OLYMPUS®

INSTRUCTIONS

DP26

MICROSCOPE DIGITAL CAMERA

This instruction manual is for the Olympus Microscope Digital Camera Model DP26.

We recommend that you study this manual thoroughly before operating the camera and familiarize yourself fully with the use of this camera, which is important to ensure the safety, and to obtain optimum performance.

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

AX7970

This device complies with the requirements of both directive 2004/108/EC concerning electromagnetic compatibility and directive 2006/95/EC concerning low voltage.

In accordance with European Directive 2002/96/EC 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 Olympus distributor in EU for return and/or collection systems available in your country.

NOTE: This equipment 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 equipment is operated in a commercial environment. This equipment 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 equipment 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 equipment.

CONTENTS

IMPORTANT

The DP26 microscope digital camera is designed to be connected to a camera adapter mounted on an Olympus UIS2/UIS series microscope for recording of microscopic magnified images.
When the DP26 is used with a camera adapter from other manufacturers than Olympus, the optical performance may not be fully manifested.

Safety Precautions

1. Before connecting or disconnecting a connection cable or power cord, make sure that the main switch of the camera or PC is set to OFF. When connecting a cable or power cord, push in the connector all the way before pressing the main switch to ON.
2. To avoid electric shock or equipment failure, never connect or disconnect a cable while the main switch is set to ON.
3. If the main switch of the camera is turned OFF using DP26, PC the application may malfunction. Be sure not to turn OFF the switch during using DP26.
4. Always use the AC adapter provided by Olympus.
   Using a similar but non-Olympus AC adapter does not only allow the camera to manifest its full performance but may also cause an equipment failure as well as a burn or fire hazard due to abnormal heating. Never use such an AC adapter.
5. The cords and cables are vulnerable to bend or twist. Do not apply excessive force to them.
   Also distribute the cords and cables away from a heat-generating part such as the lamp housing of the microscope.

6. To prevent the microscope from toppling down, avoid using microscope attachments that may make the total height of the microscope above 1 meter when they are attached.
7. The AC adapter and camera generate heat after they have been used for a long period of time. To avoid moderate temperature burn, do not leave these parts in extended contact with your skin.
8. Connect the power cord correctly and ensure that the grounding terminals of the power supply and wall outlet are properly connected. If the equipment is not grounded properly, Olympus can not warrant the electrical safety performance of the equipment.
9. Sharp edges inside the computer may cut your fingers, so take extra care.

Safety and Operation Symbols

The following symbols are found on the camera. Study the meaning of the symbols and always use the equipment in the safest possible manner.

Symbol	Explanation
⚠	Indicates a non-specific general hazard. Follow the description given after this symbol or in instruction manual.
I , O	Indicates " I " (ON) or " O " (OFF) of the main switch.
6V/2.5A ⎓	Use the specified AC adapter (6 V, 2.5 A DC)
1394	Symbol of camera cable (1394) connector.

Caution

If the equipment is used in a manner not specified in this manual, the safety of the user may be imperiled. In addition, the equipment may also be damaged. Always use the equipment as outlined in this instruction manual.

The following symbols are used to set off text in this instruction manual.

CAUTION : Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or damage to the equipment or other property. It may also be used to alert against unsafe practices.

◎ : Indicates commentary (for ease of operation and maintenance).

Caution on Image Data Storage

The recorded image data may be lost (destroyed) in the following cases. Note that Olympus will not assume any liabilities for the loss (destruction) of recorded data.

The image data may also be destroyed by an unexpected cause. It is recommended to back up the data periodically.

- When the user or a third party services or repairs the equipment.
- When the PC is shut down, the AC adapter is disconnected or the power cord is unplugged during recording or erasure (formatting) of the PC.
- When the equipment fails.

Note on Disposal

Before disposing of this product, be sure to follow the regulations and rules of your local government.

1 Intended Use

This device is intended to be used for the capture of digital images for non-clinical diagnostic purposes.

2 PC and Software

When using desktop PC or laptop PC

1. Olympus will not assume any liabilities for any damage due to the use or non-usability of this system, including compensation for the lost data.
2. When the HDD free space reduces, the data processing speed may slow extremely or errors may occur frequently. To prevent this, delete unnecessary data files frequently.

