FASTCAM Mini UX50/100

Hardware Manual

Revision 1.03 EN

Photron

Introduction

Thank you for your purchase of Photron's high-speed camera system, the "FASTCAM Mini UX50/100" (referred to below as the system).

This manual contains the operating instructions and warnings necessary for using the system.

Before using the system, please read the entire manual.

If any part of this manual is unclear, contact Photron using the contact information printed at the back of the manual.

After you finish reading the manual, store it in a safe place along with the warranty card and refer back to it when necessary.

Manual Notation

The following icons and symbols are used in the explanations in this manual.

Icon/Symbol	Description
🔒 Important	This symbol indicates content that should always be read.
⚠ Caution	This symbol indicates instructions that should always be followed when using the software, or things to be careful of when using the software.
✎ Supplement	This symbol indicates supplementary items to be aware of when using the system.
📖 Reference	This symbol indicates the location of a reference.
✺ MEMO	This symbol indicates a space for you to make notes.
" "	This symbol is used to indicate the names of items on a screen, references, dialog names, and connectors.
[ ]	This symbol is used to indicate menu names, and sub-menu names.

Using the Manual

This section explains the layout of the manual.

◆ Introduction
The introduction explains the manual and safety precautions.

◆ Chapter. 1 Overview
This chapter gives an overview of the system and an explanation of its features.

◆ Chapter. 2 Setup
This chapter gives an overview of the components that make up the system.
Please also refer to "Photron FASTCAM Viewer User's Manual" for the details of operation by PC.

◆ Chapter. 3 Functions
This chapter explains about the system's functions.

◆ Chapter. 4 Reset of Gigabit Ethernet IF's IP address and Factory Default
This chapter explains the procedure of resetting the system when the system does not work correctly.

◆ Chapter. 5 Product Specifications
This chapter explains the system's specifications.

◆ Chapter. 6 Warranty
This chapter explains about the warranty.

◆ Chapter. 7 Contacting Photron
This chapter lists the contact information to use when contacting Photron if the system malfunctions or if a portion of the manual is unclear.

Using the System Safely and Correctly

In order to prevent injury to yourself and others, and to prevent damage to property, carefully observe the following safety precautions.

Photron has given its full attention to the safety of this system. However, the extent of damage and injury potentially caused by ignoring the content of the safety precautions and using the system incorrectly is explained next. Please pay careful attention to the content of the safety precautions when using the system.

⚠ **Warning**	This symbol indicates actions that carry the risk that a person could receive a serious injury.

⚠ **Caution**	This symbol indicates actions that carry the risk that a person could receive a moderate injury, or that damage to physical property might occur.

◆ The safety precautions to be observed are explained with the following symbols.

⚠	This symbol indicates actions that require caution.

🚫	This symbol indicates actions that are prohibited and must be avoided.

❗	This symbol indicates actions that must always be performed.

⚠ **Warning**

■ Do not perform actions that will damage the AC cable or plug.
 （Do not damage the cable, modify it, use it near a heater, excessively bend, twist
 or pull on it, place heavy objects on it, or bundle it.）
 Using the cable when damaged can cause fire, electric shock, or a short circuit.

■ Do not use the system in a manner which will exceed the rating of the power
 outlet or wiring equipment used.
 Exceeding the power rating might cause a fire from excessive heat.

■ Do not insert metallic objects inside, or pour liquids such as water on, the system.
 Doing so can cause fire, electric shock, or malfunction from short circuit or heat.

■ Do not disassemble or modify the system.
 There are high voltages inside the system that can cause electric shock.

■ Do not plug in or unplug the power cord with wet hands.
 Doing so can cause electric shock.

■ This chapter lists the contact information to use when contacting Photron if the
 system malfunctions or if a portion of the manual is unclear.
 Not fully plugging in the power cable can cause fire from electric shock or heat.

■ When something is wrong with the system, unplug the power cable immediately.
 - When a foreign substance or liquid, such as metal or water, gets inside.
 - When the outer case is broken or damaged, such as from a fall.
 - When the system produces smoke, a strange smell, or strange sound.
 Using the system in these conditions might cause a fire or electric shock.

⚠ Caution

■ Always unplug the system when cleaning it or when it is unused for a long period of time. Leaving or storing the system connected to the power source might cause fire from insulation deterioration or electrical discharge.

■ Please consult us in advance when you perform an event by which laser light or direct rays fall on the image sensor surface.

■ Do not set the system in a location where the temperature gets unusually hot. The trunk and inside of a car can get especially hot in summer. Doing so can cause the outer case and internal components to deteriorate or cause a fire.

■ Do not place the system in a location prone to oily smoke or steam, or in a location with a lot of humidity or dust. Oil, moisture, and dust conduct electricity, which can cause a fire or electric shock.

■ Ambient temperature 0-40° C, humidity 85% RH or lower, maximum altitude 2,000m or lower. In addition, if exceeding these limits, use in a condensation-free environment. Doing so can cause malfunction.

■ Do not store the equipment in a location where the temperature goes below -20°C or higher than 60°C. Also, prevent condensation from forming during shipment

■ This device is for indoor use, do not use it outdoors. Do not use in a location that has dust.

■ When shipping, remove the connecting cable and use the original packaging or a dedicated carrying case. Do not ship the equipment in an environment where the temperature goes below -20°C or higher than 60°C. Also, prevent condensation from forming during shipment

⚠️ **Cleaning of the Image Sensor Surface**

Electro-Static Discharge (ESD) events may cause immediate and unrecoverable damage to the image sensor. Please read the following instructions and take EXTREME CARE when cleaning the image sensor surface.

🚫
- ■ ALWAYS take appropriate anti-static precautions when cleaning or working near the Image sensor.
- ■ DO NOT use any form of cleaning equipment using electrostatic or 'charged fiber' technology.

ℹ️
- ■ Please discharge any electrostatic build up in your body by touching a grounded metallic Surface before working near the camera sensor.
- ■ Very gently, use only clean and dry air to remove dust from surface of the image sensor.
- ■ To remove stubborn contamination use the highest grade (e.g. VLSI grade) pure Isopropyl alcohol (IPA) with optical wipes of 'clean room' grade.
- ■ Extreme care must be taken! Gently wipe across the sensor in a single action.
  (DO NOT rub to avoid abrasive damage to delicate optical coatings on the glass surface.)

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Chapter. 1   **Overview**

1.1. Product Overview and Features

1.2. About the System's Components and Accessories

1.3. Part Names

1.1.   Product Overview and Features

 The FASTCAM Mini UX50/100 has superior recording performance (UX100: 5,000fps at one million pixels, 800,000fps maximum, UX50: 2,000fps at one million pixels, 160,000fps maximum) in a lightweight, compact design of only 1.5kg (3.3 lbs).
The superior portability and recording performance is very useful for multiple purposes in research and development, design, production, and quality control, as well as numerous fields such as science, medicine, biology, aviation and space.

The small body not only has in/out signal connectors for triggering and synchronization with other equipment , but also a Gigabit Ethernet connection that allows high speed data transportation and system control from a PC. The FASTCAM Mini UX50/100 fits various image analysis and image processing applications to simplify your workflow.

Use this "state-of-the-art technology in a small body" for any dynamic image measurement purpose.

FASTCAM Mini UX50/100

1.2.   About the System's Components and Accessories

1.2.1.   Components

The system's standard components are listed below. Remove the components from the packaging and check them.
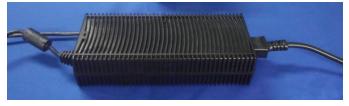
1.   Camera Body (with G type F mount)   One

2.   AC Power Supply Unit   One

3.   AC Cable with a ferrite core (*Type is different in each country)   One

4.   C-mount   One

5. 2m DC Extension Cable   One

6. Gigabit Ethernet Interface Cable with a ferrite core(LAN Cable)   One

7. Hexagonal Wrench for Changing Lens Mounts
    (1.5 mm, 4 mm)   One each

8. Lens Mount Cap (built into the camera body)   One

9. FASTCAM Series Setup Disk (Driver/Application DVD)   One

10. FASTCAM Mini UX50/100 Hardware Manual (this manual)   One

11. Photron FASTCAM Viewer (PFV) User's Manual   One

12. How to Make a Gigabit Ethernet Connection
    (Simple Procedure Manual)   One

13. FASTCAM Mini UX50/100 FirstStepGuide   One

✏ Supplement

- This system does not include a lens.

1.2.2.　Accessories/Options

The following options are available for the system.

1.　Dedicated Carrying Case

2.　DAQ option

3.　Movie analysis software

Supplement

- Lenses, lamps and other kinds of options are available. Please contact our sales representative or distributors. Please refer to "7.1.Contact Information 78page".

1.2.3. Type

For the FASTCAM Mini UX50/100 system, there are monochrome and color versions, for each of these versions, there are 4 GB standard memory capacity type and 8 GB (or 16GB) high capacity type. When purchasing, it is possible to select from these models according to the application or your demands.

The Types are listed below.

Max. Frame Rate	Full Frame Max. Frame Rate	Sensor Type	Memory	Type Name
800,000fps	4,000fps	Color	4GB	FASTCAM Mini UX100 type 800KC – 4GB
			8GB	FASTCAM Mini UX100 type 800KC – 8GB
			16GB	FASTCAM Mini UX100 type 800KC – 16GB
		Monochrome	4GB	FASTCAM Mini UX100 type 800KM – 4GB
			8GB	FASTCAM Mini UX100 type 800KM – 8GB
			16GB	FASTCAM Mini UX100 type 800KM – 16GB
160,000fps	2,000fps	Color	4GB	FASTCAM Mini UX50 type 160KC – 4GB
			8GB	FASTCAM Mini UX50 type 160KC – 8GB
			16GB	FASTCAM Mini UX50 type 160KC – 16GB
		Monochrome	4GB	FASTCAM Mini UX50 type 160KM – 4GB
			8GB	FASTCAM Mini UX50 type 160KM – 8GB
			16GB	FASTCAM Mini UX50 type 160KM – 16GB

1.3. Part Names

The system is composed of components including the camera body, AC power supply, and the "Photron FASTCAM Viewer" control software (referred to below as PFV).

🚫 For each of the system components.

- Do not expose to shock.

- Do not use in an area where flammable gas or dust present is present.

- Do not place in an unstable location such as on an unstable platform or an incline.

- Do not disassemble or modify.

