A new system for imaging: the DS-Fi3, a high resolution and sensitivity general purpose color camera has been added to the Nikon Digital Sight series. The DS-Fi3 can be connected to a PC, or the new compact tablet-style DS-L4.

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.
Optimal imaging parameters for the microscope’s light source, (LED or halogen), each sample type, and observation method can easily be set through the icons. A choice of three modes for biological and four modes for industrial imaging are available, and up to seven custom modes with freely configurable shooting parameters can be set.

**Biological Scene Mode**
- Brightfield HE ELISA

**Industrial Scene Mode**
- Wafer/IC Metal, Ceramic/Plastic
- Circuit board Flat Panel Display

Camera Control

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

**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.

**Compact, easy-to-use tablet-type microscope camera control unit.**
DS-Fi3 and DS-Ri2 can be optionally connected to the DS-L4 tablet-style control unit, eliminating the need and space requirements of a desktop PC. DS-L4 has a large number of built-in functions for measurement and annotations, and has built-in security for network connectivity.

**Integration with microscopes**
Optimal imaging parameters for the microscope’s light source, (LED or halogen), each sample type, and observation method can easily be set through the icons. A choice of three modes for biological and four modes for industrial imaging are available, and up to seven custom modes with freely configurable shooting parameters can be set.

**A wide variety of tools**
The DS-L4 enables easy measurements directly on images, with input of lines and comments. These can also be written and saved with the image, and measurement data can also be output.

**Tighten security**
McAfee embedded control with White List method is preinstalled for the virus measurement. The program which is not registered at White List cannot be launched so that the virus cannot be activated.

**Scene mode**
When connected to biological, industrial, or stereoscopic microscopes equipped with motorized hardware units and observation mode sensors, it is possible to both control the microscope and detect its observation mode state. Storing the objective lens information is convenient when making measurements.

**Tablet-type camera control unit**
Large, 10.1 inch, touch-screen 1920 x 1200 pixel display. The DS-Fi3 and DS-Ri2 can be set and operated simply and easily through the tablet by touch, or by connecting Bluetooth accessories such as a keyboard or mouse.

**User Interface for naturally simple operation**
The camera control menu uses recognizable and intuitive icons. Frequently used icons are in two rows, and the display space for live images and photographed images is large and prominently displayed.

**Medical Camera Control Unit**

**Scene mode**
- Brightfield
- HE
- ELISA

**Industrial Scene Mode**
- Water/IC
- Metal, Ceramic/Plastic
- Circuit board
- Flat Panel Display
Two Large Sensor high resolution 16.25-megapixel CMOS image sensors for microscopy

Two Nikon FX-format CMOS image sensor cameras join the Digital Sight series of microscope digital cameras: the DS-Ri2 color digital camera and the DS-Qi2 monochrome digital camera. High pixel density and large field of view coupled with USB3.0 high speed data transfer offer fast frame rates and high resolution images with these CMOS image sensors.

Large Format CMOS image sensors

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

DS-Ri2

16.25 megapixel (not interpolated) and accurate color rendition are features that make the DS-Ri2 an excellent choice for recreating color images as they eyes see them.

DS-Qi2

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 now has optimized our sensors for microscopy.
Photography with the natural colors seen through the microscope

Nikon is a leader in development of algorithms for reproducing color just as the eyes see it. The DS models’ image processing engine is based on extensive data accumulated over many years of developing microscope color digital cameras, resulting in perfect reproduction of the colors your eyes see in the microscope.

High-resolution images

16.25-megapixel CMOS image sensors for astonishing image quality

The DS series enables one-shot instantaneous capture and fast storage of images with resolution as high as 4908 x 3264 pixels, without pixel shifting or pixel stepping. This pixel density is ideally suited for photomicrography of ultra-fine structures or patterns in biological or industrial samples, at low or high magnifications.

High-speed live display

High-speed display, even of supra-HDTV-class live images

The DS-Ri2 can display 4908×3264 pixel (full-pixel) images at 6 fps, or 1636×1088 pixel (3×3 pixel averaging) images at 45 fps. This fast live frame rate makes fine focusing easy to perform.

High sensitivity, low noise

Fluorescent color image capture with high signal-to-noise ratio

Sensitivity settings that span the range from ISO200 to ISO12800 allow the capture of vivid fluorescent color images.

Transgenic C. elegans expressing venus in the head neurons and EGFP in the body wall muscles.

Conventional camera

DS-Ri2

Example of combination with the LV100ND industrial microscope

Semiconductors (IC wafers)

(Obscure: TU Plan Fluor 5X)

1636×1088 pixel / Exposure time: 100μsec

Resolution chart

(Obscure: TU Plan Fluor 20X)
High sensitivity

Detects even faint fluorescent signals

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

DS-Qi2 / Quantum efficiency

Quantum efficiency (%) vs. Wavelength (nm)

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 fluorescent images with very little noise.

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).

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.
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.

* See the NIS-Elements Catalog for details.

**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.

Compatible OS: Windows® 10 Pro 64bit, Windows® 7 Pro 32/64bit
* Nikon provides confirmed compatible PCs with up-to-date specifications. Contact Nikon for details.

**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.

**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.

**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.

**Grain size analysis**
Detects and measures grains in one and two phase samples according to JIS G0551, ASTM E112-96/E1382-97 and ISO643 standards.

**Cast iron analysis**
Detects, measures and classifies graphite content as well as ferrite content in graphite-corrected samples according to JIS G5502, ASTM A247-96 and ISO945-1 standards.
Dimensions

System Diagram

Microscope Digital Camera Specifications

- **Model**: DS-Fi3, DS-Ri2
- **Lens mount**: C-mount, F-mount
- **Video output**: Analog RGB/Displayport/microHDMI
- **Dimensions**: 100(W) × 66(D) × 65(H)mm
- **Power consumption**: 4.8 W
- **Power supply**: AC100-240V 50Hz/60Hz
- **Exposure**: -1 EV ~ ±0 EV
- **Exposure correction**: ±1EV
- **Photometry modes**: Average photometry, Peak photometry
- **Flashmetering**: Average metering, Peak hold metering
- **Exposure control**: One-time automatic exposure, Continuous automatic exposure
- **Photometry area**: Average intensity within the photometry area
- **Cooling method**: Electronic cooling
- **Camera resolution**: (1440 × 1024): 30 fps
- **Color sensor**: Color CMOS image sensor
- **Image sensor size**: 1/1.8 inch
- **Output size**: 6.91 × 4.92 mm
- **Noise**: Dark current 0.6e-/p/s (Ta=25°C)(typ.), Readout noise 2.2e- (- typ.), Full well Capacity 60000e (- typ.)
- **Quantum efficiency**: 77%
- **ISO sensitivity**: Standard: equivalent to ISO 3200, Standard: equivalent to ISO 12800, Standard: equivalent to ISO 51200
- **Weight**: MAIN: 630g (approx.), Main body: 265 × 188 × 10 mm
- **Weight**: Including extended cradle: 1060g (approx.), Including extended cradle: 265 × 201 × 107 mm
- **Power consumption**: 65W
- **Power supply**: AC100-240V 50Hz/60Hz
- **Operating environment**: 0-40°C, 60% RH max. (without condensation)
- **Dimensions**: 105(W) × 134(D) × 153(H)mm
- **Power consumption**: 13W
- **Power supply**: AC100-240V 50Hz/60Hz
- **Operating environment**: 30-40°C, 60% RH max. (without condensation)
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