3 Conformity of the System

Device driver

- The 1394 driver specialized for DP26 must be installed to operate DP26. When this driver is installed, other 1394 devices except Olympus Digital Camera for Microscope cannot be operated though connected. (Note that DP 25 cannot be used.)
- The 1394 driver can be installed at the same time when installing DP2-TWAIN or cellSens.
- To connect other 1394 devices, the driver specialized for DP26 must be uninstalled. (When the driver specialized for DP26 is uninstalled, DP26 cannot be operated.)
- When connecting the DP26 to the PC, connect the DP26's camera head directly to the 1394 connector of the PC. Connection through a commercially available 1394 hub or conversion connector may lead to malfunction.

Recommended operating environment

Common to Desktop PC/Laptop PC (except No. 7)

No.	Item	Operating Environment
1	PC	Intel Pentium 4, Intel Xeon or Intel Core Duo (or equivalent)
2	Memory	Windows® 7, Windows Vista® : 2 GB or more (3 GB or more recommended) Windows®XP : 1024MB RAM
3	HD space	1 GB (before installation)
4	PC monitor	1280 x 1024 recommended (1024 x 768 or more), 32-bit video card
5	Drive	DVD-ROM drive
6	USB	Protection key port x 1
7	1394	1394a port x 1 • Desktop PC: 9-pin 1394b port or 6-pin 1394a port • Laptop PC: 4-pin 1394a port (The AC adapter should be connected to the camera head)
8	PC input devices	2-button mouse or 3-button mouse, (Wheel-equipped model recommended) Keyboard
9	OS	Windows® 7 Ultimate / Professional (32bit / 64bit) Windows Vista® Ultimate / Business (32bitSP2) Windows® XP Professional (SP3 or after)
10	OS languages	Japanese, English
11	Web browser	IE6.0 or after

The fact that the recommended operating environment above is met does not necessary guarantee the availability of all of the operations that are usually available with the PC connection system.

Trademark information

Windows® is a registered trademark of Microsoft Corporation, USA.
All of other brand names and product names mentioned in this manual are trademarks or registered trademarks of their respective owners.

Before installation

Windows® 7, Windows Vista®

Installation is impossible unless your user account is registered as a “Computer Administrator account.” If you are registered in the “Standard user account,” please change it to the “Computer Administrator account.” (For the user account registration, refer to the manuals for your PC.)

Windows® XP

Installation is impossible unless your user account is registered as a “Computer Administrator account.” If you are registered in the “Restricted account,” please change it to the “Computer Administrator account.”

Restrictions in Use

1. The standard TV adapters are the U-TV1XC and U-TV0.63XC.
   The U-TV0.25xC, U-TV0.35xC (or a TV adapter with magnification below 0.5X), U-TV0.5XC and GX-TV0.5XC-DP cannot be used because of optical performance problems.
2. When two or more intermediate attachments are used, the peripheral part of the image may become dark or obscured depending on the observation tube and objective in use.
3. When a fluorescent lamp illumination or an illumination stand of the SZX/SZX2 series is used, the image may flicker.

4. Combinations of this product and non-Olympus microscopes have not been evaluated extensively. Non-Olympus microscopes and commercially available C-mount lenses can be used provided that they match a CCD with a size of no less than 2/3 inch and the lens projection length from the C-mount body attaching section is no more than 6 mm. However, problems due to optical adaptability, such as shading, may be observed.
5. When the specimen has a low contrast (near transparent) or high reflectance (mirror status) and the aperture iris diaphragm is stopped near the smallest aperture, spot flare may be noticeable.
6. There are some cases that red flare appears in the image of specimen which has very big differences in luminance, and the strong luminance portion is located in the image. This results from the peripheral surface reflection of the CCD. This flare can be minimized by adjusting the exposure for strong luminance portion to appropriate level, or by opening the AS.
7. When the edge of a non-transmitting object is observed by transmitted illumination under the STM6 in combination with the MM6-OB3X/5X/10X objective and the MM6C-VL/MM6-ETR, flare may be noticeable due to the difference in brightness between the transmitted sections (over-exposure) and non-transmitting section (underexposure).
   To reduce the flare, set a lower exposure using the exposure adjustment function or setting the exposure manually.
8. The image of dark specimens under reflected light or in the darkfield (specimens that need exposure of 1/2 sec. or more at ISO 100 equivalent) cannot be recorded.
9. Specimens with a distribution that is not suitable for center averaged metering require spot metering or exposure adjustment.
10. When electronic zoom is used for magnification display during focusing, the image may become noticeably coarse with certain samples.

