

INSTRUCTIONS

DP74

Microscope Digital Camera

This instruction manual is for the Evident microscope digital camera DP74.

To obtain optimum performance of this product and to ensure the safety, study this manual thoroughly before operating this product and keep it on hand during operation of this product.

Retain this instruction manual in an easily accessible place near the work desk for future reference.

For products included in the configuration of this system, see page 18 of this instruction manual.

Optical Microscope Accessory

A X 8 9 0 0

This product is applied with the requirements of standard IEC/EN61326-1 concerning electromagnetic compatibility.

- Immunity Industrial and basic electromagnetic environment

Emissions exceeding the level required by aforementioned standards may occur if this product is electrically connected to other equipment.



In accordance with European Directive on Waste Electrical and Electronic Equipment, this symbol indicates that the product must not be disposed of as unsorted municipal waste, but should be collected separately.

Refer to your local Evident distributor in EU for return and/or collection systems available in your country.

NOTE: This product has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the product is operated in a commercial environment. This product generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this product in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

FCC WARNING: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the product.

For Korea only

이 기기는 업무용 환경에서 사용할 목적으로 적합성평가를 받은 기기로서 가정용 환경에서 사용하는 경우 전파간섭의 우려가 있습니다.

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Introduction

With this microscope digital camera DP74 attached to the Evident microscope using the C-mount camera adapter, the image from the microscope can be acquired.

Using this microscope digital camera DP74 in combination with non-Evident C-mount camera adapters or non-Evident microscopes may not obtain intended performance.

Safety precautions

If the product is used in a manner not specified by this manual, the safety of the user may be imperiled. In addition, the product may also be damaged. Always use the product according to this instruction manual.

The following symbols are used in this instruction manual.



CAUTION : Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

NOTE

: Indicates a potentially hazardous situation which, if not avoided, may result in damage to the product or other property.

TIP

: Indicates the useful knowledge or information for use.

CAUTION - Installation of the product -

Install the product on a sturdy, level table or bench.

For safety, in particular, do not place a mat, etc. under the product.

Do not allow the height of the microscope higher than 1 m.

In order to prevent the microscope from overturning, do not combine accessories to make the height of the microscope higher than 1 m.

 **CAUTION - Electric safety -****Be sure to turn OFF the power of the product before connecting/disconnecting cables.**

Before connecting or disconnecting the camera interface cable, make sure that the power of the PC is set to OFF.

When connecting the camera interface cable, push it into the connector all the way and make sure that the cable will not be slipped out before setting the power of the PC to ON.

When moving the PC, set the power of the product to OFF in advance.

Do not move the PC or apply an impact to the PC while the power is ON.

Always use the power cord provided by Evident.

If the proper power cord is not used, the electric safety and the EMC (Electro-Magnetic Compatibility) performance of the product cannot be assured. If no power cord is provided, please select the proper power cord by referring to the section "Proper selection of the power supply cord" at the end of this instruction manual.

Always connect the ground terminal.

Connect the grounding terminal of the power cord and the grounding terminal of power outlet. If the product is not grounded, our intended electric safety and EMC performance of the product cannot be assured.

Do not use this product in close proximity to the sources of strong electromagnetic radiation.

The proper operation may be interfered. The electromagnetic environment should be evaluated prior to operation of the product.

Disconnect the power cord in case of emergency.

In case of emergency, disconnect the power cord from the power cord connector of the product or from the power outlet.

Install the product at the location where you can reach the power cord connector or the power outlet by hand to disconnect the power cord immediately.

 **CAUTION - Prevention of electric shock -**

Never insert any tools or metal fragments in the air vents of the product.

It could cause electric shock or failure of the product.

Keep the power cord and cables well away from the lamp housing.

If the power cord and cables contact a hot area of the lamp housing, they could melt and cause electric shock.

 **CAUTION - Prevention of burns -**

Do not keep touching the camera head for long hours.

The camera head generates heat after long hours of use. Be careful not to allow the camera head to touch your skin for long hours to avoid the low temperature burns.

Do not touch the heat generating section inside the PC.

Do not open the housing of the PC and touch the power supply or the circuit board's heat generating section right after use, since it may burn your hand. Wait until the internal temperature drops sufficiently.

Do not touch the PCIe interface board while using or immediately after use.

While using this product, the PCIe interface board becomes very hot. When removing the PCIe interface board, turn OFF the power of the PC and wait for a while before removing it.

If you need to touch the PCIe interface board, be careful not to burn yourself.

 **CAUTION - Prevention of injury -**

Do not touch sharp edges inside the PC.

Sharp edges inside the PC may cut your fingers, so take extra care.

CAUTION - Safety symbols -

The following symbols are placed to the product.

Understand the meaning of the symbols and always use the product in the safest possible manner.

Symbol	Meaning
	Indicates a non-specific general hazard. Follow the description given after this symbol or in the instruction manual.
	Indicates that the surface becomes hot, and should not be touched with bare hands. It may cause burns.

Labels

Labels are placed at parts where special precaution is required when handling and using the system. Always pay attentions to the labels.

Label	Indication position	Description in instruction manual	Page
 	Side surface of the fan on the PCIe interface board	Precautions for high temperature	4
See Manual 取説参照 参阅说明书	Right side of the fan on the PCIe interface board	Precautions for using the adjacent slot of the PCIe interface board.	6, 26

If label becomes dirty or is peeled off, contact Evident for replacement.

Handling precautions

Intended use

This device is intended to be used for acquiring digital images, but not for clinical diagnostic purposes.

Precautions for use

1. If this product is operated continuously for a long time period, the foreign objects, etc. attached to the inside of camera may be reflected to the observed image. If the attachment of foreign objects is suspected, contact Evident. However, if you intend to operate this product continuously for a long time period, it is recommended to apply the patch file (to this product) that suppresses the generation of foreign objects. You can download the patch file from URL shown below.
<https://www.olympus-ims.com/en/service-and-support/downloads/>
2. This product is a precision instrument. Handle it with care and avoid subjecting it to a sudden or severe impact. Particularly, be sure to observe following cautions. Otherwise, the product may be damaged.
 - The camera head is vulnerable to impact. Do not subject it to a sudden or severe impact when attaching to the microscope or removing from the microscope. Also, use the dedicated packaging box during transportation.
 - When transporting the PC equipped with PCIe interface board using transportation vehicles (car, truck, etc.), be sure to package it.
 - When moving the PC equipped with PCIe interface board using the cart without packaging, be careful not to allow it to collide with nearby walls or desks, etc. and get over the steps slowly and gently.
 - The PCIe interface board is vulnerable to impact. Do not subject it to a sudden or severe impact when installing the PC equipped with PCIe interface board.

3. Do not install the following boards in the adjacent slot on the fan side of the PCIe interface board. Otherwise, it may deteriorate product performance.
 - Graphic board
 - PCIe interface board of DP80, DP73 or DP72
 - Board with power consumption of 3 W or more
4. When handling the PCIe interface board, be sure to hold it by the edge. Do not allow your fingers to touch the board surface directly. Otherwise, a failure will be caused.
5. Be sure to install this product not to cover the air vents on the PC.
6. For handling of the PC, refer to the instruction manual provided separately.
7. As the camera head or the PC is heavy, hold it carefully not to drop when attaching or storing.
8. This camera head needs to be calibrated periodically (approx. every 3 months) for the level variations caused by the influence of cosmic rays. Use cellSens or DP2-TWAIN for calibration. After calibration, restart the system.
9. Do not disconnect the camera cable while the software is running. The product may be damaged.
10. The cables are vulnerable to bend or twist. Do not apply excessive force. When connecting cables, make sure of the orientation to insert them.
11. If cables are not connected correctly, the product may be damaged. Make sure that the cables are connected to respective units correctly before operating the product.
12. Note that this product is not waterproof.
13. Never disassemble any part of the product. Otherwise, failure could be caused.
14. Do not use this product in areas where it may be subjected to direct sunlight, high temperature and/or humidity, dust or vibrations.
(For conditions of operating environments, see "7 Specifications" (page 41).)
15. When disposing of this product, be sure to follow the regulations and rules of your local government.

