USER'S MANUAL

Digital High Speed

MEMRECAM

GXLink

GXLink
SP-630

nac
Image Technology

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MEMRECAM GXLink
 SP-630 Manual

Sep 2008
Reference Number 800168-0A

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Please Read Carefully Before Using

Safety Precautions

Before using, please read the following precautions. Depending on the device, the following symbols and warnings are shown for items requiring particular safety precautions during handling. For these notations, please read the warnings before beginning operation.

DANGER

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

WARNING

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

CAUTION

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

Operating Precautions

Safety alert symbol

This is the 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.

This mark is also used when there is important information relating to operation. Read the message by this symbol carefully and follow the instructions for safe and appropriate use of this device.

Grounding terminal symbol

This symbol indicates the site of a protective grounding terminal. If not grounded, electrical shock could be received from the metallic and other parts of this device. Due to this danger, please make sure it is grounded. When connecting to an electric outlet using a 3P-2P convertible plug, connect with the outside grounding terminal of the convertible plug grounding wire.

Warning

Power switch must be turn off before connecting or disconnecting cables. If the cables are connected or disconnected leaving the power switch ON, it may cause electrical shock as well as damage on the equipment.

High voltage warning

When replacing fuses, conduct with the power cable unplugged from the electric plug. Do not open the cover. Depending on the device, there may be parts that generate high voltage internally so opening the cover could result in electrical shock.

There may be problems with the conditions and circumstances of use for this device not stated above. As a result, sufficiently understand the general provisions noted in the Operation Manual of this device before using. Also, directly contact the retail outlet as soon as possible if there are any questions about this device.

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Introduction

By using the GXLink (this software), MEMRECAM GX or fx camera can be control via the network, and digital images photographed can be stored on a PC.

This Operation Manual describes the system for operation, including initial settings and applications for using these GXLink features.

Read this document and become familiar with the operation before photographing.

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1
Overview

1.1 Basic Functions

The GXLink can perform the following functions.

■Control the MEMREACM GX or fx camera (preview, record, playback, download)
■Play camera image files (MCFF, CIF), adjust image quality, convert formats (AVI, TIFF, BMP, JPEG)
■Play image files (AVI, TIFF, BMP, JPEG)
■Measure coordinates(camera preview images, camera image files, image files)

Images can be zoomed or scrolled to view.
Simultaneous display is possible, which involves simultaneously displaying images for multiple designated items (cameras or files).
Video playback allows the playback range, playback direction and playback speed to be specified.
This does not control the MEMRECAM ci camera but downloaded images (CIF) can be handled in the same manner as MCFF (MEMRECAM Camera File Format). Also, scenes from data cartridges where ci camera images are saved can be captured in the MCFF format.
If the GX-HUB option is used, synchronized high precision photography can be performed with the GX cameras.
If the M-HUB option is used, synchronized high precision photography can be performed with the fx cameras.

1.2 Overview of Operations

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

```
┌─────────────────┐
│  Start GXLink   │
└─────────────────┘
  Page 3-2
        │
        ▼
┌─────────────────┐
│Register and select│
│     camera      │
└─────────────────┘
  Page 3-4
        │
        ▼
┌─────────────────┐                    Display
│ Set photographic │         ┌──────────────────────┐
│   parameters    │         │   ┌──────────────┐    │
└─────────────────┘         │   │   Playback   │    │
  Page 3-32                 │   │(verify image)│    │          ┌──────────────┐
                            │   │Same image as in the│──────────▶│   Download   │
┌─────────────────┐         │   │  camera VF   │    │          └──────────────┘
│   Recording     │────────▶│   └──────────────┘    │            Page 3-54
└─────────────────┘         │     Page 3-30         │
  Page 3-27                 │   ┌──────────────┐    │
                            │   │Display MCFF image│◀──│
┌─────────────────┐         │   │    MCFF      │    │
│Adjust playback  │────────▶│   └──────────────┘    │
│ image quality   │         │     Page 3-66         │
└─────────────────┘         │   ┌──────────────┐    │          ┌──────────────┐
  Page 3-68                 │   │Display file image│         │Convert format│
                            │   │AVI, BMP, TIFF, JPEG│◀───────│              │
┌─────────────────┐         │   └──────────────┐    │          └──────────────┘
│     Zoom        │────────▶│     Page 3-66         │            Page 3-84
│    Scroll       │         │                      │
└─────────────────┘         │                      │
  Page 3-99                 │                      │
┌─────────────────┐         │                      │
│    Measure      │────────▶│                      │
│  coordinates    │         └──────────────────────┘
└─────────────────┘                  │
  Page 3-101                         ▼
                            ┌──────────────┐
                            │     End      │
                            └──────────────┘
```

File image

MCFF

AVI
- - - - - -
BMP
- - - - - -
JPEG
- - - - - -
TIFF

Coordinates file

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 carries out the storage format for the MEMRECAM ci recorded image.

With the GXLink, 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).

A MCFF is a single scene image file recorded on a MEMRECAM GX/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 photographic information at the time of recording.

With the GXLink, 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 but GXLink does not use codec, and can save and playback AVI files with the Motion JPEG method.

Additionally, GXLink can conduct AVI file storage/playback using compression/extension codec registered in Windows.

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

With the GXLink, images for the designated frame range for the camera image file (MCFF, CIF) can be converted to standard still image files in a TIFF, BMP, JPEG format for each frame and saved, and the image information or photographic information when recorded 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 GXLink loads the converted and saved still image file and the scene information file for playback as a video.

5. Scene Information Files (TXT)

With the GXLink, 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. The GXLink 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 the GXLink, 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.

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

7. Parameter Settings Files（PRM）

With the GXLink, 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 the GXLink, 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 3–87 for details.

9. Waveform Data Files（NWF）

Use the GXLink Waveform Input Software option to input analog data（waveform data）during recording and save the waveform data to the file（NWF）. GXLink 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.

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Installation

2.1 Installation Procedures

An authorized user of the Windows Administrators group should log on.
Insert the included CD into the CD-ROM drive when other applications are not running.
The MEMRECAM GXLink installation will start automatically.

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

■ Perform installation to connect the Gbit (1000BASE-T) K5, RX-6G and RX-5G camera by installing the iSCSI Initiator and setting the PC network by referencing the supplemental camera manual "Gbit Connectivity".
The "Gbit Connectivity" refers to the use of the fxLink as the camera control software, but the GXLink should be installed instead of the fxLink.

■ For a TCP/IP MEMRECAM connection, "TCP/IP network optimization" is performed when the GXLink is installed. Please install to a PC connected to a LAN (Ethernet HUB) or a MEMRECAM that is turned on. During the GXLink installation, if the PC is not connected to a LAN or a MEMRECAM, you will be required to perform "TCP/IP network optimization" again when the MEMRECAM is connected. Click on "TCP/IP network optimization" in the Windows start menu and restart the PC after setting.

■ Install GXLink Application
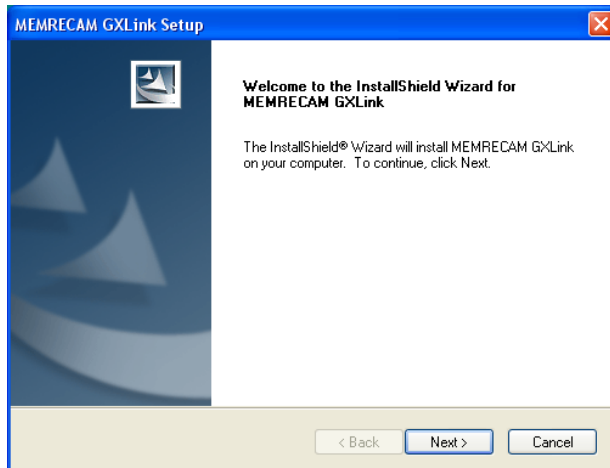
Upon starting the installation, "Welcome to the InstallShield Wizard for MEMRECAM GXLink" will be displayed. Click "Next" to start the installation.

(The screen shows Windows XP)
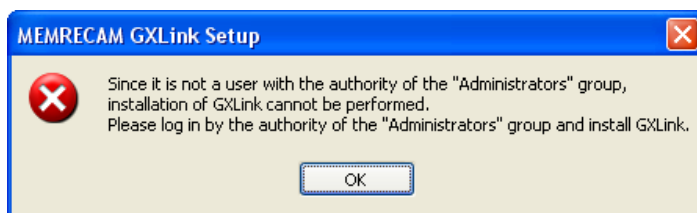
When a user who is not an authorized administrator logs on to start installation, the message shown to the left is displayed. An authorized administrator must log on and perform the GXLink installation.
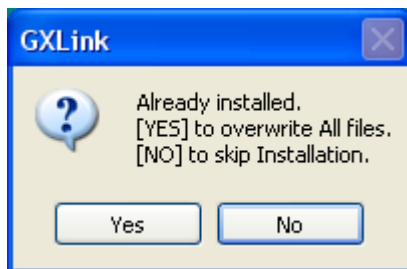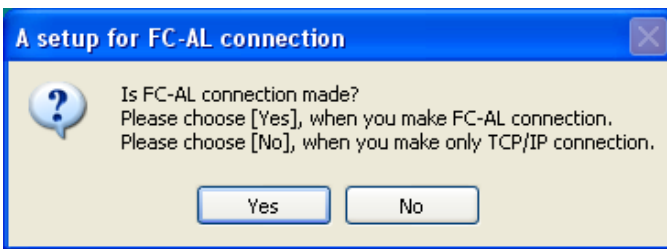

If the same version or another version of GXLink has already been installed, a warning regarding overwriting the installation is shown. We recommend uninstalling the previously installed GXLink before installation.
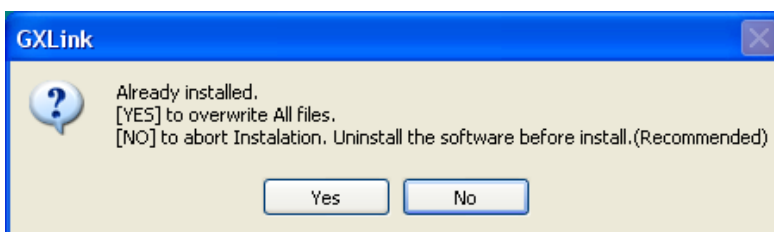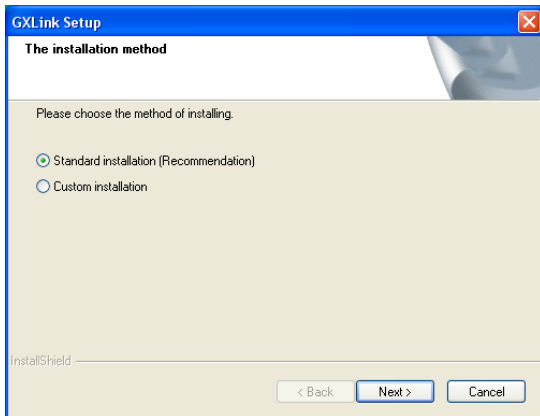
Select standard installation and click "Next".
The optimal components are installed with standard installation.

Click "Yes" if the FC-AL is connected using an fx camera.

If using only TCP/IP, click "No".

At this point, "TCP/IP network optimization" is conducted with TCP/IP or Gbit connections, so perform the following operations after connecting the PC to the LAN HUB or MEMRECAM. If the following operations are conducted when the PC is not connected to the LAN or MEMRECAM, there will be message requiring "TCP/IP network optimization" when the MEMRECAM is connected. Perform "TCP/IP network optimization" at that point and restart the PC.
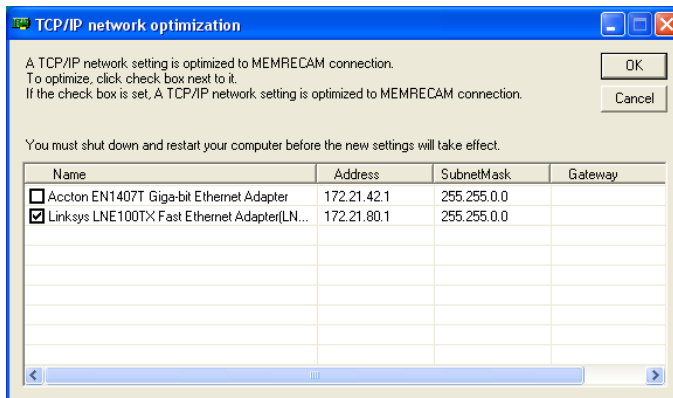
If using a GX camera or a fx camera TCP/IP(Fast Ethernet or 1000BASE-T) connection, check the network used and click OK.

If using only the fx camera FC-AL, click Cancel.
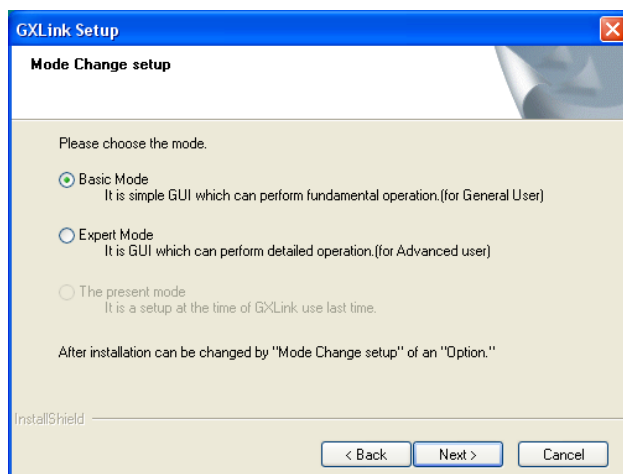
Select the mode for GXLink operation.
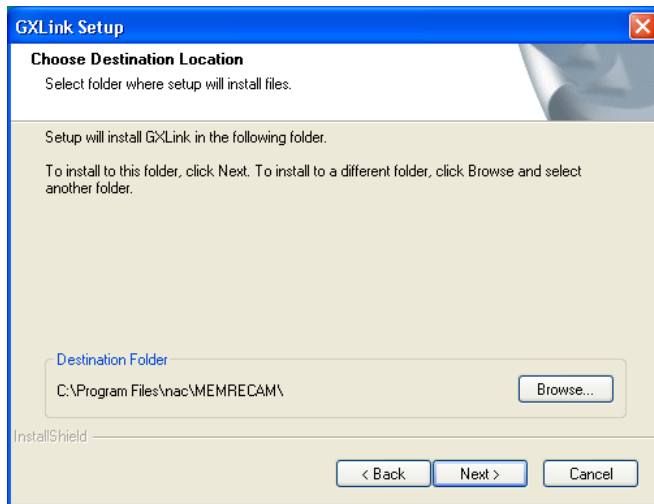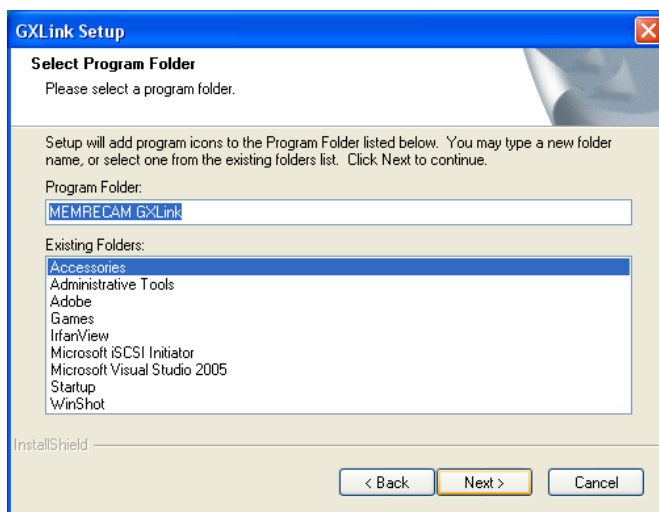Basic Mode
      Simple GUI for basic operation.
Expert Mode
      GUI for detailed settings.
The present mode
      This item cannot be selected when
   the GXLink is first installed.

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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".

Designate the name of the program folder and click "Next".

※ Designating a default program folder has already been described in this manual. If designating a different folder, change the menu display for the startup method to the designated setting.
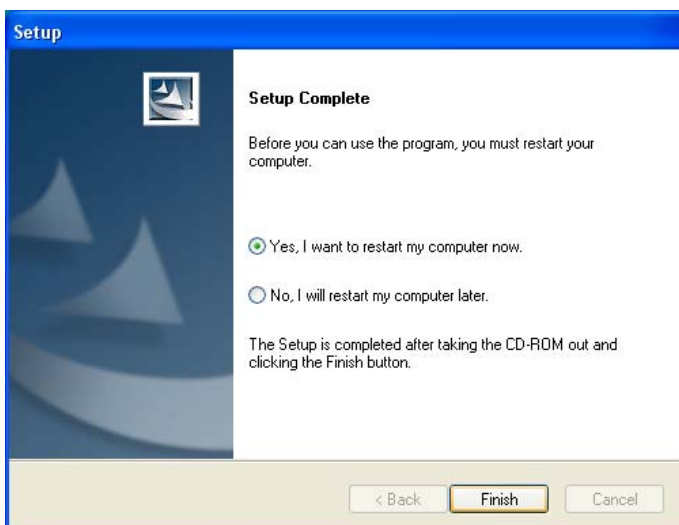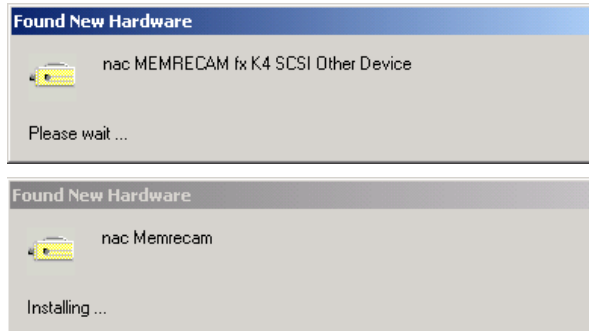

Click "Finish" when the dialog for setup complete is displayed.

The computer must be restarted before using the program.

2.2 Verify Hardware

If Windows detects a new camera when the fx camera has a FC-AL connection with Windows 2000/XP, "Welcome to the Found New Hardware Wizard" is displayed to install a driver.
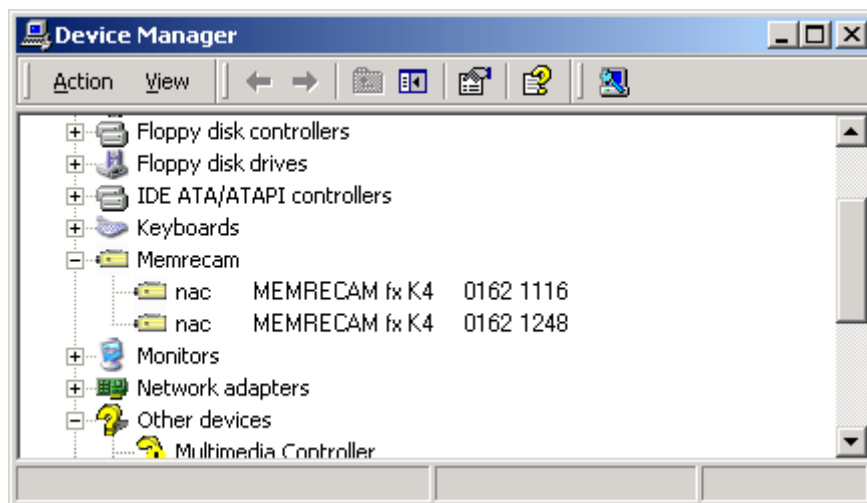
○ Windows2000

If there are two or more new cameras connected, all of the cameras should be verified.

After verifying all of the cameras, use the Device Manager to verify that the cameras are connected. The following screen shows two K3 with the PC (OS).

        fx-K3 (firmware ver1.62, CID 1116)

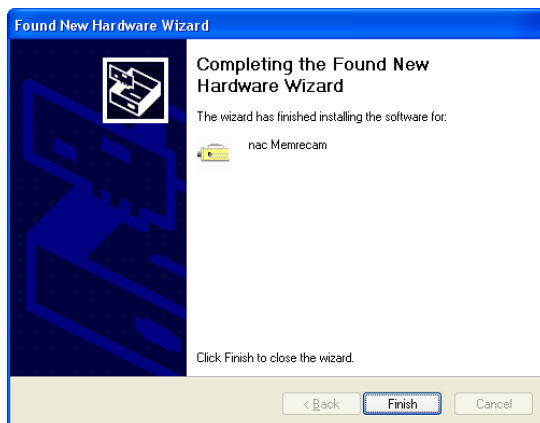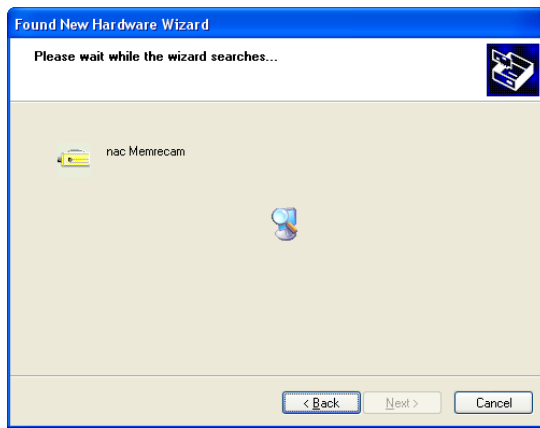   fx-K3 (firmware ver1.62, CID 1248)

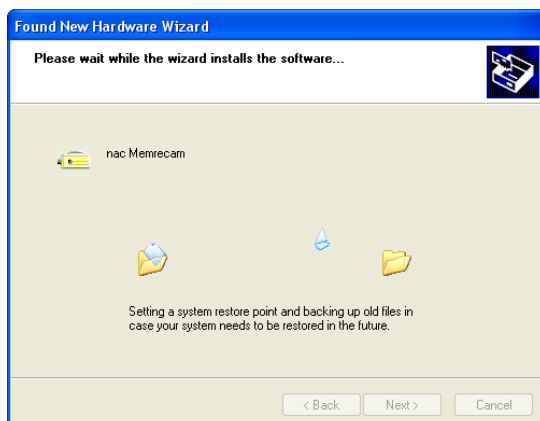   CID is a number to identify the camera (DRP) individual.

○ Windows XP

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

Once installation is complete,
"Completing the Found New Hardware Wizard" will be displayed.
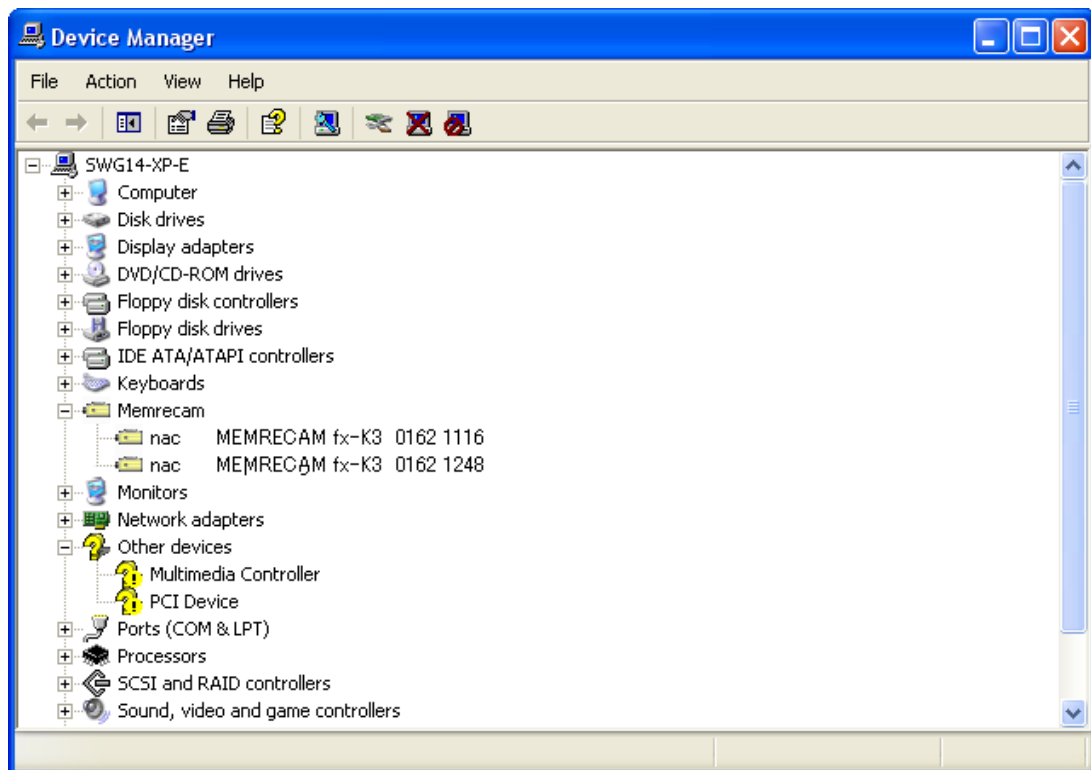Click "Finish" to close the window.

If there are two or more new cameras connected, all of the cameras should be verified.

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)

(00168)

2.3 Uninstall Procedures

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

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

Close other applications, open the "Control Panel" and double click on "Add/Remove Programs"
("Add or Remove Programs And Windows Components" on Windows XP).

○ Windows 2000
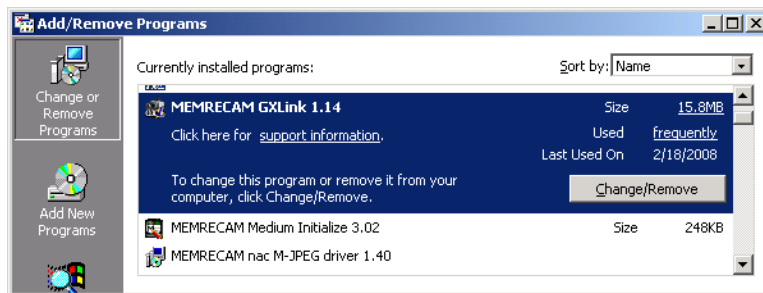
Select "MEMRECAM GXLink"
from the list of currently installed
programs and click
"Change/Remove" to display the
"Uninstall GXLink" dialog box.

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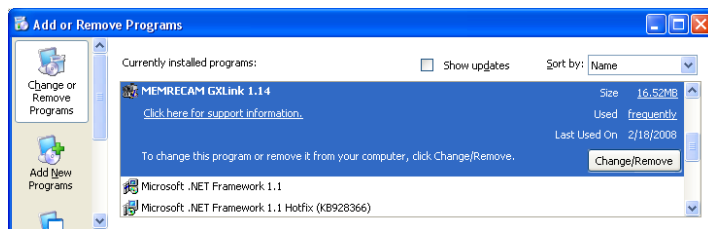
Select MEMRECAM GXLink from
the list of currently installed
programs and click
"Change/Remove" to display the
"Uninstall GXLink" dialog box.

Click "Yes" to uninstall.
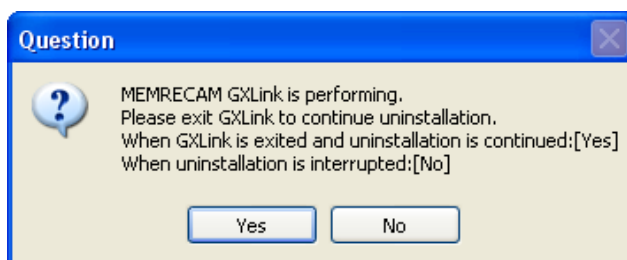
The GXLink cannot be uninstalled if
running.
The dialog shown to the left will be shown if
the GXLink is running, so follow the
instructions to proceed.

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3

Operation

3.1 Start

To start GXLink, double click on the GXLink icon on the desktop.

Double click
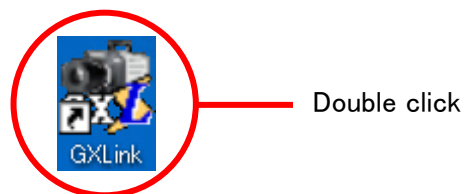
Or, start by clicking　start → All Programs → MEMRECAM GXLink → GXLink.
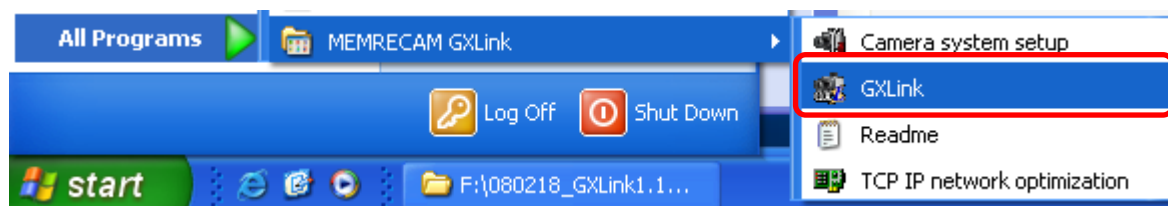
The GXLink GUI offers a basic mode and a more detailed expert mode.

Item Toolbar

Image Monitor

Main Toolbar

Status Bar

[Start screen：Basic Mode]

Item Toolbar

Image Monitor

Main Toolbar

Camera Parameter Toolbar
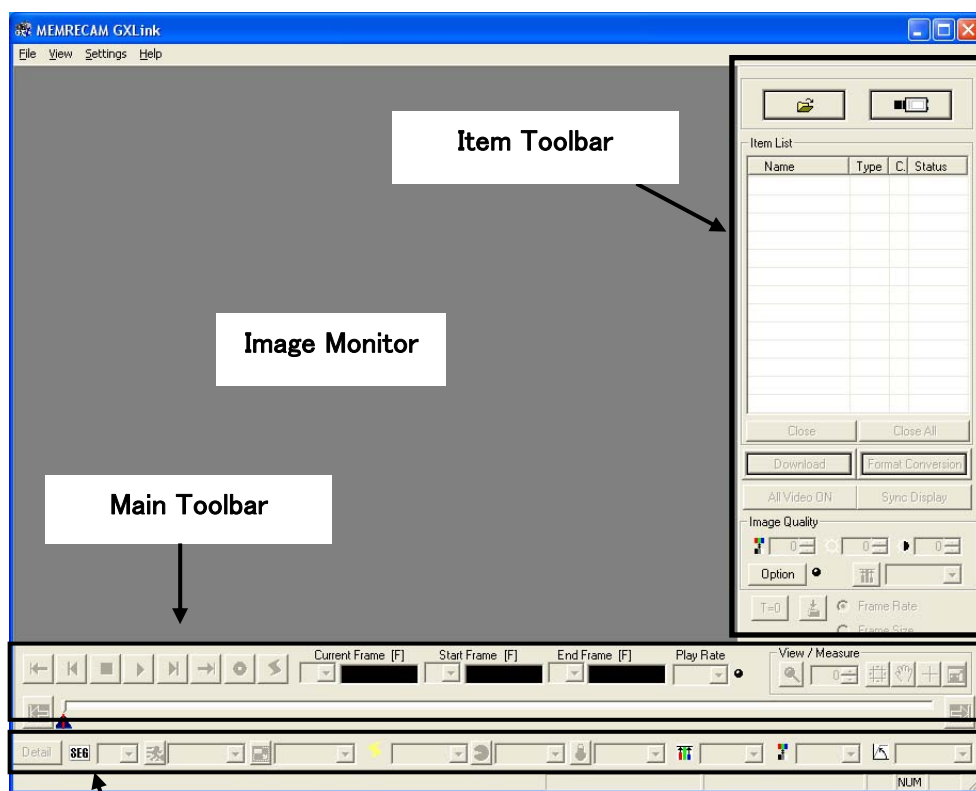
Status Bar

[Start screen：Expert Mode]

Switch to and from the Basic Mode and the Expert Mode using "Option" on the "Settings" menu.
Refer to page 3-100 for details.

3.2 Camera Registration

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

If a camera is not registered, the camera nickname becomes the camera type and the CID. 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.

Click "Camera Registration" from the Settings menu.

The camera registration dialog box will be displayed.

Input the Nickname, IP Address, Camera Type and CID on the Camera Registration screen and click "Add". The IP address cannot be set for the GX cameras.

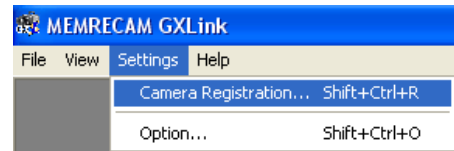The nickname input will be shown on the list on the Camera Registration screen.

Click "OK" to complete the registration.

Use the Add, Delete and Change on the Camera Registration screen for new camera registrations, and delete or change cameras registered.
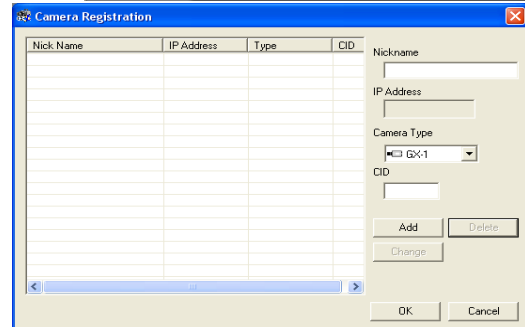
Verification of the IP Address, MODEL, CID for the GX camera (DRP) can be made with INFO on the SYS MENU shown on the JPAD3 (remote control) or the start screen.
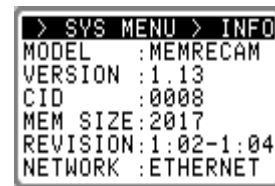
Verification of the fx series can be made with INFORMATION on the SYSTEM MENU shown on the camera menu.

JPAD3 INFO
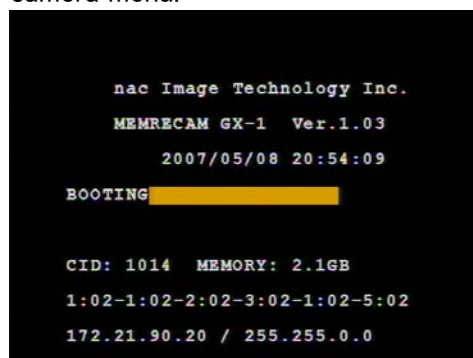
GX Series Start Screen   fx Series INFORMATION
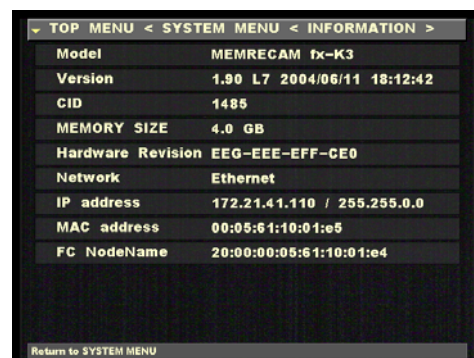
*A nickname can be set for each camera (DRP).

*The CID is a number identifying an individual MEMRECAM GX/fx camera (DRP).

*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).

* Please refer to page 6-2 for the method of changing the GX camera IP address settings.

3.3 Camera Connections

Caution

・When connecting the fx camera, confirm that the connections between the camera-PC "100B-T (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.

While the GX camera connections are set at TCP/IP, select the tabs "Option" and "Connect Type" on the "Settings" menu for the initial camera connection method for connecting fx cameras.
Select "TCP/IP Connection" if 100B-T (Ethernet), "FC-AL Connection" if FCAL (fiber channel) or "Gbit Connection" if Gbit (1000BASE-T).
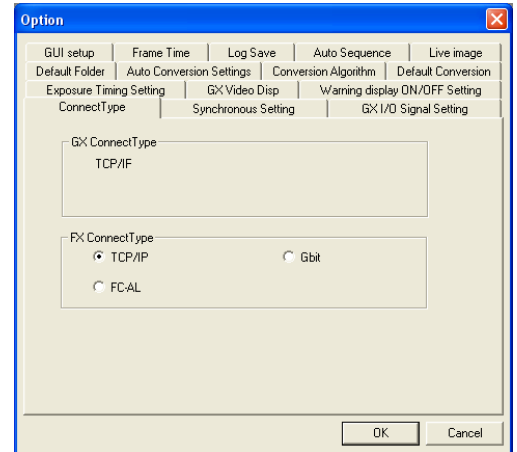
Click "Attach the camera" on the Item Toolbar to begin connections with the camera.

The "Attach the camera" dialog box will be displayed, and the GX camera connected to the PC and the FX camera registered will be displayed.

When there is only one camera registered and communication has been established with that registered camera, the "Attach the camera" dialog box will not be displayed, but the following page will be displayed.

Cameras that can be connected are sorted for display. Check the box on the left side of the list.

For "fx camera not connected to a PC" or "fx/GX 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.
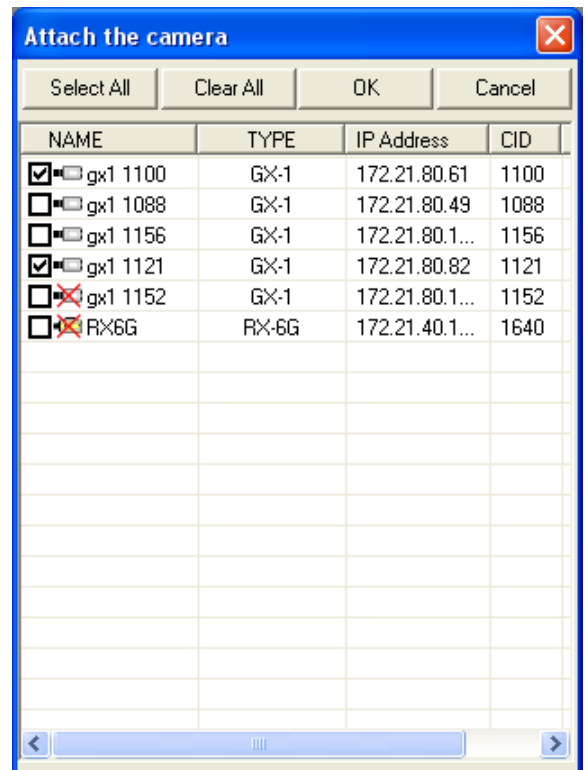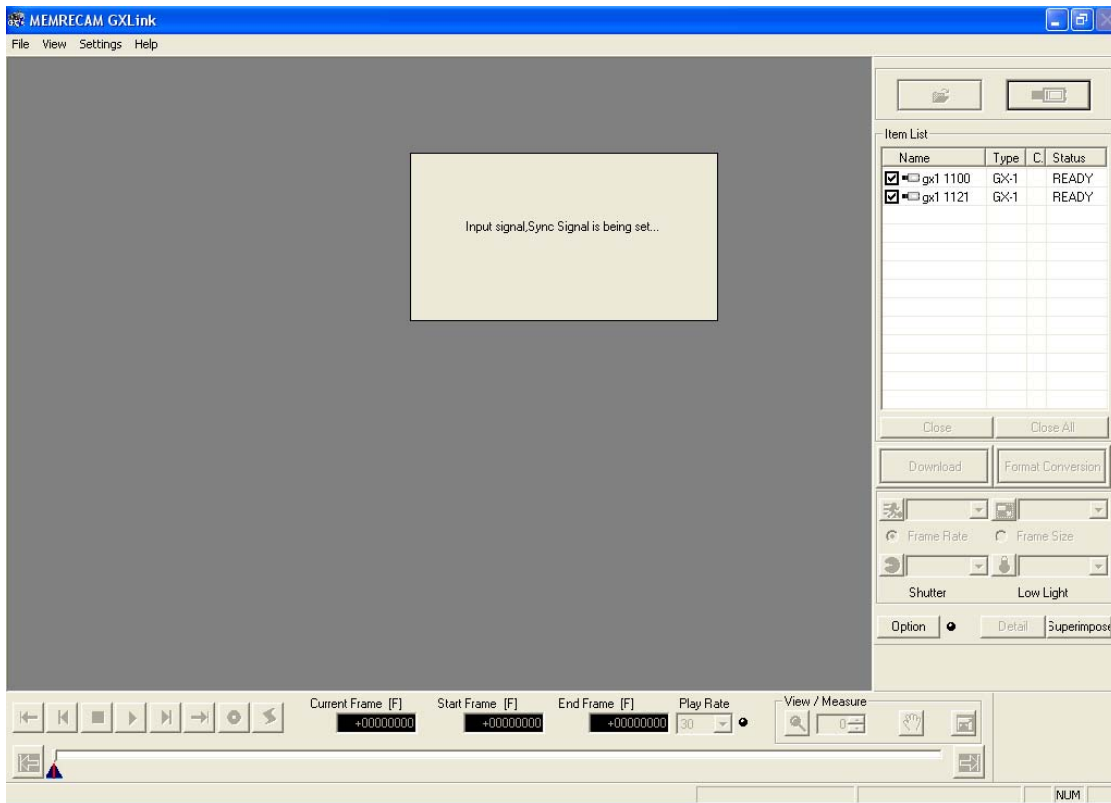
Once "Attach the camera" is started, the specified camera is added to the Item List, and the camera nickname (Name), camera type, camera head number (CAMERA) and camera status are displayed.