11. If the exposure time is set less than 1/15 seconds, the LIVE image cannot be displayed by the frame rate more than 15fps.
12. The traceability of auto white balance control deteriorates when the specimen contains little white area.
13. If the microscope light source is set too bright, color unevenness may occur in photographed images. Should this be the case, adjust the brightness to an appropriate level (for example, by lowering the lamp voltage or by inserting a neutral filter).
14. To prevent destruction of the recorded image (data), never perform the following action during recording of a still image or movie;
    - turning power OFF;
    - disconnecting the AC adapter;
    - disconnecting the camera cable;
15. When combining to CX or CKX, set the light volume of the microscope illumination closer to the maximum level in order to gain the best color reproduction.

4 Getting Ready

1. The camera head uses precision components. Handle it with care and avoid subjecting it to a sudden or severe impact. Also note that the microscope does not have a waterproof construction.
2. The image displayed on the monitor may be affected when it is used near equipment generating strong electromagnetic waves. To avoid interference during operation, keep the system far from any source of electromagnetic waves.
3. Do not use the camera in areas where it may be subjected to direct sunlight, high temperature and humidity, dust or vibrations. (For the operating environment conditions, see “SPECIFICATIONS” on page 19.)

5 Maintenance and Storage

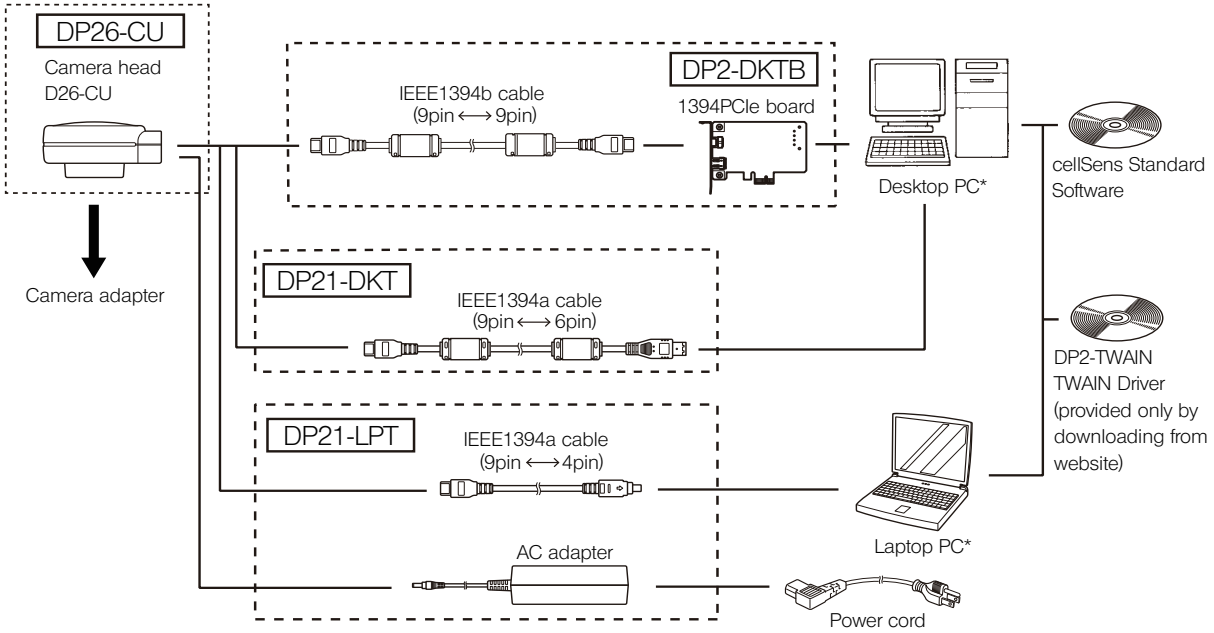
1. To clean the lenses and other glass components, simply blow dirt away using a commercially available blower and wipe gently using a piece of cleaning paper (or clean gauze).
   If a lens is stained with fingerprints or oil smudges, wipe it with gauze slightly moistened with commercially available absolute alcohol.

