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Nikon

DIGITAL CAMERA DXM1200C
for Microscope

Hardware Instruction Manual

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Preface



Thank you very much for choosing Nikon.

This instruction manual presents the system configuration of the DXM1200C (digital camera for microscope) and explains how to attach the DXM1200C to your microscope and connect it to your PC. This manual also includes safety precautions you must observe to ensure safe operation. Be sure to read this manual for correct and safe operation of your DXM1200C.

For information on how to install the ACT-1 (DXM1200C application program) on your PC and use it, see the software instruction manual.

- No part of this manual may be reproduced without Nikon's permission.
- The content of this manual is subject to change without notice.
- Nikon has carefully prepared this manual. However, we make no expressed or implied warranty of any kind and assume no responsibility for such errors or omissions.
- Be sure to read the instruction manuals for the microscope and PC you plan to use with the DXM1200C.

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Safety Precautions

Your Nikon DXM1200C was designed with safety foremost in mind. However, improper use or failure to observe instructions may result in personal injury or property damage. Before attempting to operate your DXM1200C, read this manual thoroughly and become familiar with proper operation procedures. Keep this and related instruction manuals at hand for quick reference.

Warning and Caution Symbols Used in This Manual

This instruction manual uses the following symbols to warn of potential hazards. Pay special attention to all instructions having either of these symbols.

Warning	Disregarding instructions marked with this symbol may lead to death or serious injury.
Caution	Disregarding instructions marked with this symbol may lead to injury or property damage.

Warning

1. Application of the DXM1200C

Your DXM1200C was designed to capture and digitally process optical microscope images. Do not use it for any other purpose.

2. Do not disassemble the DXM1200C.

To prevent malfunction and electric shock, never disassemble any part of the DXM1200C unless you are explicitly directed to do so in this manual. Contact your distributor should you determine that the DXM1200C does not function properly.

3. Check the power source.

The DXM1200C is powered by your PC. Make sure that your PC meets relevant safety standards. Read your PC instruction manual.

Applicable safety standards:

Areas serviced by 120 VAC line: Underwriter's Laboratories (UL)
Areas serviced by 220 to 240 VAC line: TÜV, GS, etc.

4. Water or foreign objects

To avoid malfunction and risk of fire, keep water, liquids, and foreign objects well away from and out of your DXM1200C. Should the DXM1200C be splashed with water or foreign objects find their way into the DXM1200C, immediately shut down the PC, remove the power plug from the receptacle, and contact your distributor. Do not use the DXM1200C in this condition.

5. Cable care

For continued protection against fire, avoid rough handling of the cable. Do not twist it or bend it acutely.

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Caution

1. Installation location

The DXM1200C is a precision optical instrument. Failure to use or store it properly can result in malfunction or inaccuracy. Consider the following when choosing an installation location:

- Avoid bright room lighting and direct sunlight. Bright ambient light makes it difficult to obtain clear images from the microscope.
- Avoid dusty locations.
- Avoid subjecting the product to vibration. The DXM1200C is extremely sensitive to vibration. Vibrations during image capture may result in images of poor quality.
- Avoid high temperatures and humidity. Mildew or condensation on the lens will result in deteriorated performance or malfunction.

2. Shutting down the PC

Before assembling the DXM1200C system, connecting the cable or disconnecting it, be sure to shut down your PC to prevent malfunction.

3. Connectors

To prevent malfunction and accident, connect only specified equipment to the connectors provided on the camera and the interface board.

4. Precautions on assembly, installation, and storage

- Watch your fingers or hands. They may be pinched when installing the DXM1200C.
- To prevent malfunction, exercise caution when handling the DXM1200C. Never apply shock or vibration to it.
- If you do not intend to use it for extended periods, remove the interface cable from the camera connector and the interface board connector. Be sure to shut down your PC before removing the interface cable.

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1 System Configuration

See Chapter 2, Assembly, for instructions on assembling the DXM1200C system.

- Camera
- Interface board
- Interface cable
- PC

Use a PC that meets the following requirements. The performance of the camera varies depending on the performance of the PC.

Because of a compatibility problem, the system might not work correctly with some PCs. So, please use the Nikon recommended PC as much as possible. For the Nikon recommended PC, contact your nearest Nikon representative.