- Do not expose to liquids such as water.

- Do not subject to excessive force.

1.3.1. Camera Body

The camera body contains IC memory for image recording and has been designed to be able to record high-speed images uncompressed. The back of the camera body is equipped the Gigabit Ethernet interface, which permits full camera control and data download possible via connection to a PC; the input/output connector, which allows external synchronization signals, trigger signals, IRIG time code.
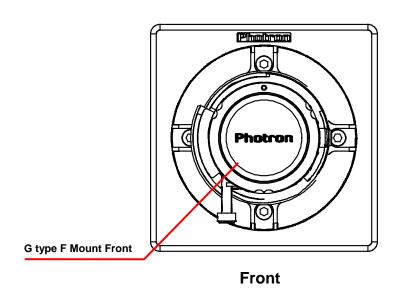
Apperance   **Rear**

FASTCAM Mini UX50/100

1.3.2.   Camera Body Part Names

FASTCAM Mini UX50/100

G type F Mount Front

Front

Status Indicator **LEDs**

GIGABIT ETHER
Gigabit Ethernet
LAN Cable Connector

RESET SW
IP address Reset Switch

POWER SW
Power Switch

DC22-32V 40VA
Power Supply Connector

I/O PORT
I/O Port Connector

Back

1.3.3.   Status Display LEDs on the Rear of the Camera Body

There are a number of LEDs on the rear of the system's camera body. These LEDs indicate the status of the system. The function of each LED is explained here.

- POWER (Green)
  LED ON: Power On
  LED OFF: Power Off

- IF LINK/TRANS (Red)
  LED ON: The Gigabit Ethernet interface is connected
  LED FLASHING: Data is transferring
  LED OFF: The Gigabit Ethernet interface is not connected

- TRIGGER (Yellow)
  LED ON: A trigger signal is present (being input) (The LED will illuminate for 0.1 second when the trigger signal is input.)
  LED OFF: The trigger signal is not present

- IRIG (Green)
  LED ON: The IRIG signal is present (being input)
  LED OFF: The IRIG signal is not present

- SYNC MODE (Red)
  LED ON: In external synchronization mode (synchronized to an external signal)
  LED OFF: In internal synchronization mode (synchronized to the internal signal)

- SYNC IN (Yellow)
  LED ON: A synchronization signal is present (being input)
  LED OFF: A synchronization signal is not present

- REC READY (Yellow)
  LED ON: Ready to record
  LED FLASHING: ENDLESS recording (The REC (Red) LED is also flashing)
  LED OFF: Not ready to record

- REC (Red)
  LED ON: Ready to record (The case of "ENDLESS" recording mode)
  LED FLASHING: Recording
  LED OFF: Not recording

◆ Illumination/blinking in operational states

■ During the Gigabit Ethernet interface initialization LEDs other than POWER (green) and IF LINK/TRANS (red) blink alternately from right to left and from left to right a number of times.

■ When Fuctory Default is executed, LEDs other than POWER (green) and IF LINK/TRANS (red) fade out from right to left a number of times, then blink.
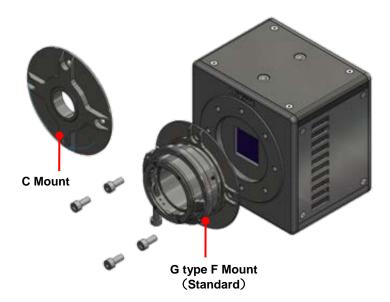
🔖 Reference

- For how to initialize the Gigabit Ethernet interface, and how to reset to Factory Default, refer to "0. Reset of Gigabit Ethernet IF's IP address and Factory Default", page 56.

1.3.4.　Interchangeable Lens Mounts

The lens mount on the system can be changed according to the recording purpose.
There are 2 types of interchangeable lens mounts: "G type F-mount", "C-mount".

◆　How to change the lens mount (G type F-mount → C-mount)

   1.　Remove the four M5 bolts with the hexagonal holes using the hexagonal wrench.

   2.　Remove the G type F-mount portion as a unit.

   3.　Install the C-mount unit using the bolts with hexagonal holes in the 90° diagonal holes.

   4.　After installation, always verify that the unit is not loose and does not rattle.

C Mount

G type F Mount
（**Standard**）

MEMO

Chapter. 2   **Setup**

2.1. Connecting the system

2.1.1. Connection

Status LEDs

Gigabit Ethernet
LAN cable connector

Power on/off SW
DC22-32V
Power connector

Rear panel

Controller details

PC with PFV installed

LAN Cable
(Gigabit Ethernet)

When you use the camera
system, put a ferrite core
on the LAN cable close to
the PC in order to prevent
EMC interference to other
electric equipment.

Camera Body

2m DC
Extention Cable

AC Power Supply Unit

AC Cable

> **Supplement**
>
> - The FASTCAM camera supports 1000BASE-T (Gigabit Ethernet) only.
>   If your PC supports 10BASE-T or 100BASE-T only, you need to install a 1000BASE-T interface
>   board or use a switching hub that supports 10BASE-T, 100BASE-T and 1000BASE-T.

2.1.2. Connecting the AC Power Supply

Connect the supplied AC power supply unit to the power supply.

1. Confirm the Power SW is turned off.

2. Connect the2m DC Extension cable to the "DC22-32V" connector on the back of the camera body.

3. Connect the 2m DC Extension cable to AC power supply unit.

4. Connect the AC cable to the AC power supply unit.

5. Connect the AC cable to the power outlet.

6. Turn on the Power SW one the system.

📖 Reference

- For the specification of the power supply which can be used, refer to "5.1.2. General Specifications", page 59.

🔒 Important

- When you use the camera system, put a ferrite core on the AC cable the camera in order to prevent EMC interference to other electric equipment.

2.2.   Connecting the Gigabit Ethernet Interface to a PC

The system can have the operation of its functions performed from a PC using the Gigabit Ethernet interface.This section explains the required setup when connecting the system to a PC.

To connect a PC to the system, connect the system to a commercially available 1000BASE-T-compatible interface board with a LAN cable. If Hi-G is not required, a commercial LAN cable can be used. (Putting a ferrite core with cable rolling up twice is recommended.)For the LAN cable, prepare a UTP or STP Cat 5e (enhanced category 5) or higher LAN cable. (UTP: Unshielded Twisted Pair, STP: Shielded Twisted Pair)

The maximum cable length between the PC and the system is 100 m (compliant to the 1000BASE-T specification). One PC can connect to a maximum of 64 Photron Gigabit Ethernet interface equipped cameras using a hub. When connecting multiple devices, connect through a switching hub that can connect at 1000BASE-T. The maximum length of the cable that connects the system (or PC) to the switching hub is also 100 m.

Reference

- For the setting method of IP address for camera system, refer to "2.4.1. IP address setup for PC", page 21.
- For the setting method of control PC, refer to "Photron FASTCAM Viewer User's Manual".
- Please refer to the [GigabitEthernet Interface Connection Tutorial Manual」for detail instruction on PC connection setting.

Supplement

- Photron recommends using an STP cable over long distances or in noisy locations.

Important

- The system is only 1000BASE-T compatible. When using a PC compatible with only 10BASE-T or 100BASE-TX, the PC must be connected through a 10BASE-T, 100BASE-TX, and 1000BASE-T compatible switching hub.
- The system's factory default IP address is below:
  IP ADDRESS > GIGABIT ETHER   192.168.0.10
   NETMASK >   GIGABIT ETHER   255.255.255.0
   GATEWAY ADDRESS > 0.0.0.0
   PORT > 2000 (Fixed, not changeable)

2.2.1. Connecting a PC

The system can have the operation of its functions performed from a PC using the Gigabit Ethernet interface.

This section explains the required setup when connecting the system to a PC.

Insert a LAN cable to "1000BASE-T" connector.

A bundled LAN cable may be different from the cable in the picture.

2.3. Installing PFV
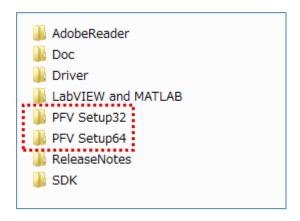
This system is controlled by PFV.
This section explains a software installation and its setup.
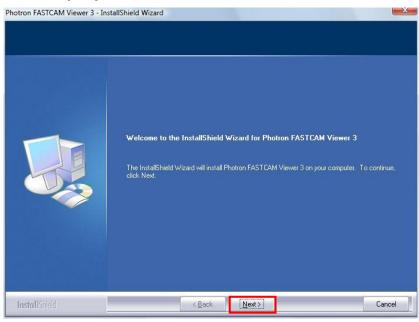
1. Insert the PFV installation DVD in the DVD drive and open that drive form "Computer".
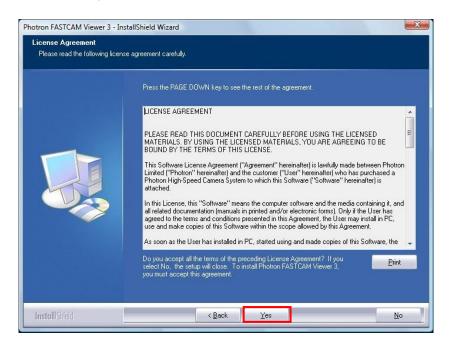
2. For a 32-bit version of Windows, open the "PFV Setup32" folder and double click "Setup.exe".
    For a 64-bit version of Windows, open the "PFV Setup64" folder and double click "Setup.exe".

3. The setup program starts and the dialog box below is displayed.
   Click the [Next] button.
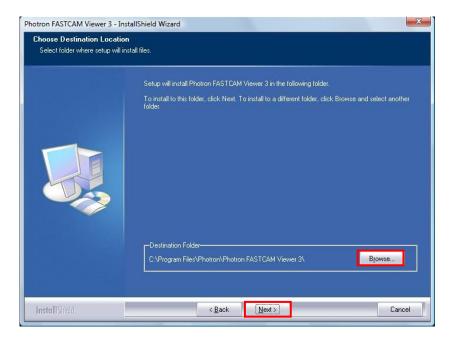
4. The license agreement is displayed. Confirm the contents and click the [Yes] button.
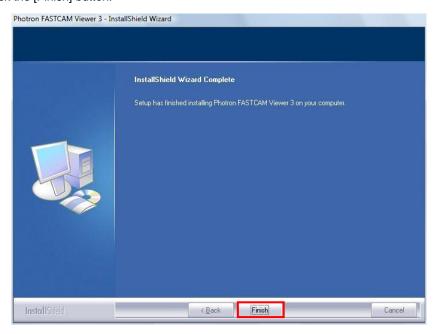
5.   Specify the installation location. The default setting for the installation location is
"C:\Program Files\Photron\Photron FASTCAM Viewer 3".
When necessary, click the [Browse] button and change the installation location to your preferred
location.
After specifying the installation location, click the [Next] button.

