time in year/month/day/minutes with the “File Type” in the “Open Related Waveform Files” dialogue.

##### File Type

day

day + hour

day + hour + min

CSV data

All Nwf

All Files

##### Waveform Data File Shown in the Dialogue List

The nac waveform data file name is the same file as the year/month/day of the image file trigger time

The nac waveform data file name is the same file as the year/month/day/time of the image file trigger time

The nac waveform data file name is the same file as the year/month/day/minute of the image file trigger time

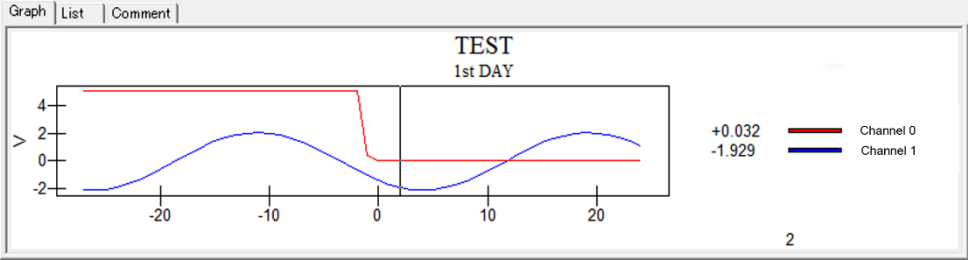
The CSV waveform data files  
(The file is exported from the Data Logger.)

All of the nac waveform data files

All of the waveform data files

Open the waveform file and the waveform data is displayed under the image display. The waveform data display can be switching between Graph, List and Comment.

Show Waveform Data Graph



With the graph display, the waveform data is shown in a graph. The range of data displayed can be modified in the graph display. Display settings are saved to the waveform file (NWF). Refer to the description of the “Graph Display Settings Dialogue” on page 5-38 for details of graph display settings. Click the mouse cursor on the graph to move the current location to the clicked location. The position of the current frame on the playback slider also moves and when an image file is open, it changes to the image and the current frame. Use the mouse cursor to drag and specify a rectangle on the graph to zoom a specific range.

Show Waveform Data List

Graph List		Comment		
Sample No	Time[sec]	Channel 0 [V]	Channel 1 [V]	
-7	-0.007000	5.078735	1.339417	
-6	-0.006000	5.077209	0.989075	
-5	-0.005000	5.078125	0.593567	
-4	-0.004000	5.077209	0.175781	
-3	-0.003000	5.076904	-0.258484	
-2	-0.002000	5.076904	-0.675354	
-1	-0.001000	0.346680	-1.060486	
0	0.000000	0.031738	-1.411133	
1	0.001000	0.032043	-1.708374	
2	0.002000	0.031738	-1.929016	

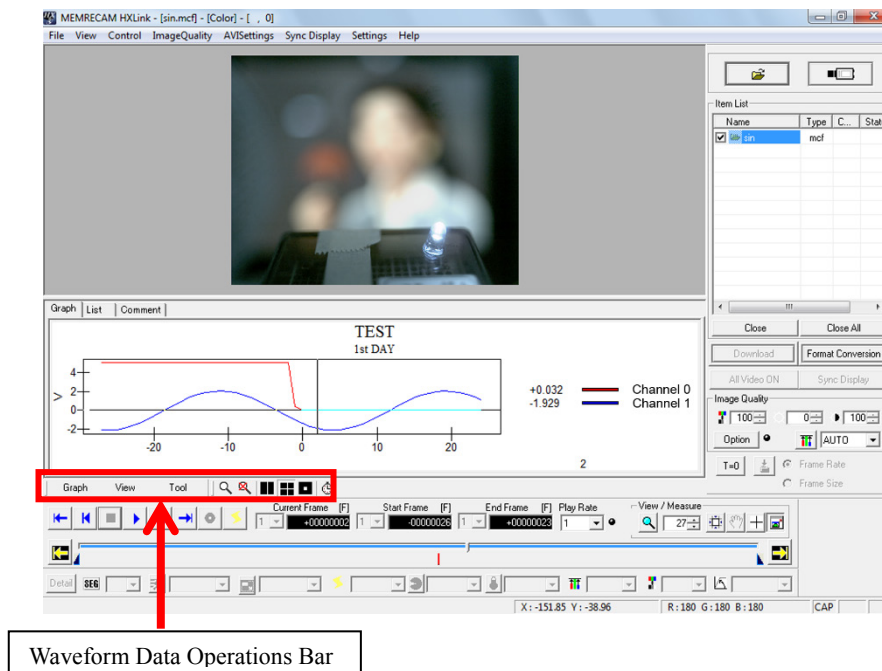
The waveform data cannot be changed on the list display. Click on the list row to move to the current position to the clicked position.

Show Waveform Data Comments

Input text as waveform data comments in the comments. The input text is saved in a waveform file (NWF). Immediately after recording, the comments are cleared.

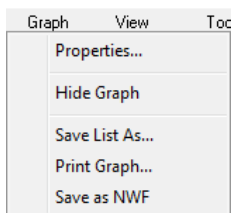
## ■ Waveform Data Operation Bar

Waveform data operation is performed with the “Waveform Data Operation Bar”.  
The “Waveform Data Operation Bar” is under the waveform data display.



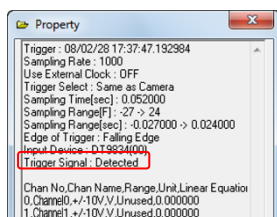
### □ Graph

Click **Graph** on the “Waveform Data Operations Bar” to display the following menu.



#### • Show Graph Information

Shows the settings during waveform data sampling.



#### Example of “Graph Information”

In “Detect Trigger” the waveform input device can confirm detection of the trigger.

If the waveform input device cannot detect the trigger, the “Detect Trigger” indicates “Not Detected”.

#### • Show/Hide Graph

Shows or hides the graph waveform data.

#### • Save List As

Contents of the list are saved to a comma delimited (CSV) or tab-delimited (TSV) file

#### • Print Graph

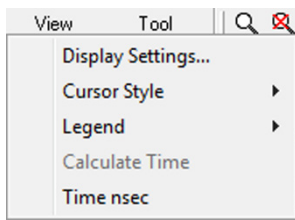
Prints the graph

#### • Save as NWF

Convert a CSV waveform data file to a NWF waveform data file.

□ View

Click **View** on the “Waveform Data Operations Bar” to show the following menu.



▪ **Graph Display Settings**

Opens the “Graph Display Settings” window.

The “Graph Display Settings” dialogue settings are saved in the waveform file.

Refer to page 5-38 “Graph Display Settings Dialogue” for details.

▪ **Cursor Style**

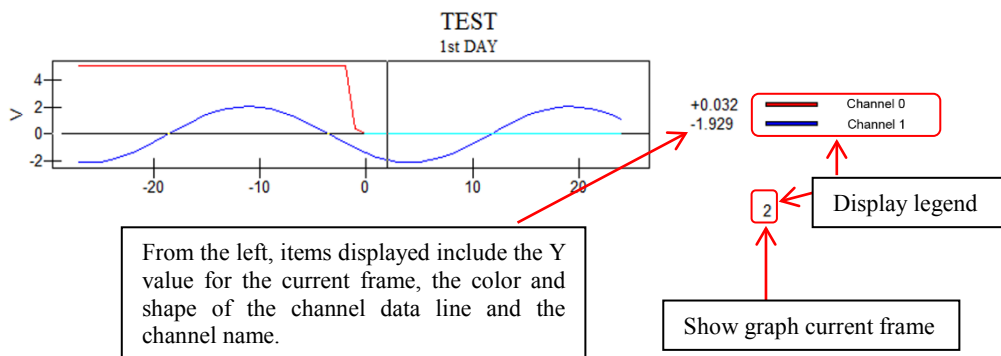
Selects the style of the cursor for the current frame on the graph.

(Vertical Line, Cross, Square)

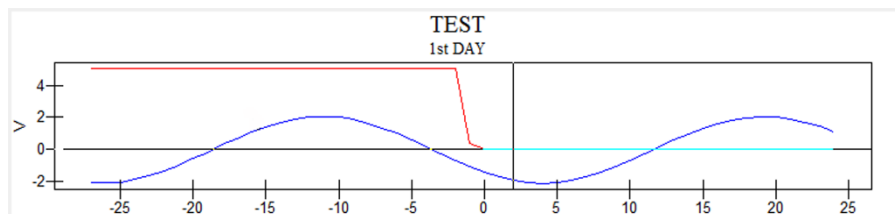
▪ **Legend**

Turns the graph legend ON/OFF.

Legend ON Graph Display

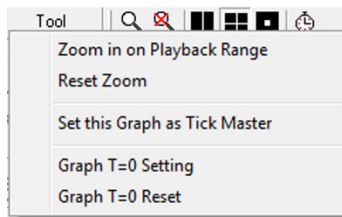


Legend OFF Graph Display



## □ Tool

Click  on the “Waveform Data Operations Bar” to display the following menu.



### • Zoom in on the Playback Range

Zooms only the waveform data corresponding to the image playback range.

### • Reset Zoom

Cancels the zoom and displays all of the recorded waveform data.

Set this Graph as Timing Standard during Playback

Sets the standard frame rate as the waveform data sampling frequency.

With an image frame rate of 1000pps, and a waveform data sampling frequency of 10,000Hz, if played back at a frame rate of 30fps, the waveform data will play at 30 per second and the image will update three times per second.

### • Set Graph T=0

Set current graph T = 0 time to image frame.

Image T = 0 does not change.

### • Reset Graph T=0

Waveform data T = 0 set to the sampling time.

Image T = 0 does not reset.

## □ Tool Types

The functions for “Tool Types” on the “Waveform Data Operations Bar” are as follows.



Playback range zoom

Zooms only the waveform data corresponding to the image playback range.



Reset zoom

Deletes the zoom, displays all of the recorded waveform data.



Vertical line cursor



Cross cursor



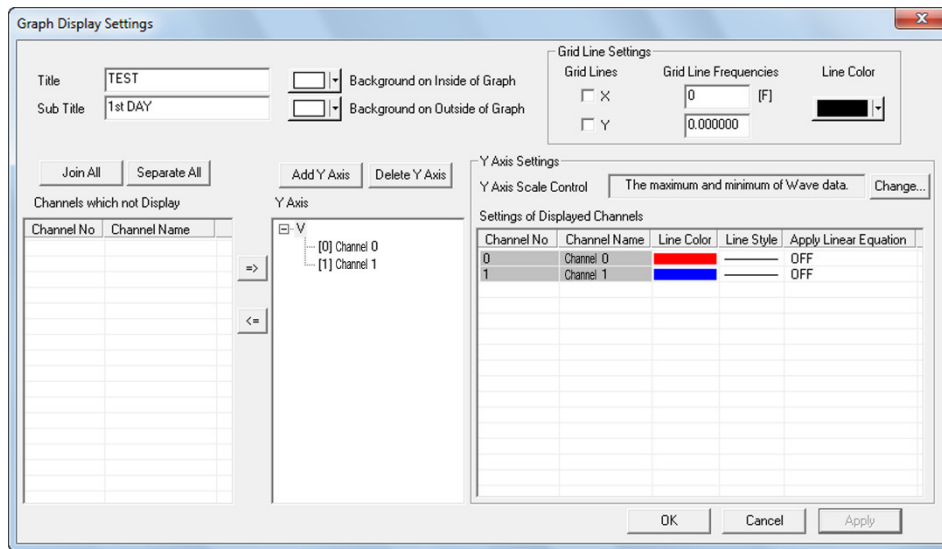
Square cursor



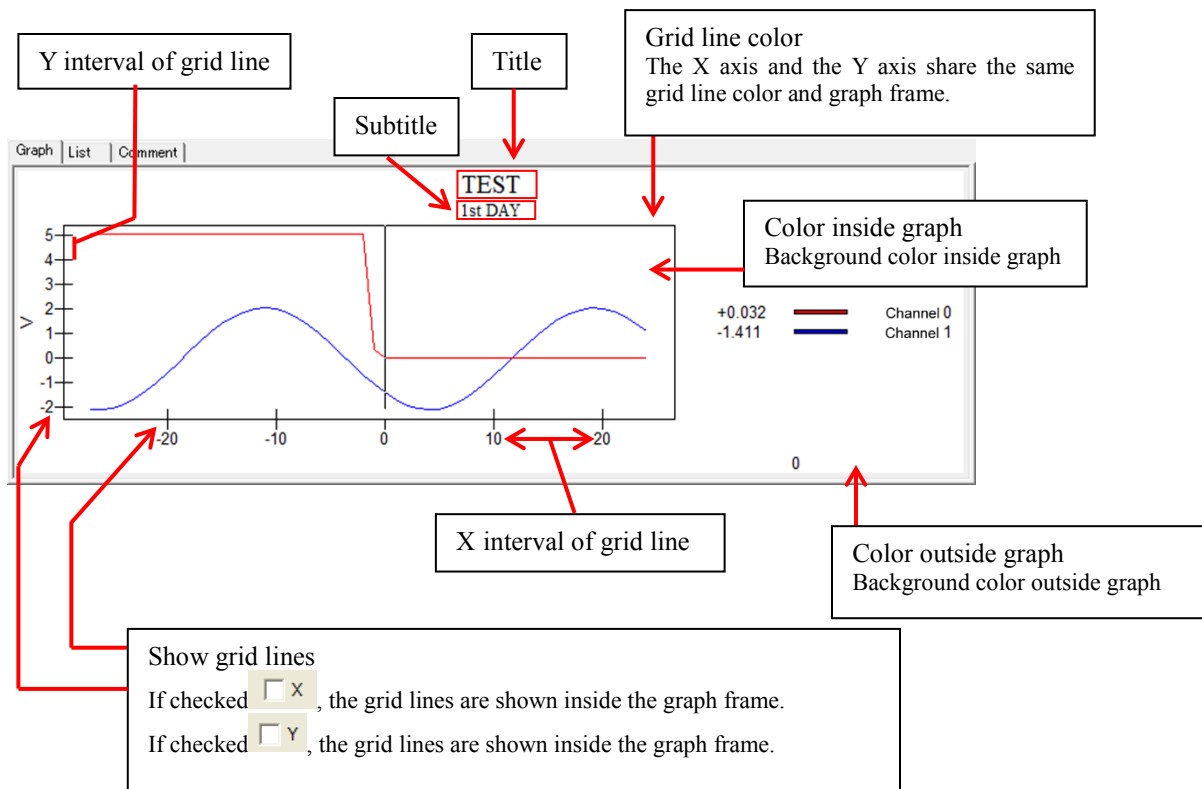
Sets the standard frame rate as the waveform data sampling frequency.

## ■ Graph Display Settings

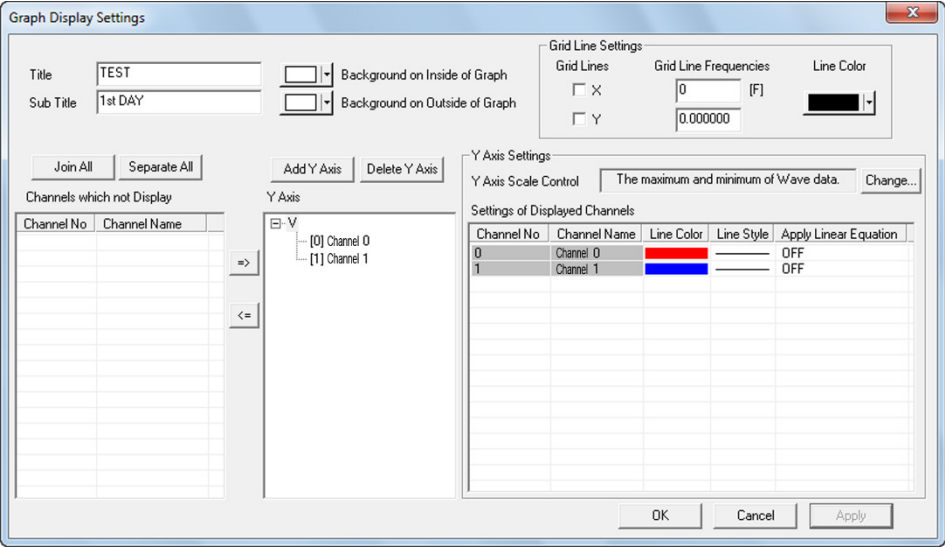
If “Graph Display Settings” is selected from the “View” button on the “Waveform Data Operations Bar”, the “Graph Display Settings” dialogue is displayed. Make the settings relating to the graph display here.



The item of a " Graph Display Settings " dialog, and correspondence of a graph

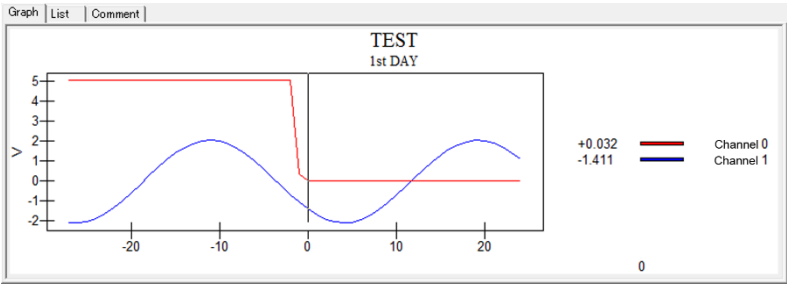


The “Graph Display Settings” dialogue and other items are shown as follows.



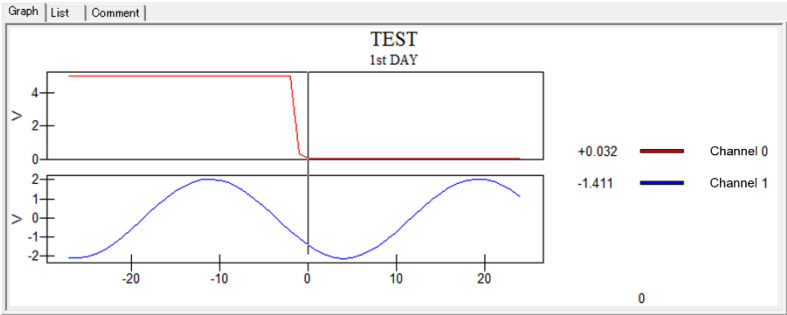
Join All

Displays all of the channels used on a single Y axis. Two channels are used, and when superimposed, are shown as follows.



Separate All

Displays all of the channels used on separate Y axes. Two channels are used, and when separated, are shown as follows.



## Channels which not Display

A list of channels not displayed on the graph.

## Y Axis

A list of the Y axis and channels displayed on the graph.

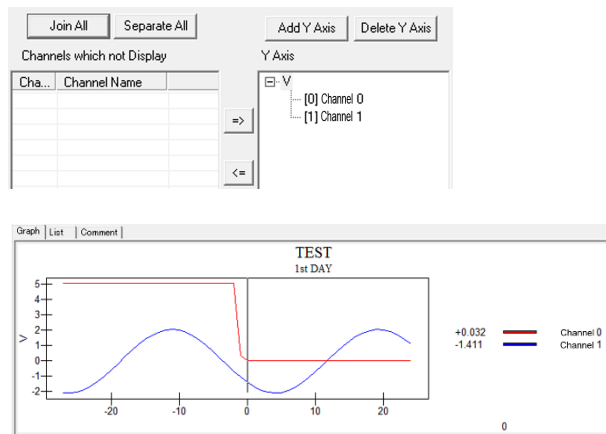


The channel selected in “Channels Not Shown” is registered to the Y axis selected in the “Y Axis” and the graph is displayed.

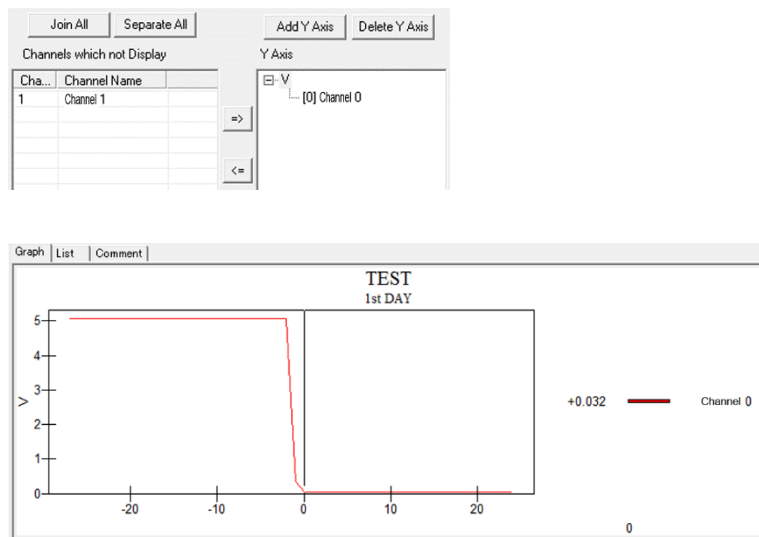


The channel selected in “Y Axis” is moved to the “Channels Not Shown” and deleted from the graph

Display when two channels are used and both channels are registered to the Y axis



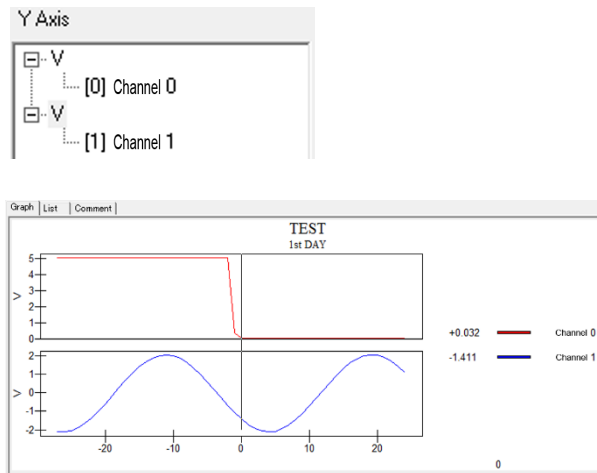
Display when two channels are used and only one channel is registered to the Y axis



Add Y Axis

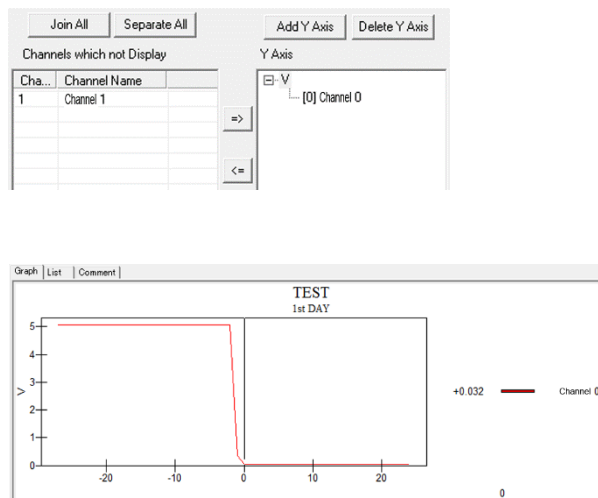
Adds a Y axis to the graph. The added Y axis is added to “Y Axis”. The Y axis name can be changed in “Y Axis”.

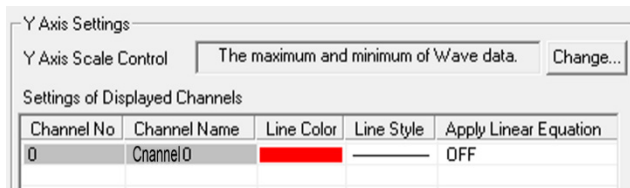
Two channels are used, and if a Y axis is added and one channel is moved to the Y axis added, the graph is shown as follows.



Delete Y Axis

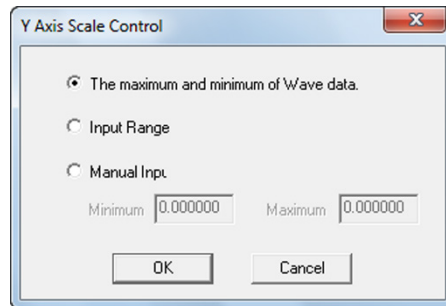
Deletes the Y axis selected with “Y Axis”. If the channel on the Y axis is registered, that channel is moved to “Channels Not Displayed”. In the “Add Y Axis” figure above, if the Y axis where channel 1 is registered is deleted, channel 1 is moved to “Channels Not Shown”, as shown in the following graph.





Displays/changes the Y axis setting selected in “Y Axis”.

Y Axis Scale Control Click  to change the settings.



Select the maximum and minimum values on the Y axis from the following.

- The maximum and minimum data.
- Channel voltage value.

Maximum and minimum voltage set to the channel with the waveform input setting.

- Manual Input.

#### Settings of Displayed Channels

Settings for the channel data lines.

Line color, line form and conversion parameter applications can be set.

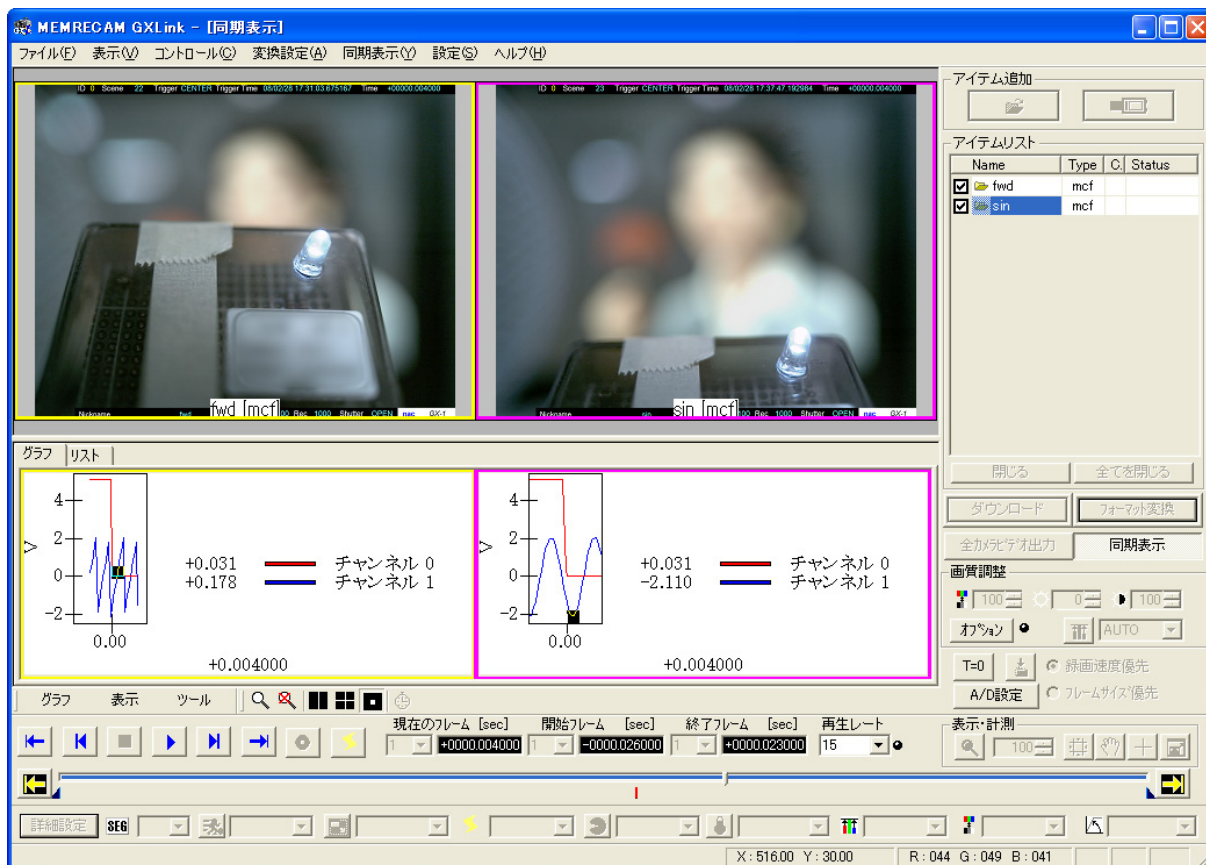
## ■Set T=0 for Waveform Data

When the image and waveform data is displayed, to set T=0 / reset T=0, the T=0 frame for both the image and the waveform data can be changed.

If setting T=0 for the waveform data only without changing the image T=0 frame, if only the waveform data is set to T=0, click “Tools” on the “Waveform Data Operations Bar” and click “Set Graph T=0”.

In the same manner, if resetting only waveform data T=0, click “Tools” on the “Waveform Data Operations Bar” and click “Reset Graph T=0”.

## ■ Waveform Data Sync Display (The image example uses GXLink)



If playing back with sync display, playback is performed to coordinate each image with the current frame time on the graph.

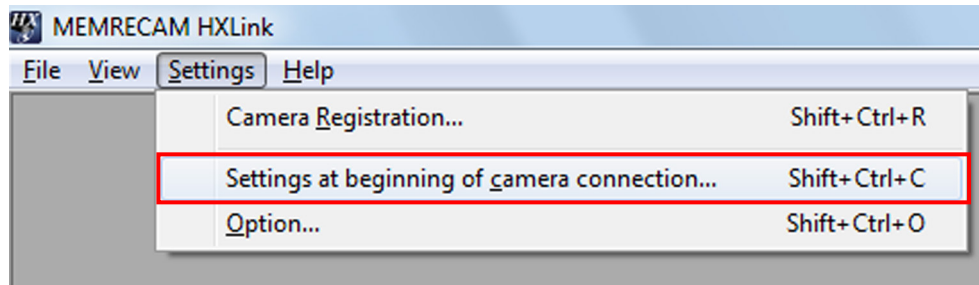
The same color frame is given to the image and the corresponding graph.

If the frame for the image is yellow, the frame of the graph corresponding to the image is also yellow.

# 6

## Camera Connection Settings

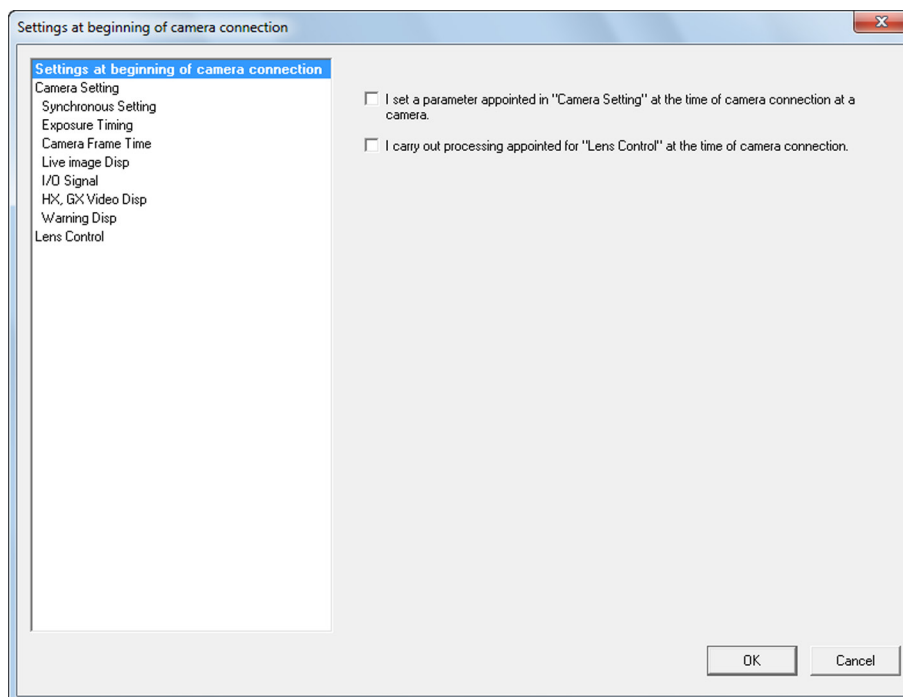
Specifies the connection settings for the camera at the start of the camera connection.



Click "Camera Connection Settings".

#### ■ Camera Connection Settings

Select whether or not to set connection setting parameters at the start of the camera connection or to perform lens control.



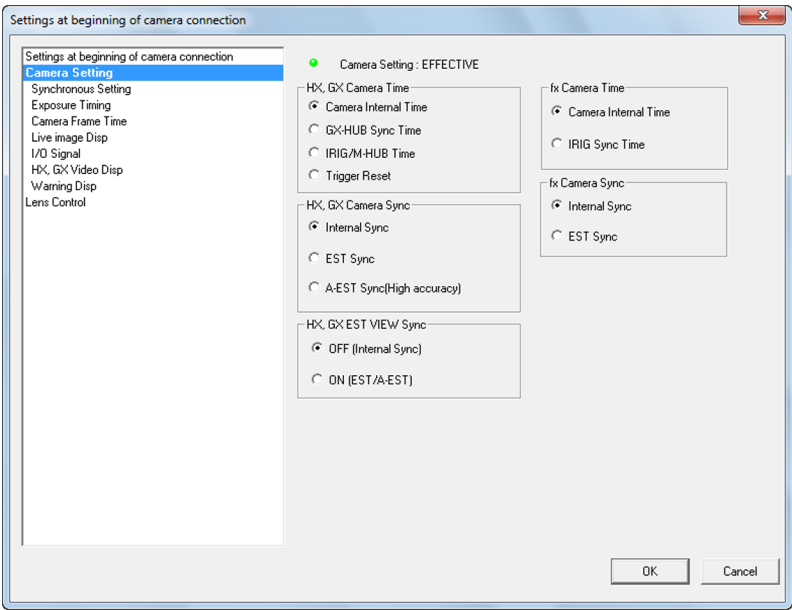
The items to set include

- Sets the parameters specified in "Camera Settings" during the camera connection to the camera.
- Executes the processing specified in "Lens Control" during the camera connection.

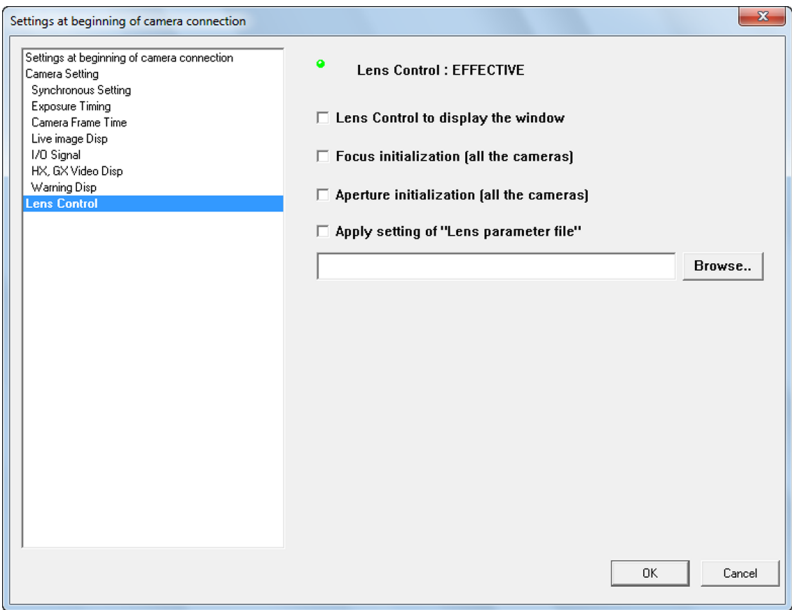
Check  the items to set.

There is "View Camera Connection Settings" on each tab of the "Camera Connection Settings" dialogue and in lens control, so confirmation can be made of the connection parameter settings set at the start of the camera connection.

- Camera Settings
  - Indicator Lights
    - Lit Green    Connection settings enabled
    - Off            Connection settings disabled

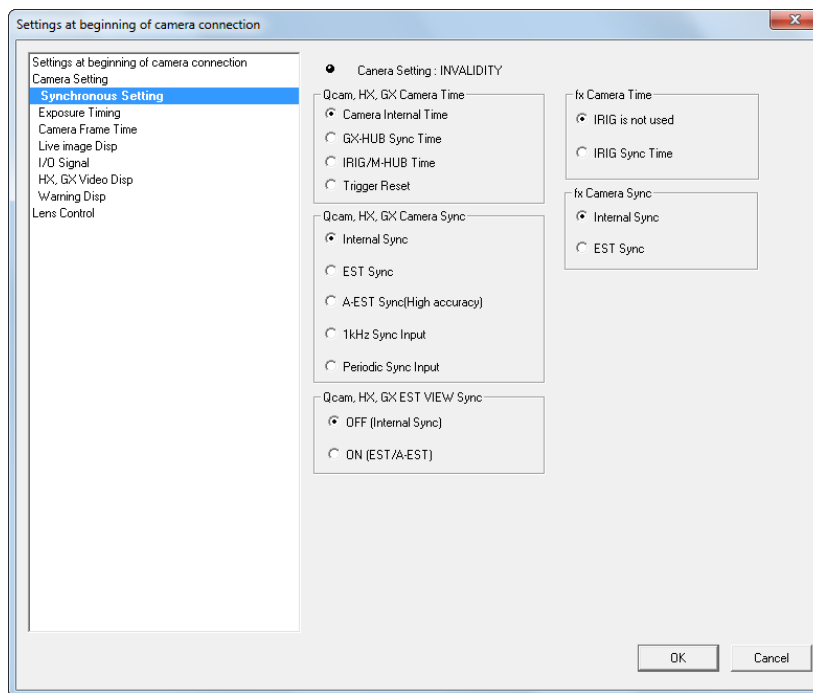


- Lens Control
  - Lit Green    Lens control enabled
  - Off            Lens control disabled



## ■ Synchronous Settings

Sets the camera time and the sync time for the HX, GX, Q and fx cameras.



### Qcam, HX, GX Camera Time

#### Camera Internal Time

Select for individual camera application or if accurate time synchronization is required. The HX, GX, Q camera time becomes the time on the internal camera timer. If connected from a control PC, the time matches the PC time at connection.

#### GX-HUB Sync Time

Without IRIG-B signals, the time for the HX, GX, Q cameras selected for GX-HUB sync recording is the time when the GX-HUB signals are transmitted. Also, the time matches the PC time at connection from the control PC.

#### IRIG/M-HUB Time

Select with synchronous recording using IRIG-B signals or synchronous recording with a mixture of fx and GX using the M-HUB. Select in any of the following.

- (1) Input IRIG signals to the HX, GX and Q cameras with the HX, GX and Q camera unit.
- (2) Connect the HX and GX cameras to the GX-HUB, and input the IRIG signals.
- (3) Connect the GX-HUB to the M-HUB with a mixture of HX, GX and fx cameras.

If inputting IRIG-B signals, the

HX, GX camera time becomes the time of the IRIG-B signals.

If IRIG-B are not used with a M-HUB • GX-HUB connection, the HX, GX camera time becomes the time the M-HUB is transmitted.

In this case, the time matches the PC time at connection from the control PC.

Trigger Reset

HX, GX-8 camera dedicated setting.

Synchronizes the trigger signals.

Select when synchronizing with an external device with trigger signals.

Refer to page 4-54 and 8-18 for details.



**Caution**

Go to “Camera Sync” and select “Internal Sync” unless “Camera Time” of Q-Cam is set as “Camera Internal Time”

fx Camera Time

Internal Camera Time

Select when using cameras without IRIG-B signals.

If connected from a control PC, the fx camera time matches the PC time.

IRIG Time

Select when performing synchronous recording by inputting IRIG-B signals to the M-HUB or IRIG BOX.

The fx camera time is the IRIG-B signal time.

Qcam, HX, GX Camera Sync

Sync settings for HX, GX, Q cameras

Internal Sync

Select when recording with internal camera sync signals.

EST Sync

Select when recording with external synchronization with EST signals.

Select sync signals EST1/EST2, and switch with "Select EST Input" under the "Input/Output Signal" tab.

A-EST Sync (High Precision)

Setting for HX, GX-8 cameras.

Select to perform high precision external synchronization.

Select synchronous signals EST1/EST2, and switch with "Select EST Input" under the "Input/Output Signal" tab.

With Q camera, A-EST Sync works as EST Sync.

1 kHz Sync

Sync settings for Q cameras

Select it when performing synchronous recording by inputting 1 kHz signals into SYNC IN.

Periodic Sync

Sync settings for Q cameras

Select it when performing synchronous recording by inputting periodic signals into SYNC IN.



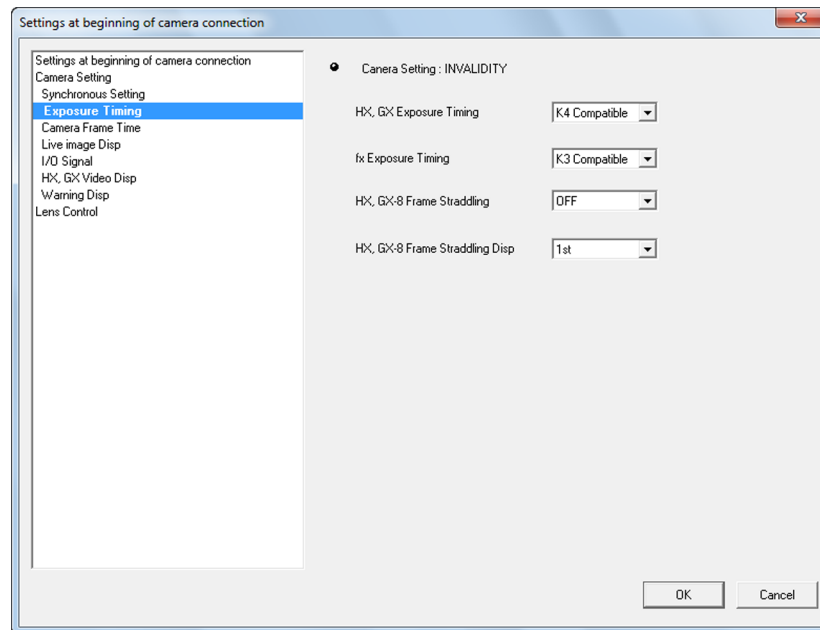
**Caution**

If you use Q camera with the settings except “Internal Sync” for “Camera Sync”, “Camera Internal Time” is set for “Camera Time”.

fx Camera Sync	Sync setting for fx cameras
Internal Sync	Select when recording with internal camera sync signals.
EST Sync	Select when recording with external synchronization with EST signals. Input the sync signals to the AUX connector of the fx camera.
Qcam, HX, GX EST VIEW Sync	Sync settings for EST recording during VIEW.
OFF (Internal Sync)	During VIEW, select when displaying images with internal synchronization when the EST signals are not input to the HX, GX cameras.
ON (EST/A-EST)	During VIEW, select when displaying images synchronized to the EST signals.

## ■ Exposure Timing

Sets the camera exposure timing and frame straddling function.



The exposure timing setting involves setting the timing for the sensor exposure relative to the recording sync signals.

If performing sync recording with a combination of fx cameras and GX cameras and the K4 compatible mode is selected, it is possible to coordinate the exposure timing for all of the cameras.

Also, if changing the shutter setting for each GX-5/GX-5F camera head, the compatible mode must be selected.

The Qcam, HX, GX exposure timing applies to the HX, GX and Q cameras, so select from "GX NATIVE", "K3 Compatible" and "K4 Compatible".

The fx exposure timing applies to the fx camera so select from "K3 Compatible" and "K4 Compatible".

### GX NATIVE

Exposure starts as the synchronized signals increase.

Also, the exposure phase function can be used.

The fx camera cannot coordinate with the GX NATIVE exposure timing.

### K3 Compatible

The same timing as the fx series camera, ends exposure as the sync signals increase. Q camera does not support.

### K4 Compatible

The same timing as the fx-K4, fx-K5 cameras, ends exposure as the sync signals increase.

With HX and GX-8 cameras, if other settings are enabled, the exposure timing settings are disabled.

With frame straddling photography, recording is performed at the exposure timing for frame straddling.

The exposure timing is GX NATIVE with trigger reset or A-EST (high precision external synchronization).

Refer to page 4-40 for exposure timing.

For HX, GX-8 frame straddling photography, select "ON", "OFF" to apply to the HX and GX-8 cameras.

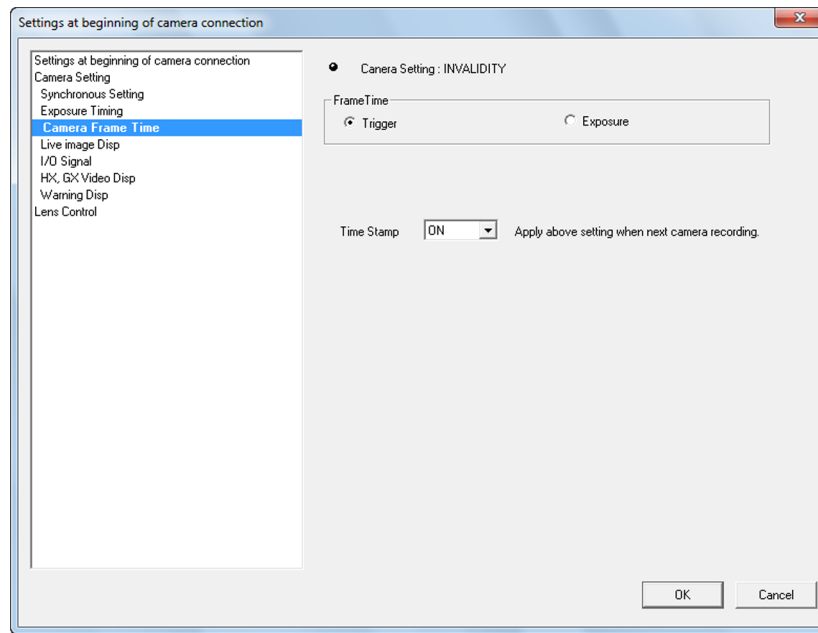
ON	Exposure starts as the sync signals increase. Recording of the second frame occurs at the first synchronous signal.
OFF	Frame straddling recording is not performed, and normal recording takes place.

The HX, GX-8 frame straddling display is applied when HX and GX-8 camera frame straddling photography is ON. Select from "ANY", "1<sup>st</sup>" and "2<sup>nd</sup>".

ANY	Displays the latest image without distinguishing between the 1 <sup>st</sup> and 2 <sup>nd</sup> frames of the frame straddling images.
1 <sup>st</sup>	Displays only the 1 <sup>st</sup> frame of the frame straddling images.
2 <sup>nd</sup>	Displays only the 2 <sup>nd</sup> frame of the frame straddling images.

## ■ Camera Frame Time

Switches the camera frame absolute time display.



### Trigger

Method that uses the trigger frame time as the trigger signal input time, and the frame time as the standard to calculate the frame time for other frames.

With this method, the frame time does not match the time that the sensor is exposed but if using the relative time based on the trigger frame, it has the benefit of being able to make each of the frame time's uniform.

With this setting, EST external sync recording does not display the frame time.

### Exposure

Method to determine the frame time as the mid-point of the time between the time the sensor started exposure and the time exposure was completed.

This method is appropriate for the frame image time but when performing automatic exposure, the times for each frame are not uniform.

If using the time stamp function with the GX camera, since the image and the time information for the image are recorded in the memory, the EST external sync recording does not display the frame time.

### Time Stamp

Setting for GX cameras.

If ON, the photographed image and the exposure time and input signal status for the image are recorded in the memory.

With the external sync recording from EST input signals, if the time stamp is not ON, the frame time will not appear.

Also, since the time stamp information contains the IRIG sync status and event frame information, if using these functions, turn the time stamp ON.

With GX cameras, if the time stamp is ON, the number of recordable frames decreases according to the frame size.

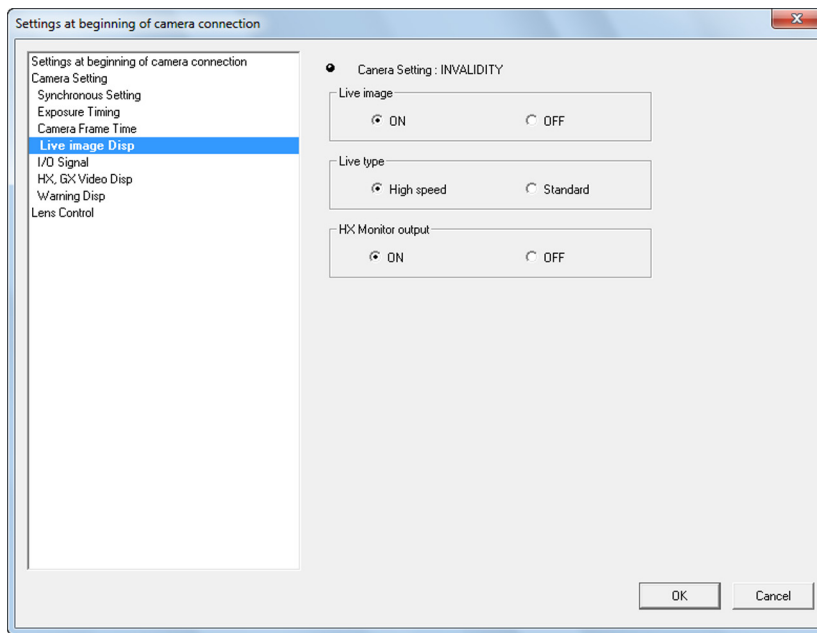
With HX and Q camera, the time stamp is always ON.

### Caution

With GX camera, if "Trigger Reset" is used, settings for "Time stamp" get invalid and work as OFF.

## ■ Live Image Disp

Selects the camera live image.



### Live Image

ON

Displays the live image of the connected camera.

OFF

Does not display the live image of the connected camera and displays a checkerboard pattern.

### Live Method

High Speed

Image displayed on the video monitor is used as the live image for the camera.

Standard

Displays the recorded/playback image from the camera. Not impacted by zooming or scrolling but the view rate is delayed.

### HX Monitor Output

ON

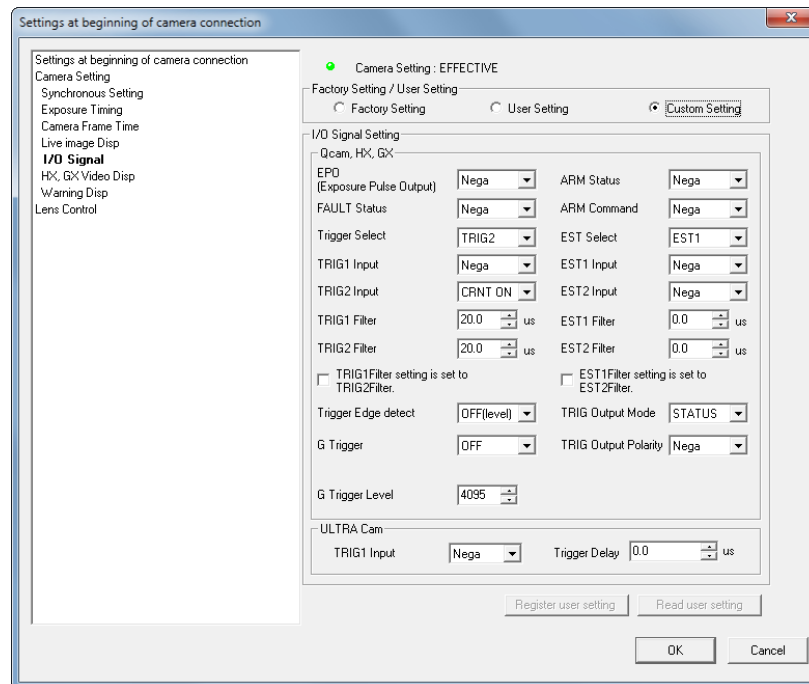
Displays the image on the monitor connected to the HX camera.

OFF

Image not displayed to the monitor.

## ■ I/O Signal

Sets the HX GX and Q cameras and ULTRA Cam input/output signals.



### Default Settings • User Settings

**Factory Settings** Select when using the input/output signal settings from the HX, GX and Q cameras DRP factory settings.

**User Settings** Select when using the input/output signal user settings registered to the HXLink. Select the custom settings to register the user settings and click "Register User Settings" after setting each signal.

**Custom Settings** Select when individually changing the input/output signal settings.

The input/output signal settings display the value set with the "Default Settings / User Settings" selection. If "Custom Settings" is selected, the set value can be changed.

### Input/Output Signal Settings (HX, GX, Q)

**EPO (Exposure Pulse Output)**  
Selects the exposure pulse polarity output from the camera.

**FAULT Status Output Polarity**  
Selects the FAULT status signal polarity output from the camera.

Trigger Input Selection	Selects the connector where the external trigger signal is input.
TRIG1	Select when the trigger signal is input to the TRIG1 connector.
TRIG2	Select when the trigger signal is input to the TRIG2 connector.
ANY	Select when using the GX-HUB trigger connector. Selection items for the HX, GX-8 cameras.
BOTH	Select when the trigger signal is input to either of the TRIG1, TRIG2 connectors. Selection items for the HX, GX-8 cameras. Select when the trigger signal is input to both the TRIG1, TRIG2 connectors and both signals are simultaneously ON to identify the trigger.
TRIG1 Input Polarity	Selects the external trigger signal (contact TTL level) polarity. If TRIG1 is not used, select "Negative Polarity".
TRIG2 Input Polarity	Selects the external trigger signal (current loop) polarity. If TRIG2 is not used, select "Current ON".
TRIG1 Filter	Specifies the external trigger signal noise filter effect to TRIG 1 in microsecond units.
TRIG2 Filter	Specifies the external trigger signal noise filter effect to TRIG 1 in microsecond units.
Match the TRIG2 Filter to the TRIG1 Filter Settings	Match the TRIG2 filter settings to the TRIG1 filter settings.
Detect Trigger Edge	
OFF (Level)	Identifies the trigger when the trigger signal is enabled.
ON (Edge)	Identifies the trigger when triggers signals changed from the disabled status to the enabled status.
G trigger (Q camera)	Function to detect trigger by G sensor, which is built in camera and sensed by shock. By setting as "ON", trigger signal is generated by shock given to camera body, in addition to standard trigger signal generated by user's facility
G trigger level (Q camera)	Specify impact level to generate trigger signal. The unit is [G] (acceleration).
Trigger Output Mode	Select trigger output mode and TRIG OUT output signal.
STATUS	TRIG OUT signal indicates that trigger was detected.
TRIGOUT	TRIG OUT signal is used as a recording trigger to cameras and other instruments. Refer to page 8-25 for details.
Trigger Output Polarity	Select TRIG OUT output polarity.
ARM Status Output Polarity	Selects the ARM status signal polarity output by the camera.
ARM Command Input Polarity	Selects the ARM command signal polarity input to the camera. If the ARM command is not used, select "Negative Polarity".
Select EST Input	Select the external sync signals used from EST1/EST2.

- |      |   |
|------|---|
| EST1 | Select when inputting sync signals to the EST1 connector.   |
| EST2 | Select with any of the following.<br>(1) Inputting sync signals to the EST2 connector.<br>(2) Cameras connected to the GX-HUB, and sync signals input to the GX=HUB EST IN connector. |

EST1 Input Polarity	Selects the external sync signal polarity.
---------------------	--

EST2 Input Polarity	Selects the external sync signal polarity.
---------------------	--

EST1 Filter	Specifies the external sync signal noise filter effect to EST1 in microsecond units.
-------------	--

EST2 Filter	Specifies the external sync signal noise filter effect to EST2 in microsecond units.
-------------	--

Match the EST2 Filter to the EST1 Filter Settings  
 Match the EST2 filter settings to the EST1 filter settings.

#### Register User Settings

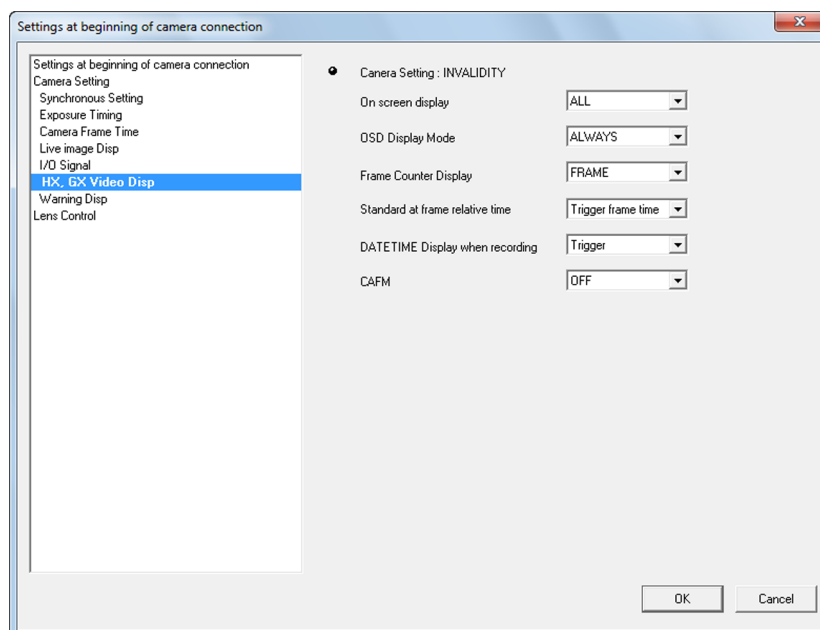
Registers the "Custom Settings" to the "User Settings".  
 Select "Custom Settings" with "Default Settings / User Settings" to enable when the "Custom Settings" do not match the "User Settings".  
 Changing the "User Settings" with "Register User Settings" can be controlled with a password. Refer to page 10-14 for the method of setting passwords.

#### Load User Settings

Load the "User Settings" to the "Custom Settings".  
 Select "Custom Settings" in "Default Settings-> User Settings" to enable when the "Custom Settings" do not match the "User Settings".

## ■Display HX, GX Video

Settings for displaying superimposed information (OSD: on screen display) on the video of the HX and GX cameras.



### Video On-Screen Display

None	No superimposed information displayed other than marks at the center of the image.
Frame	Shows only the frame counter.
All	All of the information (scene, trigger time, frame counter, segment number, status, playback speed, frame rate, shutter speed) is superimposed.

### OSD Display Mode

Normal Display	Normal display of superimposed information.
Display at STOP	Superimposed information displayed on the video monitor as OSD only when the camera is in the STOP mode (READY). During VIEW/ARM/REC/PLAY/LOOP, superimposed information is not shown. During STOP (READY), information is displayed but during recording or playback, the information is erased so the settings are useful only when displaying images.