Hardware and Software Requirements

CPU:	Pentium 4　2 GHz or faster
RAM:	256 MB or greater memory space required
Hard disk:	100 MB or greater memory space required
Mother board:	PCI expansion slot space required
VRAM:	16 MB or greater memory space required
OS:	Windows 2000/XP (Japanese/English ver.)
Note)	Be sure to use one of the following: Windows 2000 (Japanese /English/Simplified Chinese ver.): Windows 2000 professional Service Pack 4 or later Windows XP (Japanese /English/Simplified Chinese ver.): Windows XP Professional Service Pack 2 or later
Note)	When a SCSI controller board is installed into the PC, the DXM1200C may not work correctly. In that case, remove the SCSI controller board from the PC.
Display monitor:	Minimum resolution and colors are 1024 x 768 pixels and 16.7 million colors. Recommended resolution and colors are 1280 x 1024 pixels or more and 16.7 million colors or more.

- Microscope
- C-mount adapter (optional)

The following C-mount adapters are available from Nikon.

- C-mount direct TV adapter
- 1X relay lens for ECLIPSE series + C-mount TV adapter
- C-mount TV adapter 0.6X
- C-0.7X DXM relay lens

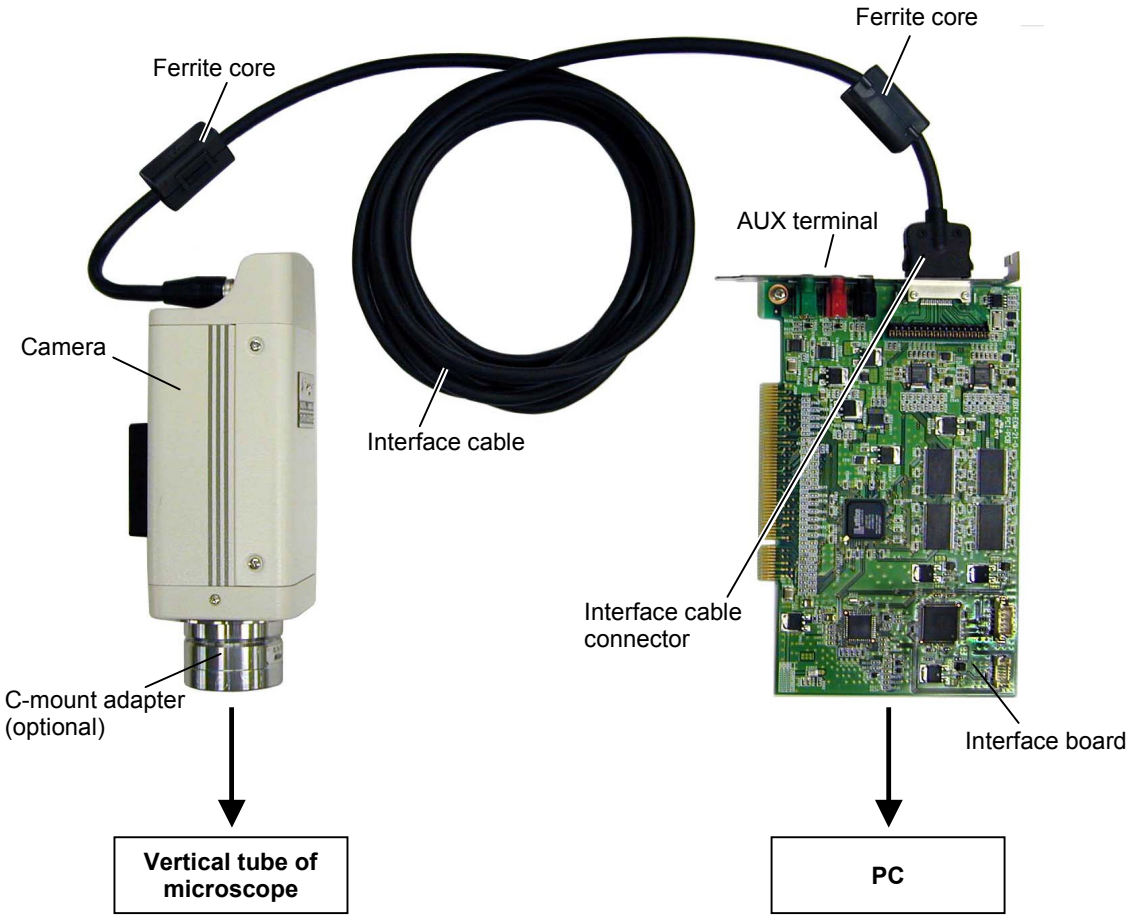
(If your microscope is not manufactured by Nikon, please consult the dealer from which you have purchased the microscope.)