The status display for the Item List is updated each time the camera status is changed, and the camera status is displayed.
Once the camera connections are completed, the camera live images are displayed on the monitor.
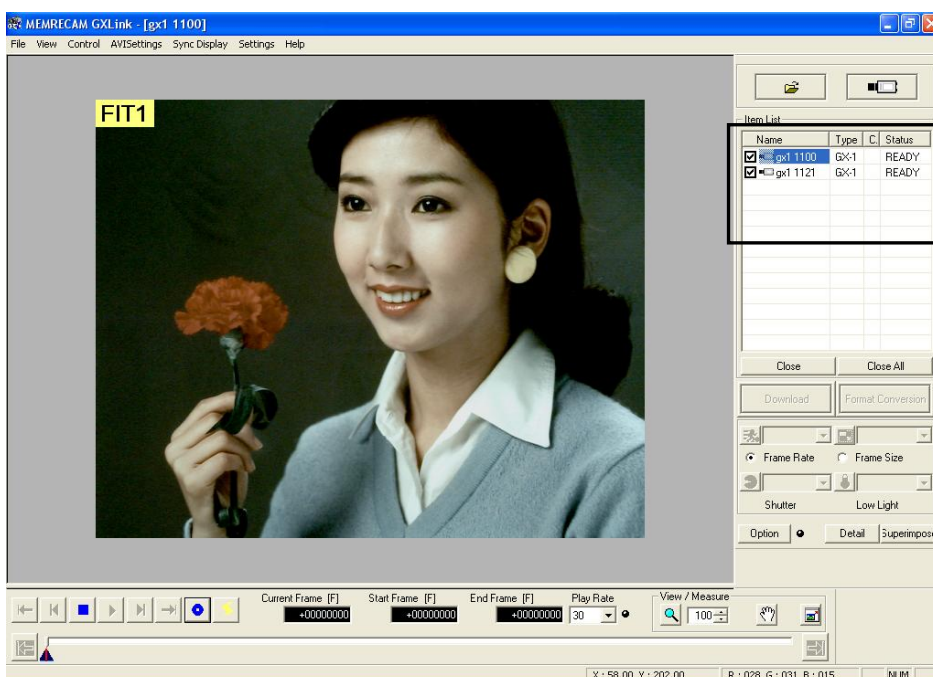
The connected cameras are added to the item list.

3.4 Menus

■File Menu

The items on the file menu vary according to the item selected (camera, file) from the Item List.

File menu
(when camera item (GX) selected)

File menu
(when file item (MCFF) selected)

・Open File...   Opens the image file (MCFF, CIF, AVI, TIFF, BMP, JPEG) and adds the file item to the Item List.

・Open Camera...   Connects with camera and adds the camera item to the Item List.

・Open Data Cartridge...   Opens the ci camera data cartridge and captures the specified scene image as the camera image file (MCFF), and opens the file. Adds the file item to the Item List.

・Open Other...   Opens the waveform data file (NWF).

・SnapShot...   Saves the currently displayed live image or file image in BMP format.

・Close   Disconnects camera during camera image display and deletes all of the camera items from the Item List.
                               Closes the image files for the file images (MCFF, AVI, TIFF, BMP, JPEG) displayed and deletes that item from the Item List.

・Close All   Deletes all of the items on the Item List from the Item List.
                               If a camera is connected at this point, it is disconnected.

・Property   Displays item property information.

Property	Property	Property
Title:gx1 1100 Type:GX-1 FilePath: DisplayImageSize:600x480 Frame_Rate: 1000 Frame_Size: 1280x1024 NciaVersion:0.9.6.0 Version:1.16 BuildDate:080215155322 ID: 0 CID: 1100 MemorySize:2.1 GB HardwareREV.:1:02-1:06-2:04-3:04-4:05-5:06 ElapsedTime: 29h31m FrameTime: TRIGGER TriggerSelect: CENTER TriggerValue: 0 Trigger Filter: 200.0 us RecTriggerTime: 08/02/19 10:36:02.106201 Scene_No.: 3 Comment: EventFrameList: RecBeginFrame: 1: -645 RecEndFrame: 1: 645 PlayBeginFrame: 1: -645 PlayEndFrame: 1: 645	Title:gx1 1100.mcf Type:GX-1 FilePath:C:\Program Files\nac\MEMRECAM\gxl DisplayImageSize:1280x1024 Frame_Rate: 1000 Frame_Size: 1280x1024 Type: GX-1 Version: 1.16 ID: 0 CID: 1100 MCFF_Version: 10001 MCFF_Length: 2120525568 Bytes Media_Type: NET TriggerSelect: CENTER TriggerValue: 0 Trigger Filter: 200.0us TopFrame: -645 BottomFrame: 645 Frames: 1291 Rec_Time: 08/02/19 10:36:02.106201 Scene_No.: 3 Comment: RecBeginFrame: -645 RecEndFrame: 645 EventFrameList: EventTimeList:	Title:gx1 1100.avi Type:GX-1 FilePath:C:\Program Files\nac\MEMRECAM\gxl DisplayImageSize:1280x1024 FrameRate:1000 Frame_Rate: 1000 Frame_Size: 1280x1024 Type: GX-1 Version: 1.16 ID: 0 CID: 1100 MCFF_Version: 10001 MCFF_Length: 2120525568 Bytes Media_Type: NET TriggerSelect: CENTER TriggerValue: 0 Trigger Filter: 200.0us TopFrame: -645 BottomFrame: 645 Frames: 1291 Rec_Time: 08/02/19 10:36:02.106201 Scene_No.: 3 Comment: RecBeginFrame: -645 RecEndFrame: 645
OK	OK	OK
Camera Properties	MCFF Properties	AVI Properties
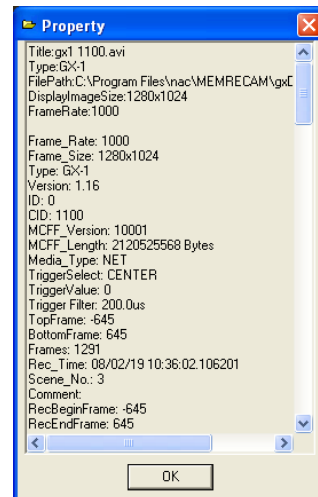
・Exit GXLink   Ends the GXLink application.

〇Camera Items

・Download...   Downloads the image data from the camera and creates a camera image file (MCFF).

・Auto Download...   After recording ends, downloads the camera image file (MCFF). Refer to page 3-91 for details.

・USB Save...   Saves the image data to the USB media connected to the camera and creates a camera image file (MCFF)

・Load Recording Setting from file...
                              Reads settings such as camera photographic conditions from the parameter file (prm) and sets the camera selected on the Item List.

・Save Recording Setting to file...
                              Saves settings such as the current photographic settings for the camera selected in the Item List on the parameter file (prm).

〇File Items (MCFF)

・Convert Image Format...   Converts and saves the camera image file (MCFF/CIF) with the current image quality settings to a specific image file format.

■View Menu

The items on the view menu vary according to the item selected (camera, file) from the Item List.

View menu	View menu	View menu
(for camera item (GX) selection)	(for camera item (fx) selection)	(for file item selection)

・Main Toolbar — Main Toolbar display/ do not display switch.

・Camera Parameter Toolbar — Camera Parameter Toolbar display/ do not display switch.

・Item Toolbar — Item Toolbar display/ do not display switch.

・Status Bar — Status Bar display/ do not display switch.

・Rotate Image — Rotates the camera, MCFF, CIF image.
Refer to page 3-69 for details.

・Reverse Image — Reverses the camera, MCFF, CIF image.
Refer to page 3-70 for details.

・Zoom In / Zoom Out — Displays the enlarged/reduced image.

・Actual size — Displays the actual size of the image.

・Zoom Tool — Zoom Tool ON/OFF switch.
Displays the desired magnification of the image. Refer to page 3-86 for details.

・Full screen — Automatically adjusts the magnification so the image fills the entire screen.

・Frame Counter Display — Frame counter display switch. Display types include the frame display and the relative time (unit: seconds) from the trigger frame time. During EST recording, the relative time is not accurate. Additionally, errors in the relative time display may occur when the time stamp is ON.

・Event Mark Display	Event Mark Display ON/OFF switch.
・IRIG LOCK, EVENT2 DISPLAY	
	Switches the GX camera IRIG lock and event 2 display ON/OFF.
・Warning Display	Warning window display / do not display switch. The warning window displays a list of warnings generated during camera use and file operation.
・Hand Tool	Hand Tool ON/OFF switch. Scrolls the image.
・Measurement	Starts / stops measurements. Refer to page 3-87 for details.

○Camera Items

・Live Image Resolution...	Sets the reduction of the fx camera live image. With live image reduction (1/2, 1/4), the live image resolution drops but the time for updating the image display decreases.
・Live Time Display	Switches the GX camera frame absolute time and current time display ON/OFF.
・Zoom Magnification Display	Switches the GX camera zoom setting value display ON/OFF.
・All Video ON	Switches the video output for all cameras ON/OFF.
・Display Composite Image On/Off	
	Display / do not display the composite display of the live image and file image. Refer to page 3-95 for details.
・Select Composite File...	Select the live image and the composite display file. Refer to page 3-95 for details.
・Select Fit Direction	Sets the position of the live image and the composite display file image. Refer to page 3-95 for details.
・Reticule	Displays horizontal and vertical lines in red and confirms the center of the image.
・Low Light View Angle Display	
	Designates the color of the frames in Low Light mode. Refer to page 3-40 for details.
・Control	Opens the Control window to set the camera parameters selected in the Item List. Refer to page 3-29 for details.
・I.I.Toolbar	Controls the RX-6 I.I. camera and verifies information. I.I. toolbar display / do not display switch. Refer to the MEMRECAM fx RX-6 I.I. camera user's manual for I.I. toolbar details.

■Control Menu

If there are no items on the Item List, the control menu is not displayed.
The items on the control menu vary according to the item selected.
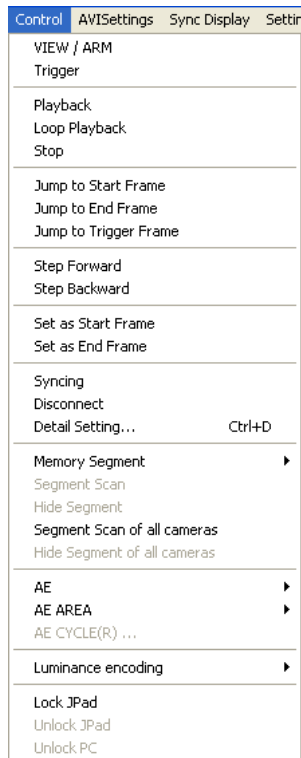
Control menu
(camera item selection)

Control menu
(file item selection)

○Camera Item
・Camera Control

VIEW / ARM / Trigger / Playback / Loop Playback / Stop / Jump to Start Frame / Jump to End Frame / Jump to Trigger Frame / Step Forward / Step Backward / Set as Start Frame / Set as End Frame

・Syncing

Synchronizes camera time when the fx camera has an M-HUB connection.
Used with an IRIG connection or after the synchronization settings fail during a camera connection.
Refer to page 3-102 for details of the camera time.
Refer to page 4-3 for details on synchronization setting failures.

・Disconnect   Disconnects communication with all cameras.

・Detail Setting…

Displays the Detailed Settings dialog box with single camera control.
Refer to page 3-39 for details.
Opens "The list of camera setup" window with multiple camera control.
Refer to page 3-29 for details.

・Memory Segment Operation

Memory Segment / Segment Scan / Hide Segment / Segment Scan of all cameras / Hide Segment of all cameras Refer to page 3-40 for details.

・Automatic Exposure Control (AEC)

AE / AE AREA / AE CYCLE

Refer to page 3-43 for details.

・Luminance encoding

NORMAL / LINEAR

Input/output properties for image data display.

Select NORMAL to use gain, gamma and knee.

Select LINEAR to ignore gain, gamma and knee settings, and convert the data to linear display.

・Lock JPad

Prevents camera operation from the JPAD3.

・Unlock JPad

Allows camera operation from the JPAD3.

・Unlock PC

Allows camera operation from the PC. PC LOCK is set with LOCK on the JPAD3 menu (SYS MENU).

○ File Items

・Playback Control of Image Files

Playback / Loop Playback / Stop / Jump to Start Frame / Jump to End Frame / Jump to Trigger Frame / Step Forward / Step Backward / Set as Start Frame / Set as End Frame

・T=0 Frame Settings for Image Files

T=0 Setting... / T=0 Reset...

Refer to page 3-79 for details.

■Image Quality Menu
    When the selected item is MCFF / CIF file, the image quality menu is shown.

ImageQuality	AVISettings	Sync Display	Settings
Gain			▶
White Balance			▶
Enhance			▶
Gamma			▶
Chroma			▶
Knee			▶
Low Pass Filter			▶
Luminance encoding			▶
White Balance Display/Settings			
Adjust Brightness/Contrast...			
Input Black Level...			
RGB Matrix Correction			▶
Reset			
Load Settings of Format Conversion...			
Save Image Settings of Format Conversion...			
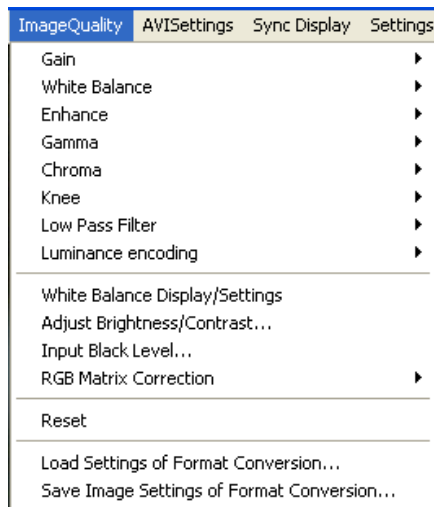
・Gain / White Balance / Enhance / Gamma / Chroma / Knee / Low Pass Filter / Luminance encoding
    Select MCFF image quality settings.

・White Balance Display/Settings
    Displays the white balance window.
    Displays current RGB Gain in the white balance window, and allows changes in the settings.

・Adjust Brightness/Contrast...
    Shows a bar graph of the luminance of the image to adjust the contrast and brightness of the image.

・Input Black Level...
    Shows a bar graph of the luminance of the image to adjust the input data black level.

・RGB Matrix Correction
    Corrects the image data RGB matrix.

・Reset
    Makes the image quality adjustment performed with GXLink invalid and sets the image quality saved on the MCFF file.

Refer to page 3-59 for details.

■AVI Settings Menu

When the selected item is MCFF / CIF file, the AVI settings menu is shown.
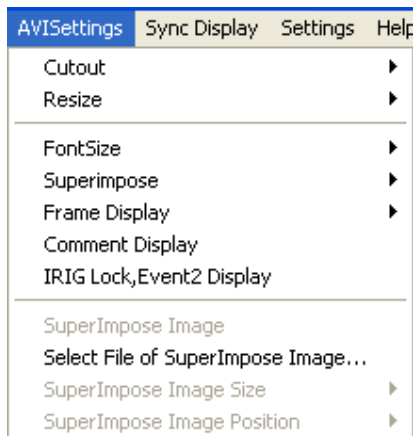
・Cutout
Select to cut the image to 640×480.

・Resize
Select to reduce the image cut by ½.

・FontSize
Select the font size for the superimposed information.
(Small, Middle, Large)

・Superimpose
Select to superimpose information on the converted image. (None, Frame no. , All)

・Frame Display
Select the style for the superimposed frame information.
(Frame Number, Relative Time, Absolute Time)

・Comment Display
Select the recording comments superimposed on the converted image.

・IRIG Lock,Event2 Display
Switches the IRIG lock for the GX camera and the event 2 display ON/OFF.

・ Superimpose Image / Select File of Superimposed Image… / Superimpose Image Size / Superimpose Image Position
Specifies the desired image file superimposed.

Refer to page 3-66 for details.

■Sync Display Menu

If there are no items in the item list, the Sync Display menu is not shown.
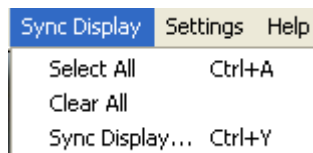
・Select All   Specifies all items in the item list for synchronized display.
・Clear All   Deletes all items in the item list for synchronized display.
・Sync Display…   Switches to synchronized display / selection item display.

Refer to page 3-77 for details.

■Settings Menu

・Camera Registration   Camera Registration is required for fx camera connection.
Refer to page 3-4 for details.

・Option...   Sets various GXLink settings. Refer to page 3-96 for details.

(1)Default Folder   Default folder settings

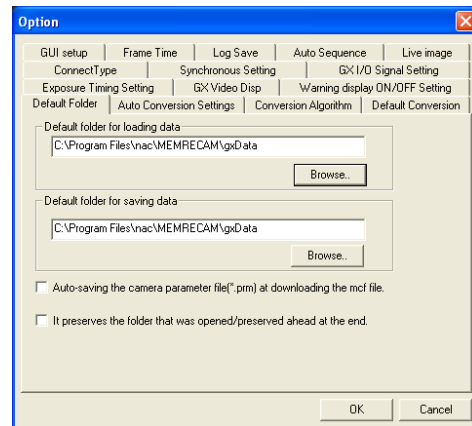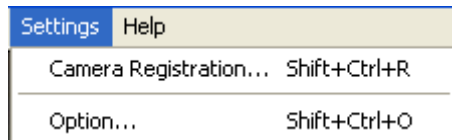(2)Auto Conversion Settings   Automatically applies image quality settings and parameters for conversion settings

(3)Conversion Settings   Format conversion algorithm settings

(4)Default Conversion   Sets file type and compression during format conversion

(5)GUI Setup   Switches to/from Basic Mode and Expert Mode
Switches to/from individual conversion and batch conversion (List)

(6)Frame Time   Frame absolute time display settings

(7)Log Save   Camera communication log save time settings

(8)ConnectType   Selects connection method for fx cameras (TCP/IP, FC-AL, Gbit)

(9) Synchronous Setting   Settings enabling use of IRIG and EST signals

(10)GX I/O Signal Setting   Settings related to the GX camera input/output signals

(11)Exposure Timing Setting   Settings to coordinate exposure times with other models

(12)GX Video Disp   Sets items shown on the GX camera video display

(13)Warning Display ON/OFF Setting
     Turns ON/OFF warnings for frame rate, IRQ, remaining battery, RTC low battery

(14)Auto Sequence   Sets camera automatic control

(15)Live image   Selects camera live image

 Caution
Of the option settings listed above, set (3) (6) (9) (10) and (11) before connecting cameras and opening MCFF files.
Even if settings are changed with the camera/file open, they won't be applied until the next camera / file is opened.

■Help menu

・About GXLink   Display GXLink Application version information

3.5 Toolbar

■Item Toolbar(Basic Mode/Expert Mode)
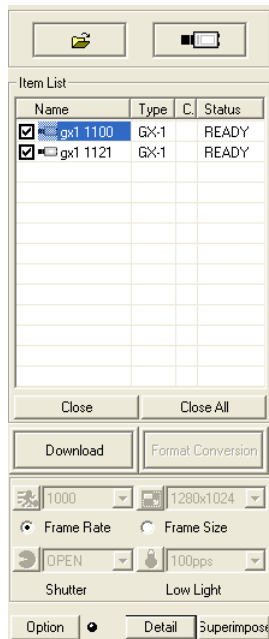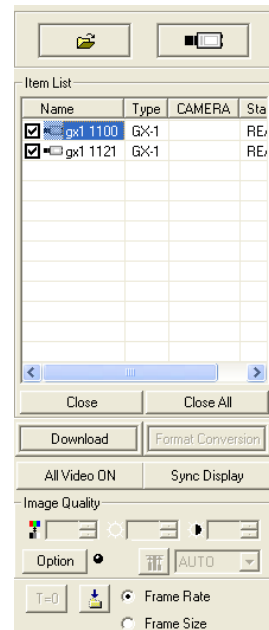
[Item Toolbar:Basic Mode]   [Item Toolbar:Expert Mode]

Add Items

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

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

Item List

Displays items (camera connections, image files open).

☐ ☑   Sync Display check box

            Item mark

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

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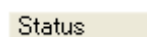
Status   Camera status

Close   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.

Close All   Closes all items and deletes them from the item list.
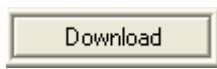
Download

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

Format Conversion

・Converts format of camera image file
Converts and saves MCFF files in AVI/BMP/TIFF/JPEG format.
If MCFF is designated as the format for conversion, the time is cut out and then saved.

All Video ON

・All Video ON
Turns ON/OFF all of the camera video output.
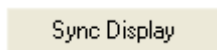
Sync Display

・Sync Display
Synchronizes display for items where the synchronized display setting box is checked. Click Sync Display to execute/delete the synchronized display.
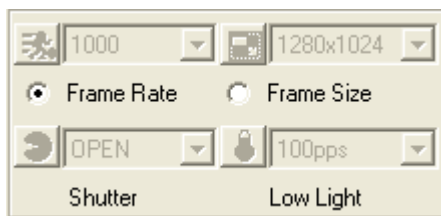
・Camera Control (Basic Mode)
Sets Frame Rate・Frame Size・Shutter Speed (Shutter)・Low Light.
Sets the priority for either frame rate or frame size. For example, if frame rate is selected, the frame rate can be freely selected but the frame size is limited to values within the frame rate conditions.

・Image Quality (Expert Mode)
Sets Chroma・Brightness・Contrast・White Balance. Also, the light to the right of "Option" indicates "Auto Conversion Settings" is applied.

Detail

・Detailed Camera Settings (Basic Mode)
Displays the "Detailed Settings" dialog box for single camera control.
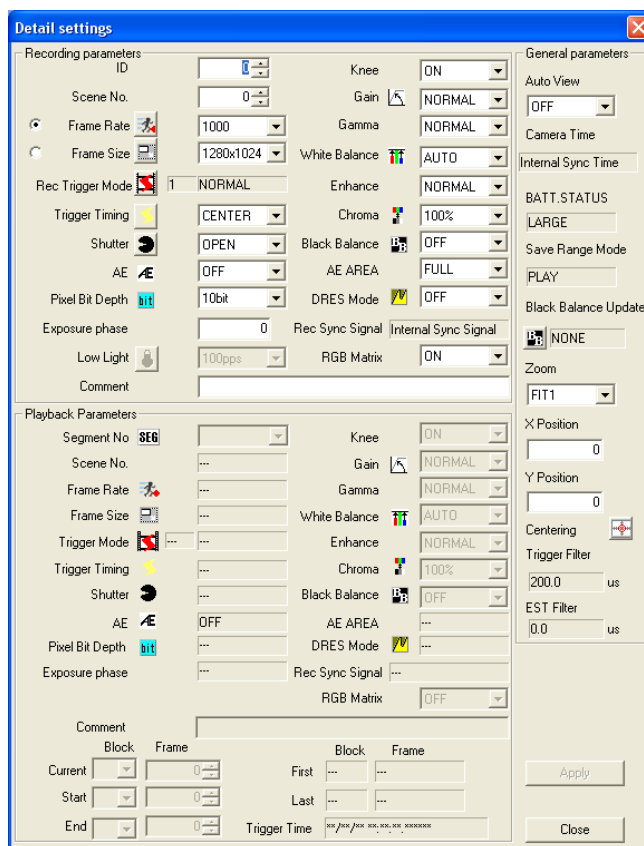
Detailed Settings

Open the "List of Camera Setup" window for multiple camera control.
Refer to page 3-29 for details.
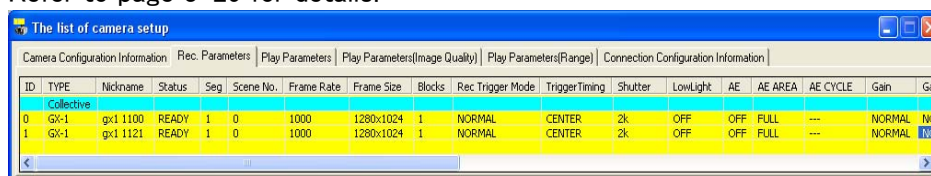
The List of Camera Setup Window

Superimpose

・Superimpose information settings for format conversion (Basic Mode)
Turns all superimpose settings ON/OFF.
Refer to page 3-66 for details.

T=0

・T=0 Setting (Expert Mode)
T=0 frame settings for image files.
　(MCFF/CIF/AVI/TIFF/BMP/JPEG/NWF)
Refer to page 3-79 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 3-91 for details.

■Right Click Item Menu
　　Select and right click an item on the item list to display the menu.

　　Camera Item Menu
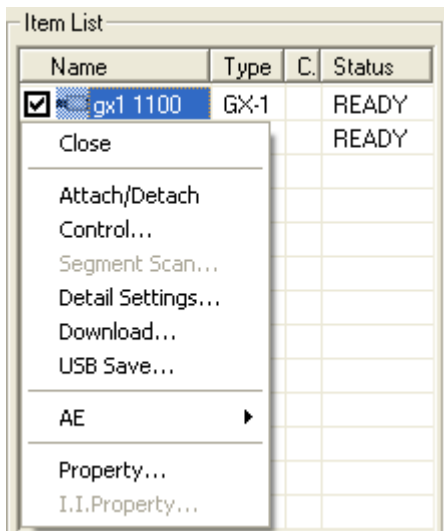
Close	Disconnects all connected cameras and deletes all camera items from the item list.
Attach/Detach	
	Connects/disconnects all connected cameras.
Control	Displays camera control window. Refer to page 3-29 for details.
Segment Scan...	
	Performs segment scans. When a segment scan is performed, images for other segments saved on the camera are added to the item list as MEM items.
Detail Settings...	
	Shows the Detailed Settings dialog box. Refer to page 3-39 for details.
Download...	Downloads image data from the camera and creates camera image files (MCFF).
USB Save...	Saves image data on the USB media connected to the camera and creates camera image files (MCFF).
AE	Selects the settings for automatic exposure control (AEC). Refer to page 3-43 for details.
Property...	Displays the camera properties. Refer to page 3-8 for details.
I.I.Property...	Displays the RX-6 I.I. camera properties. I.I. properties are shown only when a RX-6 I.I. camera is connected.

MCFF/CIF File Item Menu
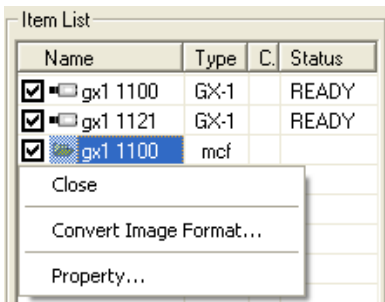
Close   Closes MCFF/CIF files and deletes items from the item list.

Convert Image Format
         Converts formats.
         Refer to page 3–72 for details.

Property...   Display MCFF/CIF properties.
         Refer to page 3–8 for details.

AVI/TIFF/BMP/JPEG File Item Menu
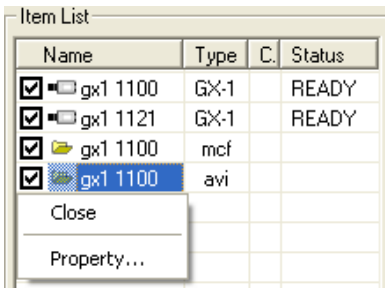
Close   Closes AVI/TIFF/BMP/JPEG files and deletes items from the item list.

Property...   Displays AVI/TIFF/BMP/JPEG file properties.
         Refer to page 3–8 for details.

■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 setting of conversion.
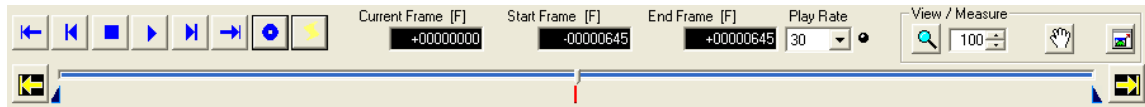
[Main Toolbar：Basic Mode]
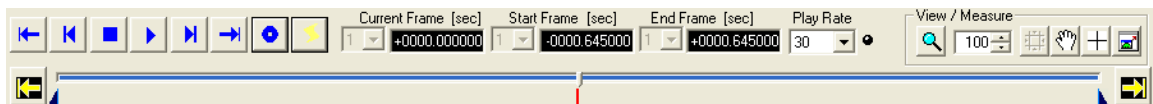
[Main Toolbar：Expert Mode]

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, playback speed, frame by frame, forward and reverse)

View・Measure
- Zoom, scroll and display all of the image
- Display the coordinates for the noteworthy points of the image displayed (can be set to the point of origin). Refer to page 3-85 for details.
- Capture settings for the conversion settings. Refer to page 3-68 for details.

Operation Buttons
Use the mouse to click on these buttons to control and operate the camera and files.

	Jump to Start Frame	Displays the playback start frame.
	Step Backward	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, VIEW and ARM and switches to READY mode.
	Playback/Loop Playback	Press Playback for a long time for loop playback.
	Step Forward	In the READY mode, goes forward one frame. Press for a long time to fast forward. In the PLAY/LOOP mode, the playback rate decreases.
	Jump to End Frame	Displays the playback end frame.

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	VIEW/ARM	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.

Press "Playback" for a long time or click "Playback" during playback for loop playback.
During playback, click Step Backward or Step Forward to change the playback speed.

Camera Operation Diagram

■Camera Parameter Toolbar (only for Expert Mode)

    Sets parameters for camera recording/playback control.

| Detail | SEG | 1 ▼ | 🏃 500 ▼ | 1280x1024 ▼ | ⚡ | CENTER ▼ | ◗ OPEN ▼ | 💡 100pps ▼ | ⁛ AUTO ▼ | ⁝ 100% ▼ | ⅄ NORMAL ▼ |

    Parameter values shown are the camera values selected with the item toolbar.

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

■Status Bar

Open the camera to attach	If there is a cursor on the toolbar, detailed information for that button / display is shown.
X : 208.00 Y : 234.00	If there is a cursor on the image monitor, the location of the cursor is shown.
R : 180 G : 180 B : 180	If there is a cursor on the image monitor, the RGB value for the image at that location is shown.

■I.I.TOOLBAR

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

    This I.I. toolbar is displayed 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.

I.I.Gate	I.I.Gain	I.I.Status		ExposureMode	Frequency	Interval	I.I.Gate(PLAY)	I.I.Gain(PLAY)	ExposureMode(PLAY)
20ns ▼	0 ▼	● OFF	I.I.Reset	SINGLE ▼	1 ⇅	500 ⇅	20ns	0	SINGLE

3.6 Recording・Playback

■Recording

While in the READY mode, click [●] VIEW/ARM on the main toolbar and the camera will switch from WAIT→VIEW, and the live image photographed by the camera is displayed 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/ARM again to start recording. The camera will access the ARM mode, and writing to the camera image memory will begin, and it will enter 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.

The Rec Trigger Modes include (1) NORMAL recording, (2) event recording, (3) burst recording and (4) multi trigger recording.
These four Rec Trigger Modes cannot be used together. Only one Rec Trigger Mode can be selected. Priorities in the Rec Trigger Mode are set as multi trigger recording > burst recording > event recording > NORMAL recording.

(1)NORMAL Recording
NORMAL recording is a recording method where trigger signals can only be received once during segment recording.
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 the stop button 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 4th) 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 protect function)
In this case, since ARM fails, a warning is displayed, and the FAULT signal from the camera is turned ON. Click the stop button 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 the stop button 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 Rec Trigger Mode in the Detailed Settings dialog box to EVENT.

・Set Rec Trigger Mode in the Rec. Parameters tab of the camera settings window to EVENT.

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 the stop button is clicked.

(3)Burst Recording

A recording method for only the period when there is external trigger signal input.

Perform any of the following operations for burst recording.

・Set Rec Trigger Mode in the Detailed Settings dialog box to BURST.

・Set Rec Trigger Mode in the Rec. Parameters tab of the camera settings window to BURST.

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 the stop button is clicked.

(4)Multi Trigger Recording

Partitions the selected memory segments into 2 - 16 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 the stop button is clicked. The GX camera has 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 Rec Trigger Mode in the Detailed Settings dialog box to MULTI and simultaneously designate the number of blocks partitioned.

・Set Rec Trigger Mode in the Rec. Parameters tab of the camera settings window to MULTI and simultaneously designate the number of blocks partitioned.

GX 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.

■ Camera Playback (Verify Image)

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

The playback range can be designated by operating the playback slider.

[Playback Slider]
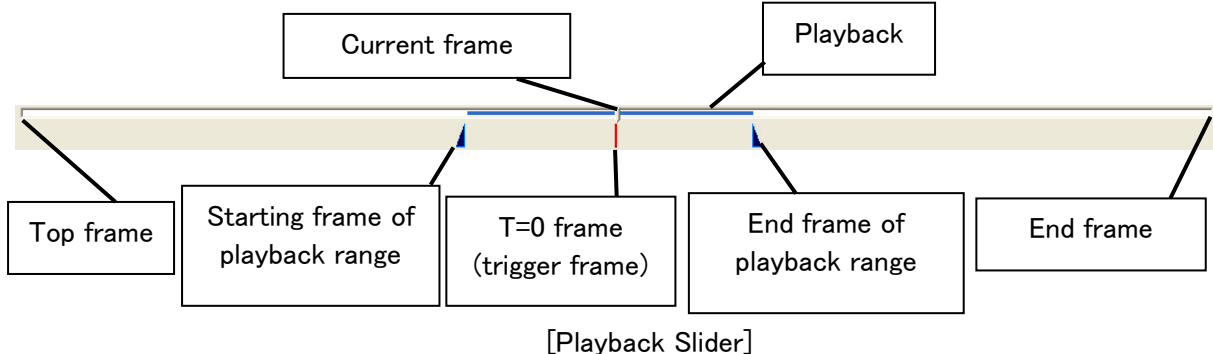
The playback parameters can be set with the "Detailed Settings" dialog box. Additionally, precise settings for the playback range can be made in single frame units.

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

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

Detailed image verification is possible by showing the frame for the recorded image.

Use the zoom scroll tool described later for zoom display and scrolling of the still images shown.

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

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 Unit：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 Unit：pps

    ・The ＞＞＞＞＞＞ in the "Playback Rate" combo box is the actual playback speed.
           Plays back at the same rate as the recording frame rate.

    ・ −＞−＞−＞ and ＜−＜−＜− in the "Playback Rate" combo box during synchronized display
             −＞−＞−＞ is the fastest playback speed that does not drop frames of live camera images, and performs forward playback.
             ＜−＜−＜− is the fastest playback speed that does not drop frames of live camera images, and performs reverse playback.

■Playback Slider

Use to designate playback frame and set playback range.
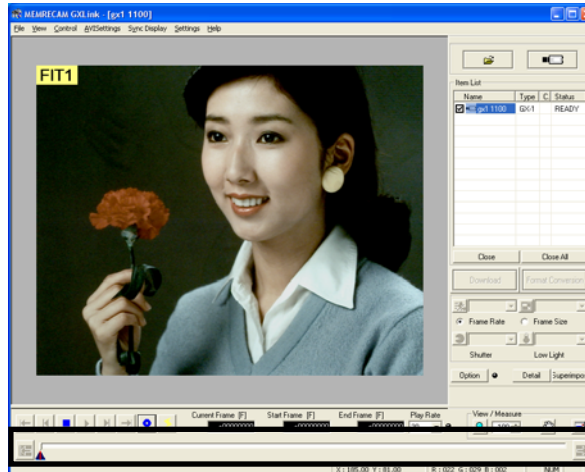
← Playback slider

The playback slider refers to different displays than Rec Trigger Mode.

（1） Example of Event Frame Display

Frames input by the subsequent trigger signals are treated as event frames.

T=0 frame　　　　Event　　　　Event
(trigger frame)　　frame　　　　frame
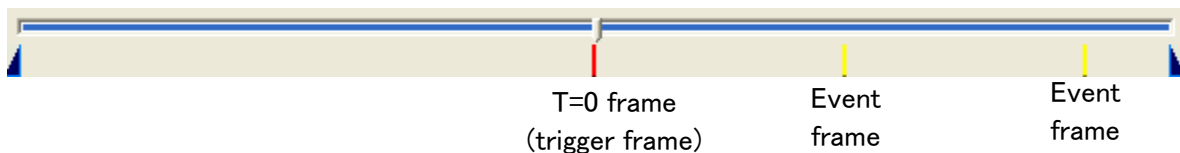
（2） Example of BURST Recording Display

Records the time frame during which the burst signals are input to the trigger connector.

Burst　　　　Burst　　　　Burst　　　　Burst
block 1　　　block 2　　　block 3　　　block 4

（3） Example of Multi Trigger Frame Display

Records the number of partitioned blocks.

Block 1 T=0 frame　　　　Block 2 T=0 frame　　　　Block 3 T=0 frame
(Block 1 trigger frame)　(Block 2 trigger frame)　(Block 3 trigger frame)

Block 1　　　　　　　　Block 2　　　　　　　　Block 3
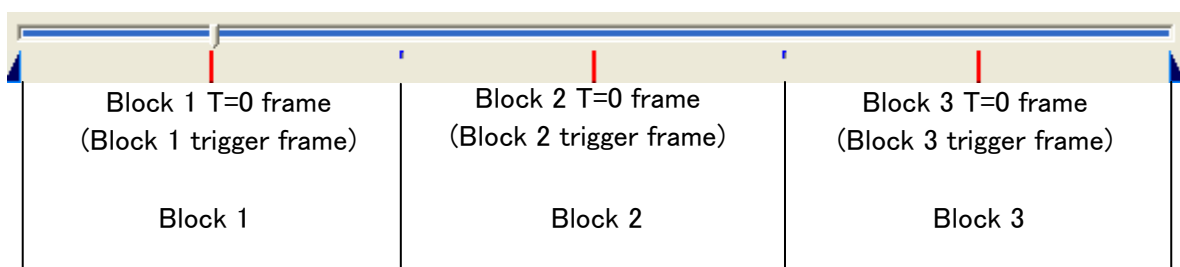
3.7 Parameter Settings

■Parameter Settings

Any of the following methods can be used to set the parameters on the camera.
- ・Camera Parameter Toolbar
- ・Control Dialog Box
- ・The List of Camera Setup window
- ・Detailed Settings Dialog Box

If the camera recording parameters are set, the image displayed on the image 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 Recording Setting to File…/Load Recording Setting from File" on the file menu and pick the file name.

Refer to Appendix C for details of the parameter file.

■Camera Parameter Toolbar (Expert Mode only)

The Camera parameter toolbar functions once a connection between the PC and camera has been established.
If the camera is in VIEW, the recording parameters can be set using the camera parameter toolbar.
If the camera is in READY, the play parameters can be set using the camera parameter toolbar.

Open the list of camera setup window or the detailed settings dialog

Camera Parameter Toolbar
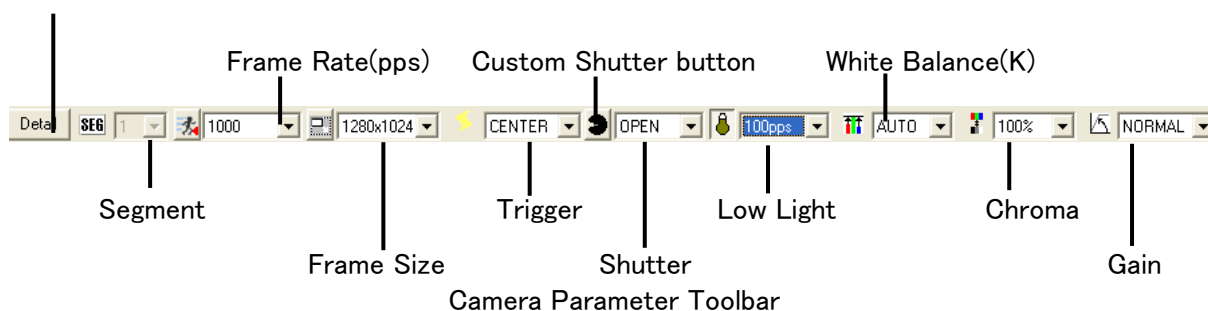
The camera parameter toolbar is a GUI to set parameters on all cameras.
The parameter values shown on the camera parameter toolbar are the values set for the camera selected on the item list.
The main parameters, including the camera frame rate can be set using the camera parameter toolbar.
Click [Detail] to open the "List of Camera Setup" window or the "Detailed Settings" dialog box to set detailed parameters.