6.   The installation starts, when it is completed, the screen below is displayed.
Click the [Finish] button.
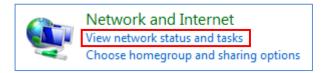
2.4. PC Setup
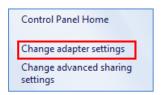
2.4.1. IP address setup for PC

This system is controlled by a PC via network. This section explains IP address setup for connecting the system and PC.

1. Open Start Menu, click "Control Panel"

2. Click "View network status and tasks".
   If "View by:" is not "Category", Click "Network and Sharing Center".

   Network and Internet
   View network status and tasks
   Choose homegroup and sharing options
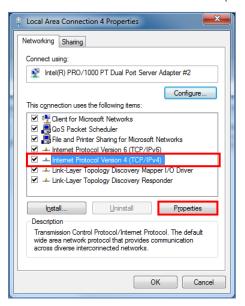
3. Click "Change adapter settings" at left side.

   Control Panel Home
   Change adapter settings
   Change advanced sharing settings

4. Network devices on the PC are displayed. Right click "Local Area Connection".
   Then click "Properties".

   Local Area Connection
   Marvell Yukor
   Disable
   Status
   Diagnose
   Bridge Connections
   Create Shortcut
   Delete
   Rename
   Properties
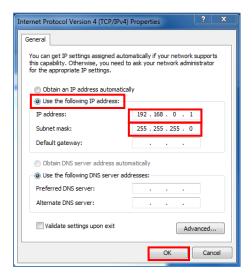
5. "Local Area Connection Properties" window is opened.
   Double click "Internet Protocol Version 4 (TCP/IPv4)"

6. "Internet Protocol Version 4 (TCP/IPv4) Properties" window is opened.
   Check on "Use the following IP address:" radio button.
   Input IP address and Subnet mask as below, then close the window by clicking "OK".

   IP address   :   192 . 168 .   0 .   1
   Subnet mask   :   255 . 255 . 255 .   0
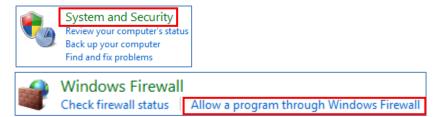
2.4.2. Windows Firewall Setup
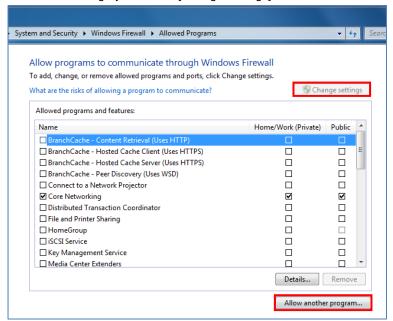
Even if an IP address is set up, Windows Firewall blocks the connection.
This section explains how to set up that PFV is allowed through Windows Firewall.
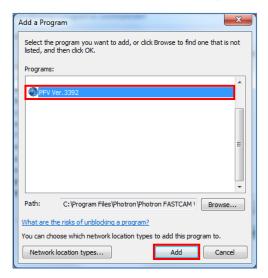
1.   Open Start Menu and click "Control Panel".

2.   Click "System and Security".   Then click "Allow a program through Windows Firewall"
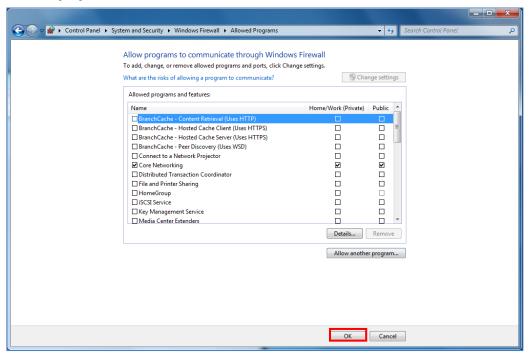
3.   Click [Allow another program…] button.
     If the button is gray-out. Click [Change settings] before that.

4. Select the installed "PFV Ver.XXX", then click [Add] button.

5. Click [OK] button and close the window.

2.4.3. Connections of PC and multiple systems

The control software PFV can control multiple systems of SA / Mini series, MC2.1 and MH4-10K by connecting with one PC.

> ⚠ **Caution**
>
> • Please do not set up conflicted IP addresses.

MEMO

Chapter. 3 **Functions**

3.1. What PFV Does

Operating this system requires connecting PC and the system, and the control software PFV.
The following figure shows functions which PFV can do. Please refer to "Photron FASTCAM Viewer
User's Manual" for the details of operation.

Control the high-speed camera with the PC
Display the live image
Set shot conditions
Collective control of multiple cameras
Set the trigger mode Shoot

PFV Manual Chapter.2
PFV Manual Chapter.3

Playback of the camera's recorded images
Play the images recorded by the camera
Select replay speed and number of frames

PFV Manual Chapter.4

Saving recorded images
Save recorded images to the PC
Save as a specified file type
Save a specified area or number of frames
Add information to an image and save

PFV Manual Chapter.5

Play saved data
Play/resave data saved to the PC
Read/simultaneous playback of multiple data

PFV Manual Chapter.6

3.2.　Selecting the Frame Rate

Images can be recorded with the system from 50 fps to 4,000 fps (2,000 fps for UX50) using the full 1,280x1,024 pixel resolution of the image sensor. For frame rates higher than 4,000 fps (2,000 fps for UX50), high-speed recording is achieved by limiting the read area of the image sensor.

> **Reference**
>
> - Please refer to "3.3 Setting and Registering the Frame Rate/Resolution" of "Photron FASTCAM Viewer User's Manual" for the details of the setup.

> **Supplement**
>
> - Even if a limited horizontal resolution is applied, Frame Rate cannot be increased. This specification is different from other systems. Please refer to "5.1.5. Frame Rate and Resolution" for available frame rate.

3.3.　Selecting the Resolution

The maximum resolution of the image sensor is 1,280 x 1,024: total 1,310,720 pixels. By reducing the resolution, images can be taken with even faster frame rates, or the recording duration can be extended accordingly.

> **Reference**
>
> - Please refer to "3.3 Setting and Registering the Frame Rate/Resolution" of "Photron FASTCAM Viewer User's Manual" for the details of the setup.

3.4. **Selecting the Shutter Speed**

The shutter speed (Exposure time) is independent of the frame rate, and it is possible to control the exposure time in the frame using the electric shutter. By making an exposure that is of a shorter period than the frame rate, high-speed objects can be photographed blur-free.

The shortest setting value of shutter speed is 1/1,000,000 sec (approx 1 usec, 1/256,000 for UX50).

Reference

- Please refer to "3.4 Setting the Shutter Speed" of "Photron FASTCAM Viewer User's Manual" for the details of the setup.
- For more information of Shutter Speed, refer to "5.1.6.Shutter Speed List" 67 page.

Supplement

- A minimum exposure time depends on a set up frame rate.

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FrameRate	Limitation
50fps ～ 160,000fps	1/frame ～ 1/256,000 sec are selectable
200,000fps	1/frame sec (3.76usec) is only available
256,000fps	1/frame sec (2.72usec) is only available
512,000fps	1/frame sec (1.78usec) is only available
800,000fps	1/frame sec (1usec) is only available

FASTCAM Mini UX50

FrameRate	Limitation
50fps ～ 160,000fps	1/frame ～ 1/256,000 sec are selectable

3.5. Selecting the Trigger Mode

In order to reliably capture high-speed phenomena, many kinds of trigger modes have been made available. These trigger modes are explained next.

There are five types of trigger modes which are listed below.

- START   - CENTER   - END   - MANUAL
- RANDOM
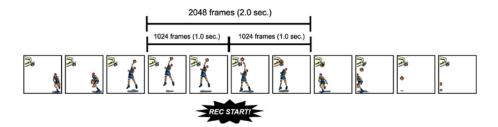
3.5.1. START Mode

START mode is a trigger mode where recording starts the instant the trigger is input, the scene is recorded until the memory is full, and then recording ends. This mode is suitable for taking images of high-speed phenomena when what will happen, and when it happens, is known in advance.
For example, in a situation with a maximum useable memory of two seconds of recording, two seconds of high-speed video is saved immediately after the trigger is input.

3.5.2. CENTER Mode

CENTER mode is a trigger mode where an equal amount of content recorded before and after the trigger is input is saved to memory. This mode is suitable for viewing before and after an important instant. For example, in a situation with a maximum useable memory for two seconds of recording, one second before and one second after the trigger was input is recorded for a total of two seconds of high-speed video.

3.5.3. END Mode

END mode is a trigger mode where the content recorded immediately before the trigger is input is saved to memory. This mode is suitable for recording a high-speed phenomenon where it is hard to predict when the important action will start and stop. For example, in a situation with a maximum useable memory for two seconds of recording, the two seconds of high-speed video immediately before when the trigger was input are saved.
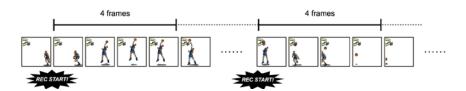
3.5.4. MANUAL Mode

MANUAL mode is a trigger mode, similar to CENTER mode, where the content recorded before and after the trigger is input is saved to memory, but the proportion of time before and after the trigger can be set as required. For example, in a situation with a maximum record time of two seconds, 0.5 seconds before and 1.5 seconds after the trigger is input are recorded and saved, a total of two seconds of high-speed video.

3.5.5. RANDOM Mode

RANDOM mode is a trigger mode where each time a trigger is input only a predetermined number of frames are saved to memory. For example, this function is convenient for a subject which is an irregular and repeated phenomenon which can have a trigger output produced for each cycle or occurrence. The number of frames recorded each time the trigger is input can be set as desired, in one frame increments, from one frame to the maximum of all the recordable frames available.

3.6. LOW LIGHT Mode

The more you increase the frame rate or shutter speed of the camera, the more the amount of light entering the camera decreases, making the displayed image darker. Low light mode is a function that temporarily increases the exposure time, making the displayed image easier to see to enable you to focus and setup the camera.

