Introducing a new all-in-one, high-definition model in the Nikon Digital Sight series.

The new Digital Sight 10 makes possible the switching of color and monochrome images at the high image quality of 23.9-megapixel (6K). Choose the ideal microscope camera to suit every application, including the Digital Sight 1000, which directly displays microscope images on a full HD display without a PC, and the DS-Qi2, a monochrome high-sensitivity model suited to fluorescence photography.

Attention: All the examples in this page are images for research. We do not guarantee clinical use.

Four camera options covering two computing platforms

**Microscope Camera**

**Digital Sight 1000**

- Frame rate: 30fps (1920×1080)
- Max recordable pixels: 1920×1080
- C-Mount

**Microscope Camera**

**DS-Fi3**

- Frame rate: 15fps (2880×2048), 30fps (1440×1024)
- Max recordable pixels: 2880×2048
- C-Mount

**Microscope Camera**

**Digital Sight 10**

- Frame rate: 9fps (6000×3984), 66fps (1920×1080)
- Max recordable pixels: 6000×3984
- F-Mount

**Monochrome Microscope Camera**

**DS-Qi2**

- Frame rate: 6fps (4908×3264), 45fps (1636×1088)
- Max recordable pixels: 4908×3264
- F-Mount

**Using a tablet PC**

**Using a desktop PC**

**Imaging software**

**NIS-Elements**

- Only NIS-Elements F is compatible with Digital Sight 1000.

**Full HD images**

Equipped with a 2 megapixel CMOS image sensor, the Digital Sight 1000 can display, capture and save full HD, 1920x1080 pixel images at 30 frames / second.

**Stand-alone mode**

By connecting a Full HD display and a mouse, the Digital Sight 1000 can be used without a PC, conserving bench space. Captured images and videos can be saved directly to an SD card which is inserted into the camera. Users can easily display scale bars, measure areas and calculate distances between two points.

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Camera Control

Superior color reproduction

Nikon is well-known for outstanding and lifelike color reproduction, and developing superior algorithms for creating results that look like the actual samples. These algorithms are used in all of the color cameras in the digital sight lineup.

High-speed live display

Fast USB3.0 data transfer means fast, smooth live updating of images for finding samples or focusing, even at full resolution.

High-resolution images

A CMOS high density 5.9 megapixel sensor produces high resolution images. USB3.0 data transfer allows fast focusing at high resolution, and easy capture images in all types of observation methods such as brightfield, differential interference contrast, and phase contrast.

High sensitivity, low noise

Quantum efficiency and read noise have been greatly improved, providing better capability for acquisition of fluorescent images with better signal-to-noise ratios than before.

Microscope Camera

DS-Fi3

DS-Fi3 interfaces with PC via a USB3.0 interface directly to the camera head, and uses NIS-Elements series software for image acquisition.

Breast cancer, FISH method (Objective: CFI Plan Apochromat Lambda 100X Oil)
Photos courtesy of: Hiroko Kuskari, Diagnostic Pathology, St. Marianna University Hospital

Uterine cervix Pap. Staining (Objective: CFI Plan Apochromat Lambda 40X C)
Photos courtesy of: Kazuhiro Mita, Department of Pathology, Yokohama City University Hospital

Bone marrow (Objective: CFI Plan Achromat NCG 40X)
Photos courtesy of: Clinical Laboratory Department, Yokohama City University Hospital

Tubular adenoma, HE staining (Objective: CFI Plan Apochromat Lambda 4X)
Photos courtesy of: Dr. Yasunori Ohta, Department of Pathology, IMSUT Hospital, Institute of Medical Science, The University of Tokyo
Equipped with CMOS sensor technologies for Nikon’s DSLR cameras.

Digital Sight 10 / DS-Qi2 high-definition cameras

The Nikon FX format CMOS image sensor enables instantaneous capture of images in high definition. Digital Sight 10 allows the unprecedented high resolution of 6K and switching color and monochrome capture with a single camera. This high-performance model also features a high frame rate for fast focusing on high-definition images.