■Control Window

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

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

Click "Previous" to move to the camera settings higher on the item list.
Click "Next" to move to the camera settings lower on the item list.
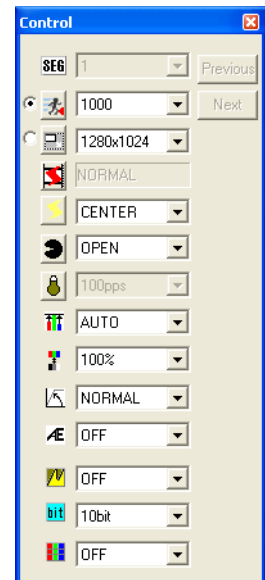
■"The List of Camera Setup" Window

"The List of Camera Setup" Window

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

Any of the following can be used to open the "List of Camera Setup" 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)

Set the memory segment, the live image resolution and rotate the image in "Camera Configuration Information".
Set recording parameters in the "Rec. Parameters" tab.
Set play parameters in the "Play Parameters (Image Quality)" tab, "Play Parameters (Range)" tab and the "Play Parameters" tab.
Double click on the cell for the parameter to be set to open the setting dialog box and change the setting.
Set parameters using "Collective" at the very top to set parameters for all of the cameras.

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

・Camera Configuration Information

Camera Configuration Information（GX camera connection）1

Camera Configuration Information(GX camera connection)2

"Camera Configuration Information" Items
(ID, Memory Segment, Live Image Resolution, Rotate Image, Reverse Image, Black Balance Update, Zoom, Scroll Position, Auto View, PC Lock and Lock JPad can be set. Other items are for display only and the settings cannot be changed.)

ID	Camera (DRP) ID
TYPE	Camera (DRP) type
Nickname	Camera (DRP) nickname (refer to page 3-4)
FC-AL node	Camera (DRP) fiber channel node name (shown with FC-AL connection)
IP Address	Camera (DRP) IP Address (shown with TCP/IP connection)
MAC Address	Camera (DRP) MAC Address (shown with TCP/IP connection)
CID	Camera (DRP) identification number
DRP Version	Camera (DRP) firmware version
Memory	Maximum recording memory
	If multiple camera heads, the memory used for each camera head.
Master/Slave	Camera synchronization master, synchronization slave settings
Memory Segment	Memory for one segment, and number of segments
Live Image Resolution	Live image resolution
Rotate Image	Image rotation angle
Reverse Image	Image reverse direction
BATT.STATUS	Battery status
Video Out	Video output method (NTSC/PAL)
Auto View	Auto View setting
Video Out	Video output method (NTSC/PAL)
Auto View	Auto View setting
PC Lock	Operation locks status from PC
Lock JPad	Operation lock status from remote control
Save Range Mode	Setting whether or not to continue save range
Black Balance Update	Black Balance calculation
Camera Time	Camera time setting
Zoom	Video display zoom setting
X Scroll Position	Video display X scroll setting
Y Scroll Position	Video display Y scroll setting
Trigger Filter	External trigger signal noise filter
EST Filter	External synchronization signal noise filter

・Rec. Parameters

Rec. Parameters（GX Camera）1

Rec. Parameters（GX Camera）2

Rec. Parameters（GX Camera）3

"Rec. Parameters" Items

ID	Camera（DRP）ID
TYPE	Camera（DRP）type（For display only. Setting cannot be changed.）
Nickname	Camera（DRP）nickname（refer to page 3-4） （For display only. Setting cannot be changed.）
Status	Camera（DRP）status（For display only. Setting cannot be changed.）
Seg	Recording segment number（1～128）
Scene No.	Photograph number（0～65535） +1 for each photograph
Frame Rate	Recording frame rate（pps）（values that can be set vary by model）
Frame Size	Recording frame size （values that can be set vary by model）
Blocks	Select 1～16 values for the number of blocks for partition recording
Rec Trigger Mode	Sets Rec Trigger Mode

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

Trigger Timing	Recording Trigger Position

START	Sets the START trigger position.
CENTER	Sets the CENTER trigger position.
END	Sets the END trigger position.
BURST	Sets the BURST recording. Do not select BURST if there are two or more blocks.
CUSTOM	Sets the CUSTOM trigger position.

Shutter	Shutter Speed (values that can be set vary by model)
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.

Low Light	Setting where the Low Light mode preview brightness corresponds to the frame rate.
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.

AE	Select automatic exposure function. Sets fx-K5 and GX cameras.
OFF	No automatic exposure.
LOW	Low average image brightness.
NORMAL	Normal average image brightness.
HIGH	High average image brightness.

AE AREA	Select automatic exposure range. Sets fx-K5 and GX cameras.
FULL	Detects brightness in the entire range.
CENTER	Detects brightness in the center of the image.
UPPER	Detects brightness in the upper part of the image.
LOWER	Detects brightness in the bottom part of the image.
LEFT	Detects brightness in the left part of the image.
RIGHT	Detects brightness in the right part of the image.

AE CYCLE	Designate the automatic exposure cycle. Sets fx-K5 cameras.

Gain	Brightness
LOW	Lower gain by one aperture.
NORMAL / 0dB	Normal brightness.
HIGH / 6dB	Raise gain by one aperture.
12 dB	Raise gain by two apertures.

Gamma	Gamma correction
OFF	No gamma correction.
LOW	Low gamma correction.
NORMAL	Normal gamma correction.

White Balance	White Balance
AUTO	Auto White Balance setting.
3100K	3100K setting for lighting color temperature.
5000K	5000K setting for lighting color temperature.
9000K	9000K setting for lighting color temperature.
REG	Uses the auto white balance setting obtained with SET during the preview.

Enhance	Enhance profile
OFF	No enhance.
LOW	Low enhance.
NORMAL	Normal enhance.
HIGH	High enhance.

Knee	Turns correction expanding the dynamic range ON/OFF by lowering the gain of the signals exceeding a specific brightness level.
Chroma	Color 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%.
Comment	Recording comments. Input setting up to 30 ASCII characters.
Rec possible Frame	
	Number of frames that can be recorded.
	(For display only. Setting cannot be changed.)
DRES Mode	Dynamic range expansion shutter mode. GX camera setting.
OFF	Normal setting.
	Sets dynamic range to approximately 200%.
LOW	Sets dynamic range to approximately 400%.
MID	Sets dynamic range to approximately 800%.
HIGH	Sets dynamic range to approximately 1600%.
Exposure Timing	Used to match fx, ci camera exposure times.
	(For display only. Setting cannot be changed.
	To change, set with "Exposure Time Settings" in the option menu.
	Refer to page 3-106 for details.)
Pixel Bit Depth	Pixel Bit Depth setting
8bit	Sets the bit length to 8bit.
10bit	Sets the bit length to 10bit.
12bit	Sets the bit length to 12bit.
Black Balance	Black Balance ON/OFF setting. GX camera setting.
Rec Sync Signal	EST selection (For display only. Setting cannot be changed.)
	To change, with "Syncing" in the option menu. Refer to page 3-102 for details.)
Exposure phase	Designate the exposure phase shift with a value 0～359 (°). GX camera setting.
RGB Matrix	Turns RGM matrix correction ON/OFF for the image data. GX camera setting.
Luminance encoding	
	Input/output properties when image data is displayed.
	GX camera setting.
NORMAL	Use Gain・Gamma・Knee
LINEAR	Convert to linear data for display.

・Play Parameters

Play Parameters1

Play Parameters2

"Play Parameters" Items
(ID, Frame No., Comment, Play Start, Play End settings.
Other items are for display only. The setting cannot be changed.)

ID	Camera (DRP) ID
TYPE	Camera (DRP) type
Nickname	Camera (DRP) nickname (refer to page 3-4)
Status	Camera status
Frame No.	Current frame
Seg	Segment number
Scene No.	Scene number
Frame Rate	Recording frame rate
Frame Size	Recording frame size
Blocks	Number of blocks for recording
Rec Trigger Mode	Rec Trigger Mode setting
Shutter	Shutter speed
AE	Automatic exposure setting
AE AREA	Automatic exposure range
AE CYCLE	Automatic exposure cycle
Comment	Recording comments. Input setting up to 30 ASCII characters.
DRES Mode	Dynamic range expansion shutter mode.
Exposure Timing	Exposure Timing Setting
Pixel Bit Depth	Pixel bit length setting
Black Balance	Black Balance ON/OFF
Rec Sync Signal	EST setting
Exposure phase	Exposure phase shift setting

・Play Parameters(Image Quality)

ID	TYPE	Nickname	Status	Frame No.	Gain	Gamma	White Balance	Edge Enhance	Knee	Chroma	RGB Matrix	Luminance encoding	
	Collective												
0	GX-1	gx1 1100	READY	0	NORMAL	NORMAL	AUTO	NORMAL	ON	100%	OFF	NORMAL	
0	GX-1	gx1 1121	READY	0	NORMAL	NORMAL	AUTO	NORMAL	ON	100%	ON	NORMAL	

Play Parameters (Image Quality)

Play Parameters (Image Quality) Items

ID   Camera (DRP) ID

TYPE   Camera (DRP) type
(For display only. The setting cannot be changed.)

Nickname   Camera (DRP) nickname (refer to page 3-4)
(For display only. The setting cannot be changed.)

Status   Camera (DRP) status
(For display only. The setting cannot be changed.)

Frame No.   Current frame

Gain   Brightness
- LOW   Lower gain by one aperture.
- NORMAL / 0dB   Normal brightness.
- HIGH / 6dB   Raise gain by one aperture.
- 12 dB   Raise gain by two apertures.

Gamma   Gamma correction
- OFF   No gamma correction.
- LOW   Low gamma correction.
- NORMAL   Normal gamma correction.

White Balance   White Balance
- AUTO   Auto White Balance setting.
- 3100K   3100K setting for lighting color temperature.
- 5000K   5000K setting for lighting color temperature.
- 9000K   9000K setting for lighting color temperature.
- REG   Uses the auto white balance setting obtained with SET during the preview.

Enhance   Enhance profile
- OFF   No enhance.
- LOW   Low enhance.
- NORMAL   Normal enhance.
- HIGH   High enhance.

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

Chroma   Color 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%.

RGB Matrix   Turns RGB matrix correction for image data ON/OFF.
GX camera setting.

Luminance encoding
Input/output properties when image data is displayed.
GX camera setting.
- NORMAL   Use Gain・Gamma・Knee.
- LINEAR   Convert to linear data for display.

・Play Parameters （Range）

Play Parameters （Range）

Play Parameters （Range） Items
（**ID, Play Start, Play End** settings. The other items are for display only.）

ID	Camera （DRP） ID
TYPE	Camera （DRP） type
Nickname	Camera （DRP） nickname （refer to page 3-4）
Status	Camera status
Trigger Timing	Trigger setting
Trigger Time	Trigger signal input time
Play Start, Play End	Playback start frame/time, playback end frame/time
Rec. Start, Rec. End	Recording start frame/time, recording end frame/time
Save Status	Save status for camera data

・Connection Configuration Information

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
	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
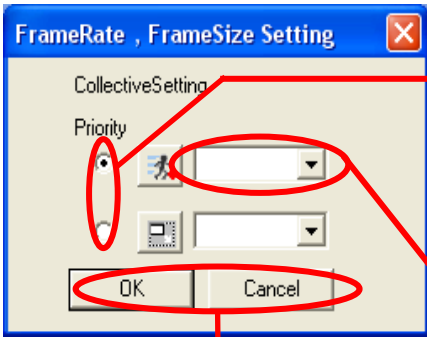
Connection Configuration Information (M-Hub)

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 3-4)
Sync	Synchronization setting end status
IRIG	IRIG signal status
I-M SYNC	IRIG and master M-Hub synchronization 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 Connect	Master M-Hub and slave M-Hub connection status (C:connected, D:disconnected)
M-S Sync	Master M-Hub and slave M-Hub synchronization 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 synchronization status
CID	Camera (DRP) identification number
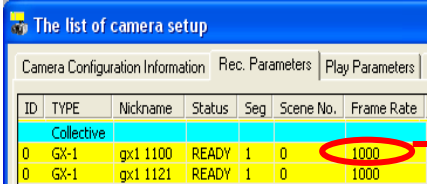
【Example】 Changing the Frame Rate in the "Collective" Row

1.
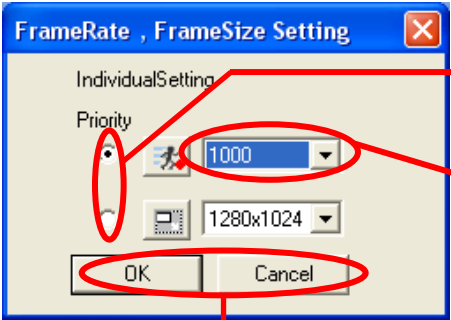
Double click on the Frame Rate cell in the "Collective" row.
The "Frame Rate, Frame Size Settings" dialog for setting parameters will be displayed.

2.

Select the priority for the frame rate and frame size.
If frame rate has priority, the frame rates for all of the cameras will be displayed on the pull down menu. Select from the frame sizes shown, which are the frame sizes possible with the frame rate selected at that time.

Specify the frame rate to be set.
Once specified, the parameters for all of the cameras will be set.

Click OK to close the "Frame Rate, Frame Size Settings" dialog box.
Click Cancel to close the dialog box and return all of the cameras to the state before the settings were changed.

【Example】Select a Camera and Set the Frame Rate

1.

Double click on the "Frame Rate" cell to select a camera.
The "Frame Rate, Frame Size Settings" dialog box for setting parameters will be displayed.

2.

Select the priority for the frame rate and frame size.

Specify the frame rate to be set.
Once specified, the parameters for only the camera selected will be set.

Click OK to close the "Frame Rate, Frame Size Settings" dialog box.
Click Cancel to close the dialog box and return the selected camera to the state before the settings were changed.

■Detailed Settings Dialog Box

Parameters for a single camera can be set with the "Detailed Settings" dialog box.

Any of the following can be used to open the Detailed Settings dialog box.
・Click "Detailed Settings" on the "Control" menu when one camera is connected.
・Click "Detailed Settings" on the item toolbar when one camera is connected. (Basic Mode only)
・Click "Detailed Settings" on the camera parameter toolbar when one camera is connected. (Expert Mode only)
・Select a camera from the item list and click "Detailed Settings" with the right mouse button (the "Detailed Settings" dialog box will open when a camera in the item list is designated even if multiple cameras are connected).

Detailed Settings dialog box

■Low Light

There may be cases when a clear monitor image cannot be obtained in the VIEW mode with temporary low levels of lighting for the photography. In this case, click [00pps] "Low Light" on the item toolbar (Basic Mode) or the camera parameter toolbar (Expert Mode) to display a brighter image than that on the set frame rate on the monitor and then verify the angle and focus.

Additionally, if the frame size is too small, a frame larger than the set frame size is displayed in the Low Light mode, so the area actually recorded is displayed with a border.

(During image recording, verify the aperture to obtain light corresponding to the set frame rate parameters. Also, adjust the position so the desired photograph fits inside the frame borders.)

Low Light can also be set with the "Rec. Parameters" tab in "The List of Camera Setup" window and the "Detailed Settings" dialog box in the "Control" window.

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.

Implement actual recording according to the set frame rate parameters.

Frame borders

VIEW (Low Light Mode) Live Display   VIEW (Low Light Mode) Video Display

ARM Live Display   ARM Video Display
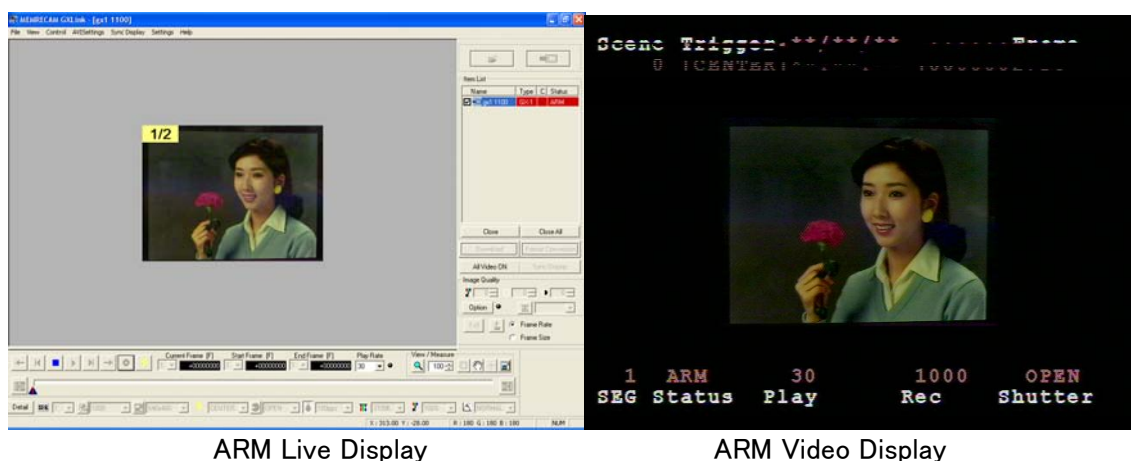
■Memory Segments

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.

⚠ **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.

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

When segmenting the camera memory and images other than the current segments are saved, conduct a "Segment Scan" and all of the segments where images are recorded will be added to the item list.
When switching memory segments and images are already saved in the selected memory segment, the original memory segment will be added to the item list as a memory item.

Switch from a memory segment with a recorded image to another memory segment.
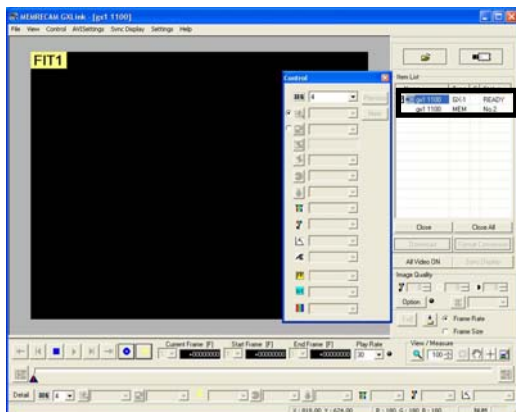
The image selected prior to switching is added to the item list as a memory item.

Any of the following can be used for the segment scan.
  ・Click "Segment Scan" in the "Control" menu.
  ・Click "Segment Scan All Cameras" in the "Control" menu.
  ・Select a camera from the item list and click "Segment Scan" with the right mouse button.

The memory segment number is displayed in the item list status.
In this example, there is an image recorded in memory segment number2.

Any of the following can be used to delete memory segment items from the item list.
  ・Select the camera from the item list and click "Hide Segment" on the "Control" menu.
  ・Click "Hide Segments from All Cameras" on the "Control" menu.

■GX Camera Frame Rate, Frame Size CUSTOM Settings

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

The parameters of GX-1 cameras are restricted, with the width a factor of 4 less than 1280, the height a factor of 16 less than 1024 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 "Detailed Settings" dialog box or the "Control" dialog box, and click on   Frame Rate 🏃 or Frame Size 🖳 to display the "Custom Settings" dialog box.
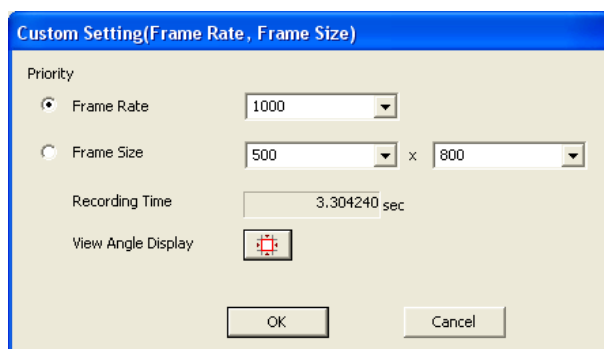
CUSTOM Settings Dialog Box

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, click "View Angle Display" to open the "View Angle Display" dialog box, and the entire image and the frame for the frame size will be displayed.
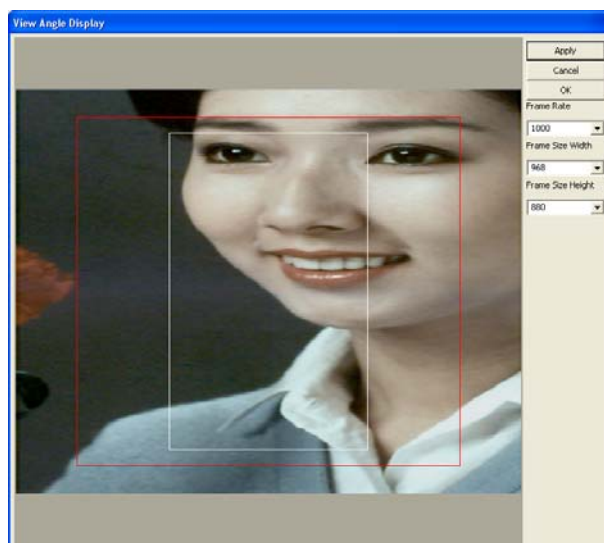
View Angle Display Dialog Box

In the "View Angle Display" dialog box, the camera live image (still image) and the currently set frame size area (white border) will be displayed.
Change the frame size by dragging the border. At this point, the red border shows the frame size after the change.
If the priority is the frame rate, it is not possible to drag to an area that exceeds the upper limit of the frame size.
If the priority is the frame size, the frame will automatically be reduced if the upper limit of the frame size is exceeded when dragged.

The input by the numerical value is possible, too. When the parameter that wants to change is input, and the "Apply" button is clicked, Frame Size (red frame) and Frame Rate are renewed.

Click "OK" button after the setting change, the parameter is set to the camera.

■AE Control

GX cameras and the fx-K5 camera has an AEC function (automatic exposure). The AEC function measures light in the specific area of the 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 "Rec. Parameters" in the "Detailed Settings" dialog box.

Select any of the following for AE.

OFF	Do not use AE.
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].

Additionally, the AE AREA must be designated when using AE.
Any of the following can be used to designate the AE AREA.
- ・ Select the camera in the item list and select "AE" from the "Control" menu.
- ・ Select "AE" from the "Detailed Settings" dialog box.

Select any of the following for AE AREA.

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.

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

To designate the AE CYCLE, enter an integer from the "AE CYCLE" in the recording parameters of the "Detailed Settings" dialog box in millisecond units.

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

Since the GX has 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 be changed frequently, it is possible to know the fx-K5 exposure time for each frame.

■GX Camera Pixel Bit Depth

The bits per pixel for the photographed image can be changed on the GX camera.

If the number of bits is increased, the depth per pixel increases, resulting in a high quality image.

If the number of bits is decreased, the depth per pixel decreases, resulting in a lower quality image but this saves the recording memory and extends the recording time.

Any of the following can be used to change the pixel bit depth.
- Select "Pixel Bit Depth" in the "Control" window.
- Select "Pixel Bit Depth" in the "Detailed Settings" dialog box.

Any of the following can be used to select the pixel bit depth.

8bit	Sets the bit length to 8bits. Low image quality.
10bit	Sets the bit length to 10bits. Standard image quality.
12bit	Sets the bit length to 12bits. High image quality.

■GX Camera Exposure Phase

The GX camera can shift the exposure timing (phase) during recording.

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

To change the exposure phase, designate the value of "Exposure Phase" in the "Detailed Settings" dialog box in single degree units from 0~359 (°).

Refer to Chapter 5, 5.6 Exposure Phase Shift Recording for details regarding exposure phase shift recording.

■GX Camera Black Balance

Black Balance is a function that corrects the GX camera sensor pixel dependent noise.

With the GX camera, the sensor temperature properties are calculated and FPN correction is applied to remove the noise so when conducting high precision photography, applying black balance immediately before or after photographing is recommended.

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 photographing.

To calculate the black balance, first set the frame rate and frame size to that used for photographing. Next, place the cap on the camera lens so light does not reach the sensor.

Conduct "Black Balance Update" in "Camera Configuration Information" in the "Detailed Settings" dialog box.

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 switch the black balance, select ON/OFF for the Black Balance in the recording parameters found in the "Detailed Settings" dialog box.

ON	Using black balance corrected data.
OFF	Not using black balance corrected data, correcting internal camera data.

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 "Detailed Settings" dialog box.

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 photographing. If a long period of time has elapsed between the black balance calculation and photographing, the noise may not be adequately removed.
- 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 Camera DRES Mode

If the DRES mode (dynamic range expansion shutter mode) is used on the GX camera, the camera sensor reduces the saturation of areas of high brightness.

To use the DRES mode, select any of the following in "DRES Mode" for the recording parameters found in the "Detailed Settings" dialog box.

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%.

The DRES mode can be used together with the gamma settings and the lens aperture.
If the DRES mode is employed, the gain and knee settings are not valid.

■GX Camera Auto View

Auto View is a function that automatically accesses the VIEW mode when camera recording has been completed.

Also, when ARM is started and the image is saved on the current segment, it automatically switches to the next segment.

To use Auto View, select any of the following in "Auto View" for "Camera Configuration Information" found in the "Detailed Settings" dialog box.

OFF	Auto View not used.
AUTO	Record 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 Rec Trigger Mode (NORMAL(L)) that automatically switches segments for recording.   In this case, the Rec Trigger Mode settings take priority.

■GX Camera Zoom/Scroll
　　　With NTSC settings, a maximum of 640×480 pixels are displayed on the video monitor.
　　　With PAL settings, a maximum of 768×576 pixels are displayed on the video monitor.
　　　When the photographed image is zoomed, the portion outside the size mentioned above is cut and not displayed on the screen.
　　　At this point, the display location cannot be altered by scrolling.

　　　The contents of the range displayed on the video are displayed as the live image on the GX camera. However, the live image on the fx camera is shown in the entire frame.

　　　To use zoom, select any of the following in "Zoom" for the "Camera Configuration Information" found in the "Detailed Settings" dialog box.

FIT1	Displays the screen on 100% of the video monitor. The entire image can be displayed in an over scan compatible video monitor. With NTSC settings, displays at a maximum of 640×480 With PAL settings, displays at a maximum of 768×576
FIT2	The entire image reduced to about 80% of the video monitor. The entire image can be verified with a standard video monitor. With NTSC settings, displays at a maximum of 512×384 With PAL settings, displays at a maximum of 640×480
1/2	Reduces the image photographed to ½ 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, if the image is large, the entire image will not be displayed.
　　　To scroll an image, input a numerical value in the X Scroll Position or the Y Scroll Position of the Camera Configuration Information in the "Detailed Settings" dialog box.
　　　"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.

3.8 Downloading Images

Determine the file name and save range to be downloaded and download the camera images. When the camera is connected, use any of the following methods to display the download dialog box 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 dialog box may differ depending on the option dialog box GUI settings.
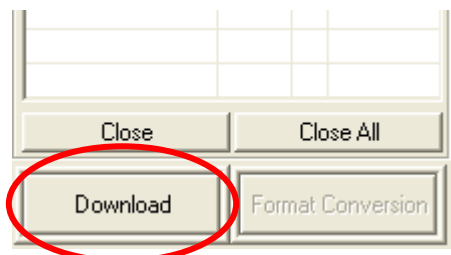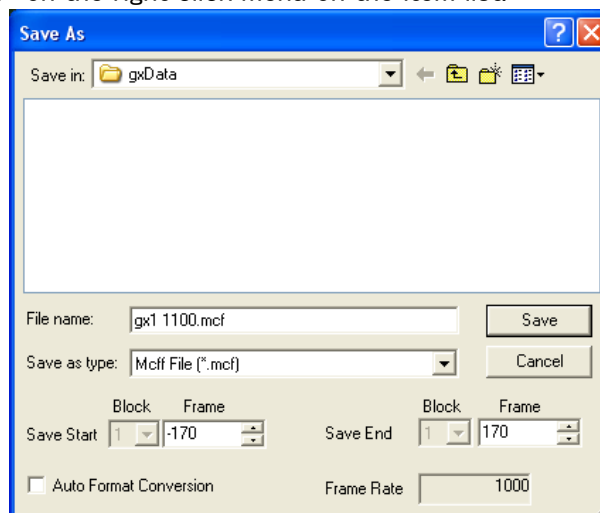

Download
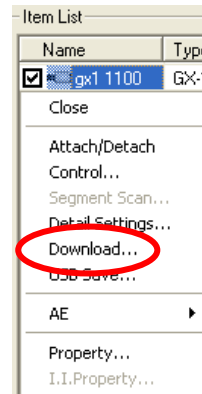
Right click menu on the item list

■Individual Downloads

Any of the following methods can be used to display the "Save As" dialog box 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" Dialog Box

Set the folder for the download, the file name and the frame to save 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 5-11 for details.

■Batch Downloads

Any of the following methods can be used to display the "Download" dialog box (list) and perform batch downloads.

        ・Click "Download".

        ・Click "Download" from the file menu.
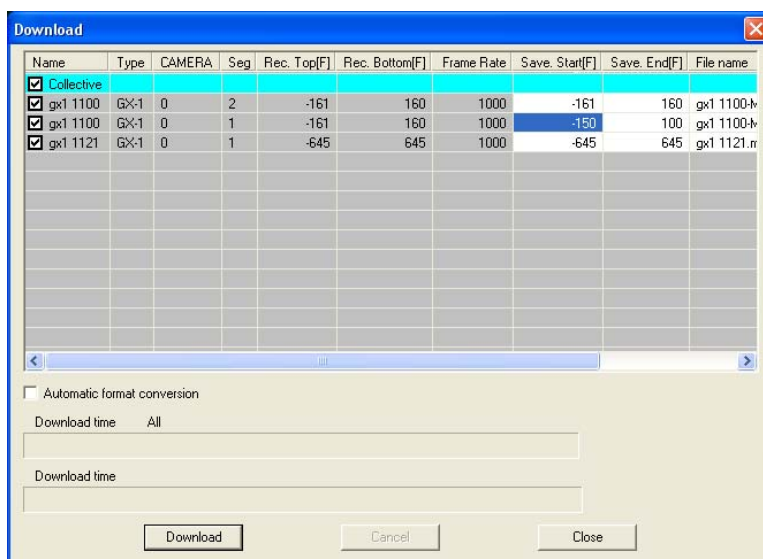
Download Dialog Box

Download settings for all of the connected cameras and segments can be made in the "Collective" row.

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" dialog box.

☑	Data checked are subject to batch settings and downloads. If not downloading, remove the check.
Save. Start[sec]	Save Range start time
Save. Start[F]	Save Range start frame

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.

| Save. End [sec]	Save Range end time.
Save. End [F]	Save Range end frame.

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" dialog box.
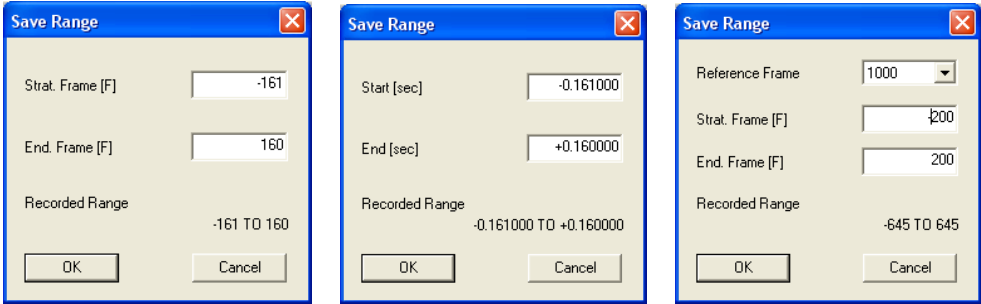
Set a range for starting and ending a download, and press OK.

If "Save Range" in the "Collective" row is selected when the frame counter display indicates "Frame", "Reference Frame Rate" must be selected. Set the time corresponding to the "Reference Frame Rate" save start frame and end frame for each camera.

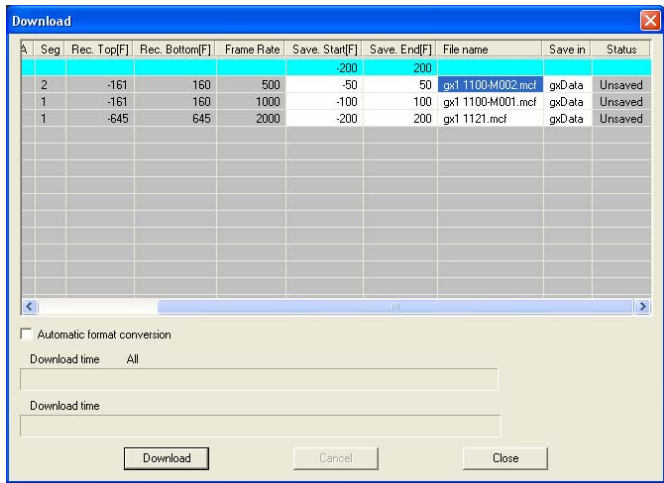The figure below shows an example when the reference frame rate is set to 2000, and the start and end frame is −200〜200. In this case, the save range for each camera is the frame corresponding to −0.1〜0.1[sec].
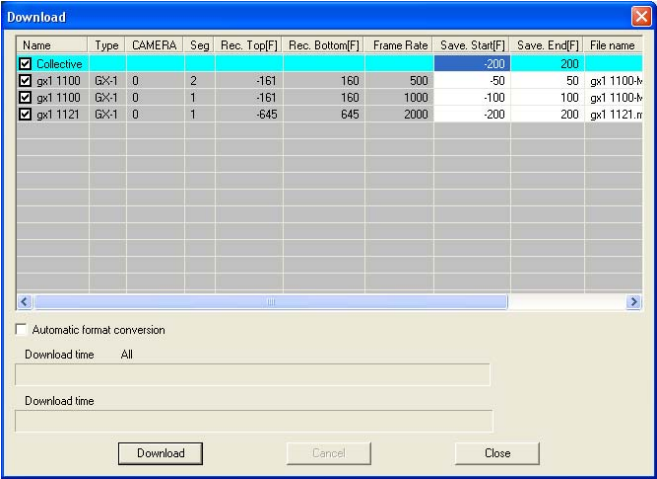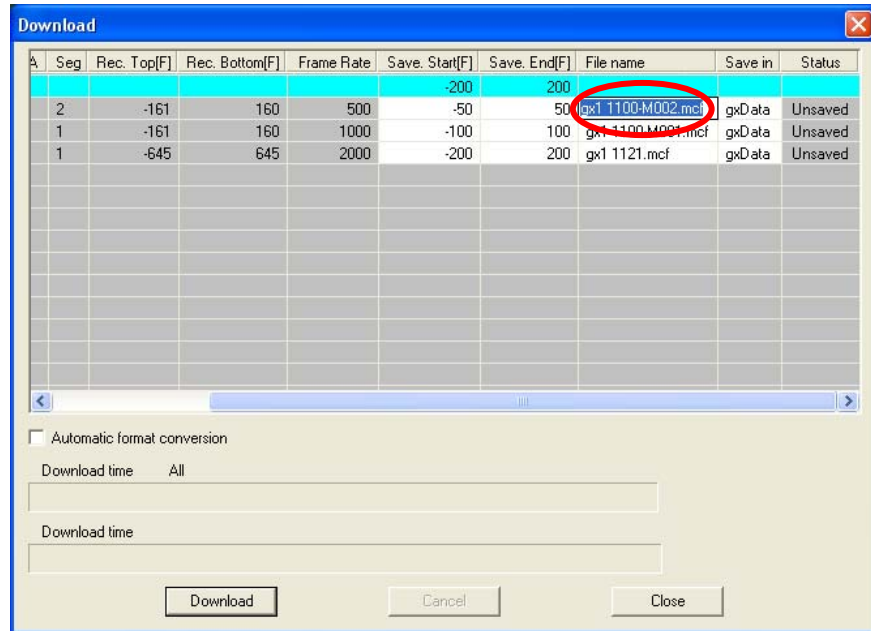

File name   The file name attached to the downloaded data is displayed.
Conduct the following to change the save file name.

1. Select the camera where the save file name is to be changed.

2.Click on the cell with the save file name to change the name.

A	Seg	Rec. Top[F]	Rec. Bottom[F]	Frame Rate	Save. Start[F]	Save. End[F]	File name	Save in	Status
					-200	200			
	2	-161	160	500	-50	50	gx1 1100-M002.mcf	gxData	Unsaved
	1	-161	160	1000	-100	100	gx1 1100-M001.mcf	gxData	Unsaved
	1	-645	645	2000	-200	200	gx1 1121.mcf	gxData	Unsaved

Automatic format conversion

Download time   All

Download time

Download   Cancel   Close

Save in   Displays the folder where downloaded data is to be saved.
Conduct the following to change the save folder.

1.Double click to select the save folder cell (Collective cell if a batch) corresponding to the camera where the save folder is to be changed.

2. Select the download folder from the "Browse for Folder" dialog box and click "OK".
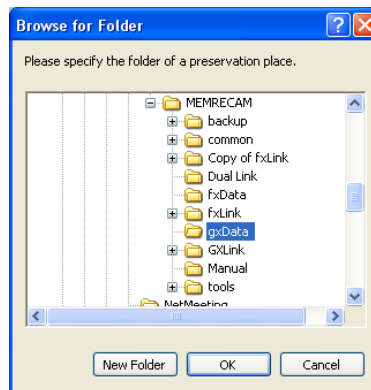
3.If creating a folder, press "New Folder", input the folder name in the "New Folder" dialog box and press "OK".
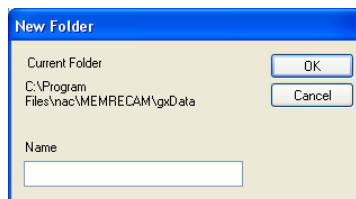
Automatic format conversion If checked, format conversion will be performed after downloading.
Refer to page 3-93 for auto format conversion.

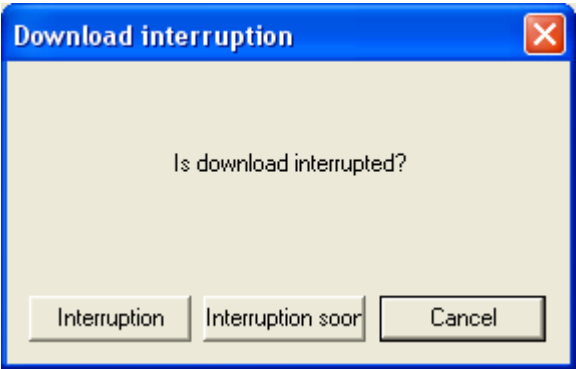Each button in the "Download" dialog box functions as follows.

Download — Downloads the data checked.

Cancel — Cancel download.
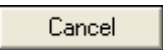The abort methods shown in the "Cancel Download" dialog box can be selected.

Download interruption

Is download interrupted?

| Interruption | Interruption soor | Cancel |

Interruption — The download of the current data is continued but subsequent downloads are cancelled.

Interruption soor — Abort download soon.
Cancels subsequent data downloads.

Cancel — Cancels downloads.

Close — Close "Download" dialog box.

・If the image is downloaded, the download data (MCFF) is displayed in the item list, and the "Convert Image Format" button is enabled.

Item List

| Name	Type	C.	Status
☑ gx1 1100	GX-1		READY
☑ gx1 1121	GX-1		READY
☑ gx1 1100	mcf		

3.9 Saving Images on USB

Determine the save range for the data to be saved on USB media connected to the GX camera and save the camera image.

Perform the following procedures in advance of connecting the USB media to the 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 dialog box and start downloading.

The download dialog box shown may differ depending on the number of cameras and the status shown on the item list.
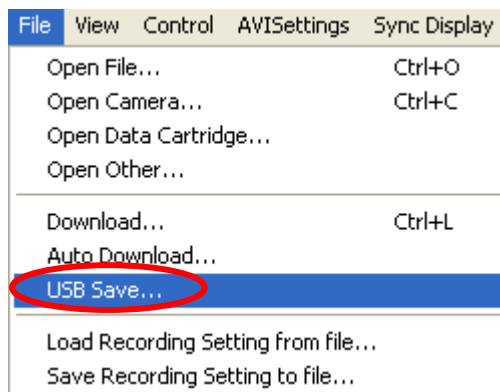
File Menu "USB Save"   Item List Right Click Menu
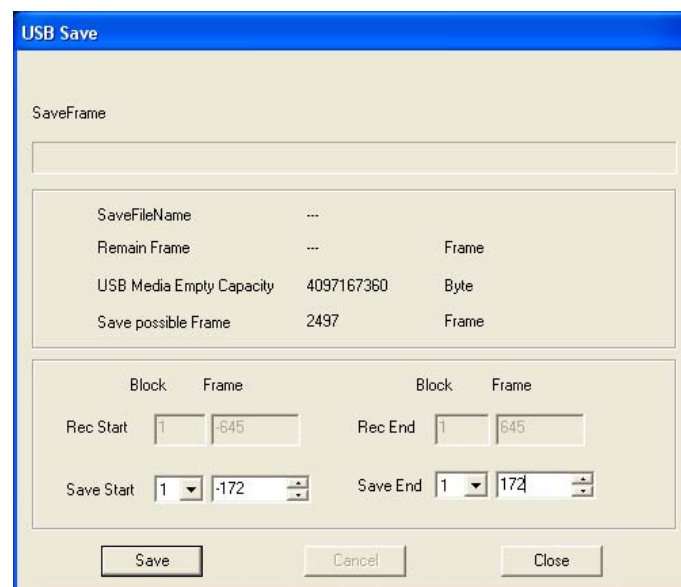
・"USB Save" Dialog Box (Individual)

Displayed when one camera is connected or when specifying one camera from the item list and saving the image from one camera on USB media.

