### Specifications

#### Operating environment
- C, 60% RH max. (without condensation)

#### Power consumption
- USB device port x 1 (Mass Storage Class support, computer control connection, PictBridge)
- IEEE 1394b x 1 (computer control connection), FireWire x 1 (3Gbps)

#### Interface
- USB host port x 2 (USB mouse, USB memory stick, USB keyboard, microscope connection), Camera I/F x 1
- Camera I/F x 2

#### External monitor output
- DVI-I (Digital: Conforms to DVI 1.0/Analog: 0.7 Vpp (75 Ω), 0.7 Vpp (75 Ω))
- 8.4-in. TFT color LCD XGA (1024 x 768, 60Hz)

#### LCD monitor
- AC adapter, Power cord, USB memory stick, Mouse NIS-Elements F package

#### CCD cooling device
- Peltier Device, 10
- ISO 400 to 8000
- Recommended exposure index:

#### Camera head

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Field Of View</th>
<th>Resolution</th>
<th>Maximum Frame Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>DS-U3</td>
<td>1280 x 1024 (max. 19 fps), 640 x 480 (max. 32 fps)</td>
<td>0.7x Relay lens</td>
<td>2/3 in. square pixel CCD; Total number of pixels: 1.5 megapixels (effective 1.45 megapixels)</td>
<td>ROI mode (max.23 fps)</td>
</tr>
<tr>
<td>DS-V3</td>
<td>1600 x 1200 (max. 15 fps), 800 x 600 (max. 27 fps), 800 x 560 (max. 29 fps)</td>
<td>Center Scan (max. 29 fps)</td>
<td>1/1.8 in. high-density CCD; Total number of pixels: 2.11 megapixels (effective 2.01 megapixels)</td>
<td>Live display mode</td>
</tr>
</tbody>
</table>

#### Optional accessories
- DS remote controller, microscope control license
- PictBridge printer (sold separately)

#### Networking
- Ethernet (10/100Base-TX), DHCP compatible, HTTP, TELNET or FTP server, FTP client

#### Weight
- CCU: approx. 1400g / AC Adapter: approx. 350g approx. 1400g

#### Dimensions
- 230 (W) x 64.5 (D) x 200 (H) mm
- 193 (W) x 196 (D) x 35 (H) mm

#### Exposure control
- Program AE, Shutter-priority AE, Focus AE, Manual with AE lock function

#### Recordable image file format
- JPEG

#### Image adjustments
- Gamma correction, shading adjustment, black level adjustment, hue adjustment, color saturation adjustment

#### White balance
- 1PTJUJPOTJ

#### Exposure time
- 1/1000 to 600 sec, 1/1000 to 60 sec (pixel-shifting mode)

#### ISO Sensitivity
- Equivalent to ISO 800 (switchable sensitivity equivalent to ISO 50 to 2000)

#### System composition
- Approx. 260g
- 1/1000 to 60 sec

#### Recordable pixels
- CCD
- 2/3 in. square pixel CCD; Total number of pixels: 5.24 megapixels (effective 5.07 megapixels)

#### Exposure time
- 1/1000 to 600 sec, 1/1000 to 60 sec (pixel-shifting mode)

#### ISO Sensitivity
- Equivalent to ISO 100 (Can be varied between ISO 50-2000)

#### System composition
- Approx. 290g
- 1/1000 to 600 sec

#### Recordable pixels
- CCD
- 2/3 in. square pixel CCD; Total number of pixels: 1.5 megapixels (effective 1.45 megapixels)
Build an imaging system optimized for your application

With 5 cameras, you can select the optimum camera from an extensive lineup to suit a wide range of applications for microscopic imaging.

The Digital Sight (DS) camera system allows you to freely combine camera heads with stand-alone or PC-based control units.

The DS series offers outstanding functionality and a wide range of incorporated functions, all in a compact design. You can build an optimal microscopic digital imaging system for any biomedical or industrial application, from documentation to advanced image processing and analysis.

With 12.7 megapixel output, true color reproduction, low noise, and wide dynamic range, this color documentation camera is an ideal choice. Superb spatial resolution and accurate color rendition make the DS-Ri1 the camera of choice for many research, development, and analytical applications.

