Digital Camera System for Microscopy

DIGITAL SIGHT
The Choice is Yours
– A perfect digital solution for your requirements

Nikon has developed a comprehensive range of digital camera systems that are optimized for capturing microscopic images of superb quality. The 5 types of camera heads and 2 types of control units all function seamlessly together, providing the ultimate in flexibility to configure the perfect digital system for many applications. The Digital Sight series provides the solution for a variety of applications, from industrial to biological use, and from high-level research to simple capture of inspection results.

Recommended camera heads for general observation

These camera heads can be deployed in a broad range of illumination techniques, including bright-field, darkfield, phase contrast and Nomarski DIC (differential interference contrast).

Recommended camera heads for fluorescence and ultra low light observations

These cameras are ideal for darkfield and fluorescence samples. Incorporating a Peltier cooling mechanism, cooled types are able to greatly reduce the thermal noise that can be generated from long time exposures.

DS-2MBW
DS-2MBWc

High-sensitivity imaging

The 2MBWc incorporates a Peltier cooling mechanism that minimizes thermal noise. Its 2-megapixel monochrome CCD boasts a sensitivity rating five times greater than that of previous models, resulting in a shortened total exposure time and reduced fading, and allowing the realization of high frame rate.

DS-2MBW
DS-2MBWc

DS-5M
DS-5Mc

High speed

DS-5M incorporates a 5-megapixel color CCD that offers a high-resolution image size of 2560x1920 pixels. It is ideal for acquiring detailed microscopic images under a variety of illumination techniques, including bright-field, phase contrast and DIC.

High resolution

DS-2MBWc
DS-2MBW

Captures true to life images

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DS-2MBWc
DS-2MBW

For extremely clear color fluorescence images

With its built-in Peltier cooling mechanism, the temperature of the 5-megapixel color CCD can be maintained at 20 °C below room temperature. Thermal noise is thus greatly reduced during long time exposure.

DS-2MBWc
DS-2MBW

DS-5M
DS-5Mc

DS-2Mv

Smooth and comfortable live images

Incorporates a 2-megapixel color CCD that can smoothly display SXGA live motion images at 15 fps*1 (max. 30 fps). A well balanced camera head that enables display of live images and capture of high definition images.

*1 Using the DS-L1, with output to an external monitor.

DS-2MBWc
DS-2MBW

DS-5M
DS-5Mc

DS-2Mv

DS-5M

The Digital Sight series provides the solution for a variety of applications, from industrial to biological use, and from high-level research to simple capture of inspection results.
Stand-alone camera control unit

**DS-L1**

A stand-alone control unit incorporating a large, high-definition monitor, offering easy operation and useful functionality.

- **Stand-alone type**
  - Does not require a PC or an external monitor.

- **Type LCD monitor**
  - XGA (1024x768) screen resolution, which allows simple, fast and accurate focusing without the need to enlarge the image.

- **On-screen menus**
  - Intuitive, intuitive menu-based operation allows for simple set-up and capture.

- **Scene mode for one-click optimal photography**
  - Using Nikon’s experience with digital imaging, optimal pre-programmed imaging modes have been made available as menus, including preset camera conditions according to the sample types and illumination techniques used. Optimal images can be captured with a simple click. Users can also customize settings and save up to seven of these modes for quick retrieval.

- **Excellent output options**
  - In addition to saving to a Compact Flash™ card, the unit offers these output options:
    - Analog RGB output
    - Direct printing (using PictBridge)
    - USB Mass Storage Class
    - Network connectivity

- **A wide variety of tool functions**
  - Measurement tools
    - Distance measurement
      - Easily measures the distance between any two points specified by the user.
    - Vertical / horizontal measurement
      - Easily measures the distance between two horizontal and two vertical lines.
  - Screen patterns
    - Cross line and concentric circle patterns can be displayed.
  - Count marking
    - Up to 99 serial numbers per color can be marked to provide a convenient way to identify points of interest on-screen. They can be easily saved and printed with the image.
  - Scale display
    - XY scale display
    - Point to line distance
    - Circular measurement (displays diameter, circumference, center of gravity)
    - Angle
  - Other useful tools
    - Two-screen split display
      - A frozen image can be displayed alongside the live image for easy comparison.
    - Text input, line and figure drawing
    - Thumbnail image display
    - Superimpose function
    - Histogram
    - Focus indicator
    - Digital zoom
    - Log text saving
    - Internal exposure