"USB SAVE" Dialog Box (Individual)

"USB Media Empty Capacity (Bytes)" and "Save Possible Frame" will be displayed.

Set the save range (frame/relative time) and click "Save" to save on USB media.

USB Save

It is preserving in USB.

SaveFrame

SaveFileName	MCFF0000.MCF
Remain Frame	304 Frame
USB Media Empty Capacity	4097167360 Byte
Save possible Frame	2497 Frame

	Block	Frame		Block	Frame
Rec Start	1	-161	Rec End	1	160
Save Start	1	-161	Save End	1	160

Save   Cancel   Close

"USB Save" Dialog Box (Individual)   Start Save

The file name is automatically assigned as a sequence of
MCFF0000.MCF ～ MCFF9999.MCF.
While saving, the progress will be displayed in real time on the progress bar and the
"Remain Frame".

If "Cancel" is pressed while saving, saving to the USB media will be immediately aborted.

· "Save to USB" Dialog Box (List)

This is displayed when there are multiple cameras connected or when a memory segment item is shown for one connected camera.

Name	Type	CAMERA	Seg	Rec. Top[F]	Rec. Bottom[F]	Save. Start[F]	Save. End[F]	File name	Status	Save possibl
☑ Collective										
☑ gx1 1100	GX-1	0	3	-161	160	-161	160	---	Unsaved	2466
☑ gx1 1100	GX-1	0	1	-161	160	-161	160	---	Unsaved	2466
☑ gx1 1100	GX-1	0	2	-161	160	-161	160	---	Unsaved	2466
☐ gx1 1121	GX-1	0	1	-645	645	-645	645	---	No Media	---

Save Frame All

"Save to USB" Dialog Box (List)

Settings for all of the connected cameras and the USB save segment can be made in the "Collective" row.

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 frame 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" dialog box.

| ☑ | Data checked are saved. |
| | If not saving, remove the check. |

Save. Start[sec]   Save Range start time
Save. Start[F]   Save Range start frame
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.

Save. End [sec]   Save Range end time.
Save. End [F]   Save Range end frame.
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 end save frame/time is set for all blocks.

When specifying a save range, double click on either the Save.Start cell or the Save.End cell.
Double click to display the "Save Range" dialog box.

Set a range for starting and ending a download, and press OK.

Each button in the "Save to USB" dialog box functions as follows.

Save　　Saves the data checked on the USB media.

"Save to USB " Dialog Box (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.
The file name is automatically assigned as a sequence of MCFF0000.MCF～MCFF9999.MCF.

Cancel　　Immediately cancels the save.
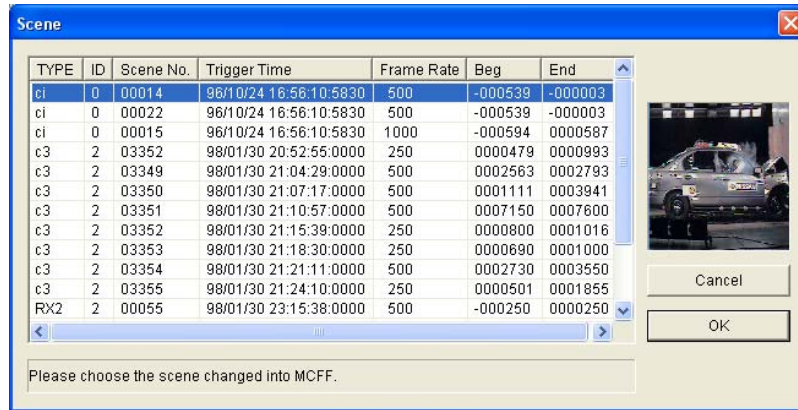
Close　　Closes the "Save to USB" dialog box.
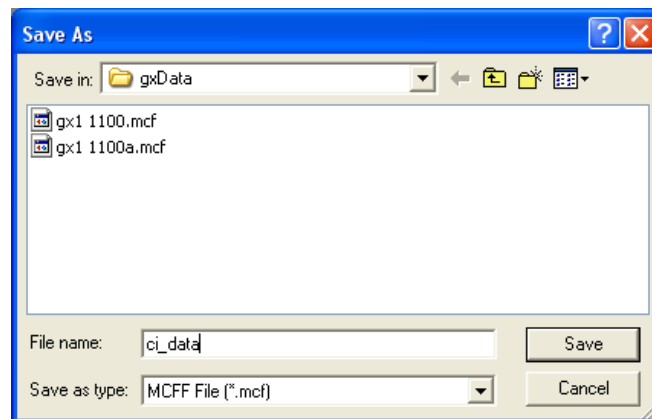
3.10 Data Cartridge Image Input

The GXLink can convert scene images from a data cartridge where ci series camera data has been saved into MCFF files that can be read.

Click "Open Data Cartridge" on the file menu to display the scene list found on the data cartridge.
Refer to the preview images to select the images for input.

Click "OK" to display the settings dialog box for the location and file name of the input image (MCFF format).

Input the file name. The extension .mcf is automatically added to the input file name to indicate the MCFF format.
Click "Save" to convert the data cartridge image to MCFF and save.

After the data cartridge image input has been completed, the file is automatically added to the item list and the image is displayed on the image monitor.
The input image file can be played back with the buttons on the main toolbar, in the same manner as on the camera.

3.11 Play File Images
(MCFF, CIF, AVI, BMP/TIFF/JPEG)

Opens MCFF, CIF, AVI, BMP/TIFF/JPEG files, displays and plays back the images. Multiple files can be selected and opened in the same manner.

Any of the following can be used to open MCFF, CIF, AVI, BMP/TIFF/JPEG files.

・Click "Open File" on the file menu and select a file in the "Open" dialog box. Refer to (1.1) and (1.2) below.

・Select a file with explorer to drag and drop to the image monitor.

Multiple files can be selected. Refer to (2) below.

(1.1)

Use the mouse for multiple selections.

Select multiple files and click "Open".

(1.2)

Click the mouse while pressing Ctrl for multiple selections.

Select multiple files and click "Open".

(2)
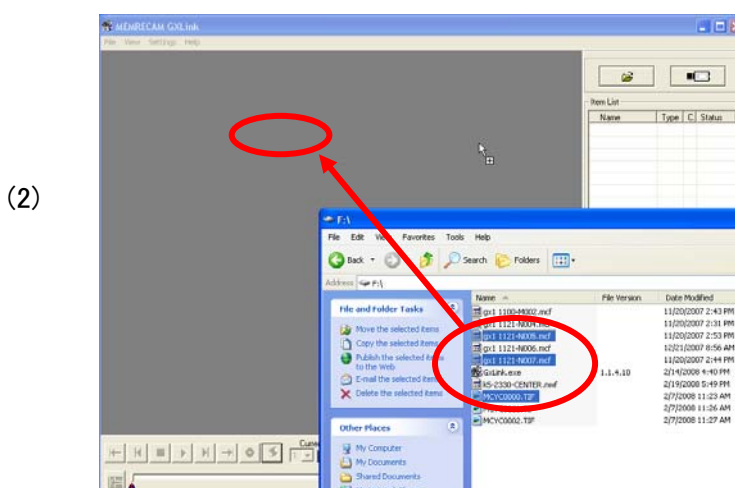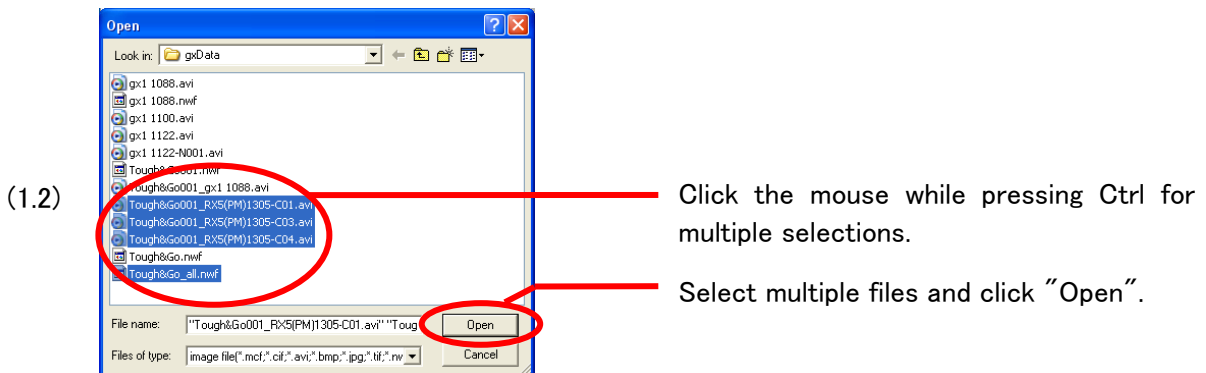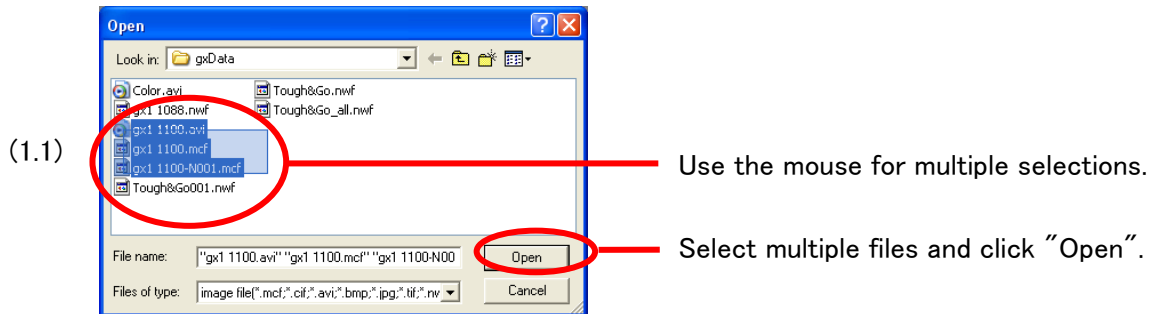
Drag and drop files selected with the explorer to the image monitor.

The following playback speeds can be assigned when using the file images.
        ・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 Units：pps
     ・−>−>−> and <−<−<− in the Playback Rate combo box
      −>−>−> 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.

Use the frame by frame button to change the playback speed during playback.
Dropped frame verification indicator
Verify dropped frames by the color of the indicator. (green: no dropped frames; yellow: dropped frames; black: NA)

3.12 Adjusting the Quality of Camera Image Files

Use 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 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" dialog box from the "Settings" menu to specify file conversion settings (FCV) for automatic conversion settings.
Refer to page 3–97 for details.
When specifying the file conversion settings for automatic conversion settings, "Auto Apply" will turn green and once the camera image file (MCFF) is opened, the specified file conversion settings will be automatically applied with the automatic conversion settings.

"Auto Apply" is to the right of "Option"
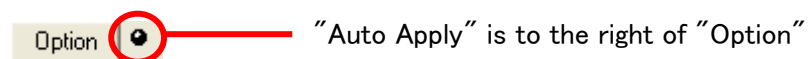
Details of image quality adjustment can be set from the "Image Quality" menu.
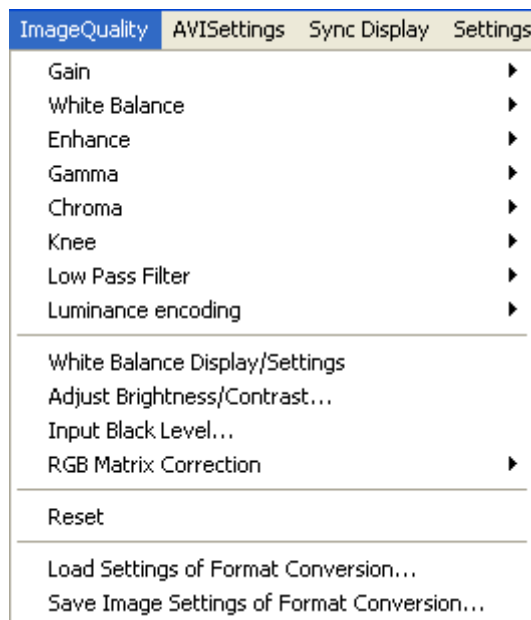
"Image Quality" Menu

■ "Image Quality" Menu

Items that can be set with the "Image Quality" menu are described below.

· Gain
This function corresponds to the MEMRECAM Gain function.

LOW	Lower gain by one aperture.
NORMAL / 0 dB	Normal brightness.
HIGH / 6dB	Raise gain by one aperture.
12 dB	Raise gain by two apertures.

· White Balance
This function corresponds to the MEMRECAM white balance function.

REG	The white balance value saved in the MEMRECAM SET REG function while photographing.
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" dialog box and set the white balance with pointer settings, range specification and numerical input. Refer to page 3-63 for details.
AUTO	Auto White Balance setting 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 3-65 for details.

· Enhance
This function corresponds to 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 corresponds to the MEMRECAM gamma correction function.
To playback 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 corresponds to 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" dialog box and adjust the hue and chroma.
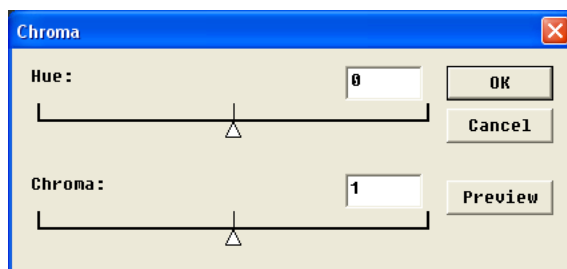
Click "Preview" to redraw the image with the set chroma and confirm the results. Click "OK" to apply.

・Knee

This function corresponds to 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.

・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.

・Luminance Encoding

Input/output properties when the image data is displayed. Setting only for GX camera MCFF.

NORMAL	Use Gain・Gamma・Knee (normal setting)
LINEAR	Ignore Gain・Gamma・Knee settings and convert data to linear for display.

・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 3-63 ~ 3-65 for details on CUSTOM White Balance and Auto White Balance.
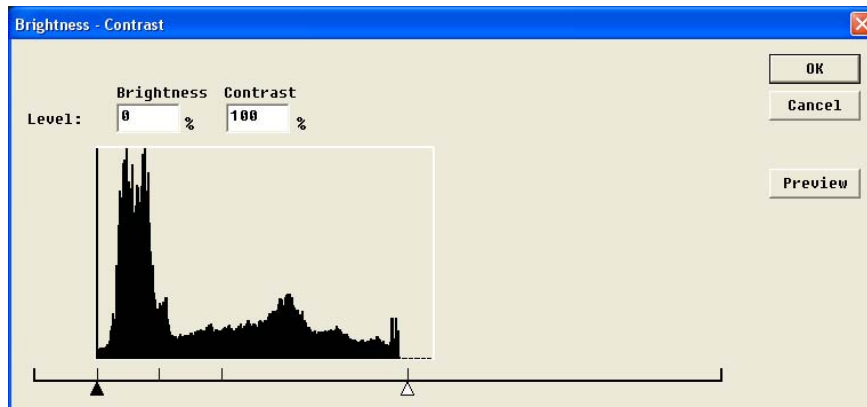
・Adjust Brightness/Contrast

Image Brightness： Function to adjust the brightness and contrast.

Click "Adjust Brightness/Contrast" on the "Image Quality" menu for the "Brightness -
Contrast" dialog box to adjust the brightness.

Use "Image Quality" in the main tool bar to adjust the ☼ brightness and ▶ contrast.
(Expert Mode only)

One method inputs numbers for brightness (Black level：0% position) and contrast (Gain) and
one method specifies by dragging the ▲：black level：0% position and △：white level：100%
position using the mouse.

Click Preview to redraw the image with the set brightness and verify the results.
Click OK to apply the set brightness and contrast.

・Input Black Level

This is a function to adjust the black level of the input image.

Click "Input Black Level " on the "Image Quality" menu for the "Input Black Level" dialog
box to adjust the input black level.

One method inputs numbers for the black level (0% position) and one method specifies by
dragging the ▲：black level：0% position in the "Input Black Level" dialog box using the
mouse.

△is the white level：100% position

Click "Preview" to redraw the image with the set brightness and verify the results.
Click "OK" to apply the set brightness.

・RGB Matrix Correction
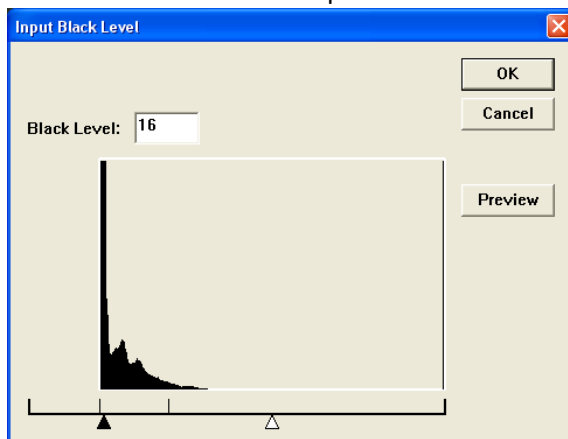
Conducts RGB matrix correction on the image data.

ON   RGB matrix correction setting.

OFF   Setting for no RGB matrix correction.

・Reset

Click "Reset" on the "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 Settings of Format Conversion...

Saves the settings and conversion range for image quality adjustment set for the MCFF displayed to "file conversion settings (FCV)".

Refer to Appendix B for details of file conversion settings (FCV).

・Load Settings of Format Conversion...

When setting the saved conversion settings for the MCFF image, click "Load Settings of Format Conversion" in the "Image Quality" menu to specify the file conversion settings (FCV).

Refer to Appendix B for details of file conversion settings (FCV).

■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 "Image Quality" menu.

・Select CUSTOM and click 📊 "Custom/Auto White Balance" in the "White Balance" combo box for the image quality adjustment section of the item toolbar. (Expert Mode only)

In the CUSTOM White Balance mode, White Balance →CUSTOM →Change Setup on the "Image Quality" menu is checked, and "Custom / Auto White Balance" for the image quality adjustment section of the item toolbar has been pressed.
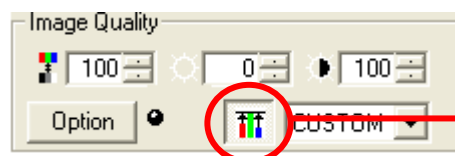
"Custom / Auto White Balance" has been pressed.

<u>CUSTOM White Balance Specification Method</u>

・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.

・Region Specification

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
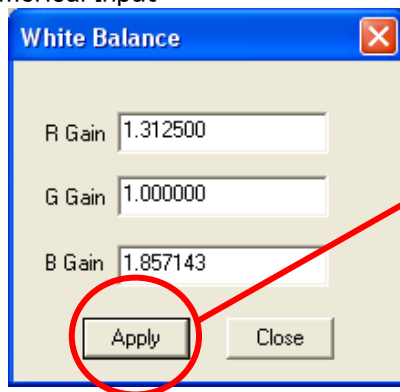
Input the RGB gain value in the "White Balance" window and press "Apply" to obtain the white balance value for the input RGB gain value and then the entire image displayed will be redrawn.

Click White Balance →CUSTOM →CUSTOM Select on the "Image Quality" menu and the white balance value will be the value set in CUSTOM White Balance.

Click "CUSTOM Select" 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 "CUSTOM Select" 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" on the "Image Quality" menu or click "Custom / Auto White Balance" for the image quality adjustment section of the item toolbar.
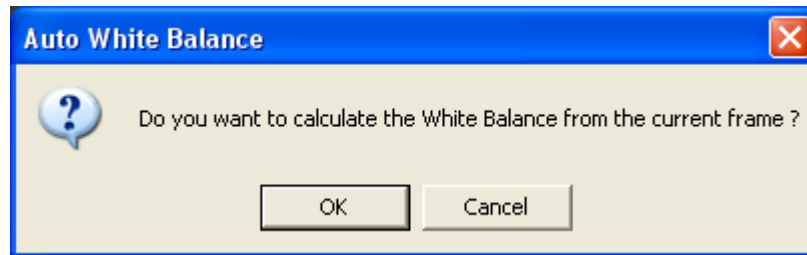
■Auto White Balance Function

Function to obtain the white balance with the currently displayed image frame.

Any of the following can be used to set the white balance using "Auto White Balance".

・Click White Balance →AUTO →Change Setup on the "Image Quality" menu.

・Select "White Balance" in the image quality adjustment section of the item toolbar,

select AUTO, and then click "Custom / Auto White Balance".

Set the "Auto White Balance" to display the auto white balance verification dialog box and click "OK".

"Auto White Balance Verification" Dialog Box

If the auto white balance hasn't been set, click White Balance →AUTO →AUTO Select on the "Image Quality" menu to obtain the value of the auto white balance calculated for the first MCFF frame and then the entire image displayed will be redrawn.

If the AUTO setting has been changed, click AUTO Select to obtain the value from when the white balance value was set in the auto verification dialog box, and then the entire image displayed will be redrawn.

■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.

Click "Options" on the "Setting" menu to specify the automatic conversion settings in the "Options" dialog box. Automatic conversion settings can be specified even when "Options" is clicked on the image quality adjustment section of the item toolbar. Refer to page 3-97 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.
The FCV file is read and the item settings in the file can be employed.
Items not requiring setting should be turned off or deleted.
Refer to Appendix B for FCV details.
The FCV files may be changed without prior notice.

3.13 AVI Settings

Conversion settings allow superimposed information, superimposed images, cutout and resize settings for format conversion to be implemented.

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.
Cutout/Resize refers to cutting a portion of the MCFF image into VGA size (640×480) when creating a converted image, as well as reducing the MCFF image.

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.

Superimposed information 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.
Cutout/Resize is a setting for each MCFF.

■Superimpose

Specify the information to be superimposed in the "AVI Settings" menu.

Items related to "Superimpose" on the "AVI Settings" menu

Superimpose	Select information to be superimposed on the converted image. (None, Frame, All) When "All" is specified, the ID, scene, trigger timing, trigger time, frame number, nickname, CID (camera identification number, frame rate, shutter, event frame and camera type are superimposed on the image.
Frame Display	Select the form for the frame number. (Frame, Relative Time, Absolute Time)
Comment Display	Select the recording comments to be superimposed on the converted image.
IRIG LOCK and EVENT2 DISPLAY	Check it to superimpose "IRIG lock status" and "EST2 signal ON/OFF status".

 Locked to IRIG signal (green)

 Not locked to IRIG signal (red)

 EST2 ON

FontSize	Select the font size for the superimposed information relative to the size of the image.

Small	For image sizes of 512×512 and 640×480
Middle	For image sizes of 768×592
Large	For image sizes of 1280×1024

■"Superimpose" button on the Item Toolbar (Basic Mode only)

When using the basic mode and "Superimpose" on the item toolbar is in the pressed

state ⬚Superimpose , everything is superimposed and "Display Comments" for the

superimposed information is activated.

If the button is canceled, nothing is superimposed and "Display Comments" for the
superimposed information is deactivated.

The superimposed information settings can be changed with the menu by pressing the
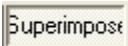button or after cancelling but the button status cannot be changed.

■Superimpose Image

Specify the image to be superimposed in the "AVI Settings" menu.

Items related to "Superimpose Image" on the "AVI 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" dialog box, 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/Middle/Large/Actual size
Superimposed Image Position	
	Select the superimposed image position to be superimposed on the converted image.
	Upper Left/Lower Left/Upper Right/Lower Right
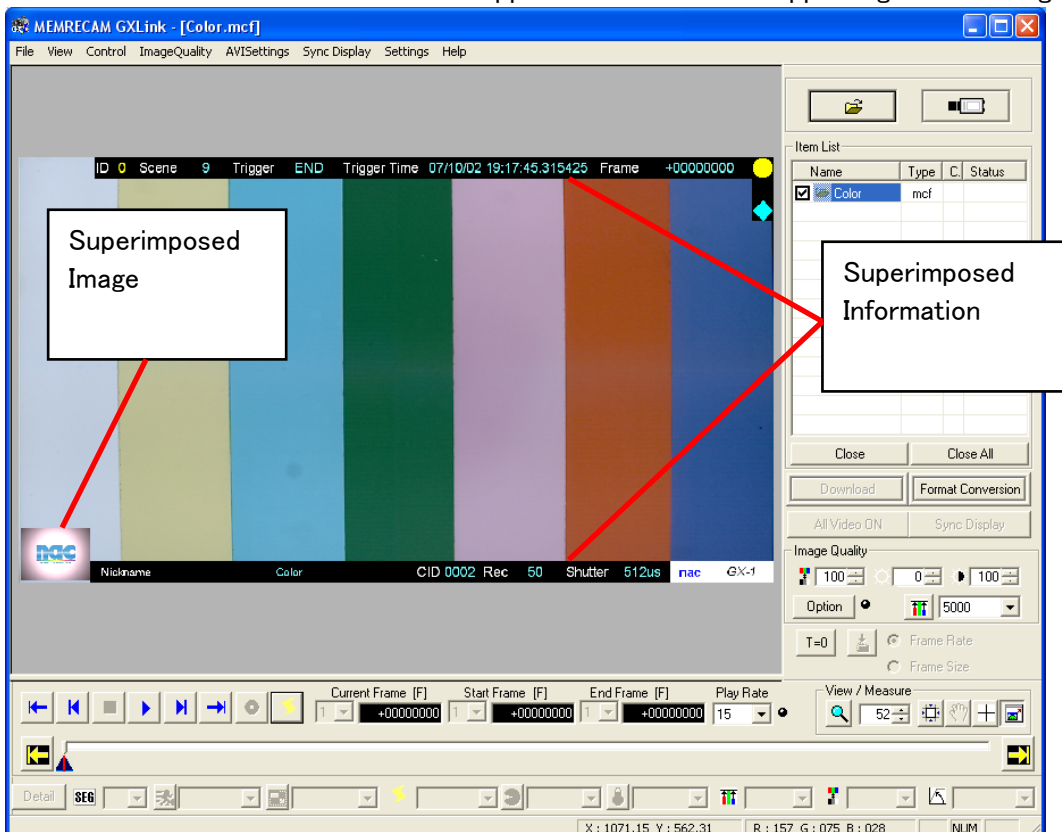
■Cutout/Resize

Specify "Cutout/Resize" in the "AVI Settings" menu.

Specify cutout with the ⊡ button on the main toolbar. (Expert Mode only)

Items related to "Cutout/Resize" on the "AVI Settings" menu

Cutout	Select when the image is cut out to a size of 640x480.
Resize	Select when the image is converted to ½ size when cutout

Click "Cutout" or the ⊡ button to open the "CUT Range Setting" window to specify the cutout position.

Specify the cutout position for the VGA sized image using the mouse or using numerical input.

Specify the bottom left corner of the MCFF image as the starting point for the coordinates of the cutout image.
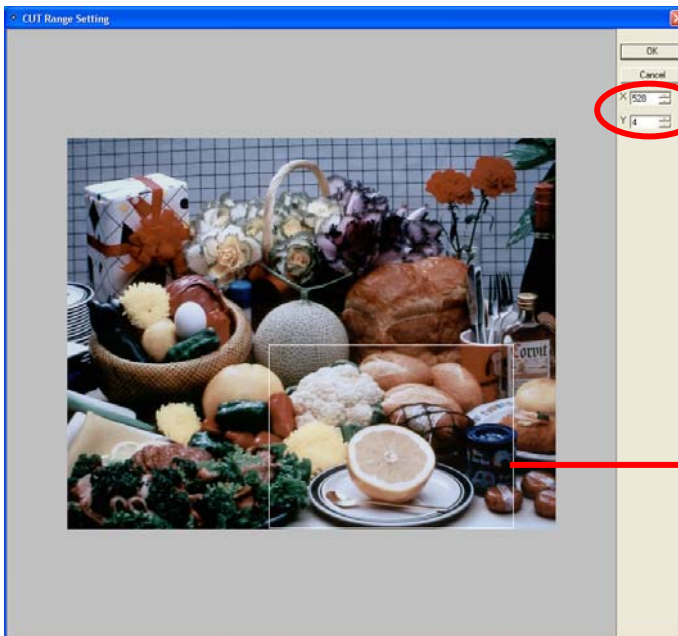
Specify the cutout position using numerical input for the X, Y coordinates for the bottom left corner of the cutout image
The bottom left corner of the MCFF image is the starting point for the cutout coordinates.

Use the mouse to drag the white frame shown on the image to specify the cutout position.

A display of the cutout image is as follows.
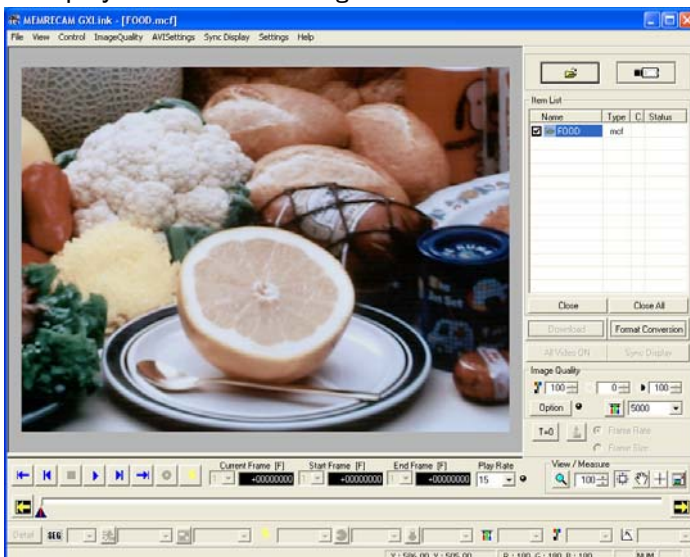
3.1 4 Rotate Image・Reverse Image

With the GXLink, the camera or MCFF file image can be rotated or reversed for display. AVI, BMP, TIFF and JPEG file images cannot be rotated for display.

Rotate Camera ・MCFF Images

Open the view menu when camera or MCFF are selected.

Select "Rotate Image" in the view menu and click on the rotation angle.

Angles that can be set include 0° (standard), 90°, 180° and 270°.

The image rotates in a clockwise direction.

Click the rotation angle.

The image is rotated for display.

Reverse Camera ・MCFF File Images

Open the view menu when camera or MCFF are selected.

Select "Reverse Image" in the view menu and click on the direction for reversal.

Items that can be set are Top Bottom, and Left Right.

Click on the direction for reversal.

Reversal image is displayed
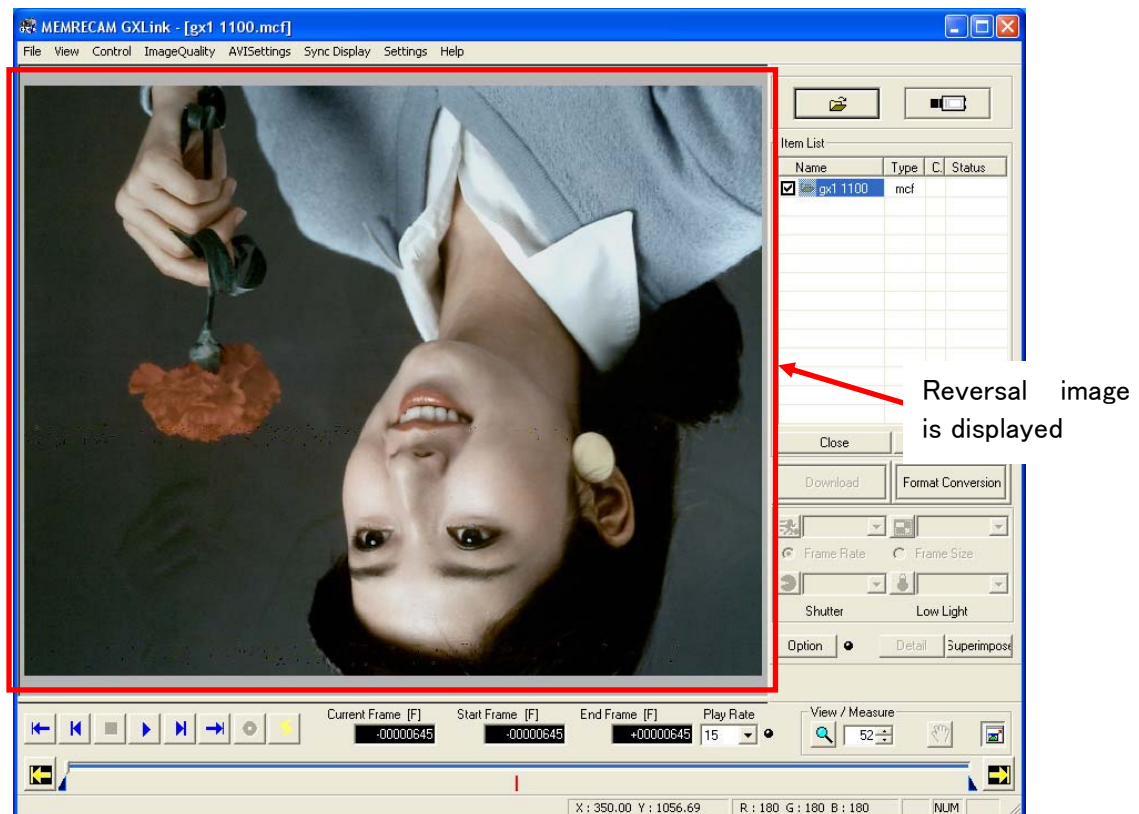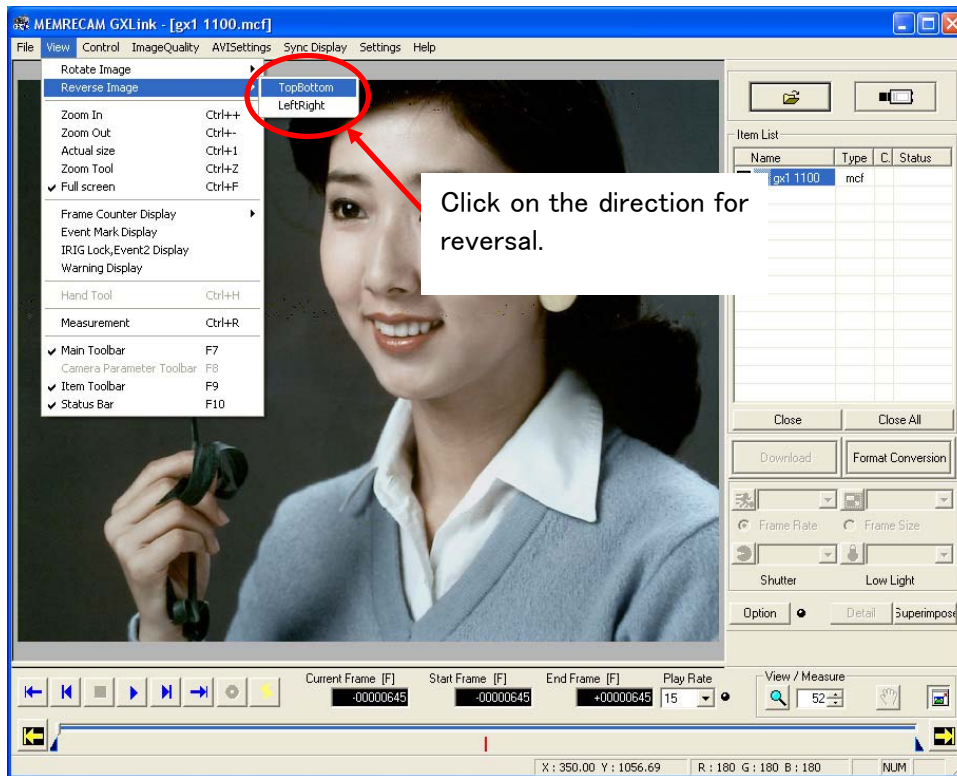
Display Rotation ・Display Reversal for MCFF File Images

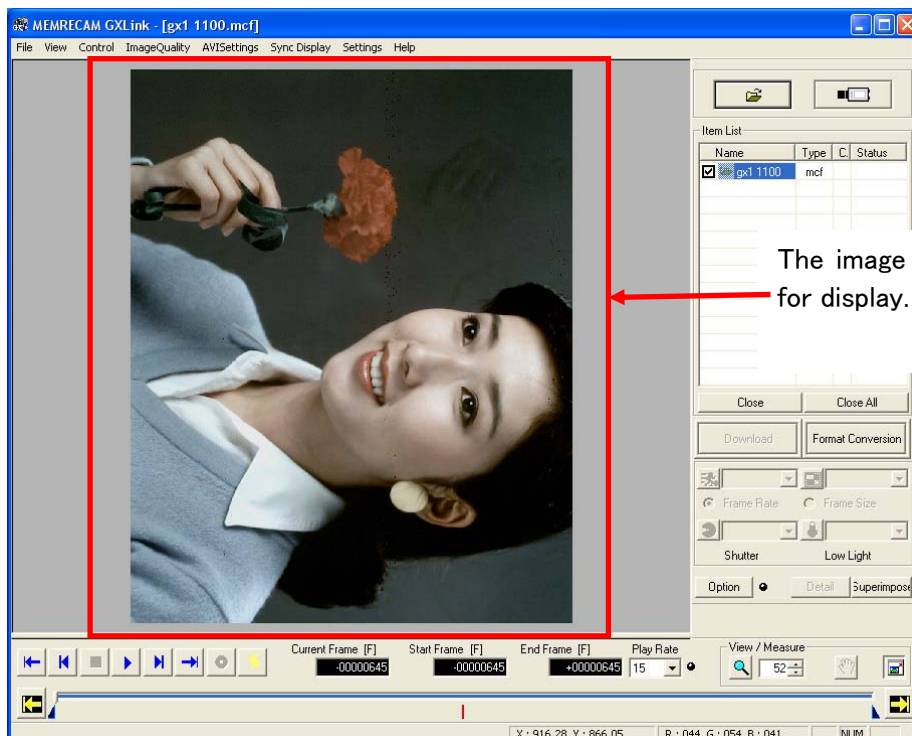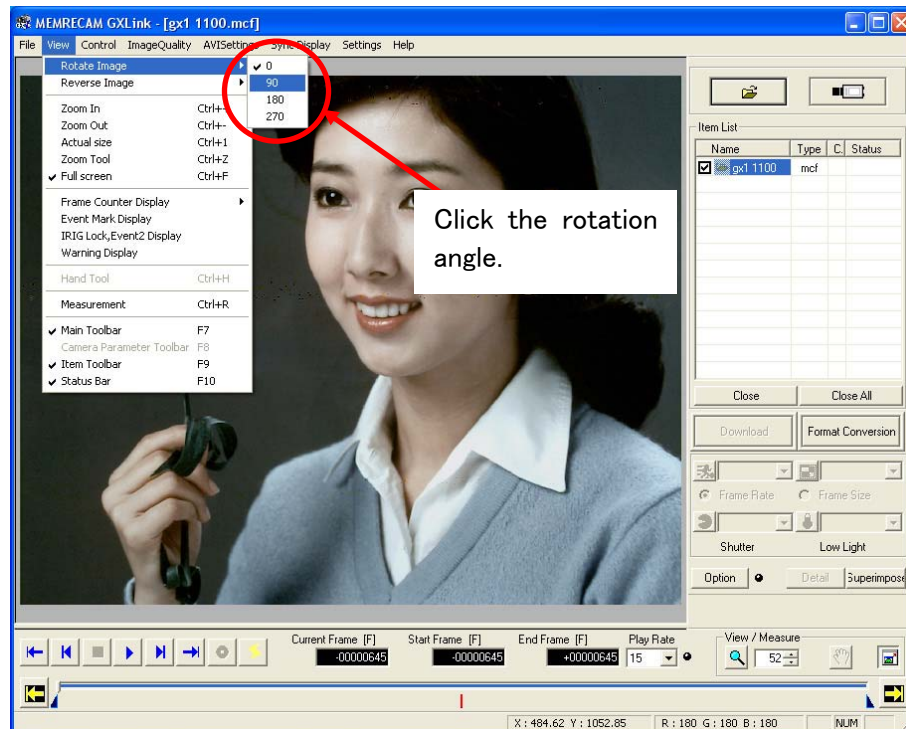If live camera images with the rotated ・reversed display are downloaded, the downloaded MCFF file images can be displayed with the rotation angle and reverse direction specified for the live camera image display.
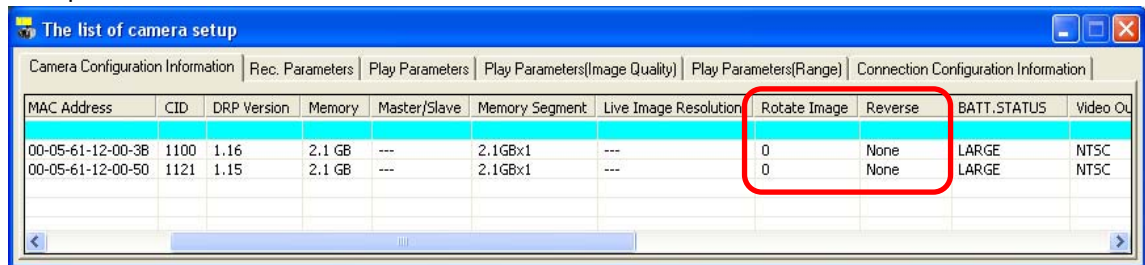
However, images in MCFF files do not contain the rotation angle or reverse direction displayed. As a result, when MCFF files are opened, the images are displayed with a rotation angle of 0° and without reversal.