Image data

1. The recorded image data may be lost (corrupted) in the following cases. Evident is not liable for the loss (corruption) of recorded data.
 - When the user or a third party carried out a repair to the product.
 - When the PC is terminated or the power cord's plug is disconnected while the PC is recording or deleting (initializing) the data.
 - When the cable is disconnected while acquiring still images or movies.
 - When the data has been kept saved in the recording media such as USB flash drive, etc. beyond the data storage lifetime (approx. from one to several years).
 - When the product is damaged.
2. If following phenomena occur even though the camera is working properly, images cannot be restored and the damages are not compensated.
 - The image is abnormal.
 - File properties such as file names, file date, etc. are abnormal.
 - The image is lost.
3. In general, as there is a data storage lifetime in the recording media, such as USB flash drive, HDD, CD-R, DVD-R, etc., the saved files may be lost after several years.
4. The image data may be lost (corrupted) unexpectedly, so make frequent backups of the data you acquired.
5. Make sure that there is no problem in acquiring the image of the specimen before image acquisition. Even though the problem may occur by the acquired images, Evident is not liable for these problems.

PC and software

1. Evident shall have no liability for any damage (including compensation for the lost data) caused by the use or incapable use of this product.
2. The PC used with this system should set up and run the OS designated by Evident.
For the OS in the PC, the user is requested to create a backup and retain it carefully. (Evident does not support the OS-related matters including its backup.)
For details of the PC and OS, refer to their respective manuals.
3. The quality of this product is assured by factory default. Evident is not liable for abnormal operations and/or functional failures caused by changing configurations of the PC (including BIOS change), installing other software or adding other hardware by yourself.
4. When the HDD free space is reduced, the data processing speed may be extremely slow or errors may occur frequently. To prevent this, delete unnecessary data files frequently. For procedures to delete the data files, refer to the instruction manual of Microsoft® Windows®.
5. Never attempt to delete or rename the folders and files installed by the provided installer software. Otherwise, the software may not start.
6. It is recommended to install the antivirus software to the PC to protect from the computer virus. Note, operations of the software cellSens / Evident Stream may be slower depending on the antivirus software.
7. Use a PC that complies with the safety standards of your country.

Trademark

Microsoft Windows are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

Intel and Intel Core are trademarks of Intel Corporation in the United States and/or other countries.

Other company names or product names described in this manual are either registered trademarks or trademarks of respective companies.

System compatibility

Restrictions in use

1. The C-mount camera adapter with "O" mark in the following table can be used with this product.

U-TV0.5XC-3	U-TV0.63XC	MXV-TV0.63XC-2	GX-TV0.7XC	U-TV1XC	U-TV1X-2 +U-CMAD3	MXV-TV1XC
X	O	O	O	O	O	O

O : Usable

X : Not recommended to use, since the four corners of the image may be darkened due to incompatible specifications with DP74.

2. If the intermediate tubelength is long (see examples below), the periphery of the field of view may be obscured depending on the observation tube and/or objective used together.

* Examples when the intermediate tubelength is long:

- Two or more intermediate attachments are combined.
- BX3 series: The reflected light illuminator and the intermediate attachment are combined.
- IX3 series: IX73P2F or IX83P2ZF is used as a microscope frame.

3. If the illumination used with the microscope is the fluorescent light ring illumination or the illumination driven by the alternate current such as a phase control light intensity control method, etc., and also if the light intensity voltage becomes higher and the exposure time becomes shorter when combining the microscope with this camera, the following phenomena may be observed due to the flickering of the illumination light.
 - Flickering of the displayed image
 - Variation of exposure
 - Image disturbance when acquiring the image with pixel shift

However, if the brightness can be adjusted by adjusting the illumination light level or attaching/detaching the attenuation filter, these phenomena can be avoided by adjusting the exposure time to 1/50 s or longer. For details such as the microscope model name which drives the illumination by the alternate current, etc., contact Evident.

4. Performances in combination use of this product and non-Evident microscopes have not been evaluated. Non-Evident microscopes and non-Evident C-mount lenses can be used if they match a 1/1.2 inch or larger image sensor and the lens projection length from the C-mount body attaching section is no more than 4.5 mm. However, problems, such as shading, etc. may be observed due to optical adaptability.
5. If you narrow down the AS (aperture diaphragm), the spot flare may be noticeable. This flare becomes less noticeable if you open the AS (aperture diaphragm).
6. When observing the specimen containing the high light intensity area, the flare may be noticeable in the low light intensity area. To reduce the flare, open the AS (aperture diaphragm) or set the exposure darker.
7. If the specimen is moved during image acquisition in 3CMOS mode (5760 x 3600 / 2880 x 1800 / 1920 x 1200 pixels), the image may be disturbed.

8. If the camera or microscope is vibrated during image acquisition in 3CMOS mode (5760 x 3600 / 2880 x 1800 / 1920 x 1200 pixels), the image may be disturbed. The several causes for the vibration are, operation of keyboard and mouse on the same table where the microscope equipped with the camera is placed, vibration from the equipment with built-in air cooling fan placed on the same table as microscope, etc.
9. If the resolution of the live image is different from the resolution of the image to be acquired, intended images may not be obtained.
10. The maximum speed of the frame rate of the live image may not be secured depending on the graphic card type to be used.
11. If you insert the high reflectance filter (45LBD-IF, etc.) in the filter holder of the microscope, the flare may be noticeable.
The flare becomes less noticeable if you place the ND filter for transmitted light illumination or low reflectance type (45-ND25, etc.) on the condenser side of the high reflectance filter.
12. If the color of the illumination is disproportionate significantly (Ex: low color rendering LED illumination), the white balance may not be obtained.
13. When you move the specimen (stage), an afterimage or the area viewed in black may be noticeable on the live image due to the influence of the live noise reduction function.
14. When you move the specimen (stage), the afterimage may be noticeable on the live image due to the influence of the HDR function.

15. The position navigator function does not necessarily guarantee the operations of all specimens, observation conditions and operation methods.
16. The position navigator function is not available in the following cases.
 - When there is no specimen in the observation field of view.
 - When the stage rotates.
17. If observing a dark or low contrast specimen, the accuracy for creating the map of the position navigator function may be lowered.
18. In the following cases, you may fail in estimating the magnification when changing the objectives using the position navigator function.
 - Fluorescence observation in the modes other than Low Light mode.
 - The magnification ratio between the objectives before and after changing is 5 times or more.
 - Observation of the specimen containing the target object that is structured uniformly.
 - A part of the image acquisition range is out of the created map.
 - The stage is moved immediately before or immediately after changing the objectives.

In addition, the changing of optical elements, e.g. mirror cassette, condenser, etc. or changing of the light path of trinocular tube, etc. may be falsely detected as the changing of objectives.

Recommended specifications of the display

- Display available for full color view of 1280 x 1024 or more (Factory default:1280 x 1024)
- AdobeRGB compatible display if using this product in AdobeRGB mode

Recommended PC configurations

1. PC requirements

	PC/AT compatible
CPU	Intel® Core i5, Intel® Core i7, Intel® Xeon, (or equivalent)
RAM	4 GB or more (dual-channel)
HDD	Free space: 1 GB or more
Graphic	VGA card of PCI Express X16 available for 32 bit color with 1280 x 1024 or more * The onboard graphic is also usable.
Extension slot	PCI Express X4 Rev.2.0a or later (electrical mode X4 or more) Half-size or low-profile PCIe board compatible (106.7 mm x 174.6 mm)
OS	Microsoft® Windows® 10 Pro (64 bit) Microsoft® Windows® 8.1 Pro (64 bit) Microsoft® Windows® 7 Ultimate / Professional SP1 (32 bit / 64 bit) Language: English / Japanese

* Required configurations for Live HDR

- Graphic board applicable to CUDA made by NVIDIA (compute capability 2.1 or more)
- Graphic board driver applicable to CUDA 7.0 or more

Even though the above mentioned recommended operating environments are satisfied, it does not necessarily guarantee the functions of combination use with all commercially-available PCs. Refer to Evident website to check the PCs whose performances in combination use with this system were confirmed.