CAUTION

- **Since the absolute alcohol is highly flammable, it must be handled carefully. To prevent fire ignition, be sure to keep it away from open flames or potential sources of electric sparks -- for example, electrical equipment that is being switched on or off.**
- **Also remember to always use these chemicals only in a well-ventilated room.**

2. Parts other than the glass components should be cleaned by wiping with a clean cloth. Do not use organic solvents to remove major stains. Use a soft cloth slightly moistened with a neutral detergent solution.
3. When the system is not used, store it with the dust cover. Before storage, ensure that the main switches of the camera head and the microscope are set to OFF and that the camera head, AC adaptor and lamp housing is cool enough.
4. Do not disassemble any part of the camera as this could result in malfunction or reduced performance.
5. As this camera is easy to roll over, when you store it after removing it from the microscope, keep the C Mount area down.
6. When smoking the room for cleaning, etc., move the DP26 to a place not exposed to smoke.
7. Care is required against condensation as this may sometimes cause malfunction. Condensation is the phenomenon in which the vapor in the air is condensed into water drops, which attach to the surface of a metallic plate, etc. It often occurs when the ambient temperature changes suddenly, for example when a camera is brought from cold outdoors into warm indoors.

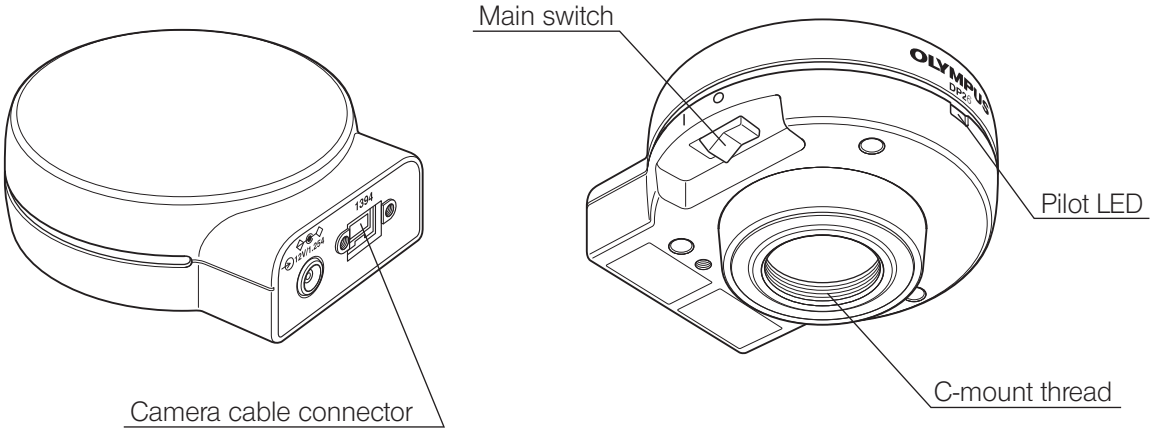
1 SYSTEM CHART



* DP26 combined with certain PCs may not be operated properly. Confirm PCs whose actions have already been checked in Website.

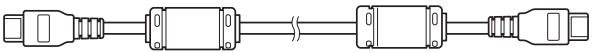
2 NOMENCLATURE

Camera head

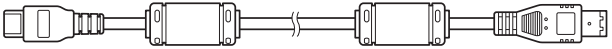


Camera cable

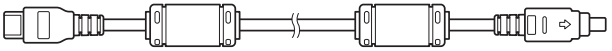
Attached with DP2-DKTB
(9pin - 9pin)



Attached with DP21-DKT
(9pin - 6pin)



Attached with DP21-LPT
(9pin - 4pin)