Rotate Image ・Reverse Image for Format Conversion

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

"The List of Camera Setup" Window

When there are multiple cameras connected, in addition to the methods listed above, they can be designated using the "Camera Configuration Information" tab in "The List of Camera Setup".

Camera Configuration Information

3.15 Convert Image Format

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 Image Format" on the right click menu or click "Option" on the "Setting" menu to set the format conversion display on the "GUI Setup" tab to "Individual" and display the "Save As" window to save the converted file.
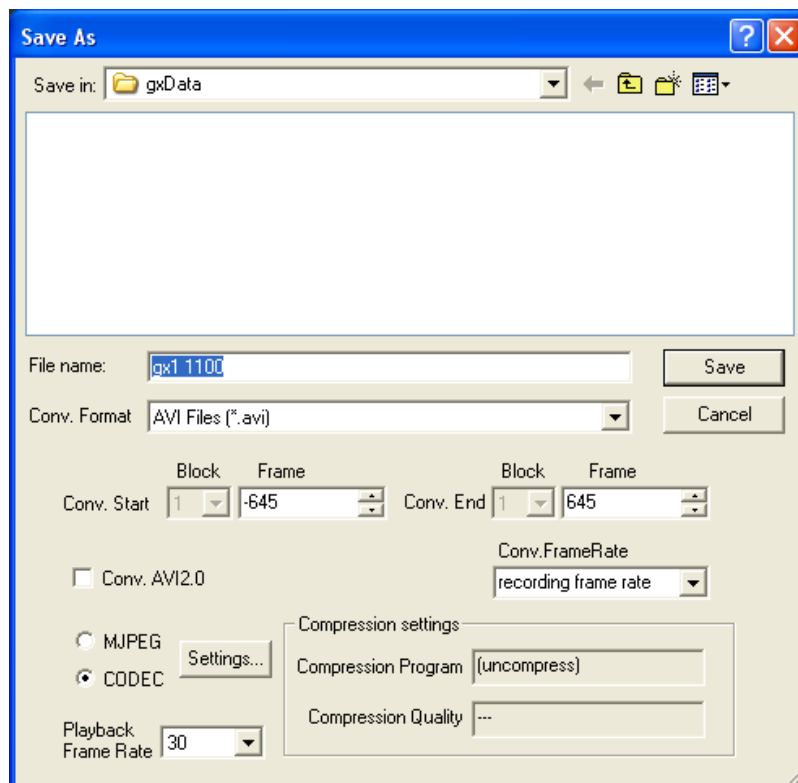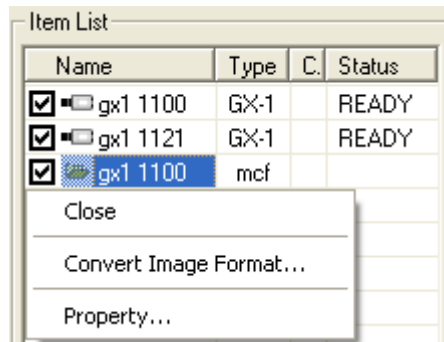
・Set the type of file, save folder for the converted file and file name, and then click "Save" to convert.

The conversion frame rate saved is the specified frame rate that culls frames during format conversion. Refer to page 3−76 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 playback speed used with the Windows Media Player and Adobe Premiere.

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" dialog box and update the compression rate.
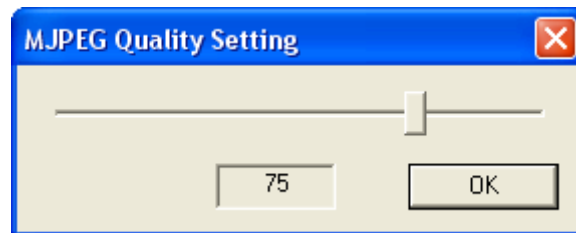
・"CODEC"
Converts to AVI files using codec.
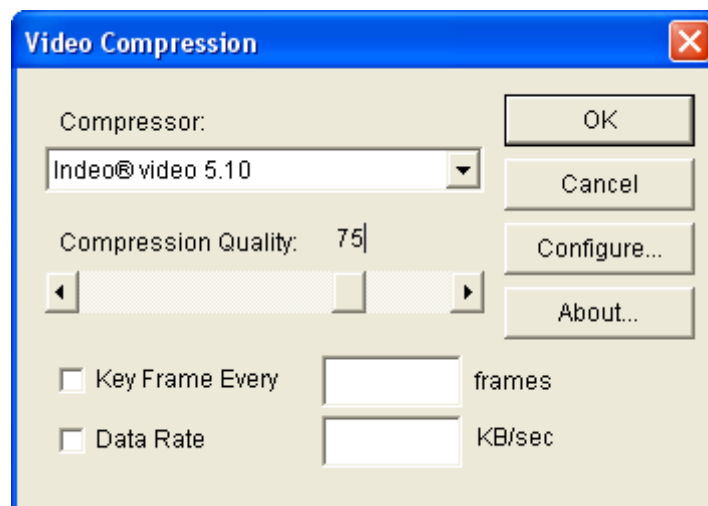
"Compressor"	Select codec used for conversion.
"Compression Quality"	Updates the compression rate.
"Key Frame Every"	The entire screen is converted at the set frame. That frame becomes the standard, with the subsequent frames recording only that portion so the recorded size is reduced. This is not performed unless the box is checked.
"Data Rate"	Sets the data transfer speed. In the same manner as "Key Frame Every", this is not set unless the box is checked.

Codec may not allow changes to "Key Frame Every" 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 "Setting" menu and if the "Collective (List)" is selected for format conversion on the "GUI Setup" tab, click on "Format Conversion" to display the "Format Conversion" dialog box for saving converted files.

"Format Conversion" dialog box

Double click on each cell 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 "Collective" row.

Parameters can be set for the selected MCFF in each MCFF row.

The following six items can be set in the "Format Conversion" dialog box.

☑   Format conversion for the MCFF checked.
            Remove the checks if there will be no format conversion.

Conv. Start [sec]   Start time/frame for the conversion range.
       [F]   Units for the absolute time setting are seconds. Can be specified up to one microsecond.
              With multi trigger recording, the conversion start time/frame is set for all blocks. The frame setting can be set at single frame units.

Conv. End [sec]   End time/frame for the conversion range.
       [F]   Units for the absolute time setting are seconds. Can be specified up to one microsecond.
  With multi trigger recording, the conversion end time/frame is set for all blocks.
              The frame setting can be set at single frame units.

Save as type   Specifies the type of file after conversion (AVI, TIFF, JPEG, BMP, MCFF).
              The default setting can be made from "Option" in the "Setting" menu. Refer to page 3-99 for details.

File name	File name after format conversion
Save in	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.

The following operations are performed with each button in the "Format Conversion" dialog box.

Conversion start   Starts MCFF format conversion for those checked.
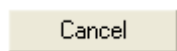
Cancel   Select the abort process from the dialog box shown below.

Format conversion interruption

Is the format conversion aborted?

Abort   will Abort at the next place after this file
Abort Now   will Abort immediately
Cancel   will cancel the Abort Process (No Action)

| Abort | Abort Now | Cancel |
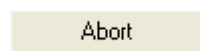
Abort   Formatting in progress continues but subsequent format conversions are cancelled.

Abort Now   Immediately aborts format conversions.
Cancels subsequent format conversions.
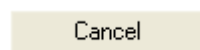
Cancel   Does not abort format conversion.
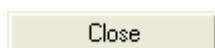
Close   Closes the "Format Conversion" dialog box.

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 image monitor. (To prevent the converted file from being opened after format conversion, set with "Default Conversion" in "Option" on the "Setting" menu)

■ Setting Fixed Values during Format Conversion

Click "Option" on the "Settings" menu to set fixed parameters used for format conversion. Refer to page 3-99 for details.

3.16 Frame Rate Conversion

The frame during format conversion is culled and is converted to the image file for the specified frame rate.
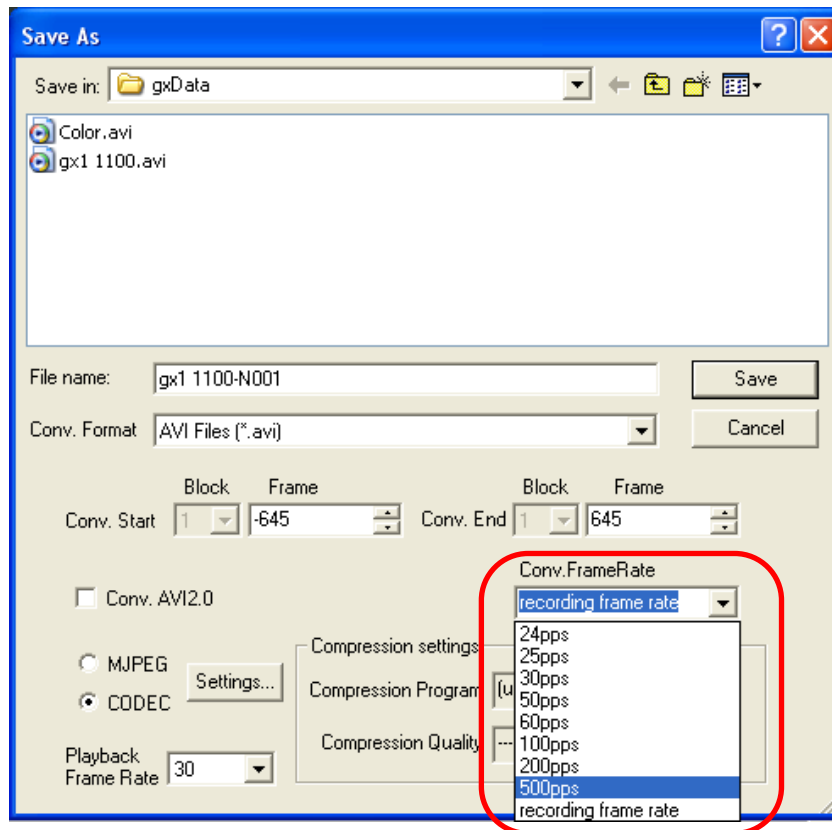
Culling is performed with the T=0 frame as the standard frame, and is subject to frame rate conversion.

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 "Default Conversion" in "Options".
　　・Specify the frame rate with the abovementioned "Save As" GUI.
　　　（There is no frame rate specified with batch conversion GUI.）

The frame rate can be selected from the pulldown menu for "Conv.FrameRate" or by setting a value in "Conv.FrameRate".

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 photographed, prior to conversion while the frame counter display is the time calculated from the converted frame rate.

3.17 Sync Display

Multiple selected images can be synchronized and displayed on the image monitor by opening multiple image files, selecting the images by checking the "Synchronized Display Setting" box on the item list and clicking "Sync Display" on the "Sync Display" menu.
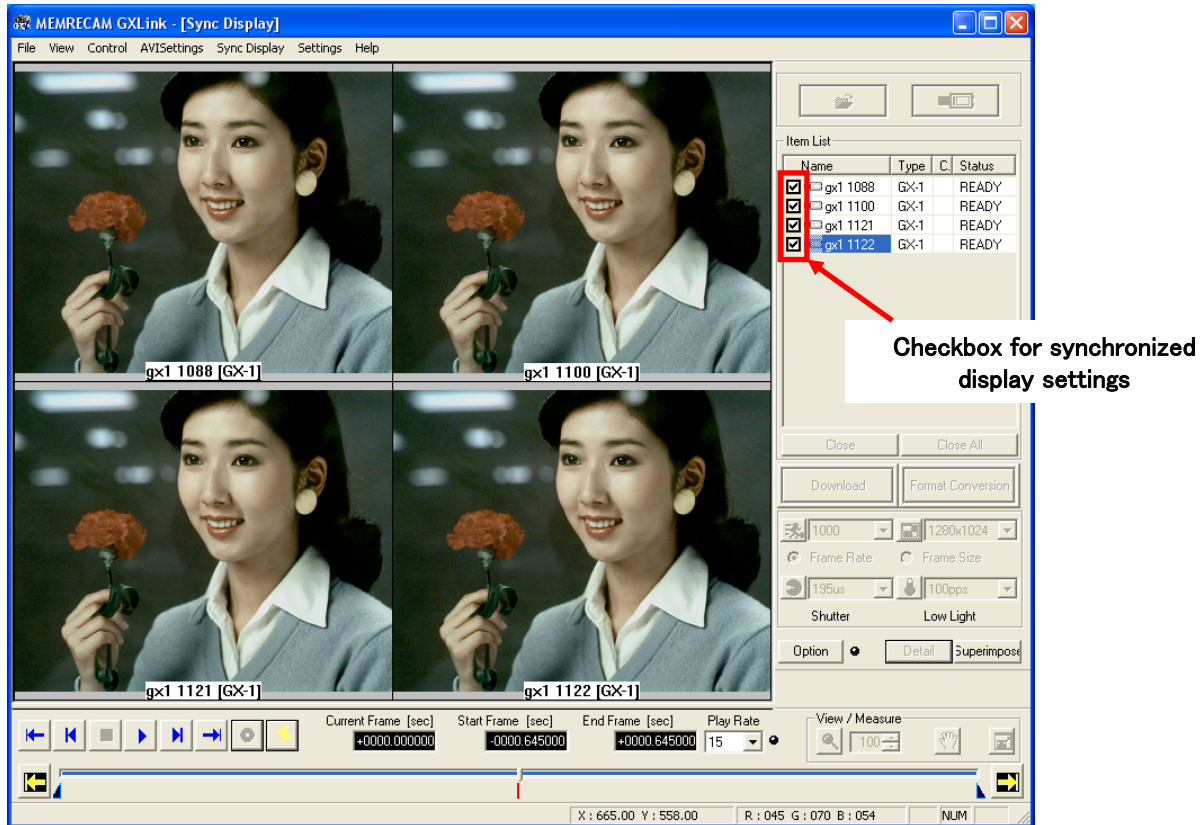
Cameras and files can be synchronized for display. Playback with synchronized display is performed by playing back each image at the same time. With the camera mode in VIEW, ARM or REC, the files are displayed as still images.

If any of the images are double clicked during synchronized display when playback is stopped, the synchronized display is halted and the double clicked image is shown on the image monitor.

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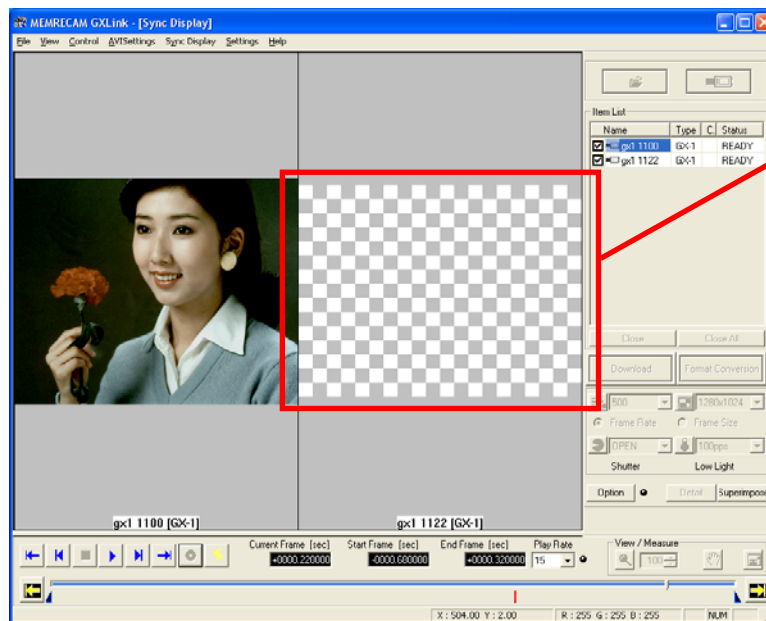
Since the current frame is outside the range, a checkerboard pattern is shown.

The time interval for updating images during synchronized playback is the frame rate for the selected image.

If the selected image is not synchronized for display, the image for the fastest frame rate for the synchronized display is played back at the speed of the play rate.

If the frame rate for each image on the synchronized display is 500pps, 1000pps, or 5000pps, and synchronized display is conducted by selecting the 1000pps image, the time interval for updating the images becomes 0.001000sec (1 millisecond).

3.18 T=0 Setting

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 confirms the photographed image and sets T=0 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 ⎡T=0⎤ to display the "T=0 Setting" dialog box.
In Basic Mode, click "T=0 Setting" in the "Control" menu to open the "T=0 Setting" dialog box.
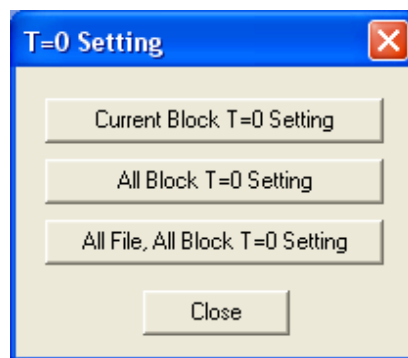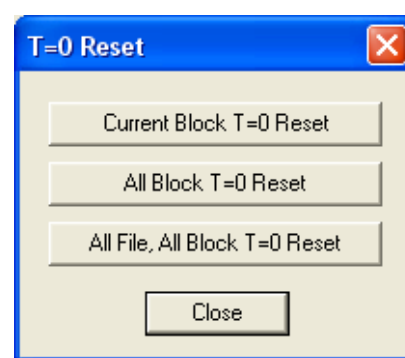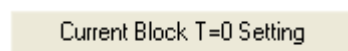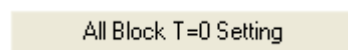
"T=0 Setting" dialog box   "T=0 Reset" dialog box

■"T=0 Setting" Dialog Box

Current Block T=0 Setting	Changes the frame displayed to the T=0 frame.
All Block T=0 Setting	(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.
All File, All Block T=0 Reset	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.
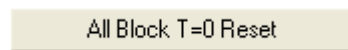
■"T=0 Reset" Dialog Box
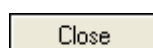
Current Block T=0 Reset	Sets the trigger frame for blocks containing the frame displayed to the T=0 frame.
All Block T=0 Reset	(only when multi trigger recorded files are open) Sets the T=0 frame for all blocks in the displayed files to each trigger frame.
All File, All Block T=0 Reset	Sets the T=0 frame for all files displayed in the item list to each trigger frame.
Close	Closes the "T=0 Setting" and "T=0 Reset" dialog boxes.

■Procedure to Amend T=0 (Expert Mode only)

1) Open file (MCFF,CIF,AVI,BMP,TIFF,JPEG).
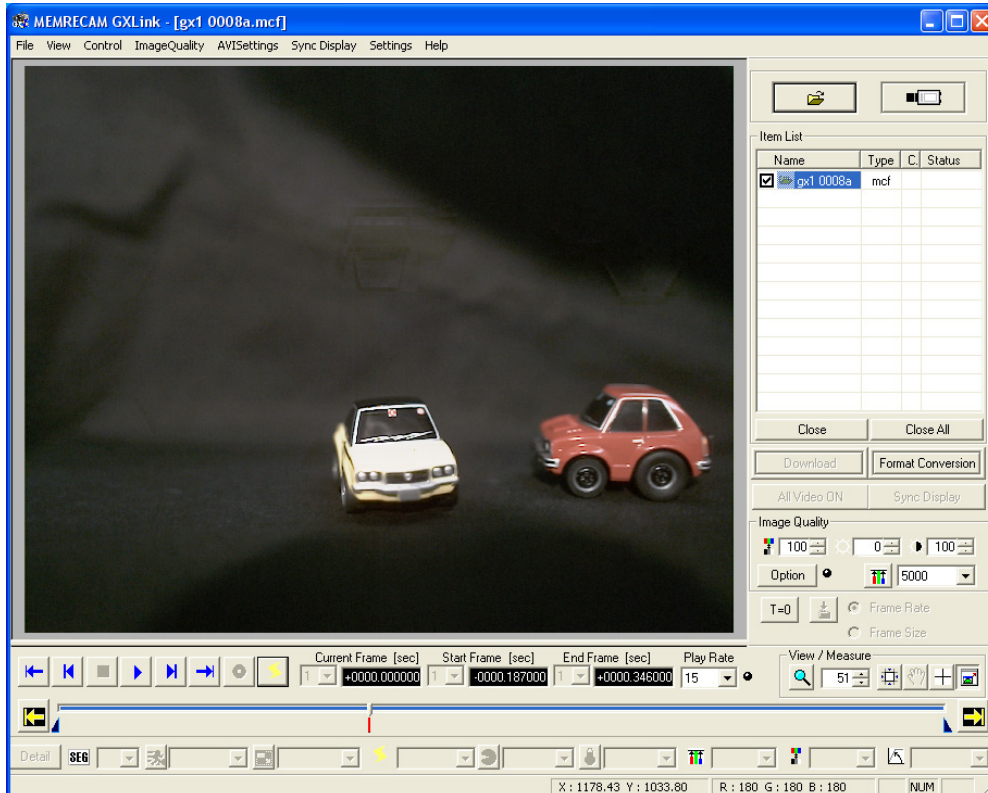
2) Move frame by frame to the frame where the T=0 frame is set and click "T=0".
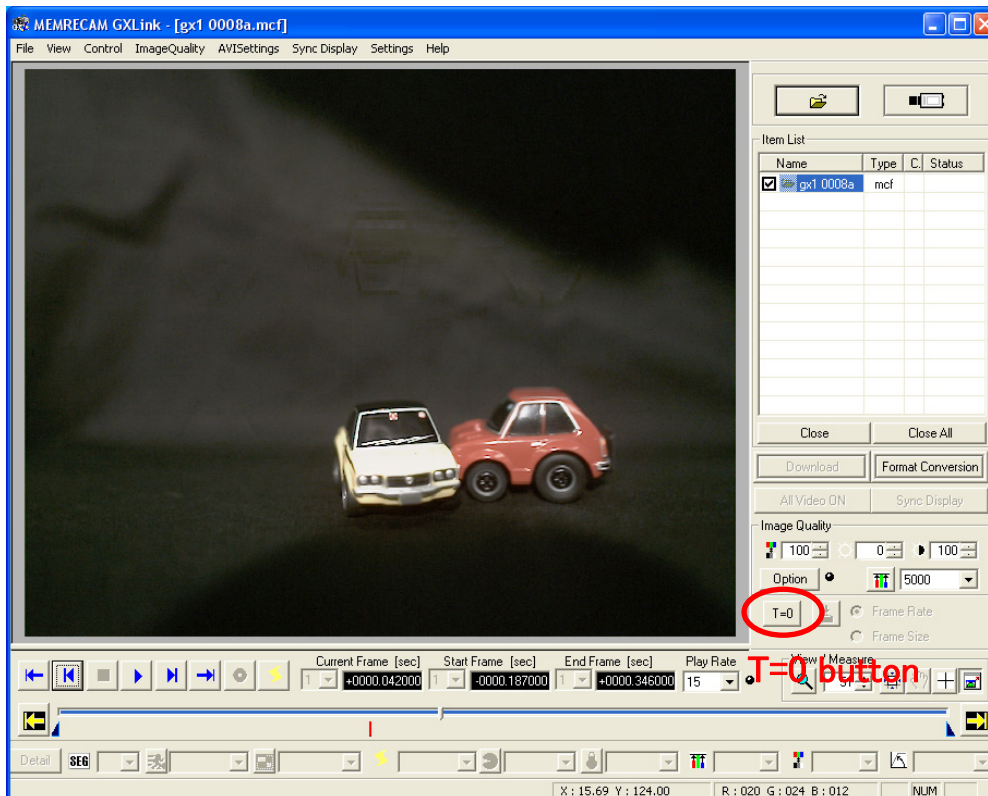
3) After the "T=0 Setting" dialog box is displayed, click "Current Block T=0 Setting".
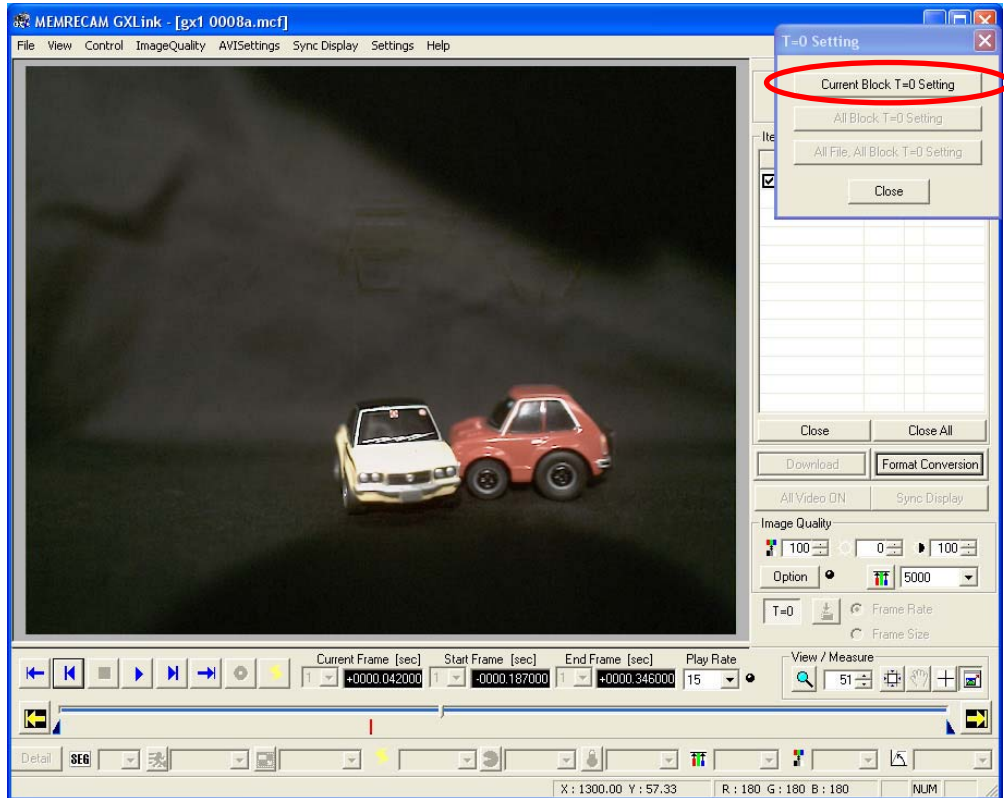
4) The T=0 frame is updated.
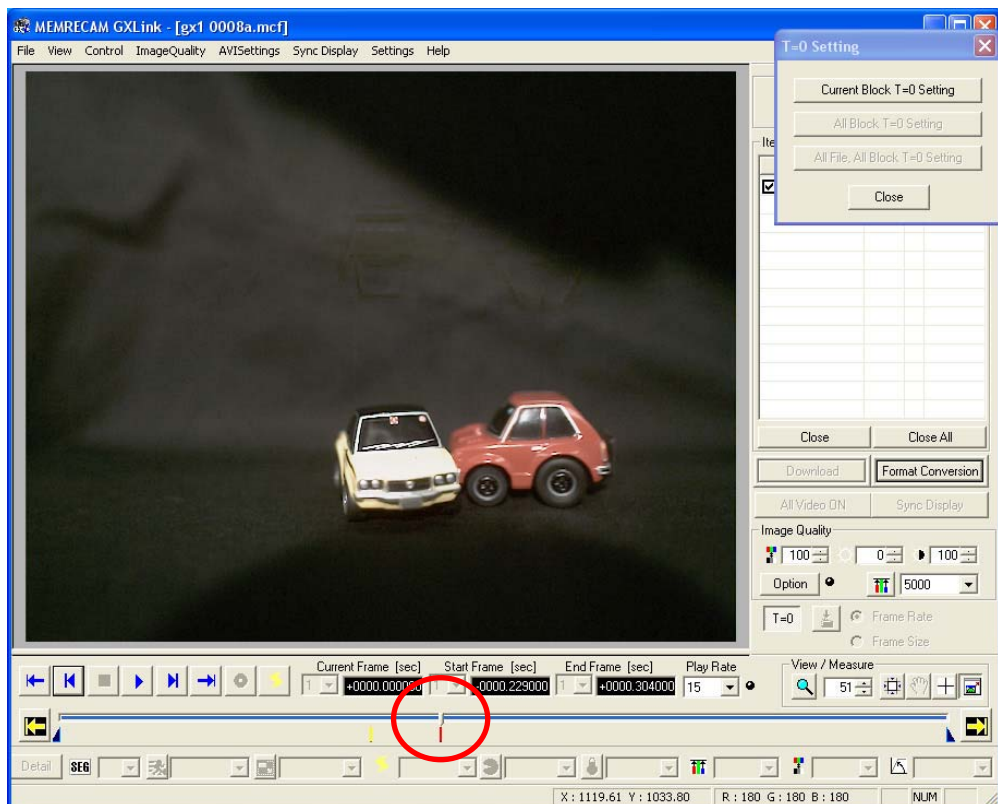
5) When resetting the T=0 setting, select "T=0 Reset" on the "Control" menu.
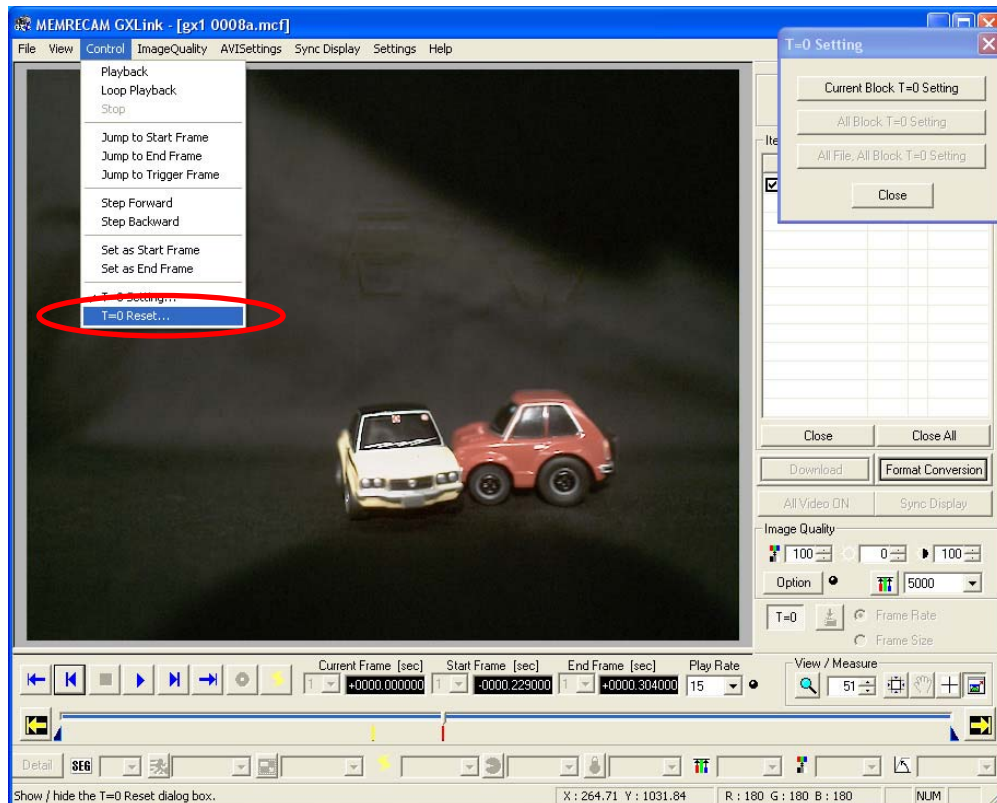
6) After the "T=0 Reset" dialog box is displayed, click "Current Block T=0 Reset".
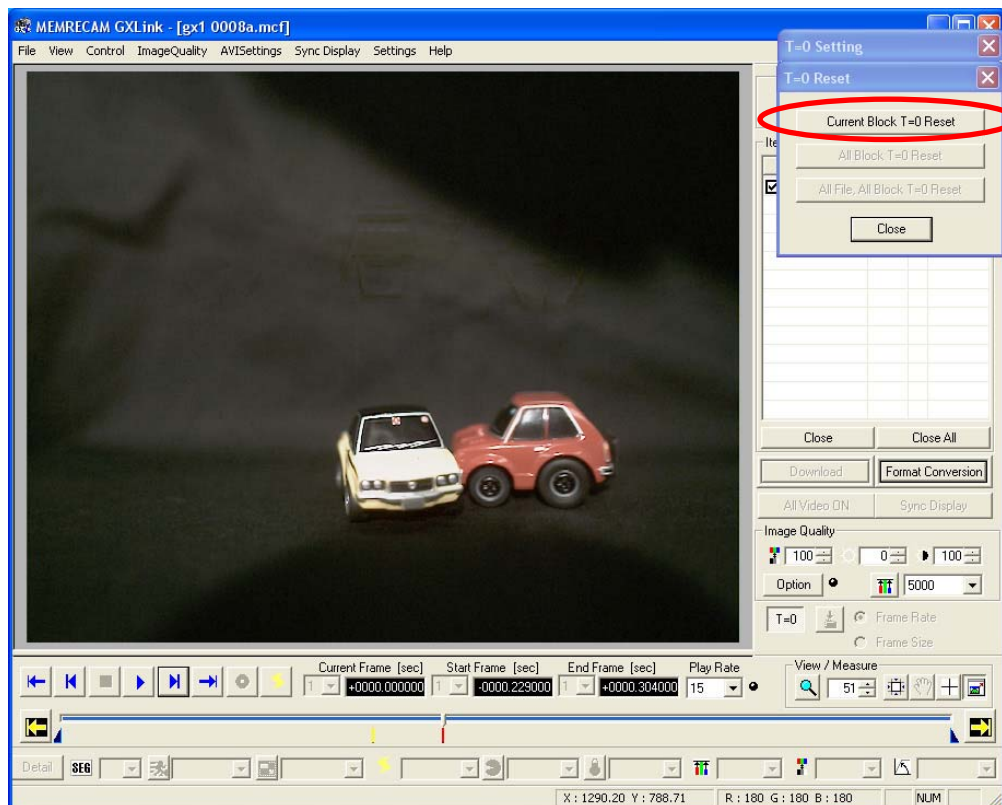
7) The changes to the T=0 frame made with the T=0 setting are invalidated and it returns to the original T=0 frame.
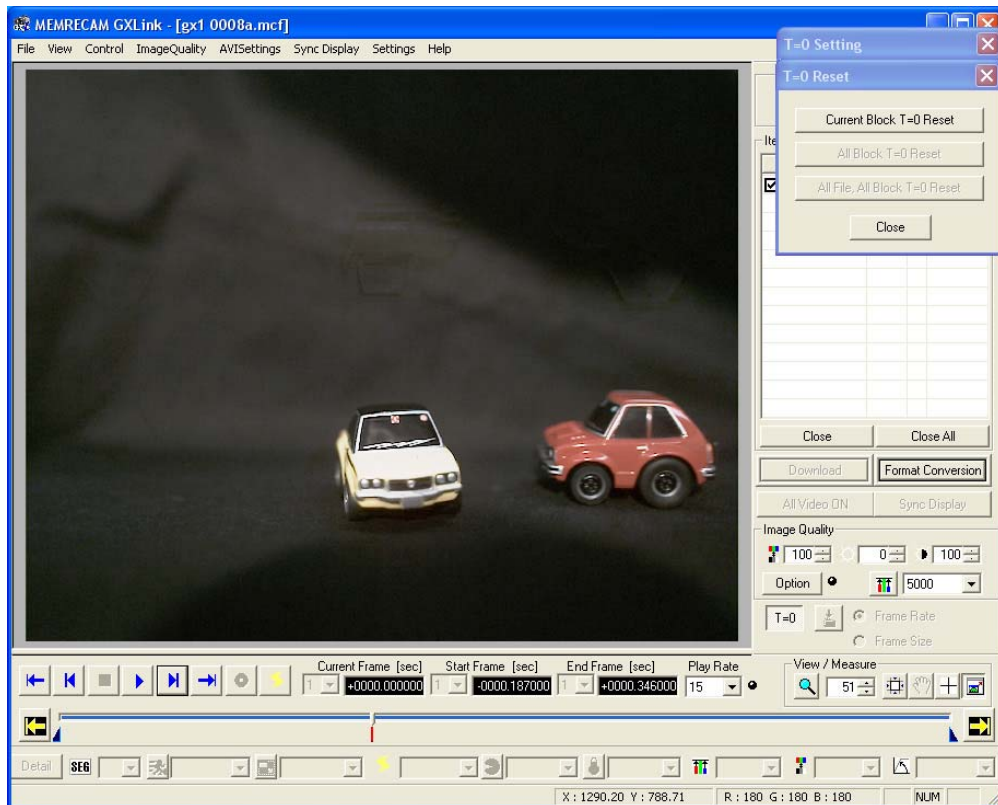
The following warning is shown for the T=0 setting.

With fx series camera image files (MCFF), if format conversion is MCFF→MCFF, the T=0 setting can apply.

With ci series camera image files (CIF, MCFF), the T=0 setting is not supported.
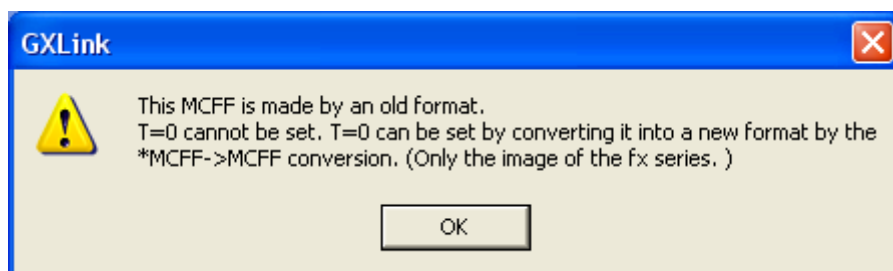
T=0 Setting/Reset is not possible with BURST recorded files.
If T=0 Setting/Reset is used with BURST recorded files, the following warning is displayed.

GXLink

⚠ T=0 cannot be set to the BURST recorded image.

OK

GXLink

⚠ T=0 cannot be reset to the BURST recorded image.

OK
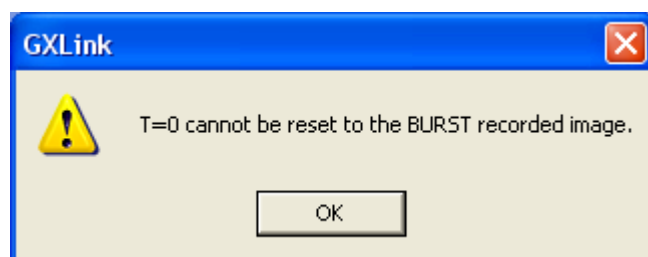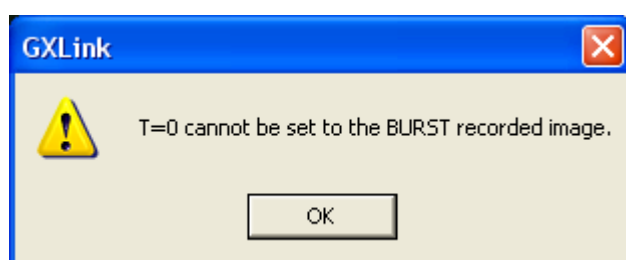
If T=0 Setting/T=0 Reset is used when multiple files are open, the following warning is displayed for the BURST recorded files. Click as directed.

GXLink

⚠ T=0 cannot be set to the BURST recorded image.

Click [OK] to set T=0 except the BURST recorded image.
Click [Cancel], in order not to perform T=0 Setup.

OK   Cancel

GXLink

⚠ T=0 cannot be reset to the BURST recorded image.

Click [OK] to reset T=0 except the BURST recorded image.
Click [Cancel], in order not to perform T=0 Reset.

OK   Cancel
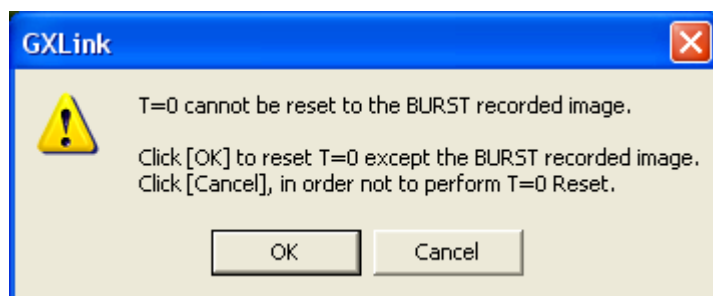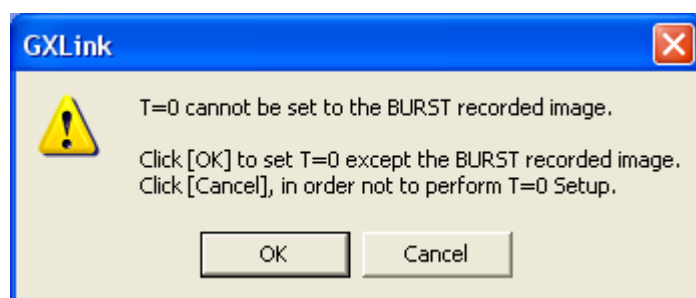
3.19 View ・Measure

Use the view and measure buttons on the main toolbar to zoom or scroll on the image monitor, display the coordinates of a specific point and save to a coordinate point file (CSV format) for coordinate data.