### Frame Counter Display

Frame	Displays the current frame number.
Relative Time	Displays the relative time for the current frame time.
Memory %	Displays the current frame position as a percentage of the memory segment.
Absolute Time	Displays the absolute time for the current frame.

### Reference for Relative Frame Time

This selection is enabled when the "Frame Absolute Time" under the "Camera Frame Time" is "Exposure Time".

### Trigger Frame Time

The trigger frame time is the reference for the frame relative time.  
The trigger frame time subtracted from the frame time becomes the frame relative time.

### Trigger Signal Detection Time

The trigger frame time as the trigger signal input time is the reference for the frame relative time.  
The trigger frame time subtracted from the frame time becomes the frame relative time.

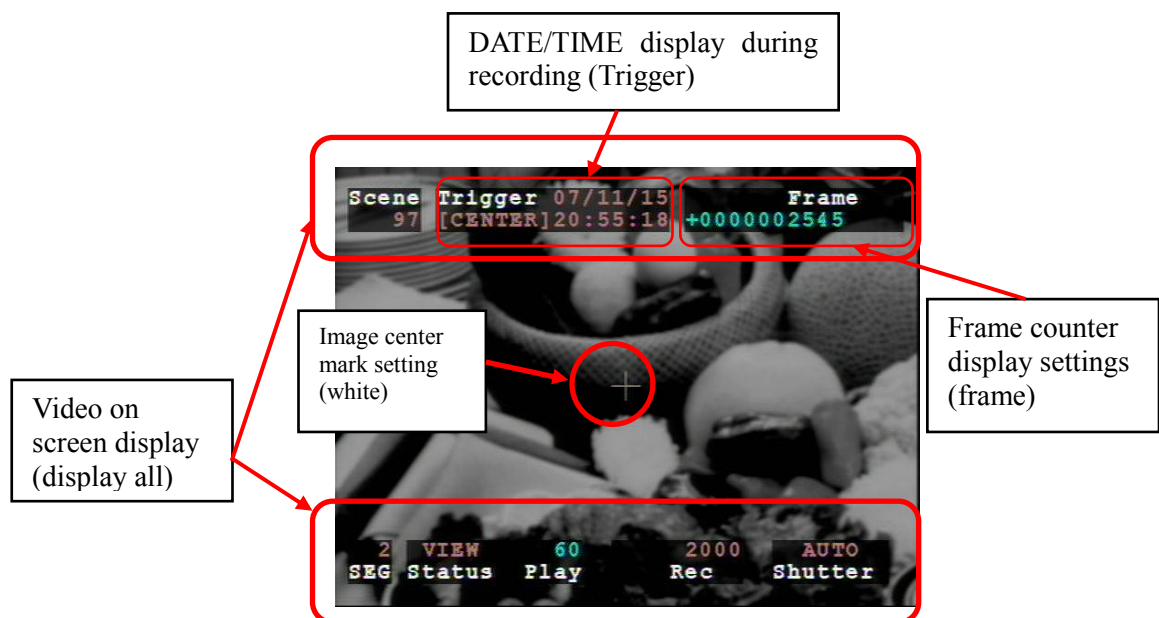
### DATE/TIME Display for Recording

Trigger The trigger time for the image recorded in the memory is shown in blue.

Current Displays the current time during VIEW/ARM/REC in red.  
Displays the trigger time for the image recorded in the memory during READY/PLAY/LOOP in blue.

### Image Center Mark Settings

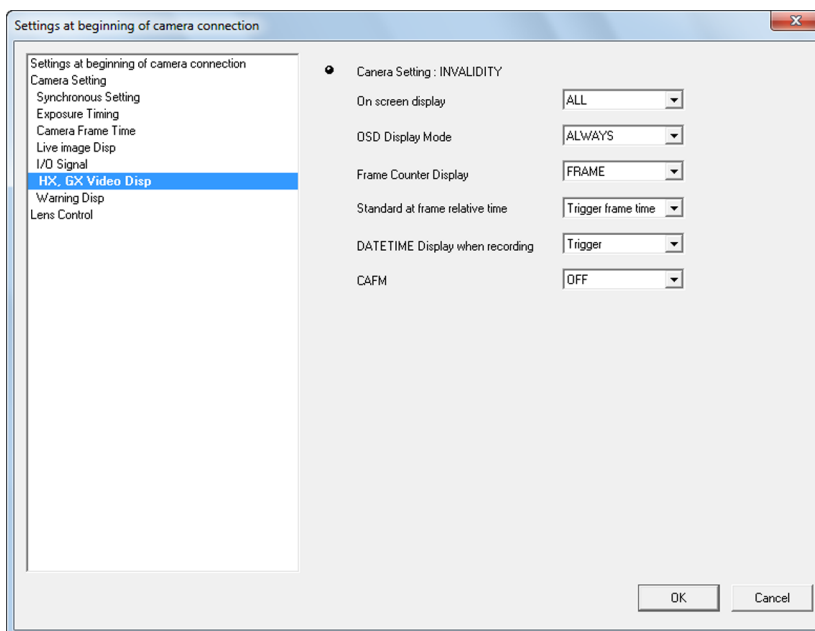
OFF Image center mark not shown.  
White Image center mark shown in white.  
Black Image center mark shown in black.



## ■ Warnings

Settings to turn each item ON/OFF for the warnings displayed on the video and the PC warning window.

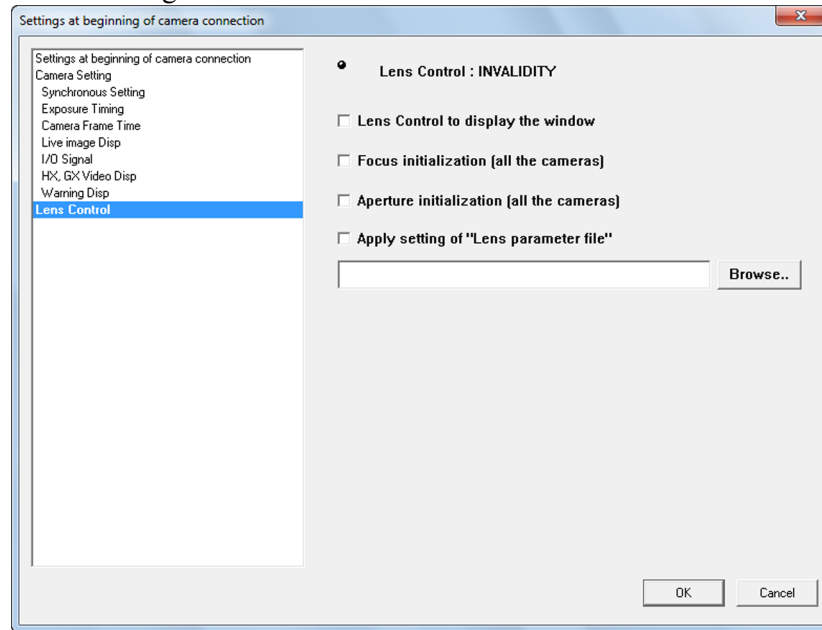
Warnings are normally displayed, and some can't be turned OFF.



If the following items are checked, the relevant warning is displayed on the video and in the warning window.

Frame rate	Abnormal recording speed (timing)
IRQ (camera interruption)	Abnormal video update timing
Battery	Abnormal or low battery voltage
RTC Low battery warning	Low clock battery
Black Balance	After updating the black balance, the frame size, frame rate or shutter changes.

- Lens Control (When the optional EF mounting adapter is connected to the HX camera)  
Setting for the lens control during camera connection.



Implement during connection if the following items are checked.

Display lens control window

Shows the lens control window when the camera is connected.

Initialize focus (all cameras)

Initializes the focus for all connected cameras.

Initialize aperture (all cameras)

Initializes the lens aperture for all connected cameras.

Apply lens parameter file settings

Loads the lens parameter file and applies the settings.

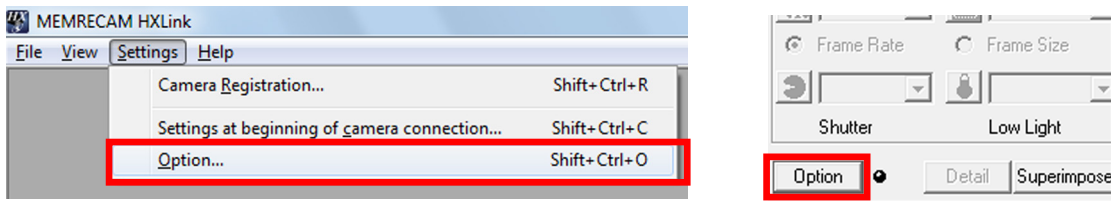
Refer to "Appendix D Lens Control Settings File" for details.

(Blank Page)

# 7

## Setting Options

In setting options, HXLink program settings and batch settings for the connected cameras is performed. To display the setting options window, click options in the settings menu or click the options button on the item toolbar in the basic mode GUI.



The setting options window is divided into the following tabs.

General		File	
GUI		Auto Conversion	
Folder		Default Conversion	
Conversion Algorithms		MCFF Frame Time	
MISC		Functions	
Camera		Auto recording / download	
ConnectType		Qcam Transfer Rate Adjustment	
Live image Disp (*)			
Download			
I/O Signals (*)			
Synchronous Settings (*)			
Exposure Timing (*)			
Frame Time (*)			
HX, GX Video Disp (*)			
Warning Disp (*)			
Log Save			
Auto Processing			

Click "OK" on the "Options" tab to set all of the settings specified in "Options".

□ Batch set the connected cameras

In the tabs listed above with asterisk (\*) the same items in “Camera Connection Settings” can be batch set for the connected cameras.

“Camera Connection Settings” are used to set when starting to connect cameras from PC but the “Options” settings are enabled only when cameras are connected.

The parameters for batch setting connected cameras display the values set for the camera.

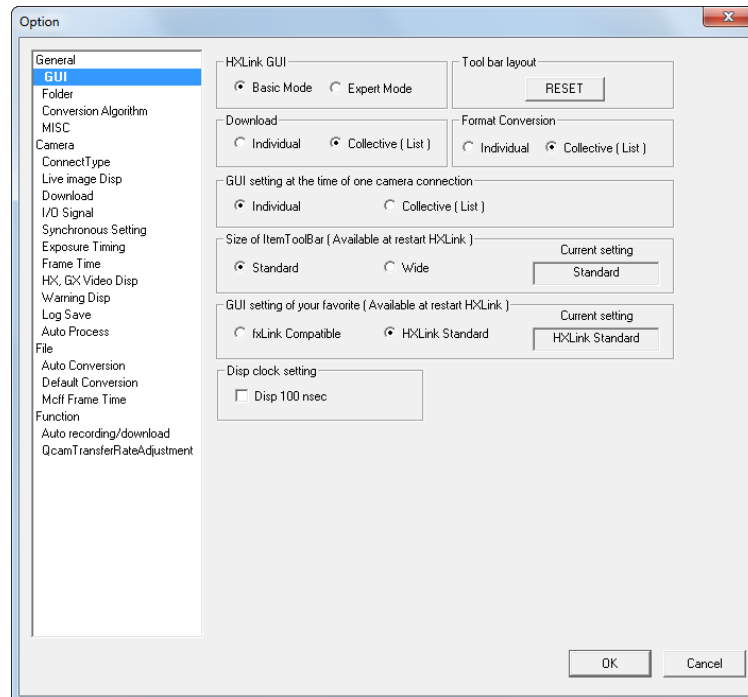
The same set values are displayed for items where all of the camera settings are the same.

"(blank)" or "---" is shown in the parameters for items where all of the camera settings are not the same. Items selected with the roller show whatever selection was not picked.

In this state, the camera is not set for items not specifying parameters set in the camera even if "OK" under the "Options" tab is clicked.

## ■GUI Settings


### Settings for the HXLink GUI.



- Selects the operational mode in the HXLink GUI.

Basic Mode	Performs basic operations.
Expert Mode	Performs detailed operations.

The F12 key on the keyboard can be used to switch between the "Basic Mode" and the "Expert Mode".

- Click RESET  on the initial settings on the toolbar to return to the initial settings toolbar display.
- Select from individual or batch conversion (list) in the dialogue displayed while downloading or during format conversion.

Individual Conversion "Save As" dialogue for a single camera.  
The range for downloading • format conversion is shown on the slider bar.

Batch Save／Batch Conversion (List)  
Dialogue in list format to batch download or convert the format of MCFF files.  
With multi trigger recorded images, the range for downloading • format conversion is specified for each block.  
Refer to page 8-14 for details.

- GUI Settings When 1 Camera is Connected  
Click "Detailed Settings" in the control menu or "Detailed Settings" on the item toolbar or camera parameters toolbar to select the window displayed.

Camera Details (Individual)  
Uses the "Camera Details" dialogue for one camera.

List of Camera Settings (List)  
Uses the "List of Camera Settings" window in the list format.

▪Size of Item Toolbar

Select “Standard” or “Wide” for the size of the item toolbar.

Restart HXLink to enable the selected settings.

“Wide” in the item list toolbar displays bigger than “Standard” and so is useful when using long file names or when there are many cameras or files.

The recommended PC screen resolution is 1280x960 or greater.

Refer to page 3-4 for item toolbar details.

▪fxLink Compatible GUI Settings

Select the GUI applied to the fx camera.

The settings are enabled at the next HXLink startup.

fxLink Compatible	GUI applied to the fx camera. All of the functions on the HX, GX and Q cameras and the ULTRA Cam cannot be used.
HXLink Standard	GUI where all of the functions on the HX, GX and Q cameras and the ULTRA Cam can be used.

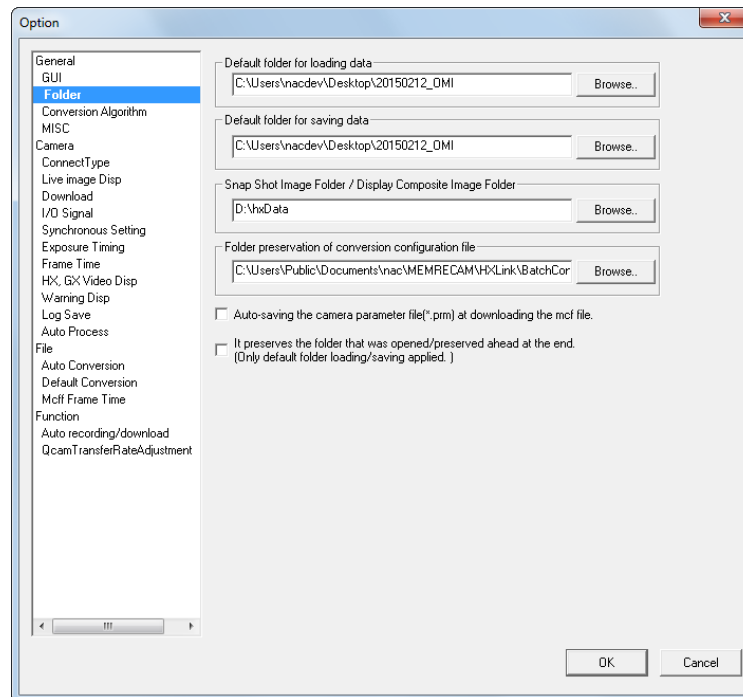
▪Time Display Settings

Selects the display settings for the HX, GX camera monitor output and the HXLink frame time.

ON	100ns units (displays seconds in less than 7 decimal places)
OFF	1 $\mu$ s units (displays seconds in less than 6 decimal places)

## ■ Folder

Specifies the input and save folders.



- Input Folder      Sets the reference folder when opening image files.
- Save Folder      Sets the reference folder when saving downloaded/format converted files.
- Snapshot/Composite Display Folders  
Sets the reference folder when saving snapshot files or when specifying composite display files.
- Save Destination Folder for Conversion Setting Files  
Sets the folder to save conversion setting files used for “Batch File Conversion (BatchConv)”.
- Save MCFF downloaded and camera settings files (prm) in the same folder as MCFF  
If checked, saves the downloaded camera image file (MCFF) together with the saved camera settings file (prm files).  
The camera settings for the prm file can be reflected in the camera loaded during camera connections.  
Refer to Appendix C for details of prm files.

The following contents are written in the prm files.

```

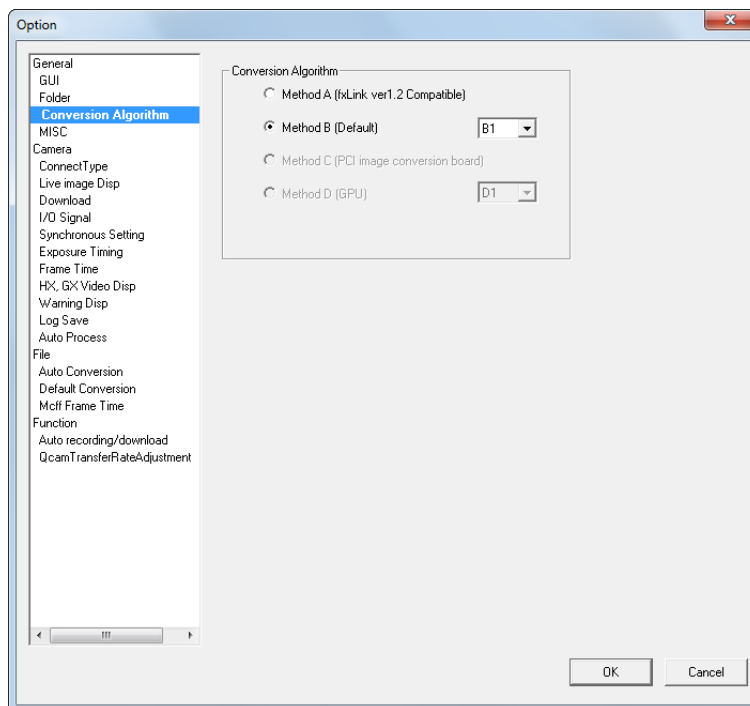
---
WB=3100K                White balance
GAIN=NORMAL             Gain
GAMMA=NORMAL            Gamma
ENHANCE=HIGH            Enhance
---
```

Refer to Appendix C for details.

- Save the Source/Destination Folder. (applies only to input folders/save folders)  
Check to automatically change the “Input Folder” and “Save Folder” to open/save files.

## ■ Conversion Algorithm Settings

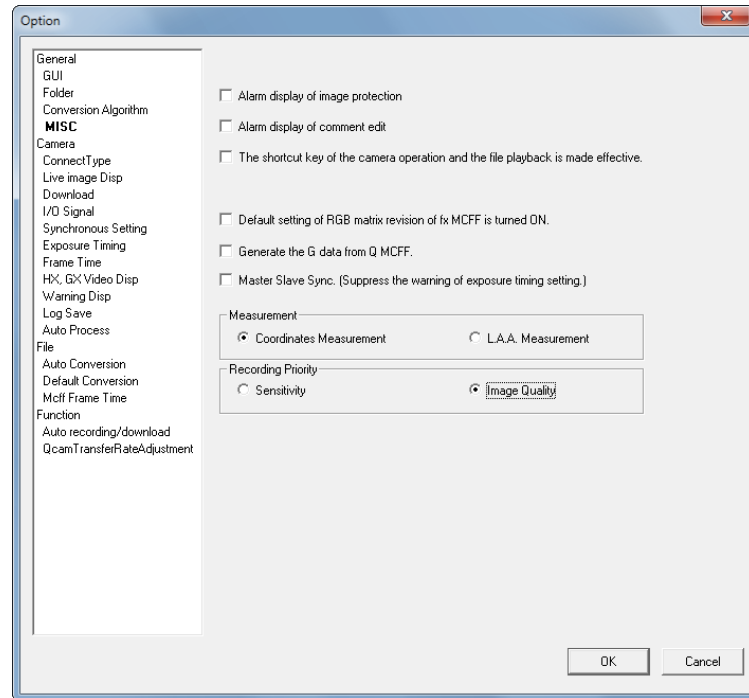
Sets the method of converting images from MCFF.



The four conversion methods are as follows.

- |          |  |
|----------|--|
| Method A | An algorithm compatible with the previous version of fxLink.   |
| Method B | <p>A new conversion algorithm that converts to high resolution images with distinct color and good contrast. Method B is the default. Includes methods B1 and B2.</p> <p>B1      Default conversion method.</p> <p>B2      Better resolution than B1 but requires more conversion time.</p> <p>B3      Reduce moire and false color than B2 but requires more conversion time. By Method B3, if Low Pass Filter is ON, a noise will be reduced, without deteriorating image quality. Enhance is processed oblique direction in addition vertically and horizontally.</p>   |
| Method C | <p>A method that uses the optional PCI image conversion board that converts images to the same quality as method B but at a high speed.</p> <p>This method applies to the MEMRECAM fx series excluding the pencil cameras for the fx RX-5, fx RX-5G PM units.</p>  |
| Method D | <p>Method of using the GPU installed graphic board that corresponds to the optional “MCFF high speed conversion software” that performs high speed playback and conversion of MCFF files so the image has the same quality as Method B. Method applies to the MEMRECAM HX, GX, Q and fx series excluding the pencil cameras for the fx RX-5, fx RX-5G PM units.</p> <p>Includes methods D1 and D2. There is a method of D1, D2, D3, conversion time does not change almost.</p> <p>D1      Default conversion method.</p> <p>D2      Better resolution than D1.</p> <p>D3      Reduce moire and false color than D2. By Method D3, if Low Pass Filter is ON, a noise will be reduced, without deteriorating image quality. Enhance is processed oblique direction in addition vertically and horizontally.</p> |

## ■ MISC



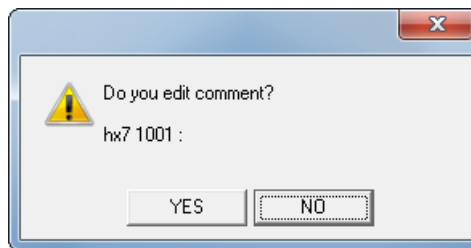
### Display Image Protection Warnings

Check to display the messages below during operation.

- Shows messages about downloading after recording.
- Shows warnings when recording without saving data.
- Shows warnings when cameras are connected without saving data.

### Display Warnings to Edit Comments

Check and click ARM to show all of the connected camera nicknames and recording comments, and display a confirmation window to change recording comments or just start recording.



Click “Yes”  to disarm the camera and display the recording parameters in the “List of Camera Options” window with all of the camera image comments that can be edited. After editing the recording comments, ARM the camera again.

Click “No”  to ARM the camera.

### Enable the Shortcut Key for Camera File Operation

Check to enable the shortcut keys relating to camera and file operations.  
Main toolbar camera and file operation can be performed from the keyboard.  
Move the cursor to the main toolbar operation to display a description of the status bar operation buttons and shortcut keys.  
Refer to Appendix A for details of the shortcut keys.

### Turn ON the Default Settings for the fx MCFF RGB Matrix Correction

Specifies the default settings for RGB matrix correction applied when opening MDFF files on the fx camera.

### Generate the G data from Q MCFF

Check to generate Waveform Data from recorded data by G sensor of Q camera at the following timing.

- when download MCFF file from Q camera
- when open Q camera MCFF and select “Open related Waveform file” at file menu or right click item menu.

Then, G sensor data can be displayed in a graph.

Graph displays G data and G trigger level

The unit of a vertical axis is [G] (acceleration).

Range is 0~205.

<u>Data</u>	<u>channel name</u>
G data	G
G trigger level	Threshold

List displays G data, G trigger level and existence of external trigger signals

<u>Data</u>	<u>channel name</u>
G data	G
G trigger level	Threshold
Existence of external trigger signals	TRIG

### Master Slave Sync

Check to ignore the slave cameras which synchronize to EST, and the warning of exposure timing is suppressed.

### Measurement Function

Select the HXLink measurement function from “Measure Coordinates” and “LAA Measurement”.

Refer to chapter 13 for the measurement function.

### Recording Priority

Select the recording priority of the Q1m/Q1v/HX-7S image sensor from “Sensitivity” and “Image Quality”.

The recording priority is set as an image sensor at the time of ARM starting or VIEW starting.

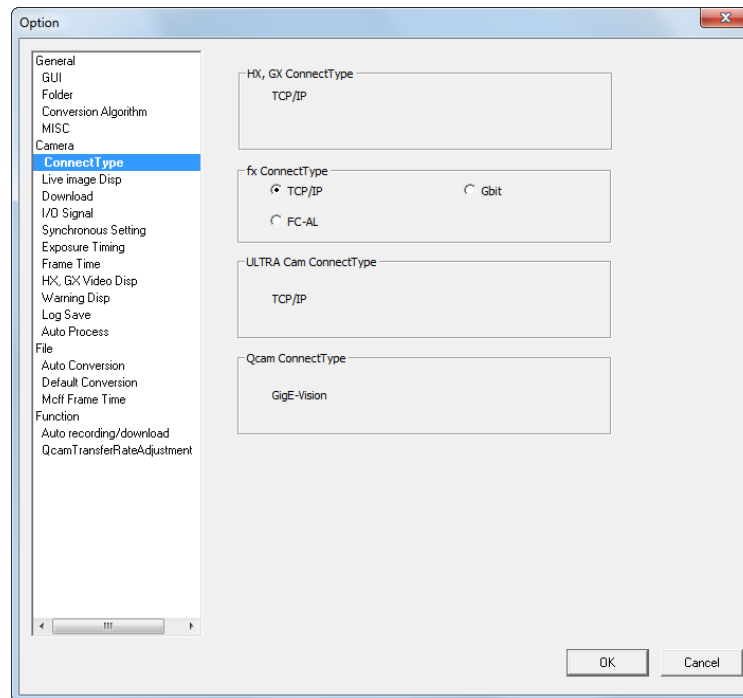
The recording priority is setting of recordings, and it isn't possible to change a recording priority of the image recorded.

### ■ Connection Type

Switches the camera connection method.

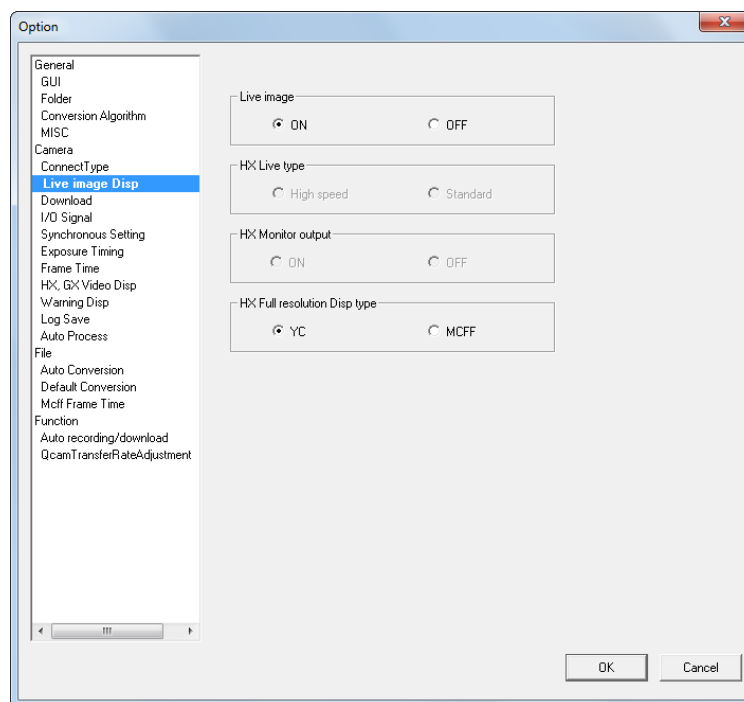
Fixed at TCP/IP for the HX, GX and Q cameras and the ULTRA Cam.

The three types of fx camera connections include TCP/IP, FC-AL, Gbit.



## ■Live image Disp

Sets the live image display for the camera.



### Live Image

Sets the PC and camera live image communication ON/OFF.

ON	Displays the live image loaded from the camera.
OFF	Does not load the live image from the camera. Reduces the amount of data transmitted with the camera.

### Live Method (Only HX camera)

Sets the live recording creation method to the PC from HX cameras.

High Speed	Outputs the same image as the camera monitor output to the PC as a live image. Zoom image: Select from FIT1, FIT2, 1/2, 1, x2, x4. Faster than standard update rate of the camera monitor output and PC live image.
Standard	Outputs all of the image angles recorded independently from the camera monitor output to the PC as a live image. The same method as that for fx cameras. Zoom image: Select from 1/1, 1/2, 1/4.

### HX Monitor Output (Only HX camera)

Sets the live image output to the monitor connected to the HX camera ON/OFF.

ON	Outputs the image to the connected monitor.
OFF	No output of the image to the connected monitor.

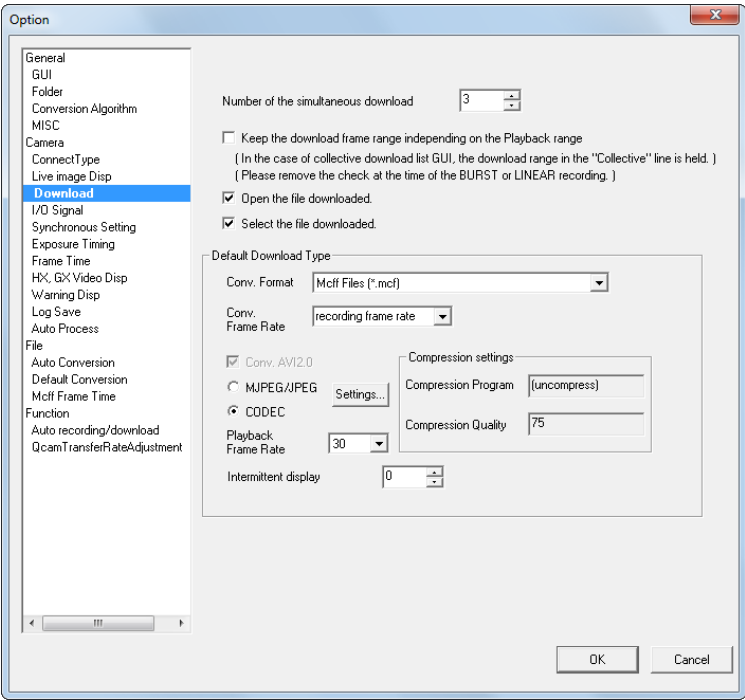
### HX Full Resolution Display (Only HX camera)

Sets the data format for the HX camera full resolution display.

YC	Shows the image format for the monitor output. Faster update rate than the MCFF.
MCFF	HXLink transfers data from the camera to the PC without conversion.

■Download

Settings relating to camera download.



Number of Cameras Simultaneously Downloading

If multiple HX, GX and Q cameras are connected, image data can be simultaneously downloaded. If adjusting the number of cameras simultaneously downloading, the download time can be shortened.

Refer to page 4-82 for simultaneous downloading details.

Save Download

Check to save the download range of the MCFF specified when downloading to enable downloading of the same range for subsequent downloads. If the download GUI settings are for a batch save, the download range specified for the batch is saved.

Save_Start(F)	Save_End(F)
-100	100
-100	100
-100	100
-100	100
-100	100

Saves the range set in the top row of the “Download” dialogue (list).

If not checked, the playback range is set as the download range.

Open File after Downloading

Check to automatically add the downloaded MCFF to the item list and show the image.

Previous Download Format

Sets the default download format.

Conversion Format Specifies the type of downloaded file (AVI, TIFF, JPEG, BMP, MCFF) .

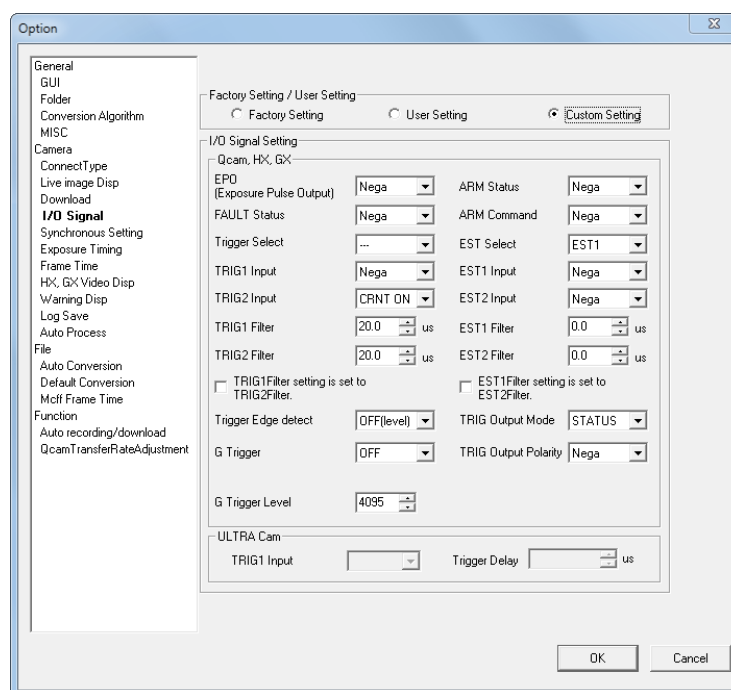
Frame Rate when Converting	<p>The frame rate when converting subtracts the frames from format conversion to get the specified frame rate for saving.</p> <p>Refer to page 5-31 for details.</p>
Convert to AVI2.0	<p>Specify an AVI file as the download type to save as “AVI 2.0”. “AVI 1.0” cannot be selected.</p>
Compression Settings	<p>Select “MJPEG” to convert to a motion JPEG.</p> <p>Select “CODEC” to convert from the method selected in the registered compression program (CODEC) to Windows.</p> <p>We are not liable for any CODEC other than nac M-JPEG codec. Please contact the CODEC manufacturer for questions regarding CODEC.</p>
Frame Rate	<p>Enabled when the file type after conversion is AVI.</p> <p>Select the frame rate set to AVI.</p> <p>This is not related to the image quality of the AVI file created with format conversion.</p> <p>The frame rate is the frame rate for AVI files used with the Microsoft Windows Media Player or the Adobe Premier video editing software.</p>
Intermittent Display Rate	<p>Shows frames downloaded on the monitor at the frame interval specified while downloading. No intermittent display when 0 is specified.</p>

## ■ I/O Signal

Items that can be set are the same as those in “Camera Connection Settings”. Refer to page 6-11 for details.

If connected to cameras, click OK to set the parameters to all of the cameras.

If not connected to cameras, the items changing the camera parameters cannot be set.

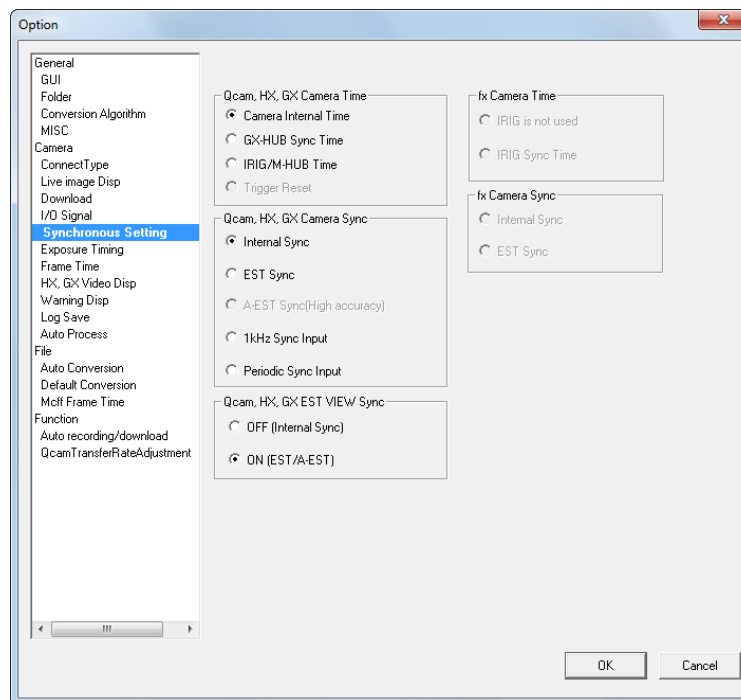


## ■ Synchronous Setting

Items that can be set are the same as those in “Camera Connection Settings”. Refer to page 6-4 for details.

If connected to cameras, click OK to set the parameters to all of the cameras.

If not connected to cameras, the items changing the camera parameters cannot be set.



There is no previous settings displayed by opening “Option” next time when operating Q, HX and GX cameras in mixture and set to control Q camera only by “1kHz Sync Input” or “Periodic Sync Input” at “Sync Settings of Option”

In “Option”, the parameters will be displayed if settings of all connected cameras are same. There is no setting displayed if different settings are applied.

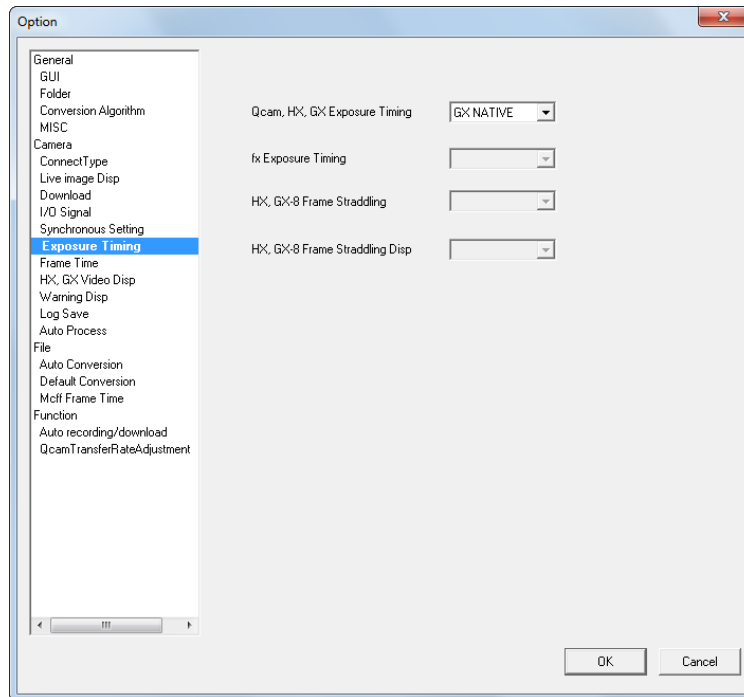
To confirm settings of all connected cameras, go to “Recording Parameters” of “List of Camera Settings”.

### ■ Exposure Timing

Items that can be set are the same as those in “Camera Connection Settings”. Refer to page 6-7 for details.

If connected to cameras, click OK to set the parameters to all of the cameras.

If not connected to cameras, the items changing the camera parameters cannot be set.

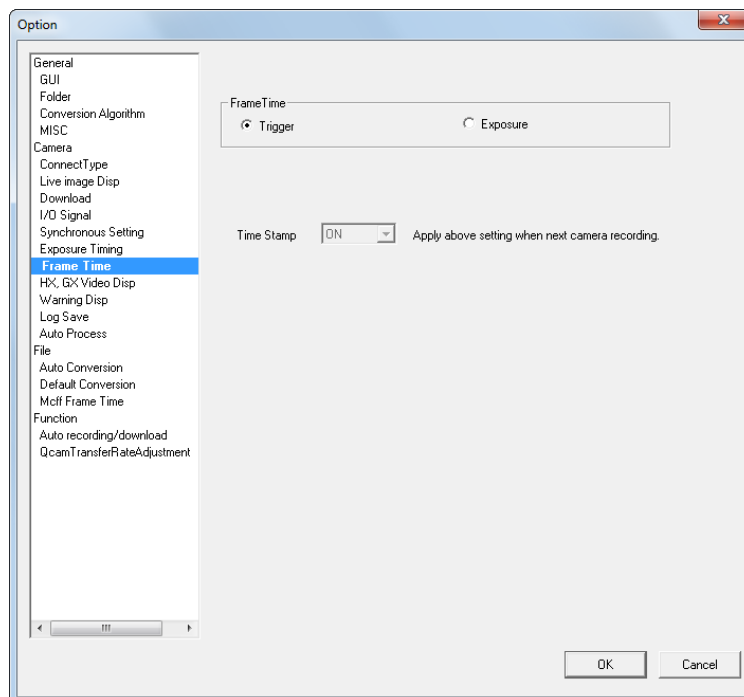


### ■ Frame Time

Items that can be set are the same as those in “Camera Connection Settings”. Refer to page 6-9 for details.

If connected to cameras, click OK to set the parameters to all of the cameras.

If not connected to cameras, the items changing the camera parameters cannot be set.

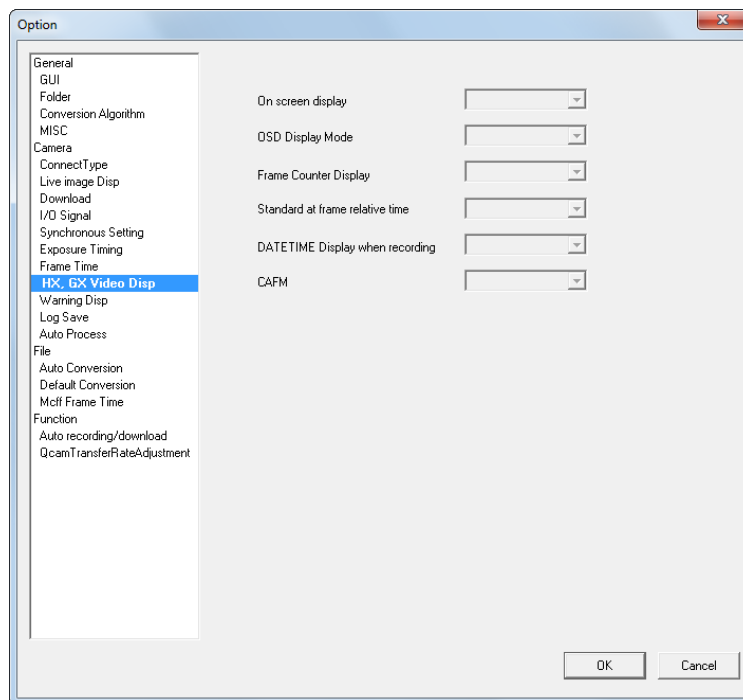


## ■ HX, GX Video Disp

Items that can be set are the same as those in “Camera Connection Settings”. Refer to page 6-14 for details.

If connected to cameras, click OK to set the parameters to all of the cameras.

If not connected to cameras, the items changing the camera parameters cannot be set.



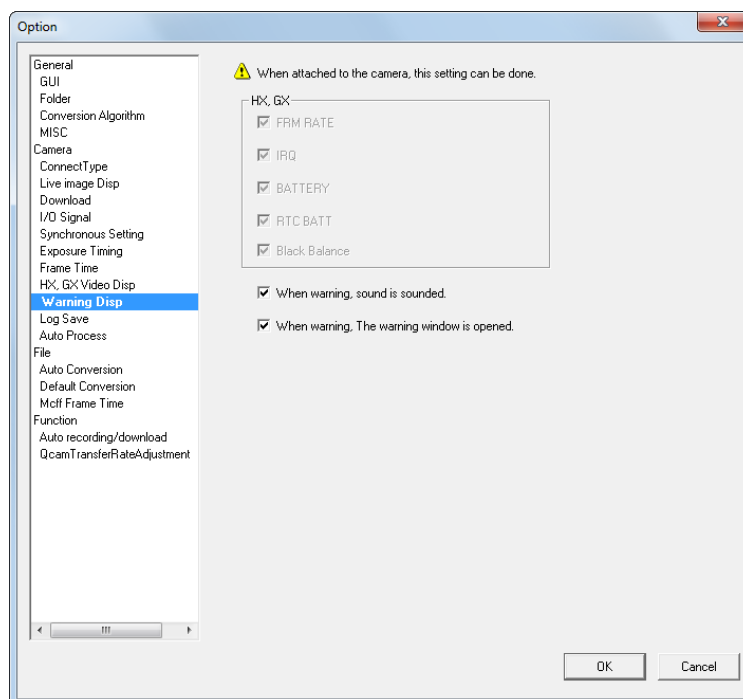
## ■ Warning Disp

Sets each item to enable/disable the display of warnings for the HX, GX and Q cameras.

Enable this setting to display the warning in the HXLink warning window too.

If connected to cameras, click OK to set the parameters to all of the cameras.

If not connected to cameras, the items changing the camera parameters cannot be set.



Check the following items to show the relevant warning on the video and warning window.

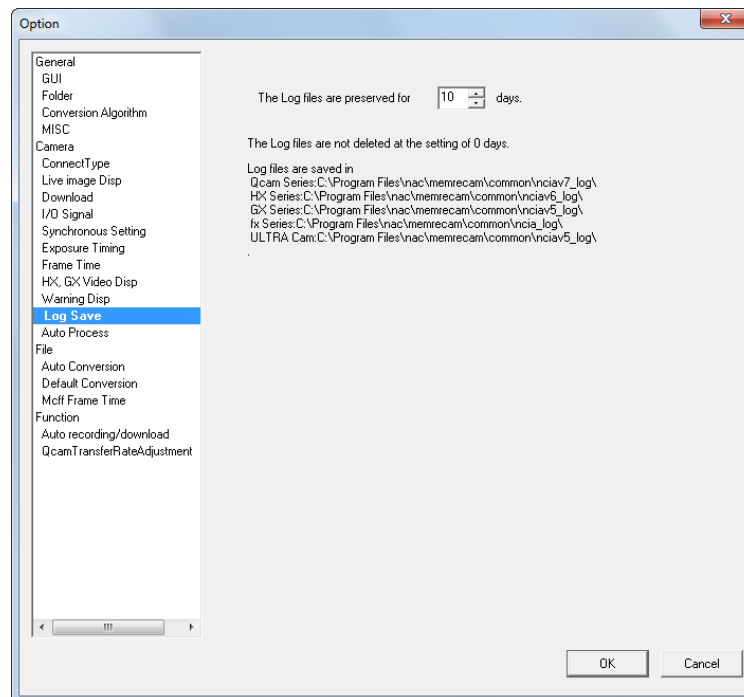
Frame rate	Abnormal frame rate
IRQ (camera periodic interruption)	Abnormal video updates timing
Battery remaining warning	Out of spec or abnormal battery voltage
RTC low battery warning	Low clock battery
Inconsistent black balance data	After updating the black balance, the frame size, frame rate or shutter is changed

Set the notification method for warnings with the following items.

Sound noise for warnings	A warning sounds when a warning is displayed.
Open warning window for warnings	The warnings window opens when a warning is generated.

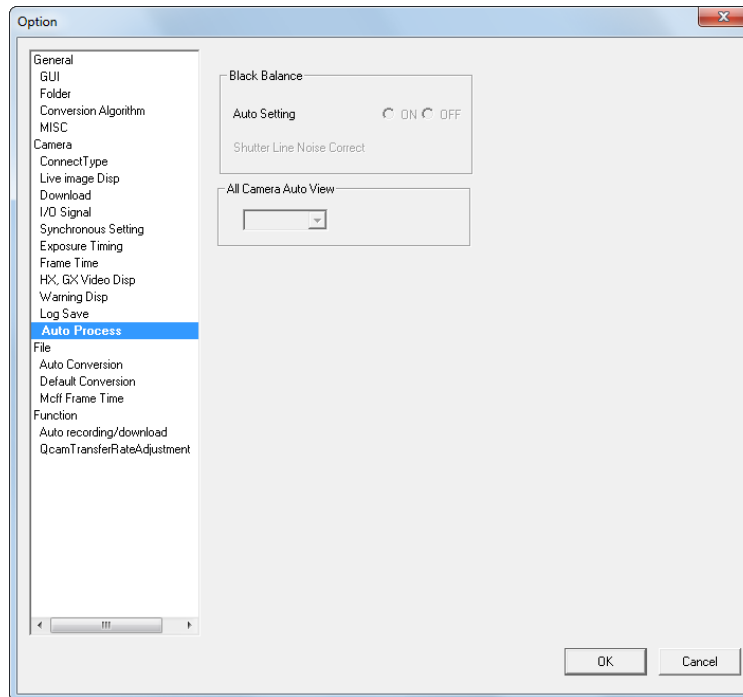
#### ■Save Log

Sets the number of days to save the communication log files between the cameras and the PC.  
The log file is used for HXLink and camera maintenance.



## ■Auto Processing

Settings for the HX camera black balance and auto view.



### Black Balance

#### • Auto Update

HX cameras automatically update the black balance data.

Update black balance: At camera startup, VIEW, ARM and at the end of recording

- |     |  |
|-----|--|
| ON  | Automatically update the black balance.          |
| OFF | Does not automatically update the black balance. |

### All Camera Auto View

Auto view is a function for HX and GX cameras that automatically starts VIEW when recording has been completed.

If images are recorded to the current segment, it automatically switches to the next segment when ARM is started.

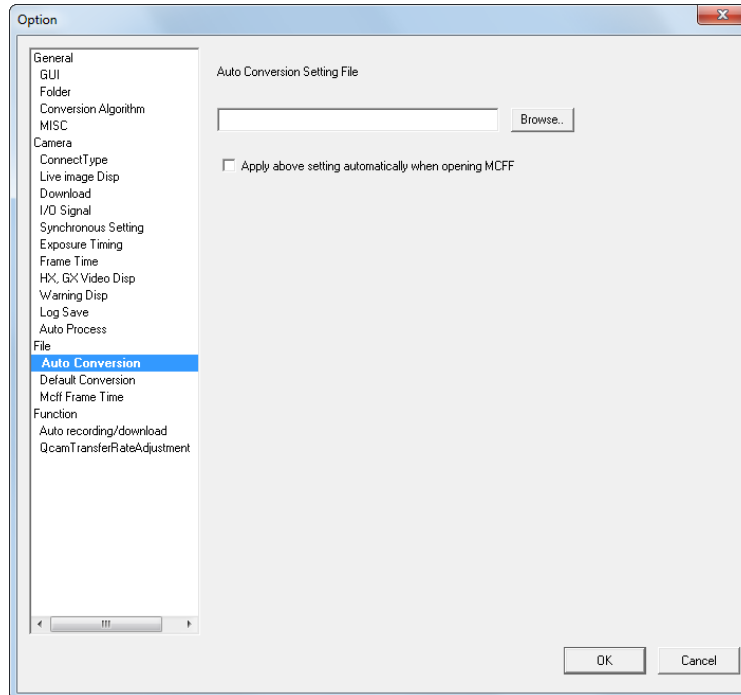
The auto view settings are made in "All Camera Auto View" in the "Option" dialogue and are set to all of the connected HX and GX cameras. Auto view settings cannot be set individually for each camera.

- |      |   |
|------|---|
| OFF  | Auto View not used.   |
| AUTO | Records to the last segment. Images after recording is done are not overwritten.  |
| LOOP | Returns to the first segment and switches to the VIEW mode after recording the last segment. Overwrites even recorded segments when ARM is started. |

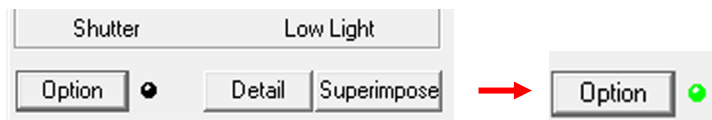
Auto View cannot be used together with the recording trigger mode (NORMAL(L)) that automatically switches segments for recording. In this case, the recording trigger mode settings take priority.

## ■Auto Conversion

When opening a MCFF format or a CIF format, if the file conversion settings (FCV) for the image quality adjustment, conversion settings and specified range settings are registered to an auto conversion setting file, the image is displayed with the details in the conversion setting file.

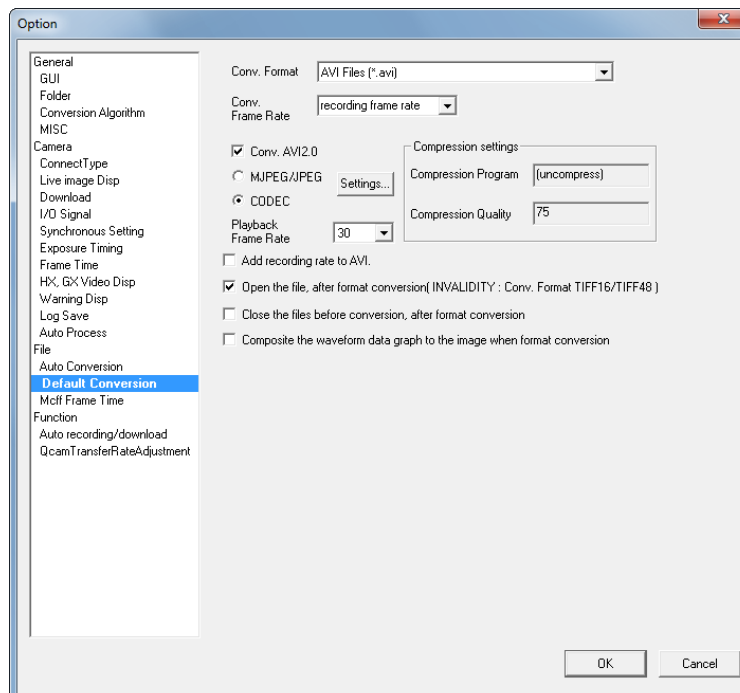


Check “Apply Auto Conversion Settings to the MCFF” and specify “Conversion Settings File (FCV)”, the right indicator in “Options” in the item toolbar turns green on and then the “Conversion Settings” are reflected in the “Camera Image File” (MCFF).



## ■Default Conversion

Sets the default conversion format. Settings for camera image files (MCFF) previously opened can be applied.



#### Conversion Format

Specify the type of file after conversion (AVI, TIFF, JPEG, BMP, MCFF).

#### Conversion Frame Rate

The conversion frame rate saved is the specified frame rate that culls frames during format conversion. Refer to page 5-31 for details.

#### Conversion with AVI2.0

Check to save an AVI file using the "AVI 2.0" format.

Remove the check to save the AVI file using the "AVI 1.0" format.

Since the AVI 1.0 format has a file size limitation of 2GB, if converting images for long recording times, select AVI 2.0.

#### Compression Settings

Select "MJPEG" to convert to a motion JPEG.

Select "CODEC" to convert from the method selected in the registered compression program (CODEC) to Windows.

We are not liable for any CODEC other than nac M-JPEG codec. Please contact the CODEC manufacturer for questions regarding CODEC.

#### Playback Frame Rate

Enabled when the file type after conversion is AVI.

Specify the frame rate set to AVI.

This is not related to the image quality of the AVI file created with format conversion.

The frame rate is the frame rate for AVI files used with the Microsoft Windows Media Player or the Adobe Premier video editing software.

If you check "Add recording rate to AVI." below, the specification of "Playback Frame Rate" is invalid and the frame rate of AVI will be 25 fps.

#### Add recording rate to AVI.

Check to add the recording rate to AVI file.

However, the recording rate added by this function are not used by our software such as HXLink, MOVIAS Neo. When this function is enabled, the above "Playback Frame Rate" specification will be invalid.

#### Open File after Format Conversion

Check to save the format converted data in the file and the file automatically opens and is registered to the item list.

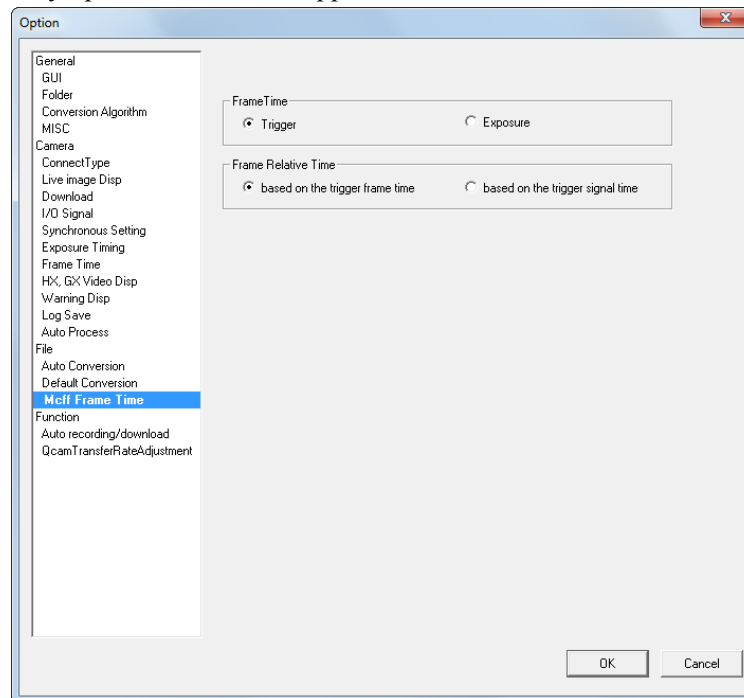
Settings are disabled with TIFF16/TIFF48 conversion.

#### Close Converted File after Format Conversion

Check to close the converted camera image file (MCFF, CIF) after format conversion and that item is removed from the item list.

## ■MCFF Frame Time

Switches the absolute time display for the MCFF frame. This setting reflects the item relating to the MCFF property time to the frame displayed for superimposed information. Settings for already open MCFF can be applied.



### Frame Time

#### Trigger

This method calculates the frame time for the recording speed with the trigger frame time as the trigger signal input time and with other frame times as the reference.

With this method, the frame time is not the same as the exposure time so if using the trigger frame as the relative time, it has the advantage of being easy to understand since the time between each frame is uniform.

With this setting, the frame time is not shown with external sync recording.

#### Exposure

This method is the frame time that is the mid-point between the time when the sensor starts exposure and the time when exposure is stopped.

This method is useful for frame image times but if conducting auto exposure, the time between each frame is not uniform.

With GX cameras, if using the time stamp function, since the image and the time information for that image are stored in the memory, the frame time is shown for EST even with external sync recording.

### Frame Relative Time

#### based on the trigger frame time

“Frame Relative Time” is enabled when “Frame Time” is “Exposure”.

Standard when the trigger frame time calculates the relative frame time.

The trigger frame time is subtracted from the frame time and the time becomes the relative frame time.

#### based on the trigger signal time

The trigger signal input time becomes the standard when calculating the relative frame time.

The time subtracting the trigger signal input time from the frame time becomes the relative frame time.