Digital Sight 10

Freely switch between color and monochrome at 23.9 megapixels

High pixel density, high sensitivity and low noise are key features of the DS-Qi2 monochrome camera.

Large Format CMOS image sensors

Nikon manufactures CMOS image sensors and imaging technologies for professional DSLR cameras, and has optimized our sensors for microscopy.

*BPAE Fluorescent Stain Specimen Nikon Standard Sample: DIC (Left) and Fluorescence (Right) Nucleus (DAPI), Actine (FITC), Mitochondria (MitoTracker RedFM)

Sample courtesy of Michael Davidson, National High Magnetic Field Laboratory, Florida State University

Pig kidney epithelial cells expressing GFP-EB3 tubulin

Sample courtesy of Michael Davidson, National High Magnetic Field Laboratory, Florida State University
Covers a wide field of view with 6K ultra-high Definition. Achieves efficient, one-shot image capture.

Observation with a wide field of view
A full-frame CMOS image sensor for instantaneous one-shot image capture of wide areas
A 25 mm field of view (FOV), possible in combination with inverted microscopes, and upright microscopes, enabling the capture of images over a wider area in one shot. Tiled images can be created efficiently, cutting the time required for screening.

*Upright microscopes are supported only by the Ni series (brightfield).

High-definition observation
Easily capture fine details with 6K pixel resolution and high image quality
Microscopic images can be captured at up to 6000 x 3984 pixels (23.9 megapixels), ideal for image analysis and observation of fine structures.

Digital Sight 10

Fast live display
A frame rate that captures moving samples at the perfect instant
Digital Sight 10 is capable of live display of 6000 x 3984 pixel (23.9-megapixel) images at 9 frames/second or 1020 x 1080 pixel (2.1-megapixel) images at 66 frames/second. Fine focusing is easy and stress-free. By using the ROI mode, it is possible to shoot only any place at a higher speed.

High sensitivity and low noise
Ideal for fluorescence observation requiring a wide field of view and high definition
Digital Sight 10 achieves high sensitivity equivalent to ISO 200 in color mode and ISO 800 in monochrome mode. Clear fluorescence observation with a high signal-to-noise ratio is possible in both monochrome and color image acquisition.

Photo courtesy of: Nichirei Biosciences Inc.

Kidney tissue
(WGA: 488)
(Objective: CFI Plan Apochromat VC 20X)

Stomach, SMA staining,
(Tx/A2 stain)
(Objective: CFI Plan Apochromat 40XC)

Photo courtesy of: St. Marianna University Hospital
Digital Sight 10

For discriminating fine structures

For 3D imaging

For model organisms

High-definition capture in both color and monochrome. Ready for use in a wider range of observation scenarios.

Color shooting and Monochrome shooting are possible with one unit

During manual operation

<table>
<thead>
<tr>
<th>Color mode</th>
<th>Monochrome mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>When inserting the color filter</td>
<td>Can shoot 400 to 680 nm in color</td>
</tr>
<tr>
<td>When detaching the color filter</td>
<td>Capable of shooting 400 to 850 nm in Monochrome</td>
</tr>
</tbody>
</table>

*Replace with monochrome IR filter

Electric switching function

During electronic operation (using the 1x electronic adapter)

Easy color mode switching, either manually or electronically

Digital Sight 10 makes it possible to easily switch the color mode either electronically or manually by using specialized imaging software for electronic switching or attaching/detaching filters to the slot at the bottom of the microscope camera for manual switching.

Achieves consistent shooting with a single sensor

A convenient all-in-one camera for multiple observation applications

A single sensor captures both color and monochrome images, for consistent appearance even when switching color mode. Easy image acquisition is possible without the hassle of using different cameras.

Digital Sight 10’s monochrome mode supports near-infrared (700 nm–) fluorescence image capture, normally difficult to achieve with conventional color cameras. As fluorescence sensitivity extends to the NIR region, this camera is suited to fluorescence image capture of thick samples and samples with weak photo toxicity.

Kidney cancer, Vimentin staining (Objective: CFI Plan Apochromat Lambda D 20X)

Photo courtesy of: Nichirei Biosciences Inc.