Expert Mode "Main Toolbar"
view / measure
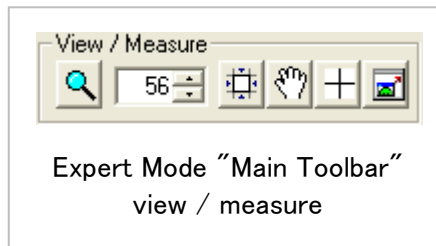
🔍	Zoom Tool	Switch to the zoom mode
100	Zoom magnification	Numerical setting for zoom magnification
	CUT Range Setting	Setting for cutting for 640 × 480 (Expert Mode only) Click "Cutout" (640x480) in the "AVI Settings" for the Basic Mode cutout settings.
	Hand Tool	Switch to image scroll mode
+	Measurement	Switch to measurement mode Click "Measurement" on the "View" menu to measure coordinates in basic mode.
	Full screen	Setting to automatically enlarge to match the size of the window

The X coordinates, Y coordinates and RGB values for the cursor position are shown on the status bar.

X : 338.00 Y : 712.00   R : 233 G : 251 B : 254   NUM
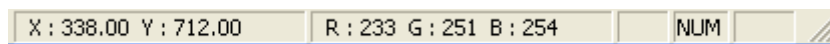
Zoom Display

The three designations for the zoom display include designating a point, designating a rectangle and designating the magnification.

Click "Zoom Tool" to switch to the zoom mode where the cursor is shown as a magnifying glass.

Click "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 to be zoomed.

The sides of the rectangular area designated will be enlarged for display on the image monitor.

| Rectangular designation | Zoom view |
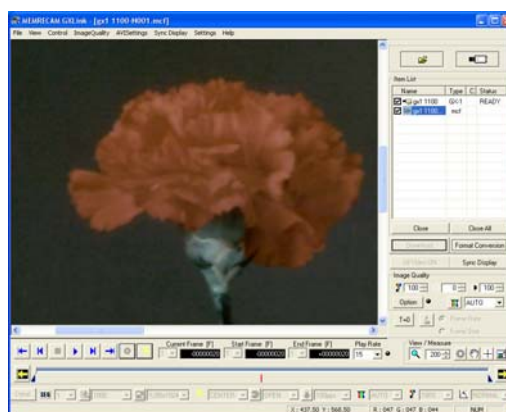
■ For zoom designating the magnification, input a numerical value for the zoom magnification.

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.

Scroll Function

To scroll the displayed image, either scroll using the scroll bar on the image 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.

Click on the image and move the mouse in the direction you wish to scroll to scroll on the image.

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

This is different from the zoom/scroll function for live output on a 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 3-46 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.

Measurement

If the cursor is moved on the image monitor while an image is being displayed, the X coordinates, Y coordinates and the RGB values for the image where the cursor is located are shown on the status bar.

In the initial step where the item is opened, the point of origin for the X coordinate and Y coordinate is set by the bottom left corner of the image.

Click ⊞ the measurement button to display the measurement dialog box.

The X coordinates and the Y coordinates can be measured for a maximum of 10 points.
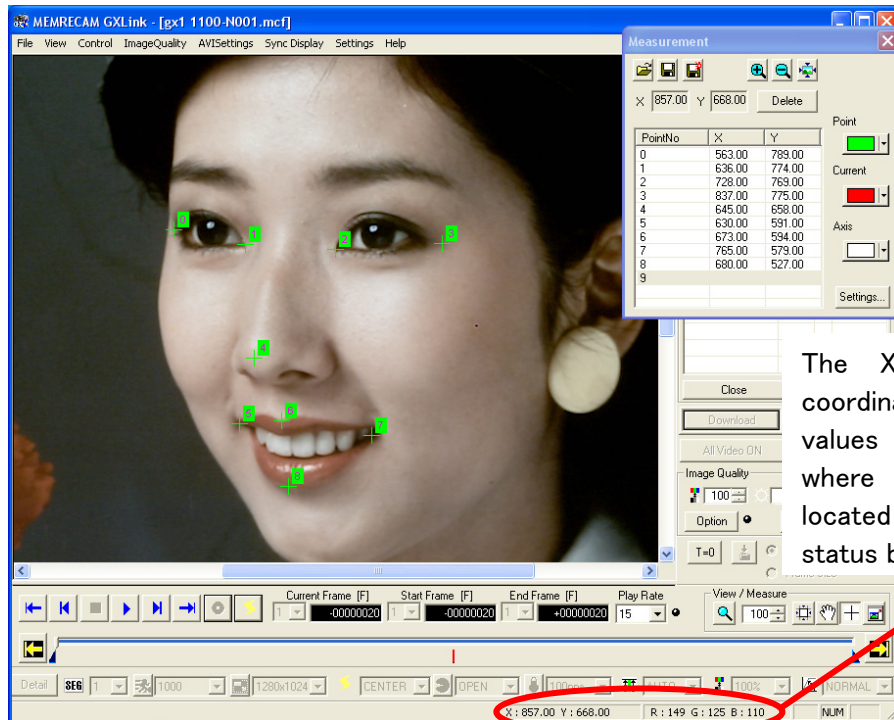
The X coordinate, Y coordinate and RGB values for the image where the cursor is located is shown on the status bar.

Click the left mouse button on the point on the image monitor to be measured and a cross-shaped cursor and a point number will be displayed. The point and the coordinates of that point will be added to the list in the measurement dialog box.

Right click the mouse to designate the point of origin and display the X and Y axis.

Set the point of origin and subsequent coordinate point data will be from that point of origin.

To change the coordinate data point measured, select the point to be changed from the list in the measurement dialog box and then click the left button on the mouse to change the coordinate point.

The axis and the color of the coordinate data point can be changed with the right button in the measurement dialog box.

Also, the coordinate data point (current point) currently selected can be changed to a different color.

The coordinate data point measured and the location of the point of origin can be saved as a coordinate point file (CSV).

The coordinate point data of a saved file can be modified.

(open icon)	Open a coordinate point file (CSV).
(save icon)	Overwrite and save a coordinate point file (CSV).
(save as icon)	Assign a name to a coordinate point file (CSV) and save.
(zoom in icon)	Enlarge an image on the image monitor.
(zoom out icon)	Reduce an image on the image monitor.
(actual size icon)	Display an image on the image monitor as the actual size.
Delete	Delete the selected coordinate point data.
Settings...	Calls the "XY Coordinator Settings" dialog box (Point No. Settings/Save the RGB data). The current point when the frame is moved can be designated and a setting for RGB value out can be made. Click ⸢Settings...⸥ to set the point number when the current frame is changed and to set the CSV output for the RGB value.
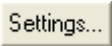
Use the "Point No. Settings" tab to set the current point number when the frame is moved. If "Select Point No. 0." is selected when the frame is moved, the point number becomes 0.
If "Keep Point No. at previous frame" is selected when the current frame is moved, the point number is the point number selected before the frame was moved.
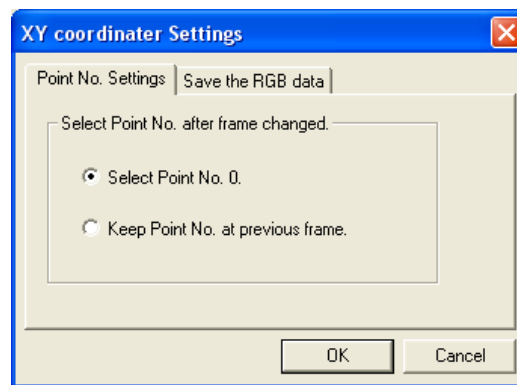
Check "Save the RGB data of a coordinates point to the file" under the "Save the RGB data" tab to save the coordinate location and the RGB value to the coordinate point file (CSV).
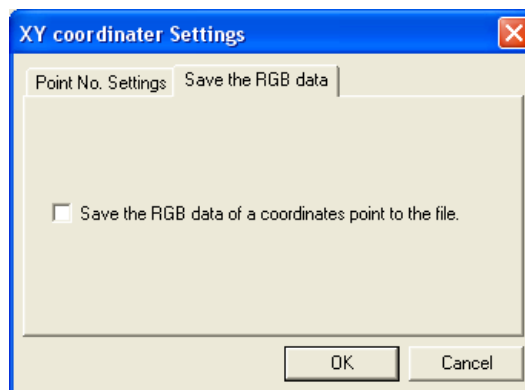
The process for measuring coordinates is as follows.

① Select the item to be measured from the item list to display the image to be measured on the image monitor.

② Click ＋ the measurement button to display the measurement dialog box.

③ Set the point of origin to be measured on the screen.

Move the cursor to the location of the point of origin on the screen to be set and right click on the mouse.

Select "Set Origin" shown on the menu to set the position of the cursor as the point of origin.

④ Move the cursor to the focal point (measurement point) of the image and left click on the mouse.

Each time the left mouse button is clicked, the coordinate point data is added to the list on the measurement dialog box.

Use the zoom view to precisely designate the focal point.

(the zoom view does not impact the display of the coordinate point data for the focal point)

⑤ Call a different frame to the screen and click the focal point in the same manner as done in ④.

⑥ After measuring the focal points, click "Save As" in the measurement dialog box and specify a CSV file name to save. (coordinate data points measured but not saved in a CSV file are lost)

⑦ Click ✛ the measurement button again to end coordinate measurement.

Use software such as Notepad or EXCEL to read the saved coordinate data files.
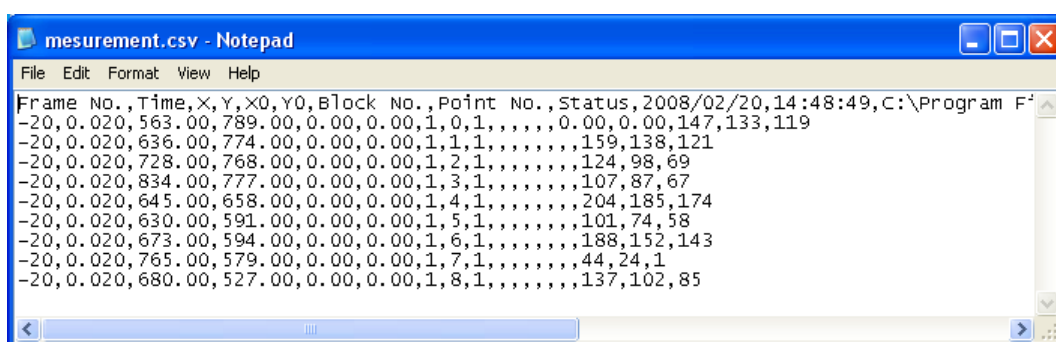
Example of coordinate point file (CSV) opened with Notepad
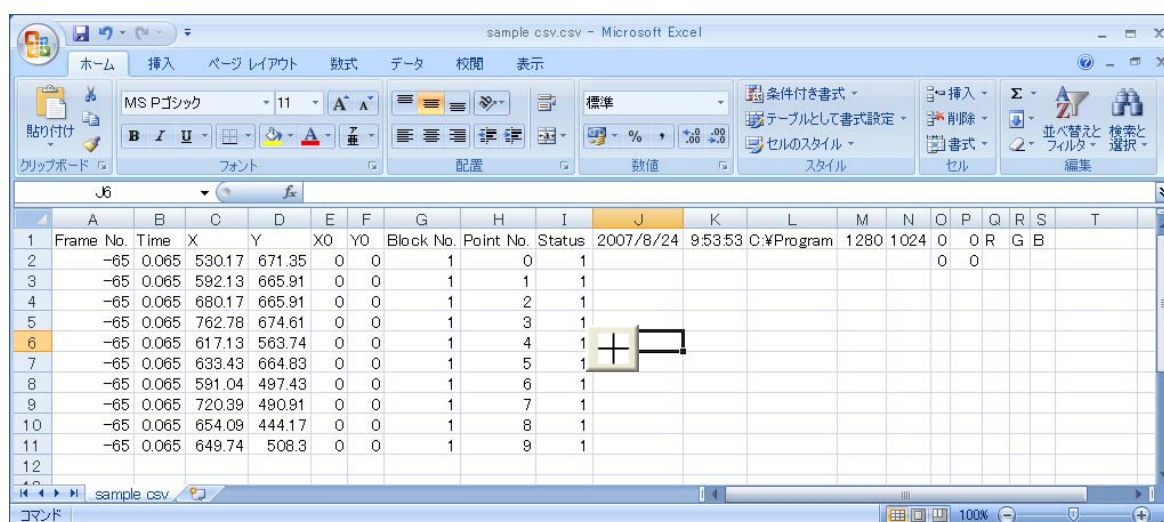
Example of coordinate point file (CSV) opened with EXCEL

Items that can be Saved in a Coordinate Point File (CSV)

1. Frame No.   Frame number for the coordinate point image

2. Time   Relative time for the coordinate point image [msec] (frame number 0 is 0 msec)

3. X   X coordinate for the coordinate point (using the point of origin of X0 as the standard)

4. Y   Y coordinate for the coordinate point (using the point of origin of X0 as the standard)

5. X0   X coordinate for the location of the coordinate point of origin (using the bottom left corner of the image as the standard)

6. Y0   Y coordinate for the location of the coordinate point of origin (using the bottom left corner of the image as the standard)

7. Block No.   Block number when the measurement image is photographed

8. Point No.   Measured point number (number starting from 0)

9. Status   Status of the coordinate point data (0：invalid data, 1：valid data)

10. Date CSV File Created   Date title saved in a coordinate point CSV file

11. Item Information   File path for image file; nickname for camera

12. Image Width   Width of image measured (X)

13. Image Height   Height of image measured (Y)

14. X Coordinate for Point of Origin

  X coordinate for final point of origin in the measured frame (using the bottom left corner of the image as the standard)

15. Y Coordinate for Point of Origin

  Y coordinate for final point of origin in the measured frame (using the bottom left corner of the image as the standard)

16. R   R value for the coordinate point

17. G   G value for the coordinate point

18. B   B value for the coordinate point

Items 10〜13 are saved when the file is saved, and items 14, 15 are saved when the X and Y coordinates for the point of origin set after coordinate measurement are saved.

Items 10〜15 are saved in the smallest point number for each frame and only the X and Y coordinates for the point of origin set in a frame are saved in items 14,15.

Points are shown for the coordinates before rotation during coordinate measurement and when the image is rotated.

3.20 Other Functions

■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" on the file menu.
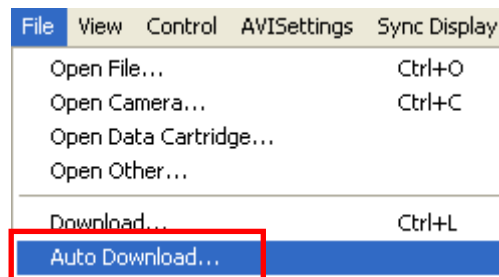
・Click "Auto Download" on the item toolbar. (Expert Mode only)
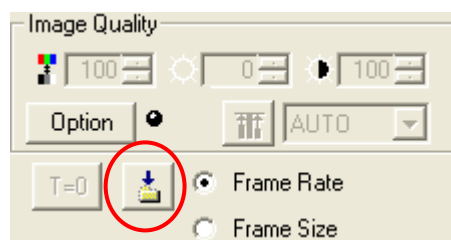
When the item to download under "GUI Setup" on the option menu is "Individual", the "Save As" dialog box will be displayed.

When the item to download under "GUI Setup" on the option menu is "Collective (List)", the "Download" dialog box for the table will be displayed.

pe	CAMERA	Seg	Rec. Top[F]	Rec. Bottom[F]	Frame Rate	Save. Start[F]	Save. End[F]	File name	Save in
X-1	0	1	---	---	2000	---	---	gx1 1100-N002.mcf	gxData
X-1	0	1	---	---	1000	---	---	gx1 1121-N002.mcf	gxData

☐ Automatic format conversion

Download time   All

Download time

[OK]   [Cancel]   [Cancel]

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 where the trigger frame is 0.

Once the camera has finished recording, an automatic download is performed, it is saved under the file name set for the designated folder and a file item is added to the item list.

■Automatic Format Conversion Function

Function to automatically convert the format after downloading according to values set in advance.

To set auto format conversion, first connect a camera and record, check "Auto Format Conversion" in either the "Download" dialog box or the "Save As" dialog box, and then click "Save" or "OK".
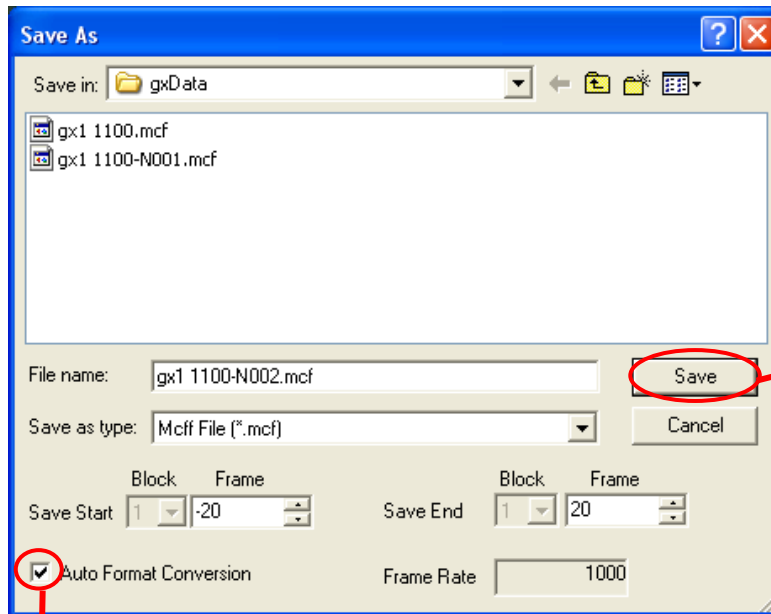
2.After specifying the download, click "Save".

For "Individual" Download in GUI Setup

1. Check box
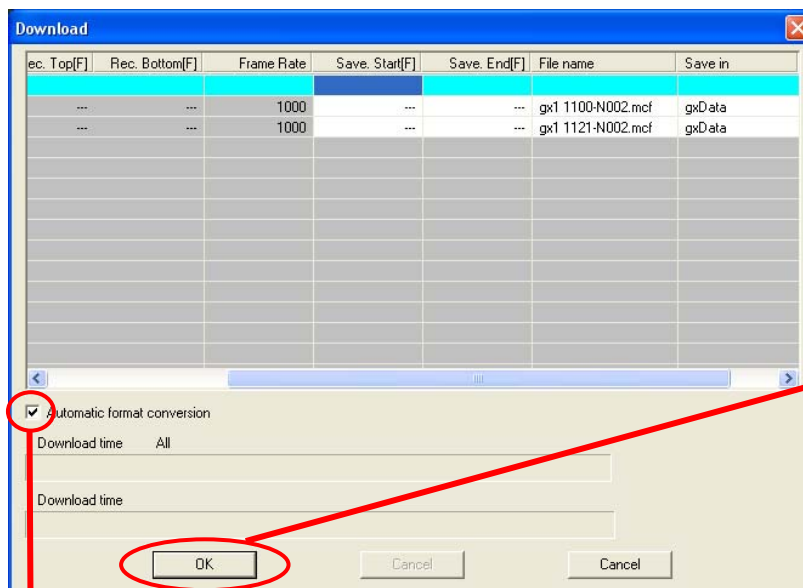
2.After specifying the download, click "OK".

For "Collective (List)" Download Items in GUI Setup

1. Check box

Then, the "Format Conversion" dialog box will be displayed to set the location and the file name for the format converted file to be saved.
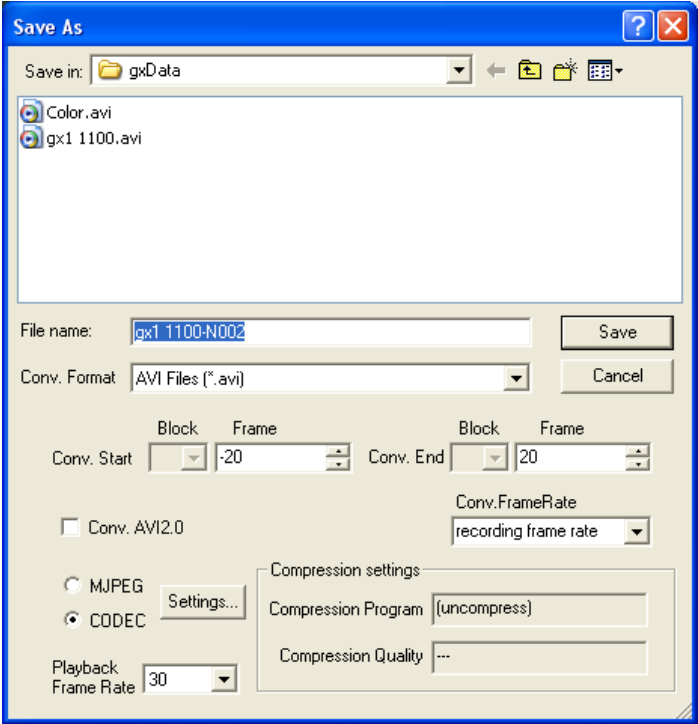
For "Individual" Download in GUI Setup
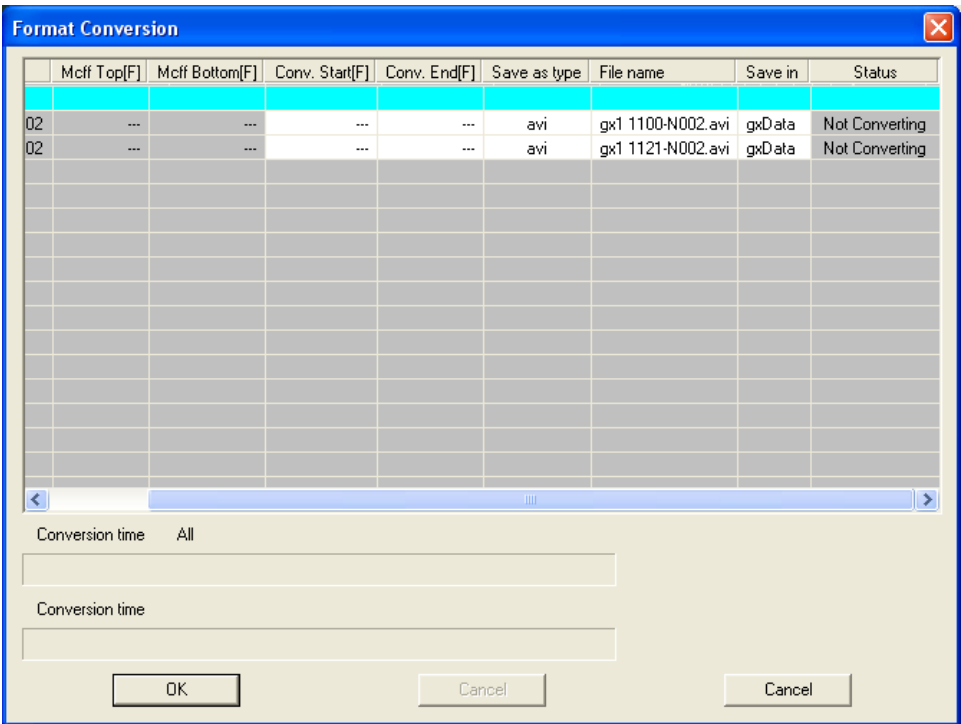
For "Collective (List)" Download Items in GUI Setup

After setting items such as the type of file and compression settings, click "OK". Refer to 3-72 for details on each setting.

After the download has been completed, the format conversion will automatically start.
Once the download and format conversion have been completed, the file saved will be registered on the item list and the last camera image downloaded will be displayed.

(00168)

■Composite Display

    While a camera is connected, a live camera image and a specific image file can be combined for display.
Composite display is used when reproducing past photographs. Previously photographed images are used for comparisons and adjustments for the position of the location or subject photographed.

    To use composite display, first select the image file (BMP, JPEG) to be reproduced in "Select Composite File" in the view menu. Next, click "Display Composite Image On/Off" on the view menu to combine the live image and the image file. 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 "Select Fit Direction" in the view menu.
Select any of the following.

Height	Adjusts the display of the image file to match the height of the frame size and the height of the image file.
Width	Adjusts the display of the image file to match the width of the frame size and the width of the image file.

    In any of these cases, if the center of the image matches, the height/width ratio is not changed.
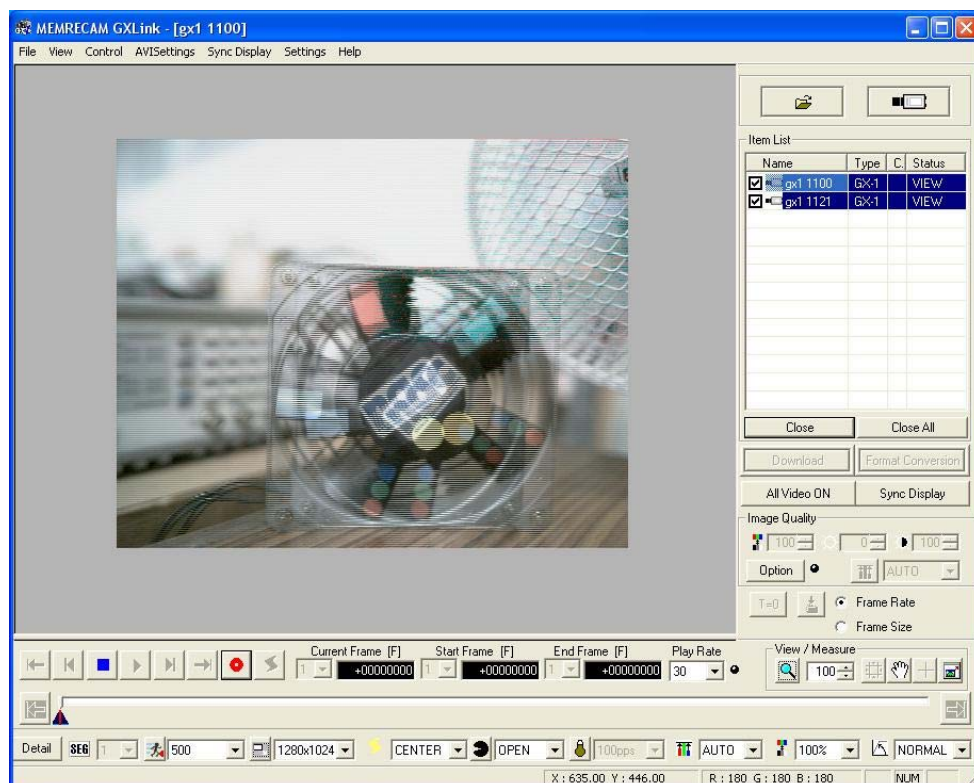
Composite Display

    Set the zoom magnification to a multiple of 100% using the zoom tool to enable the composite display to function properly. This function uses a method of forming even numbered lines for one image and odd numbered lines for the other image so if the zoom magnification is set to something other than a multiple of 100%, the composite display will not be properly formed.

3.21 Option Settings

■Default Folder

    Specifies the input folder and save folder.
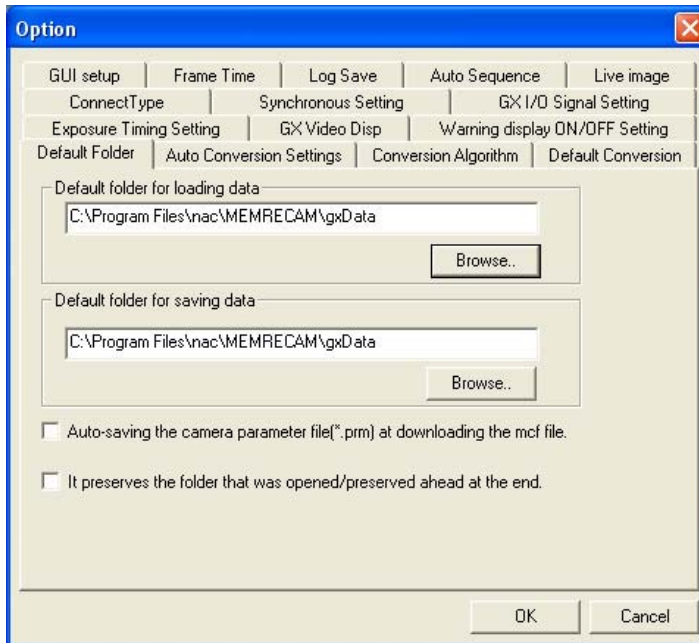
In the "Default folder for loading data", set the reference folder when the image file is open. In the "Default folder for saving data", set the reference folder when the downloaded/format converted file is saved.

If the "Auto-saving the camera parameter file[*.prm] at downloading the mcf file." is checked, the file saved (prm file) with the camera settings when the camera image file (MCFF) was downloaded is saved together with the MCFF.
The camera settings for the prm file can be reflected in the camera connected.
The prm file contains the following contents.

    ...

WB=3100K	White Balance
GAIN=0db	Gain
GAMMA=NORMAL	Gamma
ENHANCE=HIGH	Enhance

    ...

Refer to Appendix C for details.
If "It preserves the folder that was opened / preserved ahead at the end." is checked, the designated folder is set in the "Default folder for loading data" and the "Default folder for saving data" each time a file is opened or saved.

■Auto Conversion Settings

　　　When MCFF format or CIF format files are opened, they reference conversion setting files
　　　（FCV）where the image quality adjustment, conversion settings and range designations were
　　　set.
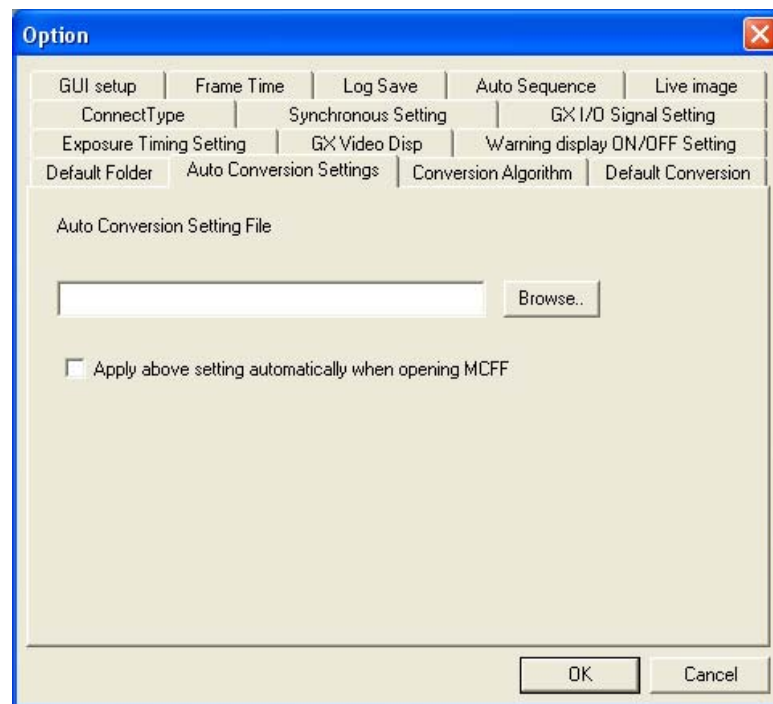
　　　With "Auto Conversion Settings", if "conversion setting files (FCV)" is designated and
　　　"Apply above setting automatically when opening MCFF" is checked, the light to the right of
　　　"Option" on the image quality adjustment part of the item toolbar (Expert mode only) turns
　　　green and then the "conversion settings" are reflected in the open "camera image file
　　　(MCFF)".
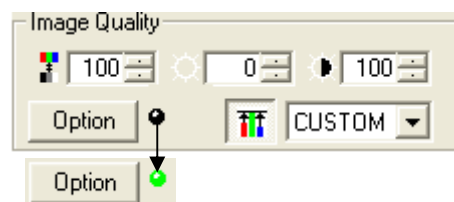
■Conversion Algorithm

Designate the format conversion algorithm with the "Conversion Algorithm" tab.

⚠ Caution   This item must be set before the MCFF file is opened.
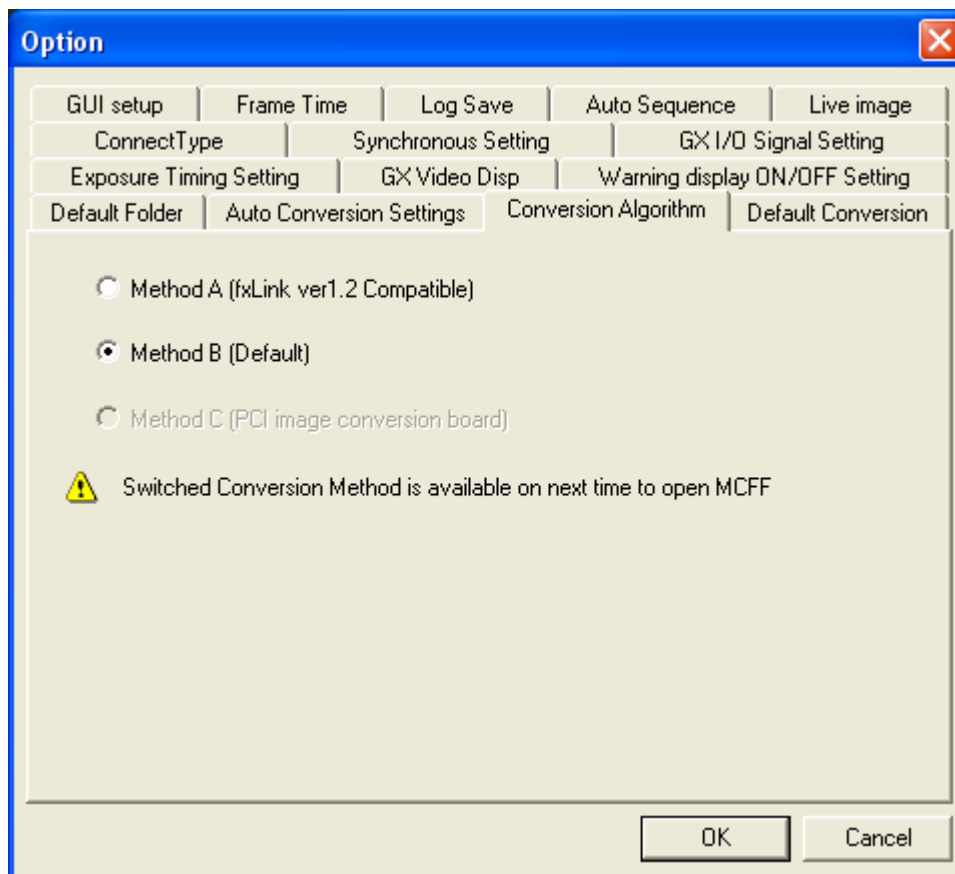
The three conversion methods are as follows.

Method A   An algorithm compatible with the previous version of fxLink.

Method B   A new conversion algorithm that converts to high resolution images
               with distinct color and good contrast. Method B is the default.

Method C   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.

■Default Conversion

        Sets the default conversion format.

        The set conversion format is saved even when the GXLink is finished.
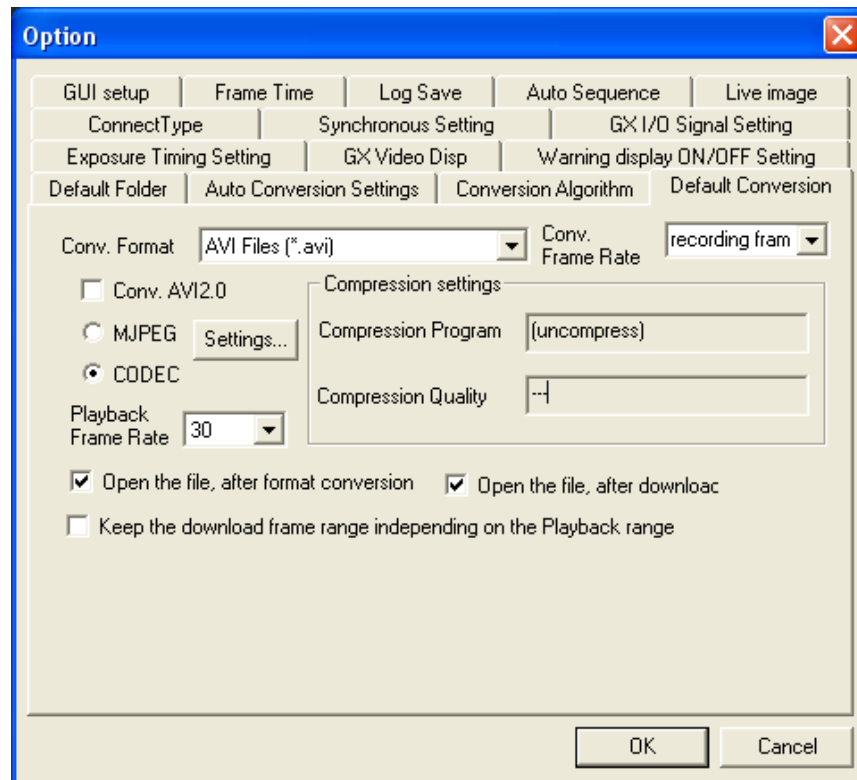
Conv. Format	Designates the type of file after conversion (AVI, TIFF, JPEG, BMP, MCFF).

Conv. AVI2.0	Check to save an AVI file in AVI 2.0 format.
	Remove the check to save an AVI file in AVI 1.0 format.
	There is a limit of 2GB for files in AVI 1.0 format.

Compression settings

        Select "MJPEG" to convert to Motion JPEG format.

        Select "CODEC" to convert to the format selected from the compression program (codec) registered in Windows.

        This company accepts no liability for any codec other than nac M-JPEG codec. Contact the codec manufacturer for questions relating to codec.

Conv. Frame Rate

        The conversion frame rate culls the frames from the format conversion into the specified frame rate and converts them for saving.

        Refer to page 3-76 for details.

Playback Frame Rate

        After conversion, the file type is valid with AVI.

        Select the playback rate set in AVI.

        There is no correlation with the image quality for the AVI file created

with the format conversion.

The Playback Frame Rate is the AVI file playback speed used with the Windows Media Player and Adobe Premiere.

Open the file after format conversion

When checked, if the format converted data is saved to a file, it is automatically added to the item list and the image is displayed.

Keep the download frame range according to the Playback range

If checked, the MCFF downloaded range specified during the download is saved, with subsequent download ranges performed in the same manner.

If not checked, the camera playback range is set as the download range.

Open the file after download

When checked, the downloaded MCFF is automatically added to the item list and the image is displayed.

■GUI Setup

The GXLink GUI includes the "Basic Mode" for basic operations and the "Expert Mode" for more advanced operations.
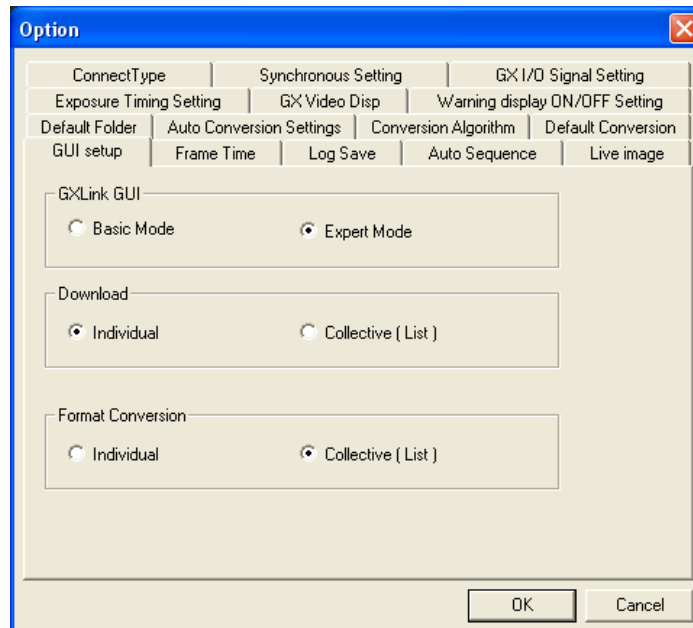
Perform the following to switch between the basic mode and the expert mode.

・Click "Options" in the "Setting" to access the "GUI Setup" tab.
・Press the F12 key on the keyboard.

Select either the download or the format conversion dialog box.

Individual   Displays the "Save As" dialog box for one camera and performs individual downloads or format conversion.

Collective (List)   Click "Download" or "Convert Image Format" to display the dialog box for the summary table and perform batch downloads or format conversions for multiple MCFF files.