3 INSTALLATION

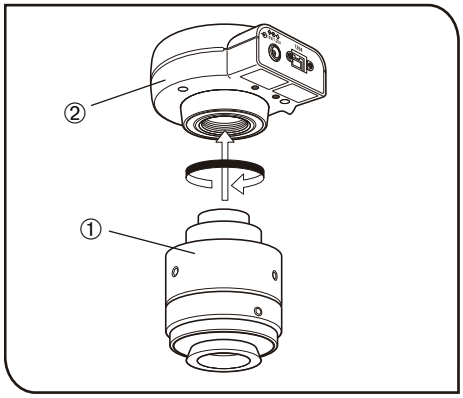


Fig. 1

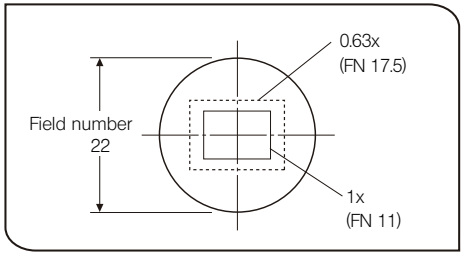


Fig. 2

1 Installing the Camera Head

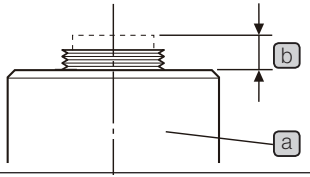
Screw in the U-TV1XC C-mount camera adapter 1 into the mount thread at the bottom of the camera head 2. If you use a different C-mount camera adapter, follow its instruction manual.

As the photographed field is as shown below, use a camera adapter having magnification of 0.63X to 1X. (Vignettings may occur in 4 corners in the image when the camera adapter magnification is set to 0.35, or 0.5x depending on the microscope to be combined.)

If a C-mount TV adapter from other manufacturers than Olympus is used, the optical performance of the system may not be fully manifested.

CAUTION

- **Be sure to adjust the parfocality before using a camera adapter. Otherwise, the focusing of the camera image will not match that of the image observed through eyepieces. For the parfocality adjustment method, refer to the instruction manual for the camera adapter in use.**
- **Be careful in using other manufacturer's C-mount camera adapter or C-mount lens [a] having a thread length over 4.5 mm [b]. Otherwise, the threaded section will hit the inside of the camera head and cause damage to it.**



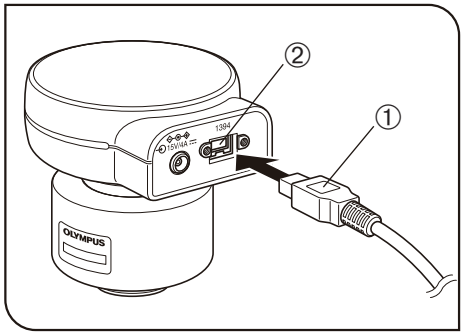


Fig. 3

2 Connecting the Camera Cable

CAUTION

- **The cords and cables are vulnerable to bend or twist. Do not apply excessive force to them.**
- **Be sure to switch off the camera head and PC before connecting.**

◎When connecting the cable, insert the connector plug in the proper direction.
(Example: Camera cable)

Cable side　　Connector side

1. Insert the connector ① on one end of the camera cable into the connector ② on the camera head.
2. Insert the connector on the other end of the camera cable into the connector on the PC.

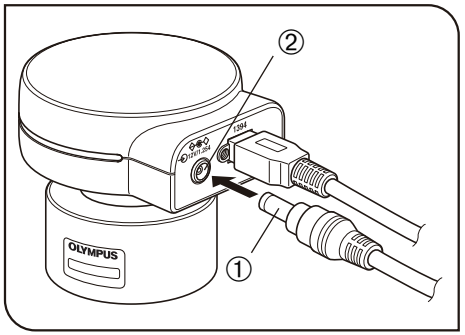


Fig. 4

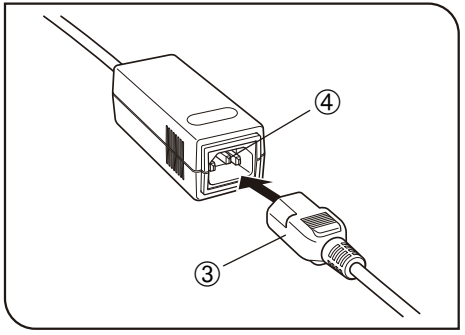


Fig. 5

3 Connecting the AC adapter (necessary only when a laptop PC is connected)

CAUTION

- **Always use the AC adapter provided by Olympus. Using an other AC adapter will result in malfunction or damage.**
- **The cords and cables are vulnerable to bend or twist. Do not apply excessive force to them.**

1. Insert the output connector ① of the AC adapter into the DC input connector ② of the camera head.
2. Insert the connector ③ of the power cord into the input connector ④ of the AC adapter.