The default shutter speed of this product is 1/50 second.

3.7. VARIABLE Setting

In the recording conditions settings, the frame rate and resolution can be set to the desired value following the conditions listed below.

- ■ FRAMERATE can be set between 50 fps and 256,000 fps.
  (between 50 fps and 160,000 fps for UX50)
- ■ The size and horizontal position of the resolution can be set in 128 (horizontal) and 8(vertical) increments.
- ■ The minimum resolution is 640 (horizontal) and 8 (vertical).

📖 Reference

- • Please refer to "3.3 Setting and Registering the Frame Rate/Resolution" of "Photron FASTCAM Viewer User's Manual" for the details of the setup.

✏ Supplement

- • The area cannot be moved to the vertical/horizontal direction at the variable setting of the system.

3.8.   White Balance Adjustment (Color Models Only)

On digital video cameras, photographing white as pure white is described as "having the appropriate white balance." On the system's color models as well, in order to take images with the correct color representation, the white balance must be adjusted for the color temperature of the light source used. The intensity of each color, R, G, and B, can be adjusted on this system. By adjusting the balance of those three colors to match the light source used, the appropriate white balance can be achieved. Two methods are available for adjusting the white balance, preset and user-editable white balance. These methods are explained in this section.

3.8.1.   Using Preset White Balance (Color Models Only)

With the system, there are two types of white balance presets (5100K, 3100K) for use with common light sources. The suggested color temperature for these presets is listed below.
5100K (Daylight, Outdoors)
3100K (Halogen Light Source)

3.8.2.   Using User White Balance (Color Models Only)

User white balance can be set in order to achieve the most appropriate white balance for the light source used with the system and the conditions during recording.
The values set here are stored in the camera body's internal memory as the user preset, and they can be loaded by selecting USER.
There are also two methods for setting user white balance, AUTO USER and EDIT USER.

📖 Reference

- Please refer to "3.8 Other Settings" of "Photron FASTCAM Viewer User's Manual" for the details of the setup.

3.9.　Color Enhancement Function (Color Models Only)

Color models feature an image color enhancement setting. The image color enhancement level can be adjusted in five steps, including the OFF setting.

Menu Display	Contents
OFF	Turns the color enhancement mode off
x 0.5 (LEVEL1)	Sets x0.5 color enhancement
x 1　 (LEVEL2)	Sets x1 (default) color enhancement
x 1.5 (LEVEL3)	Sets x1.5 color enhancement
x 2　 (LEVEL4)	Sets x2 color enhancement

📖 Reference

- Please refer to "3.8 Other Settings" of "Photron FASTCAM Viewer User's Manual" for the details of the setup.

3.10.　Edge Enhancement Function

With the system's edge enhancement setting, you can enhance the edges in the recorded image in three steps.

Menu Display	Contents
OFF	Edge enhancement off.
LEVEL1	Edge enhancement set to weak.
LEVEL2	Edge enhancement set to medium.
LEVEL3	Edge enhancement set to strong.

📖 Reference

- Please refer to "3.8 Other Settings" of "Photron FASTCAM Viewer User's Manual" for the details of the setup.

3.11.　Partition Memory & Record

The system contains internally 4 GB standard, or a maximum of 16 GB, of high-capacity memory for recording use.
This recording memory can be partitioned and assigned to each recording. Memory is partitioned into equal sizes and a maximum of 64 partitions can be set. The partitioned sections are managed by ID numbers.
Each section can be set with completely independent recording conditions, so this feature is convenient when taking consecutive recordings with changed conditions.

📖 Reference

- Please refer to "3.8 Other Settings" of "Photron FASTCAM Viewer User's Manual" for the details of the setup.
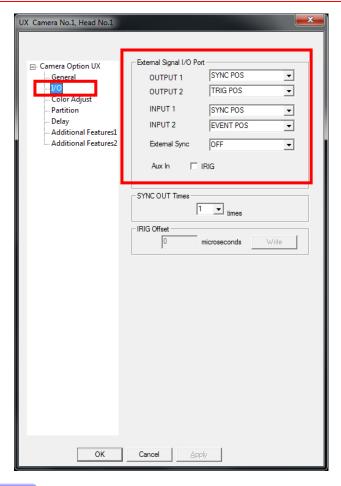
3.12.   Input / Output Signal Types

With the system, many signals can be input and output through the I/O connector. Signals that can be input and output from the I/O connector are listed below.

🚫 A signal other than the specified signal must not be input to the various connectors.

Use extreme caution as there is a risk of damage to both, the input device and the output device.

📖 Reference

- Please refer to "3.8 Other Settings" of "Photron FASTCAM Viewer User's Manual" for the details of the setup.

The followings are I/O connectors and related signals.

3.12.1. TRIG SW IN Connector

This trigger is input during the READY or ENDLESS recording state by contact between the BNC connector's shield and a center pin (switch closure). The center pin normally has voltage flowing through it. Use caution to avoiding contact with other pins.

3.12.2. IRIG IN Connector

IRIG signal is input from other equipment.

3.12.3. INPUT(1,2) Connector

The effect when a signal is input is described below, and can be optionally selected and set.
The input voltage is 0V to +12V (H level +2.5V to +12V), positive or negative polarity, pulse width is 200 ns or greater.
Default settings are INPUT1 connector is assigned "SYNC POS", INPUT2 connector is assigned "TRIG POS".

SYNC POS/NEG	Inputs a synchronization signal from another camera or other equipment.
TRIG POS/NEG	Inputs a TTL signal to control start/end of recording. The system's status should be set READY or ENDLESS.
READY POS/NEG	Inputs a change recording ready status signal (READY ON/OFF).
EVENT POS/NEG	Inputs a signal for the event trigger.

📖 Reference
- Please refer to ”3.17.Event Marker Function for the event trigger. 52 page

✏ Supplement
- When 2 or more these systems are synchronized, slave cameras' external synchronization settings should be set "ON CAM" at PFV.

3.12.4. OUTPUT (1, 2) Connector

These are also BNC connectors. The signals below can be changed and output from PFV.

The output voltage is 0V to +5V, positive or negative polarity, pulse width can be changed.

Default settings are OUTPUT1 connector is"SYNC POS", OUTPUT2 is "TRIG POS".

(POS: positive polarity, NEG: negative)

SYNC POS/NEG	Outputs a vertical synchronization signal.
EXPOSE POS/NEG	Outputs the camera's exposure period signal. * Outputs during both LIVE and recording.
REC POS/NEG	Outputs a signal during recording.
TRIG POS/NEG	Outputs the trigger signal the camera received.
READY POS/NEG	Outputs a signal that indicates the recording ready state.

3.13. Using External Triggers

With the system, you can record by receiving various trigger signals matched to the recording application. The trigger signals that can be used on the system are explained here, along with a description of how to use them.

3.13.1. Inputting an External Trigger Signal

The external trigger signals that can be used with the system and their input system are listed below.

Connector Name (Input System)	Menu	Signal
INPUT	TRIG POS	FET Input 0V - +12V (H level +2.5V to +12V), Positive Polarity
	TRIG NEG	FET Input 0V - +12V (H level +2.5V to +12V), Negative Polarity
TRIG SW IN	None	Contact signal

When a trigger signal is input to INPUT connector, this item should be set to a signal type.
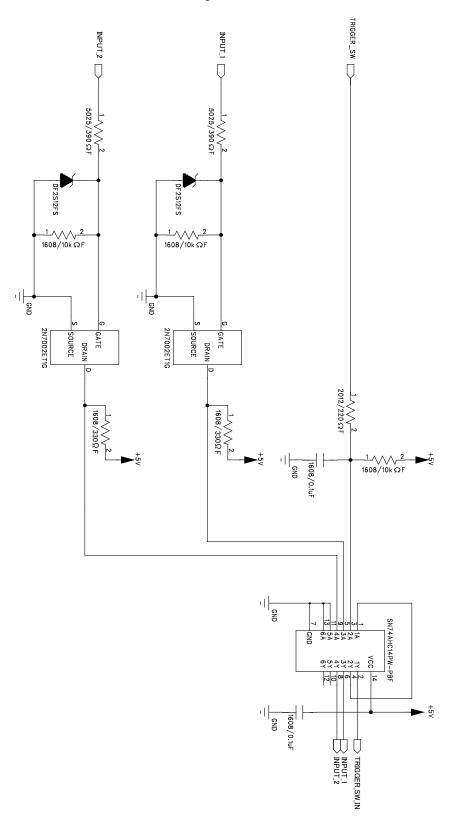
⚠ Use caution not to input more than specified voltage or current to the INPUT trigger signal inputs as there is a risk of damage to the equipment.

📖 Reference

- For the setting method of the signal inputted into INPUT, refer to "3.15.1. INPUT Signal Settings", page 48.

◈ INPUT, TRIG SW IN Circuit Diagram

3.13.2. Outputting External Trigger Signals

With the system, you can externally output trigger signals. Output can also be optionally set from the OUTPUT connector.

The chart below summarizes the output systems and the signals that can be output.

Connector Name (Output System)	Menu Setting	Signal Type	Delay Time
OUTPUT	TRIG POS	TTL, SW, SOFT, all TRIG pulse output CMOS (74LVC2T45 buffer) output, Positive Polarity.	For TRIG SW IN, approx. 20,4 usec. For INPUT, approx. POS: 220n sec. NEG: 228n sec
	TRIG NEG	TTL, SW, SOFT, all TRIG pulse output CMOS (74LVC2T45 buffer) output, Negative Polarity.	

3.14. Using External Synchronization Signals

An external synchronization mode to synchronize to an external signal is provided on the system. By using an external synchronization signal, recording can be conducted using multiple cameras to synchronize the timing of the shots or to also synchronize the shots with external measuring devices and lighting. The procedure and precautions for using the external synchronization signal are explained below.

3.14.1. Inputting an External Synchronization Signal

When INPUT 1 or 2 is set to SYNC POS/NEG, an external synchronization signal can be input with the system. See the chart below for external synchronization input settings.