■Frame Time

Switches the absolute frame time.

⚠ **Caution**   These items must be set before the camera is connected and the MCFF file is opened.
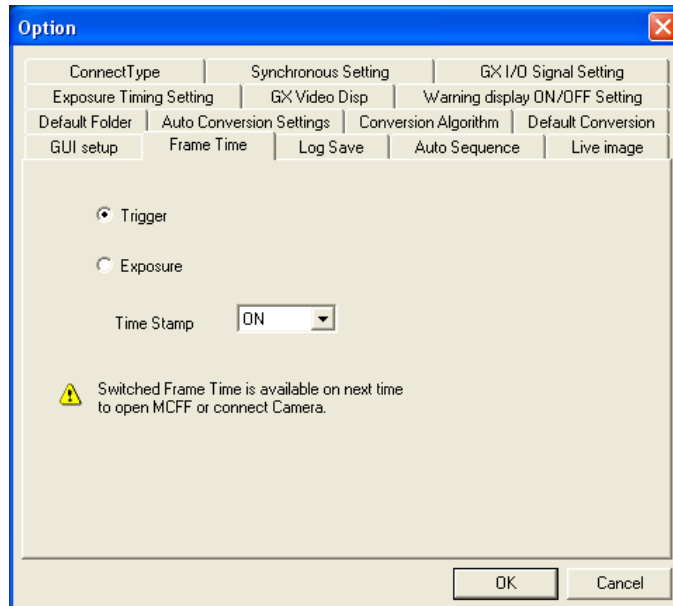
Trigger	Method using the trigger frame time as the trigger signal input time, where the frame time is used as the standard, and other frames are added to the frame time of the photographic speed.
	With this method, the frame time does not match the sensor exposure time but it has the advantage that when the trigger frame relative time is used as the standard, the time between each frame will be uniform and thus easier to understand.
	However, with this setting the frame time is not shown with external EST synchronized recording.
Exposure	Method to set the center point between the starting and ending time for sensor exposure as the frame time.
	With this method, the frame image time is correct but during automatic exposure, the time between frames is not uniform.
	If the time stamp function is used for the GX camera, the image and the time information for that image are saved in the memory so the frame time is shown for external EST synchronized recording.
Time Stamp	If ON, the image photographed and the exposure time or input signal status for that image are saved in the memory.
	If the time stamp is not ON during external EST synchronized recording via input signals, the frame time will not be available.
	Also, since the IRIG signal synchronized status and event frame information is included in the time stamp information, the time stamp should be ON when these functions are used.
	However, when the time stamp is ON, the number of frames available for recording decreases according to the frame size.

■Log Save

Sets the number of days for which the log file between the camera and the PC should be saved.

The log file is used for GXLink and camera maintenance.
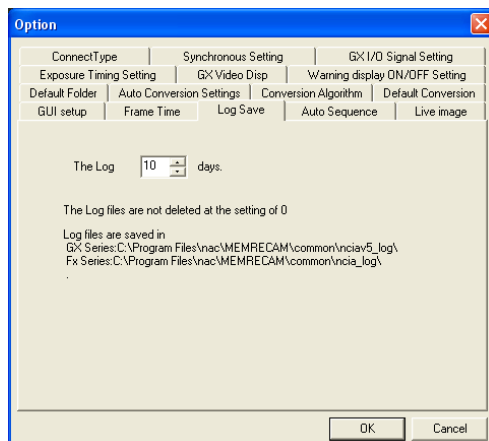
■Connect Type

Switches the camera connection method.

The GX camera is set at TCP/IP.

The three connection methods for the fx camera include TCP/IP, FC-AL and Gbit.
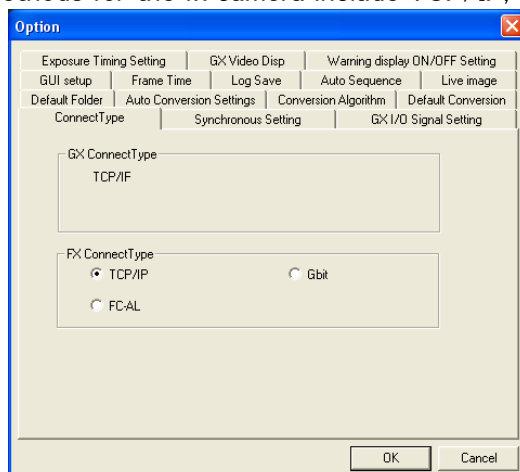
■Syncing

Sets the camera time and the synchronized camera signals for the GX camera and the fx camera.

⚠ **Caution**   These items must be set before the camera is connected.

GX Camera Time

Camera Internal Time   Select when using a single camera or when precise synchronized timing is not required. The time on the GX camera will be the time on the internal camera timer. If connected to a control PC, it will match the time on the PC.

GX-HUB Synchronous Time   Selects synchronized photography using the GX-HUB without IRIG-B signals. The time on the GX camera becomes the time of the GX-HUB transmitted signals. If connected to a control PC, the time matches the time on the PC.

IRIG ・M-HUB Time   Selects synchronized photography using IRIG-B signals or using M-HUB with a mixture of fx and GX. Select any of the following.
    （1）Use a single GX camera and input IRIG signals to the GX camera.
    （2）Connect the GX camera to a GX-HUB and input IRIG signals to the GX-HUB.
    （3）Use a combination of GX cameras and fx cameras and connect the GX-HUB to the M-HUB.
For M-HUB ・GX-HUB connections without using IRIG-B signals, the time on the GX camera will be the time of M-HUB transmission. In this case, if connected to a control PC, the time matches the time on the PC.　If IRIG-B signals are input, the GX camera time becomes the IRIG-B signal time.

fx Camera Time

Camera Internal Time   Select when using cameras without 　IRIG-B signals. If connected to a control PC, the fx camera time matches the time on the PC.

IRIG Synchronous Time   Select when IRIG-B signals are input to the M-HUB or the IRIG BOX for synchronized photography. The fx camera time is the time of the IRIG-B signals.

GX Camera Synchronous Signal

Internal Synchronous Signal   Select when not using external synchronized signals (EST) on the GX camera.

EST1 Synchronous Signal   Select when inputting synchronized signals to the GX camera EST1 connector.

EST2 Synchronous Signal   Select any of the following.
(1) Use a single GX camera and input synchronized signals to the GX camera EST2 connector.
(2) Connect multiple GX cameras to a GX-HUB and input synchronized signals to the GX-HUB EST IN connector.

fx Camera Synchronous Signal

Internal Synchronous Signal   Select when not using external synchronized signals (EST) on the fx camera.

EST Synchronous Signal   Select when inputting synchronized signals to the EST pin for the fx camera AUX connector.

■GX I/O SIGNAL SETTING
Sets the GX camera input/output signals.

⚠ **Caution**

These items must be set before the camera is connected.

EPO (Exposure Pulse Output)   Select the polarity of the exposure pulse output from the camera

Trigger Select   Selects the connector where the external trigger signal is input. Select "TRIG2" when using the GX-HUB trigger connector.

TRIG1 Input	Select the polarity of the external trigger signal (contact point TTL level) Usually, if the external trigger is not used, select "Nega".
TRIG2 Input	Select the polarity of the external trigger signal (current loop). Usually, if the external trigger is not used, select "CRNTON".
Trigger Filter	Designates the noise filter effect for the external trigger signals in microseconds.
EST Filter	Designates the noise filter effect for the external synchronized signals in microseconds.
ARM Status	Select the polarity of the ARM status signals output from the camera.
FAULT Status	Select the polarity of the FAULT status signals output from the camera.
ARM	Select the polarity of the ARM command signals input to the camera. Usually, if the ARM command is not used, select "Nega".
EST1/EST2 Input	Select the polarity of the external synchronized signals.

■Exposure Timing Setting
　　　Sets the camera exposure time.

　　　Sets the exposure time for the sensor relative to the synchronized recording signals.
　　We recommend selecting GX NATIVE for synchronized photography using only a GX camera. However, when combining fx and GX cameras for synchronized photography, if the compatible mode is selected, the exposure times for all of the cameras can be matched.

⚠️ **Caution**　　　These items must be set before the camera is connected.
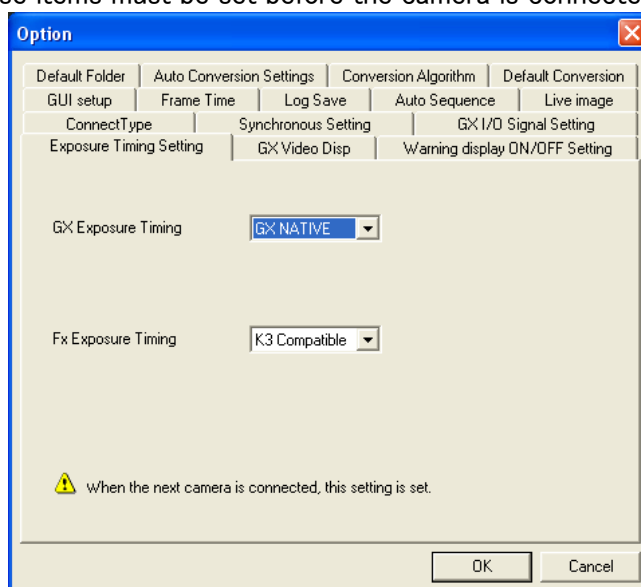
　　　GX exposure times apply to GX cameras and can be selected from "GX NATIVE", "K3 Compatible" and "K4 Compatible".
　　　fx exposure times apply to fx cameras (fx-K4 and fx-K5) that support exposure times, and can be selected from "K3 Compatible" and "K4 Compatible".

　　GX NATIVE　　　Starts exposure with synchronized signals. The exposure phase function may also be used. fx cameras cannot match the exposure times of GX NATIVE.

　　K3 Compatible　　Ends exposures with synchronized signals using the same timing as in fx series cameras other than fx-K4 and fx-K5. If the shutter speed for the GX, fx-K4 and fx-K5 cameras is 1K or greater, it is coordinated with the K3 compatible exposure times.

　　K4 Compatible　　Ends exposures with synchronized signals using the same timing as in fx-K4 and fx-K5 cameras. If the frame rate for fx series cameras other than the fx-K4 and fx-K5 is not 1000pps or greater, it is not coordinated with the K4 compatible exposure times.

　　　The compatible mode can be used when the synchronized camera signal under the "Syncing" tab is "internal synchronized signal". The compatible mode does not function with EST recording settings.

■GX Video Disp

Settings for GX camera video display.
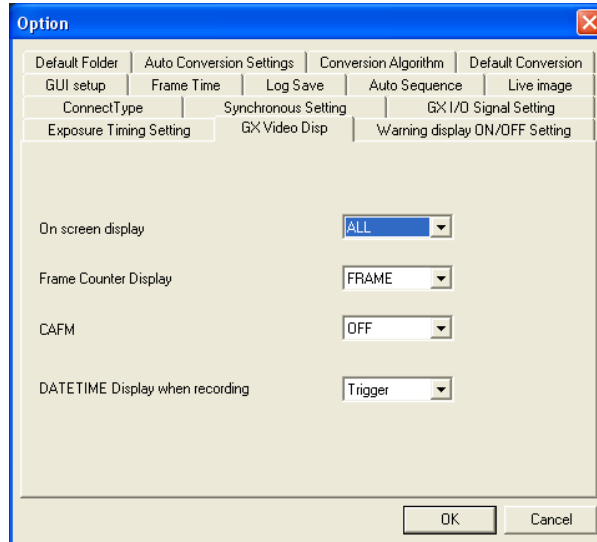
・ On screen display

NONE	Nothing shown.
FRAME	Only displays the frame counter.
ALL	Displays everything (scene, trigger time, frame counter, segment number, status, playback speed, frame rate and shutter speed).

・ Frame Counter Display

FRAME	Displays the current frame number.
TIME	Displays the current frame time as a relative time from the trigger frame.
MEMORY%	Displays the current frame position as a percentage of the recording range.
ABS. TIME	Displays the absolute time for the current frame.

・CAFM

OFF	No image center mark shown.
WHITE	Image center mark shown in white.
BLACK	Image center mark shown in black.

・ DATETIME Display when recording

Trigger	Displays the trigger time.
Current	Displays the current time in VIEW/ARM/REC.

Shows the photographed DATETIME (Current)

Image center mark setting (white)

Frame counter display settings (Frame)

Video on-screen display (display all)

■Warning Display ON/OFF Setting

Select GX camera warning display.
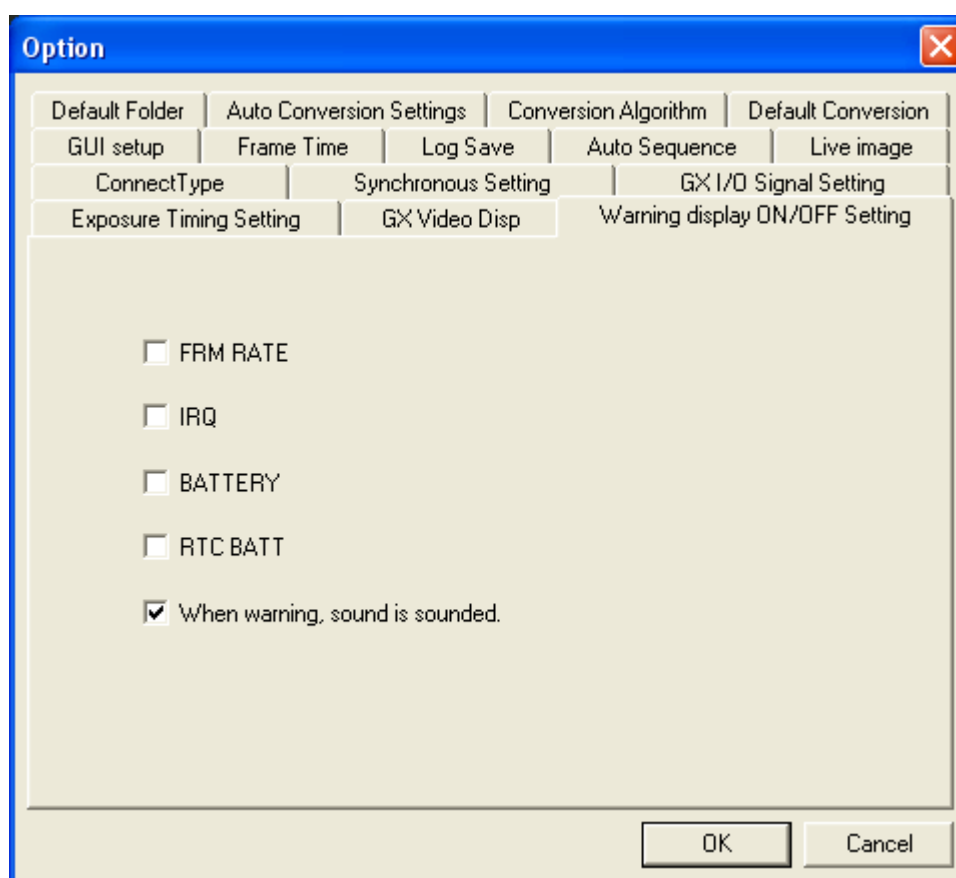
Check the following items to display the relevant warning on the video screen.

FRM RATE   Abnormal frame rate

IRQ (interrupt internal camera cycle)

Abnormal video update timing

BATTERY   Battery charge is low or abnormal

RTC BATT   Low day timer battery

The following item determines the warning notification method.

Sounds warning   Sounds a warning and displays a warning message in warning window.

■Auto Sequence

Settings related to automatic camera control.

With automatic camera control, automatic camera connection, recording and downloading is performed after the GXLink is started up.

⚠️ **Caution**   If automatic camera control is not used, remove the check from "After GXLink startup, GXLink automatically records and downloads ".
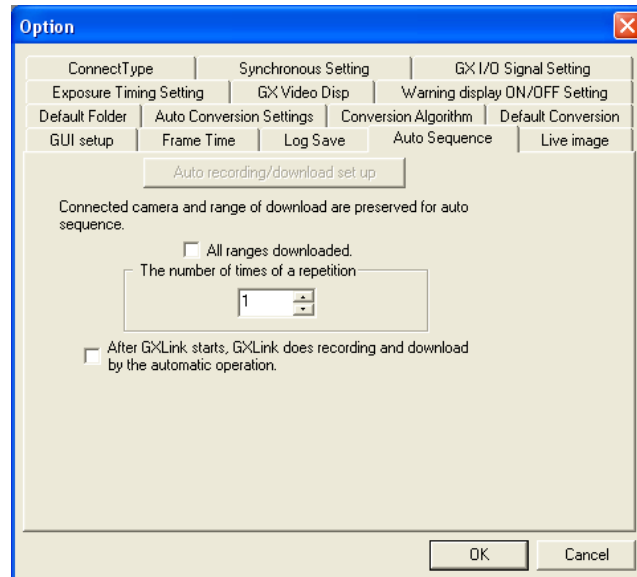
Auto recording/download set up	Click to set the currently connected camera. The camera must be connected to click this button.
Download all ranges	Check for a download range after recording that is the same as the recording range. Uncheck and the download range will be the same as the download range for the current camera. Click "Auto recording/download set up" to implement this setting.
The number of repetitions	Designates the number of times to repeat automatic control. Click "Auto recording/download set up" to implement this setting.
After GXLink startup, GXLink automatically records and downloads	Automatic camera control. Automatic camera control at the next GXLink startup. To check this item, the camera must be set with the "Auto recording/download set up" button.

■Live image

Select live camera image.
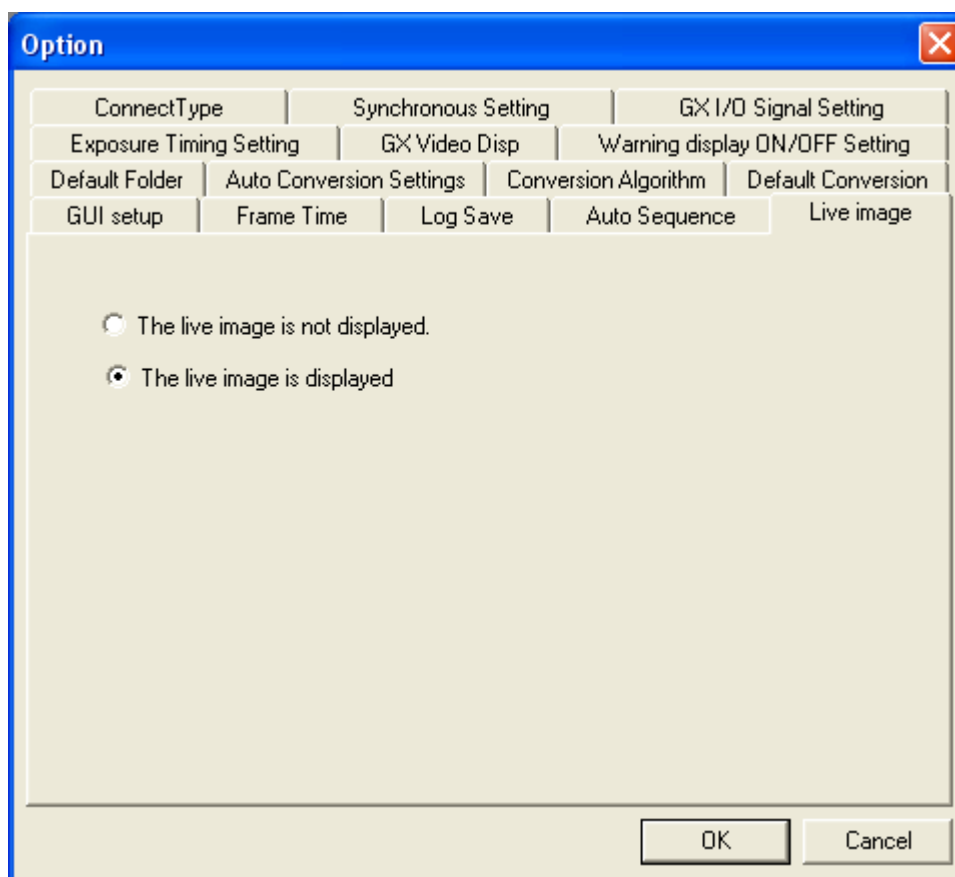
Do not display the live image   Instead of displaying the live image for the connected camera, a checkerboard pattern is shown.

Display the live image   Displays the live image for the connected camera.

4

Troubleshooting

4.1 Troubleshooting

Several suggested solutions are described for problems that may occur while using GXLink.

■ A "Setup Error" message appears when I press "Attach the Camera" (TCP/IP connection)

If this message appears, open "Network Connections" on the control panel and verify that the network is connected.
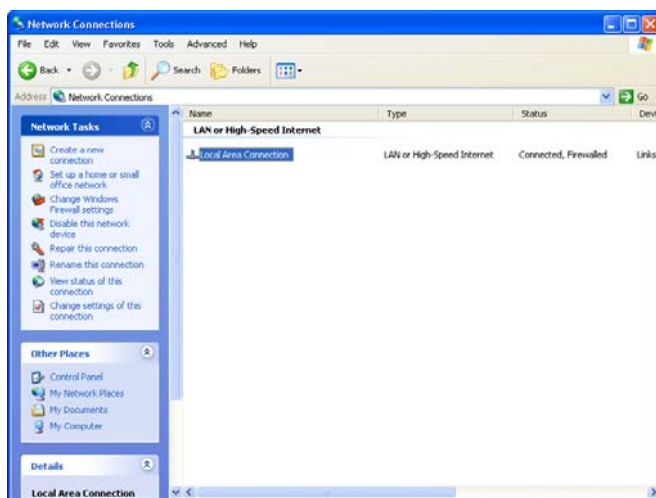
Next, click the Windows Start button→All Programs→MEMRECAM GXLink →TCP IP network optimization, check the network used and then click OK. Then, restart your computer. This will set the network to the optimal value.
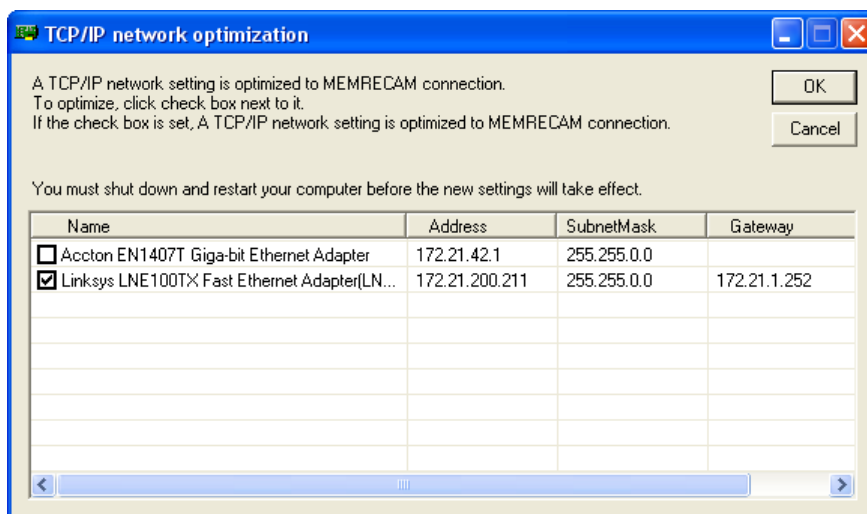
■A "Setup Error" message appears when I press "Attach the Camera" (FC-AL connection)

Setup Error

⚠ The setup for MEMRECAM connection is not performed.
Perform "C:\Program Files\nac\MEMRECAM\GXLink\fcal_setup.reg" as an authorized user of the Windows "Administrators" group.
And.
When not performing this setup, the software cannot display a live image and cannot download the camera images.

[OK]

If this message appears, run the GXLink program file＜fcal_setup.reg＞ created in the install folder (usually C:¥Program Files¥nac¥MEMRECAM¥GXLink) and then restart the computer. This will set the FC-AL host adapter to the optimal value.

■ Cannot connect to the camera

I press the "Attach the Camera" button and when the dialog box appears, there is red **X** on the camera icon that should be connected (or for GX cameras, there is no icon on the list). Check the following items.

・Are the camera and PC properly connected?

・Was the camera already connected to another PC?

・For fx cameras, was the proper CID, IP address and type registered?

・For fx cameras, was the ConnectType (TCP/IP, FC-AL, Gbit) Option properly set?

■ "Failed to set Sync." appears during fx camera connection

When the "fx Camera Time" setting under the Option "Synchronous Setting" tab is set to "IRIG Synchronous Time", the following message appears during camera connection or when "Syncing" is clicked on the control menu.

Failed to set Sync.

⚠ Failed to set Sync.
Press "Retry" to retry Sync. Setting.
Press "Ignore" to execute View as it is.
Press "Cancel" to cancel View.

[Abort] [Retry] [Ignore]
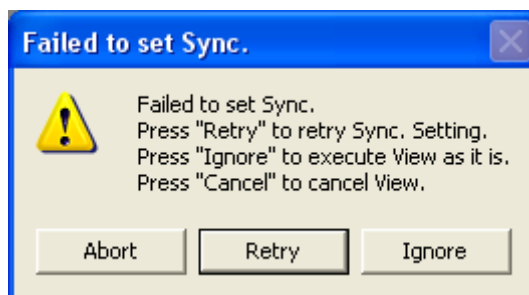
If using IRIG signals, confirm the following items.

・ If using IRIG BOX, are the IRIG-B signals properly connected to the IRIG BOX IRIG IN connector?

・ If using M-HUB, are the IRIG-B signals properly connected to the M-HUB IRIG.IN connector?

・ Is the external trigger in the input state?

■ I can't get the camera into VIEW

The following message appears when trying to connect a camera to a camera head not connected to a DRP capable of multiple camera head connections, such as RX-5
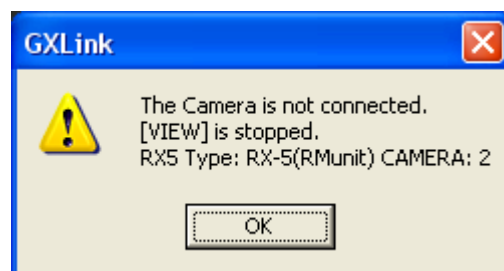
With the display shown above, a camera head is not connected to the MEMRECAM fx RX-5 PM Unit port 2, so VIEW cannot be accessed. Disconnect the camera and connect the camera head to port 2 or connect the camera with port 2 removed.

■ The video display and PC live images don't work in VIEW/ARM on the GX camera or noise appears

When the synchronized camera setting is "EST", the image isn't updated in VIEW if the EST signals are received.

If not using EST, set "GX Camera Synchronous Signal" under "Synchronous Setting" in "Options" to "Internal Synchronous Signal".

If using EST, check the following.

　　・Is the EST properly input to the connector for "GX Camera Synchronous Signal" under "Synchronous Setting" in "Options"?
　　・Is the recording parameter shutter (the frame rate when OPEN) set slower than the EST signal frequency?

If there are no recording problems, and noise only appears during VIEW, check the following.

　　・ If the EST signals are less than 120[Hz], is the recording speed set at less than 120[pps]?
　　・ If the EST signals are 120[Hz] or higher, is the recording speed set at 120[pps] or higher?

■ Does the photograph time on the GX camera say January 1 or December 31?

If the "GX Camera Time" is the "IRIG/M-HUB Time" under "Synchronous Setting" in "Options", one of the following could occur.

　　・ The IRIG signals aren't connected to the GX-HUB.
　　・ "fx camera via the GX-HUB and M-HUB" isn't selected when the camera is connected.

■ The photograph time doesn't match the IRIG signal time

For GX cameras, check the following.

・Is the "GX Camera Time" the "IRIG/M-HUB Time" under "Synchronous Setting" in "Options"?

・Is the IRIG-B signal properly connected to the camera's IRIG-B IN connector when the IRIG signal is directly input to the camera?

・ If using a GX-HUB, is the IRIG-B signal properly connected to the IRIG-B IN connector of the GX-HUB?

・ If using a GX-HUB and a M-HUB, is the IRIG-B signal properly connected to the IRIG-B IN connector of the M-HUB?

For fx cameras, check the following.

・ Is the "fx Camera Time" the "IRIG Synchronous Time" under "Synchronous Setting" in "Options"?

・If using IRIG BOX, is the IRIG-B signal properly connected to the IRIG-B IN connector of the IRIG BOX?

・If using M-HUB, is the IRIG-B signal properly connected to the IRIG-B IN connector of the M-HUB?

■ When ARM is started, "Failed Rec Command" and "Memory Protected" appears and recording is not possible
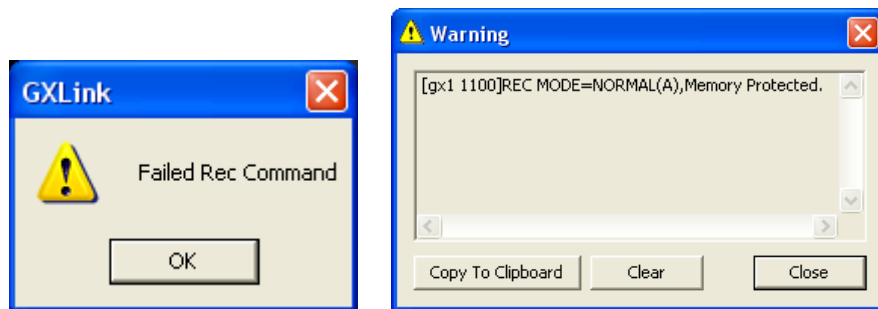
Make sure that the Auto View in the "Detailed Settings" dialog box is not "AUTO" and that the Rec Trigger Mode is not "AUTO" (Example: NORMAL(A)、EVENT(A))

With these settings, the recorded segments are protected and overwriting data by recording (ARM) is prohibited.

If overwriting data is allowed, set Auto View in the "Detailed Settings" dialog box to anything other than AUTO and anything other than AUTO (NORMAL or such) for the Rec Trigger Mode.

■ While in ARM, the video display and PC live images are not updated, and recording is not possible

If the Rec Trigger Mode is in "BURST", burst signals are not input during ARM and so images cannot be saved.

For burst recording with the GX camera, images are only updated when burst signals are received during ARM. If not burst recording, access the "Detailed Settings" dialog box and set "NORMAL" under "Rec Trigger Mode".

For burst recording, check that burst signals are properly input to the connector designated with "Trigger Select" in "GX I/O Signal Settings" under "Options".

■ The trigger button doesn't work when in ARM

When the camera status is ARM, the trigger button is gray and I can't click it.

In this case, check that the following has not occurred.

1) The Rec Trigger Mode is in BURST.

For BURST recording, input the burst recording signals from the trigger connector

Recording with the trigger button is possible when the Rec Trigger Mode is in NORMAL, EVENT or MULTI.
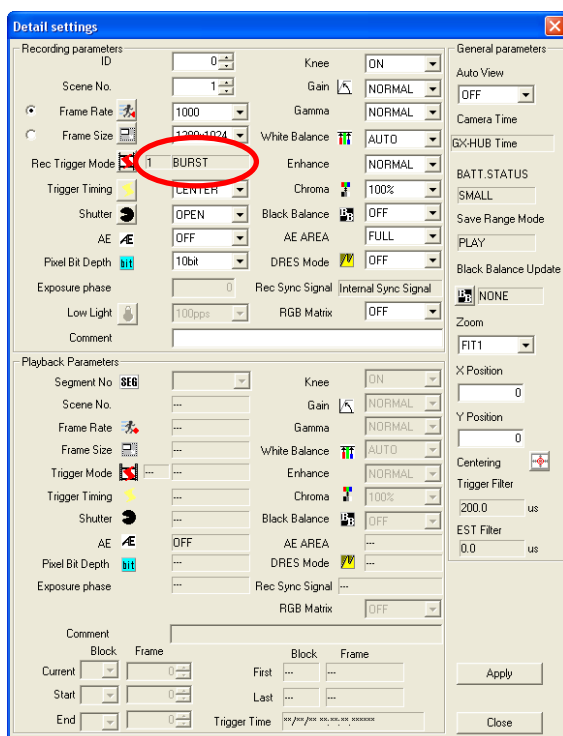
2) It doesn't say "All Cameras are in the ARM mode" during GXLink connection.

Use the STOP button to temporarily stop ARM and then restart it.
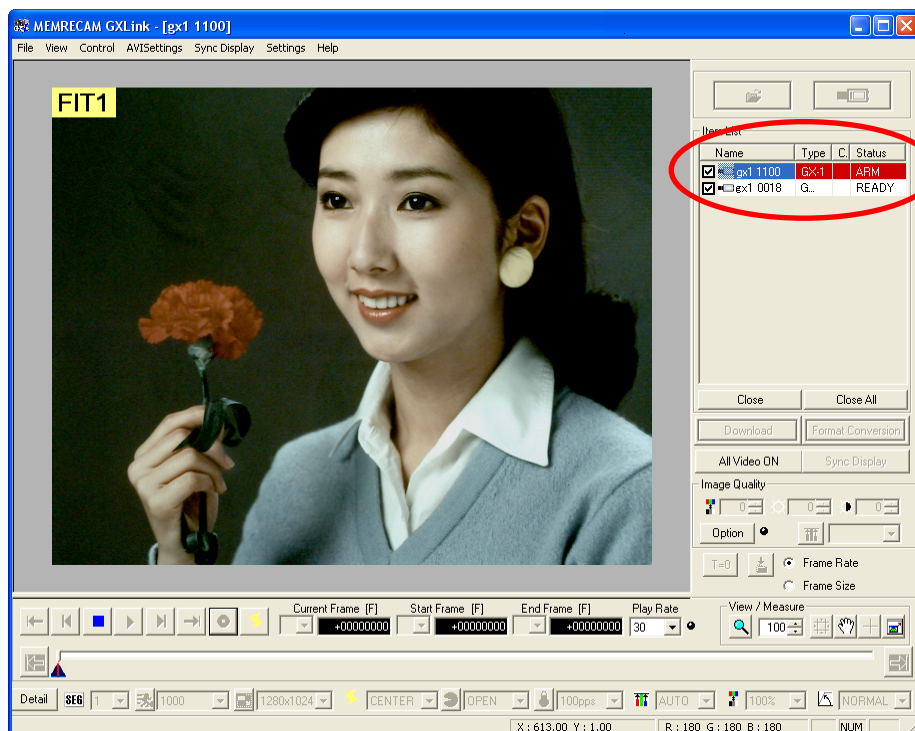
■ The camera image data download failed

The following message may appear when downloading.

```
GXLink                                              ✕
  ⚠  Disk Full
      Space : 2037.2 MB. Download Size : 1837.4 MB. Folder : G:
                    ┌──────────┐
                    │    OK    │
                    └──────────┘
```
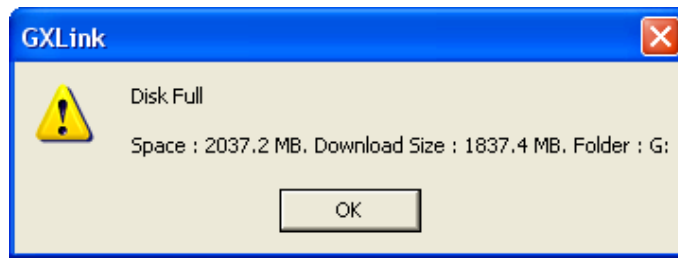
This is displayed when there is insufficient disk space and the camera image data for the designated range cannot be downloaded. Change to a different disk to save the camera image data or delete a file that is not needed from the disk or reduce the range to be downloaded.

■ I can't download images larger than 4GB

Check the file system format. Files where the format is FAT32 cannot be downloaded if the file is larger than4GB. To download files larger than4GB, change the file system format to NTFS.

■ "There is no image data" appears on the image monitor

If this is displayed, for some reason, the camera image download has failed, and the camera image data is not included on the MCFF file.
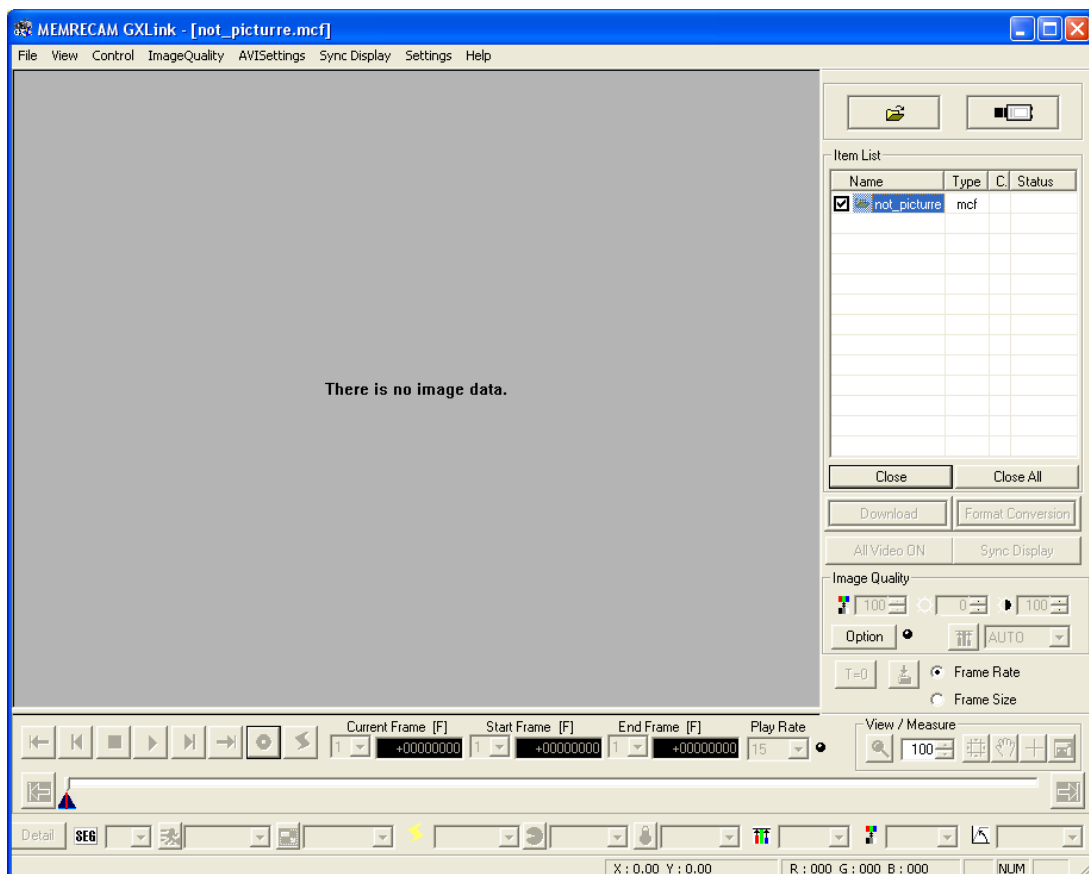
■ The image doesn't change using MCFF image quality adjustment

1) Gain and knee weren't applied

If the MCFF image is photographed in the DRES mode, the gain and knee settings are not valid.

If the DRES mode is LOW/MID/HIGH for the MCFF image properties, it isn't possible to photograph in the DRES mode.

2) Gain, gamma and knee weren't applied

If the luminance encoding for the MCFF image is LINEAR, the gain, gamma and knee settings are not valid.

If the luminance encoding in the image quality menu is NORMAL, gain, gamma, and knee are applied.

■ AVI conversion with a compression program (codec)

Some compression programs (codec) have limits on the image size that can be converted.

For example, with an Indeo3.2 codec, a conversion error will be generated with sizes larger than 640x480.

Refer to the codec manufacturer for inquiries relating to codec.

Conversion of most image sizes can be handled with GXLink Motion JPEG conversion.

When there is an AVI conversion failure, the format conversion dialog box will be displayed as follows.

"Conversion failed"
will be displayed
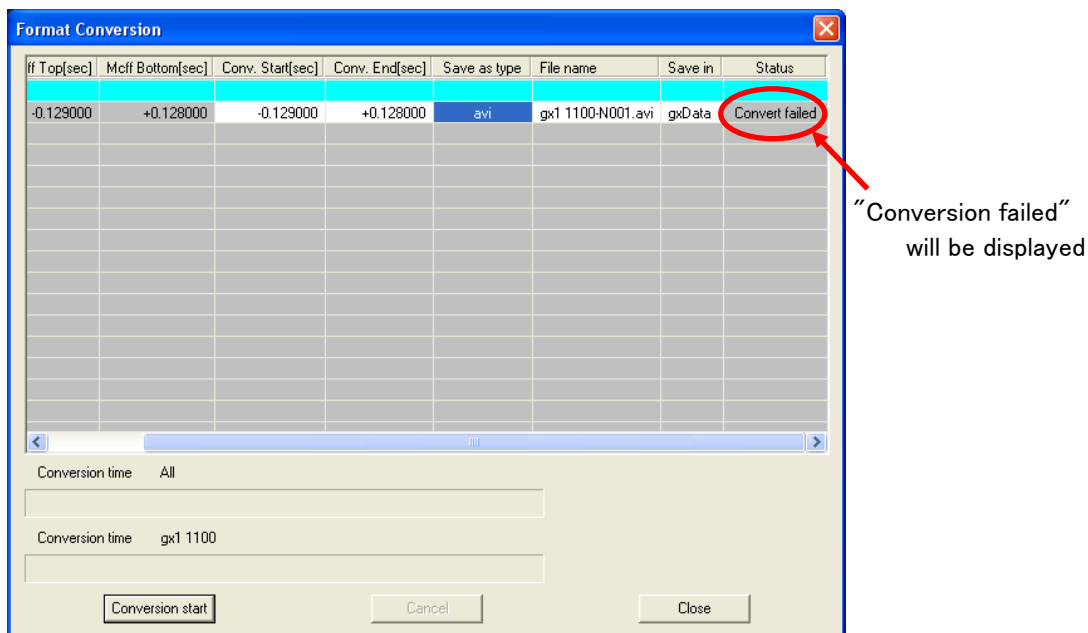
When there is an AVI conversion failure, nothing is shown in the "Save As" dialog box.