2. CPU

Evident does not guarantee the performance of the PC where a CPU not compatible with Core series or non-Intel chipset is installed.

3. HDD free space

The HDD free space is the space that is required not to cause any problem when installing or running the system.

4. RAM

If a RAM other than a PC2700 or greater, dual-channel RAM is used, the full-size live frame rate may drop.

5. Display

Use an AdobeRGB compatible display when using this product in AdobeRGB mode. The proper color reproduction cannot be obtained if the sRGB/AdobeRGB setting of this product is not matched with the mode to be set to the display to be used.

6. Sequential connection of PCIe units:

Up to two PCIe units including the DP74 and a PCI interface board of the DP73/DP72/DP71/DP70/DP30BW can be connected in series.

However, as their simultaneous operation is not available, it is required to select either PCI interface operation.

7. Power supply

The PCIe interface board should be powered by connecting the HDD power supply connector from the ATX power supply in the PC.

Maintenance and storage

1. Do not leave stains or fingerprints on the lenses and filters. If they get dirty, blow away dust with a commercially-available blower and gently wipe the lens or filter with a piece of cleaning paper (or clean gauze).
Only when cleaning fingerprints and oil stains, slightly moisten a piece of cleaning paper with commercially-available absolute alcohol and wipe them off with it.

**CAUTION**

Since the absolute alcohol is highly flammable, it must be handled carefully. Be sure to keep it away from open flames or potential sources of electrical sparks. For example, the electrical equipment that is switched ON and OFF may cause the ignition of a fire. Also, always use absolute alcohol only in a well-ventilated room.

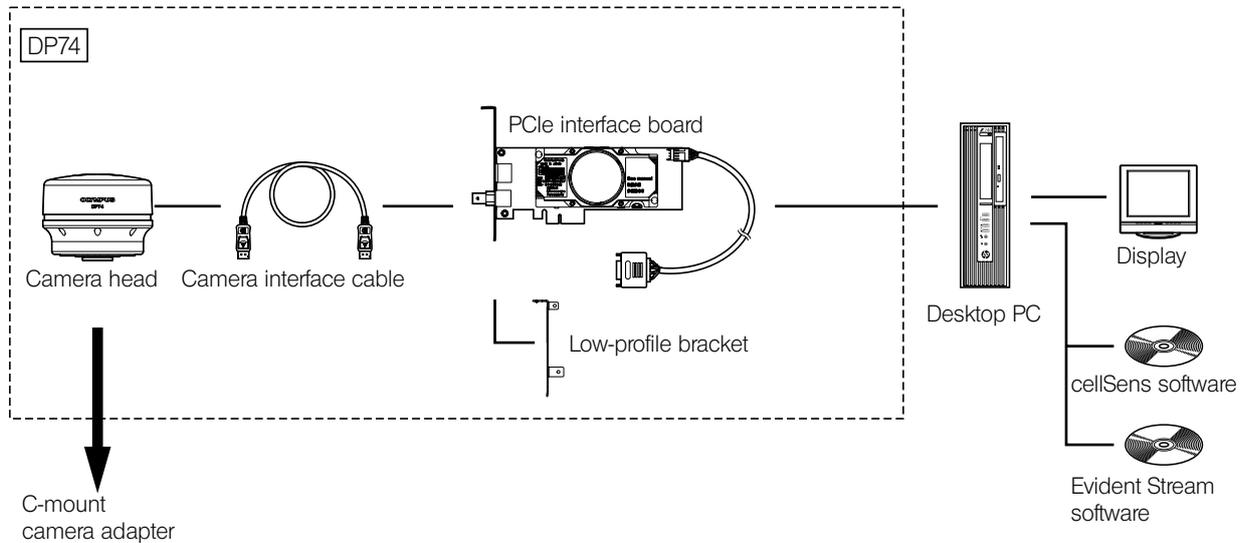
2. Wipe the portions other than the lens with a dry soft cloth. If the dirt cannot be removed by dry-wiping, moisten a soft cloth with diluted neutral detergent and wipe the dirty surface with it.

NOTE

Do not use organic solvents to clean the portions other than lens parts, since it deteriorates painted surfaces or plastic parts.

3. When storing the camera, be sure to attach the provided C-mount cap to the camera to prevent the IR cut filter built-in this camera from getting scratched.
4. When smoking the room for cleaning, etc., move the camera head to a place not exposed to smoke.
5. Be careful not to generate the dew condensation, as this may cause failure of the product. Dew condensation is the phenomenon that the vapor in the air contacts the surface of a metallic plate, etc. and attached as water drops. When the temperature suddenly changes, the dew condensation may be generated, for example when the camera head is suddenly moved from cold place to warm place, etc.
6. This camera turns over easily. When storing this camera, put the C-mount portion at the bottom.

1 System diagram



Consult Evident for the compatible microscope and C-mount camera adapter.

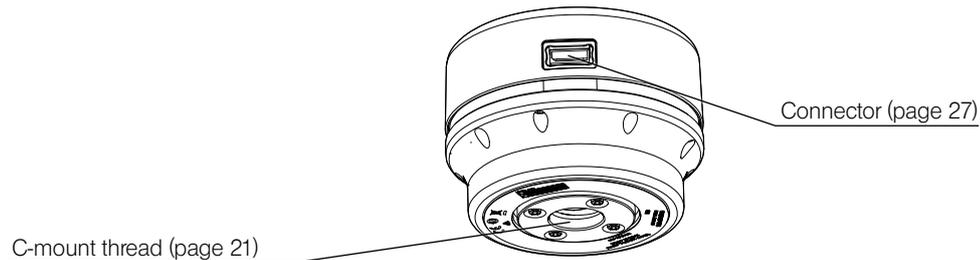
Consult Evident for the microscope, camera adapter and DP2-TWAIN to be used together.

2 Nomenclature of respective portions

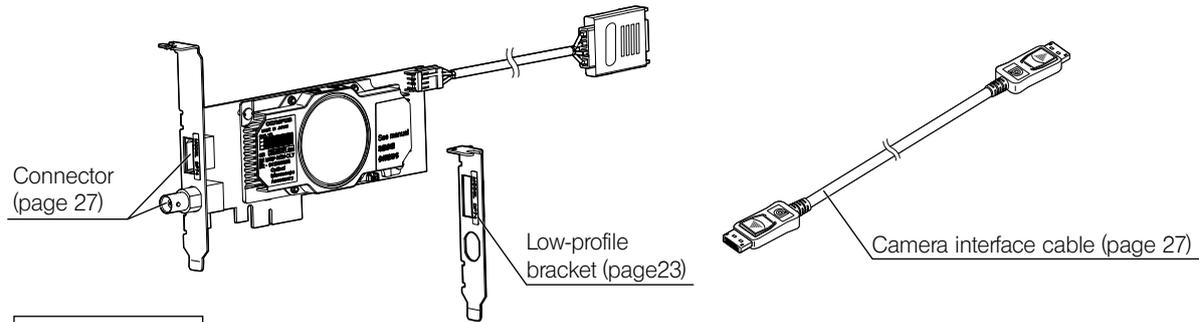
Camera head

NOTE

Any product connected to the camera head should be an Evident-designated product or a product in compliance with the requirements of IEC60950 or CISPR22/24 (international standards related to product safety). If products other than these products are connected, Evident cannot guarantee any performance of the camera.