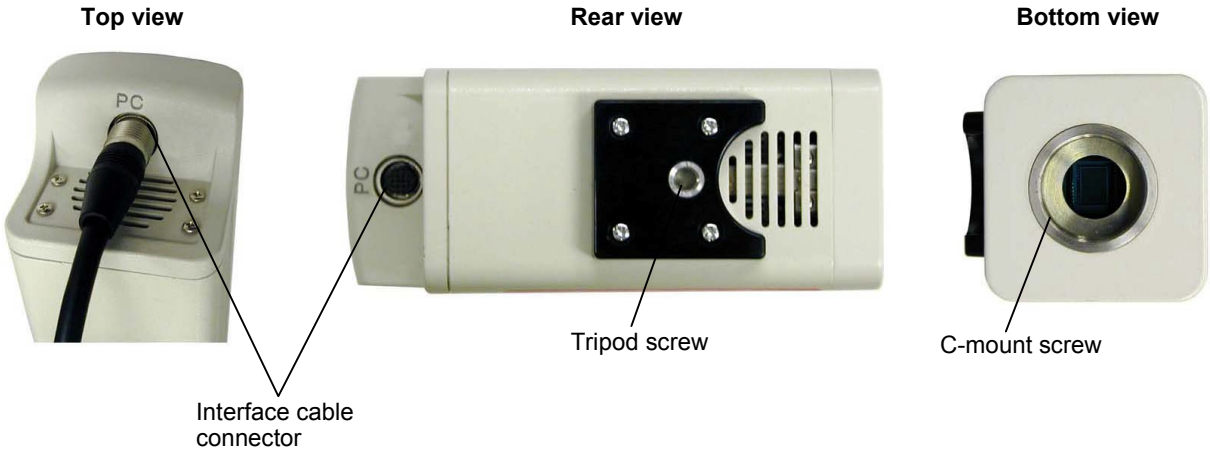
The interface board and camera of DXM1200C are incompatible with those of DXM1200 and DXM1200F.

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Overall Configuration



Camera



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2 Assembling

Before starting to assemble the DXM1200C system, read and observe the "Safety Precautions" provided earlier in this manual.

[Installation locations]

- Avoid bright room lighting and direct sunlight. Bright ambient light makes it difficult to obtain clear images from the microscope.
- Avoid dusty locations.
- Avoid subjecting the product to vibration. The surface must be level. The DXM1200C is extremely sensitive to vibration. Vibrations during image capture may result in images of poor quality.
- Avoid high temperatures and humidity. Mildew or condensation on the lens will result in deteriorated performance or malfunction.

[Required tools]

Screwdriver, allen wrench (supplied with the microscope)

1 Mounting the interface board in the PC

> Warning Remove the power cable from the power connector on the PC before mounting the interface board.

1. **Read your PC instruction manual** before mounting the interface board.
2. Remove and save the screws from the PCI slot. You will be using these screws later to secure the interface board.
3. Remove the cover from the PCI slot. Keep the cover for later use.
4. Carefully insert the interface board into the PCI slot. Avoid touching the motherboard and other components. Make sure the board is fully inserted.
5. Use screws removed from the cover to secure the interface board. The board may move when you tighten the screws, so hold the board level as you tighten them.
6. Fully insert the power cable into the power connector on the PC.

2 Attaching the C-mount adapter to the camera

1. Remove the protection sticker from the camera.
2. Check that the C-mount adapter is clean and free of dust.
3. Screw the adapter fully into the camera. Ensure the adapter bottoms on the end.

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3 Attaching the camera to the microscope

1. Insert the vertical tube sleeve of the C-mount adapter into the vertical tube on the microscope.
2. Use clamping screws to secure the sleeve and the tube.

4 Connecting the camera and the PC with the interface cable



Be sure to shut down the PC before starting this task.

Use the interface cable to connect the interface board connector and the connector on the camera.