CAUTION

- **Always use the power cord provided by Olympus. If no power cord is provided with the camera head, please select a proper power cord by referring to chapter "PROPER SELECTION OF THE POWER CORD" at the end of this instruction manual (page 26).**

3. Insert the power cord plug into the power outlet. Connect the power cord correctly and ensure that the grounding terminals of the power supply and wall outlet are properly connected.

CAUTION

- **If the equipment is not grounded properly, Olympus can no longer warrant the electrical safety performance of the equipment.**

◎The AC adapter generates heat after long hours of use, but this is not malfunction.

◎The AC adapter of the camera is required only when it is connected to a laptop PC. It is not necessary when it is connected to a desktop PC or controller.

Power supply to the camera

The camera head of the DP26 has a main switch. Set this switch to ON when using the camera. The pilot LED on the camera head lights when power is supplied to the camera head.

When a desktop PC or controller is connected

The camera is powered from the desktop PC or controller so the AC adapter is not necessary. The camera is turned OFF automatically when the PC is shut down.

When a laptop PC is connected

Since the laptop PC cannot supply power, the AC adapter is necessary. Since the power is supplied from the AC adapter, the camera remains ON even when the PC is shut down. To turn the camera OFF, set its main switch to OFF.

◎There is no problem in shutting down the laptop PC while leaving the camera power ON. The camera power is left ON until the main switch is set to OFF or the AC adapter is unplugged.

4 IMAGE RECORDING PROCEDURE

4-1 Software

CAUTION

- **When DP2-TWAIN or cellSens is installed, the 1394 driver is also replaced with the dedicated driver for the DP26. When this driver is installed, other 1394 devices except Olympus Digital Camera for Microscope cannot be operated though connected. (Note that DP 25 cannot be used.)**
- **If you want to use an IEEE1394 device other than the DP26, open the Device Manager and update the driver software of "OLYMPUS(R) MICROSCOPE 1394 DIGITAL CAMERA SYSTEM" under "1394 Bus Host Controllers".**

Before Installation

- Quit all running applications before installing software.
- The software cannot be installed unless the user account is registered as "computer administrator." If the user account is registered as a "Restricted account," change it to the "Computer administrator" account. (For the user account registration, refer to the instruction manuals for your computer.)
- When using a 1394PCIe board, install it in the PC before installing software.

TWAIN Driver DP2-TWAIN

DP2-TWAIN is not included in this product. Download the installer from the following URL prior to use. For installation procedures, refer to the following URL.

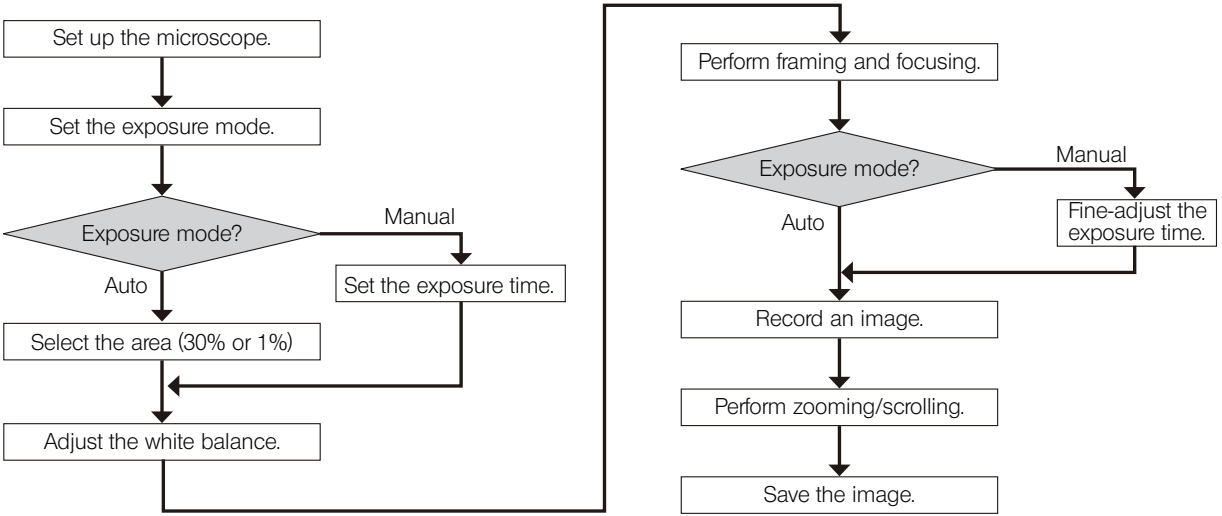
[DP2-TWAIN Download Site]