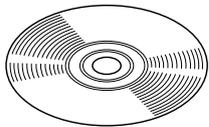


PCIe interface board (PCI standard half-size, low-profile size compatible)



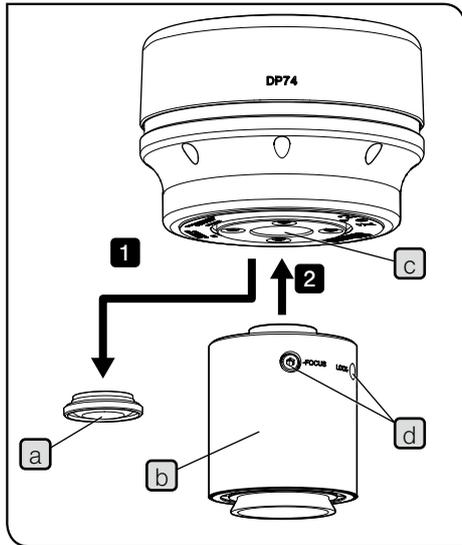
Software (option)

cellSens/Evident Stream



3 Assembly

3-1 Attaching the camera head



- NOTE**
- Do not touch the C-mount thread, since it is sharp.
 - Be careful not to drop the camera head and the C-mount camera adapter when attaching or detaching them.
 - Be sure to attach the C-mount camera adapter by screwing it into the camera head securely. If the C-mount camera adapter is not attached securely, the camera head may drop during operation or the sufficient performance cannot be obtained during image acquisition.

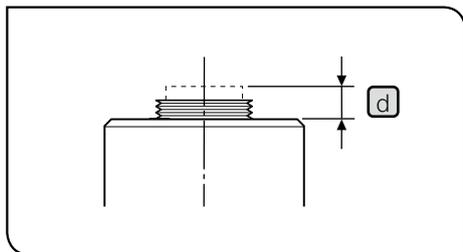
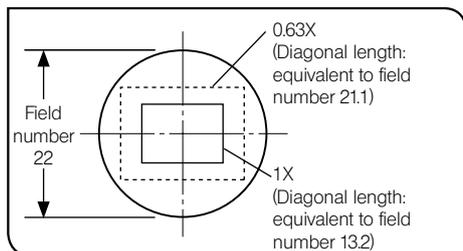
The procedures to use the C-mount 0.63X camera adapter U-TV0.63XC are described below.

- 1** Remove the C-mount lens cap **a**.
- 2** Screw the C-mount camera adapter **b** into the C-mount thread **c** at the bottom of the camera head until it stops.
- 3** Attach the C-mount camera adapter to the camera port of the microscope.

TIP

- The screw (LOCK/FOCUS) **d** have to be operated while adjusting the parfocality. Attach the C-mount camera adapter in the direction so that you can operate the screws (LOCK/FOCUS) easily.

- Be sure to adjust the parfocality between the C-mount camera adapter and the eyepieces. Otherwise, the focus of the image through the eyepieces and the image through the camera may not match each other. For the parfocality adjustment method,



refer to the instruction manual for the C-mount camera adapter in use.

- If the camera is not attached in a correct direction, the direction of the image observed through the eyepiece does not match with the direction of the image through the camera. After the hardware is installed, compare the image observed through the eyepiece with the live image acquired by the camera, and rotate the C-mount camera adapter so that the directions of these images match each other.

TIP

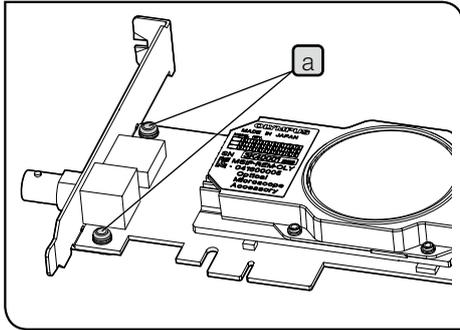
- As shown in the left picture, the image area acquired by the camera relative to the observation area through the eyepieces (field number 22) differs depending on the magnification of the C-mount camera adapter. Use the C-mount camera adapter with the magnification of 0.63X or more. (If you use the C-mount camera adapter with the magnification lower than 0.63X, four corners of the image may be obscured depending on the microscope to be combined.)

- The left figure shows an approximate field of view area. Check the actual field of view area by observing the specimen equipped with a scaling function, etc. before use.
- If a non-Evident C-mount camera adapter is used, the optimum optical performance may not be obtained.

NOTE

- Do not use the non-Evident C-mount camera adapter which has a threaded section **d** longer than 4.5 mm, since it will collide with the parts inside the camera head to cause damages to them.

3-2 Installing the low-profile bracket

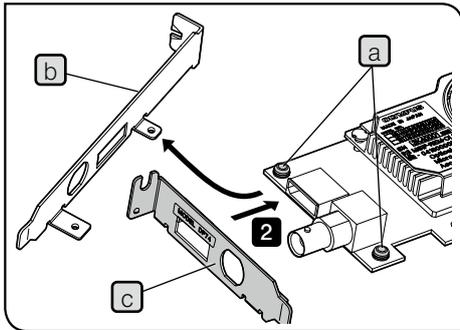


If the PCIe slot of the desktop PC is the low profile specifications, it is required to replace the existing bracket with the low-profile bracket.

- NOTE**
- To avoid damage caused by static electricity, touch an unpainted metallic surface of the PC with your hand to discharge the static electricity before replacing the bracket.
 - When replacing the bracket, do not touch the parts on the board surface or push it with excessive force to prevent the damage.

1 Prepare the Phillips screwdriver and remove the screw **a** (2 positions) from the PCIe interface board.

2 Replace the existing bracket **b** attached to the PCIe interface board with the low-profile bracket **c** and screw in the screw **a** (2 positions).



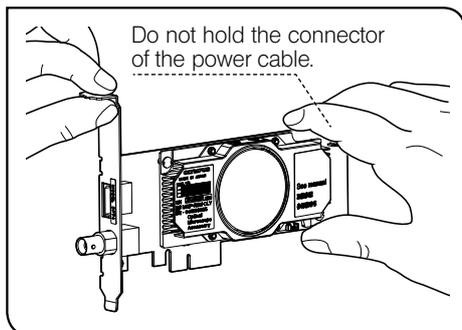
3-3 Installing the PCIe interface board

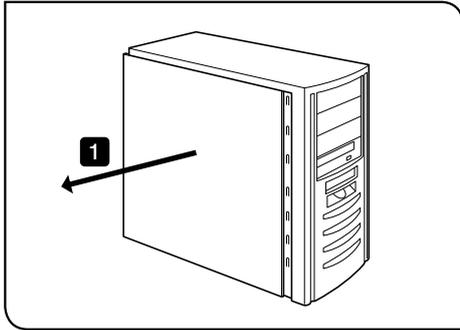
CAUTION

Be careful not to cut your fingers by sharp portions within the PC.

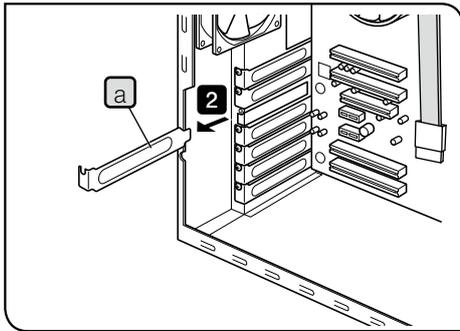
NOTE

- Before installing the PCIe interface board on the PC, be sure to read the instruction manual for the PC to prevent the damage.
- Be sure to turn OFF the PC and peripheral equipments and disconnect their power cords before installing the PCIe interface board.
- To avoid damage caused by static electricity, touch an unpainted metallic surface of the PC with your hand to discharge the static electricity before installing the PCIe interface board.
- When installing the PCIe interface board, do not touch the parts on the board surface or push it with excessive force to prevent the damage. Be careful not to let power cords be caught by the parts inside the PC.
- When inserting the PCIe interface board into the PCIe slot inside the PC, check the shape of the PCIe slot and that of the board edge and insert the PCIe interface board into the PCIe slot in the correct direction without misaligning from the PCIe slot.





1 Open the housing of the desktop PC.

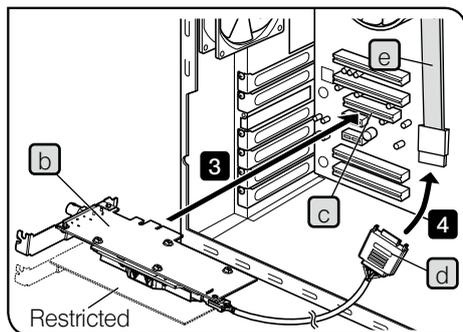


2 Remove the slot cover **a** of an unused PCIe slot on the motherboard.

NOTE Select the position of the PCIe slot whose electrical mode (data transfer rate) is X4 or more. The electrical mode (data transfer rate) of PCIe slots might differ from the mechanical mode (slot shape) of them. Be sure to confirm your PC's instruction manual and labels for PCIe slots.