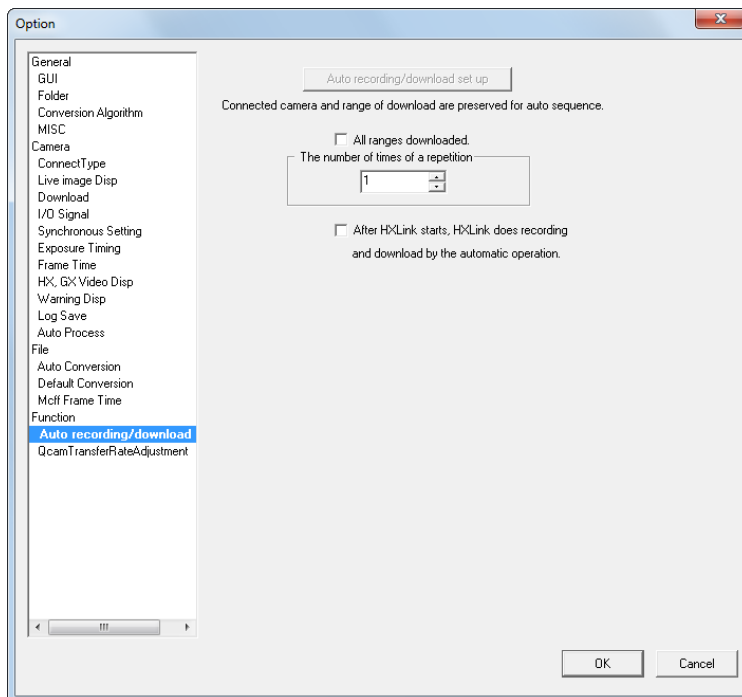
## ■ Camera Auto Control

Settings relating to auto control of the cameras.

If the camera auto control is enabled, camera connection, recording and downloading is automatically performed after HXLink startup.

### Caution

- If not using camera auto control, make sure to remove the check from “Automatically Record and Download at Startup”.
- Camera auto control saves image data in the format specified in “Default Download Format” under the “Camera Live Display ▪ Download” tab of options.



### Auto Record of Download Settings

Click to load the camera CID and download range from the connected cameras and save as the auto control conditions. With camera auto control, click to record with the same conditions (camera and download range) as performing auto recording. Click to set the camera auto control conditions and the amount of disc space required for auto control is calculated, and if there is not enough free space in the download destination drive, a warning is displayed. If a warning is displayed, but the auto control is performed, the recording and download is performed for the free space in the download destination drive.

### Download Entire Range

Check to download all of the images recorded.

Remove the check to specify the download range loaded from the camera in “Auto Record of Download Settings”.

### Repeat Frequency for Record of Download Control

Specifies the repeat frequency for auto control.

### Auto Record of Download at Startup

Enables camera auto control.

Camera auto control is performed at the next HXLink startup.

Check this item and the camera for auto control must be set with “Auto Record ▪ Download Settings”.

## ■ Qcam Transfer Rate Adjustment

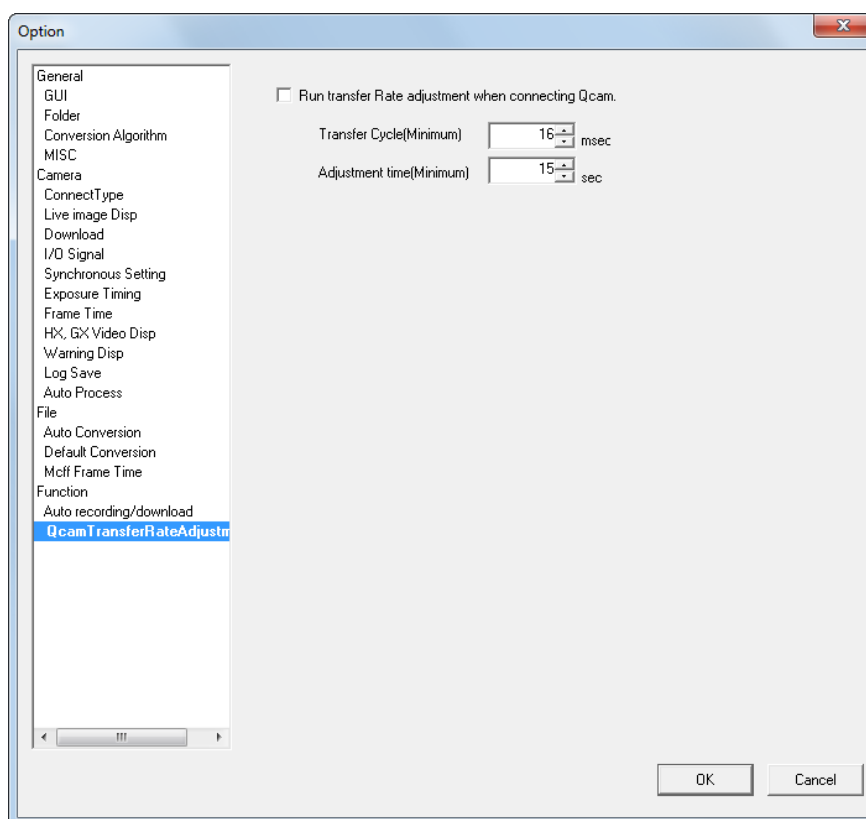
Set Q camera transfer cycle for smooth data transfer that will fit into your own network environment as Q cameras are controlled via GigE Vision network which transfers the data one sided

The following “network connection environment” means types and numbers of the devices existing on the network.

In multi-camera operation, make sure to connect all cameras including HX, GX, fx cameras prior to this adjustment.

Once adjusted, the setting values are saved in PC, so it is unnecessary to adjust it again-unless the network connection environment changes.

Execute this adjustment again, when network connection environment changes.



Run transfer Rate adjustment when connecting Qcam.

Check to execute adjustment at Q camera connection.

Transfer Cycle (Minimum)

Specify the interval time on how often the live images are updated.

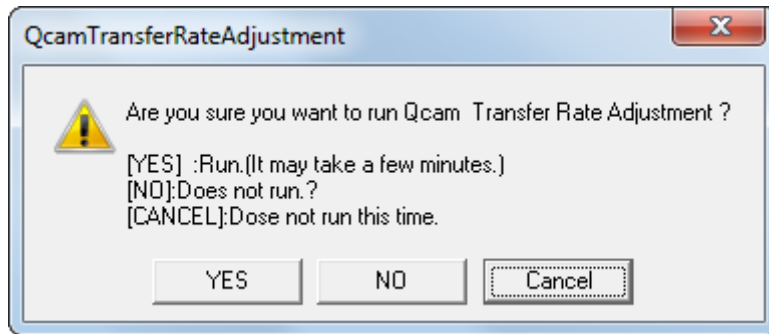
Actual update cycle of live images could vary according to the network connection environment.

Adjustment time (Minimum)

Specify adjustment time.

e.g. Live images get more reliable if the setting is long enough.

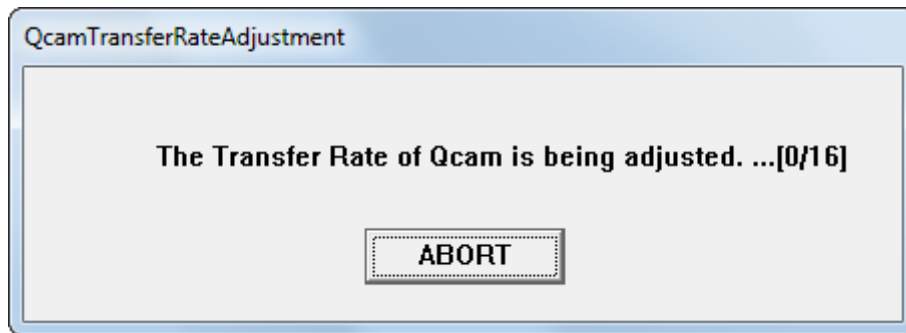
Once shutting down with “Run transfer Rate adjustment when connecting Qcam” checked (✓), the following window is displayed when connecting Q cameras next time.



Press “Yes” to start transfer rate adjustment-

Press “No” not to execute this adjustment.

Press “Cancel”, not to execute this adjustment now but above check window will be displayed again at the next Q camera connection.

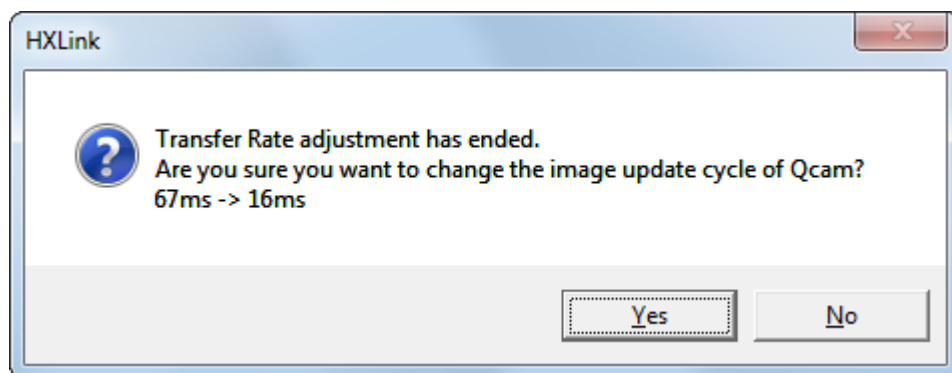


Above window is displayed to show transfer rate is being adjusted.

Wait for completion of adjustment.

Click “ABORT” to suspend the adjustment.

After completion of this adjustment successfully, the following window is displayed.



If clicking “Yes”, update cycle of live images is changed and “Run transfer Rate adjustment when connecting Qcam” gets unchecked.

If clicking “No”, update cycle of live images is not changed and the above check window is displayed again at the next Q camera connection.

# 8

## Settings for the Recording Methods

## 8.1 List of Recording Methods

HXLink can perform various recordings by controlling the MEMRECAM Q, MEMRECAM HX, MEMRECAM GX, and the MEMRECAM fx.

This chapter describes the settings for each of the recording methods.

- External sync recording (EST)
- Multi camera sync recording with IRIG-B signals
- GX multi camera sync recording with the GX-HUB
- Multi camera sync recording with a combination of HX, GX, fx
- Event recording
- Burst recording
- Multi trigger recording
- Exposure phase shift recording
- Long term recording with post trigger
- Set exposure timing with trigger signal
- Frame straddling photography
- Multi camera sync recording with Q cameras

Settings for “Sync Settings”, “Input/Output Signals”, “Exposure Timing”, “Camera Frame Time” required for each recording method can be performed with any of the following.

Settings with connected cameras

“Photograph” menu

“Options”

Settings when connecting cameras

“Camera Connection Settings”

Settings for “Exposure Phase”, “Frame Rate” and Shutter” required for each recording method are performed during camera connection. “Exposure Phase”, “Frame Rate” and Shutter” are stored on the camera so set once and record with the same settings.

## 8.2 External Sync Recording (EST)

When performing EST recording with GX cameras, the shutter must be set so the sensor exposure time is shorter than the cycle (or shortest time frame) of the external sync signal. If the following sync signal pulse is received during sensor exposure, proper recording will not be possible.

With HX and GX-8 cameras, A-EST synchronization is possible with great precision. With A-EST synchronization, set the exposure time to 1/2 or less the cycle of the external sync signal.

With fx cameras, you must set the frame rate for two or more times that of the external sync signal.

Example) If GX-1 external sync signal:2400Hz -> cycle:416.7us  
If the GX-1 image size is 640x480, set the shutter (exposure time) to 413us or less.  
Since the fx requires a frame rate setting of 5000pps, the exposure time is at the max of 200us.

- Setting and Confirming the HX, GX and Q camera Shutter Values Set  
With EST Signal:2400Hz, frame size:640x480

Connect the HX and GX cameras with HXLink to display the “Camera Details” dialogue.  
(Select the HX or GX camera with “Detailed Settings” or from the item list and right click to select).

Click the frame rate button on the recording parameters in the “Camera Details” dialogue to display the “Custom Settings (Frame Rate, Frame Size)” dialogue.  
Set the frame rate to 2400 (input 2400 on the keyboard) and the frame size to 640x480 and click “OK”.

Click the shutter button on the recording parameters.  
The “Custom Shutter Settings” dialogue appears, and the possible settings for the shutter range are shown under microSEC. The maximum value noted there is the maximum value that can be set for the shutter during 2400Hz EST recording. Set the shutter time in this dialogue and click “OK”.

When recording with this setting and the EST signal is greater than the assumed frequency of 2400Hz, multiple EST signals show up during the frame exposure determined by the shutter setting, and in that case, the recording stops. Recording will not function until the EST signal frequency drops and recording can be conducted at the shutter setting.  
In this case, either make sure the EST signals do not get higher than the frequency or change the shutter settings to shorten the exposure time.

Also, if changing the shutter settings to extend the exposure time, check the shutter settings in advance and set a low frame rate to the camera.

- Connection for EST Recording  
Input the external sync signal to the HX or GX or Q camera or GX-HUB for EST recording.  
With fx cameras, input the external sync signal to the AUX connector on the rear panel. Refer to the fx camera user's manual for details.  
To input direct sync signals to GX camera, connect the J1 cable to the J1 POWER connector and input the sync signal to the EST1 or connect the J3 cable to the J3 ETHERNET connector and input the sync signal to the EST2.

With HX cameras, either input the sync signal to the EST connector (EST1) or connect the J3 splitter cable to the REMOTE connector and input the sync signal to the EST2.

With Q cameras, input the sync signal to the EST connector (EST). Refer to page 8-23 for details of sync recording with Q cameras.

When using the GX-HUB, connect any of PORT1~PORT4 on the GX-HUB to the GX camera J3 ETHERNET connector with the remote cable and input the sync signal to the GX-HUB EST IN.

#### ■ Procedures for External Sync Recording Settings

Set EST recording with the following procedures.

Settings (1)(2)(3)(4)(6) below can be batch set in “External Sync Recording (EST)” in the “Recording” menu once HXLink is used for camera connections. Refer to page 8-28 for details.

- (1) Select sync signal in sync settings (Options/Camera Connection Settings), and set EST for the HX, GX and Q cameras to be synchronized.  
Sets fx camera synchronization to EST.  
Sets HX, GX EST view sync. Select ON (EST/A-EST) if the EST sync signal is input during VIEW, or OFF (internal sync) otherwise.

※Set the HX and GX cameras to EST recording, input the sync signal and the CM LED at the back of the camera flashes during VIEW/ARM/REC.

- (2) Select the polarity and noise reduction filter for the sync signals in input/output signals (Options/Camera Connection Settings)
  - EST Input Selection  
Selects EST1 or EST2.
  - EST1 Input Polarity  
Sets the signal polarity if the sync signal from the POWER (J1) cable is input.
  - EST2 Input Polarity  
Sets the signal polarity if the sync signal from the ETHERNET (J3) cable or the GX-HUB EST IN is input.
  - EST1 Filter  
Sets the time constant (time delay) for the filter removing noise from the sync signal.
  - EST2 Filter  
Sets the time constant (time delay) for the filter removing noise from the sync signal.

- (3) Exposure Timing (Options/Camera Connection Settings)  
During EST recording, selects the GX native for the exposure timing setting.  
(The fx compatible camera mode does not function properly during EST recording)

- (4) Camera Frame Time (Options/Camera Connection Settings)  
To recognize the recorded frame time during EST recording, select the exposure time as the absolute frame time and turn the time stamp ON.  
During EST recording, since it isn't known how many start exposure sync signal pulses are input, if the time stamp is not recorded, the frame time of the recorded image is not known.

- (5) Connect Cameras with HXLink

- (6) Exposure Phase for Recording Parameters (Camera Details or List of Camera Settings)  
Click “Detailed Settings” to open the window for “Camera Details” or “List of Camera Settings” and set the exposure phase for the recording parameters to 0°.

(7) Frame Rate and Shutter for Recording Parameters (Camera Details or List of Camera Settings)

Sets the frame rate and shutter in HX, GX and Q cameras so the next exposure pulse (sync signal) doesn't arrive during sensor exposure. With fx cameras, sets the frame rate to double or more the speed of the sync signal.

(8) EST Recording

After setting the aforementioned, turns the camera to VIEW/ARM.

■ VIEW during EST Recording Settings

During EST recording settings, the GX camera drives the sensor with external sync signals when in VIEW. If there is no external sync signal during VIEW, select "OFF (Internal Sync)" with "HX, GX EST VIEW Sync" in "Sync Settings" of "Options" or "Camera Connection Settings".

With fx cameras, the sensor is driven by internal sync signals when in VIEW. The fx camera can display the image even without external sync signals when in VIEW and the captured image is not synced to the external sync signals so if using a strobe light, the image with the same brightness as the recording cannot be confirmed.

■ HX and GX-8 A-EST Sync

With HX and GX-8 cameras, "A-EST Sync" is available in addition to "Internal Sync" and "EST Sync" in "Sync HX, GX Cameras".

A-EST sync sets synchronization to EST signals that is more precise than EST synchronization. To use A-EST sync, select "A-EST Sync" in "Sync HX, GX Cameras" under "Sync Settings" in "Options" or "Camera Connection Settings".

Specify in "Sync Cameras" under the "Recording Parameters" tab in the "List of Camera Settings" window.



Caution

With A-EST, if the EST signal interval is double or less that of the exposure time, the brightness of the image may fluctuate and there may be horizontal noise.

Caution

With HX and GX-8 cameras, if external sync recording when the "Sync GX Camera" is set to "EST Sync" or "A-EST Sync", the trigger resetting function does not work. If "GX Camera Time" is set to "Reset Trigger", that setting is disabled and the "GX Camera Time" functions as "Camera Internal Time".

Caution

When using "A-EST Sync", the "Exposure Timing" setting is disabled and it functions as "GX Native".

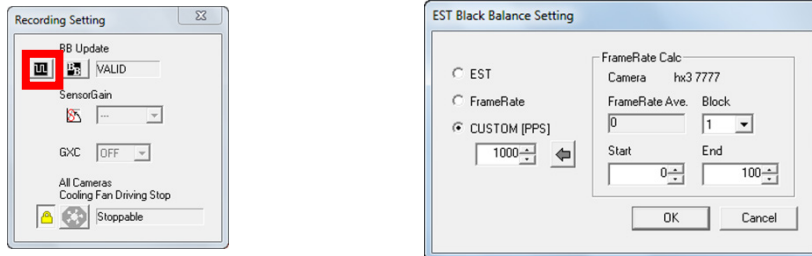
## ■ EST Recording Black Balance Settings

The black balance data recording rate can be specified for HX camera EST recording.

If the frequency for the external sync signals changes with EST recording, and if a frame rate slower than the minimum frequency is not set, recording is not possible.


With ESTBB settings, specify the black balance recording rate for EST recording and set the HX camera.

The optimal setting can be the recording rate calculated from the recorded data.



Click the ESTBB settings button  to open the ESTBB settings window.

Select “CUSTOM” in the ESTBB settings window and enter the frame rate.

If recording data to the HX camera, specify the data range (block, start frame, end frame) to display the average frame rate for the range and then click  to set that value to the “CUSTOM” frame rate.

Even if the ESTBB setting is “CUSTOM”, if the black balance is the ESTBB “CUSTOM” recording rate, recording may not be possible.

There are upper limits to the frame size and shutter settings for frame rate when getting the black balance with the ESTBB CUSTOM setting.

Since recording cannot be performed at a speed higher than the maximum frame rate for the exposure time for the shutter settings, if the ESTBB “CUSTOM” recording rate is faster than the maximum frame rate for recording settings “Shutter”, the black balance is obtained at this maximum frame rate.

## 8.3 Multi Camera Sync Recording with IRIG-B Signals

This describes the connections and settings for when performing sync recording with the IRIG-B signals and trigger signal divided into each camera.

Refer to page 8-23,24 for details of sync recording using Q camera with IRIG signals.

### ■ Connections for IRIG-B Signal Input

Connect the J3 cable to the J3 ETHERNET on the back of the camera to input IRIG-B signals to the HX and GX cameras, and input the IRIG-B signals to the J3 cable IRIG-B connector.

Use the optional M-HUB or IRIG BOX to input IRIG-B signals to the fx camera. A description of the IRIG BOX (583095 IRIG BOX (CR-995)) is provided here.

Install the IRIG BOX to the fx camera, and connect the fx camera REMOTE I/O connector with the IRIG BOX DATA OUT connector using the attached connection cable. The IRIG-B signals are input to the IRIG BOX IRIG IN connector. If the IRIG BOX is used, the fx camera rear panel TRIG.IN connector is disabled so the external trigger signals are input to the TRIG BOX TRIG.IN connector.

### ■ Confirmation of HX and GX Camera IRIG Time/Status

If setting the HX and GX cameras to IRIG sync, it is possible to confirm the IRIG time and IRIG-B signals and the camera sync status during VIEW/RECORD with the live video (PC). To confirm the IRIG time on the video display, the IRIG time is displayed in the location where the trigger time is shown in the top center of the screen when the DATETIMEIBOX display is Current while recording with the HXLink settings. To confirm the IRIG time with the live PC, click on the live time display in the display menu and the IRIG time is superimposed on the live image.

Also, click IRIG lock and event 2 display in the display menu to superimpose the GX camera and IRIG-B signal sync status on the display.

### ■ Procedures to IRIG-B Sync Recording Settings

Perform the settings for IRIG-B sync recording with the following procedures.

Settings (1) (2) (3) (4) (5) below can be batch set in “IRIG Sync Recording” in the “Recording” menu once HXLink is used for camera connections. Refer to page 8-28 for details.

- (1) Select the camera time to IRIG in sync settings (Options/Camera Connection Settings), and set the HX and GX cameras to the IRIG/M-HUB time.  
Set the fx camera time to IRIG time.
- (2) Enable the time stamp in the camera frame time (Options/Camera Connection Settings)  
Sets the absolute frame time to the exposure time.  
Sets the time stamp to ON.
- (3) If there are fx cameras other than the K4, K5 with sync recording that matches the exposure timing of the camera in Exposure Timing (Options/Camera Connection Settings), make sure all of the cameras set are set to K3 compatible.  
If there are no fx cameras other than the K4, K5 with K4, K5 sync recording, set all of the cameras to K4 or K3 compatible.  
If only GX cameras are sync recording, select either GX native, K4 or K3 compatible.

- (4) To reduce trigger signal noise from the HXLink with the trigger filter properly set in Input/Output Signals (Options/Camera Connection Settings), the trigger filter has a default of 20us. Change this setting to adjust the trigger time variation for the GX and fx cameras.
- (5) The recording data IRIG time is shown on the GX camera video display when the frame counter display setting is absolute time from the trigger IRIG time set in GX video display (Options/Camera Connection Settings).  
Set the DATETIMEBOX display during recording to Current, and the IRIG time is shown on the GX camera video display during VIEW/RECORD.
- (6) Connect cameras with HXLink
- (7) Exposure Phase for Recording Parameters (Camera Details or List of Camera Settings)  
Click “Detailed Settings” to open the window for “Camera Details” or “List of Camera Settings” and set the exposure phase for the recording parameters to 0°.
- (8) Sync Recording with IRIG-B Signals  
After setting the aforementioned, turn the camera to VIEW/ARM.

## 8.4 Combined HX, GX Multi Camera Sync Recording with the GX-HUB

This describes the connections and setting for when performing sync recording with the GX-HUB and HX and GX cameras without using IRIG-B signals.

### ■ Connections for Multi Camera Sync Recording

When using the GX-HUB, connect any of PORT1~PORT4 on the GX-HUB to the HX or GX camera J3 ETHERNET connector with the remote cable. Connect the external trigger to the GX-HUB TRIG IN.

### ■ Procedures for Multi Camera Sync Recording

Settings (1) (2) below can be batch set in “GX-HUB Sync Recording” in the “Recording” menu once HXLink is used for the camera connections. Refer to page 8-29 for details.

#### (1) Sync Settings (Options/Camera Connection Settings)

Set the HX,GX camera time to GX-HUB time.

#### (2) Input/Output Signals (Options/Camera Connection Settings)

Set the trigger input selection to TRIG2 and set the TRIG2 input polarity to current ON.

(If the TRIG2 input polarity is set to current OFF, the trigger signal is ON even if there is no connection to the GX-HUB TRIG.IN terminal)

## 8.5 Combined Qcam, HX, GX, fx Multi Camera Sync Recording

Refer to the GX-HUB user's manual for the connection method for combinations of HX, GX and fx cameras using the M-HUB or GX-HUB.

### ■ Precautions for a Combined HX, GX, fx System

- One fx camera is needed for M-HUB control with a M-HUB system.
- If using IRIG-B signals, input the IRIG-B signals to the M-HUB IRIG.IN terminal.
- Input trigger signals to the M-HUB TRIG.IN terminal.

### ■ Procedures for Combined HX, GX, fx Multi Camera Sync Recording

Settings (1),(2) below can be batch set in “Combined Qcam, HX, GX, fx Sync Recording” in the “Recording” menu once HXLink is used for camera connections. Refer to page 8-29 for details.

#### (1) Sync Settings (Options/Camera Connection Settings)

Set the Qcam, HX, GX camera time to IRIG/M -HUB time.

#### (2) Input/Output Signals (Options/Camera Connection Settings)

Set the trigger input selection to TRIG2 and set the TRIG2 input polarity to current ON.

(If the TRIG2 input polarity is set to current OFF, the trigger signal is ON even if there is no connection to the M-HUB TRIG.IN terminal)

## 8.6 Event Recording

This is a recording method that saves events when the trigger signal is ON.

### ■Precautions for Event Recording

- Since an event cannot be accessed with the HXLink “Trigger” button during event recording, the “Trigger” button is disabled. Make sure to record with event signals and trigger input.
- The event is shown on the HXLink playback slider and the ability to frame jump events differs according to the camera used on the segment.

HX Camera	63
GX Camera	15
Fx Camera	15

If the time stamp function is used with the GX camera, 16 or more events can be recorded.

However, with the 16<sup>th</sup> and subsequent events, only the event mark is superimposed on the image of the frame input for the event signals, and the event mark is not shown on the playback slider, and frame jumping for the event is not possible.

- With GX cameras, if there are more than 15 events, turn the time stamp ON.

## 8.7 Burst Recording

This is a recording method that saves images when the burst signal (external trigger signal) is ON. The burst recording end conditions are when the memory segment recording is done or when recording is interrupted with the “Stop” button.

### ■ Precautions for Burst Recording

- Since recording is not possible with the “Trigger” button during burst recording, the “Trigger” button is disabled. Make sure to record with burst signals and trigger input.
- Turn the burst signals ON/OFF to perform multiple block recording but the ability to identify and display block boundaries with HXLink varies according to the camera.

HX Camera	Maximum of 64
-----------	---------------

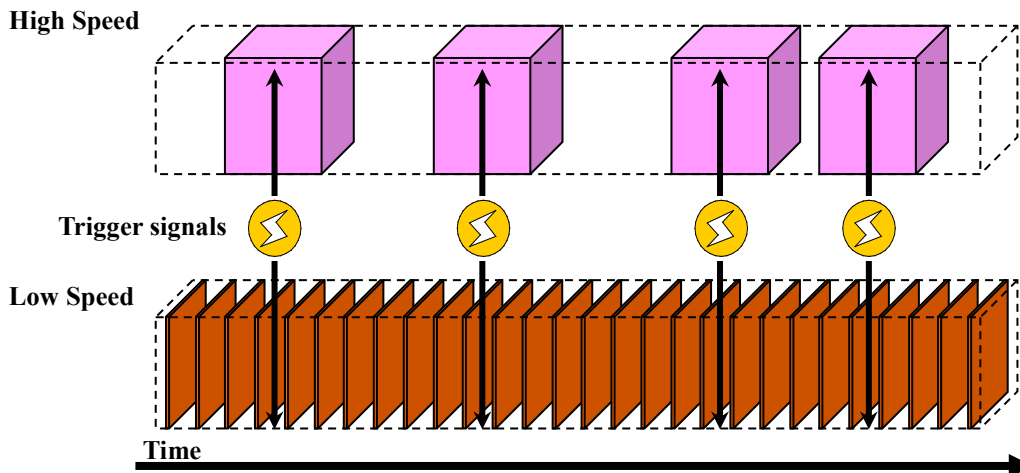
GX Camera	Maximum of 16
-----------	---------------

Also, the recorded data after the 65<sup>th</sup> (HX camera) or 17<sup>th</sup> (GX camera) block is all saved in the 64<sup>th</sup> (HX camera) or 16<sup>th</sup> (GX camera) blocks.

- With GX cameras, if there are more than 16 burst recorded blocks, make sure to turn the time stamp ON and set the absolute frame time to the exposure time. If the time stamp is OFF, the data for the 17<sup>th</sup> and subsequent blocks directly linked to the 16<sup>th</sup> block are identified as a recorded item.
- For trigger input with burst signals, a trigger filter is added for noise reduction. This trigger filter has a default setting of 20us. Set the trigger filter to 0us when recording at a timing without any delay of the burst signals.
- When downloading burst recorded image data, previously set ranges cannot be downloaded. Turn the “Save Download Range” to OFF and then set the range to be saved.

## 8.8 DUAL Recording

DUAL recording is a function of the HX cameras and is a recording method that uses two segments to simultaneously record high and low speeds. With DUAL recording, the high speed recording segments are partitioned into multiple blocks recording with the timing shown in the following figure. The two segments filmed with DUAL recording can be separately played back and saved.



### Restrictions for DUAL Recording

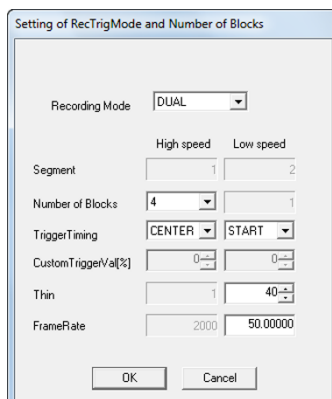
- The frame size for high speed and low speed DUAL recording is the same.
- The ratio for the frame rate for high speed and low speed DUAL recording is in whole numbers.
- The maximum frame rate for DUAL recording is 1/2 the normal recording.
- The DUAL recording shutter OPEN exposure time is 1/2 the normal recording.
- If switching from normal recording to DUAL recording, 1/2 of the normal recording frame rate is set for high speed recording.

### Method of Setting DUAL Recording

- 1) Partition at least two segments before setting DUAL recording.
- 2) Set the frame rate to high speed.

If the DUAL recording high speed recording is 2000pps, set the frame rate to 4000pps.

- 3) Open the recording trigger mode setting window.



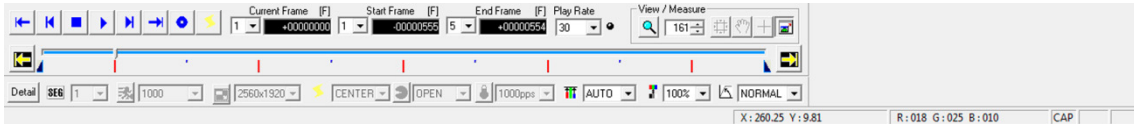
- 4) Select DUAL as the recording trigger mode.
- 5) Set the number of blocks for high speed recording.  
4 is set in the example.
- 6) Set the trigger timing.  
In the example, CENTER is set for high speed and START is set for low speed.
- 7) Set the frame rate for the low speed recording.  
50pps is set as the frame rate for low speed in the example.
- 8) Adjust the high speed and low speed recording time with the segment size settings.
- 9) Select the high speed recording segments and start DUAL recording.

## 8.9 Multi Trigger Recording

### ■ Download Multi Trigger Recordings

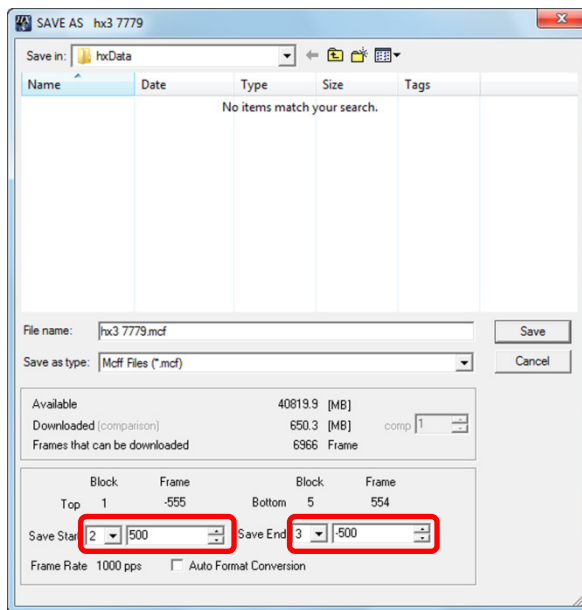
Specifying the range of multi trigger recording downloads varies according to the downloaded GUI.

With individual downloads, the data for all recorded blocks is shown on the slider bar so the portion of the recorded range is downloaded.



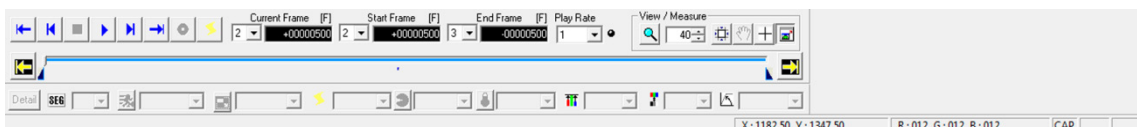
The camera recorded block and the recorded range immediately after multi trigger recording is shown in the following example.

- Block 1 (Recorded range: -555 ~ +554)
- Block 2 (Recorded range: -555 ~ +554)
- Block 3 (Recorded range: -555 ~ +554)
- Block 4 (Recorded range: -555 ~ +554)
- Block 5 (Recorded range: -555 ~ +554)



Open the “Save As” dialogue, and set the following save range to download.

- Start Save: Block 2, Frame +500
- End Save: Block 3, Frame -500

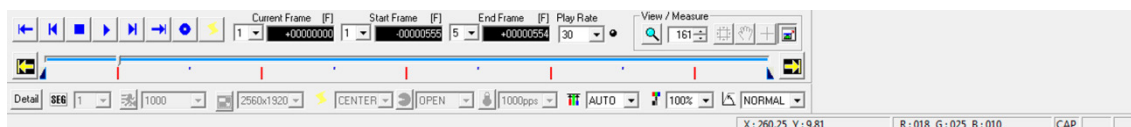


The playback block for the created MCFF and the playback range are shown as follows.

- Block 2 (Playback Range: +100 ~ +554)
- Block 3 (Playback Range: -555 ~ -500)

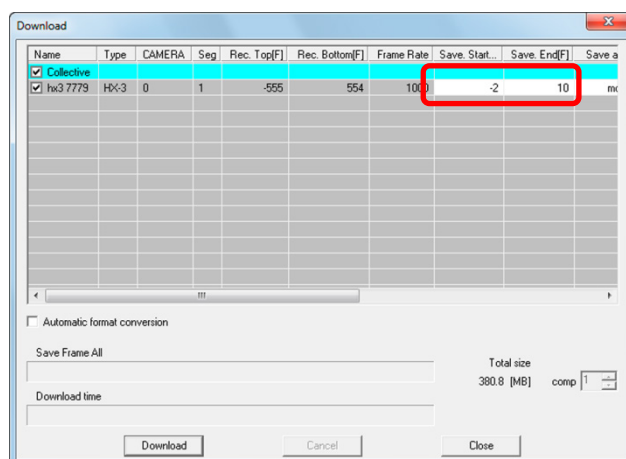
With batch downloads, the data for the range of the frame numbers specified for all of the data blocks for the camera is downloaded. Blocks cannot be specified.

The frame numbers displayed in the Start Save+End Save when the “Download” dialogue was opened are the minimum frame number and maximum frame number for the range saved, and so differ from the start frame and end frame shown on the slider bar.



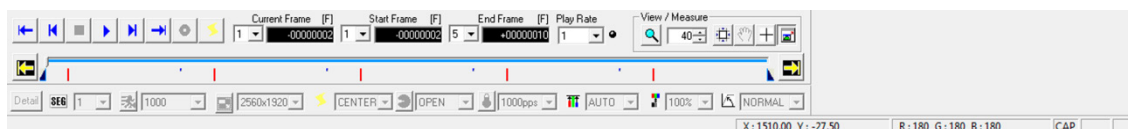
The camera recorded block and the recorded range immediately after multi trigger recording is shown in the following example.

- Block 1 (Recorded range: -555 ~ +554)
- Block 2 (Recorded range: -555 ~ +554)
- Block 3 (Recorded range: -555 ~ +554)
- Block 4 (Recorded range: -555 ~ +554)
- Block 5 (Recorded range: -555 ~ +554)



Open the “Download” dialogue, and set the following save range to download.

- Start Save: Frame -2
- End Save: Frame +10



The playback block for the created MCFF and the playback range are shown as follows.

- Block 1 (Playback Range: -2 ~ +10)
- Block 2 (Playback Range: -2 ~ +10)
- Block 3 (Playback Range: -2 ~ +10)
- Block 4 (Playback Range: -2 ~ +10)
- Block 5 (Playback Range: -2 ~ +10)

## 8.10 Exposure Phase Shift Recording

Use this method for high resolution+high speed recording using multiple HX, GX and Q cameras. Applies to telephoto recording where the parallax generated can be ignored, depending on the location of the cameras.

For example, recording at 10000pps with the GX-1 with a frame size of 512x384 is possible but at 20000pps, a frame size of 512x384 is not possible.

However, sync two GX cameras and set the exposure phase for one camera to 180° and record while matching the focal axis to obtain data from two cameras with a frame size of 512x384 that is equivalent to 20000pps.

### ■ Precautions for Exposure Phase Shift Recording

- With the exception of the exposure phase, all of the camera settings used for exposure phase shift recording are identical.
- Make the exposure timing setting GX native.
- Make the absolute frame time the exposure center time.
- Use IRIG signals or the GX-HUB to sync all of the cameras.
- Set the sync signals to internal synchronization. The exposure phase shift function does not work with external synchronization (EST).

### ■ Procedures for Settings for Exposure Phase Shift Recording

#### (1) Sync Settings (Options/Camera Connection Settings)

Set the Qcam, HX, GX camera time to GX-HUB time if using the GX-HUB without IRIG signals.

Set the Qcam, HX, GX camera time to IRIG and M-HUB time if using IRIG signals.

Set the Qcam, HX, GX cameras to internal synchronization.

#### (2) Exposure Timing (Options/Camera Connection Settings)

Set the Qcam, HX, GX exposure timing to GX native.

#### (3) Camera Frame Time (Options/Camera Connection Settings)

Select the exposure time with the absolute frame time.

#### (4) Connect Cameras with HXLink

#### (5) Exposure Phase for Recording Parameters (Camera Details or List of Camera Settings)

Click “Detailed Settings” to open the window for “List of Camera Settings” and set the exposure phase for the recording parameters to each of the cameras. Settings other than exposure phase are common for all of the cameras.

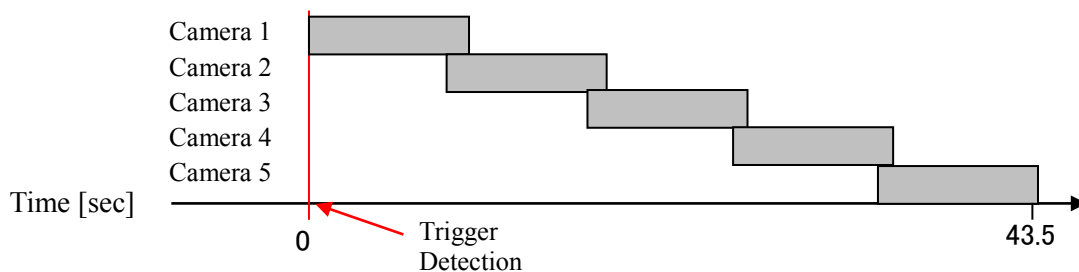
## 8.11 Long Term Recording with Post Trigger (HX and GX-8 Cameras)

Use this method for long term recording using multiple HX and GX-8 cameras.

Applies to telephoto recording where the parallax generated can be ignored, depending on the location of the cameras.

For example, recording at 10000pps with the GX-8 (model with 8GB memory) with a frame size of 1024x768, and a pixel bit length of 10bit, 8.7 seconds (8704 frames) of recording is possible. However, with 5 synchronized GX-8 (model with 8GB memory) cameras, set the “Initial Frame Recorded” for each to 0, 8700, 17400, 26100, 34800, and record with the focal axis coordinated to obtain data equivalent to about 43.5 (43504 frames) from the data from 5 cameras.

Camera	Recording Start Frame	Recording End Frame	Recording Start [sec]	Recording End [sec]
Camera 1	0	+8703	0	+8.703
Camera 2	+8700	+17403	+8.700	+17.403
Camera 3	+17400	+26103	+17.400	+26.103
Camera 4	+26100	+34803	+26.100	+34.803
Camera 5	+34800	+43503	+34.800	+43.503



### ■ Precautions for Post Trigger

- With the exception of the trigger position, all of the camera settings used for post trigger recording are identical.
- Make the absolute frame time the exposure center time.
- Use IRIG signals, the GX-HUB or external sync (EST) to sync all of the cameras. However, if synchronizing with EST without using IRIG signals or the GX-HUB, the time for each camera will not match.

### ■ Procedures for Settings for Long Term Recording with Post Trigger

#### (1) Sync Settings (Options/Camera Connection Settings)

If using the GX-HUB without IRIG signals, set the HX and GX camera time to the GX-HUB time. Set the HX, GX camera time to IRIG, M-HUB time if using IRIG signals. If not using IRIG signals or the GX-HUB but using EST signals, set the HX and GX camera synchronization to EST. However, this is limited to when the time display does not have to be correct.

#### (2) Camera Frame Time (Options/Camera Connection Settings)

Select the exposure time with the absolute frame time if displaying the time.

#### (3) Connect Cameras with HXLink

#### (4) Trigger Timing for Recording Parameters (Camera Details or List of Camera Settings)

Click “Detailed Settings” to open the window for “List of Camera Settings” and select the trigger timing (CUSTOM) for the recording parameters and set “First Frame Recorded” in the custom trigger dialogue to each of the cameras. Settings other than trigger position are common for all of the cameras.

## 8.12 Setting the Exposure Timing with Trigger Signals (HX and GX-8 Cameras)

With the GX-8 camera, the trigger signal can synchronize the exposure timing with an external device.

If the GX camera time is set to trigger reset and a trigger signal is detected during recording, the exposure is ended immediately afterwards and exposure of a new trigger frame starts and recording thereafter is performed at the specified frame rate.

### Recording Limitations with Trigger Reset

- There are recording frame size limitations with trigger reset recording, and there are conditions at which recording can be performed for each pixel bit length. H is the horizontal resolution and V is the vertical resolution.

Camera	Pixel Bit	Horizontal Resolution (H)	Vertical Resolution (V)	
GX-8 (standard 64x4 units)	8bit	Multiple of 16	Multiple of 8	
	10bit	Multiple of 32	Multiple of 16	
	12bit	Multiple of 16	Multiple of 16	
HX-1 (standard 64x8 units)	8bit	Multiple of 64	Multiple of 8	(no restrictions)
	10bit	Multiple of 64	Multiple of 16	
	12bit	Multiple of 64	Multiple of 16	(no restrictions)
HX-1 using HD-mag (standard 64x8 units)	8bit	Multiple of 64	Multiple of 64	
	10bit	Multiple of 128	Multiple of 128	
	12bit	Multiple of 128	Multiple of 64	

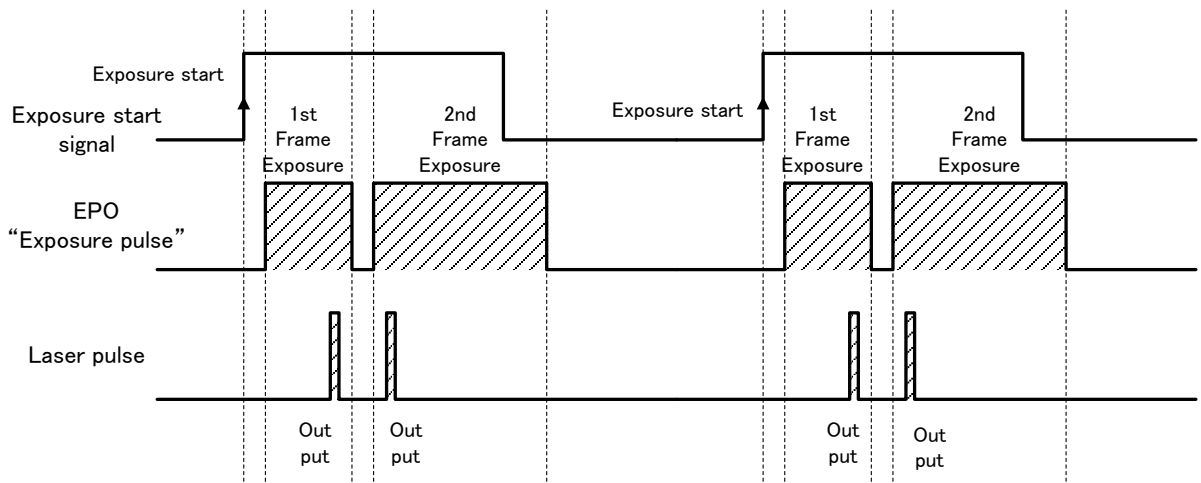
- The time stamp cannot be saved with trigger reset recording.
- The brightness (black level) of frame number 0 (trigger frame) may differ from the other frames.
- The frame number-1 (immediately before the trigger frame) image may not be properly saved.
- With trigger reset recording, since sync recording is not possible with the IRIG and EST signals, the variation in exposure timing (error) increases as the recording time lengthens.
- Synchronization of the exposure timing with the trigger timing can only be performed once during recording.

To use the trigger reset function, set “GX Camera Time” to “Trigger Reset” in the sync settings (Options/Camera Connection Settings) (Refer to page 6-4).

Refer to the GX-8 user's manual (800249) for details of the trigger reset function.

## 8.13 Frame Straddling (HX and GX-8 Cameras)

With the HX and GX-8 cameras, the frame straddling function enables recording two images with a very short time separation that is used with PIV (Particle Image Velocimetry). Frame straddling photography is a method of recording a group of two images that involves shining a laser at a very short time interval before and after the frame. With GX-8 frame straddling, recording is performed on two frames (1<sup>st</sup> frame, 2<sup>nd</sup> frame) at the first exposure start signal.



To use the frame straddling function, set “HX, GX-8 Frame Straddling” under the “Exposure Timing” tab of “Camera Connection Settings” or “Options” to “ON”. Refer to page 6-7.

It can also be set in “Recording Parameters” in the “List of Camera Settings” window. Refer to page 4-22.

Internal sync or EST sync can be selected for the camera synchronization.

- With the camera EPO output signal as a reference, if synchronizing with laser pulse timing, set the GX camera synchronization to “Internal Sync”.
- If a reference signal exists separate from the camera, set the HX and GX camera synchronization to “EST Sync” so the timing of the camera and the laser pulses are synchronized to the reference signal. The frame rate depends on the frequency of the reference signal.

The timing to switch the camera from the 1<sup>st</sup> frame to the 2<sup>nd</sup> frame can be adjusted by changing the 1<sup>st</sup> frame exposure time in the shutter settings.

Also, the 2<sup>nd</sup> frame exposure time depends on the frame size and so cannot be changed.

During frame straddling, only one of either the 1<sup>st</sup> frame or the 2<sup>nd</sup> frame can be shown on the live video and PC display, which is handy to verify the timing of the laser pulses.

Set “HX, GX-8 Frame Straddling” in “Exposure Timing” (Options/Camera Connection Settings) (Refer to page 6-7.).

- |     |   |
|-----|---|
| ANY | In VIEW/ARM, displays the most recent video or live image without differentiating between the 1 <sup>st</sup> and 2 <sup>nd</sup> |
| 1st | In VIEW/ARM, displays the most recent video or live image in the 1 <sup>st</sup> frame  |
| 2nd | In VIEW/ARM, displays the most recent video or live image in the 2 <sup>nd</sup> frame  |

Refer to the HX or GX-8 camera user's manual for details of the frame straddling function.

## 8.14 Multi camera sync recording with Q camera

For sync recording of Q camera, you can use the following connection methods.

### 1. Synchronize Q cameras

- Synchronize multi Q cameras with external signals
- Synchronize multi Q cameras with daisy-chain connection
- Synchronize multi Q cameras with Q-HUB

### 2. Synchronize Q cameras and HX, GX cameras

- Synchronize Q cameras and HX, GX cameras with external signals
- Synchronize Q cameras and HX, GX cameras with GX-HUB and Q-HUB

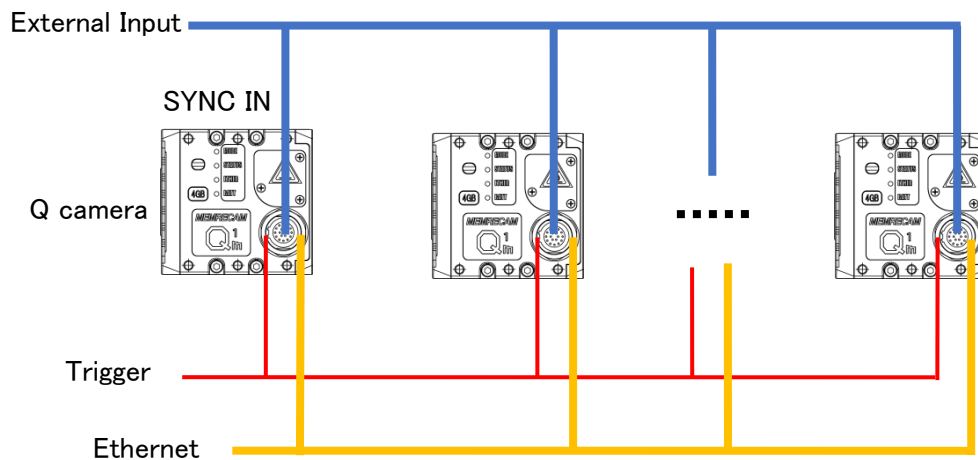
### 8.14.1 Synchronize Q cameras

You can input 1. none/ 2. EST/ 3. period/ 4. 1kHz/ 5. IRIG/ 6. Q-HUB into the System with only Q cameras.

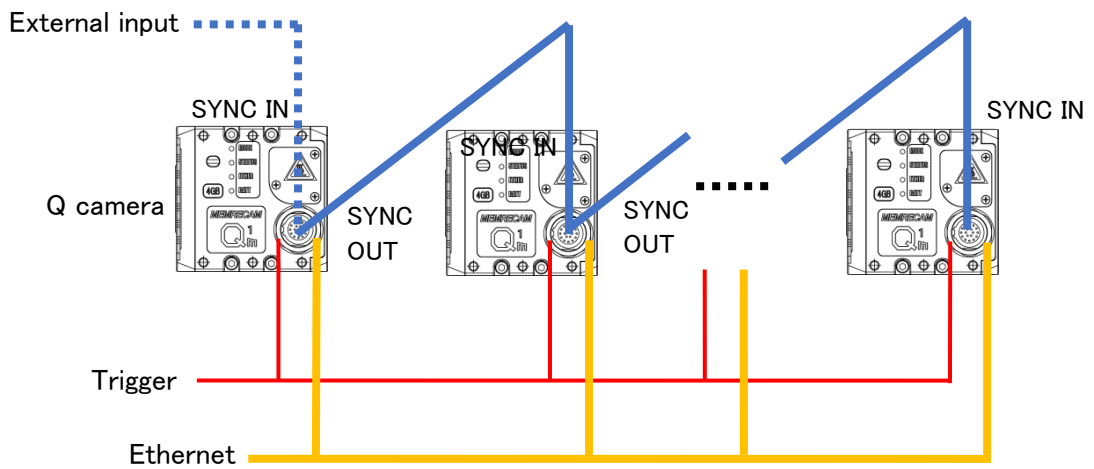
Refer to page 8-24 table.1 for each sync settings.

#### ■Synchronize multi Q cameras with external signals

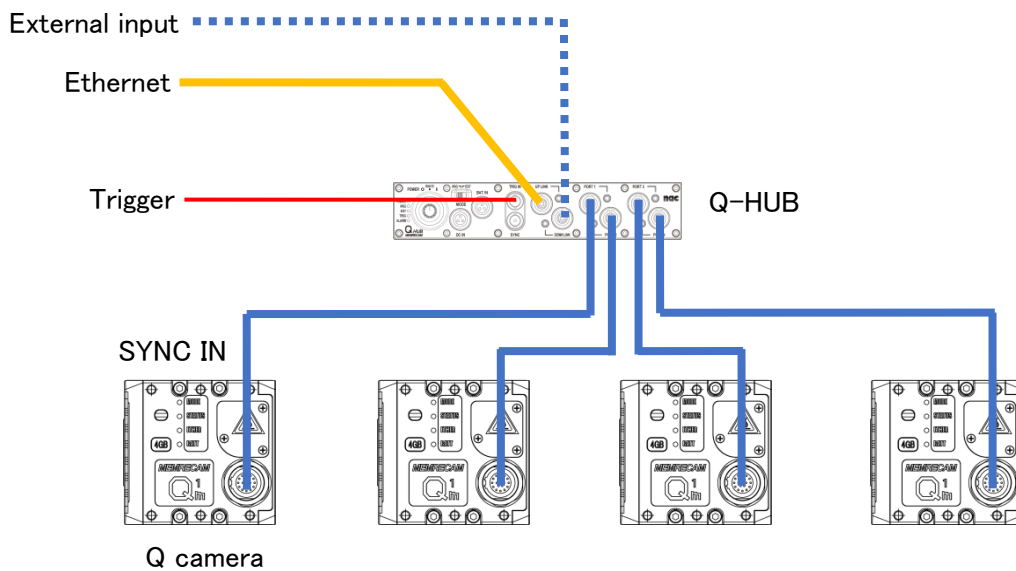
Multi Q cameras can synchronize each other by synchronizing same external signal.



- Synchronize multi Q cameras with daisy-chain connection  
 You can synchronize Q cameras by using the first camera as standard.  
 You can also input external signal to the first camera.



- Synchronize multi Q cameras with Q-HUB  
 You can synchronize Q cameras by using Q-HUB as standard.  
 You can also input external signal to Q-HUB.

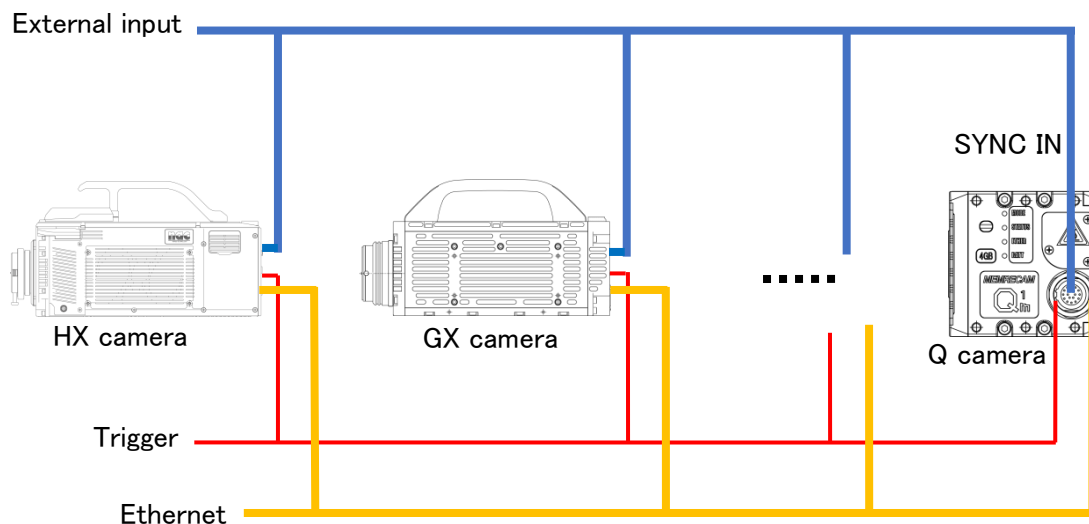


## 8.14.2 Synchronize Q cameras and HX, GX cameras

You can input EST or IRIG into the System with only HX, GX cameras.  
Refer to page 8-24 table.1 for each sync settings of Q camera.

### ■ Synchronize Q cameras and HX, GX cameras with external signals

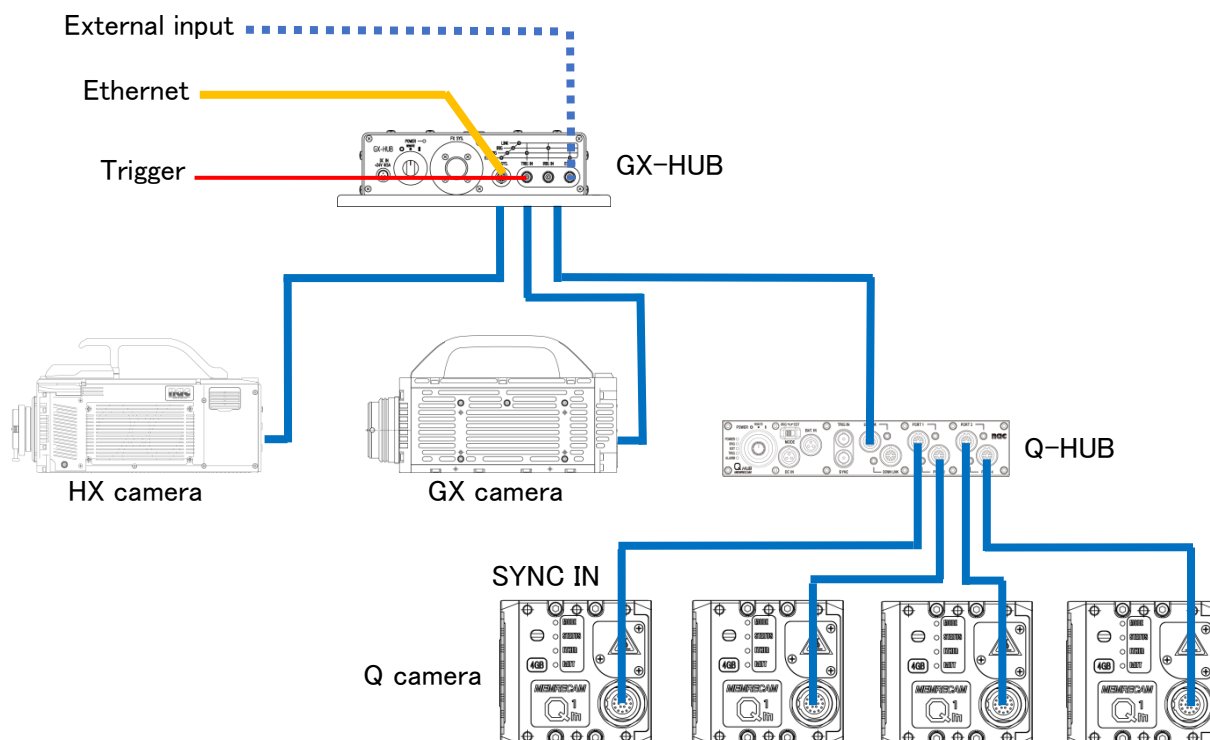
Multi cameras can synchronize each other by synchronizing same external signal.