Blurring and color bleeding are low even to the periphery, for images that are clear even when enlarged. ECLIPSE Ni supports everyday observation and inspection of samples with high resolution and high color fidelity.

Mouse neuron (Objective: CFI Plan Apochromat Lambda D 40X)

From deblurred images of 18 μm thickness every 0.2 μm. Image processed with Clarify.ai

ECLIPSE Ti2 takes advantage of a wide field of view (field number 25) to achieve high throughput even when capturing 3D or other large-size data. Combined with image processing, it enables the capture of clear images with a higher signal-to-noise ratio, even deep into subjects.

Zebrafish larva (brightfield/myocardium GFP) (Objective: SHR Plan Apo 2X)

Photo courtesy of: Dr. Hiroyuki Nakajima, National Cerebral and Cardiovascular Center

SMZ25/18 offers high definition at high frame rates. Capture perfect, bright images without missing high-speed biological reactions. Low noise makes this system ideal for time lapse imaging.
Capture Low light fluorescence and Large Fields of View

Monochrome Microscope Camera

DS-Qi2

16.25 megapixel  Monochrome Cooled

High sensitivity
Detects even faint fluorescent signals
7.3 μm pixels, high quantum efficiency, and very low read noise allow the DS-Qi2 to read in even faint fluorescent signals.

Excellent linearity
Reliable quantitative analysis made possible
With a linearity error of ±1%, the DS-Qi2 is a superb tool for measuring intensities in fluorescence samples, including time-based intensity measurement and ratiometric measurement.

High frame rate
Fast focusing, even with fluorescent images
With a high-sensitivity CMOS image sensor and USB 3.0-based data transfer, the DS-Qi2 enables high-speed live imaging and image capture at up to 45 fps (1636×1088 pixels).

Low noise
Acquires dim fluorescent signals with ultra-low noise
Both 2.2 electrons read noise coupled with a large full-well capacity and 0.6 electrons dark current allow the acquisition of 14bit fluorescence images with very little noise.

Time-lapse photography
Fluorescent time-lapse imaging through integration with NIS-Elements software
With a large field of view and pixel density, and low noise, the DS-Qi2 is ideal for time-resolved imaging applications.
Integration with the comprehensive imaging software series

Nikon uses the NIS-Elements series as control software. NIS-Elements allows functions from basic imaging to control of the microscope and peripheral devices to be performed, as well as the measurement, analysis, and management of acquired images. Four basic packages and a variety of optional modules are available to suit every application and objective.

**Free package**
The bundled free package offers functions for the display of scale on live images, full-screen display, and more. The simple operation screen makes shooting easy.

**Documentation package**
The documentation package is equipped with measurement and report creation functions. It enables general microscopic image acquisition in fields from biomedical to industrial, and is expandable through optional added features such as EDF and databases.

**Research package**
The research package enables the construction of advanced image acquisition systems, including multidimensional imaging (up to 4 dimensions for Br, 6 dimensions for Ar), through integration with systemized microscopes. Sets equipped with a rich range of image processing and analysis functions are available for every application.

**Multichannel (Multi Color)**
NIS-Elements can acquire full bit depth multi-color images, combining multiple fluorescence wavelengths and different illumination methods (DIC, phase contrast etc.), while offering independently scalable channels.

**Z-series**
Through motorized focus control, NIS-Elements reconstructs and renders 3D images from multiple Z-axis planes.

**Multi-dimensional Image Display**
NIS-Elements displays time lapse, multi-channel, multiple X, Y, Z positions in an intuitive layout, which allows for automatic playback and the ability to select subsections of the data to be saved as a new file.

**HDR (High Dynamic Range) image acquisition**
HDR creates an image with appropriate brightness in both the dark and bright regions in a sample by combining multiple images acquired with different exposure settings. It is also possible to create HDR image using multiple captured images.

**Area** is underexposed
**Area** is overexposed
Captures both areas  and  with optimal exposure

**Manual measurement and image annotation**
Manual measurement allows easy measurement of length and area by drawing lines or an object directly on the image. The results can be attached to the image, and also exported as text or to an Excel spreadsheet.