Examples of labels for PCIe slots:

- PCIe3x16(4)
mechanical mode X16, electrical mode X4 (usable)
- PCIe3x4(1)
mechanical mode X4, electrical mode X1 (not usable)



The direction of the PCIe interface board may become upside down depending on the PC in use.

- 3** Insert the PCIe interface board **b** into the PCIe slot **c** carefully without touching the board surface directly by hand.

NOTE Do not install the following boards in the adjacent slot on the fan side of the PCIe interface board. Otherwise, it may deteriorate product performance.

- Graphic board
- PCIe interface board of DP80, DP73 or DP72
- Board with power consumption of 3W or more

- 4** Connect the connector **d** to the SATA power cable **e** of PC.

NOTE • Insert the cable connectors completely to the end.

- For prevention from possible damage, be careful not to apply excessive force to the connectors of the PCIe interface board or cables.

- 5** Fix the cover of the PCIe slot securely and attach the cover of the desktop PC to the original position. Make sure that the cables are not caught in the cover or the operation portions inside PC such as fan, etc.

For procedures to remove the cover of the desktop PC and the cover of the PCIe slot, refer to the instruction manual of the PC.

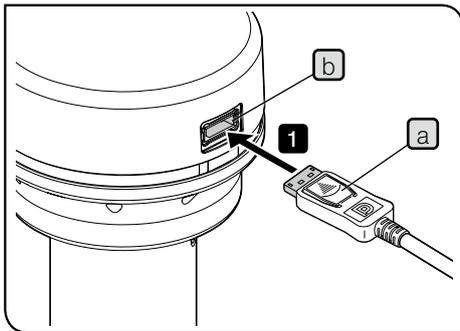
3-4 Connecting the camera interface cables

CAUTION

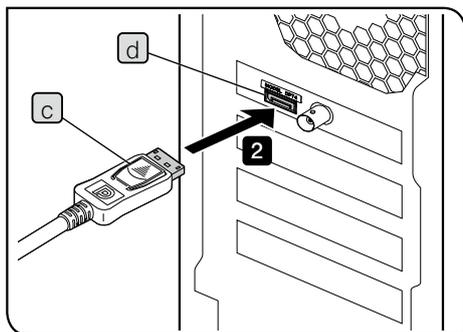
- Be sure to turn OFF the power of the PC before connecting the camera interface cables.
- Always use the camera interface cable provided by Evident.
- Keep the camera interface cables well away from equipment generating high heat, such as the lamp housing of microscope.

NOTE

- The camera interface cable is vulnerable to bend or twist. Be careful not to apply excess force.
- Connect the camera interface cable in the correct orientation paying attention to the shape of the connector without applying excessive force.



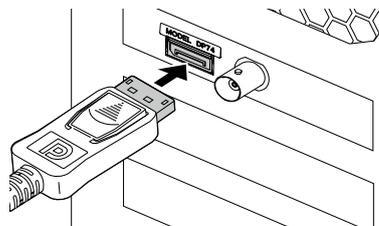
- 1** Insert the connector **a** of the camera interface cable into the connector **b** of the camera head until the click sound is heard. Make sure that the camera interface cable will not be slipped out.



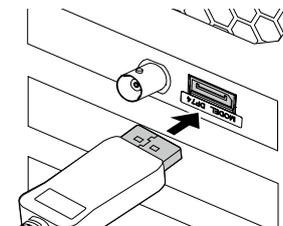
- 2** Insert the other connector **c** of the camera interface cable into the connector **d** of the PC until the click sound is heard. Make sure that the camera interface cable will not be slipped out.

NOTE • Be sure to connect the camera interface cable to the connector where this product name “DP74” is displayed. Be careful not to connect the camera interface cable to the display connector of the PC. And also be careful not to connect the display cable to the connector where this product name “DP74” is displayed.

- The direction of the built-in PCIe interface board may become upside down depending on the PC in use. In this case, the direction of the connector becomes upside down as well. Check the direction of the label of the connector and connect the interface cable in the proper direction.

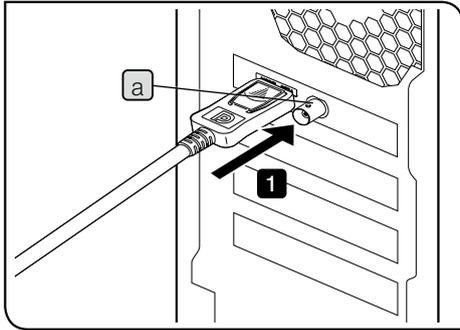


Normal direction



Opposite direction

3-5 Connecting the external equipments



Please read this section when using the external triggering function.
For the external triggering function, refer to “6 External trigger function”
(page 34).

- 1** Insert the connector of the BNC cable of the external equipment into the connector **a** of the PCIe interface board of the PC.

NOTE To use the external triggering function, the software cellSens / Evident Stream is required.

4 Installation of software

Software cellSens / Evident Stream

Refer to the installation manual of cellSens / Evident Stream before installation.

Before installing software

1. Close all running application software before installing software.
2. If the user account logging on the Windows® is not registered as a “Administrator”, the software cannot be installed. If it is registered as a “User”, change it to a “Administrator”.
(For the change of user account, refer to the Help of Windows®.)

TWAIN Driver DP2-TWAIN

DP2-TWAIN is not included in this product. Download the installer from Evident web site.

When using DP2-TWAIN with 64-bit OS, the commercially-available software that supports TWAIN in 64-bit native operation is required.

Selecting the device

When selecting the device in cellSens or EVIDENT Stream, specify it in the device list shown below. The device list is displayed when you startup cellSens or Evident Stream for the first time. Or, in Menu bar, select [Acquisition]→[Devices] →[Device List] to display the device list.