### ■ Synchronize Q cameras and HX, GX cameras with GX-HUB and Q-HUB

You can synchronize Q cameras and HX, GX cameras by using GX-HUB as standard.

You can also input external signal to GX-HUB.



### 8.14.3 Sync recording operation

For sync recording of Q camera, you can use the following external input signals.

Page 8-24 table 1 shows sync settings for using each external input signals.

Please refer to

#### 1 Nothing of external signals

- use nothing of external signals

#### 2 Use EST signals

- perform sync recording by inputting EST signals into SYNC IN

The maximum frame rate when using of EST signals is less 1/2 of the maximum frame rate of camera specification.

#### 3 Use periodic sync signals

- perform sync recording by inputting periodical signals into SYNC IN

※If you input lower frequency signals than frame rate setting, starting exposure and exposure time shift from setting.

※Not input higher frequency signals than frame rate setting.

#### 4 Use 1kHz sync signals

- perform sync recording by inputting 1kHz signals into SYNC IN

You can record at frame rate which is Multiple of 1,000 pps.

※1kHz signals requires time accuracy within  $\pm 200$  ns per cycle.

#### 5 Use IRIG signals

- perform sync recording by inputting IRIG signals into SYNC IN

※When you input IRIG signals directly into Q camera, signal standard is IRIG(DCLS).

Please be careful to not input other signals.

#### 6 Use Q-HUB without external signals

- perform sync recording of Q camera by using Q-HUB as standard without other external signals.

Refer to Q-HUB User's Manual for details about operation method of Q-HUB.

In case that input external signals into Q-HUB

Switch EST / IRIG of Q-HUB switch according to external signals, as shown below.

EST signals

Switch EST.

1kHz signals

Switch IRIG.

In this case, set recording settings of Q camera according to "5 Use IRIG signals"

Period signals

Switch EST.

IRIG signals

Switch IRIG.

Above operation methods can use daisy-chain connection to sync record.

## 8.14.4 Settings of sync recording

Settings of Q camera about “camera time” and “camera sync” are same as HX, GX cameras. Refer to HXLink User’s Manual for details.

“Q camera sync output” is selection from below 4 patterns of sync signals Q camera outputs.

- IRIG output
- 1kHz output
- EPO output
- Through output

Table.1 external input signals and sync recording settings

Operation method	external input	settings	Without daisy-chain connection	With daisy-chain connection	
				the first camera	after the second camera
1 Nothing of external signals	nothing	Camera Time	Camera Internal Time	Camera Internal Time	IRIG/M-HUB Time
		Camera Sync	Internal Sync	Internal Sync	Internal Sync
		Qcam Sync Output	(※1)	IRIG Output	Through Outout(※2)
2 Use EST signals	EST	Camera Time	Camera Internal Time	Camera Internal Time	Camera Internal Time
		Camera Sync	EST Sync	EST Sync	EST Sync
		Qcam Sync Output	(※1)	Through Output	Through Outout(※2)
3 Use periodic sync signals	periodic sync	Camera Time	Camera Internal Time	Camera Internal Time	Camera Internal Time
		Camera Sync	Periodic Sync Input	Periodic Sync Input	Periodic Sync Input
		Qcam Sync Output	(※1)	Through Output	Through Outout(※2)
4 Use 1kHz sync signals	1kHz sync	Camera Time	Camera Internal Time	Camera Internal Time	Camera Internal Time
		Camera Sync	1kHz Sync Input	1kHz Sync Input	1kHz Sync Input
		Qcam Sync Output	(※1)	Through Output	Through Outout(※2)
5 Use IRIG signals	IRIG	Camera Time	IRIG/M-HUB Time	IRIG/M-HUB Time	IRIG/M-HUB Time
		Camera Sync	Internal Sync	Internal Sync	Internal Sync
		Qcam Sync Output	(※1)	Through Output	Through Outout(※2)
6 Use Q-HUB without external signals	Q-HUB	Camera Time	GX-HUB Sync Time	GX-HUB Sync Time	GX-HUB Sync Time
		Camera Sync	Internal Sync	Internal Sync	Internal Sync
		Qcam Sync Output	(※1)	Through Output	Through Outout(※2)

(※1) all settings are valid

(※2) all settings are valid in the end camera of daisy-chain connection

## 8.15 Recording with TRIG OUT

A camera with TRIG OUT signal output (HX-7) can output a recording trigger for the cameras and the other instruments.

The recording trigger output function is the function by which a camera outputs the trigger factor detected in ARM state to TRIG OUT pin as a recording trigger.

To use recording trigger output function, select TRIGOUT in Trigger Output Mode.

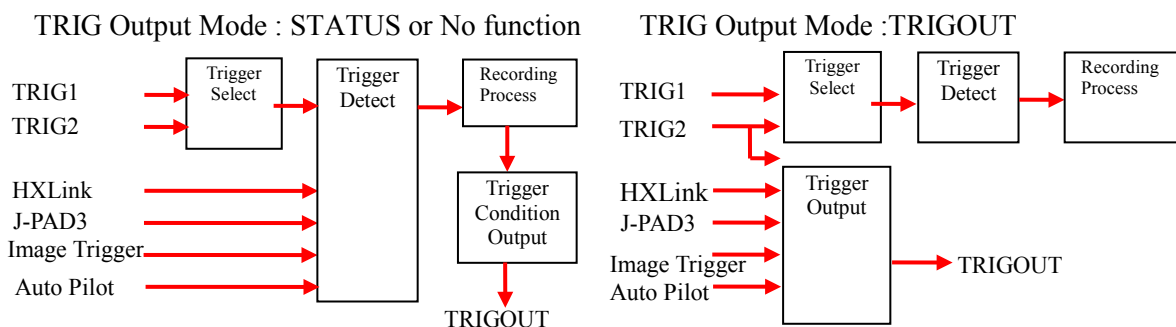
- The camera which selected STATUS in Trigger Output Mode outputs the trigger condition (It's equal to indication of TRIGGER LED.) in TRIG OUT pin.

This output signal is used to indicate the trigger condition. For this output signal to have delay (less than 1 second), it isn't possible to use as recording trigger.

A trigger factor of the Trigger Output function of HX-7 is indicated.

- (1) TRIG2 signal
  - (2) Trigger command from HXLink
  - (3) Trigger command from J-PAD3
  - (4) Image Trigger function
  - (5) Trigger command of Auto Pilot function
- TRIG1 signal isn't included in a trigger factor.

### Block diagram of a trigger signal of HX-7



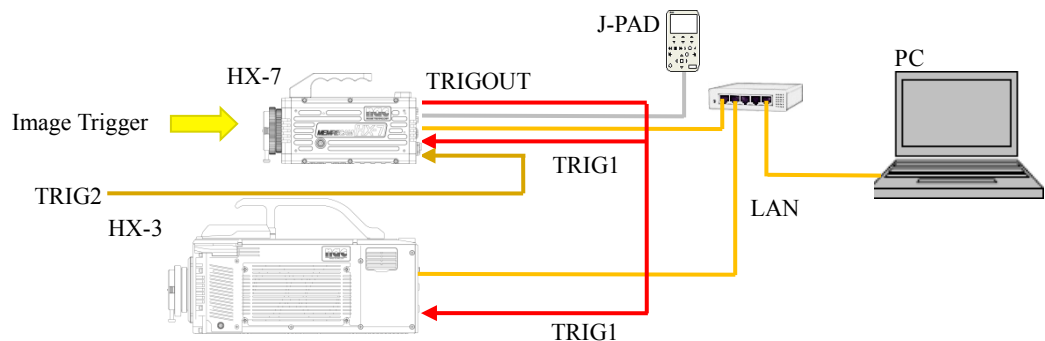
### Connection of TRIG OUT signal

Hereinafter the camera which selected TRIGOUT in Trigger Output Mode is called Trigger Master.

Connect TRIGOUT signal of the Trigger Master camera to trigger input of all cameras.

Also connect TRIGOUT signal to trigger input of the Trigger Master camera.

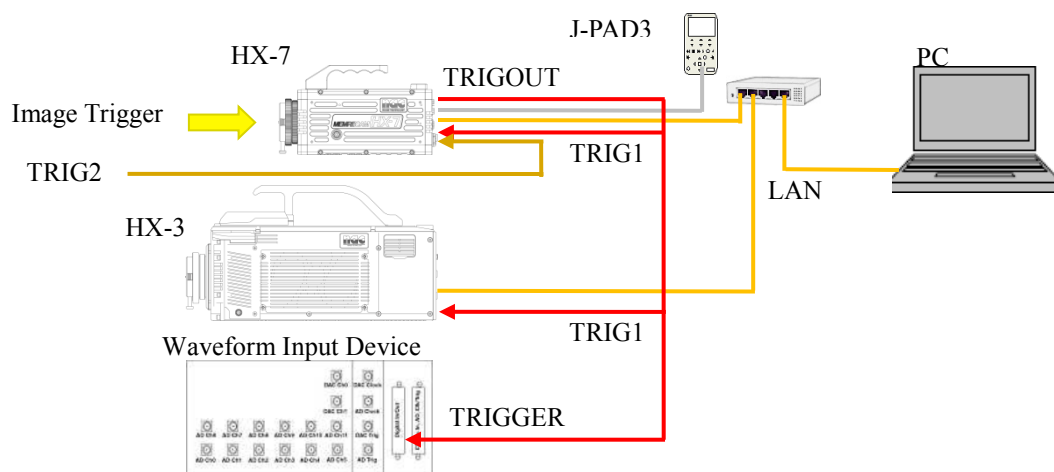
- When not connecting a TRIGOUT signal to trigger input, a Trigger Master camera wouldn't be recorded. To put timing of the recorded by a Trigger Master camera and other instruments together, the Trigger Master camera records by recording trigger outputs by itself.



Example about the connection when recording by TRIG OUT signal, and setting.

■ Recording HX-7, HX-3, and a Waveform Input Device.

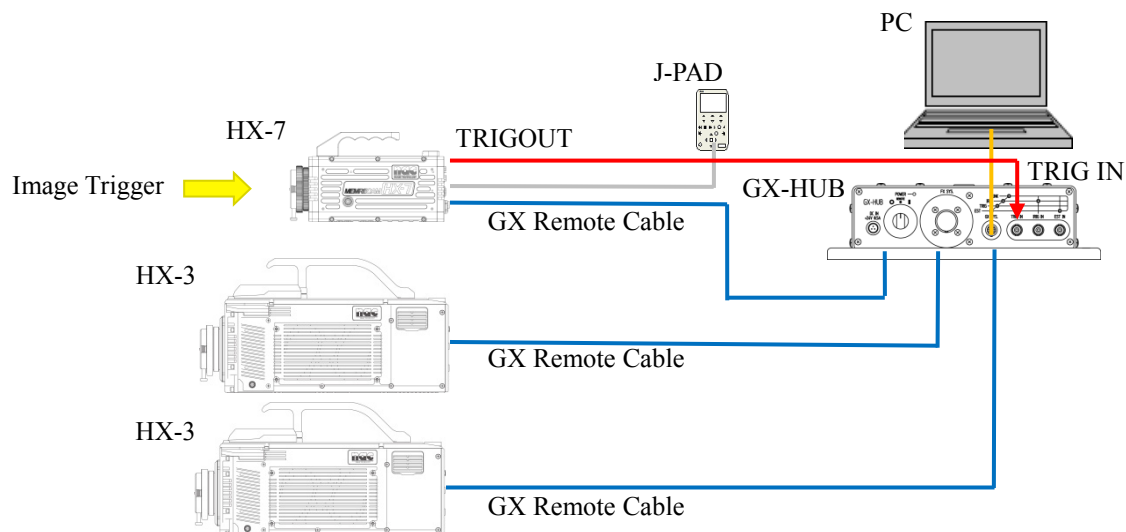
	Trigger Output Mode / Polarity	Trigger Selection / Polarity	Exposure Timing	Image Trigger
HX-7	TRIGOUT/ Nega	TRIG1/Nega	K4 Compatible	ON/OFF
HX-3	No Setting	TRIG1/ Nega	K4 Compatible	OFF
Waveform Input Device	No Setting	No Setting	No Setting	No Setting



■ Recording synchronously by operation of HXLink / J-PAD3 or image trigger.

	Trigger Output Mode / Polarity	Trigger Selection / Polarity	Exposure Timing	Image Trigger
HX-7	TRIGOUT / Nega	TRIG2 / CRNT ON	K4 Compatible	ON/OFF
HX-3	No Setting	TRIG2 / CRNT ON	K4 Compatible	OFF

- When it's different in shutter setting every camera when setting at the timing of exposure as a GX native, a trigger frame isn't identical every camera.



## 8.16 Setting the Recording Method Using the Recording Menu

The different sync settings and input/output signal settings for each recording method can be batch set from the recording menu for all of the connected cameras.

The following recording methods can be set in the recording menu.

- External sync recording (EST)
- IRIG sync recording
- GX-HUB sync recording
- Combined HX, GX, fx sync recording
- Default settings
- Custom settings
- Reset recording settings

Select the recording method on the recording menu and the parameters for the cameras selected with the item list in the dialogue will be displayed.

If there are no parameters displayed for the camera selected in the item list, values for another camera are shown. If there are no cameras with parameters, a value will not be shown.

Select “User Settings” in “Input/Output Signals” in each dialogue.



Refer to page 6-11 for details on the “Factory Shipment Settings”, “User Settings” and “Custom Settings”.

“Input/output Settings” are displayed as follows.

“Factory Shipment Settings” The input/output signal settings for all of the HX, GX and ULTRA Cam cameras match the “Factory Shipment Settings” and are different from the User Settings” and “Custom Settings”.

“User Settings” The input/output signal settings for all of the HX and GX cameras match the “User Settings”

“Custom Settings” Anything not indicated above.

If the input/output settings for the cameras used each time are determined, if those settings are registered as the “User Settings”, only the settings that are the same as those selected in “User Settings” can be used.

## ■ External Sync Recording (EST)

Setting to record synchronized to the exposure start signal (external sync recording (EST)) input.

Refer to page 8-3 for the procedure to set the external sync recording (EST).

Sets the sync settings, exposure timing, absolute frame time, time stamp and exposure phase for EST recording.

Refer to page 6-11 for details of the sync signals, EST input selection, EST1 input polarity, EST2 input polarity, EST1 filter, EST2 filter, trigger input selection, TRIG1 input polarity, TRIG2 input polarity, TRIG1 filter, and TRIG2 filter.

Refer to page 6-5, 6-6 for “Qcam, HX, GX EST VIEW Sync”, “Qcam, HX, GX camera time” and “fx camera time”.

Refer to page 3-9 for “Qcam Output Sync Signal”.

## ■ IRIG Sync Recording

Settings for when performing sync recording with the IRIG-B signals and trigger signal divided into each camera.

Refer to page 8-7 for the procedure to set the IRIG sync recording.

Sets the Qcam, HX and GX camera time, fx camera time, absolute frame time, time stamp and GX video TIME display for IRIG sync recording. The Qcam, HX, GX and fx camera sync is internal synchronization.

Refer to page 6-11 for details on trigger input selection, TRIG1 input polarity, TRIG2 input polarity and trigger filters.

Refer to page 6-7 for details on Qcam, HX, GX and fx exposure timing.

Refer to page 3-9 for Qcam Output Sync Signal.

#### ■GX-HUB Sync Recording

GX-HUB synchronous recording Setting

I/O Signal Setting  
☒ Factory Setting ☐ User Setting ☐ Custom Setting

Qcam, HX, GX Camera Time: GX-HUB Time

Qcam Output Sync Signal: Through Output

Trigger Select:

TRIG2 Input: CRNT ON

TRIG1 Filter: 20.0 us

TRIG2 Filter: 20.0 us

☒ TRIG1Filter setting is set to TRIG2Filter.

Setting Cancel

Settings for when performing sync recording with the GX series cameras using the GX-HUB. Refer to page 8-9 for the procedure to set the GX-HUB sync recording.

Sets the HX and GX camera time and trigger input selection for GX-HUB recording. The HX and GX camera sync is internal

Refer to page 6-12 for details on TRIG2 input selection and trigger filters.

Refer to page 3-9 for Qcam Output Sync signal.

#### ■ Combined Qcam, HX, GX, fx Sync Recording

Qcam, HX, GX, fx synchronous recording Setting

I/O Signal Setting  
☒ Factory Setting ☐ User Setting ☐ Custom Setting

Qcam, HX, GX Camera Time: IRIG/M-HUB Time

fx Camera Time: --

Qcam Output Sync Signal: Through Output

Trigger Select: TRIG2

TRIG2 Input: CRNT ON

TRIG1 Filter: 20.0 us

TRIG2 Filter: 20.0 us

☒ TRIG1Filter setting is set to TRIG2Filter.

Setting Cancel

Settings for when performing sync recording with the HX series, GX series or fx series cameras using the M-HUB or GX-HUB.

Refer to page 8-10 for the procedure to set the combined HX, GX, fx sync recording.

Sets the HX and GX camera time and trigger input selection to the combined HX, GX, fx sync recording. The HX, GX and fx camera sync is internal

Refer to page 3-9 for Qcam output Sync Signal.

Refer to page 6-4 for details on fx camera time.

Refer to page 6-12 for details on TRIG2 input selection and trigger filters.

## ■ Default Settings

The 'Default Setting' dialog box is divided into several sections for configuring camera settings. The 'Qcam, HX, GX' section includes settings for camera time, sync, EST VIEW Sync, exposure timing, trigger select, and input/output filters. The 'fx' section includes settings for camera time, sync, and exposure timing. The 'Qcam' section includes the output sync signal. The 'ULTRA Cam' section includes trigger select and delay. At the bottom are 'Setting' and 'Cancel' buttons.

Section	Parameter	Value
Qcam, HX, GX	Qcam, HX, GX Camera Time	Internal Sync Time
	Qcam, HX, GX Camera Sync	Internal Sync
	Qcam, HX, GX EST VIEW Sync	OFF (Internal Sync)
	Qcam, HX, GX Exposure Timing	K4 Compatible
	Trigger Select	TRIG1
	TRIG1 Input	Nega
	TRIG2 Input	CRNT ON
	FrameTime	Trigger
fx	fx Camera Time	Internal Sync Time
	fx Camera Synchronous	Internal Sync
	fx Exposure Timing	K3 Compatible
Qcam	Output Sync Signal	IRIG Output
ULTRA Cam	TRIG1	Nega
	Trigger Delay	0.0us

Camera default settings (factory settings).

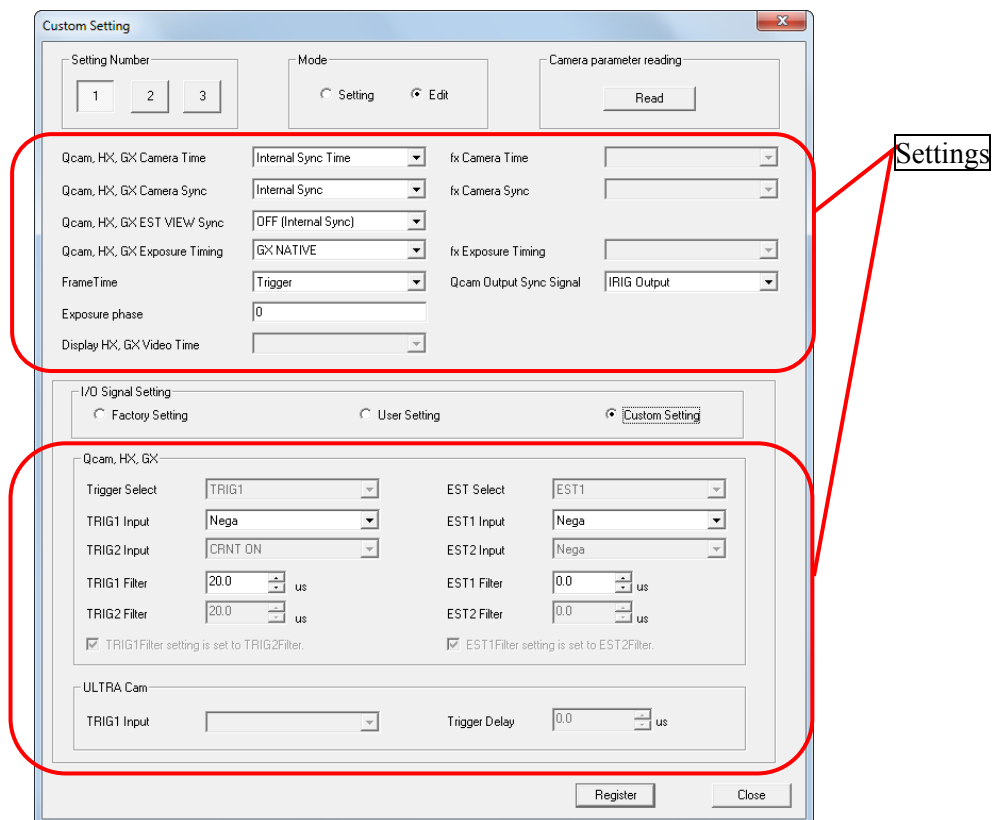
The values for the recording method (camera sync settings, exposure timing, frame time, input/output signals) shown in the “Default Settings” dialogue are batch set to the connected camera.

## ■ Custom Settings

A maximum of 3 recording methods can be set to the HXLink, which can be batch set to the connected camera.

If frequently used settings are registered to the custom settings, the camera can be set easily.

### (1) Register setting details to the HXLink



Select the number to register to HXLink from the setting numbers “1~3”, and switch the mode to “Edit”.

Each setting can be edited so edit the settings with the recording conditions.

For each “Input/Output Settings” item, select from Factory Shipment Settings/User Settings/Custom Settings. Select “Custom Settings” to individually edit the settings relating to input/output settings.

Click “Retrieve” in “Retrieve Camera Parameters” to display the camera item parameters currently selected as settings.

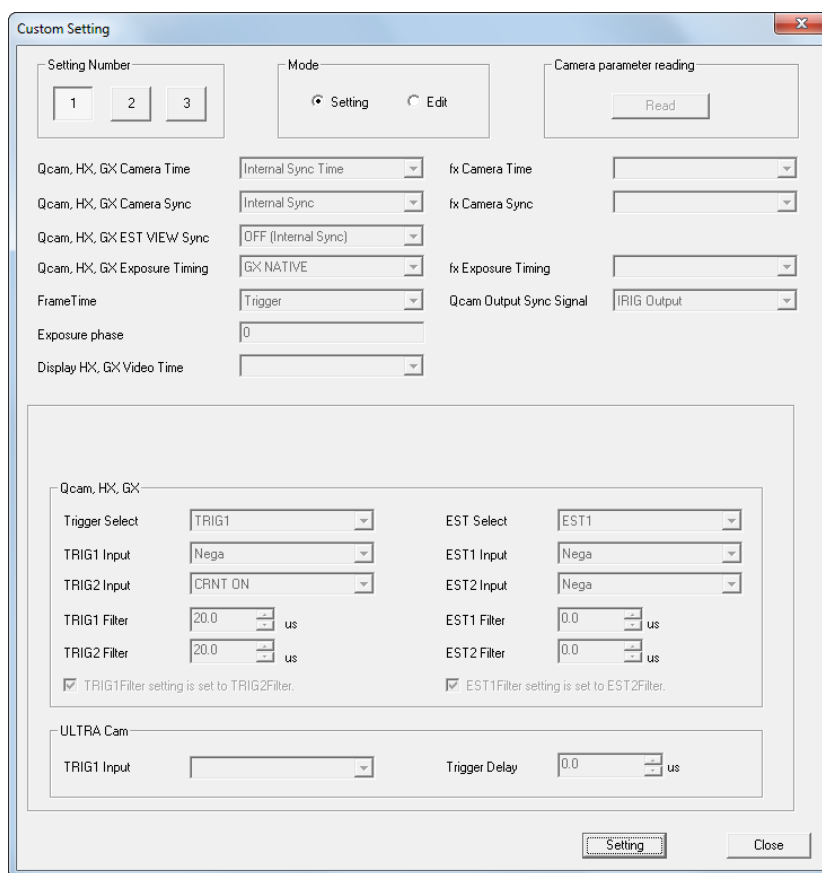
Select “Custom Settings” in “Input/Output Settings” to retrieve the camera parameters when connected to HX, GX and Q cameras.

Refer to the following pages for details on each of the settings.

Camera time, camera sync, EST view sync	Page 6-4
Exposure timing	Page 6-7
Absolute frame time	Page 6-9
Exposure phase	Pages 4-42, 8-16
Video TIME display (DATETIME display when recording)	Page 6-15
Input/output signal settings	Page 6-11

Click on “Register” under the dialogue to register the edited contents to HXLink.

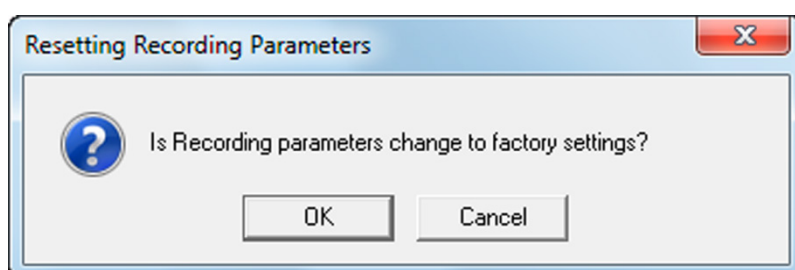
(2) Set registered contents to the camera



The "Custom Setting" dialog box is used for configuring camera parameters. It features a "Setting Number" section with buttons for 1, 2, and 3. A "Mode" section has "Setting" and "Edit" radio buttons. A "Camera parameter reading" section includes a "Read" button. The main area contains various settings for Qcam, HX, and GX, including Camera Time, Sync, EST VIEW Sync, Exposure Timing, FrameTime, Exposure phase, and Display HX, GX Video Time. There are also sections for Qcam, HX, GX Trigger Select, TRIG1 Input, TRIG2 Input, TRIG1 Filter, TRIG2 Filter, EST Select, EST1 Input, EST2 Input, EST1 Filter, EST2 Filter, and ULTRA Cam TRIG1 Input and Trigger Delay. The dialog box has "Setting" and "Close" buttons at the bottom right.

Select a setting from numbers “1~3” and switch the mode to “Settings”.  
The set contents registered in the selected setting are displayed in each setting.  
Click “Settings” under the dialogue to set to the camera.  
Click “Close” to end the dialogue.

■ Reset Recording Settings



The "Resetting Recording Parameters" dialog box asks if recording parameters should change to factory settings. It includes a question mark icon and the text "Is Recording parameters change to factory settings?". There are "OK" and "Cancel" buttons at the bottom.

Click “OK” to reset the recording settings.

The reset recording settings function is a function to reset the settings set by the factory.  
However, the recording setting scene number and recording comments cannot be reset.  
The reset recording settings function does not impact the recorded data.

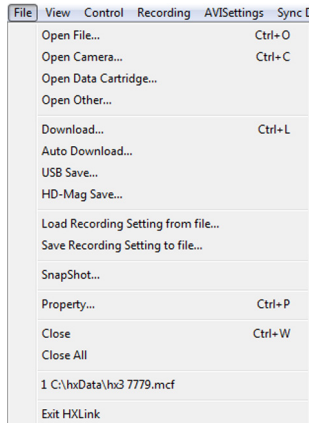
# 9

## Menus

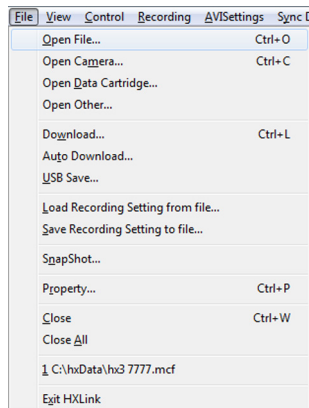
The menus differ according to the “fxLink Compatible GUI Settings” under the “GUI Settings” tab in the “Options” dialogue. Select “HXLink Standards” in “fxLink Compatible GUI Settings” for a description of the menu displayed. Refer to the GXLink (for fx) user’s manual for the menu shown when “fxLink Compatible” is selected.

## ■ File Menu

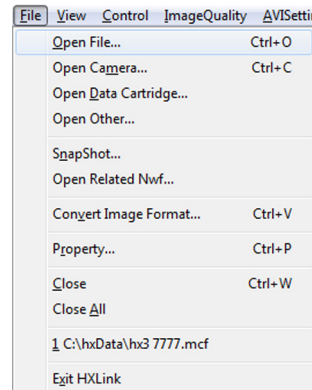
The items on the file menu vary according to the type of item (camera, file) selected in the item list.



File Menu  
(camera item HX selected)  
(HX, GX, Q camera)

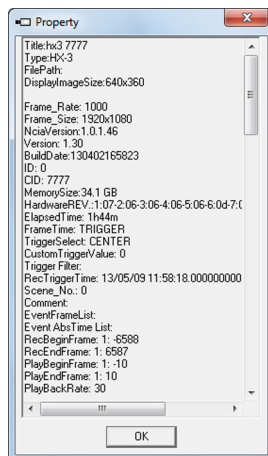


File Menu  
(camera item selected)  
(GX camera)

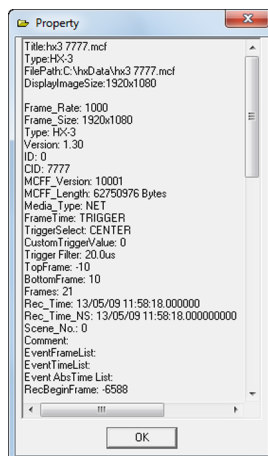


File Menu  
(file item (MCFF) selected)

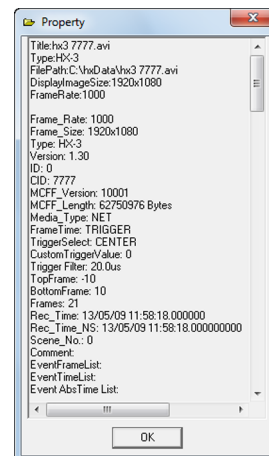
- Open / Image File Opens an image file (MCFF, CIF, AVI, TIFF, BMP, JPEG) and adds the file item to the item list.
- Open / Camera Connections Connects cameras, adds the camera item to the item list.
- Open / Data Cartridge Opens the ci camera data cartridge, crops the specified scene image as a camera image file (MCFF) and opens that file. Adds the file item to the item list.
- Open / Other Opens the waveform data file (NWF) .
- Property Shows the item property information.



Camera Property



MCFF Property

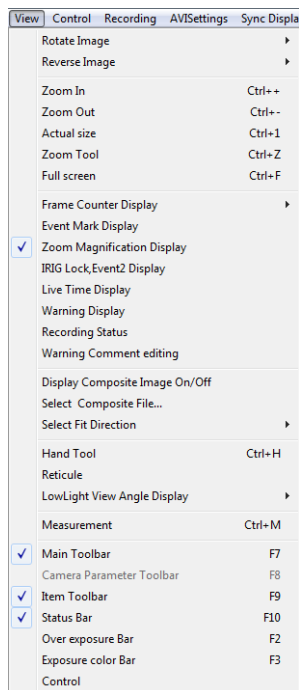


AVI Property

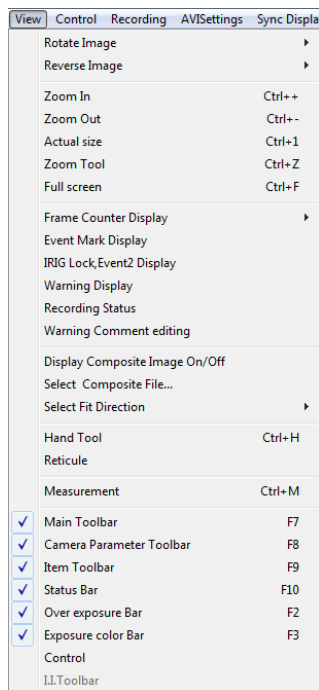
▪Close	Disconnects the camera during camera image display and removes all of the camera items from the item list. Closes the image file displayed when an image file (MCFF, AVI, TIFF, BMP, JPEG) is displayed and removes the item from the item list.
▪Close All	Closes all of the items on the item list and removes them from the item list. Cameras connected are disconnected.
▪End Application	Ends the HXLink application.
○File Items (MCFF)	
Download	Downloads image data from the camera.
▪Auto Download	Automatically downloads image data after recording stops.
▪Save on USB	Saves data to the USB device connected to the camera.
▪Save on HD-Mag	Select when the optional HD-mag is connected to the HX-1. Saves image data from the camera on the HD-mag.
▪Import Camera Settings	Imports settings such as the camera photographic conditions from the parameter file (prm) and sets the selected camera in the item list.
▪Save Camera Settings	Saves settings such as the current recording conditions for the camera selected in the item list to a parameter file (prm).
▪Snapshot	Saves the currently displayed image or a file image in a still image file (TIFF, BMP, JPEG).
○File Items (MCFF)	
▪Open Related Waveform File	Opens waveform files (NWF) related to the selected file item. Refer to page 5-32 for details.
▪Convert Format	Converts camera image files (MCFF/CIF) into image files with the specified format using the current image quality settings for saving.

## ■ View Menu

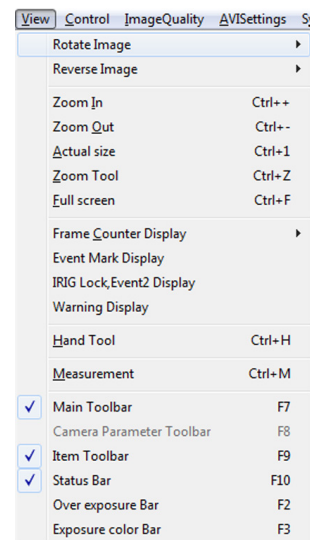
The View menu items vary according to the type of item (camera, file) selected in the item list.



View Menu  
(camera (HX, GX, Q) selected)



View Menu  
(camera (fx) selected)



View Menu  
(at file selection)

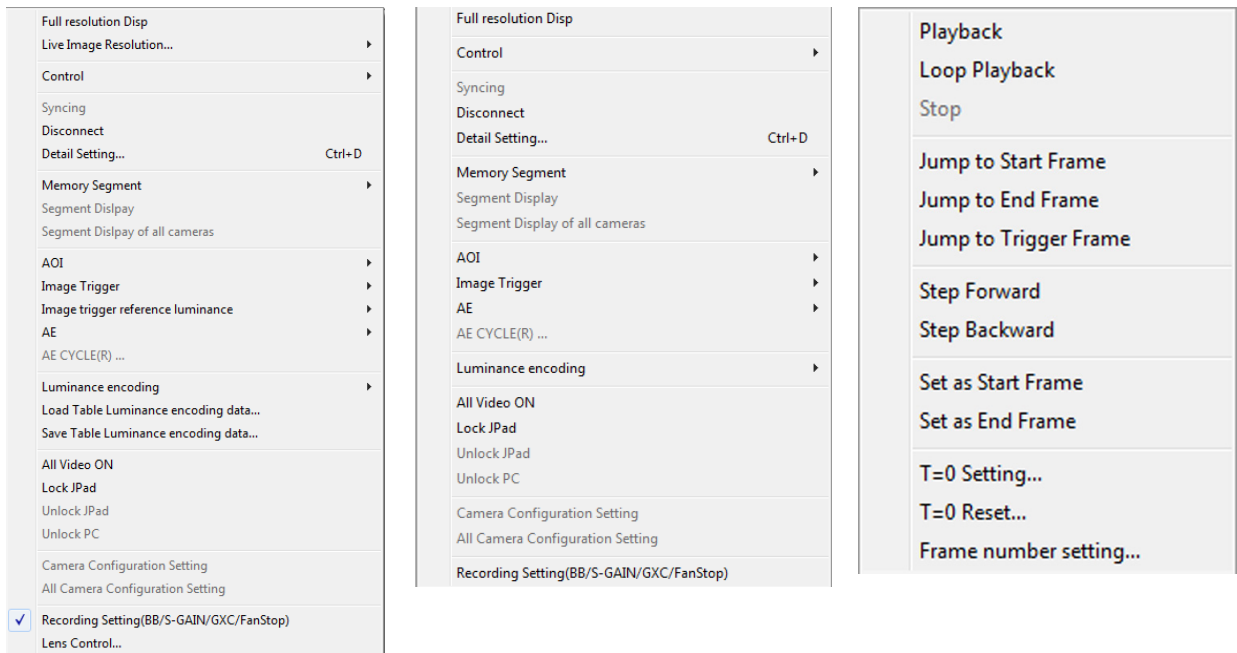
- Main Toolbar Switch between main toolbar show/hide.
- Camera Parameter Toolbar Switch between camera parameter toolbar show/hide.
- Item Toolbar Switch between item toolbar show/hide.
- Status Bar Switch between status bar show/hide.
- Overexposure Bar Switch between overexposure bar show/hide.
- Exposure Color Bar Switch between exposure color bar show/hide.
- Rotate Image Rotates the camera, MCFF, CIF image.  
Refer to page 3-23 for details.
- Reverse Image Reverses the camera, MCFF, CIF image.  
Refer to page 3-22 for details.
- Zoom Enlarges/reduces the image shown.
- Show Actual Size Shows the image in actual size.
- Zoom Tool Turns the zoom tool ON/OFF.  
Displays the image in the desired magnification. Refer to page 3-20 for details.

▪ Show Entire Image	Fits the entire image in the monitor at the maximum magnification.
▪ Show Frame Counter	Switch the display of the frame counter. If the frame number is displayed, the relative time [unit: sec] from the trigger frame time. When using EST, the relative time shown with this setting is not the correct time. Also, if the time stamp is ON, the relative time may be wrong.
▪ Show Event Mark	Switch the event mark display ON/OFF.
▪ Show IRIG Lock, Event 2	ON to show the IRIG lock and event 2 status superimposed on the HX, GX camera image displayed. When showing the recorded image, the IRIG lock and event 2 status (EST2 signal status) is shown on the image monitor. Refer to page 5-22 for details.
▪ Warnings	Switch between show/hide warnings. A list of warnings generated during camera use or file operation is shown.
▪ Recording Status	Switch between show/hide the Recording Status Window.
▪ Hand Tool	Switch between hand tool ON/OFF. If the hand tool is ON, drag the point clicked on with the mouse to scroll the image.
▪ Measure	Starts/ends measurement. Refer to page 13-2 for details.
○ Camera Items	
▪ Live Image Resolution	Sets cropping for the live image on the fx camera. If the live image is cropped (1/2, 1/4), the resolution of the live image drops but the time to update the image displayed is shortened.
▪ Display Live Image Time	ON to show time superimposed on the GX camera image displayed. During VIEW or RECORD, the current time on the camera is shown, and when showing the recorded image on the camera, the frame time is shown as the absolute time.
▪ Zoom Rate	Switch between ON/OFF for the GX camera zoom settings shown.
▪ Editing Comments Warning	Switch between ON/OFF for the popup messages displayed prompting input of recording comments before starting recording. Refer to page 7-8 (“MISC” tab of options) for details.

- Composite Display ON/OFF      Switch between show/hide composite display of live image and file image.  
Refer to page 4-67 for details.
  
- Select Composite Display File      Select live image and composite display of file.  
Refer to page 4-67 for details.
  
- Orientation (Portrait, Landscape)      Set the orientation of the live image and composite image file displayed.  
Refer to page 4-67 for details.
  
- Show Image Center Mark      Show vertical, horizontal red lines to clarify the center of the image.
  
- Low Light Angle of View Frame      Specify the color of the angle of view frame in the low light mode.  
Refer to page 4-62 for details of the low light angle of view frame.
  
- Controls      Open the “Controls” window to set the camera parameters selected in the item list.  
Refer to page 4-13 for details.
  
- I.I. Toolbar      Switch the I.I. toolbar show/hide to verify RX-6 I.I. camera control and information.  
Refer to the user’s manual for the MEMRECAM fx RX-6 I.I. camera for details of the I.I. toolbar.

■ **Control Menu**

If there are no items in the item list, the control menu is not displayed.  
The control menu items vary according to the type of item selected.



Control Menu  
(camera item selected)  
(HX, Q)

Control Menu  
(camera item selected)  
(GX)

Control Menu  
(camera item selected)

○ Camera Items

▪ Show Full Resolution

Show the image at full resolution.

▪ Live Image Resolution

If “Standard” is selected for “Live Method” of “Live Display” in options, the live display can be shown at the resolution from the camera.

Select the scale from 1/1, 1/2, 1/4 to update the live image.

▪ Camera Control

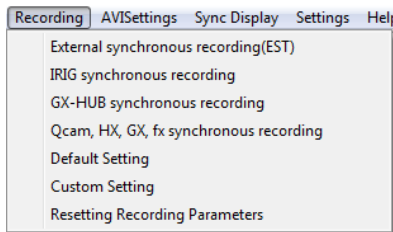
VIEW / ARM / trigger / play / loop / stop / ump to start frame, jump to end frame  
/ jump to trigger frame / move 1 frame forward /  
Move 1 frame back / set to start frame / set to end frame

- Sync Settings Synchronizes camera times when M-HUB connected to fx camera.  
Used when IRIG connected or if errors made in sync settings during camera connection.  
Refer to page 6-4 for details of camera times.  
Refer to page 14-4 for details of sync setting errors.  
“Sync Settings” are disabled when on the HX and GX cameras are connected.
- Disconnect Disconnect communication with all cameras.
- Detailed Settings With one camera control, the windows displayed vary according to the “GUI Settings” tab in the “Options” dialogue.  
Refer to page 7-2 for the method of switching the windows shown.  
Refer to page 4-27 for the “Camera Details” dialogue.  
Opens the “List of Camera Settings” with multiple camera control.  
Refer to page 4-14 for details.
- Memory Segment Operation  
Partition segments / scan segments / hide segments /  
Scan segments in all cameras / hide segments in all cameras  
Refer to page 4-55 for details.
- Auto Exposure Control (AEC)  
AOI/ image cartridge / image trigger - standard brightness/AE/AE CYCLE  
Refer to page 4-44 for details.
- Luminance  
NORMAL / LINEAR/ CUSTOM  
Input/output properties when image data shown.  
Can be used with GX cameras.  
Select “NORMAL” to use gain, gamma, knee.  
Select “LINEAR” to ignore the gain, gamma, knee settings and convert the camera data to linear for display.  
Select “CUSTOM” to custom set the luminance.  
Refer to page 5-14 for custom settings operation.
- Luminance Import TABLE data / Save luminance in TABLE data  
Import TABLE data luminance to save.  
Refer to page 5-15.
- Video Output of All Cameras  
Switch ON/OFF the video output for all of the connected cameras.
- Lock Remote Control  
Prohibit camera operation from the J-PAD3.
- Release Remote Control Lock  
Allow camera operation from the J-PAD3.
- Release PC Lock  
Allow camera operation from the PC. The PC lock is set with “PC LOCK” in the J-PAD3 menu (SYS MENU) .

- Camera Configuration Settings/All Camera Configuration Settings
  - The GX-5/GX-5F/Q5 camera configuration settings are used to enable the memory for the port connected to the camera head, even when few camera heads are used.
  - Refer to page 4-6 for details.
- Recording Settings (BB/sensor gain/GXC/stop fan)
  - Switch between show/hide “Recording Settings” window.
  - Refer to page 4-35 to update the black balance.
  - Sensor gain is a setting for the HX and ULTRA Cam cameras. Refer to page 3-18.
  - GXC is a setting for the HX camera. Refer to page 3-18.
  - Fan stop is a setting for the HX camera. Stop the fan during recording to control the blurring from vibration. Refer to page 3-19 for details.
- File Items
  - Image File Playback Control
    - Play/loop/stop/jump to start frame/jump to end frame/jump to trigger frame/move 1 frame forward/Move 1 frame back/set to start frame/set to end frame
  - Image File T=0 Frame Setting
    - Set T=0/Reset T=0/Frame number setting
    - Refer to page 5-5 for details.

## ■ Recording Menu

The recording menu is shown only when cameras are selected.

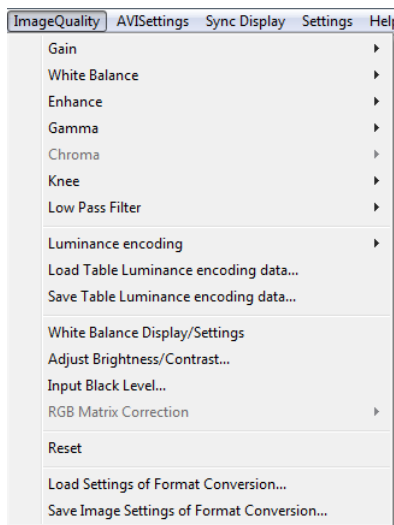


Different sync settings for each recording method and input/output signal settings can be batch set from the recording menu for all of the connected cameras.

Refer to page 8-25 for details.

## ■ Image Quality Adjustment Menu

The image quality adjustment menu is shown only when MCFF/CIF files are selected.



### ▪ Image Quality Adjustment Items

Adjusts the image quality of the MCFF image.  
Gain/white balance/enhance/gamma/chroma/knee/low pass filter/luminance

### ▪ Show/Set White Balance

Shows the “White Balance” window.

Shows a histogram of the brightness for the displayed image to adjust the image contrast and brightness.

### ▪ Adjust Input Black Level

Shows a histogram of the brightness for the displayed image to adjust the black level of the input data.

### ▪ RGB Matrix Correction

Corrects the RGB matrix of the image data.

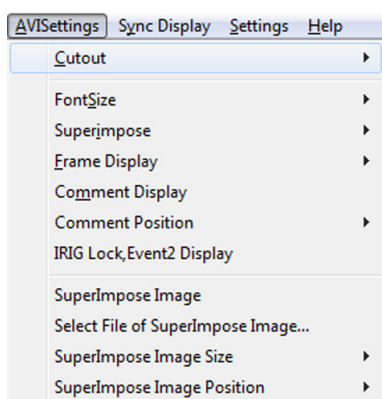
### ▪ Reset

Disables the image quality adjustment performed with the HXLink, and uses the image quality settings saved in the MCFF file.

Refer to page 5-11 for details of image quality adjustment.

## ■ Conversion Settings Menu

The conversion settings menu has settings enabled only for display or conversion of MCFF files.



- **Crop**  
Select ON to crop and resize the image. Select OFF if not cropping and resizing the image.
- **Font Size for the Superimposed Information**  
Select the font size for the superimposed information. (small, medium, large, extra-large)
- **Select Superimposed Information**  
Select the information superimposed on the converted image. (none, frame only, all, CUSTOM)
- **Show Frame**  
Select the format for the superimposed frame information. (frame, relative time (sec), relative time (msec), absolute time, relative time (CUSTOM))
- **Recording Comments**  
Select the recording comments when superimposing on the converted image.
- **Location of Recording Comments**  
Select the location of the superimposed recording comments. (top left, bottom left, top right, bottom right)
- **Show IRIG Lock, Event 2**  
Switch GX camera IRIG lock and event 2 display ON / OFF.
- **Superimpose image/select superimposed image file/size of superimposed image /location of superimposed image**  
Specify when superimposing the desired image file.

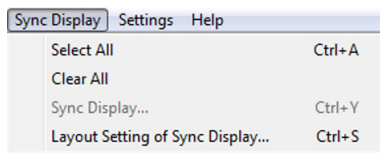
Refer to page 5-25 for details of cropping.

Refer to page 5-22 for details of superimposing information.

Refer to page 5-24 for details of superimposing images.

## ■ Sync Display Menu

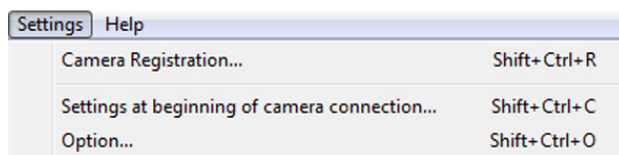
If there are no items in the item list, the sync display menu is not shown.



- |                       |  |
|-----------------------|--|
| ▪ Select All          | Specify all items in the item list for sync display. |
| ▪ Clear All           | Clear all items in the item list for sync display    |
| ▪ Sync Display        | Switch between sync display/selected item display.   |
| ▪ Sync Display Layout | Set the image layout during sync display.            |

Refer to page 3-25 for details.

## ■ Settings Menu



- |                              |  |
|------------------------------|--|
| ▪ Register Camera            | Camera registration is required for fx and ULTRA Cam camera connections. Refer to page 4-2 for details.    |
| ▪ Camera Connection Settings | Specify the parameters set to the cameras when starting camera connections. Refer to page 6-2 for details. |
| ▪ Options                    | Various HXLink settings. Refer to page 7-2 for details.  |

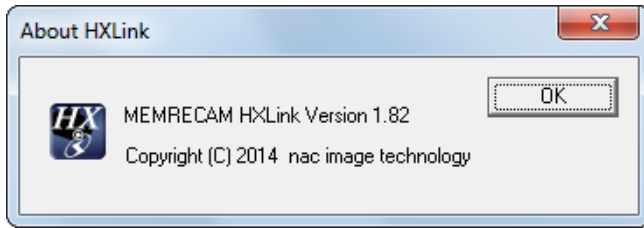
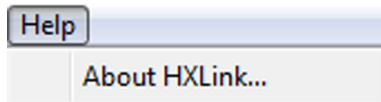


### **Caution**

With the exception of some states, the option settings are enabled when “OK” is clicked.

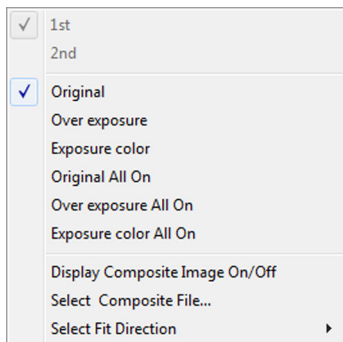
## ■ Help Menu

- HXLink Version Information Shows the version information for the HXLink application.

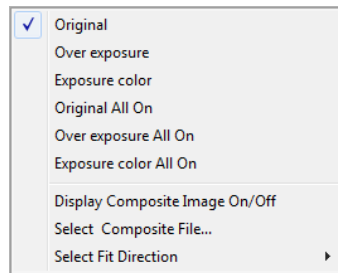


## ■ Image Monitor Right Click Menu

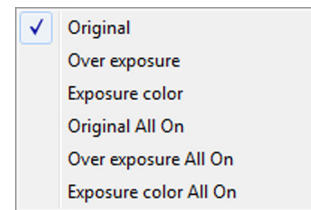
The items on the image monitor right click menu vary according to the item selected.  
The image monitor right click menu is not shown during sync display.



Right Click Menu  
(camera item selected)  
(HX)



GX, Q, fx camera



Control Menu  
(file item selected)

### ○ Camera Items

- Show Frame Straddling Select 1st/2<sup>nd</sup> frame.
- Show Exposure Original/over exposure/exposure color/all original/all over exposure/all exposure color  
Refer to page 3-27 for details.
- Composite Display Composite display ON/OFF /select composite display file/orientation (Portrait, Landscape)  
Refer to page 4-67 for details.
- Split Display (GX-5/GX-5F camera only)  
Example: OFF/Split (1,2,3,4) /Split (ALL)  
Refer to page 4-68 for details.

### ○ File Items

- Show Exposure Original/over exposure/exposure color/all original/all over exposure/all exposure color  
Refer to page 3-27 for details.

(Blank page)

# 10

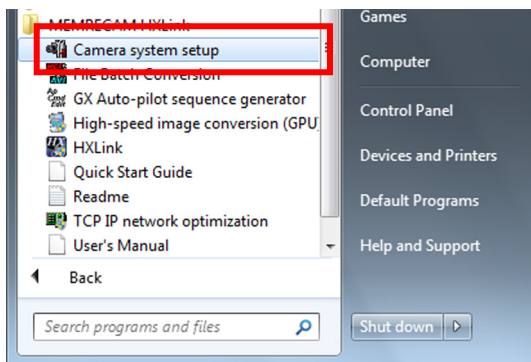
## System Settings (HXUtility)

## 10.1 HXUtility Details, Startup Process

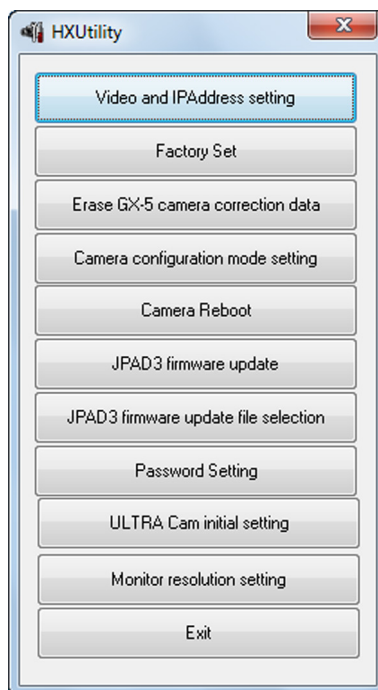
The HXUtility is a tool to perform the following on HX, GX and Q cameras.

- Change camera IP address
- Camera factory settings
- Erase GX-5 camera correction data
- Change GX-5 camera configuration mode
- Reboot camera
- Switch camera video display method (NTSC / PAL)
- Update version of remote control (J-PAD3) firmware
- ULTRA Cam initial settings (ULTRA Cam only tool)
- Monitor resolution settings (HX camera only tool)

Also, passwords can be set to prevent settings due to erroneous operation of the HXUtility.



To startup the HXUtility, click ""Camera System Settings" under "Start Menu" -> "MEMRECAM HXLink".



## 10.2 Video Format and IP Address Settings

Sets the HX, GX and Q camera IP address and GX camera video format (NTSC / PAL).

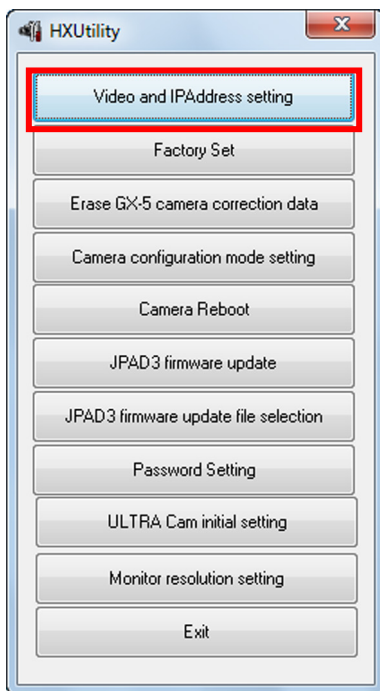
HX cameras automatically obtain the IP address. If there is a DHCP server on the LAN connected to a camera, the camera IP address can be automatically obtained from the DHCP server.

The contents changed are enabled after power to the camera is disconnected.  
Change the settings with the following procedures.



**Caution**

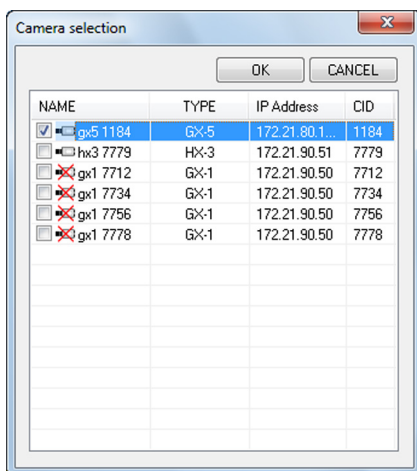
If Q camera before Ver1.18 reboot, IP address return to factory value.



Confirm that the HX and GX cameras with the settings have started up and the PC and cameras have connected to the network.

Additionally, confirm that the camera is not in use.

Startup the HXUtility and click "Video Format and IP Address Settings".



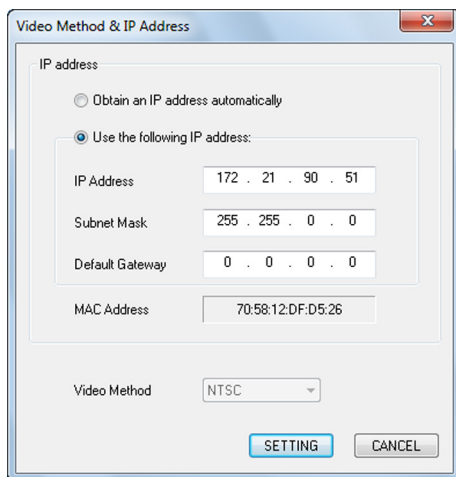
The "Select Camera" dialogue is displayed with a list of cameras currently connected to the network.

An "x" is shown on the camera icon of the camera which can't be connected. (In use, or the IP address of Q camera is not on the network segment of PC)

Even when the IP addresses of a Q camera is not on the network segment of a PC, the IP address of a Q camera can be changed.

Check a camera to set and click "OK".