- For Life Science
  http://www.olympus.co.jp/jp/support/dl/bio-micro.cfm
- For Industrial Solutions
  http://www.olympus.co.jp/jp/support/dl/ind-micro-software.cfm

4-2 Image Recording Procedure

For detail use procedures, refer to the Instruction Manual or Help of Software you will use.

Brightfield Observation Flow



6 SPECIFICATIONS

Item		Specifications
System		C-mount CCD camera unit
Image pickup device	Size	2/3-inch color CCD
	Effective pixels	5.05 megapixels (total pixels 5.24 megapixels)
	Scanning method	Progressive scanning
	Color filters	RGB primary color on-chip filters
	Recording area	9.93(H) x 8.70(V) mm, diagonal length 11.016 mm
	Max. recording pixels	4.7 million pixels (2448 x 1920)
Camera mount		C-mount
ISO speeds		100, 200, 400
Metering method		Center 1%, Center 30% average metering
Exposure control		AUTO / MANUAL AE lock: Possible only during Auto Exposure. Exposure correction: ±2EV in 1/3 EV steps, possible only during Auto Exposure.
Exposure time		AUTO: 2 to 1/20,000 sec. MANUAL: 8 to 1/20,000 sec.
Image display speed (Frame rate)		Live image When using the camera cable attached with DP2-DKTB (1394b connection) 7 fps (Displayed pixels 2448x1920) 16 fps (Displayed pixels 1224x960) When using the camera cable attached with DP21-DKT and DP21-LPT (1394a connection) 3.5 fps (Displayed pixels 2448x1920) 14 fps (Displayed pixels 1224x960)

Item	Specifications
Input/output connectors	DC input: Main power supply Camera: IEEE 1394b
Image sizes, File formats	Dependent on compatible application
Applicable OS	Windows® 7 Ultimate / Professional (32bit / 64bit) Windows Vista® Ultimate / Business (32bitSP2) Windows® XP Professional (SP3 or after)
Power consumption (Camera head)	2.8W or less
Storage environment	-20 to 60°C 10% to 90% (without condensation)
Operating environment	• Indoor use. • Altitude: Max. 2000 meters • Ambient temperature: 5° to 35°C (41° to 95° F) • Relative humidity: 20% to 80% below 31°C (without condensation) • At 31°C or above, the operating environment humidity decreases linearly through 70% at 34°C (93°F), 60% at 37°C (99°F) to 50% relative humidity at 40°C (104°F). • Supply voltage fluctuations; ±10%. • Pollution degree: 2 (in accordance with IEC60664) • Installation/Overvoltage category: II (in accordance with IEC60664)

7 TROUBLESHOOTING GUIDE

Under certain conditions, the performance of the camera may be adversely affected by factors other than defects. 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 Olympus for assistance.

Problem	Cause	Remedy	Page
a) Camera head does not work.	The main switch of camera head is OFF.	Set the main switch of the camera head to ON.	12,16
	The AC adapter is connected improperly.	Connect the AC adapter correctly to the camera head and plug the power cord firmly into a power outlet.	15
	The camera cable is connected improperly.	Connect the camera cable correctly.	14
b) Nothing is displayed on the monitor.	The monitor is not ON.	Turn it ON.	–
	The display cable is connected improperly.	Connect the display cable correctly.	–
	The monitor resolution is set improperly.	Set the correct monitor resolution.	–