■ AVI Conversion for Large Images

GXLink format conversion corresponds to AVI 1.0 and AVI 2.0 format conversion.

There is a 2GB file size limit with AVI 1.0. There are no limits with AVI 2.0.

When converting with AVI 2.0, check "Conv. AVI2.0" under the "Default Conversion" tab in "Options".

■ Returning to a previous version of GXLink

If there is a problem necessitating a return to a previous version of GXLink, uninstall GXLink and before installing a previous version of GXLink, first delete ＜GxLink.ini＞ in the GXLink program install folder (usually C:¥Program Files¥nac¥MEMRECAM¥GXLink).

■ If GXLink cannot be properly uninstalled

If there is a problem and GXLink cannot be properly uninstalled, insert the installation CD into the CD-ROM drive and reinstall. Then, uninstall it.

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5

Recording Settings

5.1 Recording Overview

GXLink performs a variety of recordings by controlling the MEMRECAM GX and MEMRECAM fx.
This chapter describes the settings for each type of recording.

・External Synchronized Recording(EST)
・Multi Camera Synchronized Recording with IRIG-B Signals
・GX Multi Camera Synchronized Recording with the GX-HUB
・Multi Camera Synchronized Recording with both fx and GX
・Exposure Phase Shift Recording
・Event Recording
・Burst Recording
・Multi Trigger Recording

5.2 External Synchronized Recording (EST)

■ For EST recording with a GX camera, it is necessary to set the shutter so the sensor exposure time is shorter than the external synchronized signal cycle (or the shortest period). Proper recording is not possible if there is a subsequent synchronized signal pulse during sensor exposure.
fx cameras require a frame rate setting that is at least double the external synchronized signal.

For example, external synchronized signal：2400Hz → cycle：416.7us
If the GX-1 camera has an image size of 640×480, the shutter setting (exposure time) must be 413us or less.
Since the frame rate of the fx camera must be set to 5000pps, the maximum exposure time becomes 200us.

■ Method of Setting and Checking the GX Camera Shutter Setting Values
EST signals：2400Hz; Frame size：640×480

If there is a GX camera connected with GXLink, click "Detail" to display the "Detailed Settings" dialog box.
If there are multiple GX cameras connected with GXLink, select the GX camera in the item list with a right click and then click "Detailed Settings".

Click "Frame Rate" under the "Recording Parameters" in the "Detailed Settings" dialog box to display the "Custom Setting (Frame Rate, Frame Size)" dialog box.
Set the frame rate to 2400 (input 2400 on the keyboard) and the frame size to 640×480 and then click OK.

Click "Shutter" in "Recording Parameters".
The "Setting shutter speed by exposure time" dialog box will be displayed and the possible settings for the shutter range will be shown under μ SEC.
The maximum value shown is the maximum shutter setting that can be set with 2400Hz EST recording.

Set the shutter time in this dialog box and click OK.

■ Frame Rate During EST Recording
With GX cameras, it is not necessary to set the frame rate for external synchronized recording but the maximum exposure time is determined by the frame rate. For example, since the exposure time in the previous example was set to 413us the frame rate must be 2400pps or less.
With fx cameras, the frame rate must be set to at least double the external synchronized signal.

■ Connections for EST Recording
For EST recording, input the external synchronized signal into the GX camera or GX-HUB.
With an fx camera, input the external synchronized signal to the AUX connector on the rear panel. For details, refer to the fx camera user's manual.
For direct synchronized signal input to a GX camera, either connects the J1 cable to the J1 POWER connector on the back and input the synchronized signals to EST1 or connects the J3 cable to the J3 ETHERNET connector and input the synchronized signals to EST2.
If using a GX-HUB, use a remote cable to connect to PORT1～PORT4 on the GX-HUB and the J3 ETHERNET connector on the GX camera, and input the synchronized signals to the GX-HUB EST IN.

■ External Synchronized Recording Setting Procedures
Use the following procedures to set for EST recording.

(1) Select the synchronized signals under "Synchronous Settings" in "Options" to set EST recording
Select "EST1 Synchronous Signal" or "EST2 Synchronous Signal" in "GX Camera Synchronous Signals".
Select "EST Synchronous Signal" in "fx Camera Synchronous Signals".

※ If the GX camera is set to EST recording and the set synchronized signals are input, the CM LED on the back of the camera flashes when in VIEW/ARM/REC.

(2) Set the polarity of the synchronized signals and the noise reduction filter with the GX I/O SIGNAL SETTING under "Options"
・EST1 Input
Sets the signal polarity when the synchronized signals are input from the POWER (J1) cable.
・EST2 Input
Sets the polarity for the signals when the synchronized signals are input from the ETHERNET (J3) cable or the GX-HUB EST IN.
・EST Filter
Sets the time constant (delay time) for the noise reduction filter from the synchronized signals.

(3) Exposure Timing Setting Options
For EST recording, select GX NATIVE in "Exposure Timing Settings".
(The fx camera compatible mode does not work for EST recording)

(4) Frame Time Options
For EST recording, to identify the recorded frame time, select "Exposure Timing" as the frame time and turn the time stamp ON.
For EST recording, since it isn't known when the synchronized signal pulse starting exposure will be input, the frame time for the recorded image will not be known unless the time stamp is saved.

(5) Camera Connection with the GXLink

(6) "Detailed Settings" or the "Exposure Phase" for "Recording Parameters" in the "List of Camera Setup"
    Click "Detail" to open the "Detailed Settings" or the "List of Camera Setup" window and set the "Exposure Phase" for "Recording Parameters to 0° .

(7) "Detailed Settings" or "Frame Rate and "Shutter" for "Recording Parameters" in the "List of Camera Setup"

    With GX cameras, the frame rate and shutter is set so there is no subsequent exposure pulse (synchronized signals) during sensor exposure.　With fx cameras, set the frame rate to a speed that is at least double the synchronized signal.

(8) EST Recording
    Set as indicated above and then switch the camera to VIEW/ARM.

■　View During EST Recording Settings
When setting EST recording, the GX camera drives the sensor with external synchronized signals even during view. However, the GX camera cannot display images without external synchronized signals during view. The fx camera drives the sensor with internal synchronized signals during view. The fx camera displays images even without external synchronized signals during view but the captured images are not synchronized with the external synchronized signals so an image with the same brightness as during recording using a strobe light will not be produced.

5.3 Multi Camera Synchronized Recording with IRIG-B Signals

This describes the connections and settings for synchronized recording by allocating IRIG-B signals and trigger signals to each camera.

■ Connections for IRIG-B Signal Input

To input IRIG-B signals to a GX camera, connect the J3 cable to the J3 ETHERNET connector on the back of the camera and input the IRIG-B signals into the IRIG-B connector on the J3 cable.

To input IRIG-B signals to an fx camera, use the optional M-HUB or the IRIG BOX. This describes the IRIG BOX (583095 IRIG BOX (CR-995)).
Attach the IRIG BOX to the fx camera, and connect the fx camera REMOTE I/O connector and the IRIG BOX DATA OUT connector with the included connection cable. Input IRIG-B signals to the IRIG BOX IRIG IN connector. If using the IRIG BOX, since the TRIG.IN connector on the rear panel of the fx camera does not function, input external trigger signals to the TRIG.IN connector of the IRIG BOX.

■ Verify GX Camera IRIG Time/Status

If the GX camera is set to IRIG synchronization, it is possible to confirm the synchronization status for the IRIG time or IRIG-G signals and the camera while in VIEW or during recording of a video or live PC image. To confirm the IRIG time for a video display, if the GXLink setting for the DATETIMEIBOX display during photographing is set to Current, the IRIG time will be shown in the location where the trigger time is displayed on the top center of the screen. To confirm the IRIG time with a PC live image, click Live Time Display on the View menu and the IRIG time will be superimposed on the live image.
Also, in the View menu, click IRIG Lock, Event2 Display for superimposed display of the synchronization status for the GX camera and IRIG-B signals.

■ Procedures for IRIG-B Synchronized Recording Settings

Use the following procedures for IRIG-B synchronized recording.

(1) Set the "Camera Time" in Synchronous Setting (Options) to IRIG.
  Set the "GX Camera Synchronous Time" to the IRIG/M-HUB Time.
  Set the fx Camera Time to IRIG Synchronous Time.

(2) Activate the "Time Stamp" with "Frame Time (Options)"
  Set the "Frame Time" to "Exposure.
  Set the "Time Stamp" to ON.

(3) Coordinate the Camera Exposure Time with the Exposure Timing Setting (Option)
  When photographing at a frame rate less than 500pps with an fx camera other than K4 or K5 for synchronized recording, all of the cameras must be set to K3 Compatible.
  If there is no fx camera other than K4 or K5 for synchronized recording, all of the cameras must be set to K4 Compatible or K3 Compatible.
  If only GX cameras are used for synchronized recording, select GX NATIVE, K4 Compatible or K3 Compatible.

(4) Use the GX I/O SIGNAL SETTING to Set the Trigger Filter to the Proper Value
To eliminate trigger signal noise with the GXLink, the default trigger filter is set to a length of 200 μ s.
However, with this setting, the time for GX cameras to detect the trigger is at least 100 μ s slower than that of fx cameras.   If the trigger signal generator outputs signals without noise, set the trigger filter setting to several tens of μ s so the difference between the trigger times with GX cameras and fx cameras can be adjusted.

(5) Setting to Display the Trigger IRIG Time with the GX Video Display Option
Set the Frame Counter Display to Relative Time so the IRIG time for the recorded data on the video display of the GX camera is displayed.
Set the video DATETIME display to Current so the IRIG time is displayed on the video display of the GX camera during VIEW and ARM.

(6) Camera Connection with the GXLink

(7) "Detailed Settings" or the "Exposure Phase" for "Recording Parameters" in the "List of Camera Setup"
Click "Detail" to open the "Detailed Settings" or the "List of Camera Setup" window and set the "Exposure Phase" for "Recording Parameters to 0°.

(8) Synchronized Recording with IRIG-B Signals
Set as indicated above and then switch the camera to VIEW/ARM.

5.4 GX Multi Camera Synchronized Recording with the GX-HUB

This describes the connections and settings for multiple camera synchronized recording without using IRIG-B signals, using only a GX-HUB and GX cameras.

■ Connections for GX Multi Camera Synchronized Recording
If using a GX-HUB, use a remote cable to connect to PORT1～PORT4 on the GX-HUB and the J3 ETHERNET connector on the GX camera.
Connect the external trigger to the GX-HUB TRIG IN.

■ GX Multi Camera Synchronized Recording Setting Procedures
(1) Synchronous Setting (Option)
Set the GX Camera Time to GX-HUB Synchronous Time.

(2) GX I/O SIGNAL Setting (Option)
Set the Trigger Select to TRIG2, with TRIG2 Input usually set to CRNT ON.
(If TRIG2 Input is set to CRNT OFF, but nothing is connected to the M-HUB TRIG.IN terminal, the trigger signal is turned ON)

5.5 Multi Camera Synchronized Recording with a Mix of fx and GX

Refer to the GX-HUB user's manual for the method of connecting a mix of fx and GX cameras using M-HUB and GX-HUB.

■ Precautions for a Mixed fx, GX System
・With a M-HUB system, one fx camera is required for M-HUB control.
・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 Multi Camera Synchronized Recording with a Mix of fx, GX Cameras
(1) Synchronous Setting Option
Set the GX Camera Time to IRIG ・M-HUB Time.

(2) GX I/O Signal Setting (Option)
Set the Trigger Select to TRIG2, with TRIG2 Input usually set to CRNT ON.
(If TRIG2 Input is set to CRNT OFF, but nothing is connected to the M-HUB TRIG.IN terminal, the trigger signal is turned ON)

5.6 Exposure Phase Shift Recording

Use multiple GX cameras for high resolution and high speed recording.
Depending on the location of the camera, infinite telephoto photography can be performed and the parallax generated can be ignored.

For example, using GX-1, photography at a frame size of 512×384 can be performed at 10000pps but photography at a frame size of 512×384 cannot be performed at 20000pps. However, to synchronize two GX cameras, set the camera exposure phase to 180° and align the optical axis to photograph and obtain data with a frame size of 512×384 that corresponds to 20000pps from data from two cameras.

■ Precautions for Exposure Phase Shift Recording
　　・Make the same settings for the cameras to be used in exposure phase shift recording.
　　・Set the Exposure Timing Setting to GX NATIVE.
　　・Set the Frame Time to Exposure.
　　・Use IRIG signals or the GX-HUB and synchronize all of the cameras.
　　・Set the GX Camera Synchronous Setting to Camera Internal Time.　The exposure phase shift function cannot be used with external synchronization (EST).

■ Procedures for Exposure Phase Shift Recording Settings
　　(1) Synchronous Setting (Option)
　　　　If using the GX-HUB without IRIG signals, set the GX Camera Time to GX-HUB Synchronous Time.
　　　　If using IRIG signals, set the GX Camera Time to IRIG ・M-HUB Time.
　　　　Set the GX Camera Synchronous Signal to Internal Synchronous Signal.

　　(2) Exposure Timing Setting Options
　　　　Set the GX Exposure Timing to GX NATIVE.

　　(3) Frame Time Options
　　　　Select Exposure in Frame Time.

　　(4) Camera Connection with the GXLink

　　(5) "Detailed Settings" or the "Exposure Phase" for "Recording Parameters" in the "List of Camera Setup"
　　　　Click "Detail" to open the "Detailed Settings" or the "List of Camera Setup" window and set the "Exposure Phase" for "Recording Parameters for each camera. Settings other than Exposure Phase are common to all of the cameras.

5.7 Event Recording

This is a recording method that records events when the trigger signal is ON.

■ Precautions for Event Recording
・With event recording, since the GXLink trigger button cannot perform events, the trigger button does not function. Photograph by adding the event signals to the trigger input.
・Events are shown on the GXLink playback slider and the maximum number of segments in an event frame jump is 15. Since the number of events that can be recorded with fx cameras is up to 15, if the time stamp function on the GX camera is used, 16 or more events can be recorded. However, the 16th and subsequent events can only have the event mark superimposed on the image for the frame input from event signals so the event mark is not shown on the playback slider and it is not possible to perform event frame jumps.
・Make sure the time stamp is ON if there are more than 15 events.

5.8 Burst Recording

This is a recording method that records images when the burst signal (external trigger signal) is ON.
The condition to end burst recording is to end recording of the memory segment or to stop recording with the stop button.

■ Precautions for Burst Recording
・Since burst recording is not possible with the trigger button, the trigger button does not function.　Photograph by adding the burst signals to the trigger input.
・Turning burst signals ON/OFF makes it possible to record multiple blocks but the maximum number of blocks that can be displayed with the GXLink is 16. Data for blocks numbered 17 and later are saved as the 16th block.
・If the number of blocks burst recorded exceeds 16, make sure the time stamp is ON and the frame time is set to exposure. If the time stamp is OFF, data for blocks numbered 17 and later are linked immediately after the 16th block and identified as recorded items.
・For trigger input of burst signals, there is a trigger filter for noise reduction. The set value for this trigger filter is set to a default of 200μs. To record with the least amount of timing delay for the burst signals, set the trigger filter to 0μs.
・When downloading burst recorded image data, a preset range cannot be downloaded. Set "Keep the download frame range according to the Playback range" to OFF and set the range to be saved each time.

5.9 Multi Trigger Recording

■ Download Multi Trigger Recording

Specifying the multi trigger recording download range varies according to the GUI download.

For individual downloads, download a portion of the recorded range linked to the entire block of recorded data shown on the slider bar.
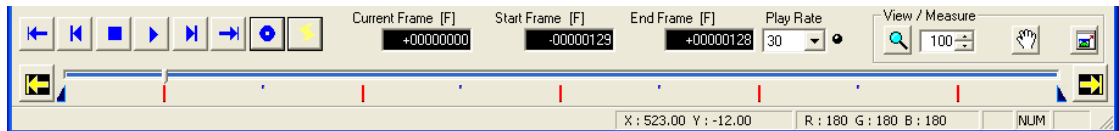
Examples of the camera recorded blocks immediately after multi trigger recording and the recorded range are given below.

・Block 1 (recorded range: -129 ～ +128)
・Block 2 (recorded range: -129 ～ +128)
・Block 3 (recorded range: -129 ～ +128)
・Block 4 (recorded range: -129 ～ +128)
・Block 5 (recorded range: -129 ～ +128)
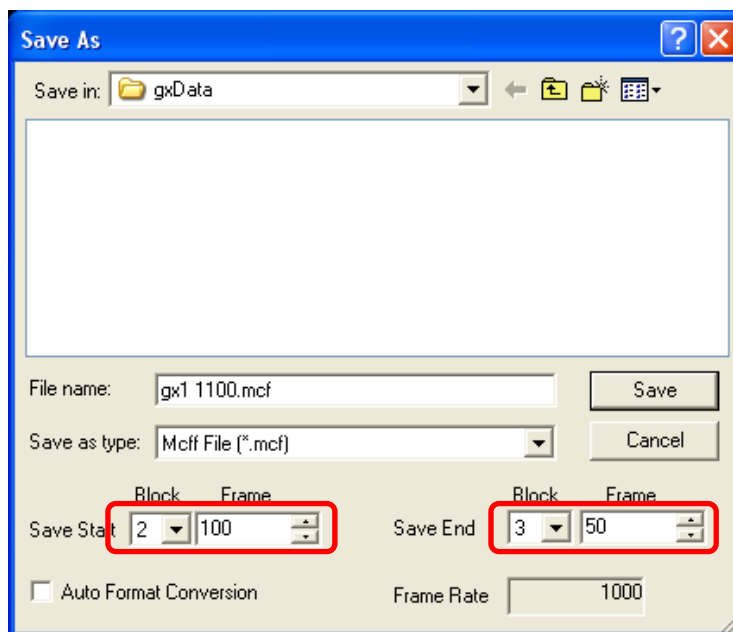
Open the "Save As" dialog box to set the following save ranges for downloading.

・ Save Start: Block 2, Frame +100
・ Save End: Block 3, Frame +50
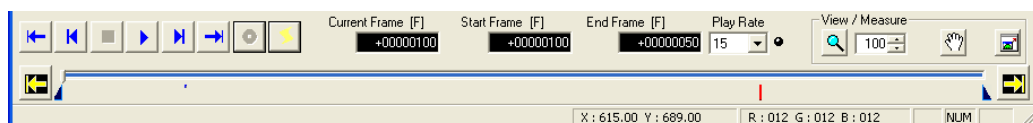
The playback blocks and playback range for the MCFF created are as follows.

・Block 2 (Playback range: +100 ～ +128)
・Block 3 (Playback range: -129 ～ +50)

With batch downloads, data for a range of frame numbers specified for all of the blocks for camera data is downloaded. Blocks cannot be specified.

The frame numbers shown in the start/end save column when the "Download" dialog box is open refer to the lowest frame number and the highest frame number for the range to be saved, and may differ from the frame number for the save range shown in the slider.
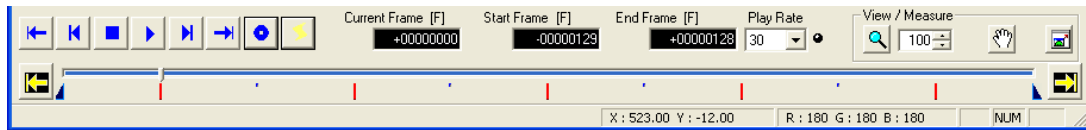
Examples of the camera recorded blocks and the recorded range immediately after multi trigger recording are shown below.

· Block 1 (recorded range: −129 ～ +128)
· Block 2 (recorded range: −129 ～ +128)
· Block 3 (recorded range: −129 ～ +128)
· Block 4 (recorded range: −129 ～ +128)
· Block 5 (recorded range: −129 ～ +128)
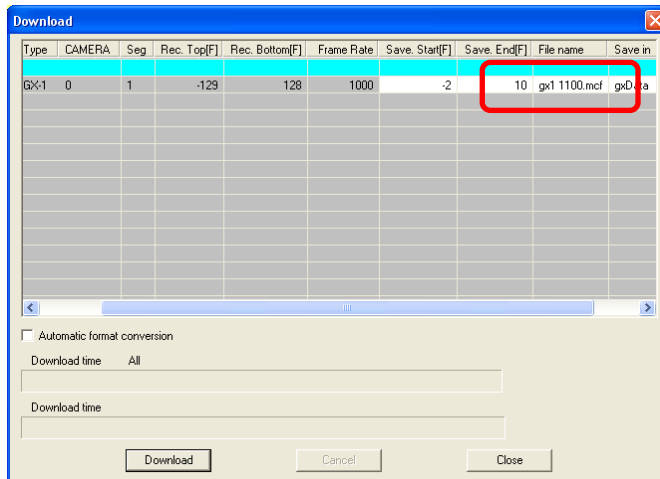
Open the "Download" dialog box to set the following range to be displayed and then download.

· Save Start: frame −2
· Save End: frame +10
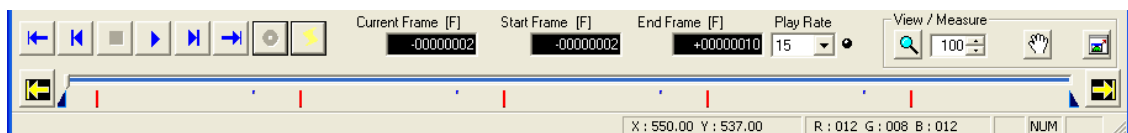
The playback blocks and playback range for the MCFF created are as follows. ·
Block 1 (playback range: −2 ～ +10)
· Block 2 (playback range: −2 ～ +10)
· Block 3 (playback range: −2 ～ +10)
· Block 4 (playback range: −2 ～ +10)
· Block 5 (playback range: −2 ～ +10)

Even with batch downloads, if the download is started without changing the range shown in the "Download" dialog box that is to be saved, the save range shown on the slider will be downloaded.

6

System Settings (GXUtility)

6.1 GXUtility Contents and Startup

GXUtility is a tool for the GX series cameras that performs the following.

- ・ Changes the camera IP address
- ・ Switches the video display method (NTSC/PAL) for the camera
- ・ Newer version of the remote control (JPAD3) firmware

Also, a password can be entered to prevent settings that would cause improper operation of the GXUtility.
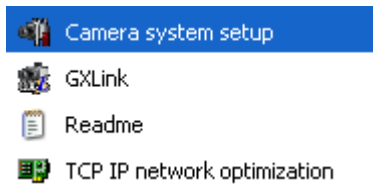
For GXUtility startup, click
Start button → All Programs → MEMRECAM GXLink → Camera system setup
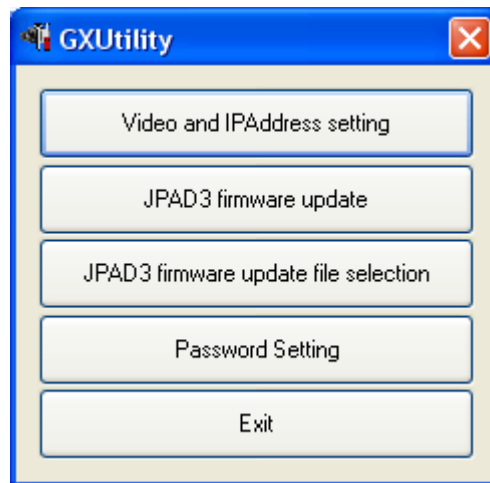
GXUtility Startup

6.2 Video Method, IP Address Setting

Changes the video method (NTSC/PAL) and the IP address for the GX camera. Turn off the camera power and restart to activate the changes.

Use the following procedure to change the settings.

Start the GX camera to be set and make sure the PC and camera are connected to the network.
Also, make sure the camera is not in use.
Startup GXUtility and click "Video and IPAddress Settings".
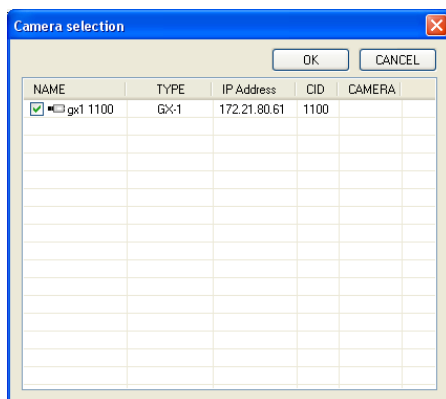
The "Camera Selection" dialog box will be displayed with a list of the cameras currently connected to the network.
A red ✕ will be displayed on the camera icons in use.
Check the camera to be set and click OK.
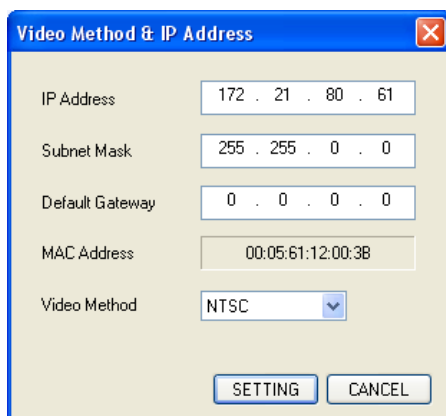
The "Video Method & IP Address" dialog box will be displayed with the current camera settings.
Specify the item (IPAddress／Subnet Mask／Default Gateway／Video Method) to be set and click "Settings".
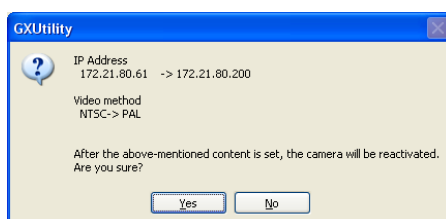
The confirmation dialog box will be displayed.
Click "Yes" to change the camera settings and restart the camera.

6.3 Updated JPAD3 Firmware

Updates the remote control (JPAD3) firmware connected to the GX camera.

![Caution symbol]

Caution While the JPAD3 firmware is being updated, do not turn off the power to the camera or unplug the JPAD3 from the GX camera.
 The JPAD3 will not work if the update is not completed properly.

First, select the firmware file using the following procedure.
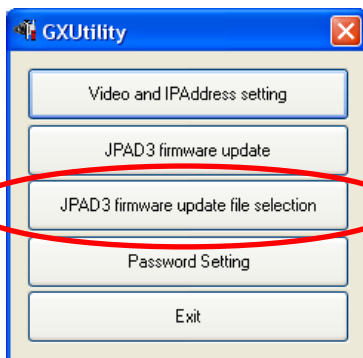
Start GXUtility and click "JPAD3 firmware update file selection".
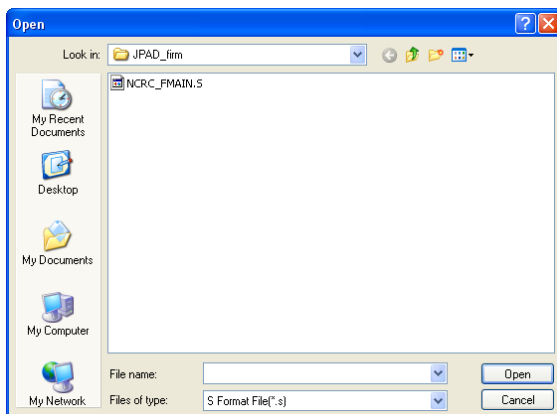
The "OPEN" dialog box will be displayed. Specify the firmware file and click "OPEN".

Use the following procedure to update the JPAD3 firmware.
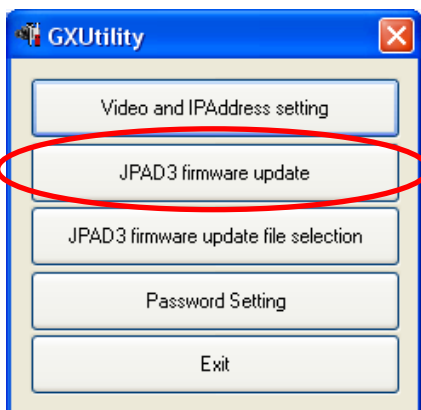
Start the GX camera to be set and make sure the PC and camera are connected to the network.
Also, make sure the camera is not in use and the JPAD3 is connected to the camera.
Startup the GXUtility and click "JPAD3 firmware update".

The "Camera Selection" dialog box will be displayed with a list of the cameras currently connected to the network.

A red ✕ will be displayed on the camera icons in use.

Check the camera to update the JPAD3 firmware and click OK.

The confirmation dialog box will be displayed.

Click "Yes" to start updating the JPAD3 firmware connected to the camera.

<u>Do not do anything until "it ended normally" is displayed.</u>

The "JPAD3 firmware update" dialog box will be displayed, and the progress of the firmware update will be displayed on the progress bar.

Once the JPAD3 firmware update has been completed, "It ended normally" will be displayed.

Click "Exit".

6.4 Set Password

Set a GXUtility password to prevent accidental changes to the camera settings.
Initially, there is no password set.
Use the following procedure to set or change the password.
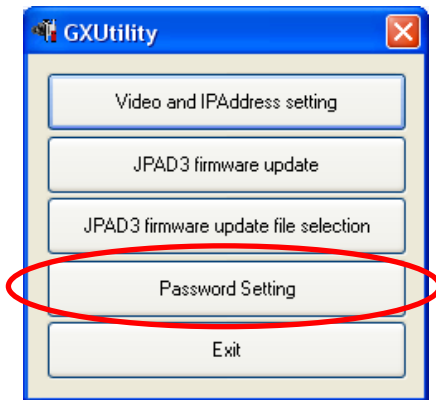
Startup GXUtility and click "Password Setting".

The "Password change" dialog box will be displayed.
If a password has already been set, enter the current password in the "Please enter currently password" box. Enter the password to be set in the "Please enter new password" and "Please enter new password again" boxes.
Leave blank if not using a password.
Then, click "OK".

The setting complete message will be displayed.
Click "OK".
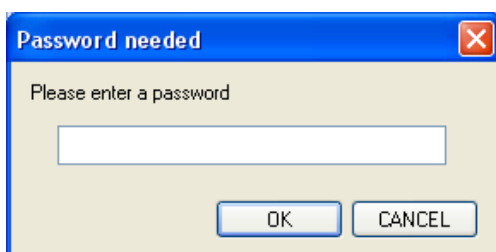
If setting a password with this procedure, a password will be needed to use the GXUtility function in the future.

7

Specifications

7.1 System Requirements

The PC conditions required to run the GXLink are as follows.

Computer	IBM PC compatible (DOS/V)
CPU	Pentium 4 1.7GHz or greater (The compression and display processing speeds depend on the CPU performance.)
Memory	512MB or greater (recommend 2GB or greater)
Monitor	Full color, screen size 1024×768 or greater
	(Recommend 1600 × 1200 or greater if the camera image size is 1280x1024)
OS	Windows 2000 Professional + SP4
	Windows XP Professional + SP2
	Internet Explorer 5.0 Service Pack 2 or higher
Disk	600MB for programs and logs
	60GB and greater for data (recommend 200GB and greater)
	(Depends on the number of cameras and number of frames to be saved.)
Network	With GX cameras or fx cameras (Gbit connection):
	Ethernet (IEEE802.3u 100BASE-TX Half Duplex)
	With fx cameras (TCP/IP Fast Ethernet):
	Ethernet (IEEE802.3ab 1000BASE-T Half Duplex)
	With fx cameras (FC-AL connection):
	FC-AL
CD Drive	1(for installation)
Mouse	1
Keyboard	1

The compression and display processing speeds depend on the CPU performance. The free space for data on the disk must be sufficient for the needed operations.

If the computer configuration or version is not that specified above, this product may not function properly.
(Please contact our company for recommendations.)

Appendix A

List of Shortcut Keys

Details of the shortcut keys used with the GxLink are described below.

Effect	Shortcut Key
Open file	Ctrl＋O
Connect camera	Ctrl＋C
Download	Ctrl＋L
Convert format	Ctrl＋V
View properties	Ctrl＋P
Close file	Ctrl＋W
Zoom in	Ctrl＋'＋'
Zoom out	Ctrl＋'－'
Zoom 100%	Ctrl＋1
Start/stop zoom tool	Ctrl＋Z
Start/stop hand tool	Ctrl＋H
Start coordinate measurement	Ctrl＋R
Display/do not display main toolbar	F7
Display/do not display camera parameter toolbar	F8
Display/do not display item toolbar	F9
Display/do not display status bar	F10
Switch modes (basic/expert)	F12
Open detailed settings window	Ctrl＋D
Select all cameras/files on the item list	Ctrl＋A
Start/stop synchronized display	Ctrl＋Y
Open camera registration dialog box	Ctrl＋SHIFT＋R
Open option dialog box	Ctrl＋SHIFT＋O

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Appendix B

File Conversion Settings (FCV files)

This describes the file conversions settings (FCV).

[CONV_PARAM] This item shows the following conversion setting items.

*** Settings for conversion range to be saved ***

・SEG_SEL Conversion segment number

0：only effective with MEMRECAM ci series

・BEGIN_FRAME Frame to start conversion(for one block)

・END_FRAME Frame to end conversion(for one block)

The settings for the conversion range to be saved are not valid when either the BEGIN_FRAME or the END_FRAME are not within the MCFF frame range or if BEGIN_FRAME ＞ END_FRAME.

Also, if the FCV file is specified as the BEGIN_ FRAME1, END_ FRAME1, BEGIN_TIME1 or END_TIME1, the BEGIN_FRAME and the END_FRAME are not valid.

・BEGIN_FRAMEn Start conversion frame for block n

・END_FRAMEn End conversion frame for block n

n is the number of 1～16 blocks.

The portion of the MCFF range between the BEGIN_ FRAMEn and END_ FRAMEn range becomes the conversion range to be saved. If the BEGIN_ FRAMEn and END_ FRAMEn range does not overlap with the MCFF range, the data for block n is not converted. If the BEGIN_ FRAMEn and END_ FRAMEn are designated as the FCV file, BEGIN_FRAME, END_FRAME, BEGIN_TIMEn and END_TIMEn are not valid.

・BEGIN_TIMEn Start conversion time (sec) for block n

・END_TIMEn End conversion time (sec) for block n

n is the number of 1～16 blocks.

The portion of the MCFF range between the BEGIN_TIMEn and END_TIMEn range becomes the conversion range to be saved. If the BEGIN_TIMEn and END_TIMEn range does not overlap with the MCFF range, the data for block n is not converted. If the BEGIN_TIMEn and END_TIMEn are designated as the FCV file, BEGIN_FRAME and END_FRAME are not valid. Also, if BEGIN_ FRAMEn and END_ FRAMEn are designated as the FCV file, BEGIN_TIMEn and END_TIMEn are not valid.

*** Format for the conversion file to be saved ***

・FILE_TYPE	Type of conversion file to be saved
・CONVERT_TYPE	Conversion method (1：Method A, 2：Method B, 3：Method C)
・FCC_HANDLER	Select compression method (codec)　(used when converting AVI files)
	0：not valid
・VIDEO_CODEC	Name of compression method (codec) (used when converting AVI files)
	Not valid when a compression method name corresponding to FCC_HANDLER isn't used
・QUALITY	Compression quality (for AVI and JPEG conversion)
	−1：Not valid
・COMP_KEYFRM	Number of frames inserted into the key frame
・COMP_BPS	Data rate(Byte/sec)
・COMP_STATE	Compression program state
・AVI_FPS_SCALE	Frame rate denominator for AVI
・AVI_FPS_RATE	Frame rate numerator for AVI
・SOFT_MJPEG	Compression setting(0：CODEC、1：MJPEG)

*** Superimposed information settings ***

・SI_TYPE	Type of superimposed information (0：none, 1：superimpose frame only 2：superimpose everything)
・SI_REC_COMMENT	Superimpose recorded comments (0：none, 1：superimpose)
・SI_FRAME_TYPE	Superimpose frame (0：frame number,1：relative time, 2：absolute time)
・SI_FONTSIZE_TYPE	Superimposed information font size (0：small, 1：medium, 2：large)

*** Cut/rotation angle settings ***

・RESIZE_SEL	Resize settings when cut(0：1/1,　1：1/2)
・CUT_SEL	Cut settings(0：no cut,　1：cut at 640x480)
・CRECT_X	Offset (X coordinate value) for point of origin for the image (top left corner) and the point of origin for cut frame (top left corner)
・CRECT_Y	Offset (Y coordinate value) for point of origin for the image (top left corner) and the point of origin for cut frame (top left corner)
・CRECT_BL0_X	Offset (X coordinate value) for point of origin for the image (bottom right corner) and the point of origin for cut frame (bottom right corner)
・CRECT_BL0_Y	Offset (Y coordinate value) for point of origin for the image (bottom right corner) and the point of origin for cut frame (bottom right corner)
・CRECT_H	Height of cut frame (fixed at 480)
・CRECT_W	Width of cut frame (fixed at 640)
・CONVERT_ANGLE	Image rotation angle
・TB_REVERS	Top/bottom reverse direction for image (0：no reverse, 1：reverse)
・LR_REVERS	Left/right reverse direction for image (0：no reverse , 1：reverse)

*** Image quality settings ***

・GAIN_SEL   Gain settings   fx cameras(-1：none,   0：0dB,   6：6dB,   12：12dB)
                                                        GX cameras (LOW、 NORMAL、 HIGH)

・GAMMA_SEL   Gamma settings(-1：none,   0：OFF、 1：LOW、 2：NORMAL)

・ENH_SEL   Enhance settings(-1：none,   0：OFF、 2:LOW、 4：NORMAL、 6：HIGH)

・KNEE   Knee settings(-1：none,   0：OFF、 1：ON)

・LPF_ENB   Low pass filter settings(-1：none,   0：OFF、 1：ON)

・CHROMA   Chroma settings(0：0%、 25：25%、 50：50%、 75：75%、
                                        100：100%、 150：150%、 200：200%)
                             -1：none,   CHGAIN_NUM、CHGAIN_DENOM set to -1

・CHGAIN_NUM   Custom chroma numerator

・CHGAIN_DENOM   Custom chroma denominator
                             Custom chroma   CHGAIN_NUM／CHGAIN_DENOM[%]

・HUE   Hue(-9999：none, -180〜+180 [degree])

・CONTRAST   Contrast (-1：none,   0〜6400[%])

・BRIGHTNESS   Brightness(-9999：none,   -180〜+180：[%])

・GAMMA_COEFF   Custom gamma value (-1.00：none,   0.00〜1.00)

・ENH_IDX   Custom enhance value(-1：none)

・LPF_IDX   Custom low pass filter value(-1：none)

・WB_SEL   White balance selection(-1：none,   0：custom
                                    1：3100K, 2：5000K, 3：9000K, 4：REG, 5：Auto)

・WB_RGAIN   White balance R gain value [0.0〜] (value with the A method conversion algorithm)

・WB_BGAIN   White balance B gain value 0.0〜] (value with the A method conversion algorithm)

・WB_YRGAIN   White balance R gain value [0.0〜] (value with the B method conversion algorithm)

・WB_YBGAIN   White balance B gain value [0.0〜] (value with the B method conversion algorithm)

・WB_YGGAIN   White balance G gain value [0.0〜] (value with the B method conversion algorithm)

・INPUT_BLACK_LEVEL   Input black level

・RGB_MATRIX   RGB matrix correction(1：ON、 0：OFF)

・FRAME_RATE   Conversion frame rate

Appendix C

Parameter File Settings (prm files)

This describes the parameter file settings (prm) for the camera.

[PARAM]　　　　　　This item shows the number of cameras.

・CAMCOUNT　　　　　　Number of cameras

[REC_PARAM0]　　　These items show the information and recording settings for the first camera.

・NICKNAME　　　　　　Nickname

・IPADDRESS　　　　　　IP address

・DEV_TYPE　　　　　　Type

・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

・EVTFRM_ENB　　　　Event frame ON/OFF

・LOWLIGHT　　　　　　Low light

・CURSEG　　　　　　Segment No.

・ESTMODE　　　　　　EST mode ON/OFF

・REC_METHOD　　　　Recording trigger mode