Menu Display	Contents	Signal (Input Signal Conditions)
OFF	Sets external synchronization off, operates independently.	(none)
ON CAM POS	Synchronizes to a positive polarity signal from the system.	FET Input 0V - +12V (H level +2.5V to +12V), Positive Polarity
ON CAM NEG	Synchronizes to a negative polarity signal from the system.	FET Input 0V - +12V (H level +2.5V to +12V), Negative Polarity
ON OTHERS POS	Synchronizes to a positive polarity signal from an external device (including other Photron products).	FET Input 0V - +12V (H level +2.5V to +12V), Positive Polarity
ON OTHERS NEG	Synchronizes to a negative polarity signal from an external device (including other Photron products).	FET Input 0V - +12V (H level +2.5V to +12V), Negative Polarity

3.14.2. Outputting an External Synchronization Signal

The system can externally output a synchronization signal.

Menu Display	Contents	Signal Type	Delay Time
SYNC POS	Outputs a positive polarity vertical synchronization signal.	CMOS (74LVC2T45 buffer) output, positive polarity	Approx. 118nsec
SYNC NEG	Outputs a negative polarity vertical synchronization signal.	CMOS (74LVC2T45 buffer) output, negative polarity	Approx. 138nsec

3.14.3. Synchronization with a variable frequency
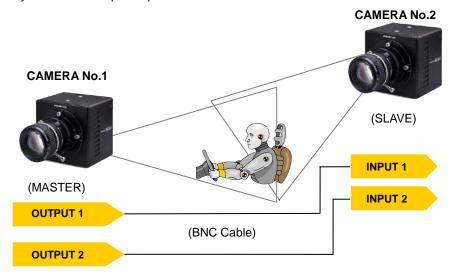
When synchronizing with a varying input frequency signal, the frame rate and resolution specified before recording will be kept as a maximum value.

3.14.4. Synchronizing Multiple FASTCAM Mini UX50/100 Systems

(Multiple Unit Synchronized Recording)

The system can perform synchronized recording by synchronizing multiple units using external.

◆ Synchronization input/output
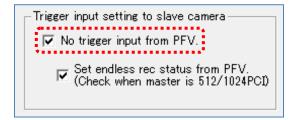
Synchronized recording settings using the system are made with PFV. The conceptual settings when performing synchronized recording using two systems are explained here. First, decide which camera to make the master camera (outputs the synchronization signal) and the slave camera (receives the synchronization signal) from the two systems to use for synchronized recording.

◆ Setting the Master Camera (Outputs Synchronization)
Set the signal output for the master camera which will output the synchronization signal. Synchronization signal settings are made with PFV.

1. Verify that the camera mode is in LIVE mode (the image displayed is passed through from the camera). If the system is in a mode other than LIVE mode, check "Live" on the camera control panel.

2. Select I/O on the left tree from "Camera Option" on the camera control panel.

3. Ensure that "OUTPUT1" is set "SYNC POS".

4. Ensure that "OUTPUT2" is set "TRIG POS".

◆ Setting the Slave Camera (Receives the Synchronization Signal)
Next, set the synchronization signal input for the slave camera which will receive the synchronization signal supplied by the master camera. Synchronization signal settings are made with PFV.

1. Input a synchronization signal to the slave camera. Connect the master camera's INPUT1 connector and the slave camera's INPUT1 connector with a BNC cable. When a synchronization signal is input to INPUT1 connector, SYNC IN LED (yellow) on the slave camera's back side lights.

2. Ensure the camera mode is "LIVE" (a live image is displayed). If the camera mode is set others, check on "LIVE" at the control panel.

3. Select "I/O" at "Camera Option" of the control panel.

4. Ensure "INPUT1" is set "SYNC POS".

5. Ensure "INPUT2" is set "TRIG POS".

6. Set "ON CAM POS" at "SYNC IN".

> ⚠ **Caution**
>
> - When a recording is started by pushing REC button on PFV, check on "No trigger input from PFV" at "Configuration > Record Option > Trigger input setting to slave camera".
>
> ```
> ┌ Trigger input setting to slave camera ──────────
> │   ☑ No trigger input from PFV.
> │
> │        ☑ Set endless rec status from PFV.
> │             (Check when master is 512/1024PCI)
> └───────────────────────────────────────────
> ```
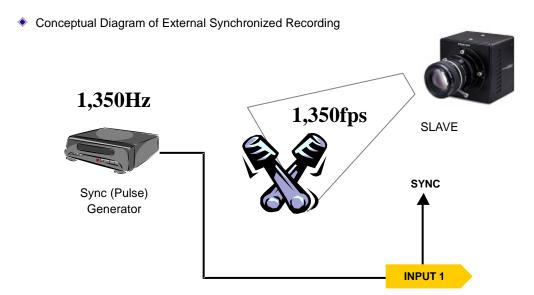
> 🔒 **Important**
>
> - If steps, 2 to 3 are completed when no synchronization signal is being input, the camera will not operate normally. As detailed in the procedure, make the settings when the signal is being input.

3.14.5. **Synchronizing the System with Other External Devices**

(Frame Rate Synchronized Recording)

With the system, in addition to the frame rate preset in the system, a function has been provided where you can receive a synchronization signal externally, set the frame rate with that frequency, and record.

In this way, for example, the system can be synchronized with a dynamic body that spins at 1,350 revolutions a second to conduct high-speed recording at 1,350 fps. This can open up broad applications that were unavailable until now.

◆ Conceptual Diagram of External Synchronized Recording

This function using an external synchronization signal to synchronize the camera to the desired frame rate is explained here.

🔒 Important

- When conducting frame rate synchronization recording with the system, the input signal must meet the following conditions.
    - ■ FET Input 0V - +12V (H level +2.5V to +12V), positive polarity or negative polarity
    - ■ 50 Hz to 800,000 Hz(50Hz～160,000Hz for UX50)

◈ System Settings

Frame rate synchronization signal settings on the system are made with PFV.

1. Input a synchronization signal to the camera from a synchronization signal generator. Connect the generator's output connector and the camera's INPUT1 connector with a BNC cable.

2. When a synchronization signal is input to INPUT1 connector, SYNC IN LED (yellow) on the slave camera's back side lights. (*When a synchronization signal is stopped, the LED turns off.)

3. Ensure the camera mode is "LIVE" (a live image is displayed). If the camera mode is set others, check on "LIVE" at the control panel.

4. Select "I/O" at "Camera Option" of the control panel.

5. Ensure "INPUT1" is set "SYNC POS" or "SYNC NEG".

6. Set "ON OTHERS" at "SYNC IN".

> ⚠ **Caution**
>
> • If no synchronization signal is input or the synchronization signal is lost, a refreshing live image is stopped.
>
> • If steps 3 through 6 are done inputting a signal over 800,000Hz(160,000Hz for UX50) , the window shows "OVER SYNC".
>
> • A minute error occurs in the input synchronization signal due to the construction of the internal circuitry of this function.
> An error of ±9.8 ns occurs for the input synchronization signal in the actual operation.
> Since the frame rate display value on the monitor is in 1Hz units, the error may be shown larger than the actual operation (an error of about ±1-5Hz is produced).
> For example, when performing external device synchronization inputting a synchronization signal of 10000Hz, the monitor display error is:
> 10,000 Hz ±1Hz = 9,999 fps to 10,001 fps.

3.14.6. Synchronizing the System with Other Cameras

(Mixed Device Synchronized Recording)

Using the function (frame rate synchronization recording) in the previous section, "3.14.5. Synchronizing the System with Other External Devices(Frame Rate Synchronized Recording)", mixed-type synchronized recording can be performed with Photron's other high-speed cameras (except for some older products).

◆ Basic Process

    1. Decide the master camera (the source of the synchronization signal) and the slave camera (the camera that will operate according to the synchronization signal from the master). Basically, by making the master camera the camera with the lowest maximum frame rate that can be set, you can avoid setting a synchronization signal speed the slave camera cannot receive.

    2. Connect the master camera's Sync output connector to the slave camera's V-SYNC input connector with a BNC cable, select the synchronization signal output polarity on the master camera, and then set the slave camera to be operated by that signal.

📖 Reference

- For camera models that can perform synchronized recording or for detailed instructions on making the settings, contact Photron at the contact information in "0. Contact Information"page 78.

3.15. INPUT / OUTPUT Signal Settings

3.15.1. INPUT Signal Settings

Details of the signals output from the INPUT connector explained in section "3.12. Contact Information" is shown in the chart below.
There are two INPUT connectors and individual settings can be made for each connector.

Menu Display	Contents	Signal (Input Signal Conditions)
TRIG POS	Inputs a positive polarity trigger signal.	FET Input 0V - +12V (H level +2.5V to +12V), Positive Polarity
TRIG NEG	Inputs a negative polarity trigger signal.	FET Input 0V - +12V (H level +2.5V to +12V), Negative Polarity
READY POS	Inputs a positive polarity READY signal. READY ON/OFF is switched by a pulse input.	FET Input 0V - +12V (H level +2.5V to +12V), Positive Polarity
READY NEG	Inputs a negative polarity READY signal. READY ON/OFF is switched by a pulse input.	FET Input 0V - +12V (H level +2.5V to +12V), Negative Polarity
EVENT POS	Inputs a positive polarity EVENT signal. EVENT TRIGGER is recorded by a pulse input.	FET Input 0V - +12V (H level +2.5V to +12V), Positive Polarity
EVENT NEG	Inputs a negative polarity EVENT signal. EVENT TRIGGER is recorded by a pulse input.	FET Input 0V - +12V (H level +2.5V to +12V), Negative Polarity

⚠ When using the camera as a part of a system, verify the characteristics of the input signals before using them.

3.15.2. OUTPUT Signal Settings

Details of the signals output from the OUTPUT connector explained in section "3.12. Contact Information" is shown in the chart below. There are two OUTPUT connectors and individual settings can be made for each connector.

Menu Display	Contents	Signal Type
SYNC POS	Outputs a positive polarity vertical synchronization signal.	+5V CMOS output, Positive Polarity
SYNC NEG	Outputs a negative polarity vertical synchronization signal.	+5V CMOS output, Negative Polarity
EXPOSE POS	Outputs the sensor's exposure interval at H level.	+5V CMOS output, Positive Polarity
EXPOSE NEG	Outputs the sensor's exposure interval at L level.	+5V CMOS output, Negative Polarity
REC POS	Outputs an interval signal during recording at H level.	+5V CMOS output, Positive Polarity
REC NEG	Outputs an interval signal during recording at L level.	+5V CMOS output Negative Polarity
TRIG POS	Outputs the trigger signal received by the camera at H level.	+5V CMOS output, Positive Polarity
TRIG NEG	Outputs the trigger signal received by the camera at L level.	+5V CMOS output, Negative Polarity
READY POS	Outputs a signal at H level during the trigger wait state. (READY in START mode.) Only valid during START, CENTER, END, and MANUAL modes.	+5V CMOS output, Positive Polarity
READY NEG	Outputs a signal at L level during the trigger wait state. (ENDLESS recording state in CENTER, END, MANUAL) Only valid during START, CENTER, END, and MANUAL modes.	+5V CMOS output, Negative Polarity

⚠️ When using as a part of a system, verify the characteristics of the output signals before using them.