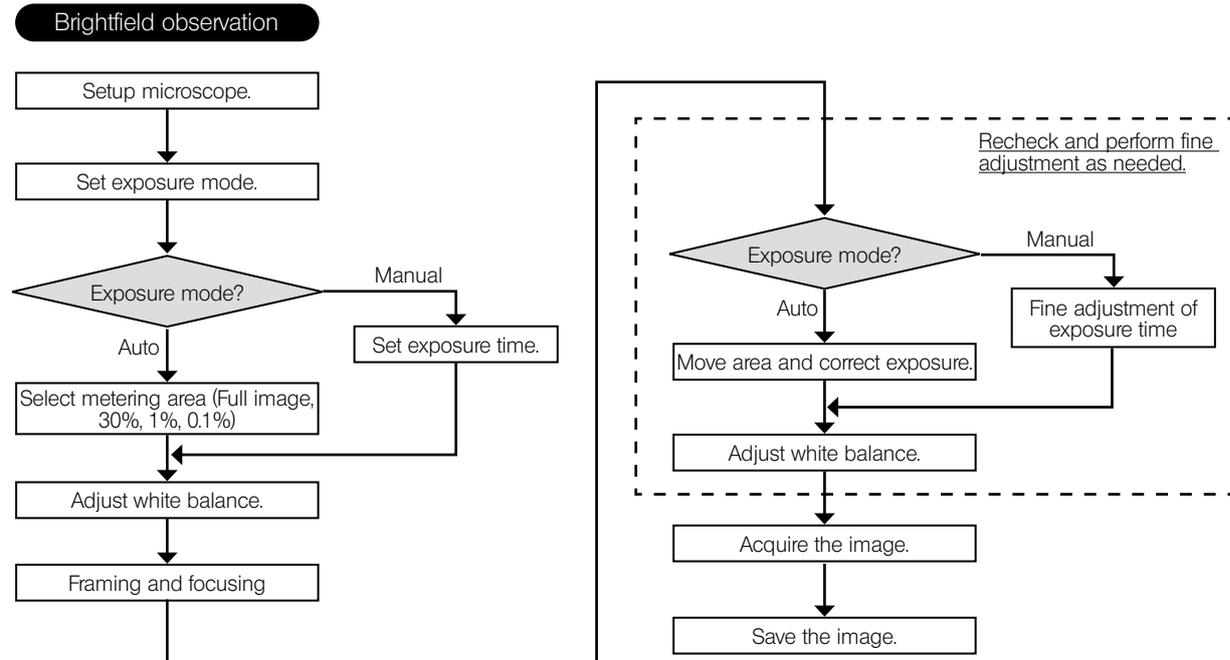
[Device List] dialog box in cellSens



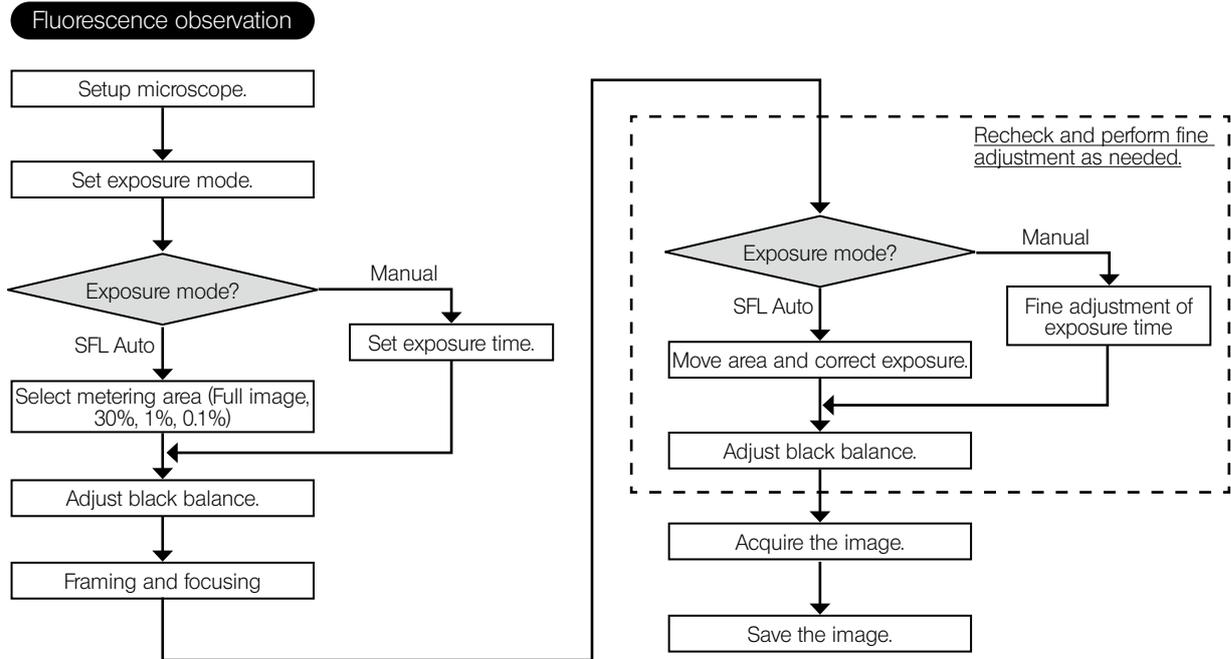
[Device List] dialog box in Evident Stream

5 Outline of image acquisition procedures

For detail operating procedures, refer to the instruction manual or Help of software you will use.



Example of procedures to acquire images in brightfield observation



Example of procedures to acquire images in fluorescence observation

6 External trigger function

With DP74, still images can be acquired and commercially-available shutters can be controlled by external trigger signals.

Trigger input

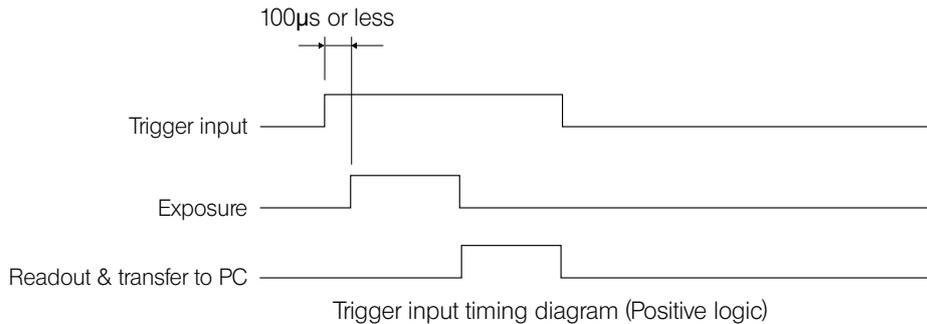
When the trigger signal is inputted from external equipments, the still image can be acquired using cellSens / Evident Stream.

When the trigger signal is detected at the edge, the image is acquired with the pre-set exposure time. The positive and negative logics of signals can be switched with cellSens / Evident Stream.

The exposure starts within 100 μ s after the trigger input.

The trigger input signal is TTL compatible.

V_{IH} : 2.0 V (min). V_{IL} : 0.8 V (max).



Trigger output

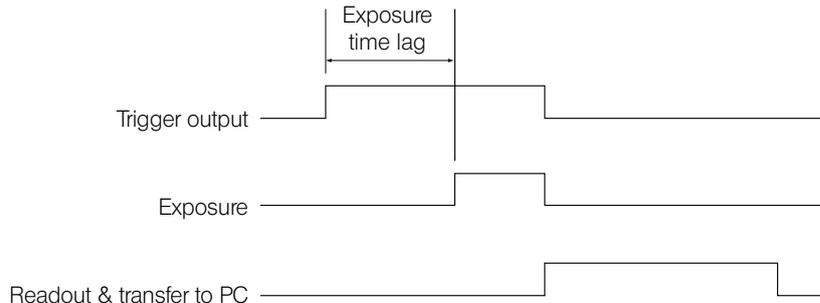
When the trigger signal is outputted from cellSens/Evident Stream, the open/close of the commercially-available shutter can be controlled.

The trigger signal is outputted in interlock with the image acquisition operation by cellSens/Evident Stream.

The positive and negative logics of signals can be switched and the exposure time lag from outputting the trigger signal to the start of exposure (0 to 2 s) can be set by cellSens/Evident Stream.

The trigger output signal is TTL compatible.

V_{OH} : 2.4 V (min.) V_{OL} : 0.4 V (max.)



Trigger output timing diagram in still image acquisition (Positive logic)

7 Specifications

The specification item with the ★ mark can be set in combination with cellSens or Evident Stream.

The specification item with the ☆ mark can be set in combination with Evident Stream.

The specification item with the ☆ mark may differ depending on the specified exposure time or operating status of the PC.