## ■HX Cameras



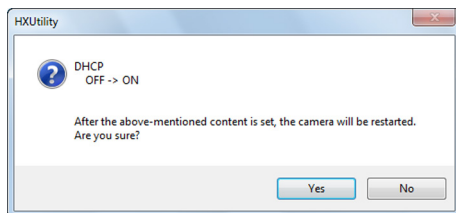
The "Video Format and IP Address Settings" dialogue is shown with the current camera settings.

"Automatically Obtain IP Address" Automatically obtain the IP address from the DHCP server on the LAN.

"Use the Following IP Address"

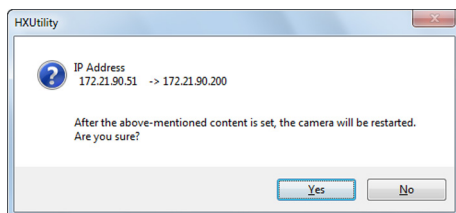
Specify the item to be set (IP address / subnet mask / default gateway).

Click "Set" when finished setting.



The confirmation dialogue shown in the figure appears when setting "Automatically Obtain the IP Address".

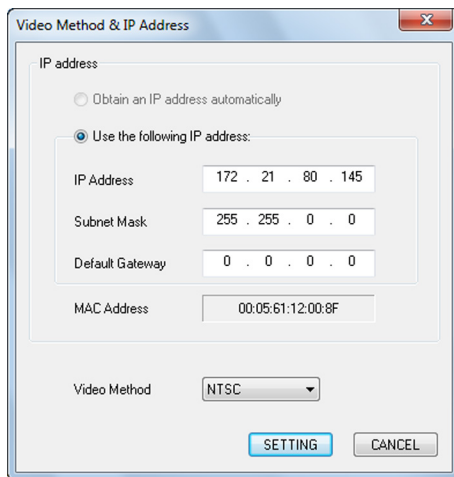
Click "Yes" to change the camera settings and restart the camera.



The confirmation dialogue shown in the figure appears when setting "Use the Following IP Address".

Click "Yes" to change the camera settings and restart the camera.

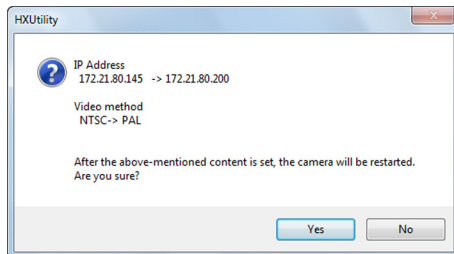
## ■GX Cameras



The "Video Format and IP Address Settings" dialogue is shown with the current camera settings. "

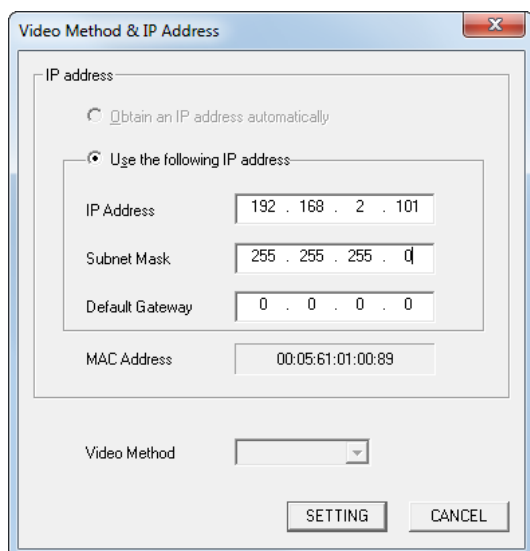
"Use the Following IP Address"

Specify the item to be set (IP address / subnet mask / default gateway / video format) and click "Set".



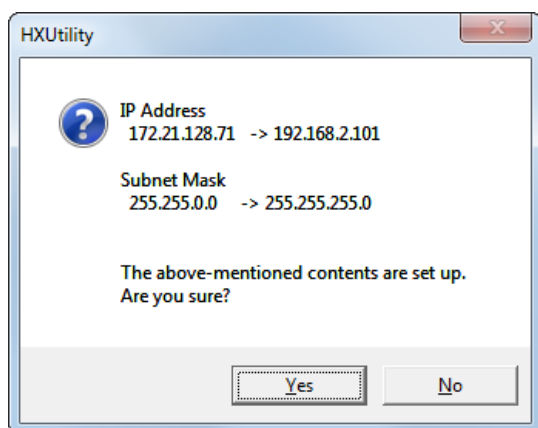
A confirmation dialogue appears. Click " Yes" to change the camera settings and restart the camera.

## ■ Q Cameras



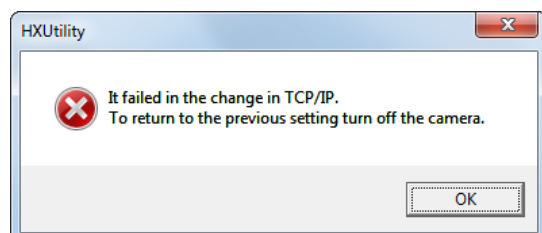
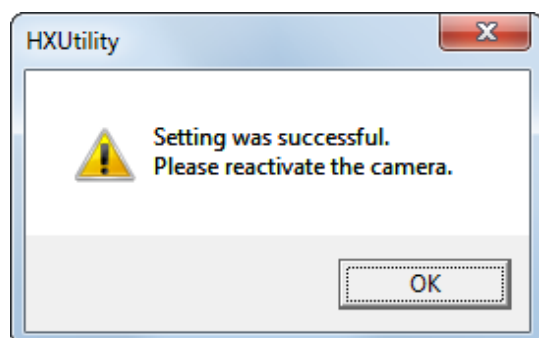
Input IP Address you use in “IP Address” in “Use the following IP address”.

You can change “Subnet Mask” and “Default Gateway”, too.



Confirm the changing of IP Address.

Click “Yes”.



## 10.3 Camera Factory Settings

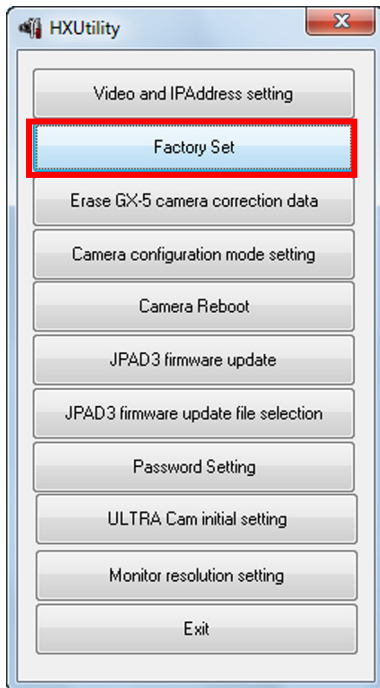
Reverts the HX, GX and Q cameras to the factory settings.



Caution

If the factory settings are implemented, the image data recorded in the camera memory is lost. If there is still data that is needed, make sure to download the image data before implementing the factory settings.

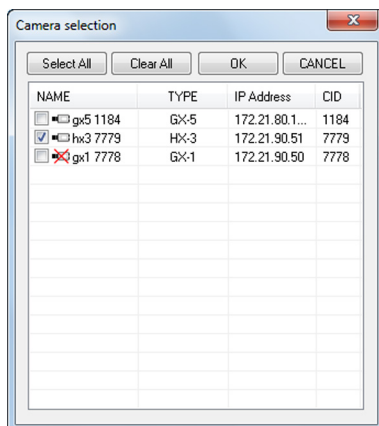
Change the settings with the following procedures.



Confirm that the HX and GX cameras with the settings have started up and the PC and cameras have connected to the network.

Additionally, confirm that the camera is not in use.

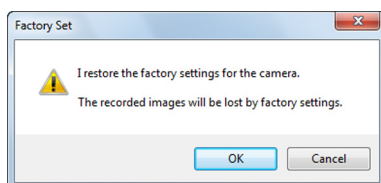
Startup the HXUtility and click "Factory Settings".



The "Select Camera" dialogue is displayed with a list of cameras currently connected to the network.

An "x" is shown on the camera icon of the camera which can't be connected. (In use, or the IP address of Q camera is not on the network segment of PC)

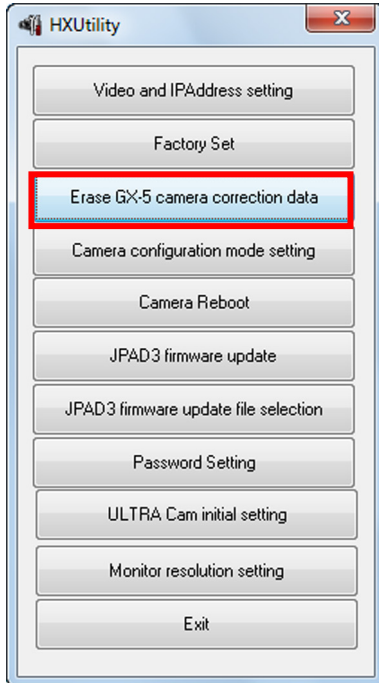
Check a camera to set and click "OK".



A confirmation dialogue appears. Click "Yes" to change to the factory settings and restart the camera.

## 10.4 Erase GX-5 Camera Correction Data

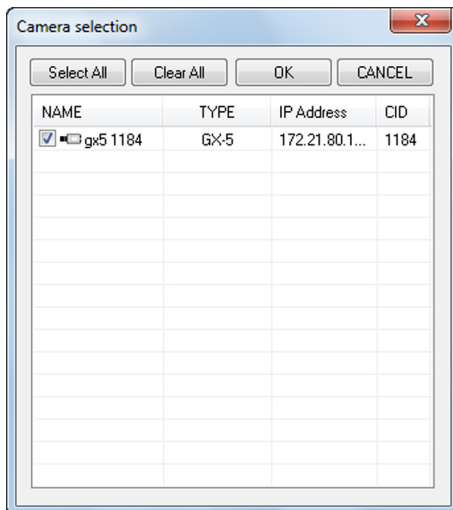
Initializes the non-volatile memory in the GX-5/GX-5F DRP where the camera correction data is saved and erases the camera correction data.



Confirm that the GX-5 cameras with the settings have started up and the PC and cameras have connected to the network.

Additionally, confirm that the camera is not in use.

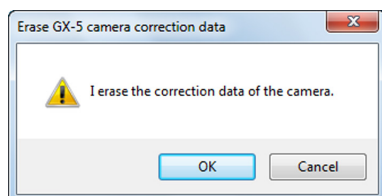
Startup the HXUtility and click "Erase GX-5 Camera Correction Data".



The "Select Camera" dialogue is displayed with the GX-5/GX-5F DRP currently connected to the network.

An "x" is shown on the camera icon for the DRP in use.

Check a camera to set and click "OK".



A confirmation dialogue appears. Click "Yes" to erase the camera correction data and restart the camera.

## 10.5 GX-5 Camera Configuration Mode Settings

Switches the GX-5 camera configuration mode settings. Select any of the following camera configuration modes.

**Set Manually** Change the camera configuration settings with the HXLink or the J-PAD3.

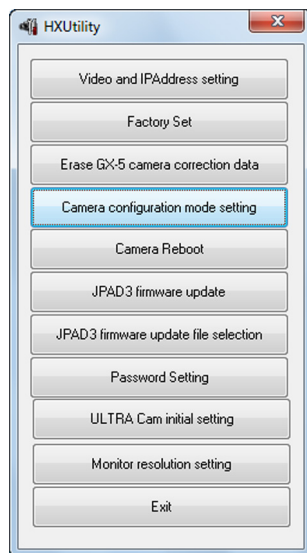
**Set Automatically** Performed automatically if the camera configuration settings and the configuration of the camera head connected to the GX-5 DRP differ at GX-5/GX-5F DRP.



**Caution**

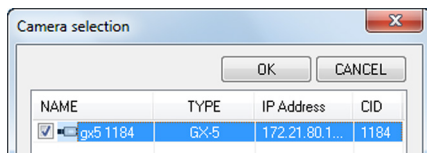
If the camera configuration mode is "Set Automatically", save the recorded data before turning off the DRP power even if there is a backup.

If the camera head cannot be verified at DRP startup due to a malfunction of the camera head contacts or such, the image data performed with the camera configuration settings will be lost.



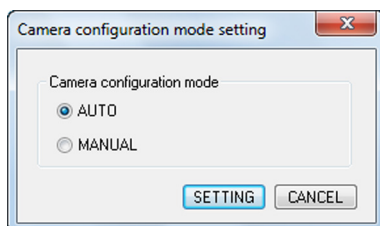
Confirm that the GX-5/GX-5F cameras with the settings have started up and the PC and cameras have connected to the network. Additionally, confirm that the camera is not in use.

Startup the HX Utility and click "Camera configuration mode setting".

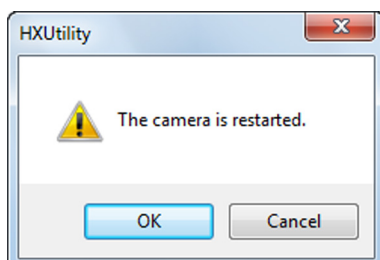


The "Select Camera" dialogue is displayed with a list of the GX-5/GX-5F cameras currently connected to the network. An "x" is shown on the camera icon for the cameras in use.

Check a camera to set and click "OK".



The "Camera Configuration Mode Settings" dialogue appears. Select the camera configuration mode.

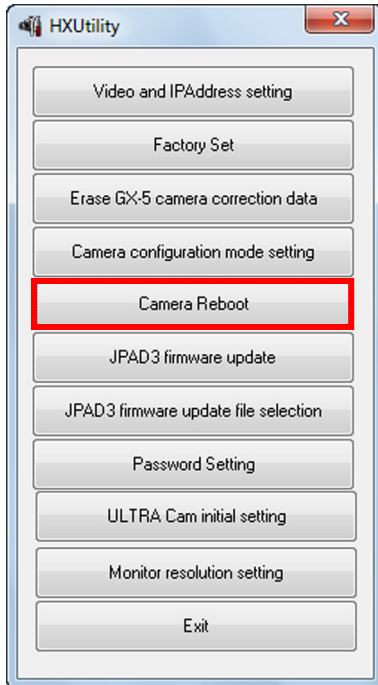


A confirmation dialogue appears when the camera configuration mode is changed. Click "Yes" to change the camera configuration data and restart the GX-5/GX-5F DRP.

## 10.6 Reboot Camera

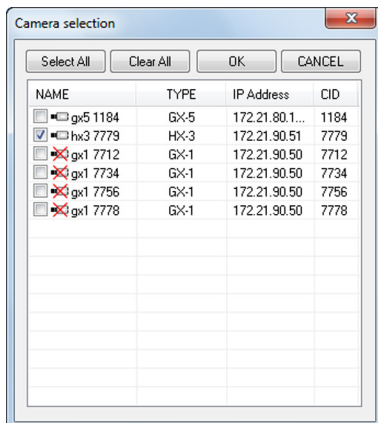
Reboots the HX and GX cameras.

Change the settings with the following procedures.



Confirm that the HX and GX cameras with the settings have started up and the PC and cameras have connected to the network. Additionally, confirm that the camera is not in use.

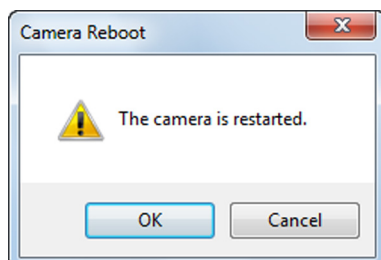
Startup the HXUtility and click "Reboot Camera".



The "Select Camera" dialogue is displayed with the cameras currently connected to the network.

An "x" is shown on the camera icon for the cameras in use.

Check a camera to set and click "OK".



A confirmation dialogue appears. Click "Yes" to reboot the camera.

## 10.7 Update J-PAD3 Firmware

Updates the firmware for the remote control (J-PAD3) connected to the GX camera.

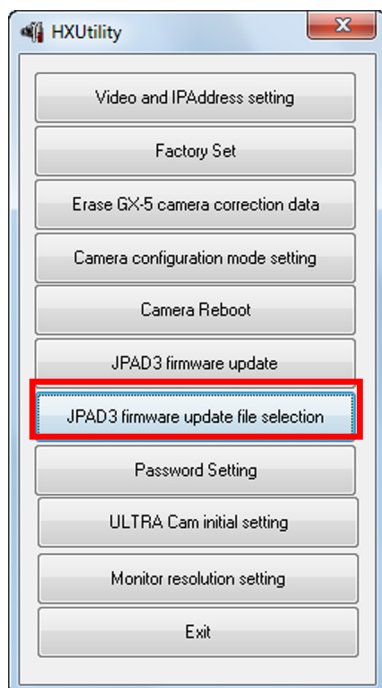


Caution

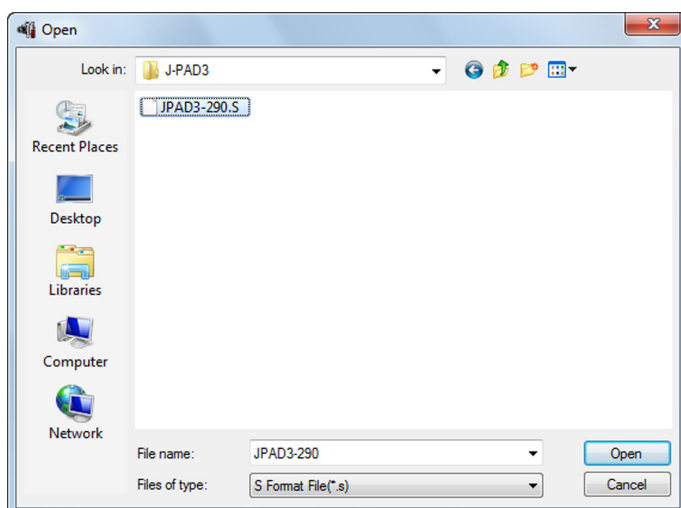
Make sure to turn off the camera power and unplug the J-PAD3 from the GX camera when updating J-PAD3 firmware.

If not properly updated, the J-PAD3 will not startup and cannot be used.

First, select the firmware file according to the following procedure.

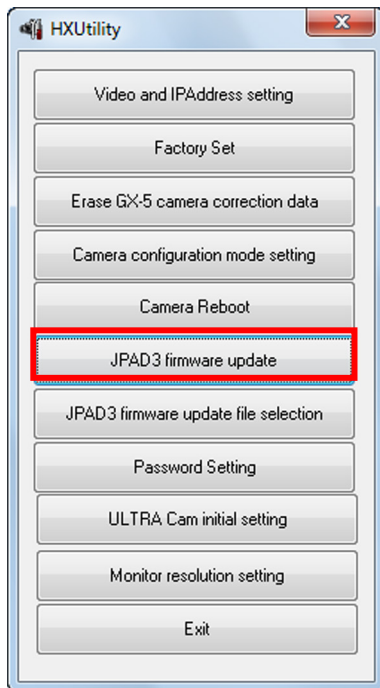


Startup the HXUtility and click "Select JPAD3 Firmware Update File".



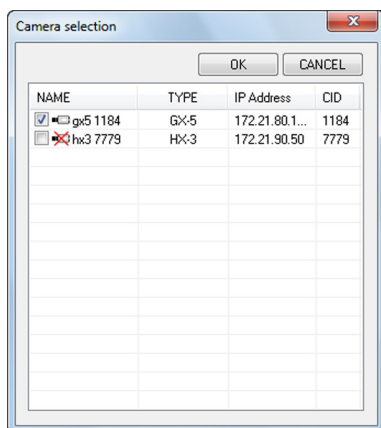
The "Open File" dialogue is displayed, so specify the firmware file and click "Open".

Next, update the firmware with the following procedure.



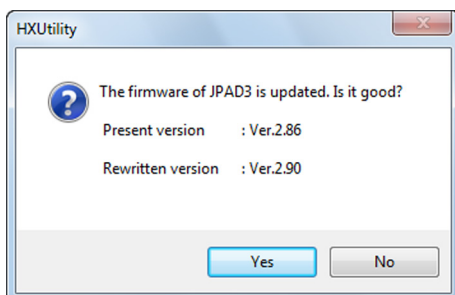
Confirm that the GX cameras with the settings have started up and the PC and cameras have connected to the network. Additionally, confirm that the camera is not in use and the J-PAD3 is connected to the camera.

Startup the HXUtility and click "Update JPAD3 Firmware".

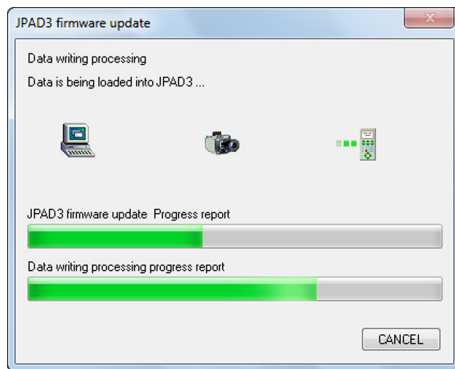


The "Select Camera" dialogue is displayed with a list of the cameras currently connected to the network. An "x" is shown on the camera icon for the cameras in use.

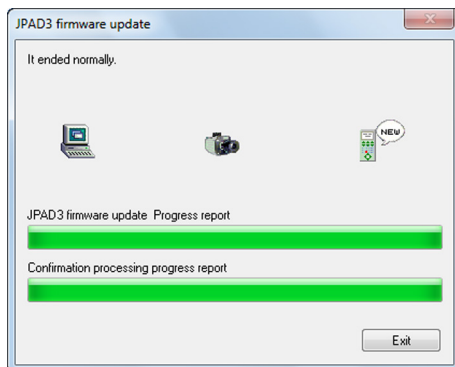
Check a camera to update the J-PAD3 firmware and click "OK".



A confirmation dialogue appears. Click "Yes" to start updating the J-PAD3 firmware connected to the camera. Then do not operate until "Completed Normally" appears.



The "Update JPAD3 Firmware" dialogue appears and the firmware writing progress is shown on the progress bar.



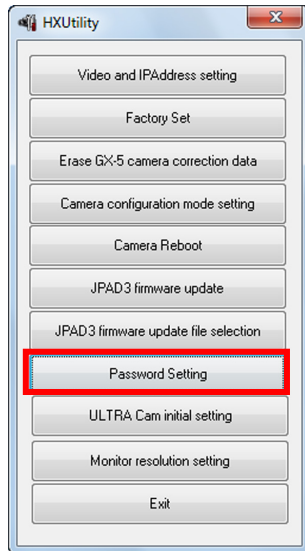
Once the J-PAD3 firmware update is done, "Completed Normally" appears.

Click "Exit".

To reboot the J-PAD3, unplug the J-PAD3 from the camera and then reconnect.

## 10.8 Set Password

Set a password on the HXUtility to prevent changes to the camera settings due to erroneous operation. Passwords cannot be set during initialization. Set/change the password with the following procedures.



Startup the HXUtility and click "Set Password".

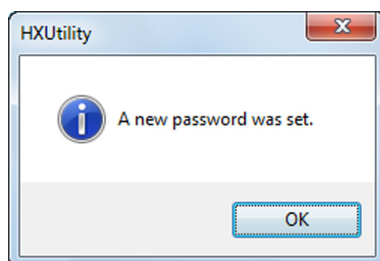


The "Set Password" dialogue is displayed.

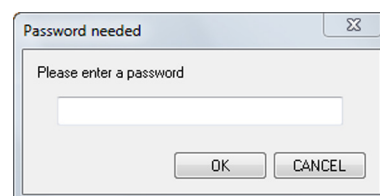
If a password is already set, input the current password in "Enter Current Password".

Enter the new password in "Enter New Password" and "Enter New Password Again". If not using a password, leave blank.

Then, click "OK".



A message appears indicating the setting was completed. Click "OK".

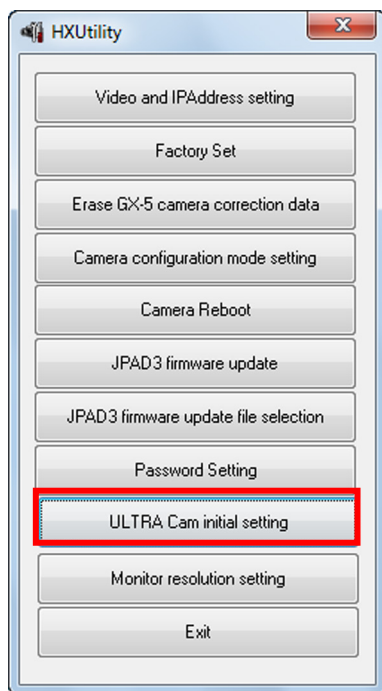


If a password was specified with the procedure given above, the password will be required to use the HXUtility function in the future.

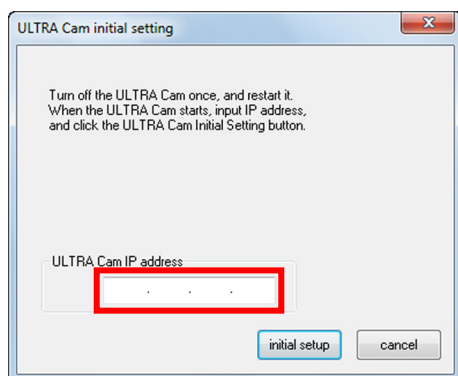
The password is also required to change "User Settings" with "Register User Settings" under the "Input/Output Signals" in the "Camera Connection Settings" dialogue.

## 10.9 ULTRA Cam Initial Settings

Retrieves the ULTRA Cam RGB gain adjustment value and calculates the RGB gain value for the camera color temperature W/B setting to be saved in the individual camera settings file. Initialize the W/B set RGB gain value with the following procedures.



Startup the HXUtility and click "ULTRA Cam Initial Settings".



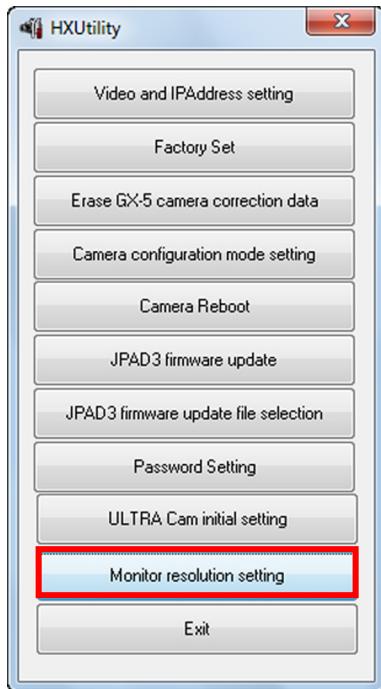
The "ULTRA Cam Initial Settings" dialogue is displayed.

Enter the IP address of the camera to be set and click "Initial Settings".

The setting completed message appears. Click "OK".

## 10.10 HX Camera Monitor Resolution Settings

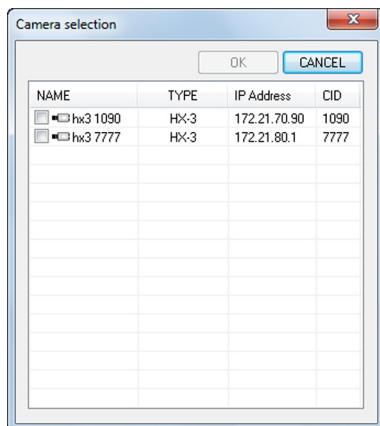
Sets the monitor resolution for the HX camera connected.



Confirm that the HX cameras with the settings have started up and the PC and cameras have connected to the network.

Additionally, confirm that the camera is not in use.

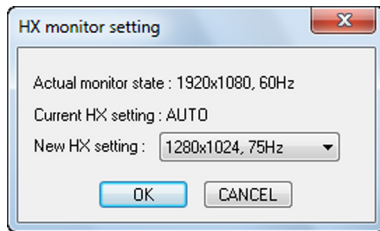
Startup the HXUtility and click "Monitor Resolution Settings".



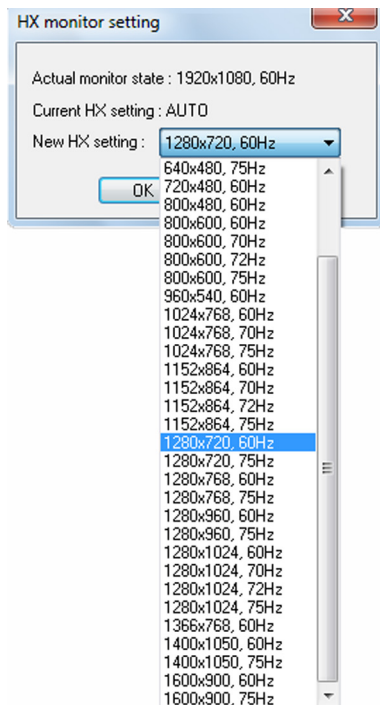
The "Select Camera" dialogue is displayed with a list of cameras currently connected to the network.

An "x" is shown on the camera icon for the cameras in use.

Check a camera to set and click "OK".

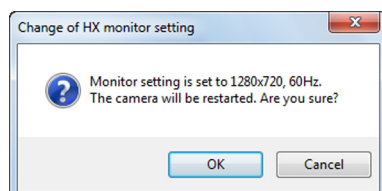
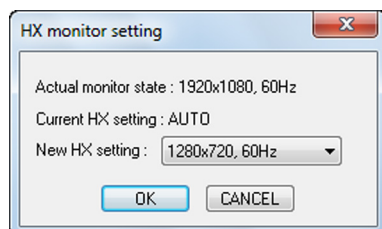


The monitor resolutions that can be used are shown in the pull down menu under "New Settings" in the "HX Monitor Settings" window. If AUTO is selected, the maximum resolution that can be used for the monitor connected to the HX camera is set.



With AUTO, any of the following resolutions is automatically selected.

- 1920×1080
- 1280×1024
- 1024×768
- 800×600
- 640×480



Click "OK" to and the window confirming camera reboot to change the monitor settings appears. Click "OK" in the confirmation window to reboot the camera and change the monitor resolution.

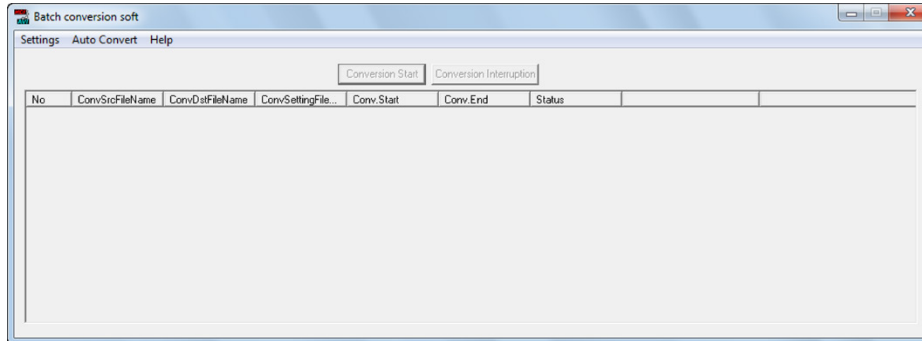
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# 11

## Batch Conversion of Files (Batch Conversion Software)

## 11.1 Overview of Batch Conversion Software

Batch conversion software is a tool to collectively perform format conversion of MCFF files specified with HXLink.



Open a MCFF file with HXLink and set the format conversion to create a conversion settings file with those settings. Create one conversion setting file for each format conversion. Batch conversion software loads conversion setting files in a previous conversion settings folder and executes the format conversion specified in the conversion settings file.

### Flow of Batch Conversion

- (1) HXLink Operations
  - 1.1) Specify the destination folder for the conversion settings file (Initial)
  - 1.2) Set parameters for MCFF format conversion
  - 1.3) Create conversion settings file
- (2) Batch Conversion Software Operations
  - 2.1) Specify the destination folder to load the conversion settings file (Initial)
  - 2.2) Execute conversion

## 11.2 Limitations with Batch Conversion Software Format Conversion

The following limitations exist for the batch conversion software.

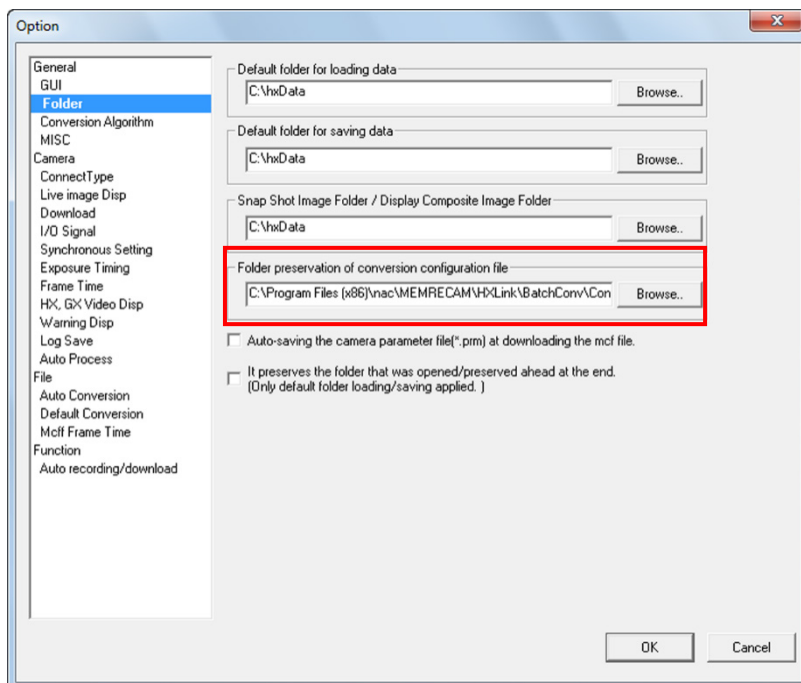
- The source file is a MCFF or BMP file.
- Format conversion cannot be performed on burst recorded or multi trigger recorded MCFF files.
- Conversion cannot be performed on partitioned and saved MCFF as a single scene.
- The image size width and height must be a multiple of 4.

The following limitations exist for AVI conversion of sequential BMP files.

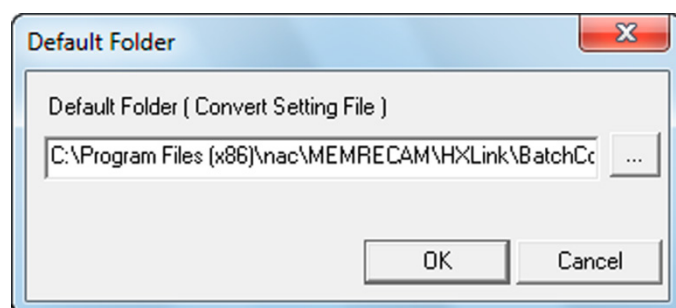
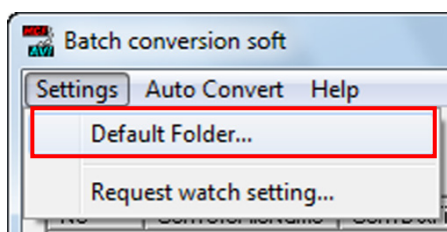
- The number assigned to the BMP file name must be an integer greater than 0.
- The format of the corresponding BMP file can only be 24 bit color and cannot be B/W (256 colors : 8 bit).

## 11.3 Batch Conversion Operations

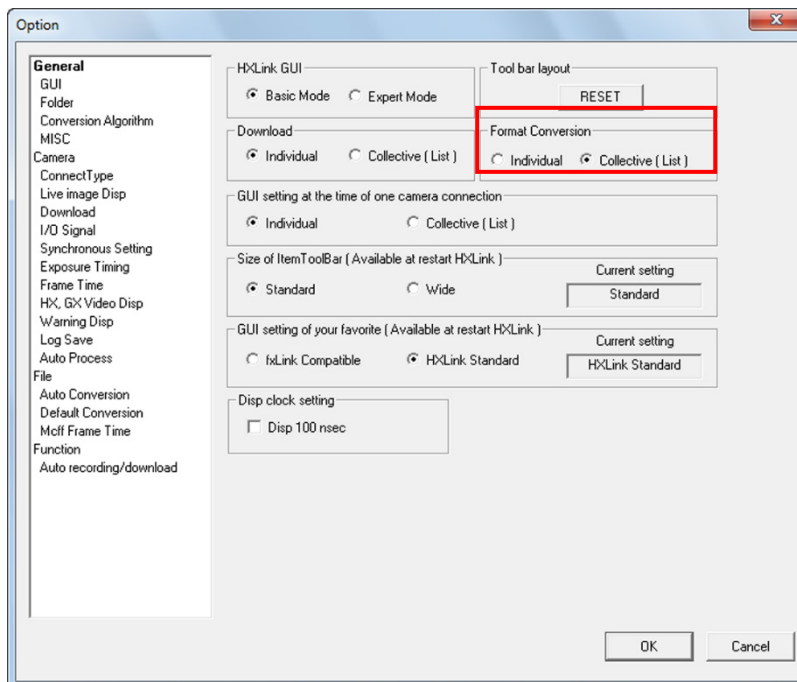
- (1) Startup HXLink and use “Folder preservation of conversion configuration file” in “Folders” under “Options” in the HXLink settings menu to specify the same folder as the “Default Folder (Convert Setting File)” for the batch conversion software.



HXLink Options “Folder”

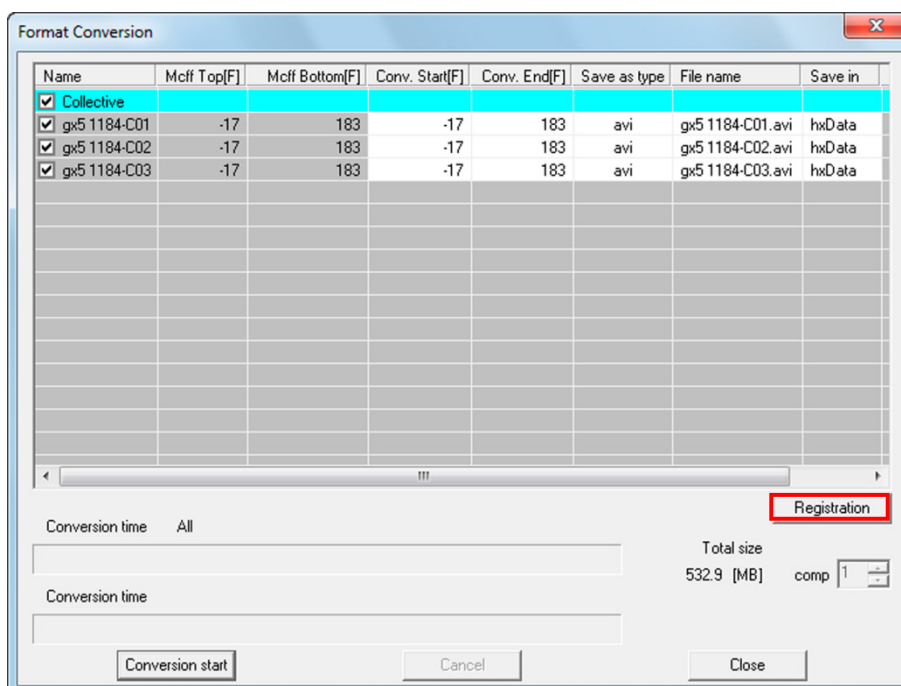


- (2) Select the “GUI Settings” tab in “Options” in the HXLink settings menu, then select “Batch Conversion (List)” in “Format Conversion” and click “OK”.

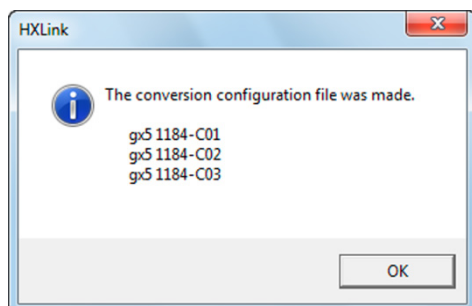


- (3) Open the MCFE file with HXLink and after adjusting the image quality if necessary, click “Format Conversion”.

- (4) The format conversion dialogue appears. Specify the range•conversion format•file name• folder for format conversion.



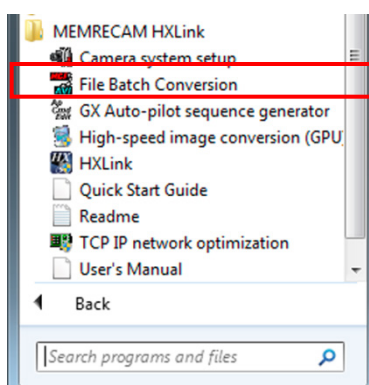
- (5) Click the conversion settings file output button **Registration** to create a batch conversion settings file from the format conversion settings specified in the format conversion dialogue list.



The batch conversion settings file is created in the specified folder.  
Also, the conversion settings file (FCV) is created in the same folder as the source MCFF file for the image quality settings • conversion range.

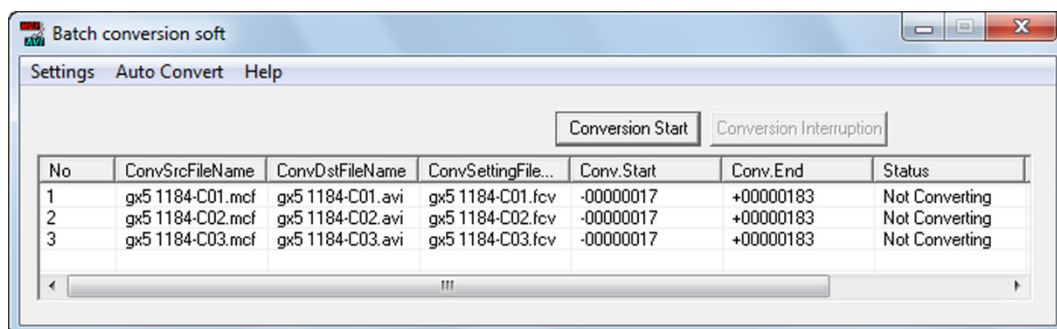
The number of times an MCFF can be set for the first conversion settings in (4) is limited.  
Multiple conversions can be performed by repeating (3) to (5).

- (6) Startup the batch conversion software program.

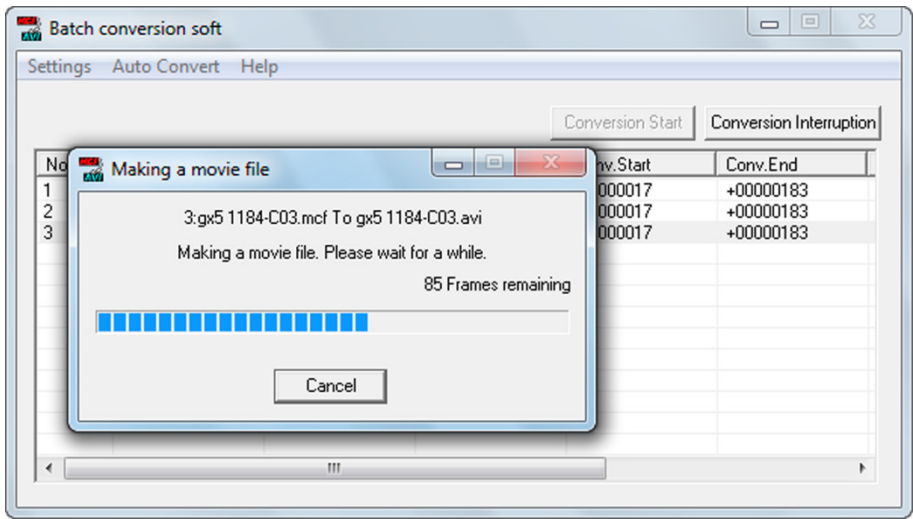


Click “Batch Conversion of Files” in “Start Menu” → MEMRECAM HXLink.

Batch conversion software loads all of the batch conversion settings files in the source folders and displays the conversion settings in a list.



- (7) Click the start conversion button  format conversion. Once conversion is executed, the list of conversion status switches to “Converting” and the converting format dialogue appears.



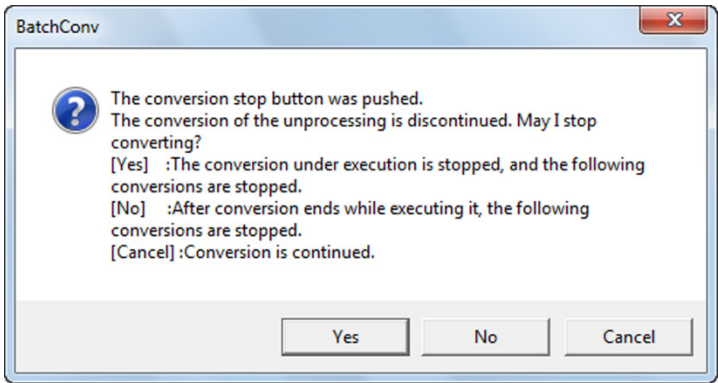
If there is a source file, it is overwritten and saved.

If an error is generated during format conversion, details of the error are shown in the list of error information and the following format conversion is started.

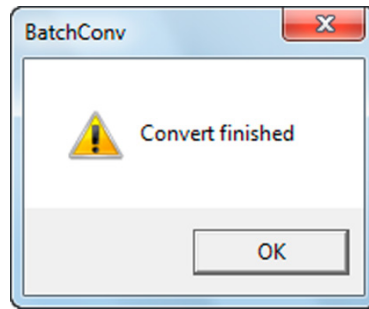
- (8) To stop conversion, click the cancel button  in the progress dialogue or click the stop conversion button .

Immediately stops conversion.

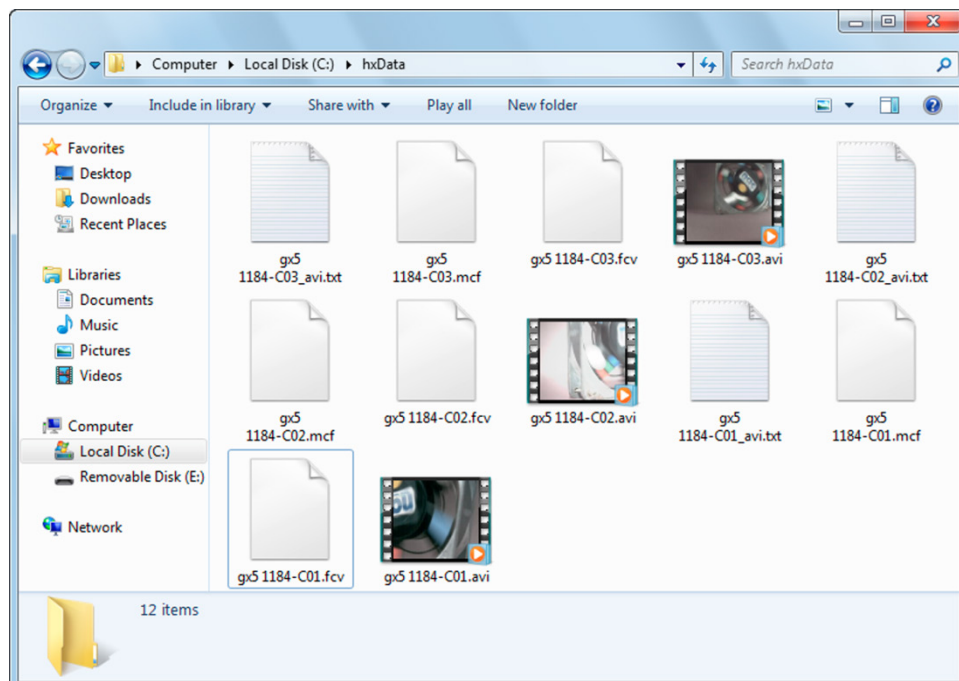
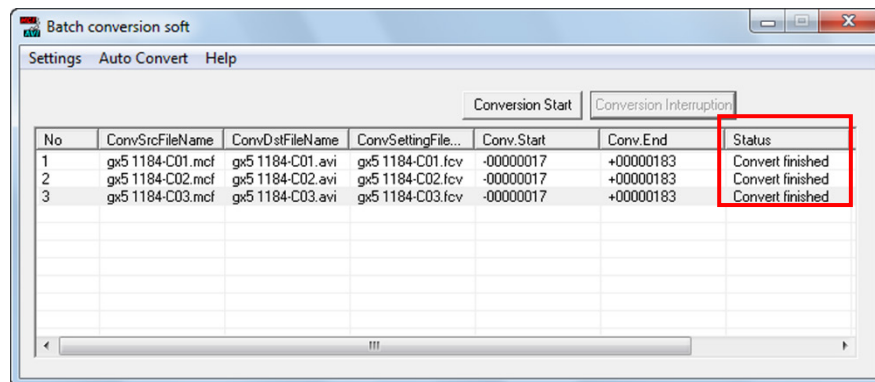
Shows the window for ending conversion.



- (9) Once all of the specified format conversions are done, the following dialogue appears. Click “OK”.



- (10) Confirm the results of the format conversion in the list of “Conversion Status” and confirm that the files for conversion are saved in the destination folder in Explorer.





Caution

If using Windows Vista/7/8/8.1/10 and the save folder under the folder where access is protected is specified, the batch conversion destination file is created in a different folder than the save folder. This is operated by the Windows Vista/7/8/8.1/10 file system function.

【Access protected folder】 C:¥Program Files, C:¥Winodws, or C:¥ProgramData

For example, if the save folder is set to the C:¥Program Files¥nac¥MEMRECAM¥¥hxData folder, the conversion file is created in the following folder. (*User\_name* replaced with a log on user name)

【Windows Vista/7/8/8.1/10 32bit】

C:¥Users¥*User\_name*¥AppData¥Local¥VirtualStore¥Program Files¥NAC¥MEMRECAM¥¥hxData

【Windows Vista/7/8/8.1/10 64bit】

C:¥Users¥*User\_name*¥AppData¥Local¥VirtualStore¥Program Files (x86)¥nac¥MEMRECAM¥¥hxData

If the format conversion fails, the error details are displayed in the list in “Error Information”.

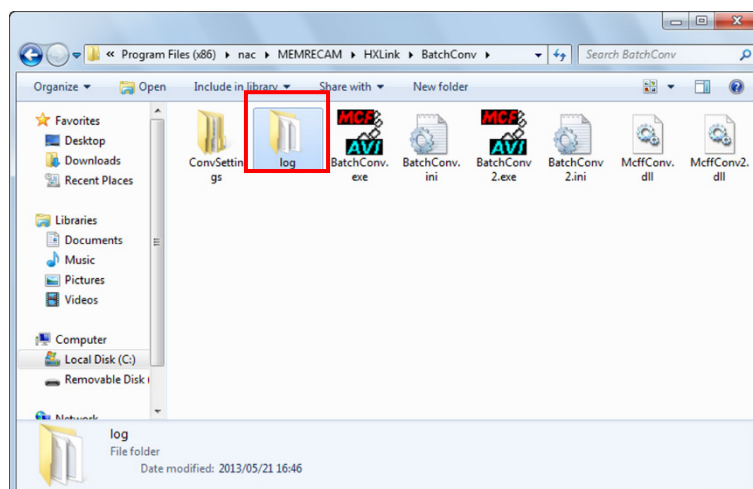
Refer to 11.4 Error Information on page 11-9 for specifics on the error details.



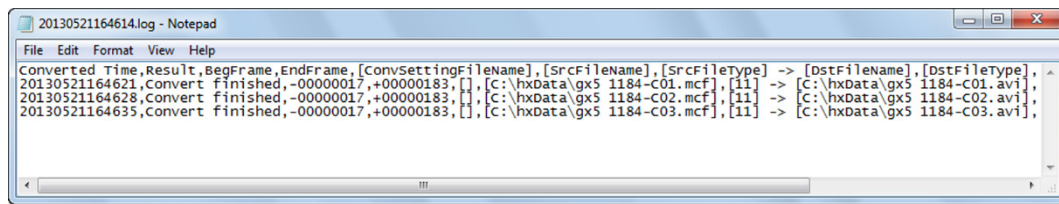
If the format conversion is successful, the converted batch conversion settings files are moved to the completed folder (created if none exists) in the “Source Conversion Settings File Folder”.

If the format conversion fails, the converted batch conversion settings files are moved to the error folder (created if none exists) in the “Source Conversion Settings File Folder”.

The history of the format conversion results is saved in the log file of the log folder.



## Log File Example



### Items Recorded in the Log File

- |                          |  |
|--------------------------|--|
| 1. Converted Time        | Time after conversion (YYYYMMDDhhmmss) |
| 2. Result                | Conversion results                     |
| 3. BegFrame              | Conversion start frame                 |
| 4. EndFrame              | Conversion end frame                   |
| 5. [ConvSettingFileName] | Batch conversion settings file name    |
| 6. [SrcFileName]         | Source file name                       |
| 7. [SrcFileType]         | Source file type (*1)                  |
| 8. [DstFileName]         | Destination file name                  |
| 9. [DstFileType]         | Destination file type (*1)             |
| 10. [FcvFileName]        | FCV file name                          |

\*1: File Type    11: MCFF,   12: AVI,   14: BMP,   15: TIFF,   16: JPEG

#### ■ Batch conversion maintenance

When batch converting, batch conversion settings files are saved in the completed/error folder in the source folder and the log files are saved in the log folder.

These files are added each time batch conversion is performed and these files are deleted on a regular basis.

## 11.4 Error Information

If there is a conversion error by the batch conversion software, the error information for the conversion failure is shown in the error information column.

### • List of Error Information Displayed

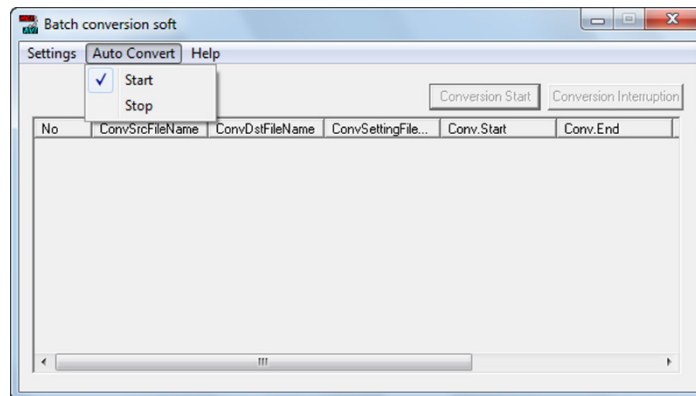
<u>Error Display</u>	<u>Error Details</u>
100, MCFF file open error	Source file does not exist, access not allowed etc.
101, RGB matrix not supported error	SDC library error (due to HXLink installation failure)
102, Section data loading error	Download suspended file not batch converted
103, GPU environment error	Insufficient conversion processing resources (used together with HXLink etc.)
104, MCFF file size error	Download suspended file not batch converted
105, Pixel bit count error	Abnormal conversion settings file, HXLink installation failure
200, FCV file not detected error	Conversion settings file does not exist, access not allowed etc.
201, Save directory error	Source folder does not exist, access not allowed etc.
202, Source image file write error	Source image file in use, does not exist, access not allowed etc.

## 11.5 Auto Conversion

Auto conversion is a function that monitors the batch conversion settings files in the existing folders on a regular basis and if conversion settings files are created, automatically converts the format.

### • Auto Conversion Procedures

- 1) Select “Start” in the auto conversion menu to start.

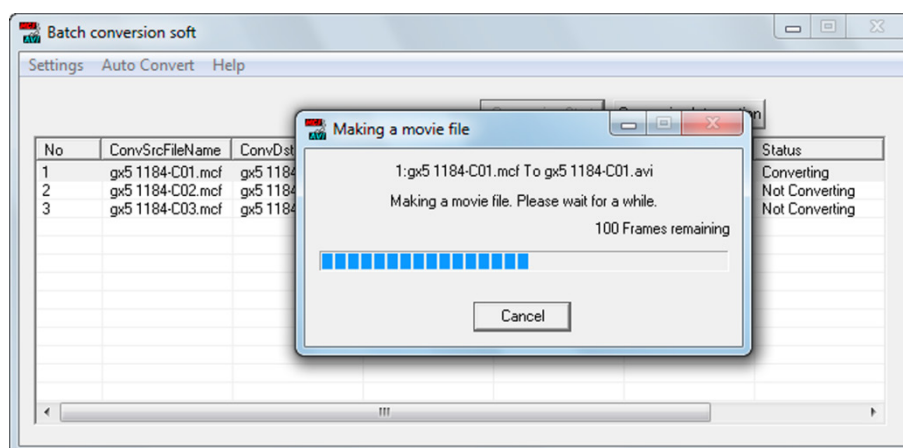


- 2) Batch conversion settings files are created in HXLink.

If conversion processing is not conducted, the batch conversion software verifies if a batch conversion settings file has been created in an existing folder each time the monitor time elapses.

If a batch conversion settings file is identified, the batch conversion settings are shown in a window and format conversion starts.

If the monitor time has elapsed, the batch conversion settings are shown in the batch conversion software window and format conversion starts.



Once format conversion is done, the batch conversion software window status shows “Conversion Successful”. The results of the auto format conversion can be confirmed in the log file.

If all of the batch conversion shown in the batch conversion software window are done, the batch conversion software reopens monitoring of the batch conversion settings file.

To end auto conversion of the batch conversion software, click “Stop” in the “Auto Conversion” menu.

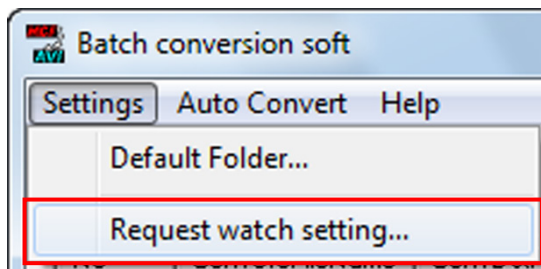
Click “Stop” in the “Auto Conversion” menu or the batch conversion software automatically repeats conversion until the conversion is done.

The batch conversion software can specify the interval at which the batch conversion settings file is loaded from the “Source Conversion Settings File Folder”.