3.16. Signal Delay
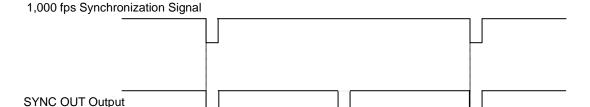
With the system, you can set the signal delay time or pulse width for the various signals that are input and output. Pulse width and delay settings for the various signals to input/output are made with PFV. The content of each setting is listed in the chart below.

Setting Item	Setting Range (Value)
TRIG TTL IN DELAY	0-5 (s) 100 ns units
SYNC IN DELAY	0-1/frame rate (s) 100 ns units
GENERAL IN DELAY	0-5 (s) 100 ns units
TRIG OUT WIDTH	0-1 (ms) 100 ns units
SYNC OUT DELAY	0-1/frame rate (s) 100 ns units
SYNC OUT WIDTH	0-500 (us), 1/frame rate (s) at 2,000 fps or higher 100 ns units
EXPOSE OUT DELAY	0-1/frame rate (s) 100 ns units
SYNC OUT TIMES	0.5, 1, 2, 4, 6, 8, 10, 20, 30 (* x1 is standard output)
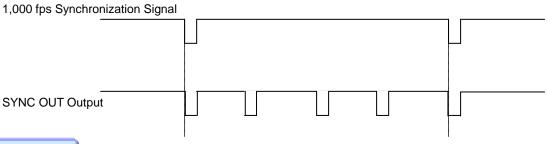
◈ SYNC OUT TIMES
Output a SYNC (vertical synchronization signal) from SYNC OUT that is X times SYNC.

Example: For a frame rate of 1,000 fps, SYNC OUT TIMES setting of 2.

1,000 fps Synchronization Signal

SYNC OUT Output

Example: For a frame rate of 1,000 fps, SYNC OUT TIMES setting of 4.

1,000 fps Synchronization Signal

SYNC OUT Output

📖 Reference

• Please refer to "3.8 Other Settings" of "Photron FASTCAM Viewer User's Manual" for the details of the setup.

- An accurate frequency is output, but when SYNC OUT TIMES is set to a large value with a high frame rate, the setting may result in frequency errors.

- There are following limitations in SYNC OUT TIMES function(-160,000fps for UX50)

Frame Rate			Restriction
	-	60,000fps	No Limit
60,001fps	-	90,000fps	x30 is unavailable
90,001fps	-	500,000fps	x20 and x30 are unavailable
500,001fps	-	700,000fps	x8, x10, x20 and x30 are unavailable
700,001fps	-	800,000fps	x6, x8, x10, x20 and x30 are unavailable

3.17. Event Marker Function

With the system, it is possible to input an external signal during recording, at the instant the frame number is stored, and during playback you can immediately access, or jump to, the stored frame numbers (event markers). This a separate feature from the trigger point, by marking interesting points during recording, these points can be easily called up for review during playback. The event marker can store ten positions within a sequence.

The frame number recording occurs on the pulse's edge, and the next frame after the pulse's edge is input is stored as the event marker. Event marker settings can be made with PFV.

3.18. IRIG Time Code (External Time Synchronization)

The system supports IRIG-B input and can add an IRIG code to each recorded frame. The sample timing for the IRIG code is once each frame.

The recorded IRIG code is displayed with the PFV.

◈ IRIG Code Input Specification

Connector	BNC
Code Format	IRIG-B (122) Analog
Amplitude	3.0Vp-p min,8.0Vp-p max
Mark to space ratio	3:1 to 6:1
Typical modulated carrier signal ratio	10:1

📖 Reference

- Please refer to "3.8 Other Settings" of "Photron FASTCAM Viewer User's Manual" for the details of the setup.

✏ Supplement

- IRIG Time Code is used when synchronizing a camera with external equipment in time.
  It is a convenient function when apparatus is physically separated.
- When the IRIG code is being input, the IRIG code is displayed in white, and is displayed to the left.
- The IRIG offset time is also displayed below it. When the IRIG code is not being input, the IRIG code is displayed in grey. At that time, the counter is the camera's internal counter and it continues to count.

3.19. Direct Trigger / Direct Start Mode

The system recording operation responding to an input trigger signal can be configured according to varies of customer's needs.

- DIRECT TRIGGER Mode (This mode is NOT supported on PFV software)
    - START TRIGGER Mode
      Recording starts immediately upon the second trigger input.

    - CENTER, END, MANUAL TRIGGER Mode
      Once the trigger signal is input, the camera will be shifted to endless recording state.

- DIRECT START Mode
    - START TRIGGER Mode
      The same operation as when the direct trigger mode is off.
    - CENTER, END, and MANUAL TRIGGER Modes
      Once the trigger signal is input, the camera is shifted to endless recording state. In this circumstance, either the "RECORD" button of PFV software or the INPUT Connector under ReadyPos state.

Reference

- Please refer to "3.8 Other Settings" of "Photron FASTCAM Viewer User's Manual" for the details of the setup.
- For details of GENERL IN signal settings, refer to "3.15.1. INPUT Signal Settings", page48.

MEMO

Chapter. 4　Reset of Gigabit Ethernet IF's IP address and Factory Default

4.1. Reset of Gigabit Ethernet IF's IP address and Factory Default

4.1.   Reset of Gigabit Ethernet IF's IP address and Factory Default

4.1.1. Camera IP Address Initialization

In some circumstance when the IP address is changed, and the new IP address is not explicit, an IP Address Initialization operation is recommended. In this case, the IP address will be reset to 192.168.0.10 as the factory settings.

1.   Press and hold the RESET switch at the camera's back side.

2.   All of the LEDs on the camera's back side light, then they turn off from right to left. All of LEDs blink twice after they turn off.

3.   Reboot the camera. The IP address is reset to the factory setting.

> **⚠ Caution**
>
> - If pressing and holding the RESET switch is stopped during LEDs are turning off from right to left, the IP address reset is not accomplished. Press and hold the switch until they blink certainly.
> - If pressing and holding the RESET switch is kept after the LEDs blink, "Factory Default" is executed.

4.1.2. Reset to the Factory Default

A camera settings can be reset to the factory default state by the following procedure.

1.   Press and hold the RESET switch on the camera's back side.

2.   All of the LEDs on the camera's back side light, then they turn off from right to left (first time). All of LEDs blink twice after they turn off. (An IP address is reset.)

3.   All of LEDs light, then they turn off from right to left (second time). All of LEDs blink twice after they turn off. And they light again.

4.   The LEDs turn off from right to left (third time). After that, they turn to keep blinking.

5.   Reboot the camera. The camera settings are reset to the factory default.

> **⚠ Caution**
>
> - To reset to the factory default, press and hold the RESET switch until all of LEDs blink after 3 times turning off from right to left.
> - If pressing and holding the RESET switch is stopped when the LEDs' turning off from right to left is finished 1 time, only an IP address is reset.

Chapter. 5 **Product Specifications**

5.1. Specifications

5.2. Dimensions

5.1.   Specifications

5.1.1.   Product Specifications

Image Sensor	CMOS image sensor	
Sensor Resolution	1,280 x 1,024 pixels	
Frame Rate	When full frame: FASTCAM Mini UX100 4,000fps max. FASTCAM Mini UX50 2,000fps max. When a frame segment: FASTCAM Mini UX100 800,000fps max. FASTCAM Mini UX50 160,000fps max.	
Lens Mount	G type F mount, C mount	
Recording Color Depth	Monochrome	12bit
	Color	RGB, each 12bit (Bayer color filter method)
Shutter Method	Electronic shutter	
Recording Method	IC memory	
Recording Memory Capacity	4 GB, 8 GB, 16 GB	
Trigger Method	START, CENTER, END, MANUAL, RANDOM	
Image Output Customization	Customizable LUT, brightness is changeable	
External Synchronization Input Signal	+3.3 to +12Vp-p, negative polarity/positive polarity (switchable)	
External Synchronization Output Signal	5 Vp-p, negative polarity/positive polarity (switchable)	
Trigger Input Signal	TTL(+3.3 to +12V), contact	
Other Output Signals	Other timing signal outputs	
External Control	Gigabit Ethernet I/F (PC)	
Video Output Signal	NONE	
Digital Interface	Gigabit Ether Port(1000BASE-T)	

5.1.2.　General Specifications

Environment Conditions	
Storage Temperature	-20℃ ~ 60℃ (No Condensation) -4ºF ~ 140ºF (No Condensation)
Storage Humidity	85% or less (No Condensation)
Operating Temperature	0 ~ 40℃ (No Condensation) 32ºF ~ 104ºF (No Condensation)
Operating Humidity	85% or less (No Condensation)
Pollution degree	Degree 2 according to IEC60664-1
Overvoltage category	Category II according to IEC60664-1
Maximum use altitude	2,000m or lower
Shock Resistance Performance	100G 10ms 6axes 1000times
External Dimensions	
Camera Body	120 (H) x 120 (W) x 93 (D) mm, excluding protrusion 4.7" (W) x 4.7" (H) x 3.6" (D)
DC Power Supply	
Power Voltage	22V ~ 32 V
Power Consumption	40VA
Weight	
Camera Body	1.5 kg 3.3 lbs

⚠ Photron has verified two types of AC cables, type A (standard for Japan, USA, Canada, etc.) and type SE (standard for Germany, France, etc.). However, when those cables cannot properly receive power when plugged in, use the proper AC cable for the region's standards and verify that AC cable works properly.
For inquires regarding the recommended AC cable for each region, contact that region's Photron branch office or the distributor.