5 Turning ON the PC power

Turn ON the power to your PC. When you start Windows for the first time after the interface board has been attached, “Windows has found new hardware, and is locating the software for it.” appears. At this time, install the interface board driver. See The DIGITAL CAMERA DXM1200C for Microscope — Software Instruction Manual for more information on installing the driver.

Supplementary information

The camera is powered by the PC via the interface board.

6 Installing the application program

See the DIGITAL CAMERA DXM1200C for Microscope — Software Instruction Manual for more information.

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3 Maintenance

Cleaning the lenses

Make sure that all lenses are clean and free from dust and fingerprints. A dirty lens filter can make it difficult to obtain clear images. If you find that lenses are dirty, follow the procedure below to clean them.

- Use a soft brush or blower to remove dust.
- If the lens is fingerprinted, dampen a soft and clean cotton cloth, lens tissue, or gauze with absolute alcohol (methyl or ethyl alcohol) and wipe the lens surface.
- Absolute alcohol and benzene are highly volatile and must be handled carefully. Keep sources of fire or flame well away while using them. Do not operate the power switch while handling them.

Cleaning painted sections

Never use solvents such as alcohol, ether, or paint thinner to clean painted, plastic, or printed areas. These solvents will damage or discolor finished and painted surfaces and erase panel markings. Nikon recommends silicone-based cleaners for cleaning.

Storage

- Shut down your PC if you do not intend to use the DXM1200C for a while.
- If you do not plan to use the DXM1200C for an extended period, remove the interface cable from the camera connector and the interface board connector. Be sure to shut down your PC before removing the interface cable.
- Store the DXM1200C in a dry, mildew-free place.
- Cover the DXM1200C to protect it against dust.

Regular inspection

To ensure a constant high level of performance, we recommend that you have the DXM1200C inspected on a regular basis. Ask your distributor about a regular inspection contract.

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4 Electrical Specifications

Type	CCD shift mechanism single device color camera	
CCD	Image size	Diagonal 11 mm (type-2/3)
	Readout method	Progressive scan
	Number of effective pixels	1392 × 1040 (about 1.45 Mega pixels)
	Unit cell size	6.45 μm × 6.45 μm square pixel
	Color filter	RGB primary color filter, Bayer array
Cooling method	Peltier device and fan cooling（-20℃ max against non-cooling）	
Number of recording pixels	Fine mode	12.6 Mega pixels or less 4116 x 3072
	Quick mode	1.4 Mega pixels or less 1372 x 1024
A/D converter	RGB 12bit each	
Lens mount	C mount	
Sensitivity	NORM (Equivalent to ISO320) / HIGH (Equivalent to ISO640) / MAX (Equivalent to ISO1250)	
Tone setting	0.3 / 0.45Normal / 0.7 / 1.0Linear	
Exposure time	1/16000 sec. to 60 sec.	
Automatic exposure	Photometry area	The size and the position can be arbitrarily set.
	Operation mode	Continuous mode or one-push mode
	Exposure correction	±8 stages
Image record format	BMP, JPG, TIFF (non-compression), JPEG2000 (loss-less compression)	
Orientation of image	Right and left reversing, Upper and lower reversing, CW/CCW 90 degree rotation	
Frame rate for motion pictures	15 frames or less/second (686×512 pixels mode)	
PC Interface	PCI bus	
External trigger input	3.5 mm mini jack, TTL level	
Operating system	Windows XP Professional / Windows 2000 Professional	
External dimensions and weight	Camera head	56 (W) x 56 (D) x 138 (H) mm (Protrusion parts are excluded.) Approx. 600g
	I/F board	107 x 176 (Protrusion parts are excluded.)
	Camera connection cable	Cable length: Approx. 3.0 m
Input power supply	5VDC 0.4A, 12VDC 0.4A (Powered through the PCI bus on the PC)	
Electric shock protection	Protection class	Class III

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Safety standards	This product meets EU Low Voltage Directive requirements. This product meets EU EMC Directive requirements.(EN61326) This is UL-listed product. (UL61010-1) This product meets FCC Part 15B Class A requirements. 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.	
Operating conditions	Temperature	0°C to 40°C
	Humidity	85% RH max. (no condensation)
	Altitude	2000 m max.
	Degree of pollution	Degree2
Storage conditions	Temperature	-20°C to 60°C
	Humidity	90% RH max. (no condensation)

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