Item		Specifications
Camera system		Single-CMOS color camera Pixel shifting type
Image sensor	Type	1/1.2 inch color CMOS Total pixels: 2.37 million pixels Effective pixels: 2.35 million pixels Global shutter system Pixel pitch: 5.86 μm (H) x 5.86 μm (V)
Cooling system		Peltier and natural air cooling
Image size		5760 x 3600 (pixel shifting, 3CMOS mode*) 2880 x 1800 (pixel shifting, 3CMOS mode*) 1920 x 1200 (1 x 1, 3CMOS mode)* 1920 x 1080 (1 x 1) 1600 x 1200 (1 x 1) 960 x 600 (1 x 1) 960 x 600 (2 x 2) * 3CMOS mode is an application of the pixel shift function, which is the mode to acquire the image with all colors (RGB) in every pixel. * The pixel shift and the 3CMOS mode images cannot be acquired in the 32bit OS environment. Also, the image cannot be acquired by the external trigger input.
Camera mount		C-mount
Sensitivity		0.5X / 1X / 2X / 4X / 8X / 16X (Equivalent to ISO 200 / 400 / 800 / 1600 / 3200 / 6400)

Item		Specifications
A/D conversion		Resolution: 12 bit
Exposure control	Exposure modes	Auto / SFL Auto / Manual
	AE lock	Available
	AE pause	Available
	Exposure correction	Correction range: ± 2.0 EV, 1/3 EV step
	Metering area	Full image / 30% / 1% / 0.1% (The metering area can be moved freely.)
Exposure time		39 μ s to 60 s
Binning		2 x 2
Live frame rate★		1920 x 1200 (1 x 1): 60 fps 1920 x 1080 (1 x 1): 60 fps 1600 x 1200 (1 x 1): 60 fps 960 x 600 (1 x 1): 60 fps 960 x 600 (2 x 2): 60 fps

Item		Specifications
Still image acquisition time★ (from start of image acquisition to display of image)		5760 x 3600 (3CMOS): approx. 7 s 2880 x 1800 (3CMOS): approx. 7 s 1920 x 1200 (3CMOS): approx. 0.8 s 5760 x 3600 (pixel shift): approx. 3 s 2880 x 1800 (pixel shift): approx. 3 s 1920 x 1200 (1 x 1): approx. 0.1 s 1920 x 1080 (1 x 1): approx. 0.1 s 1600 x 1200 (1 x 1): approx. 0.1 s 960 x 600 (1 x 1): approx. 0.1 s 960 x 600 (2 x 2) : approx. 0.1 s * If CPU of the PC does not support AVX, it takes longer time to acquire the image in 5760 x 3600 (3CMOS mode).
Color mode		Color / standard grayscale / custom grayscale
External trigger ★		Input: Edge trigger input / level trigger input Output: Trigger output With open delay (0 to 2 s, 10 ms step) TTL compatible (Simultaneous use of input and output is not available.)
Image accumulation★	Modes	Integral, averaging
	Accumulation count	64 frames (max.)

Item	Specifications
White balance	Area-specified / Manual
Black balance	Area-specified / Manual
Contrast mode	Normal / medium / High / Linear
Sharpness filter	Soft / Normal / Strong 1 / Strong 2 / Strong 3
Color space ★	sRGB / AdobeRGB
Focus indicator	Contrast bar / Line profile
Shading correction	Available
Pixel shift photobleaching	Available
HDR ☆	Available
Live noise reduction	Available
Position navigator ★	Available
Interval image acquisition ★	Interval: 1 s to 24 h 59 min 59 s Number of acquirable frames: 3,000
Image file formats	Depending on the application software
Preview image quality modes	Normal / Medium / High

Item		Specifications
PC interface		PCI Express Rev.2.0 x4 Compatible with low profiles
Applicable OS		Microsoft® Windows® 10 Pro (64 bit) Microsoft® Windows® 8.1 Pro (64 bit) Microsoft® Windows® 7 Ultimate / Professional SP1 (32 bit / 64 bit) Language: English / Japanese
Rating	Camera head	12 V / 0.8 A 
Dimension / Weight	Camera head	116 mm (Ø) x 87.7 mm (H) (excluding protrusions), approx. 1.2 kg
	PCIe interface board	181 (W) x 121 (D) x 21.6 (H) mm (excluding protrusions), approx. 200 g
	Camera interface cable	Approx. 2.5 m

Item	Specifications
Operating environment	<ul style="list-style-type: none"> • Indoor use • Altitude: Max. 2000 meters • Ambient temperature: 10 to 35 °C (50 to 95 °F) • Relative humidity: 80% for temperatures up to 31 °C (88 °F) (without condensation) In case of over 31 °C (88 °F), the relative humidity is decreased linearly through 70% at 34 °C(93 °F), 60% at 37 °C(99 °F), to 50% at 40 °C(104 °F). • Supply voltage fluctuation: ± 10 % • Pollution degree: 2 (in accordance with IEC60664-1) • Installation category (Overvoltage category): II (in accordance with IEC60664-1)
Storage environment	<ul style="list-style-type: none"> • Ambient temperature: -20 to 60 °C (41 to 104 °F) • Humidity: 10% to 90% (without condensation)

8 Troubleshooting

If problems occur, please review the following list and take remedial action as needed.

If you cannot solve the problem after checking the entire list, please contact Evident for assistance.

Problem	Cause	Remedy	Page
The software does not start.	The PCIe interface board is not installed properly.	Install the PCIe interface board properly.	24
	The software is not installed properly.	Re-install the software.	30
Live image is not displayed.	The camera and PC are not connected properly.	Turn OFF the power of PC and connect the camera to the PCIe interface board using the camera interface cable again properly.	27
	The illumination of the microscope is not turned ON. The light path selector of the microscope is not set to the camera side. The illumination light intensity of the microscope is not adjusted properly. Focusing of the microscope is not adjusted properly.	Turn ON the illumination of the microscope. Set the light path selector of the microscope to the camera side. Adjust the illumination light intensity of the microscope properly. Adjust the focusing of the microscope properly.	-
	Sensitivity, exposure mode, exposure time and/or level adjustment are not set properly.	Set sensitivity, exposure mode, exposure time and level adjustment properly.	(Online manual)
The frame rate of the live image is slow.	The PC in use does not satisfy the conditions of operating environments.	Check the specifications of the PC in use. Particularly, the extension slot should be PCI Express X4 Rev.2.0a or later (electrical mode X4 or more) and the RAM should be dual-channel.	15

Problem	Cause	Remedy	Page
The still image cannot be acquired.	The camera and PC are not connected properly.	Turn OFF the power of PC and connect the camera to the PCIe interface board using the camera interface cable again properly.	27
	DP2-TWAIN, cellSens or Evident Stream is performing the processing after image acquisition.	Wait until the processing after image acquisition is completed, and acquire the next still image. In some cases, you may need to press the [Cancel] button on the status bar and acquire the image again.	(Online manual)
	cellSens / Evident Stream is processing of file save, etc.	Wait until the processing of file save, etc. is completed, and acquire the next still image.	(Online manual)
	The PC memory is insufficient.	Close other software and acquire the still image. Save the images if you did not save them.	-

Problem	Cause	Remedy	Page
The abnormal temperature error occurs.	One of the following boards is installed in the adjacent slot on the fan side of the PCIe interface board. <ul style="list-style-type: none"> • Graphic board • PCIe interface board of DP80, DP73 or DP72 • Board with power consumption of 3W or more 	Move the relevant board to the different slot.	6, 26
The image is too bright.	The exposure correction is set to the + side beyond the appropriate value.	Return the exposure correction value to 0 and set the appropriate exposure correction value.	(Online manual)
	The dark area of the image is set as the metering area.	Set the area where you want to meter as the metering area.	(Online manual)
	AE lock, which was set when the exposure time was longer than the currently required exposure time, is active.	Cancel the AE lock.	(Online manual)
	The input highlight level of the level adjustment is too low.	Reset the current level adjustment and adjust the level properly again.	(Online manual)
	The illumination of the microscope is too bright.	Adjust the brightness by reducing the illumination light intensity of the microscope or engaging the attenuation filter in the light path.	-

Problem	Cause	Remedy	Page
The image is too dark.	The exposure correction is set to the - side beyond the appropriate value.	Return the exposure correction value to 0 and set the appropriate exposure correction value.	(Online manual)
	The bright area of the image is set as the metering area.	Set the area where you want to meter as the metering area.	(Online manual)
	AE lock, which was set when the exposure time was shorter than the currently required exposure time, is active.	Cancel the AE lock.	(Online manual)
	The output highlight level of the level adjustment is too low.	Reset the current level adjustment and adjust the level properly again.	(Online manual)
	The illumination of the microscope is too dark	Adjust the brightness by increasing the illumination intensity of the microscope or disengaging the attenuation filter from the light path.	-
The peripheral area of the image is dark.	The peripheral area is dark due to the matter of optical performances.	Perform the shading correction.	(Online manual)