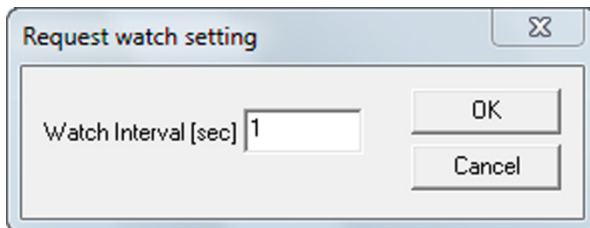
If the batch conversion software is done with conversions and the “Monitor Interval (sec)” has passed, the batch conversion file is automatically loaded from the “Source Conversion Settings File Folder” for auto conversion.

▪ Setting the Monitor Interval

- 1) Click “Set Monitor (Polling) Time” in the “Settings” menu.



- 2) In the “Set Conversion File Monitor Time Interval (sec)” dialogue shown, specify the interval in “Monitor Interval (sec)”.



## 11.6 AVI Conversion of a Series of BMP Files

A series of BMP files can be converted into a single AVI file.

- Specifications for BMP Files that can be Converted into AVI Files

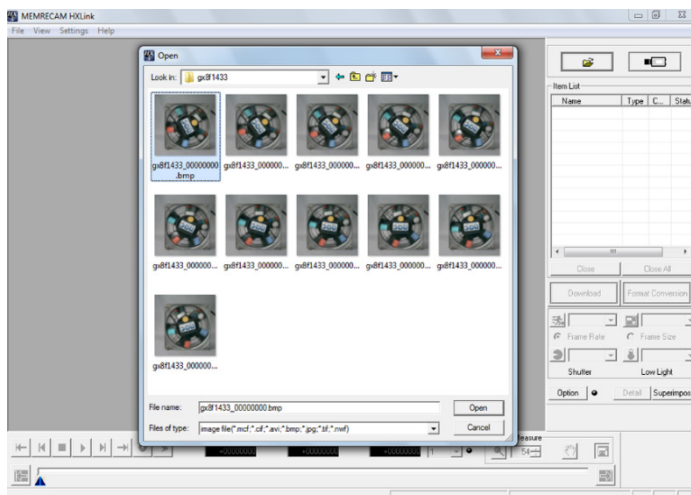
The image size (width, height) is 24bit RGB color format in multiples of 4.

- Procedures for AVI Conversion of A Series of BMP Files

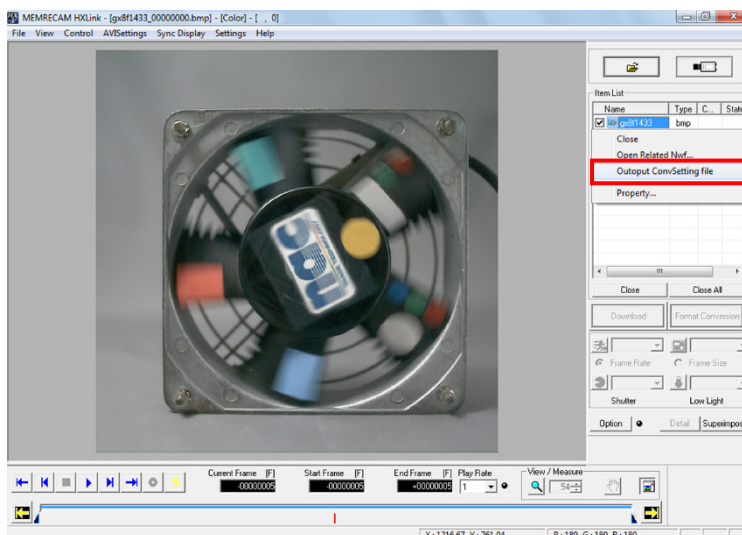
Designation of the HXLink “Conversion Settings File Destination Folder” and the batch conversion software “Source Conversion Settings File Folder” is the same as that for normal batch conversion.

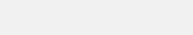
Next is a description of the procedures in an example using the auto conversion function.

- 1) Startup the batch conversion software and select “Start” in the auto conversion menu to start auto conversion.
- 2) Before creating a batch conversion settings file, select the “Source Conversion Settings” tab in “Options” in the HXLink settings menu, and specify the AVI conversion settings.
- 3) In HXLink, select and open a single BMP file from the series of BMP files for conversion.



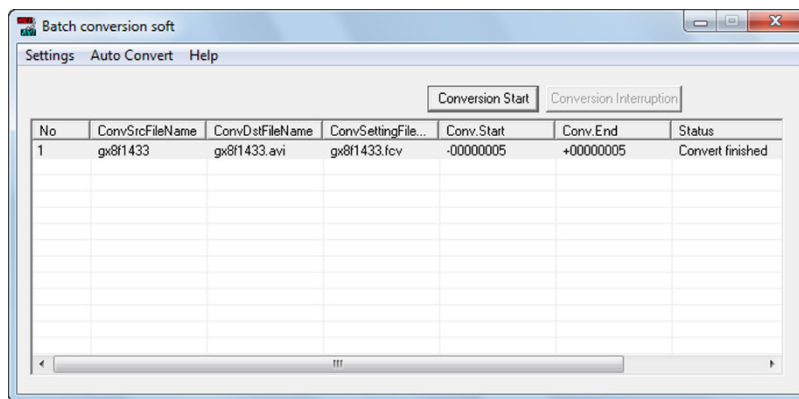
- 4) In the item list, select a series of BMP files for conversion, right click the mouse and click on the conversion settings file output from the menu.





The screenshot shows a small window titled "HXLink". Inside the window, there is a yellow warning triangle icon with an exclamation mark. To the right of the icon, the text reads: "The conversion configuration file was made." At the bottom right of the window, there is an "OK" button.

Once AVI conversion is done, the conversion status in the batch conversion software window indicates “Conversion finished”.





# 12

## Auto Pilot

## 12.1 Overview of Auto Pilot

There is an auto pilot function on the HX and GX cameras that automatically executes specific processing when the power is turned on.

(The auto pilot function can be used from the GX-1 Ver.1.31, GX-5 Ver.1.30 firmware)

The auto pilot function is not operated from the PC or remote control but is a function that is automatically executed by loading an execution sequence from USB media connected when the HX and GX cameras are powered up.

With the auto pilot function, the following processes are automatically executed when the power is turned on to the HX and GX cameras.

- (1) Start ARM and wait for the STOP mode from recording trigger input.
- (2) Set the save range and save the recorded data as a MCFF file in the USB media.
- (3) Return to (1) and repeat recording.

The sequence execution file that performs this processing is installed on the HXLink and PC as a sample. The sample sequence is in the following folder with the installer default settings.

Windows XP

C:\Program Files¥nac¥MEMRECAM¥tools¥AutoPilot¥sample\_1

Windows Vista/7/8/8.1/10

C:\Program Files (x86 ) ¥nac¥MEMRECAM¥tools¥AutoPilot¥sample\_1

The method of executing auto pilot creates the sequence execution file SEQUENCE.DAT for auto pilot and is copied on the USB media root directory, and is loaded when the HX and GX camera power is turned on with the USB media connected to the HX and GX cameras.

Startup the HX and GX cameras and when the STOP mode is accessed, all of the steps for the auto pilot sequence are loaded into the HX and GX cameras from SEQUENCE.DAT on the connected USB media, and then the auto processing starts.

If the “Video On-Screen Display Settings” under the “HX, GX Video Display” in the “Camera Connection Settings” dialogue or the “Options” dialogue of the HXLink is set to “Show All”, the status of the auto pilot sequence processing can be confirmed with the OSD in the viewfinder.

The maximum number of auto pilot sequences is 1000.

Auto processing continues even if the USB media is removed from the HX and GX cameras after auto processing has started. However, if auto processing is performed using USB media when the USB media is not connected to the HX and GX cameras, auto processing is suspended. Additionally, to switch USB media during execution of the auto processing, an UPDATE\_DRIVE command must be entered into the auto pilot sequence to identify the newly connected USB media.

This section describes the auto pilot sequence creation tool and the procedures to create a sequence execution file.

Before recording with auto pilot, execute the auto pilot sequence created and make sure the processing is performed as expected.

## 12.2 Procedures for Creating an Auto Pilot Sequence

This section describes the procedures for creating auto pilot sequences.

### ■ Auto Pilot Sequence Files

The auto pilot sequence creation tool GXAPCmdEdit program creates two types of files, specifically, sequence execution files and sequence files.

- Sequence Execution Files

Sequence execution files are written in the command format for the auto pilot function for the HX and GX cameras. Auto pilot is executed by restarting the HX and GX cameras connected to the USB media with the saved sequence execution files.

The file name of the sequence execution files is SEQUENCE.DAT.

- Sequence Files

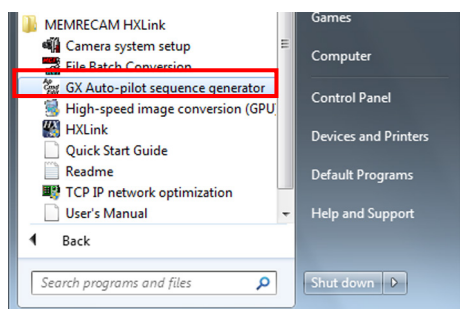
Sequence files record sequences created by the GXAPCmdEdit program.

Sequence files can be converted to sequence execution files.

The file name of the sequence files is the date created, with an extension of APF.

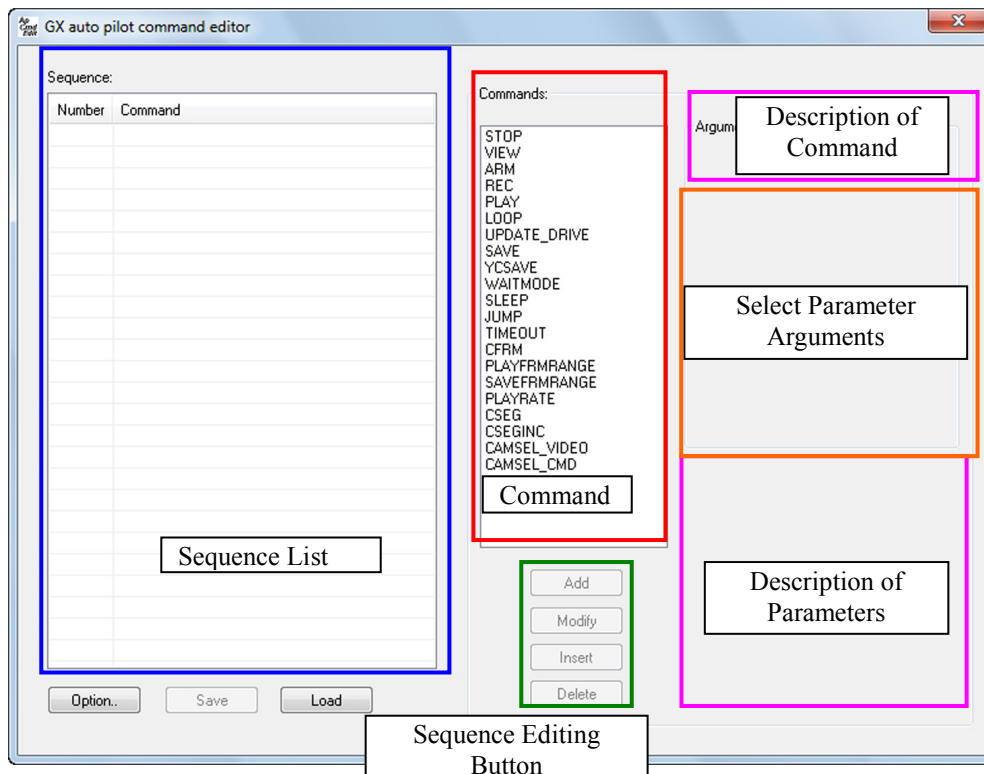
### ■ Procedures for Creating Auto Pilot Sequences

#### (1) Start the GXAPCmdEdit program.



Click “Create GX Auto Pilot Sequence” in “Start Menu” → “All Programs” → “MEMRECAM HXLink”.

The “GX Auto Pilot Command Editor” window appears.



The auto pilot sequence created is shown in the “Sequence List”.

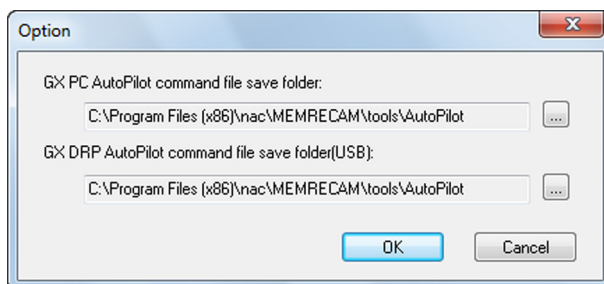
Commands given in the auto pilot sequence are shown in the “Command List”.

Select a command from the “Command List” and the auto pilot sequence is created by adding to the “Sequence List” in the “Sequence Editor Button”.

Select a command from the “Command List” and the parameters for the selected command are shown in “Select Parameter Arguments”, and a description of the command selected is shown in “Description of Command” and “Description of Parameters”.

Save the created auto pilot sequence in a file in the “Sequence List” with  . Load the sequence file into the “Sequence List” with  . Specify the file save location with

- (2) First, decide on the location where the auto pilot sequence file is to be saved. Click  to set the save folder with the following dialogue.

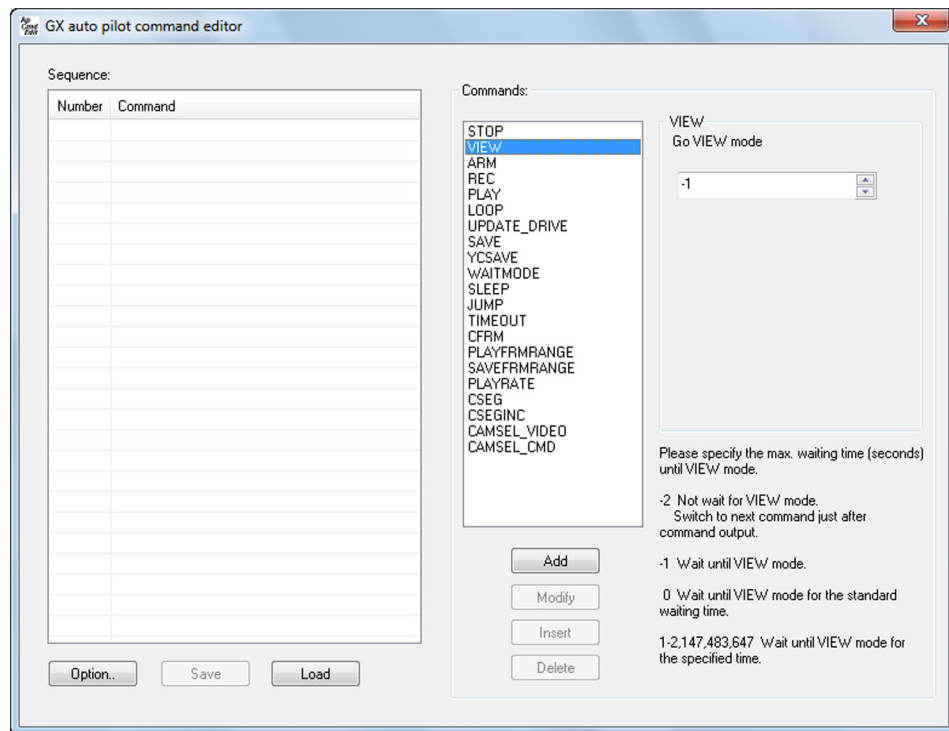


Click  to select the folder with the “Reference Folder” dialogue.

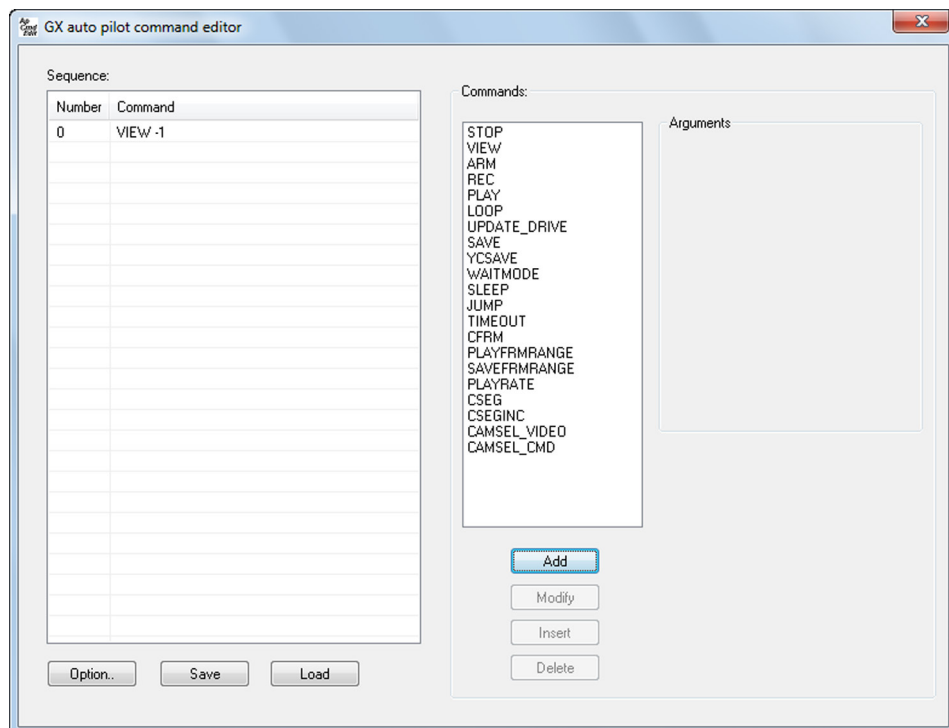
Click  to set the save folder.

Specify the save folder for the sequence file in “GX Auto Pilot Command File (PC) Save Folder”. Specify the save folder for the sequence execution file in “GX Auto Pilot Command File (DRP) Save Folder USB”.

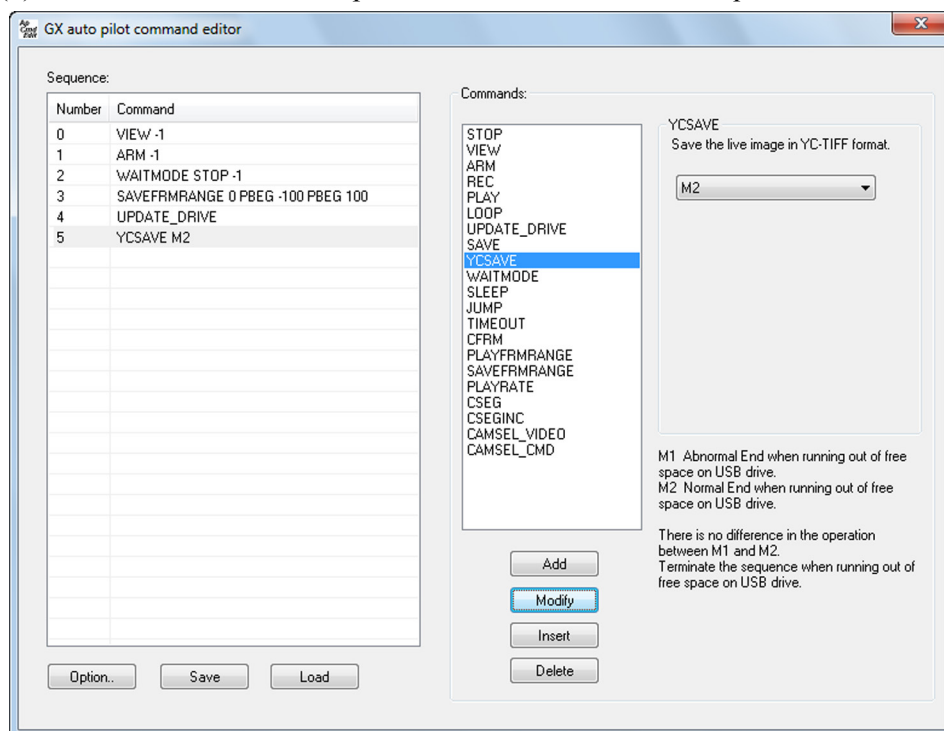
- (3) Click a command in the “Command List” to show the command selected and show the parameters and a description of the command.



- (4) Refer to the description in “Description of Command” and “Description of Parameters” and select the command and parameters specified in the auto pilot sequence using [Add](#) to add to the “Sequence List”.



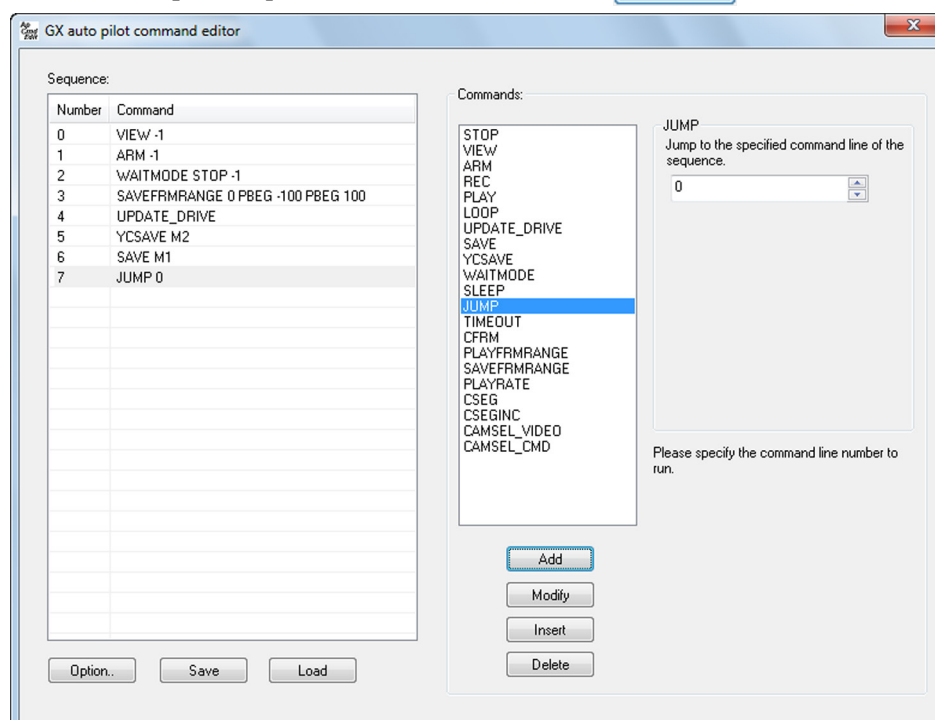
(5) Then, the command and parameters are added to the “Sequence List”.



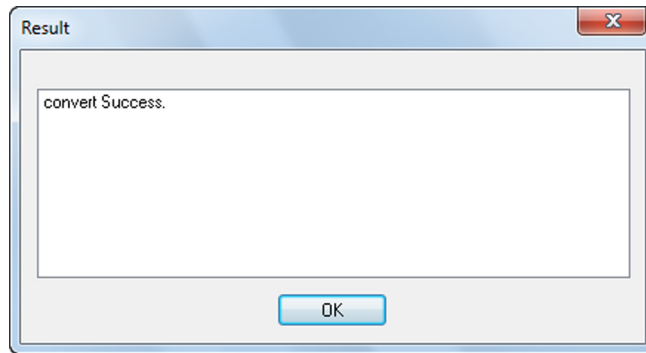
#### ■ Sequence Editing Buttons

- Add** Adds the selected command and parameter to the end of the sequence.
- Modify** Changes the contents of the selected sequence to the selected command and parameter.
- Insert** Inserts the selected command and parameter before the selected sequence.
- Delete** Deletes the selected sequence.

(6) Once the auto pilot sequence has been entered, use **Save** to save the file.

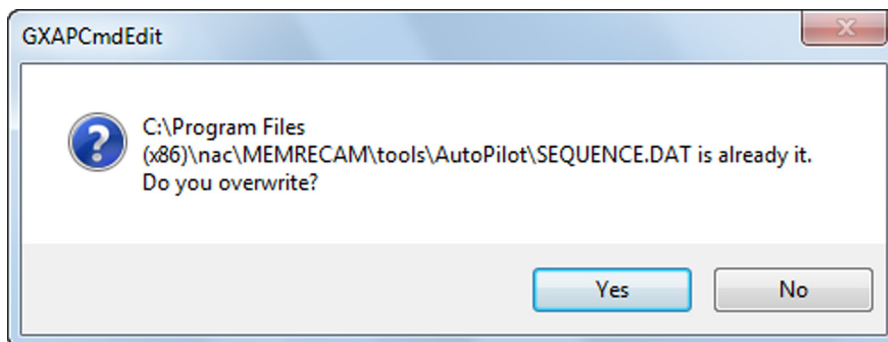


When first saving, the following message appears.



Since the sequence execution file is determined by the file name of SEQUENCE.DAT, if saving multiple sequence execution files, backup by either changing the save folder or changing the file name.

Click  in the GXAPCmdEdit program, and if there is a SEQUENCE.DAT file in the save folder of the sequence execute file, the following warning appears.




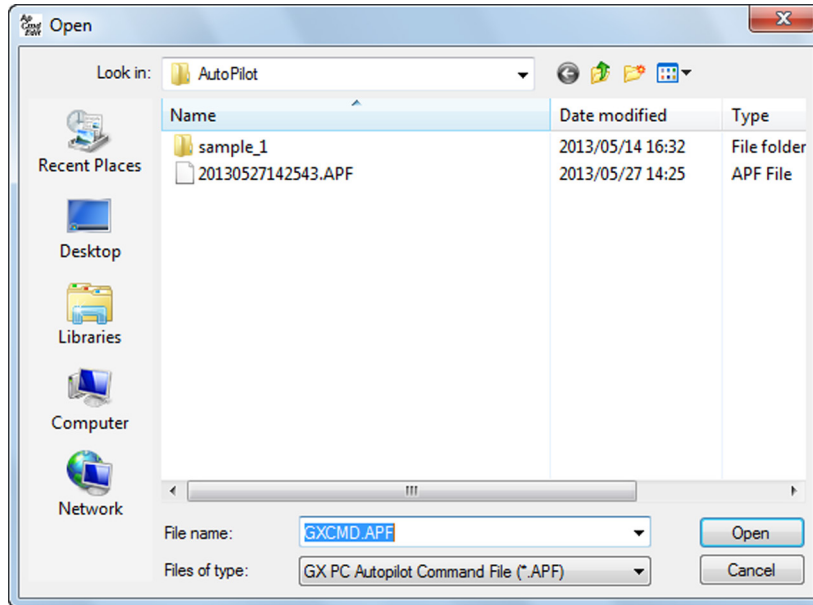
Click  to create a sequence file and overwrite the sequence execution file SEQUENCE.DAT.

Click  and the sequence file and sequence execution file SEQUENCE.DAT are not saved. Backup the SEQUENCE.DAT and save again.


■ Procedures to Create an Auto Pilot Sequence from a Sequence File

If creating a sequence execution file SEQUENCE.DAT by keeping the same or changing the sequence file created, use the load sequence file function in the GXAPCmdEdit program.

Click  under the sequence list and the dialogue specifying the sequence file appears.



Open the loaded sequence file (extension of APF) and the auto pilot sequence loaded from the file in the sequence list appears.

Click  after leaving the loaded auto pilot sequence unchanged or changing it and the sequence file and the sequence execution file are saved.

## 12.3 Auto Pilot Commands

This section describes the commands used for auto pilot sequences.

### Caution

#### (†1) Block:Block Numbers

With the CFRM, PLAYFRMRANGE, SAVEFRMRANGE commands, the Block: block number is set as a parameter to designate the frame moved, playback or saved frame range.

In the GX camera memory, the first block is block1, with a maximum of 16 block partitions but with the GX auto pilot command, blocks in the camera memory are designated from 0~15.

Block1 in the GX camera memory is designated block0 with the auto pilot command and block2 in the GX camera memory is designated block1 with the auto pilot command.

For the Block: block number parameter in the auto pilot command, the number subtracting 1 from the camera block number is specified.

- |                     |   |
|---------------------|---|
| (1) STOP            | Stop  |
| <b>【Function】</b>   | Puts the camera in the STOP mode.   |
| <b>【Parameter】</b>  | Timeout: Timeout setting  |
| Timeout:            | Specify the maximum timeout (seconds) until going into the STOP mode.   |
| -2:                 | The camera issues the command for the STOP mode but it jumps to the command following the sequence without waiting to go into the STOP mode.                                    |
| -1:                 | The camera issues the command for the STOP mode and it jumps to the command following the sequence while waiting to go into the STOP mode.                                      |
| 0:                  | The camera issues the command for the STOP mode and waits a maximum of “Standard Timeout” for the STOP mode.<br>The “Standard Timeout” is used for the TIMEOUT command setting. |
| 1~2,147,483,647:    | The camera issues the command for the STOP mode and waits the maximum of the number of seconds specified in Timeout for the STOP mode.  |
| <br>(2) VIEW        | View  |
| <b>【Function】</b>   | Puts the camera in the VIEW mode.   |
| <b>【Parameters】</b> | Timeout: timeout setting  |
| Timeout:            | Specify the maximum timeout (seconds) until going into the VIEW mode.   |
| -2:                 | The camera issues the command for the VIEW mode but it jumps to the command following the sequence without waiting to go into the VIEW mode.                                    |
| -1:                 | The camera issues the command for the VIEW mode and it jumps to the command following the sequence while waiting to go into the VIEW mode.                                      |
| 0:                  | The camera issues the command for the VIEW mode and waits a maximum of “Standard Timeout” for the VIEW mode.  |
| 1~2,147,483,647:    | The camera issues the command for the VIEW mode and waits the maximum of the number of seconds specified in Timeout for the VIEW mode.  |

- (3) **ARM**                      Start recording
- 【Function】**            Puts the camera in the ARM mode. Starts recording.
- 【Parameters】**        Timeout: Timeout setting
- Timeout:            Specify the maximum timeout (seconds) until going into the ARM mode.
- 2:              The camera issues the command for the ARM mode but it jumps to the command following the sequence without waiting to go into the ARM mode.
- 1:              The camera issues the command for the ARM mode and it jumps to the command following the sequence while waiting to go into the ARM mode.
- 0:                The camera issues the command for the ARM mode and waits a maximum of “Standard Timeout” for the ARM mode.
- 1~2,147,483,647:            The camera issues the command for the ARM mode and waits the maximum of the number of seconds specified in Timeout for the ARM mode.
- 
- (4) **REC**                      End recording
- 【Function】**            Puts the camera in the REC mode.
- 【Parameters】**        Timeout: Timeout setting
- Timeout:            Specify the maximum timeout (seconds) until going into the REC mode.
- 2:              The camera issues the command for the REC mode but it jumps to the command following the sequence without waiting to go into the REC mode.
- 1:              The camera issues the command for the REC mode and it jumps to the command following the sequence while waiting to go into the REC mode.
- 0:                The camera issues the command for the REC mode and waits a maximum of “Standard Timeout” for the REC mode.
- 1~2,147,483,647:            The camera issues the command for the REC mode and waits the maximum of the number of seconds specified in Timeout for the REC mode.
- 
- (5) **PLAY**                    Play
- 【Function】**            Puts the camera in the PLAY mode.
- 【Parameters】**        Timeout: Timeout setting
- Timeout:            Specify the maximum timeout (seconds) until going into the PLAY mode.
- 2:              The camera issues the command for the PLAY mode but it jumps to the command following the sequence without waiting to go into the PLAY mode.
- 1:              The camera issues the command for the PLAY mode and it jumps to the command following the sequence while waiting to go into the PLAY mode.
- 0:                The camera issues the command for the PLAY mode and waits a maximum of “Standard Timeout” for the PLAY mode.
- 1~2,147,483,647:            The camera issues the command for the PLAY mode and waits the maximum of the number of seconds specified in Timeout for the PLAY mode.

- (6) **LOOP**      Loop
- 【Function】**    Puts the camera in the LOOP mode.
- 【Parameters】** Timeout: Timeout setting
- Timeout:    Specify the maximum timeout (seconds) until going into the LOOP mode.
- 2:      The camera issues the command for the LOOP mode but it jumps to the command following the sequence without waiting to go into the LOOP mode.
- 1:      The camera issues the command for the LOOP mode and it jumps to the command following the sequence while waiting to go into the LOOP mode.
- 0:      The camera issues the command for the LOOP mode and waits a maximum of “Standard Timeout” for the LOOP mode.
- 1~2,147,483,647:      The camera issues the command for the LOOP mode and waits the maximum of the number of seconds specified in Timeout for the LOOP mode.
- 
- (7) **UPDATE\_DRIVE**    Update drive
- 【Function】**    Inserts the USB drive and updates the USB drive information.
- During auto pilot processing, if the USB media is not in use, the USB media can be switched. In this case, use this command to use the inserted USB media.
- 【Parameters】** None
- 
- (8) **SAVE**      Save image data
- 【Function】**    Save image data on the USB drive in MCFF format.
- Set the range of frames to save with the SAVEFRMRANGE command.
- 【Parameters】** Mode: Select display when there isn’t enough free space on the USB drive
- Mode:      Select OSD when there isn’t enough free space on the USB drive.
- M1:      If there isn’t enough free space on the USB drive, an error status is shown and the auto pilot sequence ends.
- M2:      If there isn’t enough free space on the USB drive, the auto pilot sequence ends without an error status shown.
- 
- (9) **YCSAVE**      Save live image
- 【Function】**    Saves the live image data on the USB drive in the YC-TIFF format.
- 【Parameters】** Mode: Select display when there isn’t enough free space on the USB drive
- Mode:      Select OSD when there isn’t enough free space on the USB drive.
- M1:      If there isn’t enough free space on the USB drive, an error status is shown and the auto pilot sequence ends.
- M2:      If there isn’t enough free space on the USB drive, the auto pilot sequence ends without an error status shown.

- (10) WAITMODE                      Wait mode
- 【Function】**    Waits for the camera to switch to a specified mode.
- 【Parameters】** Mode: mode specification,    Timeout: Timeout settings
- Mode:        Specify the camera mode. Waits for this specified mode.  
                      Modes that can be specified are ARM, LOOP, PLAY, REC, STOP, and VIEW.
- Timeout:    Specify the maximum timeout (seconds) until going into the specified mode.
- 1:        The camera waits for the specified mode and jumps to the command following the sequence.
- 0:        The camera waits a maximum of “Standard Timeout” for the specified mode.
- 1~2,147,483,647:        The camera waits the maximum of the number of seconds specified in Timeout for the specified mode.
- (11) SLEEP                        Sleep
- 【Function】**    Wait a specified time [seconds].
- 【Parameters】** Seconds: Wait
- Seconds:    Specify the number of seconds to wait before jumping to the command following the sequence.  
                      Seconds that can be set are 0~2,147,483,647.
- (12) JUMP                         Jump
- 【Function】**    Jump        Jumps to the command line specified for the sequence.
- 【Parameters】** Line: Command line
- Line:        Specify the command line for the sequence to control.
- (13) TIMEOUT                    Timeout setting
- 【Function】**    Set the “Standard Timeout” used with the commands for changing modes.
- 【Parameters】** Seconds: Wait
- Seconds:    Set the number of seconds for the “Standard Timeout”. Seconds that can be set are 0~2,147,483,647.
- (14) CFRM                        Jump frames
- 【Function】**    Change the frames displayed. Jump to the specified frame of the specified block.
- 【Parameters】** Block: Block number (†1) , Rule: standard frame, FrameNo: Frame number
- Block:        Block number for the frame to jump.  
                      (†1: specify the value subtracting 1 from the block number)  
                      Specify 0~15. If not performing multi trigger recording, set the block number to 0.
- Rule:        Select the reference for the frame number specifying the jump frame.  
                      Normally select TRIG.  
                      PBEG: Set the FrameNo with the start playback frame as 0 (reference).  
                      PEND: Set the FrameNo with the end playback frame as 0 (reference).  
                      RBEG: Set the FrameNo with the start recording frame as 0 (reference).  
                      RBEG: Set the FrameNo with the end recording frame as 0 (reference).  
                      SBEG: Set the FrameNo with the start save frame as 0 (reference).  
                      SBEG: Set the FrameNo with the end save frame as 0 (reference).  
                      TRIG: Set the FrameNo with the trigger frame as 0 (reference).
- FrameNo:    Frame number of the jump frame.  
                      Range values that can be set are -2,147,483,648~2,147,483,647.  
                      Specify the frame numbers of the range to be recorded.

- (15) **PLAYFRMRANGE** Playback range setting
- 【Function】** Specify the playback range for the specified block.  
If performing multi trigger recording, set the range of the entire valid block.
- 【Parameters】** Block: Block number (†1) ,  
Rule1: FrameNo1 reference frame, FrameNo1: Playback start frame number,  
Rule2: FrameNo2 reference frame, FrameNo2: Playback end frame number
- Block: Block number playback range setting.  
(†1: specify the value subtracting 1 from the block number)  
Specify 0~15. If not performing multi trigger recording, set the block number to 0.
- Rule1: Select the reference for the frame number specifying the playback start frame.  
Normally select TRIG.  
RBEG: Set FrameNo1 with the recording start frame as 0 (reference).  
REND: Set FrameNo1 with the recording end frame as 0 (reference).  
TRIG: Set FrameNo1 with the trigger frame as 0 (reference).
- FrameNo1: Frame number of the playback start frame.  
Range values that can be set are -2,147,483,648~2,147,483,647.  
Specify the frame number of the range to be recorded.
- Rule2: Select the reference for the frame number specifying the playback end frame.  
Normally select TRIG.  
RBEG: Set FrameNo2 with the recording start frame as 0 (reference).  
REND: Set FrameNo2 with the recording end frame as 0 (reference).  
TRIG: Set FrameNo2 with the trigger frame as 0 (reference).
- FrameNo2: Frame number of the playback end frame.  
Range values that can be set are -2,147,483,648~2,147,483,647.  
Specify the frame number of the range to be recorded.
- (16) **SAVEFRMRANGE** Save range setting
- 【Function】** Specify the save range for the specified block.  
If performing multi trigger recording, set the range of the entire valid block.
- 【Parameters】** Block: Block number (†1) ,  
Rule1: FrameNo1 reference frame, FrameNo1: Save start frame number  
Rule2: FrameNo2 reference frame, FrameNo2: Save end frame number
- Block: Block number save range setting. (†1: specify the value subtracting 1 from the block number)  
Specify 0~15. If not performing multi trigger recording, set the block number to 0.
- Rule1: Select the reference for the frame number specifying the start save frame.  
Normally select TRIG.  
RBEG: Set FrameNo1 with the recording start frame as 0 (reference).  
REND: Set FrameNo1 with the recording end frame as 0 (reference).  
TRIG: Set FrameNo1 with the trigger frame as 0 (reference).
- FrameNo1: Frame number of the start save frame.  
Range values that can be set are -2,147,483,648~2,147,483,647.  
Specify the frame numbers of the range to be recorded.
- Rule2: Select the reference for the frame number specifying the end save frame.  
Normally select TRIG.  
RBEG: Set FrameNo2 with the recording start frame as 0 (reference).  
REND: Set FrameNo2 with the recording end frame as 0 (reference).  
TRIG: Set FrameNo2 with the trigger frame as 0 (reference).
- FrameNo2: Frame number of the end save frame.  
Range values that can be set are -2,147,483,648~2,147,483,647.  
Specify the frame numbers of the range to be recorded.

- (17) **PLAYRATE** Frame rate setting
- 【Function】 Set the frame rate for the recorded image data.
- 【Parameters】 Rate: Set the frame rate [pps].
- Rate: Frame rate for the recorded image data.
- (18) **CSEG** Switch memory segments (specify segment number)
- 【Function】 Change the camera memory segment to the specified memory segment.
- 【Parameters】 SegmentNo: Segment number
- SegmentNo: Specify the memory segment number (1~128) to be switched.  
The first segment number is 1. If split into 16, specify 1~16.
- (19) **CSEGINC** Switch memory segments (next segment)
- 【Function】 Change the camera memory segment to the next memory segment.
- 【Parameters】 Mode: Data protection mode
- Mode: Specify the data protection mode when changing segments.
- LOOP: Switch segments without data protection.  
Switch to the first segment if at the last segment.
- NORMAL: Make sure of the data protection conditions before switching segments  
and if protecting the data, end auto pilot without switching segments.  
If the data protection conditions are not met, switch to the next  
segment if recording can be performed safely.
- Data Protection Conditions
- The current segment is the last segment or the next segment is the end of the recording.
- (20) **CAMSEL\_VIDEO** Specify video display layout (GX-5/GX-5F only)
- 【Function】 Specify the camera head and the display layout shown on the video.
- 【Parameters】 Layout: video display layout, Cameras: specify the camera shown
- Layout: Camera head layout shown on the video.  
1:1 camera shown, 4:multiple cameras shown on split screen, 8:all cameras shown.
- Cameras: Number specifying the camera head shown on the video.  
8 digit numeral. From the right, corresponds to camera head numbers 1, 2, 3, 4, 5, 6, 7, 8.  
The camera head number is the DRP port number connected to the camera head.  
With HR-CAM, the lowest number (1~8) of the multiple DRP port numbers connected to the camera.
- Example) 00110001 Split display when HR-CAM1 is connected to DRP port numbers 1, 2, 3, 4, and P-CAM 2 is connected to DRP ports 5,6 (ALL)
- (21) **CAMSEL\_CMD** Specify the camera head for the command (GX-5/GX-5F only)
- 【Function】 Specify the camera head for the playback and save.
- 【Parameters】 Camera: Camera head number (lowest number of the DRP ports connected)
- Camera: Specify the camera head number (1~8) for the camera head to playback and save.

## 12.4 Sample Sequence

### (1) Sequence Repeating Recording・Save

0 SLEEP 5	Wait MEMRECAM Ready. (HX needs 5 seconds.)
1 VIEW -1	Start VIEW
2 ARM -1	Start recording
3 WAITMODE STOP -1	Wait for the recording to end
4 SAVEFRMRANGE 0 TRIG -100 TRIG 100	Specify save range:Block 1 (※) , -100~100
5 UPDATE_DRIVE	Confirm USB media
6 SAVE M1	Save frames -100~100 to the USB media
7 JUMP 1	Return to the top of the sequence (1 VIEW) and repeat

※ Specify the auto pilot parameter block numbers by subtracting 1 from the GX/HX block number.

### (2) Sequence Repeating Recording・Playback・Save

0 SLEEP 5	Wait MEMRECAM Ready. (HX needs 5 seconds.)
1 VIEW -1	Start VIEW
2 ARM -1	Start recording
3 WAITMODE STOP -1	Wait for the recording to end
4 PLAYFRMRANGE 0 TRIG -130 TRIG 130	Playback range:Block1 (※) , -130~+130.
5 PLAYRATE 30	Set the frame rate to 30fps
6 CFRM 0 TRIG -130	Jump to frame number -130
7 PLAY -1	Start playback: Frame number -130 ~ +130 at 30fps
8 WAITMODE STOP -1	Wait for the playback to end
9 SAVEFRMRANGE 0 TRIG -100 TRIG 100	Specify save range:Block 1 (※) , -100~100
10 UPDATE_DRIVE	Confirm USB media
11 SAVE M1	Save frames -100~100 to the USB media
12 JUMP 1	Return to the top of the sequence (1 VIEW) and repeat

※ Specify the auto pilot parameter block numbers by subtracting 1 from the GX/HX block number.

(3) Sequence to Save Together after Recording 3 Times

(Split the DRP segments into at least four parts in advance)

0 SLEEP 5	Wait MEMRECAM Ready. (HX needs 5 seconds.)
1 CSEG 1	Switch to memory segment number 1
2 VIEW -1	Start VIEW
3 ARM -1	Start recording
4 WAITMODE STOP -1	Wait for the recording to end
5 CSEGINC NORMAL	If recording on the next segment, switch segments
6 VIEW -1	Start VIEW
7 ARM -1	Start recording
8 WAITMODE STOP -1	Wait for the recording to end
9 CSEGINC NORMAL	If recording on the next segment, switch segments
10 VIEW -1	Start VIEW
11 ARM -1	Start recording
12 WAITMODE STOP -1	Wait for the recording to end
13 UPDATE_DRIVE	Confirm USB media
14 CSEG 1	Switch to memory segment number 1
15 SAVEFRMRANGE 0 TRIG -100 TRIG 100	Specify save range:Block 1 (※), -100~100
16 SAVE M1	Save frames -100~100 to the USB media
17 CSEGINC LOOP	Forcibly switch to the next segment
18 SAVEFRMRANGE 0 TRIG -100 TRIG 100	Specify save range:Block 1 (※), -100~100
19 SAVE M1	Save frames -100~100 to the USB media
20 CSEGINC LOOP	Forcibly switch to the next segment
21 SAVEFRMRANGE 0 TRIG -100 TRIG 100	Specify save range:Block 1 (※), -100~100
22 SAVE M1	Save frames -100~100 to the USB media

※ Specify the auto pilot parameter block numbers by subtracting 1 from the GX/HX block number.

# 13

## Measurement Functions

## 13.1 Overview of the Measurement Functions

HXLink has the two measurement functions of “Coordinate Measurement” and “LAA Measurement”.


Select either one under the “Other” tab in options. (Refer to page 7-8.)

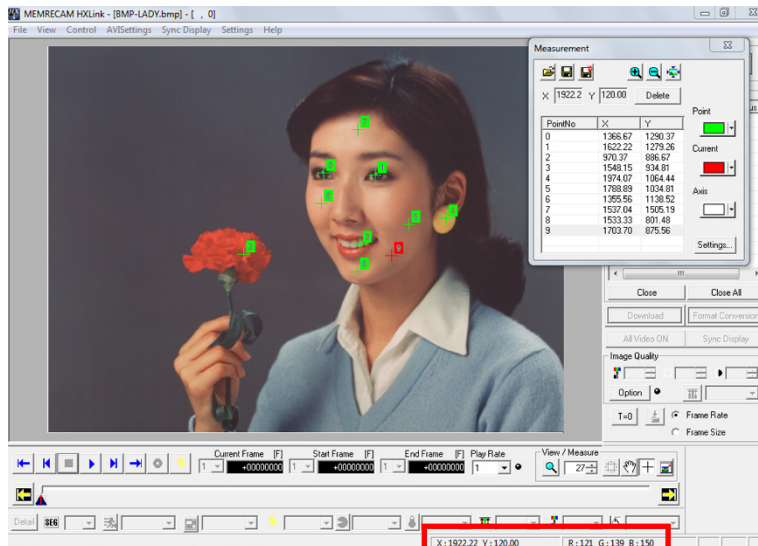
- Coordinate Measurement      The measurement target of the coordinates for the point specified on the image saved in CSV format coordinate point file is the camera image and file image.  
    Note) Measurement of the camera image is performed with the live format and display method, and may vary from the coordinates of the actual frame size.
- LAA Measurement              Measurement of speed•movement•rotation speed for the length•area•angle of measurement targets in videos.  
    The measurement target is only the file image.

## 13.2 Coordinate Measurement

When an image is shown and the cursor is moved on the monitor, the X, Y coordinates and RGB values for the image cursor position are shown on the status bar.

During the initial stage when the item is opened, the origin point position for the X and Y coordinates is set to the bottom left corner of the image.

Click the coordinate measurement button  to display the coordinate measurement dialogue, where measurement of the X and Y coordinates can be performed on a maximum of 10 points per frame.



X,Y coordinates and RGB values shown on the status bar for the cursor location.

Left click the mouse at the desired measurement point on the monitor and a cross shaped cursor and the point number is shown, and the points and their coordinate points are added to the list in the coordinate measurement dialogue.

Click the right mouse button to specify the origin point position in advance to display the coordinate axis for the X and Y axis.

Set the origin point position and origin points from subsequently specified coordinate point data become references.

To change the measured coordinate point data, after selecting the point to change on the list of the coordinate measurement dialogue, left click the mouse on the coordinate point to change.









The color of the coordinate axis and coordinate point data can be changed with the button on the right side of the coordinate measurement dialogue.

Additionally, the currently selected coordinate point data (current point) can be set for a different color.

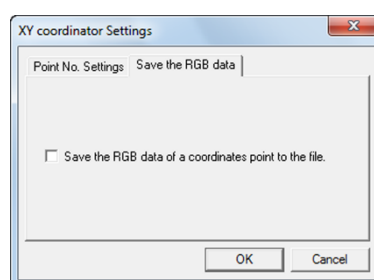
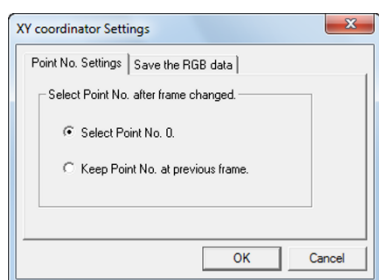
The measured coordinate point data and origin point position can be saved as coordinate point files (CSV).

Load a saved coordinate point file to superimpose the coordinate point data on the image.

## Coordinate Measurement Dialogue

	Open the coordinate point file (CSV).
	Overwrite and save the coordinate point file (CSV).
	Assign a name to the coordinate point file (CSV) and save.
	Enlarge the image on the monitor.
	Reduce the image on the monitor.
	Show the image on the monitor in actual size.
	Delete the selected coordinate point data.
	Display the “Coordinate Measurement Settings” dialogue (point no. selection / RGB value output).

In “Set Coordinate Measurement”, the point number setting when the frame is changed can be set under the point number selection tab and the RGB value SCV output can be set under the RGB value output tab.





Select the current point setting when the measurement frame is changed under the “Select Point Number” tab.

If “Select Point No. 0” is selected, the frame is changed to set the point number to 0.

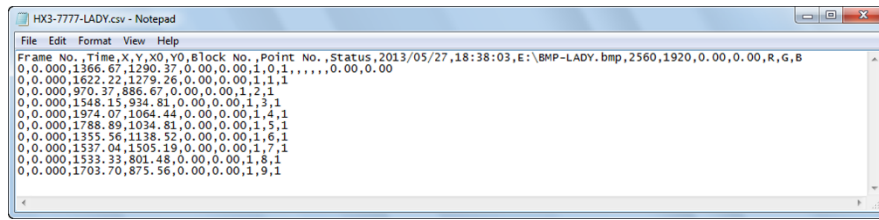
If “Keep the Point Number Selected in the Previous Frame” is selected, the frame is changed to set the point number selected before moving frames.

Check “Output the RGB Value for the Coordinate Point to the File” under the RGB value output tab to record the RGB value for each set point number and save to a coordinate point file.

The procedure for coordinate measurement is as follows.

- (1) Select the item to measure from the item list and the image to be measurement is shown on the monitor.
- (2) Click the coordinate measurement button  to display the coordinate measurement dialogue.  
Right click the mouse to move the cursor to the position setting the origin point of the screen.  
Select “Origin Point Settings” in the menu displayed to set the location of the cursor as the origin point.
- (3) Left click the mouse to move the cursor to the focal point (measurement point) in the image.  
Each time the mouse is left clicked, the coordinate point data is added to the list in the coordinate measurement dialogue.  
Zoom to precisely set the focal point.  
(the focal point coordinate data display is not impacted by the zoom display)
- (4) Call a separate frame on to the screen, click the focal point in the same manner as in ④.
- (5) Once measurement of the focal point is done, click “Save As” in the coordinate measurement dialogue and specify the SCV file name for saving.  
(If the CSV file is not saved, the measured coordinate point data will be lost)
- (6) Click the coordinate measurement button  again to end coordinate measurement.

The saved coordinate point file can be loaded with a calculation software such as Notepad or EXCEL for use.



Example of Coordinate Point File (CSV) Opened with Notepad

A1		Frame No.																		
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	
1	Frame No.	Time	X	Y	X0	Y0	Block No.	Point No.	Status	2013/5/27	18:38:03	E:\BMP-LADY	2560	1920	0	0	R	G	B	S
2	0	0	1366.67	1290.37	0	0	1	0	1						0	0	92	108	112	
3	0	0	1622.22	1279.26	0	0	1	1	1								65	64	64	
4	0	0	970.37	886.67	0	0	1	2	1								165	65	53	
5	0	0	1548.15	934.81	0	0	1	3	1								191	167	140	
6	0	0	1974.07	1064.44	0	0	1	4	1								210	160	90	
7	0	0	1788.89	1034.81	0	0	1	5	1								160	120	97	
8	0	0	1355.56	1138.52	0	0	1	6	1								230	177	145	
9	0	0	1537.04	1505.19	0	0	1	7	1								217	173	144	
10	0	0	1533.33	801.48	0	0	1	8	1								218	157	126	
11	0	0	1703.70	875.56	0	0	1	9	1								165	127	87	
12																				

Example of EXCEL Coordinate Point File (CSV) Opened with EXCEL  
(RGB Values also Saved)

#### Items Recorded in Coordinate Point (CSV) Files

1. Frame No.	Coordinate point image frame number
2. Time	Coordinate point image relative time [msec] (frame number 0 is 0msec)
3. X	Coordinate point X coordinate (origin point position X0 is reference)
4. Y	Coordinate point Y coordinate (origin point position Y0 is reference)
5. X0	Coordinate origin point position X coordinate (bottom left corner of image is reference)
6. Y0	Coordinate origin point position Y coordinate (bottom left corner of image is reference)
7. Block No.	Block number when filming measurement image
8. Point No.	Number of measured point (number from 0)
9. Status	Coordinate point data status (0:invalid data, 1:valid data)
10. Time CSV File Created	Time title recorded in coordinate point CSV file
11. Item Information	File path if image file; nickname if camera
12. Image Width	Measured image width (X)
13. Image Height	Measured image height (Y)
14. Origin point position X Coordinate	Final origin point position X coordinate (bottom left corner of image is reference) in the measurement frame
15. Origin point position Y Coordinate	Final origin point position Y coordinate (bottom left corner of image is reference) in the measurement frame
16. R	Coordinate point R value
17. G	Coordinate point G value
18. B	Coordinate point B value

Items 10~13 are recorded when the file is saved, and with items 14,15, the X and Y coordinates are recorded for the origin point position set after coordinate measurement.

The smallest point number in each frame is recorded in items 14,15.

If the image is rotated during coordinate measurement, the points for the coordinates before such rotation are shown.

## 13.3 Overview of LAA Measurement

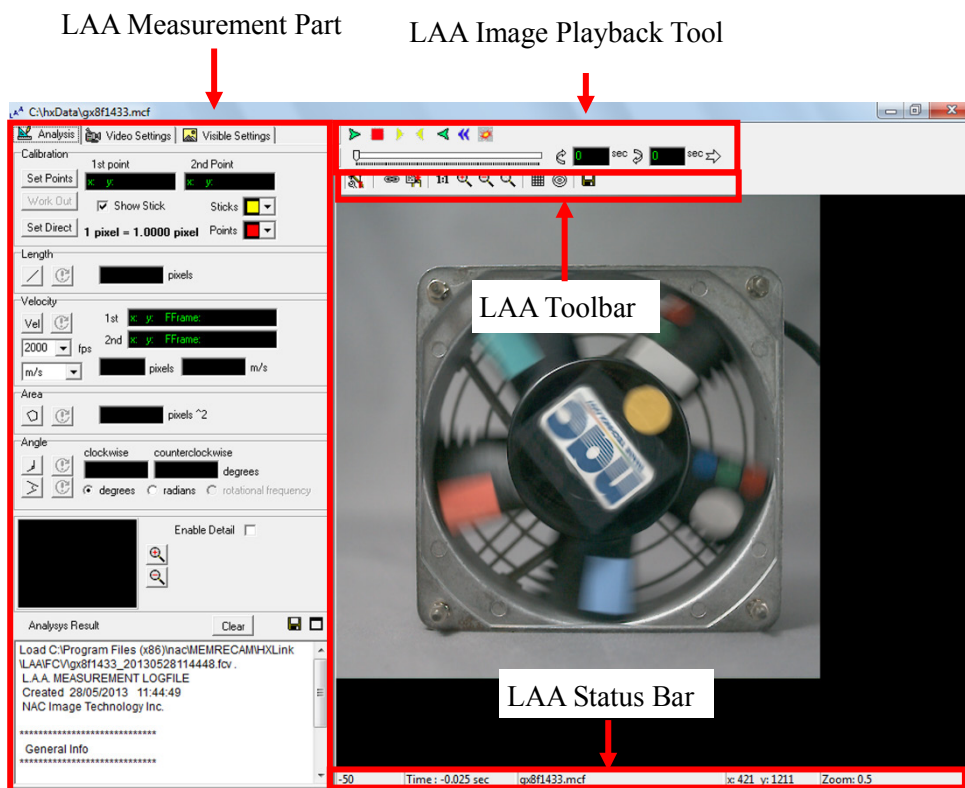
With LAA measurement, the length, area and angle of the measurement subject can be measured.  
Use the video file to measure speed and amount of movement.  
Also, the results of LAA measurement can be used to calculate rotation speed and such.

The measurement image is an image file. LAA measurements cannot be made on live camera images.

If the file image is a MCFF file, measurement can be performed on image quality adjustment before starting LAA measurement.



[LAA Measurement Main Window]




[LAA Measurement Image Window]

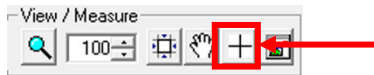


### Caution

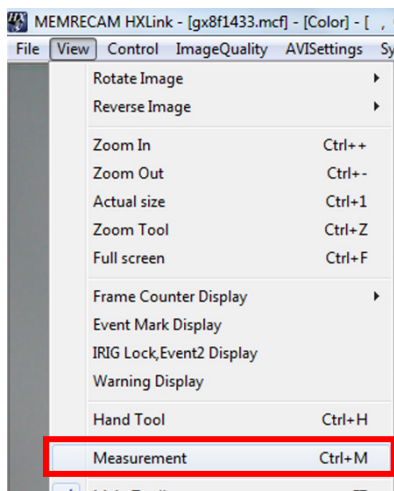
- T=0 correction cannot be performed if the image quality is adjusted in the LAA measurement image window.
- With PCs where MJPEG CODEC is not installed, HXLink can open AVI files compressed with MJPEG but LAA measurement cannot be performed.  
If performing LAA measurement of AVI files, use AVI compressed with the CODEC installed on the PC. If opening MJPEG AVI, obtain MJPEG CODEC and install on the PC.