Problem	Cause	Remedy	Page
c) Live image is not displayed.	The camera cable is connected improperly.	Connect the camera cable correctly.	14
	The microscope illumination is off. The microscope is not set to the camera light path. The illumination or specimen focusing is adjusted improperly.	Turn on the microscope illumination, adjust the lighting and focusing correctly, and select the camera light path.	–
	The ISO speed or exposure time is set improperly.	Set the ISO speed, exposure mode, exposure time and level properly.	–
d) Still images cannot be recorded.	The DP2-TWAIN or cellSens is processing recording.	Wait until the recording processing completes before starting recording of the next image. In certain cases, it may be required to press the Cancel button on the status bar and record the image again.	–
	The cellSens is processing file save, etc.	Wait until processing completes before starting recording of the next image.	–
	The computer memory is insufficient.	Exit from other software before retrying recording. Save the images which you did not save.	–

Problem	Cause	Remedy	Page
e) Picture is too bright.	Exposure correction is set in the + direction.	Set the desired exposure correction value.	–
	The metering area is set to a dark area outside the region of interest.	Move the metering area to the area where you want to obtain optimum exposure.	–
	AE lock, which was set when the exposure time was longer than the currently required exposure time, is active.	Cancel AE lock.	–
	The input highlight level adjustment is too low.	Reset the current level adjustment and adjust the optimum level again.	–
	The microscope illumination is too bright.	Reduce the microscope illumination intensity or engage an ND filter to reduce brightness.	–
f) Picture is too dark.	Exposure correction is set in the − direction.	Set the desired exposure correction value.	–
	The metering area is set to a bright area outside the region of interest.	Move the metering area to the area where you want to obtain optimum exposure.	–
	AE lock, which was set when the exposure time was shorter than the currently required exposure time, is active.	Cancel AE lock.	–
	The output highlight level adjustment is too low.	Reset the current level adjustment and adjust the optimum level again.	–
	The microscope illumination is too dark.	Increase the microscope illumination intensity or disengage the existing ND filter to increase brightness.	–

Problem	Cause	Remedy	Page
g) The colors in the picture are strange.	The area selected in white balance adjustment was improper.	Select a white area as the rectangular white balance adjustment area.	–
	The RGB balance is adjusted improperly in manual white balance adjustment.	Perform manual white balance adjustment to adjust the RGB color balance to obtain optimum colors.	–
	The screen color setting of the computer is incorrect.	Set the computer display color to 24-bit color or higher. The recommended setting is 32-bit color.	–
h) The picture is not in focus.	The microscope is not focused properly.	Adjust the focus correctly with the fine adjustment knob.	–
	The parfocality is not adjusted properly.	Adjust parfocality with the camera adapter.	–
	The aperture iris diaphragm of the condenser is open too wide.	Close the aperture iris diaphragm a little.	–
	The field iris diaphragm is not set properly.	Adjust the field iris diaphragm until the image circumscribes the field of view.	–
	Lens components of the microscope are contaminated or the cover glass on the front of the camera is stained.	Clean the objective, photography lens, condenser and/or window lens of the microscope, or clean the cover glass on the bottom of the camera head.	9
	The microscope and/or camera are subjected to vibration during recording.	Record images in an environment in which the microscope and camera are not vibrated. It is effective to use an anti-vibration bench.	–

Problem	Cause	Remedy	Page
i) The DP2-TWAIN or cellSens window is not displayed correctly or the menu characters are not displayed correctly.	The resolution setting of the screen is incorrect.	Set the resolution setting at 1280 x 1024 or more in the properties of the screen.	–
	The large font has been selected for the font size of the screen.	Select a small font in the properties of the screen.	–
j) Another 1394 device cannot be used simultaneously.	The DP26-dedicated driver is installed.	When the DP26 is connected to a PC, other 1394 devices cannot be used on the same PC.	4,17

■ PROPER SELECTION OF THE POWER CORD

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

CAUTION **In case you use a non-approved power cord for Olympus products, Olympus can not warrant the electrical safety of the equipment.**

Specifications

Voltage rating	125V AC (for 100-120V AC area) or, 250V AC (for 220-240V AC area)
Current rating	6A 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 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 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, JQA, TÜV, UL Japan/METI	
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		U.S.A.	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. Prüstelle	‹VDE›	‹HAR›	30	10	10
Union Technique de l´Electricite´ (UTE)	USE	‹HAR›	30	10	30
Instituto Italiano del Marchio di Qualita´ (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)	SV, SVT, SJ or SJT, 3 X 18AWG
Canadian Standards Association (CSA)	SV, SVT, SJ or SJT, 3 X 18AWG

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2011 06-02