5.1.3.　AC / DC Adaptor

Manufacurer		FSP Group Inc. (Brand Name : PROTEK)
Type		PMP150-14-K21
Rating	Input	AC100-240V , 47-63Hz , 1.63-0.7A
	Output	DC24V , 6.25A
Dimensions		49.7 (H) × 82 (W) × 207.6 (D) mm excluding protrusions
Weight		970g

5.1.4.   Options

User Option
Dedicated Carrying Case
DAQ option
Movie analysis software

MEMO

5.1.5.   Frame Rate and Resolution

FASTCAM Mini UX100

1,280 x 1,024～1,280 x 120

Frame Rate (fps) \ Resulution	1,280 × 1,024	1,280 × 1,000	1,280 × 800	1,280 × 720	1,280 × 624	1,280 × 512	1,280 × 480	1,280 × 400	1,280 × 312	1,280 × 248	1,280 × 200	1,280 × 152	1,280 × 120
50	○	○	○	○	○	○	○	○	○	○	○	○	○
125	○	○	○	○	○	○	○	○	○	○	○	○	○
250	○	○	○	○	○	○	○	○	○	○	○	○	○
500	○	○	○	○	○	○	○	○	○	○	○	○	○
1,000	○	○	○	○	○	○	○	○	○	○	○	○	○
2,000	○	○	○	○	○	○	○	○	○	○	○	○	○
3,200	○	○	○	○	○	○	○	○	○	○	○	○	○
4,000	○	○	○	○	○	○	○	○	○	○	○	○	○
5,000		○	○	○	○	○	○	○	○	○	○	○	○
6,250			○	○	○	○	○	○	○	○	○	○	○
6,400				○	○	○	○	○	○	○	○	○	○
8,000					○	○	○	○	○	○	○	○	○
8,192						○	○	○	○	○	○	○	○
10,000							○	○	○	○	○	○	○
10,240							○	○	○	○	○	○	○
12,500								○	○	○	○	○	○
16,000									○	○	○	○	○
20,000										○	○	○	○
25,000											○	○	○
32,000												○	○
40,000													○
50,000													
64,000													
80,000													
100,000													
160,000													
200,000													
256,000													
512,000													
800,000													

The circle indicates a possible setting. The green items are the maximum resolution setting at that frame rate.
This table is the list of default settings. Even finer settings are possible with the variable setting.

FASTCAM Mini UX100

1,280 x 96～1,280 x 16

Resolution / Frame Rate (fps)	1,280 × 96	1,280 × 72	1,280 × 56	1,280 × 32	1,280 × 24	1,280 × 16
50	○	○	○	○	○	○
125	○	○	○	○	○	○
250	○	○	○	○	○	○
500	○	○	○	○	○	○
1,000	○	○	○	○	○	○
2,000	○	○	○	○	○	○
3,200	○	○	○	○	○	○
4,000	○	○	○	○	○	○
5,000	○	○	○	○	○	○
6,250	○	○	○	○	○	○
6,400	○	○	○	○	○	○
8,000	○	○	○	○	○	○
8,192	○	○	○	○	○	○
10,000	○	○	○	○	○	○
10,240	○	○	○	○	○	○
12,500	○	○	○	○	○	○
16,000	○	○	○	○	○	○
20,000	○	○	○	○	○	○
25,000	○	○	○	○	○	○
32,000	○	○	○	○	○	○
40,000	○	○	○	○	○	○
50,000	○	○	○	○	○	○
64,000		○	○	○	○	○
80,000			○	○	○	○
100,000				○	○	○
160,000				○	○	
200,000					○	○
256,000						○
512,000						
800,000						

The circle indicates a possible setting.The green items are the maximum resolution setting at that frame rate.
This table is the list of default settings. Even finer settings are possible with the variable setting.

FASTCAM Mini UX100

1,024 x 1,024～640 x 8)

Resolution / Frame Rate (fps)	1,024 × 1,024	1,024 × 576	896 × 896	896 × 720	896 × 488	768 × 768	768 × 512	640 × 480	640 × 320	640 × 8
50	○	○	○	○	○	○	○	○	○	○
125	○	○	○	○	○	○	○	○	○	○
250	○	○	○	○	○	○	○	○	○	○
500	○	○	○	○	○	○	○	○	○	○
1,000	○	○	○	○	○	○	○	○	○	○
2,000	○	○	○	○	○	○	○	○	○	○
3,200	○	○	○	○	○	○	○	○	○	○
4,000	○	○	○	○	○	○	○	○	○	○
5,000		○	○	○	○	○	○	○	○	○
6,250		○		○	○	○	○	○	○	○
6,400		○		○	○	○	○	○	○	○
8,000		○			○		○	○	○	○
8,192		○			○		○	○	○	○
10,000					○			○	○	○
10,240								○	○	○
12,500									○	○
16,000										○
20,000										○
25,000										○
32,000										○
40,000										○
50,000										○
64,000										○
80,000										○
100,000										○
160,000										○
200,000										○
256,000										○
512,000										○
800,000										○

The circle indicates a possible setting.The green items are the maximum resolution setting at that frame rate.
This table is the list of default settings. Even finer settings are possible with the variable setting.

1,280 x 1,024～1,280 x 8

Frame Rate (fps) \ Resolution	1,280 × 1,024	1,280 × 800	1,280 × 720	1,280 × 512	1,280 × 488	1,280 × 296	1,280 × 240	1,280 × 120	1,280 × 96	1,280 × 56	1,280 × 48	1,280 × 24	1,280 × 8
50	○	○	○	○	○	○	○	○	○	○	○	○	○
125	○	○	○	○	○	○	○	○	○	○	○	○	○
250	○	○	○	○	○	○	○	○	○	○	○	○	○
500	○	○	○	○	○	○	○	○	○	○	○	○	○
1,000	○	○	○	○	○	○	○	○	○	○	○	○	○
2,000	○	○	○	○	○	○	○	○	○	○	○	○	○
2,500		○	○	○	○	○	○	○	○	○	○	○	○
3,200			○	○	○	○	○	○	○	○	○	○	○
4,000				○	○	○	○	○	○	○	○	○	○
5,000					○	○	○	○	○	○	○	○	○
5,120						○	○	○	○	○	○	○	○
8,000						○	○	○	○	○	○	○	○
10,000							○	○	○	○	○	○	○
20,000								○	○	○	○	○	○
25,000									○	○	○	○	○
40,000										○	○	○	○
50,000											○	○	○
80,000												○	○
100,000												○	○
160,000													○

The circle indicates a possible setting.The green items are the maximum resolution setting at that frame rate.
This table is the list of default settings. Even finer settings are possible with the variable setting.

FASTCAM Mini UX50

1,024 x 1,024〜640 x 240

Frame Rate (fps) \ Resolution	1,024 × 1,024	1,024 × 576	896 × 896	896 × 720	896 × 488	768 × 768	768 × 512	640 × 480	640 × 240
50	○	○	○	○	○	○	○	○	○
125	○	○	○	○	○	○	○	○	○
250	○	○	○	○	○	○	○	○	○
500	○	○	○	○	○	○	○	○	○
1,000	○	○	○	○	○	○	○	○	○
2,000	○ (green)	○	○	○	○	○	○	○	○
2,500		○	○ (green)	○	○	○	○	○	○
3,200		○		○ (green)	○	○ (green)	○	○	○
4,000		○ (green)			○		○ (green)	○	○
5,000					○ (green)			○	○
5,120								○ (green)	○
8,000									○
10,000									○ (green)
20,000									
25,000									
40,000									
50,000									
80,000									
100,000									
160,000									

The circle indicates a possible setting.The green items are the maximum resolution setting at that frame rate.

This table is the list of default settings. Even finer settings are possible with the variable setting.

5.1.6. Shutter Speed List

FASTCAM Mini UX100

Shutter Speed		
50	6,250	40,960
125	6,400	50,000
250	8,000	51,200
500	8,192	64,000
640	10,000	80,000
800	10,240	81,920
1,000	12,500	100,000
1,250	12,800	102,400
1,600	16,000	128,000
2,000	20,000	160,000
2,500	20,480	163,840
3,125	25,000	200,000
3,200	25,600	204,800
4,000	32,000	256,000
5,000	32,768	

FASTCAM Mini UX50

Shutter Speed		
50	5,120	32,768
125	6,250	40,000
250	6,400	40,960
500	8,000	50,000
640	8,192	51,200
800	10,000	64,000
1,000	10,240	80,000
1,250	12,500	81,920
1,600	12,800	100,000
2,000	16,000	102,400
2,500	20,000	128,000
3,125	20,480	160,000
3,200	25,000	256,000
4,000	25,600	
5,000	32,000	

The unit in the chart is 1/x s

Supplement

- These shutter speeds can be selected at 50 ~ 160,000fps.
- In addition, 1/frame sec is selectable at all of frame rates.

5.1.7. Recordable Image Count/Resolution

FASTCAM Mini UX100

Resolution	4GB model Rec. Frames	8GB model Rec. Frames	16GB model Rec. Frames
1,280×1,024	2,180	4,365	8,734
1,280×1,000	2,232	4,469	8,943
1,280×800	2,791	5,587	11,179
1,280×720	3,101	6,208	12,421
1,280×616	3,624	7,256	14,519
1,280×512	4,361	8,730	17,468
1,280×480	4,651	9,312	18,632
1,280×400	5,582	11,174	22,359
1,280×312	7,156	14,326	28,665
1,280×248	9,003	18,023	36,063
1,280×200	11,164	22,349	44,718
1,280×152	14,689	29,406	58,840
1,280×120	18,607	37,248	74,531
1,280×96	23,259	46,560	93,164
1,280×72	31,012	62,080	124,218
1,280×56	39,872	79,818	159,709
1,280×32	69,777	139,682	279,492
1,280×24	93,036	186,242	372,656
1,280×16	139,554	279,364	558,984
1,024×1,024	2,725	5,456	10,917
1,024×576	4,845	9,700	19,409
896×896	3,560	7,126	14,259
896×720	4,430	8,868	17,745
896×48	6,536	13,084	26,181
768×768	4,845	9,700	19,409
768×512	7,268	14,550	29,113
640×480	9,303	18,624	37,265
640×320	13,955	27,936	55,898
640×8	558,216	1,117,457	2,235,938

* Recording Time = Rec. Frames x 1/frame rate (fps)