## 13.4 Procedures for Starting LAA Measurement

- 1) Select “LAA Measurement” in “Measurement Functions” under the “Other” tab of the options settings.
- 2) Open an image file with HXLink and adjust the image quality if necessary. Currently image quality settings can only be done on MCFF.
- 3) In the expert mode, click “Measure”  .



In the basic mode, click “Measure” in the “View” menu.



- 4) The LAA measurement window appears and the image quality of the image displayed is the same as that displayed on the HXLink monitor.



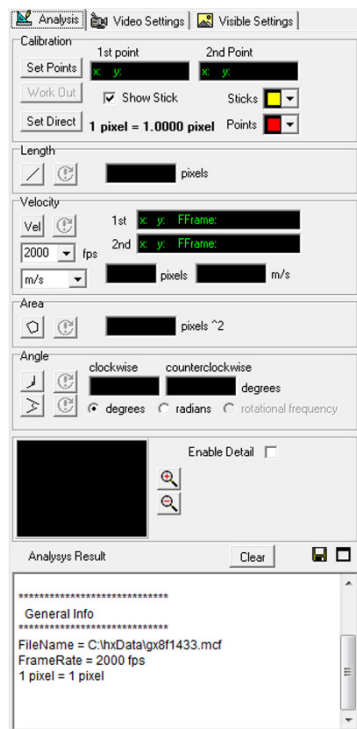
**Caution** The image quality cannot be changed after the LAA measurement window is opened.

To change the image quality of the image for LAA measurement, adjust the image quality in HXLink and then click the measure button to open a new LAA measurement window for measuring.

## 13.5 LAA Measurement Part

### ■ “Measure” Tab

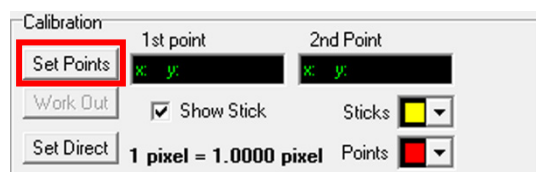
Measurement of the calibration settings, length, speed, area and angle can be performed under the “Measure” tab.



“Measure” tab

### Calibration Settings

Calibration settings used as a reference for length and area measurement are set in the calibration section.



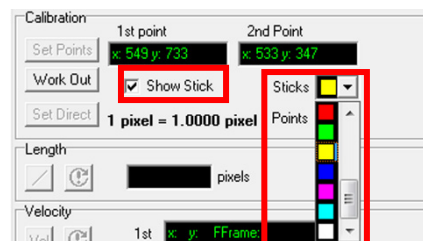
Calibration Section under the “Measure” Tab

Click “Specify Reference Points”  and then move the cursor to the image display. Sequentially click two points at known intervals on the image to display the coordinate values of the points clicked.

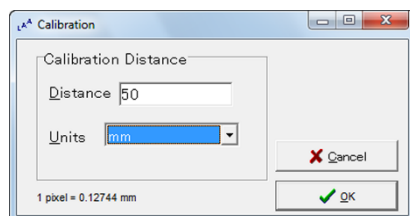


After clicking the second point, the “Cancel Calibration” button  appears under the image displayed. Click to suspend calibration.

Turn the stick display ON (check the box) to display a line between the two points. The color of the line can be set with “Line Color” and the color of the point can be set with “Point Color”.

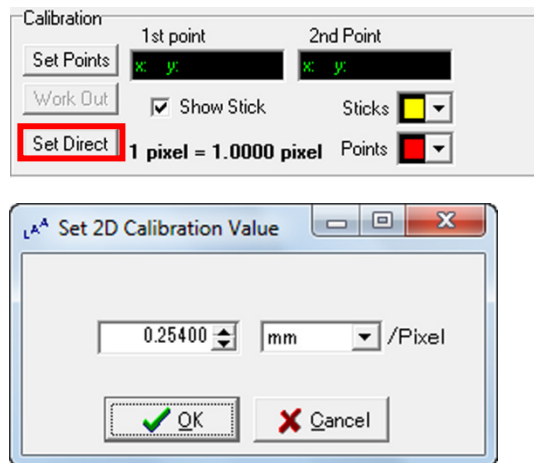


Next, click “Set Calibration”  and the “Calibration” dialogue appears, so set the distance and units and then click “OK”.



“Calibration” dialogue

If the actual length per pixel is known, click “Specify Numbers”  to display the “Enter Numbers” dialogue and directly input the numbers to set the unit length per pixel.



“Enter Numbers” Dialogue

The values set for calibration (1 pixel=XXX mm) are recorded last, and if performing analysis with other data, if starting LAA measurement, or if new calibration is not performed, this data is used as the calibration values.

The current calibration values are shown as 1 pixel=XXX mm on the calibration part.

Calibration is not performed when first using LAA measurement, so if performing measurement without calibrating, the results for length, area and speed are shown in pixel units.

### Measurement of Length

Measurement of length is performed on the length measurement part under the “Measure” tab.



Length Measurement Part under the “Measure” Tab

Click “Start Measurement”  to start measuring.

Click two points on the image displayed to measure and the distance between the two points is shown in the measurement results display window . Click more than two points and the sum of the total of the lines for the points clicked sequentially are measured.

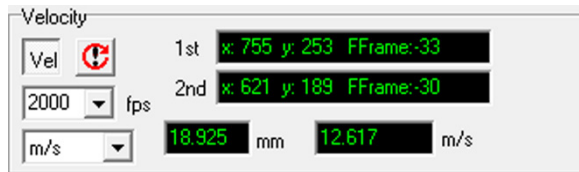
If measuring videos, after specifying the first point, use the control image playback button to switch the display to another frame and specify the second point so the amount of movement of the moving object can also be measured.

If newly measuring the length, click  to reset the measurement results.


When length measurement is done, click the start measurement again button .

## Measurement of Speed

Measurement of speed is performed on the speed measurement part under the “Measure” tab.

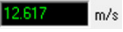


### Speed Measurement Part under the “Measure” Tab


Click “Start Measurement”  to start measuring.

Select or enter the correct frame rate (fps=frames per second) for the video filmed in the film speed input box.

Select the units for the speed to output from the next speed unit selection box.

After clicking on the first point to specifying the measurement point on the screen, use the image playback control button to move the amount of frames necessary and after clicking the second point, the speed calculated from the distance between the time of the two frames and the distance between the two points is displayed in the measurement results display window .

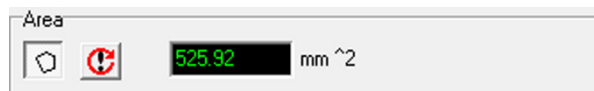
If newly measuring the speed, click  to reset the measurement results.

When speed measurement is done, click the start measurement again button .


In LAA measurement, the measured speed is the average speed calculated from the time and distance between two frames. (distance/time)

## Measurement of Area

Measurement of area is performed on the area measurement part under the “Measure” tab.





### Area Measurement Part under the “Measure” Tab

Click “Start Measurement”  to start measuring.

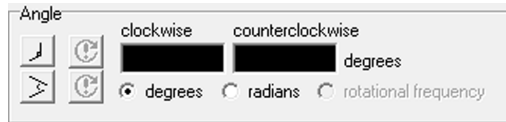


Sequentially click on the parts on the screen to determine the area, and the area of the part enclosed by the clicked points is shown in the measurement results display window **525.92** mm<sup>2</sup> .

If newly measuring the area, click  to reset the measurement results.  
When area measurement is done, click the start measurement again button  .


### Measurement of Angle


Measurement of angles is performed on the area measurement part under the “Measure” tab.



Angle Measurement Part under the “Measure” Tab

There are two methods for measuring three point and four point angles.

If measuring angles with three points, click  . In this case, proceed to “1) Measure Angles with 3 Points” on this page.

If measuring angles with four points, click  . In this case, proceed to “2) Measure Angles with 4 Points” on this page.

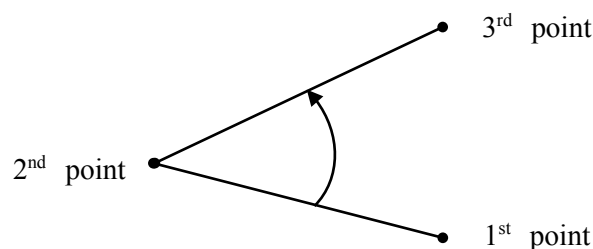
Units for angles can be selected in “Degrees” or “Radian” in the angle measurement part.

If newly measuring the angle, click  to reset the measurement results.

When angle measurement is done, click  or  to start measurement again.

#### 1) Measure Angles with 3 Points

As shown in the following figure, sequentially click on the 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> points to measure angles with 3 points. Measuring uses the line connecting the first and second points as a reference, and the angle counterclockwise or clockwise from there is determined.



Measure Angles with 3 Points (Angle in the Figure is Counterclockwise)



## 2) Measure Angles with 4 Points

As shown in the following figure, first click on the 1<sup>st</sup> and 2<sup>nd</sup> points to measure angles with 4 points. Then make a second line with the 3<sup>rd</sup> and 4<sup>th</sup> points. Measuring uses the line connecting the first and second lines as a reference, and the angle counterclockwise or clockwise from there is determined.

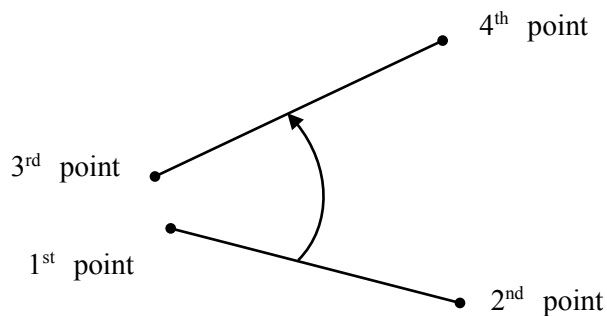
(with two vectors, the angle of vector 12 and vector 34.)



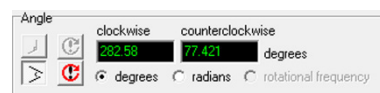
### Caution

It is important to sequentially click on 4 points.

If the clicking sequence is wrong, measurement of the expected angle will not be possible.



Measure Angles with 4 Points (Angle in the Figure is Counterclockwise)



### 3) Measure Number of Rotations with 4 Points

The same four points are specified in the same frame as that in “2) Measure Angles with 4 Points” but the frame with the 1<sup>st</sup> and 2<sup>nd</sup> points is in a different frame than that with the 3<sup>rd</sup> and 4<sup>th</sup> points.

Select “Number of Rotations” in the angle measurement part to display the number of rotations.

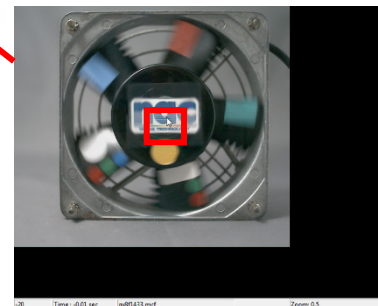


### Specify the Position for the Enlarged Image

If setting a reference length or if measuring length/area/angle, it is possible to specify the precise position of the enlarged image under the “Measure” tab.



“Enlarged Image Part under the “Measure” Tab



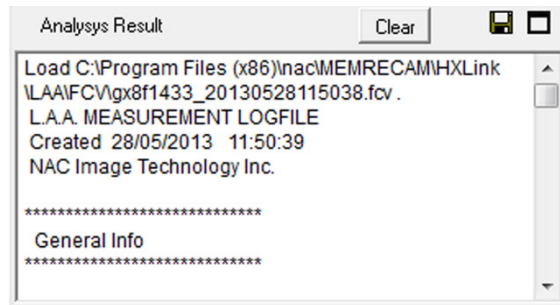
To specify the position using an enlarged image, check the box for enlarging the image in the enlarge image part. Click the point to specify on the image display and the image around that clicked is shown enlarged so click a point inside the enlarged image to specify again.

The scale of the enlarged image can be changed with the zoom button.

If using enlarged images, click on any point on the image display or in the enlarged image to specify the point.

## Analysis Results Window

In the analysis results window at the very bottom of the analysis tab, a history of the analysis results is displayed.



Analysis Results Window

### 1) Basic Analysis Information

Basic analysis information (General Info) includes the basic information for measurements. This includes the following three types of information.

- FileName                      Image file name
- FrameRate                      Image frame rate
- 1 pixel = each pixel length   Calibration values


### 2) Editing of Analysis Results

The contents of the analysis results window can be freely edited so notes needed when referencing in the future can be input or added.





**Caution** Analysis results can be deleted. Do not delete important data.

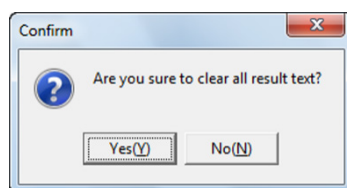
### 3) Saving Analysis Data

Click Save  to save the contents of the analysis results window to a file. Specify the destination file name in the save file dialogue and the contents of the current analysis results window are saved in the specified file.

### 4) Deleting Analysis Data



The analysis results in the analysis results window can be deleted.

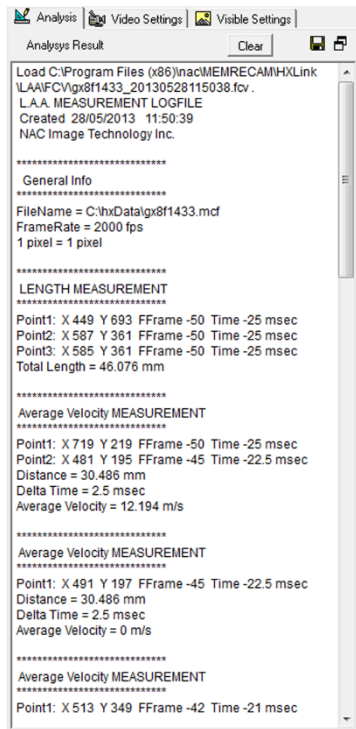
Click  to display the confirmation window and then select “Yes” .



Basic analysis information (General Info) cannot be deleted.

5) Maximizing the Analysis Results Window

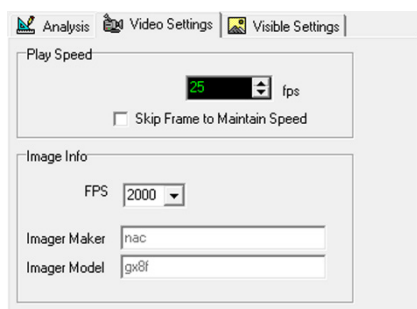
Click maximize  to maximize the analysis results window in the vertical direction.  
Click revert  to return to the original window size.



Maximizing the Analysis Results Window

## ■ “Image Settings” Tab

The image file frame rate and filming speed settings are performed in the “Image Settings” tab.



“Image Settings” Tab

### Frame Rate Setting

The frame rate settings are performed in the frame rate part of the “Image Settings” tab.



Frame Rate Part of the “Image Settings” Tab

Sets the frame rate to playback a video file. However, since the frame rate greatly depends on the performance of the PC, the values set are targets. Check priority frame rate to skip frames when the frame rate does not reach the set value to stay as near as possible to the set value.

### Image Information

The frame rate and camera type can be confirmed in the image information part of the “Image Settings” tab.

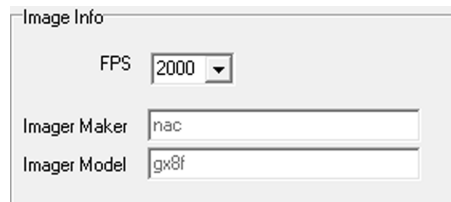


Image Information Part of the “Image Settings” Tab

Sets the film speed when filming videos with “FPS”.

To set a film speed outside of the values to be set in the pull-down display, a value can be changed in the number display window.

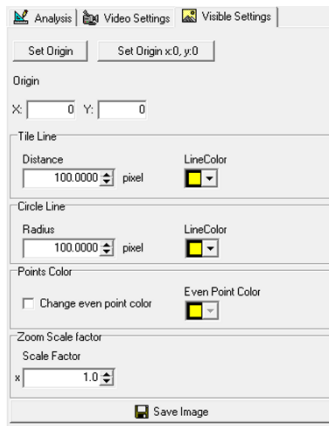
The default is 1000fps.

If using only image files with nac MCF files or scene information files as the analysis data, the film speed information is read from the file and the film speed is automatically set.

The changed frame rate is not reflected in the image file.

## ■ “Display Settings” Tab

The settings for the grid and concentric circles superimposed on the image are set in the “Display Settings” tab.

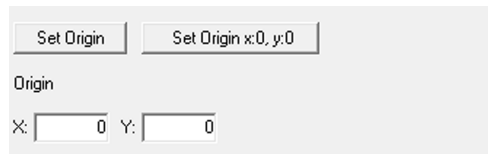


“Display Settings” tab

The LAA toolbar is used to switch ON/OFF the grid and concentric circles display. Refer to page 13-23 for details.

## Settings for the Origin Point for the Grid Display

The settings for the origin point for the grid display are set in the grid origin point settings part under the “Display Settings” tab.



Grid Origin Point Settings Part under the “Display Settings” Tab.

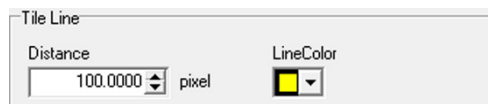
The default for the grid origin point  $(x, y) = (0, 0)$  is the upper left corner of the image. To set the grid origin point on the image display, click **Set Origin** and click a point on the image display to be the grid origin point.

The current grid origin point is displayed as X: 0 Y: 0. With numerical input, press “Enter” to confirm the grid origin point.

Click **Set Origin x:0, y:0** to return the grid origin point to the default.

## Settings to Display the Grid Lines

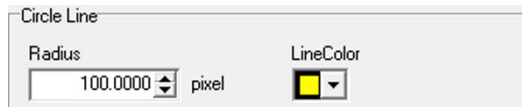
Set the grid interval and grid line color in the grid line display part under the “Display Settings” tab.



Grid Line Display Part under the “Display Settings” Tab

### Settings to Display Circles

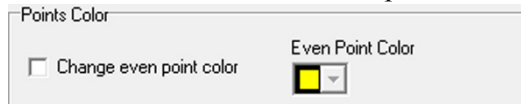
Set the interval and color of the concentric lines in the circle display part under the “Display Settings” tab.

A dialog box titled "Circle Line" with two controls: a "Radius" spinner set to "100.0000" with the unit "pixel" to its right, and a "LineColor" dropdown menu showing a yellow color swatch.

Display Circles Part under the “Display Settings” Tab

### Point Color Settings

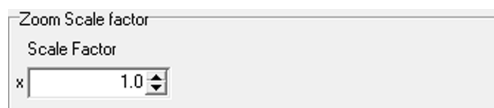
Set the color of the even-numbered points in the point color part under the “Display Settings” tab.

A dialog box titled "Points Color" with two controls: a checkbox labeled "Change even point color" which is unchecked, and an "Even Point Color" dropdown menu showing a yellow color swatch.

Point Color Part under the “Display Settings” Tab

### Zoom Scale Factor Settings

The scale set in the zoom scale factor part under the “Display Settings” tab is applied to the image when clicked in the LAA toolbar.

A dialog box titled "Zoom Scale factor" with a "Scale Factor" spinner set to "1.0" with a small "x" icon to its left.

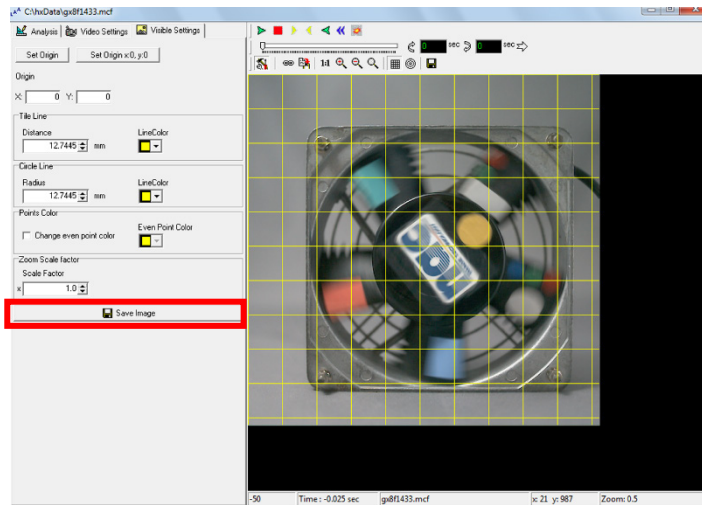
Zoom Scale Factor Part under the “Display Settings” Tab\_

## Save Image

Click “Save as Image File”

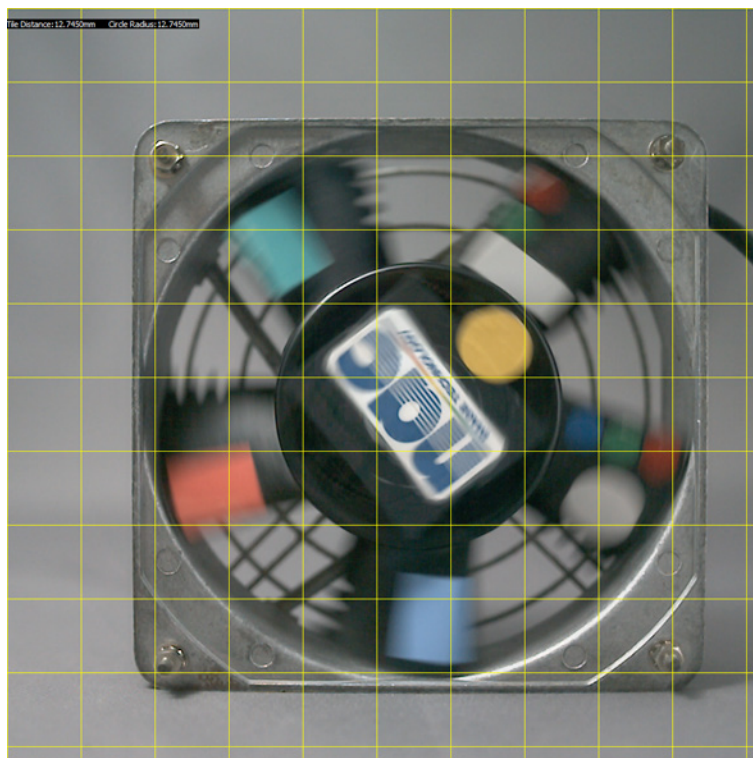
Save Image

to save the current frame image superimposed with a grid • concentric circles to a file (PNG, JPG, BMP, GIF).



File image of the results of the saved image.

The grid lines are superimposed but the stick is not shown.










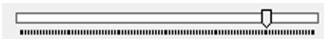
## 13.6 LAA Operation Part

### ■LAA Image Playback Tool

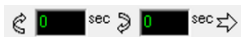


Performs operations for image playback and frame jumping.

-  Play. When stopped, plays forward.
-  Stop. Stops playback.
-  1 frame forward. Moves one frame when stopped.
-  Rewind 1 frame. Rewinds 1 frame when stopped.
-  Reverse playback. Plays back in reverse when stopped.
-  Skip to the top frame. Displays the top frame of the file.
-  Go to T=0 frame. Displays the T=0 frame of the file.






Playback slider. Shows the position of the current frame. Use the mouse to jump to the current frame on the playback slider.



Display loop playback range. Displays the set loop playback range.  
Start frame:0, End frame:0 indicate the loop playback range is not set.













Example with a loop playback range set from -0.017 seconds to +0.017 seconds



-  Setting for loop playback start frame. The current frame becomes the loop playback start frame.
-  Setting for loop playback end frame. The current frame becomes the loop playback end frame.
-  Deletes the loop playback range.

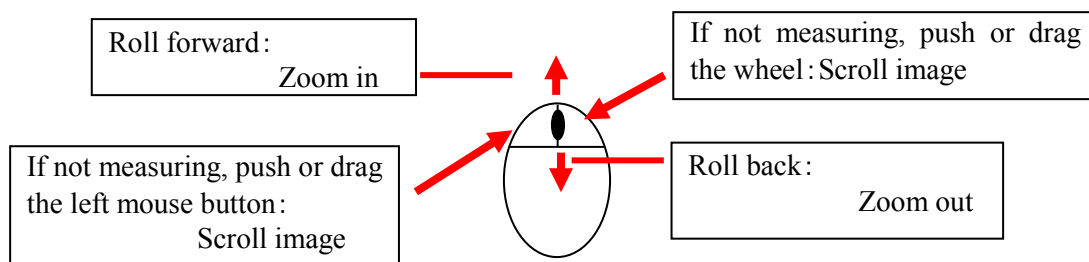
## ■ LAA Toolbar



-  Switches the LAA measurement part on the left side of the window ON/OFF.
  -  Sync button. Use the LAA measurement window  and the image in the LAA measurement is synced for playback.  
Once the sync button indicates , the LAA measurement image window becomes unable to perform sync playback.
  -  Copy image to the clipboard. The stick on the pasted image is not displayed.
  -  Displays the size of an image pixel to a display pixel. If the entire image cannot be shown in the LAA measurement image window, the image can be scrolled by operating the mouse.
  -  Zoom in. Enlarges the image displayed.
  -  Zoom out. Reduces the image displayed.
  -  Scale factor. Displays the image in the scale set in scale factor under the “Display Settings” tab.
  -  Turns ON/OFF the grid lines superimposed on the image displayed.
  -  Turns ON/OFF the concentric circles superimposed on the image displayed.
- Display settings for grid lines and concentric circles are performed in the grid line display part and the circle display part under the “Display Settings” tab.
-  Saves the image displayed in a (PNG, JPG, BMP, GIF) file. Operates the same as the “Save As Image File” button under the “Display Settings” tab.

## ■ Zoom・Scroll Image

The mouse wheel zoom uses the wheel on a mouse to zoom and scroll the image by operating the wheel of the mouse on the image.



### ■ LAA Status Bar

34	Time : 0.017 sec	gx8f1433.mcf	x: 755 y: 1195	Zoom: 0.5
----	------------------	--------------	----------------	-----------

Items shown on the LAA status bar are, from left to right, the current frame number, relative time from the T0 frame for the current frame, file name for the image file displayed, cursor coordinates and scale factor.

### ■ Line Input

When performing operations to specify multiple points such as reference points or length measurements, move the mouse on the screen while pressing the shift key to set the next point on the horizontal or vertical line.

## 13.7 LAA Measurement Main Window

Sync playback and batch frame motion in the synchronized LAA measurement image window can be conducted in the LAA measurement main window.



### Caution

If the LAA measurement main window is closed, all of the LAA measurement image windows are closed.



Play. When stopped, plays forward.



Stop. Stops playback.



1 frame forward. Moves one frame when stopped.



Rewind 1 frame. Rewinds 1 frame when stopped.



Reverse playback. Plays back in reverse when stopped.



Skip to the top frame. Displays the top frame of the file.



Go to T=0 frame. Displays the T=0 frame of the file.



Playback slider. Shows the position of the sync current frame. Use the mouse to batch jump to the current frame on the playback slider.



Display loop playback range. Displays the set loop playback range for sync playback.



Setting for loop playback start frame. The current frame becomes the loop playback start frame for sync playback.



Setting for loop playback end frame. The current frame becomes the loop playback end frame for sync playback.



Deletes the loop playback range for sync playback.

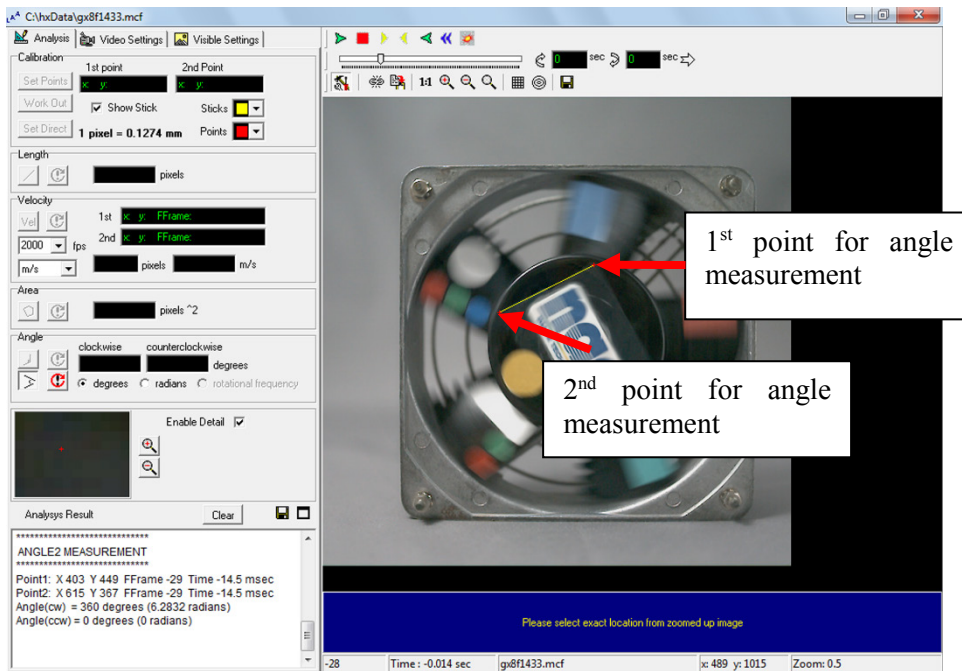
## 13.8 LAA Measurement Application Examples

Shows the application examples using the video. This application example describes the operating method but the numerical values have no meaning.

### ■ Rotation Angle and Angle Speed

Using a video example filming a location rotating at a constant speed, the rotation angle and angle speed can be determined.

After making the film speed settings, start angle measurement by specifying 4 points and click on the 1<sup>st</sup> and 2<sup>nd</sup> points for angle measurement.



Setting the 1<sup>st</sup> and 2<sup>nd</sup> Points for Angle Measurement with 4 Points

Click on the 3<sup>rd</sup> and 4<sup>th</sup> points to skip 16 frames to the next frame.

Angle measurement results 55.413°

3<sup>rd</sup> point angle measurement

4<sup>th</sup> point angle measurement

Setting the 3<sup>rd</sup> and 4<sup>th</sup> Points for Angle Measurement with 4 Points

Select the “Number of Rotations” for the angle measurement part and the number of rotations are displayed.

Angle

clockwise counterclockwise

18.893 106.11 rps

degrees radians rotational frequency



**Caution**

With LAA measurement, the rotation speed can be easily determined by calculating from the results of the angle measurements but are the average values between measurement frames.

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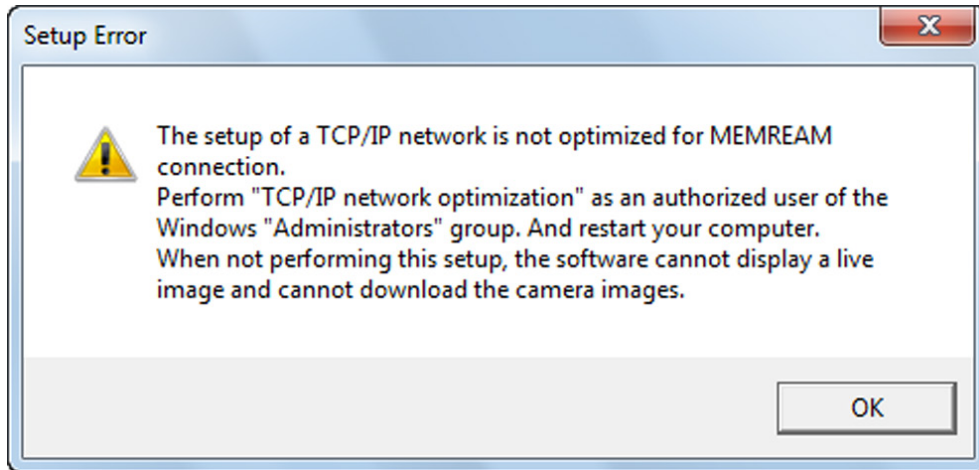
# 14

## Troubleshooting

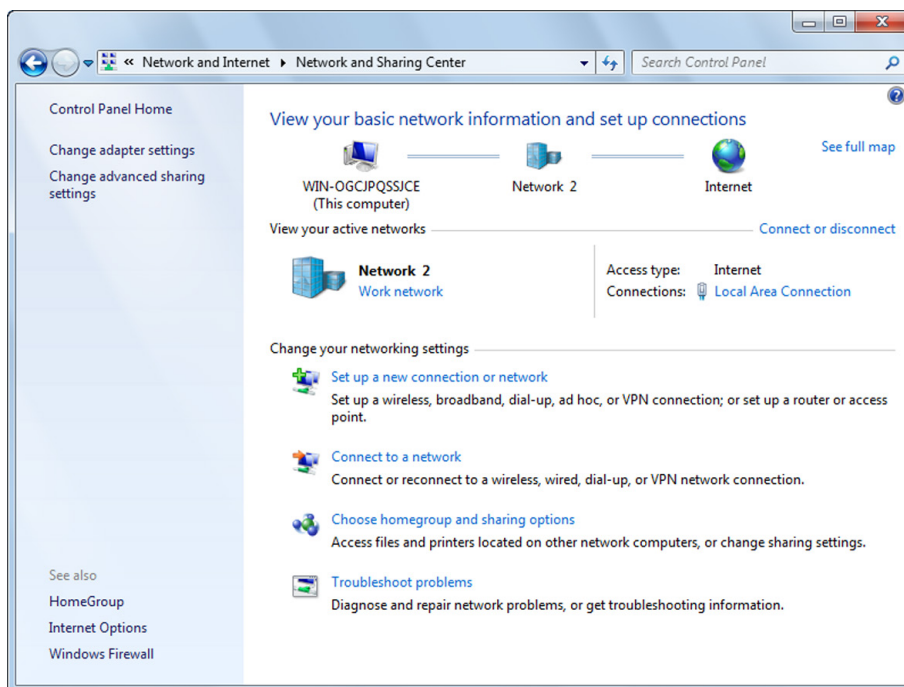
## 14.1 Troubleshooting

This describes the issues and solutions for various problems that may arise during HXLink use.  
(Jointly used items are also used with GXLink images)

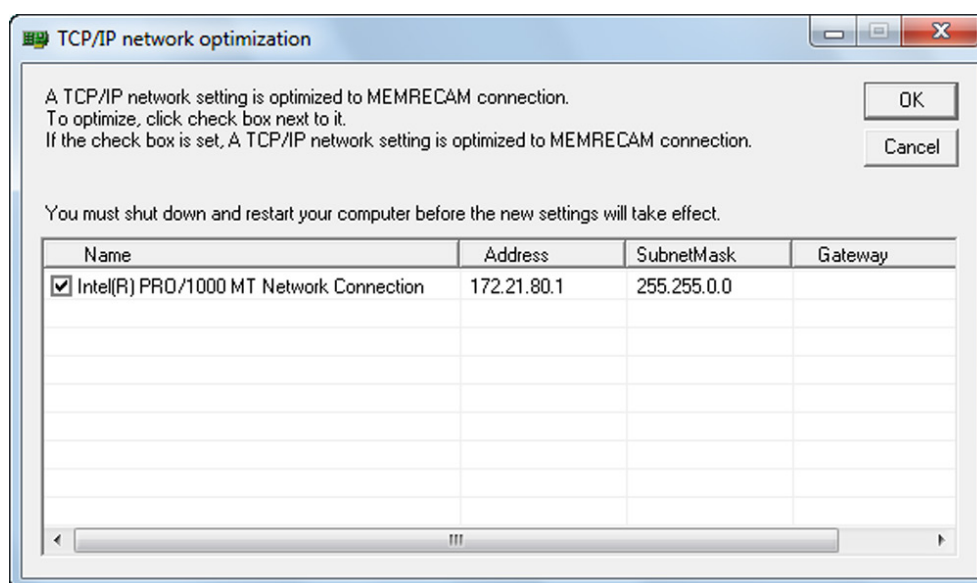
- “Error Settings” message appears when the camera connection button is pressed  
(during TCP/IP connection)



If this message is displayed, open “Network Connections” in the control panel and confirm that the network in use is valid (the status is “Connected”).



Next, click “TCP IP Network Optimization” in the Windows Start Menu → Programs → MEMRECAM HXLink.

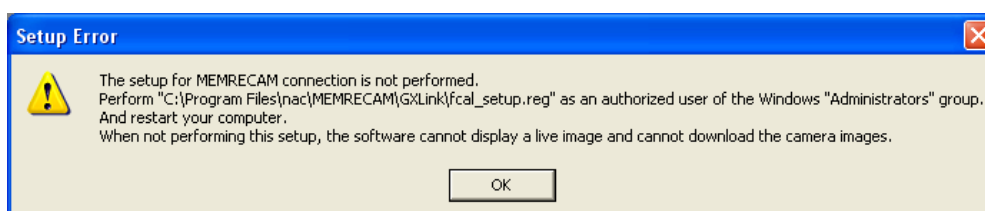


Check only the network in use and then click “OK”. Then, reboot the computer. This operation sets the optimal value for the network settings.

If the error still remains after rebooting,  
remove the setting file "NicConfig.ini"(\*1), re-try "TCP IP Network Optimization",  
and reboot the computer.

(\*1) "NicConfig.ini" is in "C:\Program Files\nac\MEMRECAM\Tools" folder,  
if nothing is specified at HXLink installation.  
In condition of Windows 64bit edition and HXLink operated under 32bit edition,  
"NicConfig.ini" is in "C:\Program Files (x86)\nac\MEMRECAM\Tools" folder.

■ “Error Settings” message appears when the camera connection button is pressed  
(during FC-AL connection)



If this message is displayed, execute the <fc\_al\_setup.reg> file created in the folder where the HXLink programs are installed (different from the OS) and then reboot the computer. This operation sets the optimal value for the FC-AL host adapter settings.

#### ■ Cannot connect camera

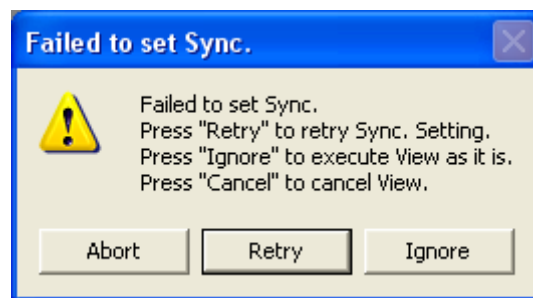
When the camera connection button is pressed and the camera connection dialogue appears, the icon for the camera that should be connected may have an “X” mark (or with HX or GX cameras, an icon is not displayed on the list).

Check the following items.

- Are the camera and the PC properly connected?
- Is the camera already connected to another PC?
- With fx cameras, was the correct CID, IP address and model registered during camera registration?
- With fx cameras, was the “Connection Format” tab (TCP/IP connection, FC-AL connection, Gbit connection) in the “Options” dialogue set properly?

#### ■ “Sync Setting Failure” appears during fx camera connection

Under the “Sync Settings” tab of the “Options” dialogue or “Camera Connections Settings” dialogue, if the “fx Camera Time” setting is “IRIG Time”, the following message may be displayed during camera connection or when “Sync Settings” in the control menu is clicked.



If using IRIG signals, check the following items.

- If using the IRIG BOX, are the IRIG-B signals properly connected to the IRIG BOX IRIG IN connector?
- If using the M-HUB, are the IRIG-B signals properly connected to the M-HUB IRIG.IN connector?
- Is the external trigger input?

■ Camera unable to VIEW

With a multi camera head DRP such as the RX-5, if camera heads not connected to DRP have HXLink camera connections, the following message is displayed during VIEW.



If the aforementioned is displayed, camera heads are not connected to the MEMRECAM fx RX-5 PM Unit port 2 so VIEW is not possible. End camera control one time with HXLink and either connect the camera head to port 2 or connect the camera with the port 2 configuration.

If using GX cameras, VIEW may not be possible when a video warning is displayed.

If a video warning is displayed, confirm that the camera is not in use (in particular, not saving on the USB) and if not in use, click "Stop" to delete the warning shown on the video. Since there are multiple warnings displayed, click "Stop" until the warnings are no longer displayed.

■ The video display or the PC live image does not work on the GX camera during VIEW/ARM or there is noise

If the camera sync setting is "EST", the image is not updated during VIEW if there are no EST signals.

If not using EST, set "Sync HX, GX Camera" to "Internal Sync" in the "Options" dialogue or under the "Sync Settings" tab in the "Camera Connections Settings" dialogue.

If using EST, check the following.

- Are the EST signals properly input into the connector specified in "Input/Output Settings" in the options dialogue?
- Is the shutter speed for the recording parameters (frame rate if OPEN) set slower than the EST signal frequency?

■ The recording date for the HX, GX camera is January 1 or December 31

Under the "Sync Settings" tab of the "Options" dialogue or the "Camera Connections Settings" dialogue, if the "HX, GX Camera Time" setting is "IRIG•M-HUB Time", any of the following may be generated.

- The IRIG signals are not connected to the GX-HUB.
- With combined HX, GX, fx use (using the M-Hub), the HXLink does not control the "fx Camera for M-HUB Control".

■ The recording time does not match the time of the IRIG signals


For HX and GX cameras, check the following.

- Under the “Sync Settings” tab of the “Options” dialogue or the “Camera Connections Settings” dialogue, is the “HX, GX Camera Time” setting the “IRIG•M-HUB Time”?
- If directly inputting IRIG signals into the camera, are the IRIG-B signals properly connected to the IRIG-B IN connector of the camera?
- If using GX-HUB, are the IRIG-B signals properly connected to the IRIG IN connector of the GX-HUB?
- If using GX-HUB and M-HUB, are the IRIG-B signals properly connected to the IRIG IN connector of the M-HUB?

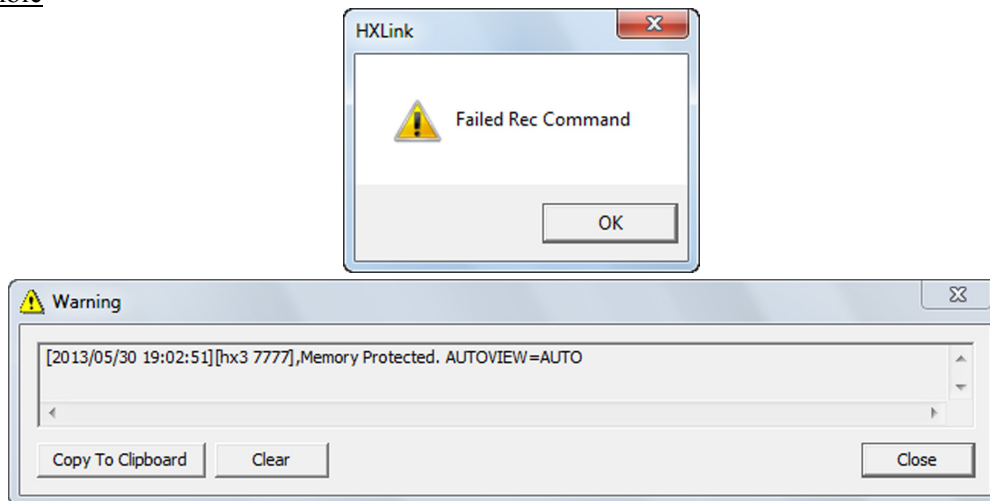
For fx cameras, check the following.

- Under the “Sync Settings” tab of the “Options” dialogue or “Camera Connections Settings” dialogue, is the “fx Camera Time” setting the “IRIG Time”?
- If using IRIG BOX, are the IRIG-B signals properly connected to the IRIG-B IN connector of the IRIG BOX?
- If using M-HUB, are the IRIG-B signals properly connected to the IRIG-B IN connector of the M-HUB?

■ IRIG locked when using M-HUB

The IRIG signals are not locked even if IRIG-B signals are used with M-HUB. Therefore, the “IRIG Lock Status” in “Display IRIG Lock, Event2” always shows in red (  ).

■ “Recording Command Failed”, “Memory Protected” displayed when starting ARM and recording is not possible



Check to see if “Auto Processing” under “Options”, “AUTO” isn’t selected in the “All Camera Auto View” or that the recording trigger mode isn’t “AUTO” (example: NORMAL(A), EVENT(A)).

If these settings are enabled, the segment is protected until recording is finished, and overwriting data by recording (ARM) is not permitted.

If it doesn’t matter if data is overwritten, set “All Camera Auto View” to something other than AUTO and set the recording trigger mode to something other than AUTO (NORMAL etc.).

■ Video and PC live image display not updated during ARM and recording is not possible

If the recording trigger mode is “BURST”, image recording does not occur unless burst signals are input during ARM. If burst recording with GX cameras, the image is updated only when burst signals are input during ARM.

If not conducting burst recording, set the “Trigger Recording Mode” to “NORMAL” in the “Detailed Settings” dialogue.

If conducting burst recording, check to make sure the burst signals are correctly input to the connector selected in “Select Trigger Input” under the “Input/Output Signals” in the “Options” dialogue or the “Camera Connection Settings” dialogue.

■ The trigger button doesn’t work in ARM

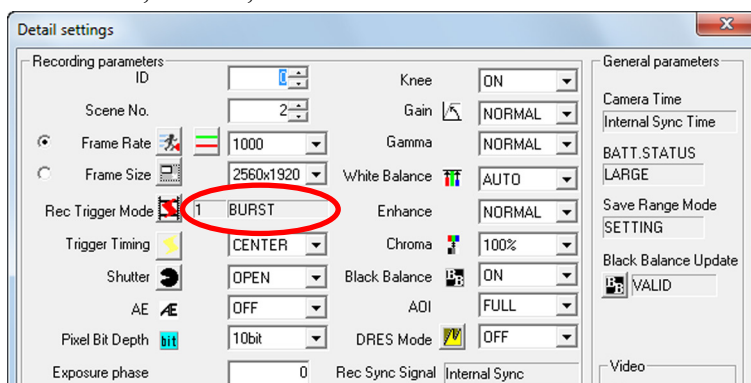
When the camera status is in ARM, the trigger button is grayed out and can’t be clicked.

In this case, check that you are not in any of the following situations.

1) The recording trigger mode is BURST.

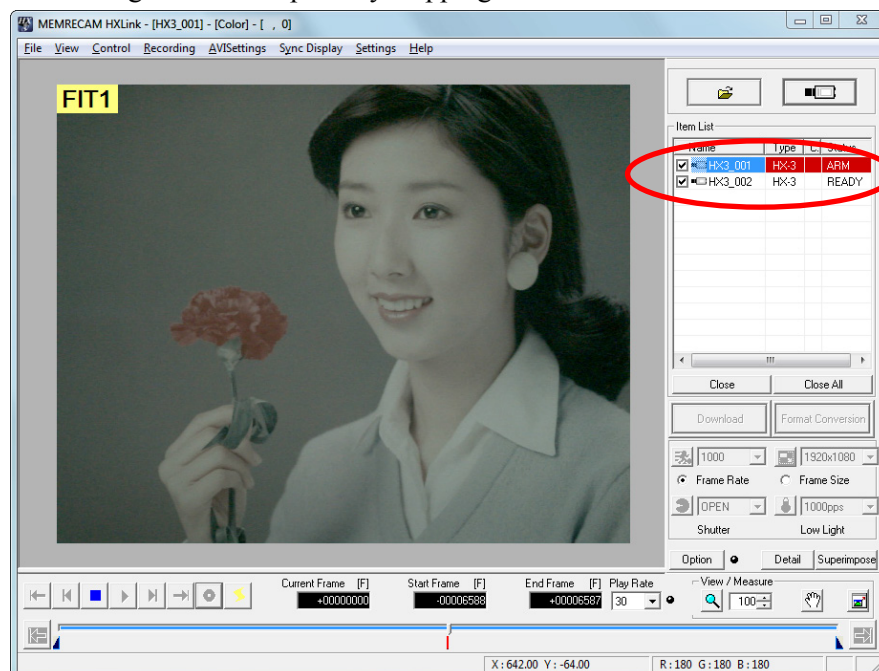
In BURST recording, input the burst recording signals from the trigger connector.

Recording with the trigger button is possible when the recording trigger mode is NORMAL, EVENT, MULTI.



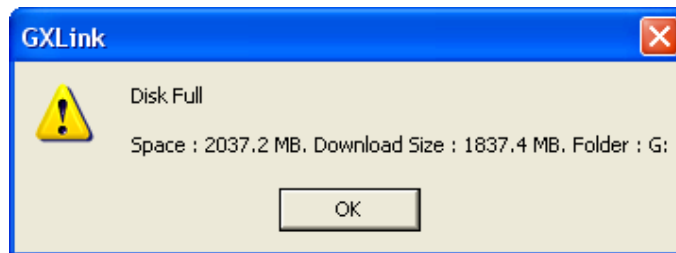
2) “ARM All Cameras” connected to HXLink is not selected.

Set ARM again after temporarily stopping ARM with the STOP button.



#### ■ Failure downloading camera image data

The following message appears when downloading.



Displayed when there is not enough free space in the disc drive and the camera image data for the specified range cannot be downloaded. Either change the destination drive for the camera image data or delete unnecessary files in the destination drive and make the download range smaller.

#### ■ The free space shown in the USB is less than the actual

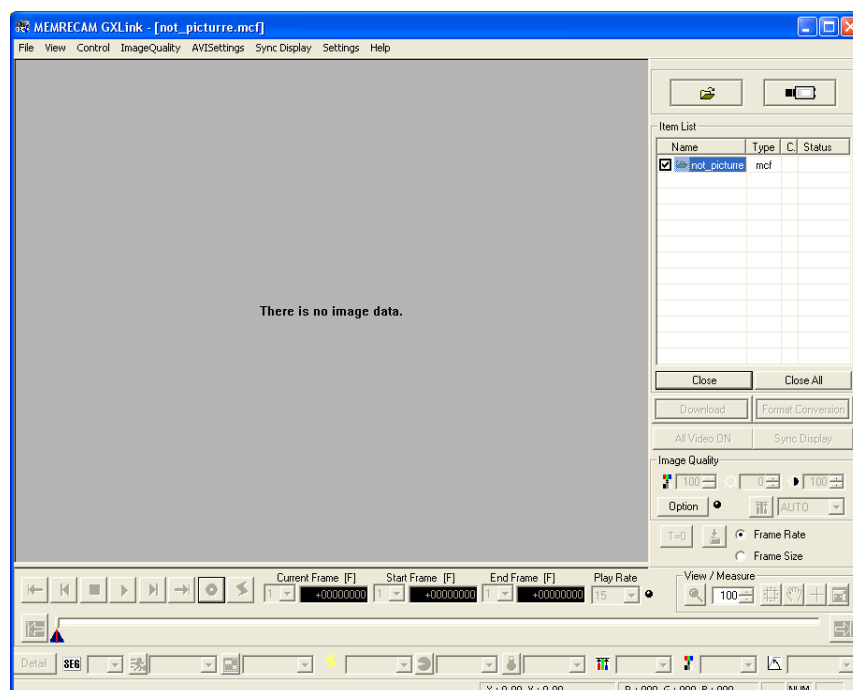
If the USB media format is wrong, it will be treated as if the free space is less than the actual. If the camera power was turned off when writing to the USB media, the USB cable was removed or the media was impacted or shaken during writing, the USB media format may be wrong. In this case, check the options for "Check for Errors" in the disc properties corresponding to the Windows PC and perform the necessary repairs.

#### ■ Unable to download images larger than 4GB

Check the file system format of the PC used. If the format is FAT32, files larger than 4GB cannot be downloaded. Change the file system format to NTFS to download files larger than 4GB.

#### ■ "There is no image data" is displayed on the monitor

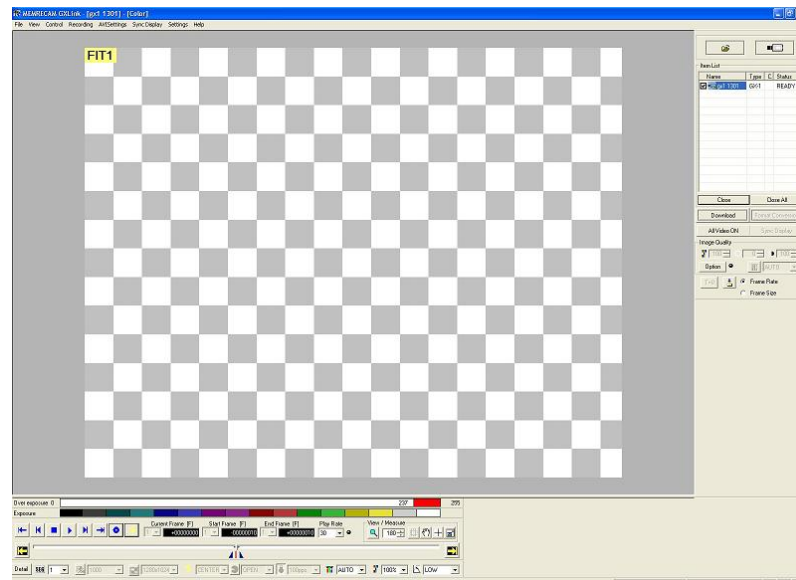
If this is displayed, for some reason, the camera image download has failed and the camera image data is not in the MCFF file.



■ A checkerboard pattern is displayed on the monitor

Consider the following causes.

- For some reason, the camera image download has failed and the camera image data is not in the MCFF file.
  - During sync display, the current frame time is outside the range for the image data.
  - The live image was set to “Do Not Display” under the “Camera Live Display•Download” tab in the options menu or the camera connection settings when connecting the camera.



■ The image does not change the image quality of the MCFF is adjusted

1) Gain and knee are not reflected

If recording MCFF images in the DRES mode, the gain and knee settings are disabled.

If the MCFF image properties in the DRES mode are LOW/MID/HIGH, record in the DRES mode.

2) Gain, gamma and knee are not reflected

If the luminance in the image quality adjustment menu is LINEAR or CUSTOM, the gain, gamma and knee settings are disabled.

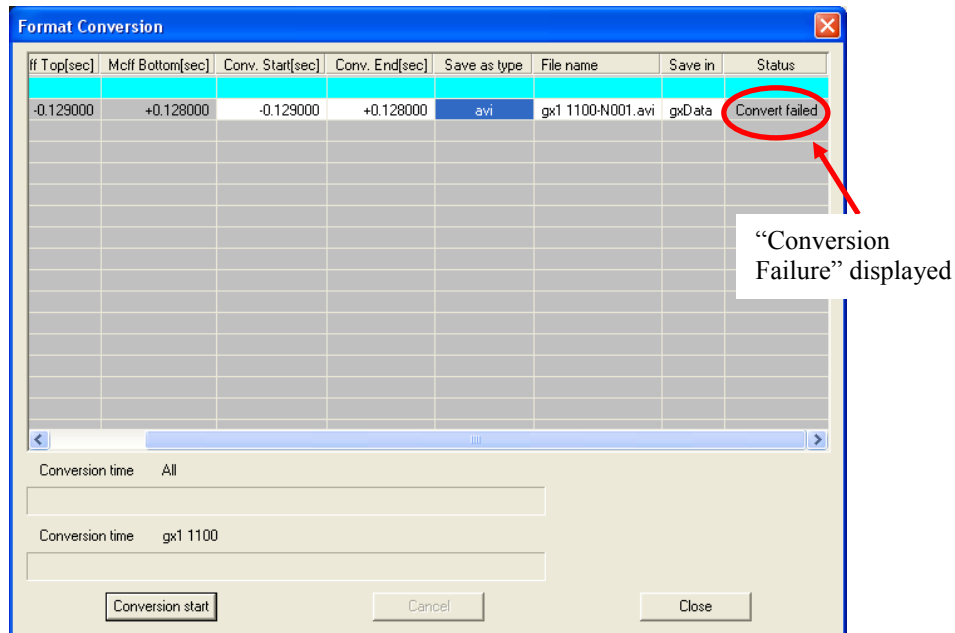
If the luminance in the image quality adjustment menu is NORMAL, the gain, gamma and knee settings are enabled.

### ■ AVI conversion with compression program (CODEC)

There are limits to the image size that can be converted with the compression program (CODEC). For example, Indeo 3.2 CODEC generates a conversion error with sizes other than 640x480. Contact your CODEC supplier for CODEC questions.

The HXLink Motion JPEG conversion can handle conversion of most image sizes.

The following format conversion dialogue will be displayed if there is an AVI conversion failure.



Nothing is displayed in the “Save As” dialogue if there is an AVI conversion failure.

## ■ AVI conversion of large images

HXLink format conversion can handle “AVI 1.0” and “AVI 2.0” AVI conversion.  
The AVI 1.0 format is limited to a file size of 2GB. There are no limits to the AVI 2.0 format.  
If converting into the AVI 2.0 format, check “Convert with AVI2.0” under the “Previous Conversion Settings” in the “Options” dialogue.

## ■ Previous versions of HXLink

If reverting to a previous version of HXLink due to some problem, uninstall HXLink but before installing a previous version of HXLink, first delete <HXLink.ini> from the folder where the HXLink program was installed and then proceed with the installation.

■ If the “User Account Restrictions” dialogue appears when HXLink is started

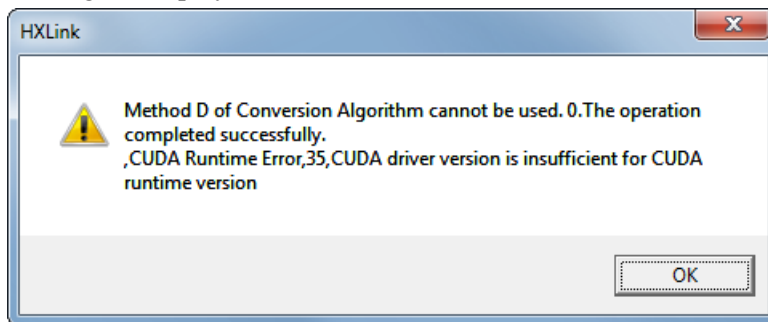
If the Windows Vista/7/8.1/10 function UAC is enabled, the “User Account Restrictions” dialogue appears when the HXLink is started.  
Click “Allow” in the “User Account Restrictions” dialogue.  
To use the drivers necessary for camera connections (FC-AL connection, Gbit connection), HXLink must be executed as an administrator.