- **Expanded functionality provided by external connectivity**
  - **Network functionality**
    - A 10/100Base-TX compatible Ethernet port is provided. By using an FTP client and HTTP/FTP/Telnet server functionality, it is possible to transmit images to a network or remotely control the camera from a network.
  - **Direct Print function (option)**
    - The Real 10 mode is selectable with a dedicated Mitsubishi CP900DW. With this mode it is possible to print with a device magnification of 10x for easy confirmation of sample size.
  - **PictBridge**
    - It is possible to print directly without a computer using a PictBridge compatible printer and USB connection.
  - **Interactive control of microscope and camera (option)**
    - In combination with the ECLIPSE 90i motorized microscope, it is possible to control the 90i from the DS-L1 menu and to automatically detect and record the microscope status data with the image, including the objective magnification and fluorescence filter in use. Automatic detection of status is also possible when combined with the ECLIPSE 80i microscope configured with a digital imaging head.

**Example of the microscope control menu**

**Network functionality**

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**Example of the microscope control menu**
Single cable connection to a PC via USB2.0 interface. Extremely versatile imaging software that is easy to operate, and has a wealth of functions to suit almost any needs.

This compact control unit can be connected quickly to a Windows® based PC via its USB2.0 interface, without the need for a separate PCI board. Connects to a PC via USB2.0 interface (USB2.0 offers both wide compatibility and high data transfer speeds), which enables camera control and live image display at high speeds on a monitor.

Two USB ports are provided. Connects to a PC via USB2.0 interface, without the need for a separate PCI board.

Extremely versatile imaging software that is easy to operate, for straightforward operations.

Tool bar:
- Frequently used menu items are displayed as buttons
- Live image screen
- Captured image screen
- Display of the captured image
- Properties dialog box
- For display/alteration of the camera’s current settings
- Image thumbnails
- Capture window
- Basic image capture control window
- Scence function for one-click optimal photography

A variety of screen layouts

The configuration offers a standard screen layout and advanced layouts with a high degree of image analysis functionality. Each layout can be customized according to need.

Standard Layout, for straightforward operations

1. Tool bar
2. Live image screen
3. Captured image screen
4. Properties dialog box
5. Image thumbnails
6. Capture window

Advanced Layout, adding useful functions

1. Toolbox
2. Process view window

Analysis of focus, profile and histogram
Displays analytical settings for control and focus

Interactive control of the microscope and camera

In combination with the ECLIPSE 90i motorized microscope, it is possible to control the 90i from the ACT-2U menu and to automatically detect and record the microscope status data with the image, including the objective magnification and fluorescence filter in use. Automatic detection of status is also possible when combined with the ECLIPSE 80i microscope configured with a digital imaging head.

A variety of measurement tools

Superimposition using the Merge function

It is easy to produce merged images of multilayered fluorescence samples using monochrome photography. When you acquire images after initially setting the number of layers and display colors for each reagent, colored images will be automatically displayed. By changing the wavelength for each acquisition, this function easily allows a superimposed image to be produced.

Scene mode for one-click optimal photography

Scene function for one-click optimal photography

Settings box, which allows detailed access from ACT-2U.

Image thumbnail window

Layout customizing window

Settings box, which allows detailed access from the standard and advanced layout.
For industrial applications

DS-2Mv-L1+SMZ1000

Stand-alone type that offers high frame rate for real-time observation
- Maximum frame rate of 30 fps enables the system to be optimized for live observation.
- Stand-alone type featuring an XGA 6.3 type TFT monitor. Observation on a larger screen is possible with an analog RGB output function.
- Images can be saved to the CF card simply by clicking the capture button.

DS-2Mv-U1+Module Microscope

PC-based system that utilizes multi-functional imaging software
- The system is controlled by a PC via a USB2.0 connection.
- ACT-2U imaging software enables the display of smooth and easy-to-see live images as well as image acquisition, processing, analysis and simple measurements via a PC.

DS-5M-L1+Module Microscope

High definition stand-alone type with network functions
- Incorporates a high-resolution 5-megapixel CCD, with a capture size of 2560x1920 pixels, true-to-life images can be captured with ease.
- The camera control unit is equipped with a high-resolution XGA TFT LCD monitor for live image viewing.
- Ethernet-based network functionality is built in. Images can be saved on any given server as well as on the CF card.

For biological applications

DS-2MBWc-U1+ECLIPSE TS2000

Offers image display and capture for low light florescence.
- A single cable connection via USB interface is possible from the control unit to a PC and the Eclipse 90i microscope. Since the 90i can be controlled from the ACT-2U imaging software, the operation of the microscope can be linked with image recording. Auto-focus image capture during bright-field microscopy is possible, utilizing the image contrast data detected by the camera.