**Auto measurement (Object Counting)**
Performs binarization on images using previously set thresholds to measure the number, area, brightness, etc. of identified objects.

**Classifier**
Object classifier uses objects identified by thresholding along with additional features such as shape factors, and other statistical methods including nearest neighbor and neural networks for classifying objects into multiple categories. It is also possible to teach the module based on interactive ‘picking’ of image pixels.

**Pixel Classifier**
This function classifies each pixel in the image with RGB/HIS and intensity across the whole image. Results are reported in percentage and it is possible to save and reuse parameters across a large sample of images. Multiple binary layers are also displayed with multiple colors on the image and are available with other analysis tools within the software package.

**EDF (Extended Depth of Focus)**
Creates a single, all-in-focus image from images of differing focus. Such images can now be created by simply turning the focus knob.

**Image stitching (Large Image)**
Stitches together images from multiple fields of view during shooting to create an image with wide field of view. Images already acquired can also be stitched together.

**Compatible OS:** Windows® 10 Pro (32/64-bit version), NIS-Elements 4R is only compatible with the 64-bit version.

* For information about compatible desktop PCs, contact Nikon.

For more information on available packages and optional modules, please contact Nikon.
Image processing software for even clearer 3D imaging

Nikon’s image processing software is able to quickly and efficiently create vivid images from images rendered indistinct by light from other than the focal plane.

Deconvolution

3D deconvolution

D deconvolution enhances image quality by removing blur from captured fluorescence images. It returns the blurred light component to its source location to prevent reduction in intensity caused by deconvolution, and can be applied to quantitative analysis. The algorithm can be selected to match the observation method, to handle fluorescence images, confocal images, and more.

2D deconvolution

2D deconvolution is an algorithm capable of processing even live images. It can remove blurred light with high accuracy from live images and time-lapse images in the XY dimensions only.

Consistently clear and high-contrast images through AI and microimaging

Clarity.ai (NIS.ai series) is a deep-learning-based AI module included with the 3D deconvolution function (optional). By removing blurred light contained in fluorescence images and automatically generating high-contrast, high-signal-to-noise images at high speed, Clarity.ai lets anyone easily acquire fluorescence images free from blurring and with greater sharpness than in the past.

Effective imaging of thick samples

Clear, blur-free images can be captured even during observation of thick samples such as model organisms, tissue sections, and three-dimensional cultures, in which fluorescent signals can become buried in blurred light.

Objective lenses that achieve even higher image quality

Use with the newly developed Plan Apochromat Lambda D series of objective lenses enables the acquisition of even higher quality images.

NIS-Elements Ar specialized option

AI module for microscopy

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Scene mode

Ten camera setting patterns for optimal color reproduction and contrast for each microscope light source, observation method and type of sample, as well as custom settings, can be selected. (Available with DS-Fi3/Digital Sight 10 microscope cameras)

Biological Scene Mode

- Brightfield
- LED-Brightfield
- Asbestos
- ELISA

Scene mode

A wide variety of tools

NIS-Elements L enables the conducting of simple measurements on images, with input of lines and comments. These can also be written onto and saved with the image, and measurement data can be output.