■ I can't open the image file even when dragging and dropping the image file from Explorer to HXLink

There are restrictions when the Windows Vista/7/8/8.1/10 function UAC is enabled.  
Use the following process to drag and drop image files into HXLink.

- 1) Start Explorer. If a menu does not appear in Explorer, press the ALT key to display the menu in Explorer.
- 2) Click "Folder Options" in the "Tools" menu and the "Folder Options" dialogue appears.
- 3) Select the "Display" tab and check the 2nd item from the top, "Open Folder Window with a Different Process".
- 4) Log off and then log on again to enable the settings in 3).
- 5) Execute Explorer as an administrator and drag and drop the image file to HXLink.  
Conduct the following to execute Explorer as an administrator.
  - 5.1) Click "All Programs" from the "Start" menu.
  - 5.2) Click "Accessories" and right click on "Explorer".
  - 5.3) Click "Execute as Administrator" when the right click menu appears.
  - 5.4) Click "Continue" when the "User Account Restrictions" dialogue appears.

■ After importing the MCFF high speed conversion software and updating the HXLink version, a message is displayed when HXLink is started



This message indicates the MCFF high speed conversion software, installed with HXLink, is not compatible with the driver for the graphics board installed on the PC.

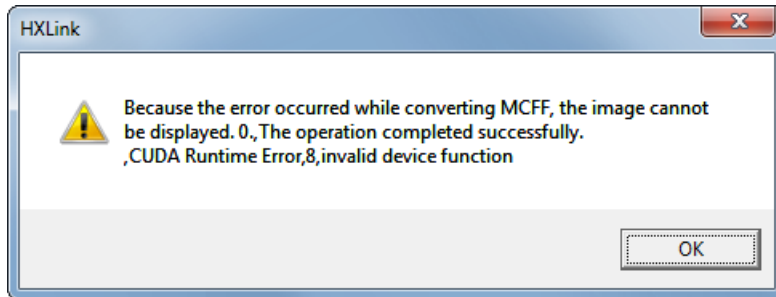
To remedy, update the NVIDIA driver to a version 314 or higher.  
Depending on the type of PC, a driver supplied by the PC manufacturer may be required.

When using the previous version 1.53a HXLink, the conversion algorithm D can be used also with the NVIDIA driver before version 314  
by performing setup.exe of the CUDA3Setup folder of installer CD.

If there is no driver with a version 314 or higher, follow the procedures below to change the HXLink environment to one  
that is compatible with the old NVIDIA driver.

Update the NVIDIA driver to a version 256 or higher.  
Execute the setup.exe in the CUDA3Setup folder on the installer CD.  
Then, use the HXLink to select the conversion algorithm D.

- Select conversion algorithm D to open MCFF but a message is displayed and the MCFF is not



This message is displayed when the HXLink environment is compatible with a 195 or less driver with a graphics board driver that is a version 256 or higher.

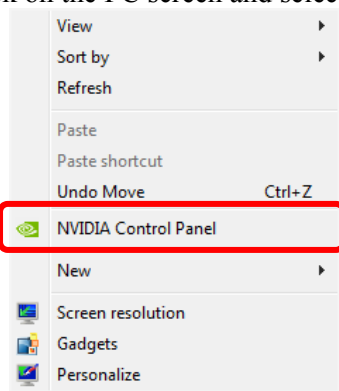
To remedy, re-install HXLink.

If other applications using MCFF are installed (MOVIAS Neo, CARS etc.), uninstall all of these applications and then re-install.

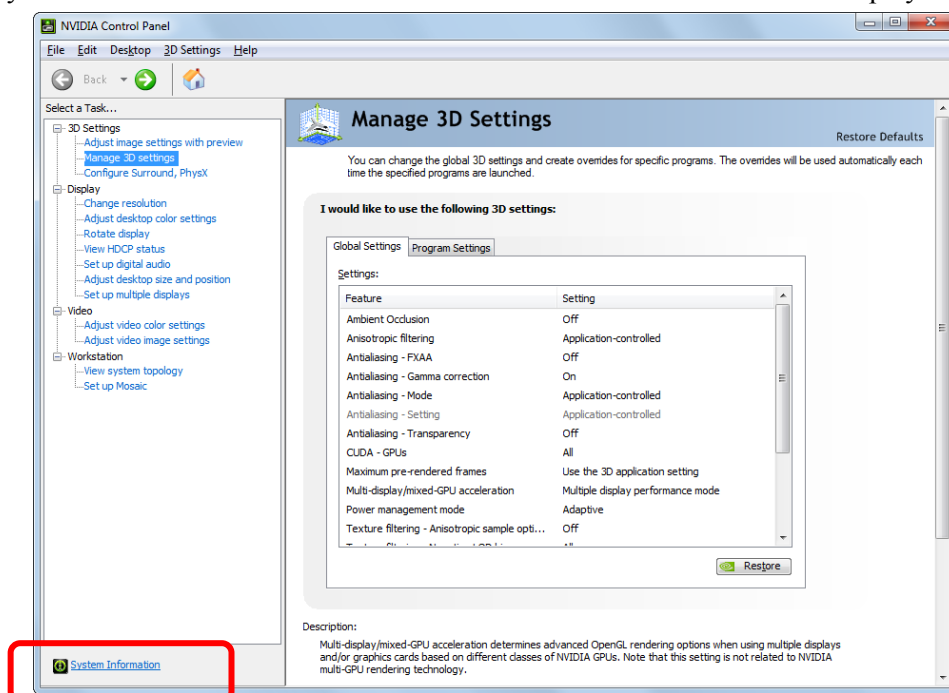
- Confirm that the NVIDIA driver version can be used with the conversion algorithm D

Confirm the NVIDIA driver version with the following process.

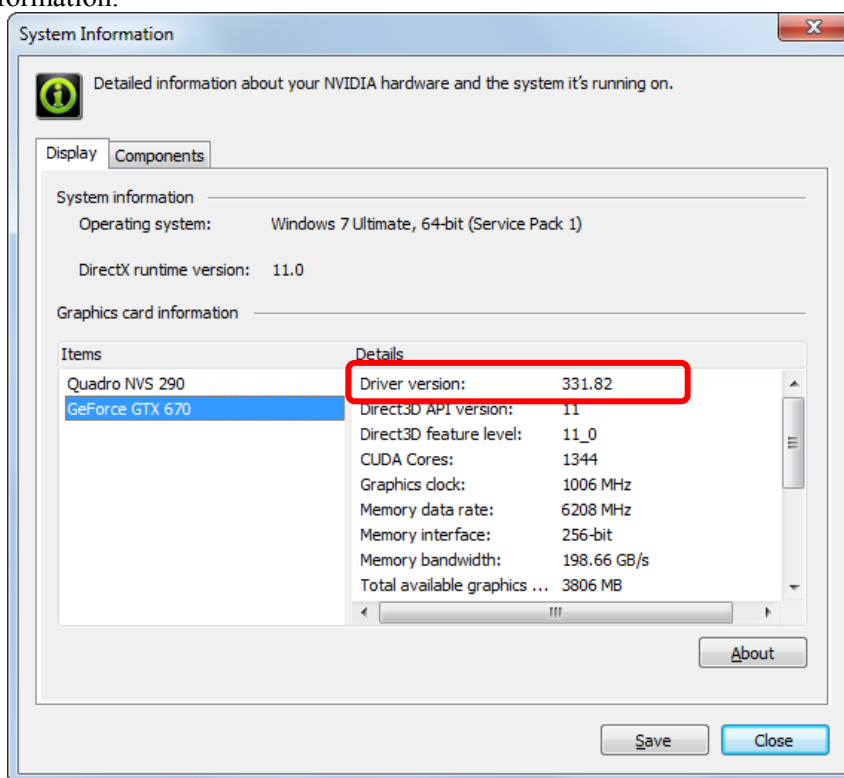
1) Right click on the PC screen and select “NVIDIA Control Panel” from the menu displayed.



2) Click “System Information” in the bottom left of the “NVIDIA Control Panel” displayed.



- 3) Confirm “Driver Version” shown in “Graphics Card Information” under the “Display” tab of the system information.



The compatible NVIDIA driver versions in HXLink are as follows.

Compatible Application and Version	NVIDIA Driver Version
HXLink 1.30 or higher	256 or higher
HXLink 1.60 or higher	314 or higher

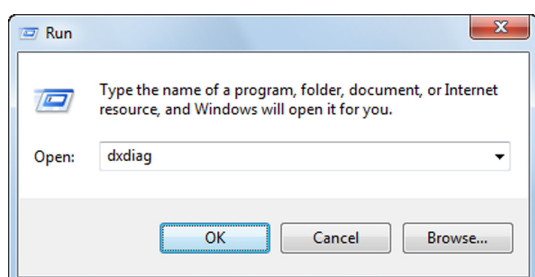
If the NVIDIA driver version is less than 256, we recommend updating the NVIDIA driver to the latest version. Depending on the type of PC, a driver supplied by the PC manufacturer may be required.

If using a NVIDIA driver with a version less than 195 with the conversion algorithm D and using HXLink Ver 3.55 or higher, the HXLink environment can be changed to operate with a NVIDIA driver version less than 195.

Execute the setup.exe in the CUDA2Setup folder on the HXLink installation CD.

■ An application error is generated when opening an AVI file with AVI2.0 format

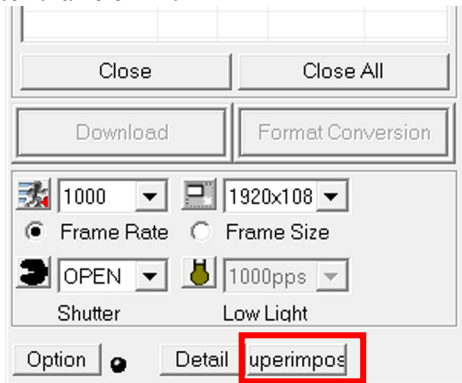
When opening an AVI file with AVI2.0 format using HXLink, DirectX 8.0 or higher must be installed.



To confirm the version of DirectX, execute “dxdiag” from “Specify the File Name” in Windows.

■ Part of the character string is missing on the screen

Not all of the character string will be displayed on the screen if the character size of the display is greater than 96DPI.

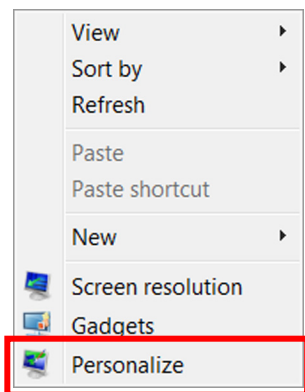


Example: The character string “Superimpose” is only partially displayed.

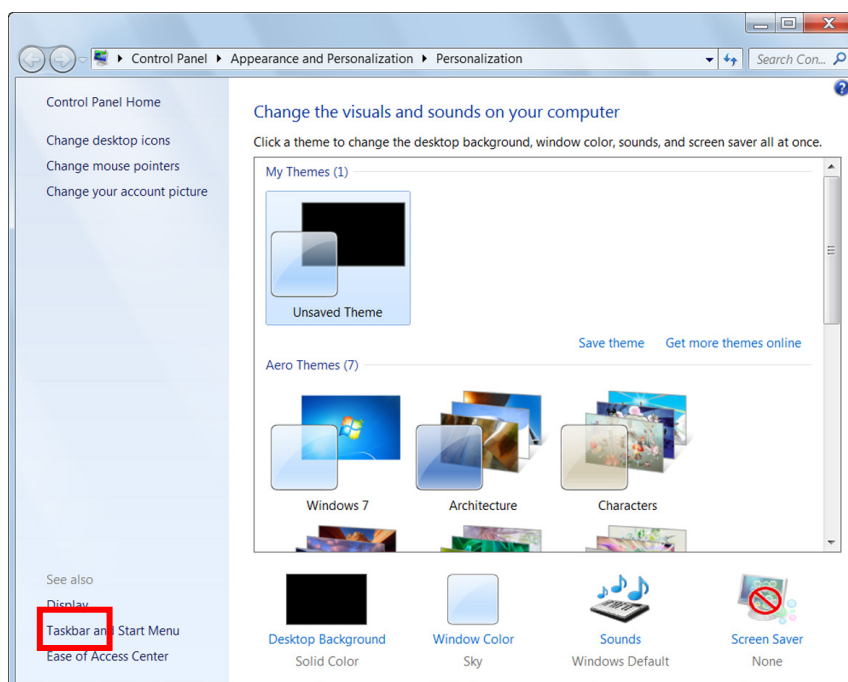
Set the character size of the display to 96DPI.

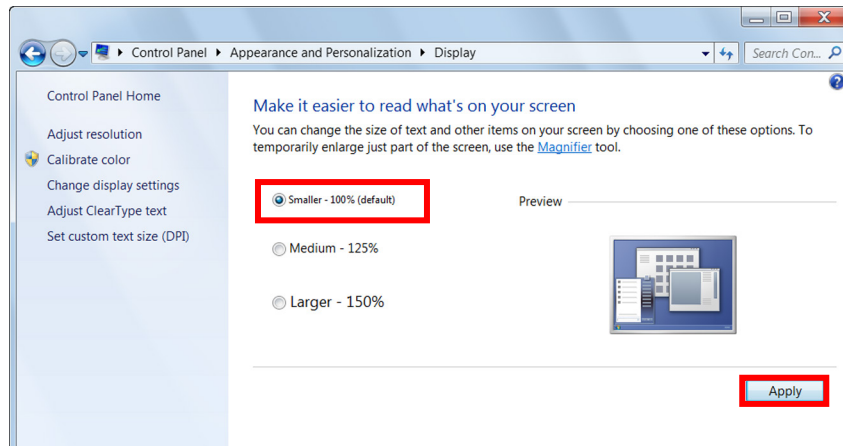
## Windows 7

1) Click on “Individual Settings” in the right mouse menu on the desktop.



2) Click “Display” at the lower left and select “Small (S) – 100%” so the screen is “Easily Read Characters on the Screen”.





3) The settings are enabled at the next log on.

■ Select conversion algorithm D to open MCFF but the message “ErrorNo:224” is displayed and the MCFF is not open.

The graphic board memory is in low.

Please start "CudaSelect" and check which graphic board is used on HXLink.

a "Start Menu" → to "MEMRECAM HXLink" "CudaSelect".

The graphics board to be recommended will depend on usage

■ When connected to HX camera, segment is set to "download reservation" and cannot be recorded..

Connection with the camera and would have been cut,

the state of the segment will be reserved even after reconnecting.

To cancel Segment Reservations, open push "download" button and open "download" dialog again.



# 15

## Specifications

## 15.1 Computer Requirements

The PC conditions to operate HXLink are as follows.

Computer	IBM PC compatible (DOS/V)
CPU	Core2 Duo 2GHz or equivalent (the compression and display processing speed depends on the CPU properties.)
Memory	2GB or greater
Display	Full color, screen size of 1024×768 or greater, screen DPI setting of 96dpi (Recommend 1600×1200 or greater for color image sizes of 1280×1024)
OS	Windows XP Professional + SP2 (32bit ) Windows Vista Ultimate/Business + SP1 (32/64bit ) Windows 7 Ultimate/Professional (32/64bit ) Windows 8 / 8.1 Pro (32/64bit) Windows 10 Pro (32/64bit) Internet Explorer 5.0 service pack 2 or higher DirectX 8.0 or higher  With Q camera, Windows 7 or higher
Disc drive	600MB for program or log 60GB or greater for data (recommend 200GB or more) (depends on the number of cameras and the number of frames saved)
Network	With HX, GX, Q and fx cameras (Gbit connection): Ethernet (IEEE802.3ab 1000BASE-T Half Duplex) With fx cameras (TCP/IP Fast Ethernet): Ethernet (IEEE802.3u 100BASE-TX Half Duplex) With fx cameras (FC-AL connection): FC-AL With ULTRA Cam: Ethernet (IEEE802.3u 100BASE-TX Half Duplex )
CD drive	1 (for installation)
Mouse	1
Keyboard	1

The compression and display processing speed depends on the CPU properties. Enough disc data free space is required for the size required by the application.

In addition to the requirements listed above, depending on the computer configuration and version, this product may not function properly.

(Please contact our company for recommended models.)

## 15.2 Compatible Cameras

HXLink is compatible with the following cameras.

### HX Series Cameras

HX-1, HX-3, HX-4, HX-5, HX-6, HX-7, HX-7S

### GX Series Cameras

GX-1, GX-1F, GX-1z, GX-1Fz

GX-3, GX-3z

GX-8, GX-8F, GX-8z, GX-8Fz

GX-5 (P-Cam, P2-Cam, S-Cam, S2-Cam, HR-Cam, C-Cam, u-Cam),

GX-5F (P-Cam, P2-Cam, S-Cam, S2-Cam, HR-Cam, C-Cam, u-Cam)

In HXLink, P-Cam, P2-Cam, S-Cam, S2-Cam, C-Cam, u-Cam are all called P-CAM.

In HXLink, only HR-Cam is called HR-CAM.

### Q Series Cameras

Q1m, Q1v, Q5 (P-Cam, P2-Cam, S-Cam, S2-Cam, C-Cam, u-Cam)

### fx Series Cameras

fx-K4, fx-K5,

fx-K3, fx-K3R,

fx RX-4, fx RX-3

fx RX-5 (RX Cameras, RX units, PM units, PM3 units)

fx RX-5G (RX Cameras, RX units, PM units, PM3 units)

fx-6000, fx RX-6, fx RX-6G

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# Appendix A

# List of Shortcut Keys

This describes the shortcut keys used with HXLink.

## Standard Shortcut Keys

Result	Shortcut Key
Open file	Ctrl+O
Connect camera	Ctrl+C
Download	Ctrl+L
Convert format	Ctrl+V
Show properties	Ctrl+P
Close camera item list/file	Ctrl+W
Zoom in	Ctrl+'+'
Zoom out	Ctrl+'—'
Zoom 100%	Ctrl+l
Display entire image	Ctrl+F
Use/end zoom tool	Ctrl+Z
Use/end hand tool	Ctrl+H
Conduct coordinate measurement	Ctrl+M
Show/hide overexposure bar	F2
Show/hide exposure color bar	F3
Show/hide main toolbar	F7
Show/hide camera parameter toolbar	F8
Show/hide item toolbar	F9
Show/hide status bar	F10
Switch modes (Basic/Expert)	F12
Open detailed settings window	Ctrl+D
Check all in the item list	Ctrl+A
Use/end sync display	Ctrl+Y
Open layout settings dialogue for sync display	Ctrl+S
Open camera registration dialogue	Ctrl+SHIFT+R
Open camera connection settings dialogue	Ctrl+SHIFT+C
Open options dialogue	Ctrl+SHIFT+O

#### Shortcut Keys for Camera / File Operation

Result	Shortcut Key
Start playback when stopped. End playback when playing.	Ctrl + SPACE
Loop playback when stopped or when playing. End playback during loop playback.	Ctrl + Shift + SPACE
1 frame forward when stopped. Increase frame rate when playing.	Ctrl + →
1 frame back when stopped. Decrease frame rate when playing.	Ctrl + ←
Jump to trigger frame or to T=0 frame.	Ctrl + T
Jump to playback start frame.	Ctrl + Home
Jump to playback end frame.	Ctrl + End
Jump to first frame or to first frame of file.	Ctrl + Shift + Home
Jump to last frame or to last frame of file.	Ctrl + Shift + End
Put the camera in the VIEW mode.	Ctrl + I
Put the camera in the ARM mode when in the VIEW mode.	Ctrl + R

The shortcut keys for camera / file operation can be used by checking ON in “Enable Shortcut Keys for Camera / File Operation” under the “Other” tab of options.

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# Appendix B

# Conversion Settings File (FCV Files)

FCV is the files to describe setting parameters of format conversion.

When the size of AVI CODEC configuration parameter is 512 characters or more, CODEC Configuration File (CSDT File) will be created, at where FCV file is, and the parameter will be saved at CODEC Configuration File.

The FCV file contains a COMP\_STATE\_EX key corresponding to a name of the CODEC configuration file.

This describes the contents of the conversion settings files (FCV).

[CONV\_PARAM]                      This item indicates the following items as conversion setting items.

\*\*\* Settings for Conversion Save Range \*\*\*

- SEG\_SEL                              Conversion segment number  
0: Only 0 is valid with the MEMRECAM ci series
  
- BEGIN\_FRAME                        Conversion start frame (With 1 block)
- END\_FRAME                           Conversion end frame (With 1 block)  
If either the BEGIN\_FRAME, END\_FRAME are not included in the MCFF frame range, or if BEGIN\_FRAME > END\_FRAME, the settings for the conversion save range are disabled.
  
- BEGIN\_FRAME<sub>n</sub>                      Conversion start frame for block n
- END\_FRAME<sub>n</sub>                        Conversion end frame for block n  
n is the number of blocks 1~16 (GX cameras), 1~64 (HX cameras).  
The part of the BEGIN\_FRAME<sub>n</sub>, END\_FRAME<sub>n</sub> range and the MCFF range overlapping becomes the conversion save range. If the BEGIN\_FRAME<sub>n</sub>, END\_FRAME<sub>n</sub> range and the MCFF range do not overlap, block n data is not converted.
  
- BEGIN\_TIME                           Conversion start time (Seconds. With 1 block)
- END\_TIME                            Conversion end time (Seconds. With 1 block)  
If either the BEGIN\_TIME, END\_TIME are not included in the MCFF frame range, or if BEGIN\_TIME > END\_TIME, the settings for the conversion save range are disabled.

- BEGIN\_TIMEn                      Conversion start time for block n (Seconds)
- END\_TIMEn                      Conversion end time for block n (Seconds)

n is the number of blocks 1~64.

The part of the BEGIN\_TIMEn, END\_TIMEn range and the MCFF range overlapping becomes the conversion save range. If the BEGIN\_TIMEn, END\_TIMEn range and the MCFF range do not overlap, block n data is not converted.

\* If BEGIN\_FRAME, END\_FRAME, BEGIN\_FRAME<sub>n</sub>, END\_FRAME<sub>n</sub>, BEGIN\_TIME, END\_TIME, BEGIN\_TIMEn, END\_TIMEn are simultaneously assigned to a FCV file, keys are used to determine the following priority. The smaller the number, the higher the priority. Setting keys with low priority is disabled.

- 1)BEGIN\_FRAME<sub>n</sub>, END\_FRAME<sub>n</sub>
- 2)BEGIN\_TIMEn, END\_TIMEn
- 3)BEGIN\_FRAME, END\_FRAME
- 4)BEGIN\_TIME, END\_TIME

The following keys are kept for compatibility. Use the keys mentioned above.

- BEG\_TIME                      Conversion start time (Seconds. With 1 block)
- END\_TIME                      Conversion end time (Seconds. With 1 block)

If either the BEGIN\_TIME, END\_TIME are not included in the MCFF frame range, or if BEGIN\_TIME > END\_TIME, the settings for the conversion save range are disabled.

\*\*\* Setting Superimposed Information \*\*\*

•SI_TYPE	Superimposed information type (0: None, 1: Superimpose frame only, 2: Superimpose all, 3: Custom Select items to superimpose with the following SI_ID ~ SI_DEV_TYPE)
SI_ID	Superimpose type: Custom ID (0: None, 1: Superimpose)
SI_SCENE	Superimpose type: Custom Scene number (0: None, 1: Superimpose)
SI_TRIGGER	Superimpose type: Custom Trigger timing (0: None, 1: Superimpose)
SI_TRIGGER_TIME	Superimpose type: Custom Trigger time (0: None, 1: Superimpose)
SI_FRAME	Superimpose type: Custom Frame time (0: None, 1: Superimpose)
SI_NICKNAME	Superimpose type: Custom Camera nickname (0: None, 1: Superimpose)
SI_CID	Superimpose type: Custom CID (Camera ID) (0: None, 1: Superimpose)
SI_REC_RATE	Superimpose type: Custom Recording speed (0: None, 1: Superimpose)
SI_SHUTTER	Superimpose type: Custom Shutter settings (0: None, 1: Superimpose)
SI_DEV_TYPE	Superimpose type: Custom Camera type (0: None, 1: Superimpose)
•SI_REC_COMMENT	Superimpose recording comments (0: None, 1: Superimpose)
•SI_FRAME_TYPE	Superimpose frame (0: Frame number, 1: Relative time, 2: Absolute time)
•SI_FONTSIZE_TYPE	Superimpose information font size (0:Small, 1: Medium, 2: Large, 3: Extra Large)

\*\*\* Settings for Cropping/Rotation Angle \*\*\*

•RESIZE_SEL	Resize settings for cropping (0: 1/1, 1: 1/2)
•CUT_SEL	Crop settings (0: None, 1:Crop to 640x480 (used for previous versions), 2: Crop to the desired size)
•CRECT_X	Offset (X coordinate) the origin point of the image (top left corner) and the origin point for the cropping frame (top left corner)
•CRECT_Y	Offset (Y coordinate) the origin point of the image (top left corner) and the origin point for the cropping frame (top left corner)
•CRECT_BL0_Y	Offset (Y coordinate) the origin point of the image (top left corner) and the origin point for the cropping frame (top left corner)
•CRECT_H	Height of cropping frame
•CRECT_W	Width of cropping frame
•CONVERT_ANGLE	Image rotation angle
•TB_REVERS	Top/bottom reverse direction for the image (0: None, 1: rotate)
•LR_REVERS	Left/right reverse direction for the image (0: None, 1: rotate)

\*\*\* Image Quality Settings \*\*\*

•GAIN_SEL	Gain settings	fx Cameras (-1: disabled, 0: 0dB, 6: 6dB, 12: 12dB) GX Cameras (LOW, NORMAL, HIGH)
•GAMMA_SEL	Gamma settings	(-1: disabled, 0: OFF, 2: LOW, 4: NORMAL)
•ENH_SEL	Enhance settings	(-1: disabled, 0: OFF, 2: LOW, 4: NORMAL, 6: HIGH)
•KNEE	Knee settings	(-1: disabled, 0: OFF, 1: ON)
•LPF_ENB	Low pass filter settings	(-1: disabled, 0: OFF, 1: ON)
•CHROMA	Chroma settings	(0: 0%, 25: 25%, 50: 50%, 75: 75%, 100: 100%, 150: 150%, 200: 200%) -1: disabled, CHGAIN_NUM, CHGAIN_DENOM also set to -1
•CHGAIN_NUM	Numerator for custom chroma value	
•CHGAIN_DENOM	Denominator for custom chroma value	Custom chroma Saturation: CHGAIN_NUM / CHGAIN_DENOM[%]
•HUE	Hue (color matching)	(-9999: disabled, -180~+180 [degree])
•CONTRAST	Contrast	(-1: disabled, 0~6400[%])
•BRIGHTNESS	Brightness (Brightness)	(-9999: disabled, -180~+180[%])
•WB_SEL	Select white balance	(-1: disabled, 0: custom, 1: 3100K, 2: 5000K, 3: 9000K, 4: REG, 5: Auto)
•WB_RGAIN	White balance value R gain value [0.0~]	(Value with conversion algorithm A)
•WB_BGAIN	White balance value B gain value [0.0~]	(Value with conversion algorithm A)
•WB_YRGAIN	White balance value R gain value [0.0~]	(Value with conversion algorithm B)
•WB_YBGAIN	White balance value B gain value [0.0~]	(Value with conversion algorithm B)
•WB_YGGAIN	White balance value G gain value [0.0~]	(Value with conversion algorithm B)
•INPUT_BLACK_LEVEL	Input black level value	
•RGB_MATRIX	RGB matrix conversion	(1: ON, 0: OFF)
•FRAME_RATE	Conversion frame rate	
•LUT_SEL	Luminance	(NORMAL, LINEAR, CUSTOM, TABLE)

\*\*\* The following items are valid only when LUT\_SEL =CUSTOM \*\*\*

•CUSTOM_LUT_MIN	Minimum input value for brightness
•CUSTOM_LUT_MAX	Maximum input value for brightness
•CUSTOM_LUT_GAMMA	Gamma value for brightness properties

\*\*\* The following items are for batch conversion of files (BatchConv). Cannot be ready by GXLink \*\*\*

- FILE\_TYPE                      Conversion save file type
- CONVERT\_TYPE                Conversion format (1: Format A, 2: Format B1, 3: Format C, 4: Format D1, 6: Format B2, 8: Format D2)
- FCC\_HANDLER                 Select compression method (CODEC) (Used with AVI file conversion)  
0:disabled
- VIDEO\_CODEC                 Compression method (CODEC) (Used with AVI file conversion)  
Disabled if compression method compatible with FCC\_HANDLER cannot be written
- QUALITY                      Compression quality (with AVI, JPEG conversion)  
-1: disabled
- COMP\_KEYFRM                Number of frames to insert key frames
- COMP\_BPS                    Data ratio (Byte/sec)
- COMP\_STATE                 Configuration parameter of compression program (CODEC).  
– Parameter is 510 characters or less.  
(This configuration parameter will be effective when the parameter of COMP\_STASTE\_EX key is invalid.)
- COMP\_STATE\_EX             File name of a CODEC Configuration file (CSDT) which is a configuration parameter of compression program.  
(COMP\_STATE\_EX key is created when the size of configuration parameter is 512 characters or more.)
- AVI\_FPS\_SCALE              Denominator of AVI frame rate value created
- AVI\_FPS\_RATE              Numerator of AVI frame rate value created
- AVI\_CONV\_TYPE             Type of AVI file format used  
(1: Use AVI1.0 format, 2: Use AVI2.0 format)
- SOFT\_MJPEG                Compression settings (0: CODEC, 1: MJPEG)
- BPC                          Bit length (8/16)
- CH\_COUNT                    Channels (1/3)
- IMAGE\_TYPE                Type of image (RGB, RAW2, BW)

Type of Output File and BPC/ CH\_COUNT/IMAGE\_TYP

Type of Output File	BPC	CH_COUNT	IMAGE_TYPE
TIFF16 (RAW)	16	1	RAW2
TIFF16 (Monochrome 16bit)	16	1	BW
TIFF48 (48bit)	16	3	RGB

# Appendix C

# Parameter Settings File (prm file)

This describes the details of the camera parameter settings file (prm).

[PARAM]                      This item indicates the number of cameras.  
    ▪CAMCOUNT                      Number of cameras

[REC\_PARAM0]                      This item indicates the first camera information and recording settings for the following items.

The following items are common for MEMRECAM HX, GX, Q series.

▪NICKNAME	Nickname
▪IPADDRESS	IP address
▪DEV_TYPE	Model
▪DRP_VERSION	Camera firmware version
▪CID	CID
▪ID	ID
▪FRAME_RATE_STR	Frame rate
▪FRAME_SIZE_STR	Frame size
▪TRIGGER	Trigger
▪TRIGGER_VAL	Custom trigger value
▪SHUTTER	Shutter
▪SHUTTER_VAL	Custom shutter value
▪COMMENT	Comments
▪WB	White balance
▪GAIN	Gain
▪GAMMA	Gamma
▪ENHANCE	Enhance
▪CHROMA	Chroma
▪KNEE	Knee
▪LOWLIGHT	Low light
▪CURSEG	Segment number
▪ESTMODE	EST mode ON/OFF
▪REC_METHOD	Recording trigger mode
▪LUT_SEL	Luminance
▪LUT_CUSTOM_MIN	Minimum value for custom luminance
▪LUT_CUSTOM_MAX	Maximum value for custom luminance
▪LUT_CUSTOM_GAMMA	Gamma for custom luminance

Followings are for Q Cameras only.

•LOWLIGHTEXP	frame rate when low light recording
•ROTATE_IMAGE	rotate image
•REVERSE_IMAGE_TB	Reverse image vertical
•REVERSE_IMAGE_LR	Reverse image horizontal
•SAVE_RANGE_MODE	save range mode
•FRAME_TIME	frame time
•CAMERA_TIME	camera time
•EST1_INPUT	EST1 input polarity
•EST1_FILTER	EST1 filter
•EST_VIEW	Qcam, HX, GX, EST View
•TRIG1_INPUT	Trig1 input polarity
•TRIG1_FILTER	Trig1 filter
•EPO_SEL	Qcam Output Sync Signal
•GTRIG_SEL	G trigger
•GTRIG_DELAY	will not be used (always shows “0”)
•GTRIG_LEVEL	G trigger level
•EXPOSURE_TIMING	Exposure timing
•PIXEL_BIT_DEPTH	Pixel bit length
•BB_SEL	Black Balance ON/OFF
•EXPOSURE_PHASE	Exposure phase
•RGB_MATRIX	RGB matrix
•FRAME_RELATIVE_TIME	Standards for frame relative time
•SCENE_NO	Scene No.

(Blank Page)

# Appendix D

# Lens Control Settings File

This describes the details of the lens control settings file.

## Form

Section	
Key	Save Value
LNS_ZOOM	Lens information noted in the Detected Lens (record)
LNS_FOCAL	Zoom (focal distance) value (record)
LNS_FPOS	Focus setting value
LNS_APOS	Aperture setting value
LNS_FN	Aperture F value x10
DLG_X	X coordinate of top left position of the lens control window
DLG_Y	Y coordinate of top left position of the lens control window

## Loading

1. Move the position of the lens control window
2. Lens control initialization (Lens control recalibration)
3. Focus aperture settings
4. Update focus aperture display

## Examples

```
[LNC0]
LNS_ZOOM=50mm-50mm
LNS_FOCAL=50
LNS_FPOS=0
LNS_APOS=0
LNS_FN=14
DLG_X=0
DLG_Y=43
```

# Appendix E

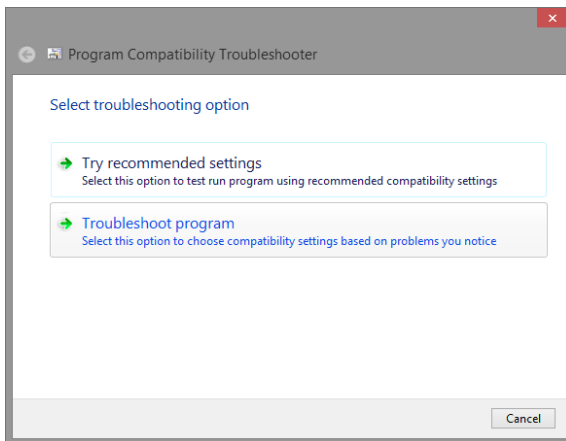
# FC-AL driver installation of Windows8

It describes how to install FC-AL host bus adapter driver (hereinafter, 'driver') with the installer for Windows Vista (SANSurfer\_IW\_1\_0\_34\_B9.exe) to the Windows8.

In addition, FC-AL control of MEMRECAM is compatible with Windows XP / Vista / 7/8 / 8.1.  
Not compatible with Windows 10.

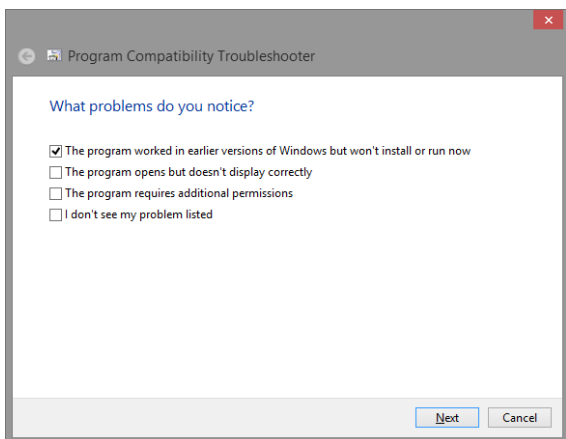
■Please install it after inserted into the PC the FC-AL host bus adapter.

## Installation Instructions

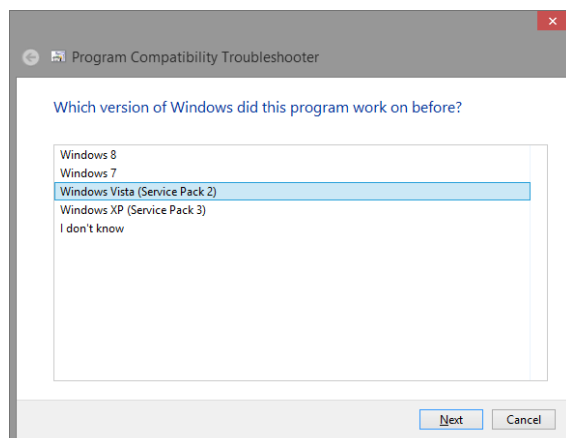


1) Click "Troubleshoot compatibility" on the Right click menu the installer

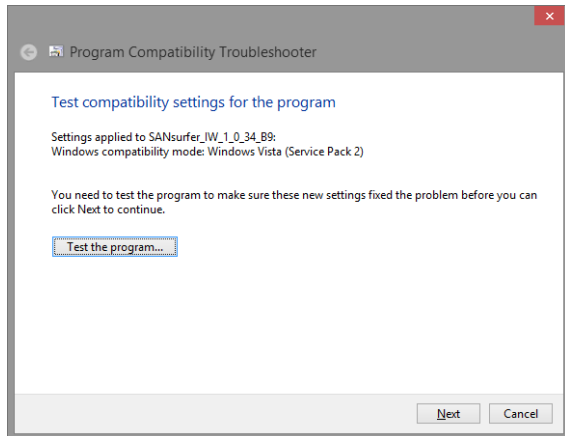
2) Click "Troubleshoot program" on the "Program Compatibility Troubleshooter" screen.



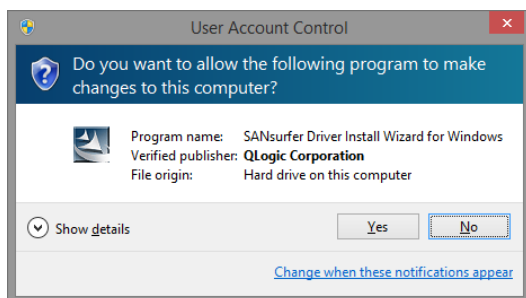
3) Click "Next" to "The program worked in earlier versions of Windows but won't install or run now" checked.



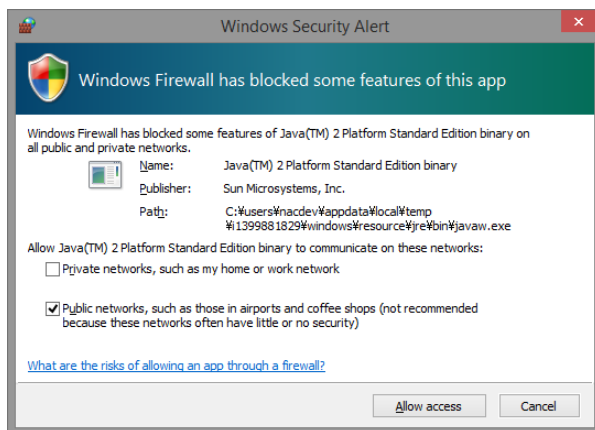
4) Click "Next" to "Windows Vista (Service Pack2)" selected.



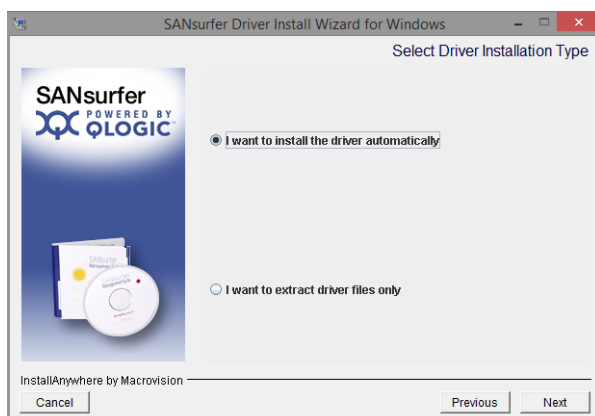
5) Click "Test the program..." on the "Program Compatibility Troubleshooter" screen.



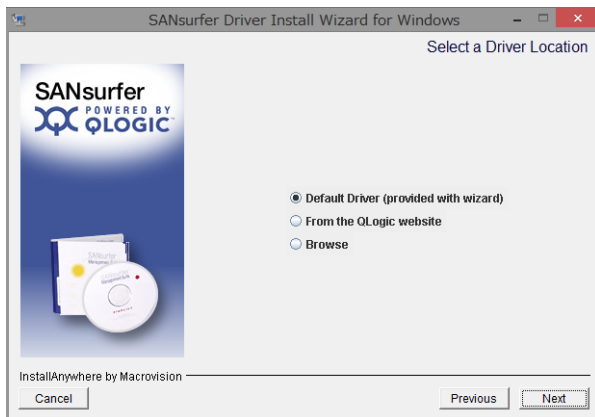
6) Click "Yes" on the "User Account Control" screen.



7) Click "Allow access" on the "Windows Security Alert" screen.

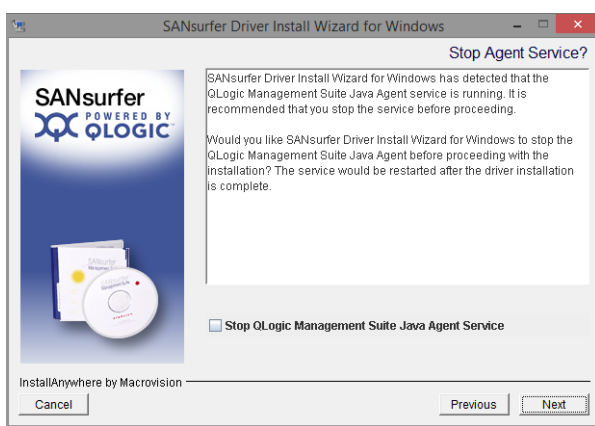


8) Click "Next" to "I want to install the driver automatically" selected.



9) Click "Next" to "Default Driver (provided with wizard)" selected.

Click "Next" on the "Preparing Driver Package" screen.



10) Uncheck "Stop QLogic Management Suite Java Agent Service" and click "Next".

When be displayed "Driver installed successfully", click "Next".



11) Click "Quit" to complete the install.

Click "Cancel" on the "Program Compatibility Troubleshooter" screen.

Please reboot Computer.

# Appendix F

# Function correspondent table for each camera model

Each function is displayed in the order of table of contents.

Mark in the table ○ : supported

△ : supported by limited model

— : not supported

page	function	Details 1	Details 2	GX	HX	Q
3-11	Segment Display			○	○	○
3-12	Segment Reservations Protect Segment			-	○	-
3-18	Recording Settings	BB Update		○	○	○
		Black Balance Settings for EST Recording		-	○	-
		Sensor Gain		-	△	-
		GXC		-	○	-
		All Cameras Cooling Fans Driving Stop		-	△	-
4-6	Camera Configuration Settings	Camera Configuration Settings		GX-5/ 5F	-	Q5
4-7		Camera Configuration Mode	MANUAL	GX-5/ 5F	-	-
			AUTO	GX-5/ 5F	-	-
4-13	“Control” Window	Current segment		○	○	○
		Frame rate (pps)	Preset	○	○	○
			Custom	○	○	-
		Frame size	Preset	○	○	○
			Custom	○	○	-
		Recording trigger mode		○	○	-
		Trigger timing		○	○	○
		Shutter		○	○	○
		Low light		○	○	○
		White balance		○	○	○
		chroma		○	○	○
		Gain		○	○	○
		AOI		○	○	-
		AE		○	○	-
		Image trigger		○	○	-
		DRES mode		○	○	-
		Pixel bit depth		○	○	○
		RGB matrix correction		○	○	○
“List of Camera Settings” Window						
4-15	Camera Device Information	ID		○	○	-
		TYPE		○	○	○
		Nickname		○	○	○
		FC-AL node		-	-	-
		IP address		○	○	○
		MAC address		○	○	○
		CID		○	○	○
		DRP Version		○	○	○
		Archive		-	HX-1	-
		HD-Mag		-	HX-1	-
		Memory		○	○	○

page	function	Details 1	Details 2	GX	HX	Q
		Master/Slave		-	-	-
		Memory Segment		○	○	○
		Live Image Resolution		-	-	-
		Rotate Image		○	○	○
		Reverse Image		○	○	○
		BATT.STATUS		○	○	○
		Video Output		○	○	-
		Auto View		○	○	-
		PC Lock		○	○	-
		Lock Remote Control		○	○	-
		Update Black Balance		○	○	○
		Zoom		○	○	-
		X Scroll Position		○	○	-
		Y Scroll Position		○	○	-
		Rotate Video		GX-8/8F	-	-
4-16	Camera Environment Settings	ID		○	○	-
		TYPE		○	○	○
		Nickname		○	○	○
		Status		○	○	○
		Save Range Mode		○	○	
		Frame Time		○	○	○
		Time Stamp		○	Always ON	Always ON
		Camera Time		○	○	○
		Camera Sync		○	○	○
		EST Input Selection		○	○	-
		EST1 Input Polarity		○	○	○
		EST2 Input Polarity		○	○	-
		EST1 Filter		○	○	○
		EST2 Filter		○	○	-
		HX, GX Synchronized view		○	○	○
		Trigger Selection		○	○	-
		TRIG1 Input Polarity		○	○	○
		TRIG2 Input Polarity		○	○	-
		TRIG1 Filter		○	○	○
		TRIG2 Filter		○	○	-
		Trigger Delay		-	-	-
		Trigger Edge Detection		-	○	-
		Trigger Output Mode		-	HX-7/7S	-
		Trigger Output Polarity		-	HX-7/7S	-
		ARM Status Output Polarity		○	○	Positive
		FAULT Status Polarity		○	○	-
		ARM Command Input Polarity		○	○	-
		EPO(Exposure Pulse Output)		○	○	Negative
		Warning		○	○	○
		On screen display		○	○	-
		Frame Counter Display		○	○	-
		Image Center Mark		○	○	-
		DATETIME Display during Recording		○	○	-
		OSD Display Mode		○	○	-
		Standards for Frame Relative Time		○	○	-

page	function	Details 1	Details 2	GX	HX	Q
		Auto Black Balance Settings		-	○	-
		HX Monitor Output		-	○	-
		ARM Status Output		-	-	○
		G Trigger		-	-	○
		G Trigger Level		-	-	○
		Recording Priority		-	HX-7S	Q1m/Q1v
4-18	Recording Parameters	ID		○	○	-
		TYPE		○	○	○
		Nickname		○	○	○
		Status		○	○	○
		Segment		○	○	○
		Scene No.		○	○	○
		Frame rate	Preset	○	○	○
			Custom	○	○	-
		Frame size	Preset	○	○	○
			Custom	○	○	-
		Blocks		○	○	-
		Recording Trigger Mode		○	○	-
		Trigger Timing		○	○	○
		Shutter		○	○	○
		Low Light		○	○	○
		Sensor Gain		-	△	-
		AOI		○	○	-
		Image Trigger		○	○	-
		AE		○	○	-
		AE CYCLE		-	-	-
		Gain		○	○	○
		Gamma		○	○	○
		White Balance		○	○	○
		Enhance		○	○	○
		Knee		○	○	○
		Chroma		○	○	○
		Comments		○	○	○
		Recordable Frames		○	○	○
		Custom Trigger Values		○	○	○
		DRES Mode		○	○	-
		Exposure Timing	GX Native	○	○	○
			K4 Compatible	○	○	○
			K3 Compatible	○	○	-
		Pixel Bit Depth		○	○	○
		Black Balance		○	○	○
		Camera Sync		○	○	○
		Exposure Phase		○	○	○
		RGB Matrix		○	○	○
		Luminance Properties	NORMAL	○	○	○
			LINEAR	○	○	○
			CUSTOM	○	○	○
			TABLE	-	○	-
		Variable frame rate		GX-8/8F	○	-
		Flame straddling Recording		GX-8/8F	○	-
		Frame Straddling Display		GX-8/8F	○	-

page	function	Details 1	Details 2	GX	HX	Q
4-23	Playback Parameters	ID		○	○	-
		TYPE		○	○	○
		Nickname		○	○	○
		Status		○	○	○
		Current Frame		○	○	○
		Segment		○	○	○
		Scene No.		○	○	○
		Frame Rate		○	○	○
		Frame Size		○	○	○
		Blocks		○	○	-
		Recording Trigger Mode		○	○	○
		Shutter		○	○	○
		Sensor Gain		-	○	-
		AOI		○	○	-
		Image Trigger		○	○	-
		AE		○	○	-
		AE CYCLE		-	○	-
		Comments		○	○	○
		DRES Mode		○	○	-
		Exposure Timing	GX Native	○	○	○
			K4 Compatible	○	○	○
			K3 Compatible	○	○	-
		Pixel Bit Depth		○	○	○
		Black Balance		○	○	○
		Camera Sync		○	○	○
		Exposure Phase		○	○	○
		Variable frame rate		GX-8/8F	○	-
		Speed ratio		GX-8/8F	○	-
		High Speed Recording Frames		GX-8/8F	○	-
		Frame Straddling Recording		GX-8/8F	○	-
		Frame Straddling Display		GX-8/8F	○	-
4-25	“Playback Parameters (Image Quality)”	ID		○	○	-
		TYPE		○	○	○
		Nickname		○	○	○
		Status		○	○	○
		Current Frame		○	○	○
		Gain		○	○	○
		Gamma		○	○	○
		White Balance		○	○	○
		Enhance		○	○	○
		Knee		○	○	○
		Chroma		○	○	○
		RGB Matrix		○	○	○
		Luminance Properties	NORMAL	○	○	○
			LINEAR	○	○	○
			CUSTOM	○	○	○
			TABLE	-	○	-
4-26	Playback Parameters (Range)	ID		○	○	-
		TYPE		○	○	○
		Nickname		○	○	○

page	function	Details 1	Details 2	GX	HX	Q
		Status		○	○	○
		Trigger Timing		○	○	○
		Trigger Time		○	○	○
		Playback Start, Playback End		○	○	○
		Rec. Start, Rec. End		○	○	○
		Save status		○	○	○
4-27	Connection Configuration Information	during M-Hub use		-	-	-
4-31	Frame Rate, Frame Size			○	○	○
4-32	Custom settings for Frame Rate and Frame Size	Size specification (Center)		○	○	-
		Specify Position, Size		-	○	-
4-34	Pixel Bit Depth			○	○	○
4-35	Shutter			○	○	○
4-36	Black Balance			○	○	○
4-38	Auto Black Balance			-	○	-
4-39	Trigger Input Selection	TRIG1		○	○	○
		TRIG2		○	○	-
		ANY		GX-8/8F	○	-
		BOTH		GX-8/8F	○	-
4-39	Trigger Timing			○	○	○
4-40	Custom trigger			○	○	○
4-41	Exposure Timing		GX Native	○	○	○
			K4 Compatible	○	○	○
			K3 Compatible	○	○	-
4-42	Exposure Phase			○	○	○
4-43	Variable Frame Rate Recording			GX-8/8F	○	-
4-45	AE Control			○	○	-
4-46	AOI	Preset		○	○	-
		Custom		○	○	-
4-49	DRES Mode(Dynamic Range Expansion)	Preset		○	○	-
		Custom		-	○	-
4-51	Image Trigger	Preset		○	○	-
		Custom		-	○	-
4-56	Reset Trigger			GX-8/8F	○	-
4-57	Frame Straddling Recording			GX-8/8F	○	-
4-58	Memory segments	Equal Division		○	○	○
		Custom Partition Segments		-	○	-
		Segment Reservation		-	○	-
		Protect Segment		-	○	-
4-60	Recording Trigger Mode	NORMAL		○	○	○
		NORMAL(A)		○	○	-
		NORMAL(L)		○	○	-
		EVENT		○	○	-
		EVENT(A)		○	○	-
		EVENT(L)		○	○	-
		BURST		○	○	-
		BURST(A)		○	○	-
		BURST(L)		○	○	-
		MULTI(A)		○	○	-

page	function	Details 1	Details 2	GX	HX	Q
		MULTI(L)		○	○	-
		MULTIS(A)		○	○	-
		MULTIS(L)		○	○	-
		MULTI1(A)		-	○	-
		MULTI1(C)		-	○	-
		MULTI2(A)		-	○	-
		MULTI2(C)		-	○	-
		MULTI3(A)		-	○	-
		MULTI3(C)		-	○	-
		Linear Recording		-	○	-
		DUAL Recording		-	○	-
4-65	Auto View			○	○	-
4-66	Low Light			○	○	○
4-68	Camera Luminance		NORMAL	○	○	○
			LINEAR	○	○	○
			CUSTOM	○	○	○
			TABLE	-	○	-
4-69	Zoom/Scroll Cameras			○	○	-
4-70	Rotate Camera Video			GX-8/8F	-	-
4-70	Composite Display			○	○	○
4-74	Display Warnings			○	○	○
4-75	EF Lens Control			-	○	-
4-78	Saving Images	Individual Downloads		○	○	○
		Batch Downloads		○	○	○
		DOWNLOAD REC		-	○	-
		Simultaneous Downloads		○	○	
		HD-mag save		-	HX-1	-
		Saving Images on USB		○	○	-
		Partitioned Saved MCFF		○	-	-
		Auto Download Function		○	○	○
		Automatic Format Conversion Function		○	○	○
		Automatic Camera Control		○	○	○
		Recording Status Display		○	○	○
5-2	Play File Images			○	○	○
5-5	Set T=0			○	○	○
5-10	Set Frame number			○	○	○
5-11	Adjusting the Quality of Camera Image Files	Gain		○	○	○
		White Balance		○	○	○
		Enhance		○	○	○
		Gamma		○	○	○
		Chroma		○	○	○
		Knee		○	○	○
		Low Pass Filter		○	○	○
		Luminance		○	○	○
		Adjust Brightness		○	○	○
		Adjust Input Black Level		○	○	○
		RGB Matrix Correction		○	○	○
		Reset		○	○	○
5-18	Custom White Balance Function			○	○	○

page	function	Details 1	Details 2	GX	HX	Q
5-20	Auto White Balance Function			○	○	○
5-20	Auto Conversion Settings			○	○	○
5-21	File Conversion Settings(FCV File)			○	○	○
5-22	Superimpose Information			○	○	○
5-23	“Superimpose Information on the Item Toolbar” (Basic Mode only)			○	○	○
5-23	Superimpose Image			○	○	○
5-24	Cropping			○	○	○
5-25	Format Conversion			○	○	○
5-30	Frame Rate Conversion			○	○	○
5-31	Waveform Data			○	○	○
Camera Connection settings						
6-4	Sync Settings	Camera Time	Internal camera Time	○	○	○
			GX-HUB Time	○	○	○
			IRIG•M-HUB Time	○	○	○
			Reset Trigger	GX-8/8F	○	-
		Camera Sync	Internal Sync	○	○	○
			EST sync	○	○	○
			A-EST Sync	GX-8/8F	○	-
			1kHz Sync	-	-	○
			Periodic Sync	-	-	○
		ESTVIEW	OFF (Internal Sync)	○	○	○
			ON (EST/A-EST)	○	○	○
6-7	Exposure Timing		GX Native	○	○	○
			K3 Compatible	○	○	-
			K4 Compatible	○	○	○
		Frame Straddling Recording		GX-8/8F	○	-
		Frame Straddling Display		GX-8/8F	○	-
6-9	Camera Frame Time		Trigger Time	○	○	○
			Exposure Time	○	○	○
		Time Stamp ON/OFF		○	Always ON	Always ON
6-10	Display Live Image			○	○	○
6-11	Input/ Output Signals	Default Settings	Factory Settings	○	○	○
		User Settings	User Settings	○	○	○
			Custom Settings	○	○	○
		EPO polarity		○	○	Negative
		FAULT Status Output Polarity		○	○	-
		Trigger Input Selection	TRIG1	○	○	○
			TRIG2	○	○	-
			ANY	GX-8/8F	○	-
			BOTH	GX-8/8F	○	-
		TRIG1 Input Polarity		○	○	○
		TRIG2 Input Polarity		○	○	-
		TRIG1 Filter		○	○	○

page	function	Details 1	Details 2	GX	HX	Q
		TRIG2 Filter		○	○	-
		Match the TRIG2 filter to the TRIG1 filter settings		○	○	-
		Detect Trigger Edge	OFF(Level)	-	○	-
			ON(Edge)	-	○	-
		G Trigger		-	-	○
		G Trigger Level		-	-	○
		Trigger Output Mode		-	HX-7/7S	-
		Trigger Output Polarity		-	HX-7/7S	-
		ARM Status Output Polarity		○	○	Positive
		ARM Command Input Polarity		○	○	-
		EST Input Selection	EST1	○	○	○
			EST2	○	○	-
		EST1 Input Polarity		○	○	○
		EST2 Input Polarity		○	○	-
		EST1Filter		○	○	○
		EST2Filter		○	○	-
		Match the TRIG2 filter to the TRIG1 filter settings		○	○	-
		Register User Settings		○	○	○
		Load user Settings		○	○	○
		G Trigger		-	-	○
		G Trigger Level		-	-	○
6-14	Display HX, GX Video	Video On-Screen Display		○	○	-
		OSD Display Mode		○	○	-
		Frame Counter Display		○	○	-
		Reference for Relative Frame Time		○	○	-
		DATE/ TIME Display for Recording		○	○	-
		Image Center Mark settings		○	○	-
6-16	Warnings	Frame Rate		○	○	-
		IRQ(camera interruption)		○	○	-
		Battery		○	○	-
		RTC Low battery warning		○	○	-
		Black Balance		○	○	-
		When warning, sound is sounded		○	○	○
		When warning, The warning window is opened		○	○	○
6-17	Lens Control			-	○	-
	Setting Options					
7-10	MISC	Recording Priority	Sensitivity	-	HX-7S	Q1m/Q1v
			Image Quality	-	HX-7S	Q1m/Q1v
7-11	Live Image Disp	Live Image		○	○	-
		Live Method		-	○	-
		High Speed/Standard		-	○	-
		HX Monitor Output		-	○	-
		HX FULL Resolution Display		-	○	-
		YC/MCFF				

page	function	Details 1	Details 2	GX	HX	Q
7-19	Auto Processing	Black Balance	Auto Update	-	○	-
		All Camera Auto View		○	○	-
7-25	Qcam Transfer Rate Adjustment			-	-	○