DS-5Mc-U1+ECLIPSE 50i

Offering the potential for integrated control of the camera and microscope

DS-2Mv-L1+ECLIPSE 80i

Delivering both smooth, live motion images and beautiful captured images
- Thanks to the high-frame-rate, 2-megapixel CCD camera, the movement of live images is extremely smooth. Live images can be viewed on the large LCD monitor built into the control unit.

DS-5M-L1+ECLIPSE 50i

For easy image capture without a PC
- This stand-alone control unit, which does not require connection to a PC, is a real space saver. Camera conditions most appropriate to the illumination techniques used can be chosen from a menu, allowing anybody to easily capture beautiful images.

DS-2MBWL1+ECLIPSE TS100F

A reasonably priced monochrome configuration
- Easily takes high contrast monochrome images in observations such as phase contrast and DIC. Using a high frame rate camera, live motion can be quickly and easily confirmed.
**System Diagram**

**Specifications**

**Camera Heads**
- DS-2MBW / DS-2MB / DS-2My
- DS-SM / DS-SMv

**DS-2MBW/DS-2MB / DS-2My**
- **Power Consumption:** 1110VA
- **Dimensions:** 180.5 (W) x 144.5 (D) x 68.4 (H) mm
- **Weight:** approx. 260g

**DS-SM / DS-SMv**
- **Power Consumption:** 43VA
- **Dimensions:** 91.0 (W) x 76.0 (D) x 41.0 (H) mm
- **Weight:** approx. 290g

**Camera Control Units**
- **DS-U1 / DS-L1**
- **Power Consumption:** 138VA
- **Dimensions:** 203 (W) x 77 (D) x 204 (H) mm
- **Weight:** approx. 1300g

**ACT-2U Imaging Software System Requirements**
- **Operating System:**
  - Windows® 2000 Professional (SP4 or later, English or Japanese)
  - Windows® XP Professional (English or Japanese), pre-installed versions only
- **CPU:**
  - Pentium® 4, 1.7GHz or faster (Pentium® 4, 2.4GHz or faster recommended)
- **RAM:** 1GB or more
- **Hard Disk:**
  - 128MB, 3GB or more (Windows® 2000 Professional), 16GB or more (Windows® XP Professional)
- **Interface:**
  - USB2.0: 2 ports
  - USB Keyboard connection
  - USB Host port (USB mouse, USB device port (Mass Storage Class support), USB device port (computer control connector), USB boot port microscoope connection, USB boot port (USB mouse, USB keyboard connection)

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TO ENSURE CORRECT USAGE, READ THE CORRESPONDING MANUALS CAREFULLY BEFORE USING THE EQUIPMENT.

NIKON CORPORATION
Fuji Bldg., 2-3, Marunouchi 3-chome, Chiyoda-ku,
Tokyo 100-8331, Japan
www.nikon.com/

NIKON INSTECH CO., LTD.
Parle Mitsui Bldg., 8, Higashida-cho, Kawasaki-ku,
Kawasaki, Kanagawa 210-0005, Japan
Phone: +81-44-223-2175(industrial dept.)
+81-44-223-2167(biological dept.), fax: +81-44-223-2182
www.nikon-instruments.jp/eng/

NIKON INSTRUMENTS (SHANGHAI) CO., LTD.
(Shanghai office)
China: phone: +86-10-5869-2255, fax: +86-10-5869-2277

NIKON SINGAPORE PTE LTD
SINGAPORE: phone: +65-6559-3618, fax: +65-6559-3688

NIKON MALAYSIA SDN. BHD.
MALAYSIA: phone: +60-3-78763887, fax: +60-3-78763387

NIKON INSTRUMENTS KOREA CO., LTD.
KOREA: phone: +82-2-2186-8410, fax: +82-2-555-4415

NIKON INSTRUMENTS EUROPE B.V.
Schiploekweg 121, 1171PL Badhoevedorp, NL
Phone: +31-20-44-96-222, fax: +31-20-44-96-298
www.nikon-instruments.com/

NIKON FRANCE S.A.S.
FRANCE: phone: +33-1-45-16-45-16, fax: +33-1-45-16-00-33

NIKON GMBH
GERMANY: phone: +49-211-9414-0, fax: +49-211-9414-322

NIKON INSTRUMENTS S.p.A.

NIKON AG

NIKON UK LTD.
UNITED KINGDOM: phone: +44-20-8541-4440, fax: +44-20-8541-4584

NIKON CORPORATION
Fuji Bldg., 2-3, Marunouchi 3-chome, Chiyoda-ku,
Tokyo 100-8331, Japan

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