FASTCAM Mini UX50

Resolution	4GB model Rec. Frames	8GB model Rec. Frames	16GB model Rec. Frames
1,280×1,024	2,180	4,365	8,734
1,280×800	2,791	5,587	11,179
1,280×720	3,101	6,208	12,421
1,280×512	4,361	8,730	17,468
1,280×488	4,575	9,159	18,327
1,280×296	7,543	15,100	30,215
1,280×240	9,303	18,624	37,265
1,280×120	18,607	37,248	74,531
1,280×96	23,259	46,560	93,164
1,280×56	39,872	79,818	159,709
1,280×48	46,518	93,121	186,328
1,280×24	93,036	186,242	372,656
1,280×8	279,108	558,728	1,117,969
1,024×1,024	2,725	5,456	10,917
1,024×576	4,845	9,700	19,409
896×896	3,560	7,126	14,259
896×720	4,430	8,868	17,745
896×488	6,536	13,084	26,181
768×768	4,845	9,700	19,409
768×512	7,268	14,550	29,113
640×480	9,303	18,624	37,265
640×240	18,607	37,248	74,531

* Recording Time = Rec. Frames x 1/frame rate (fps)

5.1.8.　Recordable Times/Resolution

FASTCAM Mini UX100

Resolution	MAX FrameRate	4GB moldel Rec. Time	8GB moldel Rec. Time	16GB moldel Rec. Time
1,280×1,024	4,000	0.55	1.09	2.18
1,280×1,000	5,000	0.45	0.89	1.79
1,280×800	6,250	0.45	0.89	1.79
1,280×720	6,400	0.48	0.97	1.94
1,280×616	8,000	0.45	0.91	1.81
1,280×512	8,192	0.53	1.07	2.13
1,280×480	10,000	0.47	0.93	1.86
1,280×480	10,240	0.45	0.91	1.82
1,280×400	12,500	0.45	0.89	1.79
1,280×312	16,000	0.45	0.90	1.79
1,280×248	20,000	0.45	0.90	1.80
1,280×200	25,000	0.45	0.89	1.79
1,280×152	32,000	0.46	0.92	1.84
1,280×120	40,000	0.47	0.93	1.86
1,280×96	50,000	0.47	0.93	1.86
1,280×72	64,000	0.48	0.97	1.94
1,280×56	80,000	0.50	1.00	2.00
1,280×32	100,000	0.70	1.40	2.79
1,280×24	160,000	0.58	1.16	2.33
1,280×24	200,000	0.47	0.93	1.86
1,280×16	256,000	0.55	1.09	2.18
1,024×1,024	4,000	0.68	1.36	2.73
1,024×576	8,192	0.59	1.18	2.37
896×896	5,000	0.71	1.43	2.85
896×720	6,400	0.69	1.39	2.77
896×488	10,000	0.65	1.31	2.62
768×768	6,400	0.76	1.52	3.03
768×512	8,192	0.89	1.78	3.55
640×480	10,240	0.91	1.82	3.64
640×320	12,500	1.12	2.23	4.47
640×8	512,000	1.09	2.18	4.37
640×8	800,000	0.70	1.40	2.79

The unit in the chart is sec

FASTCAM Mini UX50

| Resolution	MAX FrameRate	4GB moldel Rec. Time	8GB moldel Rec. Time	16GB moldel Rec. Time
1,280×1,024	2,000	1.09	2.18	4.37
1,280×800	2,500	1.12	2.23	4.47
1,280×720	3,200	0.97	1.94	3.88
1,280×512	4,000	1.09	2.18	4.37
1,280×488	5,000	0.92	1.83	3.67
1,280×296	8,192	0.92	1.84	3.69
1,280×240	10,240	0.91	1.82	3.64
1,280×120	20,480	0.91	1.82	3.64
1,280×96	25,600	0.91	1.82	3.64
1,280×56	40,960	0.97	1.95	3.90
1,280×48	51,200	0.91	1.82	3.64
1,280×24	102,400	0.91	1.82	3.64
1,280×8	160,000	1.74	3.49	6.99
1,024×1,024	2,000	1.36	2.73	5.46
1,024×576	4,000	1.21	2.43	4.85
896×896	2,500	1.42	2.85	5.70
896×720	3,200	1.38	2.77	5.55
896×488	5,000	1.31	2.62	5.24
768×768	3,200	1.51	3.03	6.07
768×512	4,000	1.82	3.64	7.28
640×480	5,120	1.82	3.64	7.28
640×240	10,240	1.82	3.64	7.28
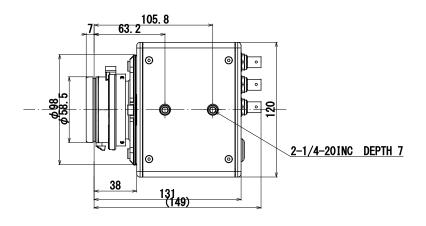
The unit in the chart is sec
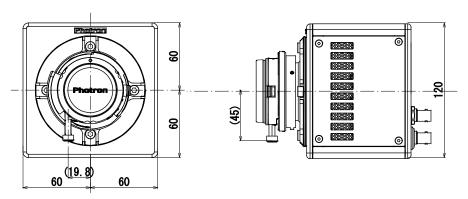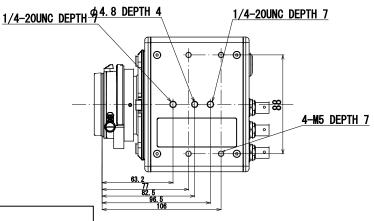
5.2.　Dimensions

5.2.1.　Camera Body

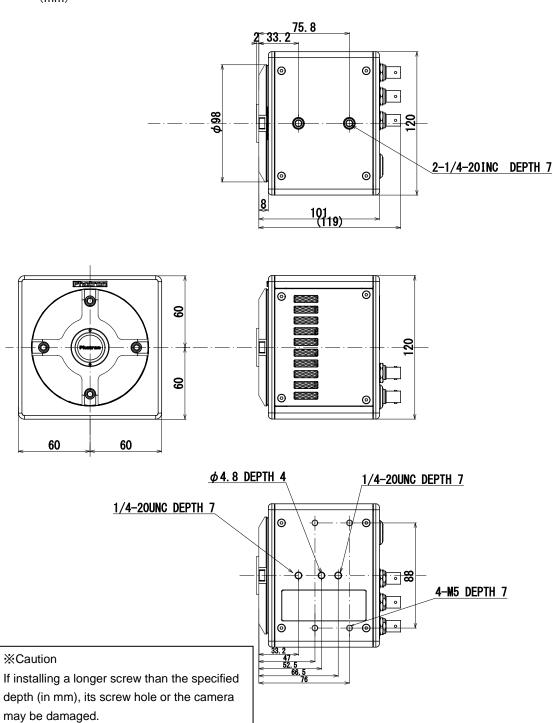FASTCAM Mini UX50/100 (G type F mount)

（mm）

※Caution
If installing a longer screw than the specified
depth (in mm), its screw hole or the camera
may be damaged.
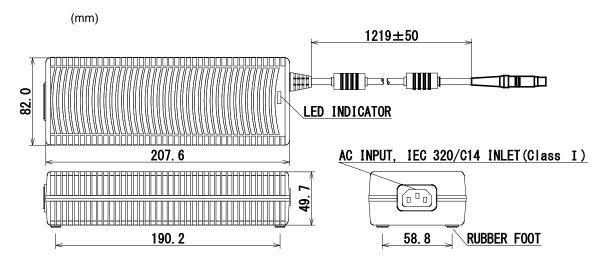
FASTCAM Mini UX50/100 (C mount)

（mm）

2-1/4-20INC DEPTH 7

φ4.8 DEPTH 4

1/4-20UNC DEPTH 7

1/4-20UNC DEPTH 7

4-M5 DEPTH 7

※Caution
If installing a longer screw than the specified depth (in mm), its screw hole or the camera may be damaged.

5.2.2.　AC Power Supply Unit

(mm)

1219±50

82. 0

207. 6

LED INDICATOR

AC INPUT, IEC 320/C14 INLET(Class I)

49. 7

190. 2

58. 8　RUBBER FOOT

Chapter. 6 **Warranty**

6.1. About the Warranty

6.1.　About the Warranty

This system has been shipped having undergone rigorous testing. However, in the unlikely event that it malfunctions due to a manufacturing defect, it will be repaired, at no charge, within the warranty period.

◆ Warranty Exceptions
The following exceptions will result in fee-based repair, even within the warranty period.

1. Damage or malfunction as a result of fire, earthquake, water damage, lightning, other natural disasters, pollution, or the effects of abnormal voltage.

2. Damage or malfunction as a result of dropping or mishandling during shipment or when moving after purchase or misuse.

3. Consumable goods (cables)

4. When repair, adjustment, or alternation done by an entity other than Photron service has been performed on the system, or damage or malfunction that is determined to be attributed to a fault in the use the product.

For inquires related to malfunction, contact the dealer where the product was purchased, or the nearest Photron office.

📖 Reference

• For inquires related to our product, refer to "0. Contact Information", page 78.

Chapter. 7   Contacting Photron

7.1. Contact Information

7.1.   Contact Information

For inquires related to PFV, contact Photron at the contact information listed below.

Additionally, the following items will be verified when inquiring, so please prepare them in advance.

Items Verified	Concrete Example
Contact Information	Company, school or organization name, customer contact name, contact phone number, contact e-mail address.
Product Name	FASTCAM Mini UX50/100
Serial Number	Check on the nameplate seal.
Condition of the system and what is known about it.	

Contact Information	
In Americas and Antipodes	**PHOTRON USA, INC.** 9520 Padgett Street, Suite 110, San Diego, CA 92126-4426, USA Phone : 800-585-2129 or 858-684-3555 Fax : 858-684-3558 E-mail : image@photron.com / www.photron.com
In Europe, Africa and India	**PHOTRON EUROPE LIMITED** The Barn, Bottom Road, West Wycombe, Buckinghamshire, HP14 4BS, U.K. Phone : +44(0) 1494 48 1011 Fax : +44(0) 1494 48 7011 E-mail : image@photron.com / www.photron.com
In China	**PHOTRON (SHANGHAI) LIMITED.** Room 20C Zhao-Feng World Trade Building, No. 369 Jiangsu Road, ChangNing District, Shanghai 200050 China Phone : 021-5268-3700 Fax : 021-5268-3702 E-mail : info@photron.cn.com / www.photron.cn.com
In other areas	**PHOTRON LIMITED** Fujimi 1-1-8, Chiyoda-Ku, Tokyo 102-0071, Japan Phone : +81 3 3238 2107 Fax : +81 3 3238 2109 E-mail : image@photron.co.jp / www.photron.co.jp

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