Problem	Cause	Remedy	Page
The colors of the image are strange.	The reference area for white balance is not selected appropriately.	Select the area where nothing is shown on the background as the reference area for white balance.	(Online manual)
	The RGB balance is not adjusted appropriately by the manual white balance.	Adjust the RGB balance appropriately by the manual white balance.	(Online manual)
	The reference area for black balance is not selected appropriately.	Select the area where nothing is shown on the background as the reference area for black balance.	(Online manual)
	The "screen color" of the PC is not set appropriately.	Set the screen color of the PC to 24-bit color or higher. Note, the 32-bit color is recommended.	-
	The color space settings (sRGB/ AdobeRGB) of the camera are different from those of the display.	Set the color space (sRGB/AdobeRGB) of the camera according to the display in use.	(Online manual)
The noise on the live image is noticeable.	The live noise reduction function is not working sufficiently.	<ul style="list-style-type: none"> • Move the specimen to the center of the observation field of view. • Bring the specimen into focus. • Stop moving the specimen (stage). 	(Online manual)

Problem	Cause	Remedy	Page
The acquired image is not in focus.	The specimen is not brought into focus.	Adjust the focus accurately with the fine focusing knob.	-
	The image is acquired by bringing the specimen into focus through the eyepieces even though the parfocality between the C-mount camera adapter and the eyepieces is not adjusted.	Adjust the parfocality between the C-mount camera adapter and the eyepieces properly.	-
	The aperture diaphragm of the condenser is open too wide.	Narrow down the aperture diaphragm appropriately and bring the specimen into focus accurately.	-
	Lens components of the microscope and the cover glass on the bottom of the camera head are dirty.	Clean the objective, lens of C-mount camera adapter, condenser, window lens of the microscope, and the cover glass on the bottom of the camera head.	17
	The microscope and/or camera are subjected to vibration during image acquisition.	Acquire images in an environment where the microscope and camera are not vibrated. It is effective to use an anti-vibration table.	13

Problem	Cause	Remedy	Page
The 5760 x 3600, 2880 x 1800 and 1920 x 1200 images are not clear.	The camera is subjected to vibration during image acquisition.	Acquire images in an environment where the microscope and camera are not vibrated. It is effective to use an anti-vibration table.	13
	The temperature inside the camera head is not stabilized.	Wait 2 minutes or more after starting the software until the temperature inside the camera head is stabilized, and acquire the image.	-
The files acquired and saved with 10-bit color/10-bit grayscale cannot be opened properly by the software other than cellSens / Evident Stream. Or, the image in black color is displayed. (including the icon on the window)	The effective data is lower 10-bit out of 16-bit file format. However, your software does not support 16-bit format or displays higher 8-bit out of 16-bit.	Use cellSens / Evident Stream to open the image file.	-
The window of DP2-TWAIN, cellSens or Evident Stream is not displayed properly. Or characters of the menu are not displayed properly.	The resolution of the display is not set appropriately.	Set the resolution of the display to 1280 x 1024 or higher.	-
	The "large font" is selected as the font size of the display.	Select the "small font" as the font size of the display.	-

Problem	Cause	Remedy	Page
The map of the position navigator cannot be created.	The speed to move the stage is too fast.	While creating the map, move the stage slowly.	(Online manual)
	Brightness and/or color of the image are uneven.	While performing the position navigator, be sure to use the shading correction function.	(Online manual)
The external trigger signal is not outputted.	The external trigger function is not enabled.	Enable the external triggering function by the applicable software, such as cellSens, etc.	(Online manual)
The still image cannot be acquired using the external trigger input signal.	The external triggering function is not enabled.	Enable the external triggering function by the applicable software, such as cellSens, etc.	(Online manual)

Repair request

If you cannot solve the problems even though taking actions described in Troubleshooting, please contact Evident for assistance.

At that time, please tell them the following information as well. If this product is combined with PC, please provide us the PC model name, OS, free space in HDD, memory, and CPU.

- Product name and abbreviated name (Example: DP74 camera head)
- Product number (7-digit number including alphabets on the bottom of the camera head)
- Problem

The repair parts are kept for the period of five years after purchase.

■ Proper selection of the power supply cord

If no power supply cord is provided, please select the proper power supply cord for the equipment by referring to "Specifications" and "Certified Cord" below:

Caution :In case you use a non-approved power supply cord for Evident products, Evident can no longer warrant the electrical safety of the equipment.

Specifications

Voltage rating	125 V AC (for 100-120 V AC area) or, 250 V AC (for 220-240 V AC area)
Current rating	6 A minimum
Temperature rating	60 °C minimum
Length	3.05 m maximum
Fittings configuration	Grounding type attachment plug cap. Opposite terminates in molded-on IEC configuration appliance coupling.

Table 1 Certified cord

A power supply cord should be certified by one of the agencies listed in Table 1 , or comprised of cordage marked with an agency marking per Table 1 or marked per Table 2. The fittings are to be marked with at least one of the agencies listed in Table 1. In case you are unable to buy locally the power supply cord which is approved by one of the agencies mentioned in Table 1, please use replacements approved by any other equivalent and authorized agencies in your country.

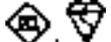
Country	Agency	Certification mark	Country	Agency	Certification mark
Argentina	IRAM		Italy	IMQ	
Australia	SAA		Japan	JET	
Austria	ÖVE		Netherlands	KEMA	
Belgium	CEBEC		Norway	NEMKO	
Canada	CSA		Spain	AEE	
Denmark	DEMKO		Sweden	SEMKO	
Finland	FEI		Switzerland	SEV	
France	UTE		United Kingdom	ASTA BSI	
Germany	VDE		USA	UL	
Ireland	NSAI				

Table 2 HAR flexible cord

Approval organizations and cordage harmonization marking methods

Approval organization	Printed or embossed harmonization marking (May be located on jacket or insulation of internal wiring)	Alternative marking utilizing black-red-yellow thread (Length of color section in mm)		
		Black	Red	Yellow
Comite Electrotechnique Belge (CEBEC)	CEBEC <HAR>	10	30	10
Verband Deutscher Elektrotechniker (VDE) e.V. Prüfstelle	<VDE> <HAR>	30	10	10
Union Technique de l'Electricité (UTE)	USE <HAR>	30	10	30
Instituto Italiano del Marchio di Qualità (IMQ)	IEMMEQU <HAR>	10	30	50
British Approvals Service for Electric Cables (BASEC)	BASEC <HAR>	10	10	30
N.V. KEMA	KEMA-KEUR <HAR>	10	30	30
SEMKO AB Svenska Elektriska Materielkontrollanstalter	SEMKO <HAR>	10	10	50

Österreichischer Verband für Elektrotechnik (ÖVE)	⟨ÖVE⟩	⟨HAR⟩	30	10	50
Danmarks Elektriske Materialkontroll (DEMKO)	⟨DEMKO⟩	⟨HAR⟩	30	10	30
National Standards Authority of Ireland (NSAI)	⟨NSAI⟩	⟨HAR⟩	30	30	50
Norges Elektriske Materiellkontroll (NEMKO)	NEMKO	⟨HAR⟩	10	10	70
Asociacion Electrotecnica Y Electronica Espanola (AEE)	⟨UNED⟩	⟨HAR⟩	30	10	70
Hellenic Organization for Standardization (ELOT)	ELOT	⟨HAR⟩	30	30	70
Instituto Portages da Qualidade (IPQ)	np	⟨HAR⟩	10	10	90
Schweizerischer Elektro Technischer Verein (SEV)	SEV	⟨HAR⟩	10	30	90
Elektriska Inspektoratet	SETI	⟨HAR⟩	10	30	90

Underwriters Laboratories Inc. (UL)
Canadian Standards Association (CSA)

SV, SVT, SJ or SJT, 3 X 18AWG
SV, SVT, SJ or SJT, 3 X 18AWG

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Evident Australia PTY LTD

Level 4, 97 Waterloo Road Macquarie Park NSW 2113, Australia

Life science solutions

Service Center



<https://www.olympus-lifescience.com/support/service/>

Official website



<https://www.olympus-lifescience.com>

Industrial solutions

Service Center



<https://www.olympus-ims.com/service-and-support/service-centers/>

Official website



<https://www.olympus-ims.com>