Measurement function

- Line distance
- Area
- Circle
- Circle distance
- Pitch distance
- Angle

Annotate function

- Line
- Arrow
- Text
- Marker
- Polyline

Graticule/scale function

- Crosshairs
- Simple crosshairs
- Circle

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Specifications

<table>
<thead>
<tr>
<th>Model name</th>
<th>Digital Sight 1000</th>
<th>DS-Fi3</th>
<th>Digital Sight 10</th>
<th>DS-Qi2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Image sensor</td>
<td>1/2.8 inch Color CMOS image sensor</td>
<td>1/1.8 inch Nikon FX-format Color CMOS image sensor</td>
<td>1/1.8 inch Nikon FX-format Color CMOS image sensor</td>
<td>1/1.8 inch Nikon FX-format Monochrome CMOS image sensor</td>
</tr>
<tr>
<td>Size</td>
<td>5.57 × 3.13 mm</td>
<td>6.91 × 4.92 mm</td>
<td>35.8 × 23.8 mm</td>
<td>36.0 × 23.9 mm</td>
</tr>
<tr>
<td>Recordable pixels</td>
<td>1920 × 1080 pixels</td>
<td>2880 × 2048 pixels</td>
<td>4908 × 3264 pixels</td>
<td>6000 × 3984 pixels</td>
</tr>
<tr>
<td>Vertical and 2 horizontal pixels</td>
<td>3 × 3 pixels average: 1636 × 1088</td>
<td>3 × 3 pixels average: 1440 × 1024</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lens mount</td>
<td>C-mount</td>
<td>F-mount</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooling method</td>
<td>Electronic cooling</td>
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<td></td>
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<tr>
<td>ISO sensitivity</td>
<td>Standard: equivalent to ISO 150</td>
<td>Standard: equivalent to ISO 50</td>
<td>Standard: equivalent to ISO 800</td>
<td>Standard: equivalent to ISO 50 (monochrome mode)</td>
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<tr>
<td>Quantum efficiency</td>
<td>77%</td>
<td></td>
<td></td>
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<tr>
<td>Full well Capacity</td>
<td>60000e⁻ typ.</td>
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<tr>
<td>Readout noise</td>
<td>2.2e⁻ typ.</td>
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<tr>
<td>Dark current</td>
<td>0.6e⁻/p/s (Ta=25°C) typ.</td>
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<tr>
<td>Exposure time</td>
<td>1 m sec ~ 10 sec</td>
<td>100 µsec ~ 30 sec</td>
<td>100 µsec ~ 120 sec</td>
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</tr>
<tr>
<td>Photometry mode</td>
<td>Average photometry</td>
<td>Average photometry: Average intensity within the photometry area</td>
<td>Peak photometry: Maximum intensity within the photometry area</td>
<td></td>
</tr>
<tr>
<td>Exposure control</td>
<td>Automatic exposure</td>
<td>Manual exposure</td>
<td>Continuous automatic exposure</td>
<td></td>
</tr>
<tr>
<td>Exposure correction</td>
<td>Available</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interface</td>
<td>USB2.0 (connect with PC or USB mouse)</td>
<td>USB3.0 (connect with PC)</td>
<td>USB3.2GEN1,2 (connect with PC)</td>
<td></td>
</tr>
<tr>
<td>Power supply</td>
<td>AC100-240V 50Hz/60Hz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power consumption</td>
<td>3 W</td>
<td>4.8 W</td>
<td>18 W</td>
<td>24 W</td>
</tr>
<tr>
<td>Operating environment</td>
<td>0~40°C, 80% RH max. (without condensation)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimensions</td>
<td>105 mm x 134 mm x 76 mm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 1,200 g</td>
<td>approx. 450 g</td>
<td>approx. 1,100 g</td>
<td>approx. 400 g</td>
</tr>
<tr>
<td>Weight: approx. 400 g</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Collected examples

Mouse kidneys slice: WGA (Alexa Fluor 488 staining), phalloidin (Alexa Fluor 568), nucleus (DAPI). Captured with DS-Qi2.

Lung cancer, Papilomucinous staining (Objective: CFI Plan Apochromat Lambda D 5X/0.15). Captured with Digital Sight 10.


*Only NIS-Elements F is compatible with Digital Sight 1000.

**SD and SDHC memory cards are available.

System Diagram

Dimensions

Digital Sight 1000

Digital Sight 10

DS-Fi3

DS-Qi2

Maintenance movie

PC (Windows® 10)

HDMI

USB 2.0

USB 3.0

AC power adapter

AC power adapter

AC power adapter

USB mouse

Full HD display

SD card

C-mount adapter

F-mount adapter

Microscope

USB mouse

USB 2.0

USB 3.0

USB 2.0

USB 3.0

USB 3.0

USB 3.2

USB 3.2

USB 3.2

USB 3.0

USB mouse

USB 2.0

USB 3.0

USB 3.0
The digital sight series is not for clinical diagnostic use.

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*Products: Hardware and its technical information (including software)

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