* Nikon recommends using the DS-U3 control unit.

12.7-megapixel high-definition images

New, high-precision pixel shift technology brings high resolution to the CCD. The camera features super-high pixel output of 12.7 megapixels and high resolution at over 2,200 TV lines.

Smooth live image display

Accelerated data transfer offers a high maximum frame rate of 19 fps/1.4 M. Live images are displayed and updated smoothly, so focusing from a monitor is extremely simple and natural.

Better fluorescence images

The DS-Ri1 uses the Peltier cooling system to maintain the CCD at 10°C below ambient temperature, effectively minimizing thermal noise contributions.

True color for samples

Nikon’s newly developed color matching logic achieves unprecedented color reproducibility. You can develop hue and saturation conversion matrices optimized for the characteristic colors of your microscope samples, and faithfully record the color of dyed samples. The ability to capture the colors observed with the microscope enables high-precision color analysis in all fields of medicine and industry.
High-definition color camera head

DS-Fi1

The DS-Fi1 is the industry standard for documentation applications in industrial and biomedical fields. With high performance in resolution, frame rate, and color fidelity, the DS-Fi1 fits a very wide range of imaging applications.

5.0-megapixel color CCD
Small pixel size and a field-of-view of 2,560 x 1,920 pixels allows you to acquire color images at very high resolution.

Smooth live image display
With a frame rate of 12 frames per second, live images are displayed and updated smoothly, so focusing from a monitor is a simple task, greatly increasing the speed of inspection, measurement tasks, and acquisition.

Support for a wide range of applications
The DS-Fi1 is a proven, cost-effective camera for a wide variety of applications including brightfield, phase contrast, and differential interference contrast (DIC).

True color rendition of samples
Nikon’s industry-leading imaging technology achieves the best true color image possible, duplicating exactly what is seen by the microscope.

High red sensitivity
A newly designed IR cut filter eliminates unwanted infrared contributions from halogen light sources, while maintaining excellent red color rendition for outstanding color reproduction.

Cooled camera head
for high-definition color images

DS-Fi1c

Better fluorescence images
The DS-Fi1c uses the Peltier cooling mechanism to cool the CCD to 20°C below the ambient temperature. When capturing fluorescence images where long exposures are required, thermal background noise is suppressed, enabling you to obtain high-contrast images.

5.0-megapixel color CCD
High-resolution images with a maximum size of 2,560 x 1,920 pixels allow you to capture even the microstructures of samples faithfully.

True color rendition of samples
Nikon’s industry-leading imaging technology achieves the best true color image possible, duplicating exactly what is seen by the microscope.

Support for a wide range of applications
The DS-Fi1c is a proven, cost-effective camera for a wide variety of applications including brightfield, phase contrast, and differential interference contrast (DIC).

High-speed color camera head

DS-Vi1

Smooth live image display
The DS-Vi1 is equipped with a 2.0-megapixel color CCD. SXGA live motion images can be displayed with a high speed of 15 fps (maximum 29 fps), and focusing is also performed easily.

Support for a wide range of applications
The DS-Vi1 is a proven, cost-effective camera for a wide variety of applications including brightfield, phase contrast, and differential interference contrast (DIC).

High sensitivity
With high sensitivity and a wide dynamic range, you can obtain clear and sharp images.
With the DS-L2 camera control unit, operation is even simpler - just click the E-LA icon on the monitor.

Scene Mode reproduces the true colors of samples with a single click

Scene Mode

DS-Fi1-L2 offers similar capability.

Nikon recommends using the DS-U3 control unit.

Reliable quantitative analysis

Linearly, a quantity index has been improved to >98%. This, together with reduced noise, assures comparable, quantitative image data collection over a wide exposure range.

Qi1 exposure time and output image intensity

Quantitative

Scene mode for clinical users

Faithful color capture with the immunoenzyme technique DS-Fi1-L2

Scene Mode

With the Digital Sight, a single click in the convenient Scene Mode automatically sets the optimal capture settings for the observation method. In Scene Mode, the E-LA mode is specifically adjusted for the immunoenzyme technique, and faithfully captures the true color of the sample with high precision using Nikon’s superior color reproduction. This allows you to capture image data just as you see it through the microscope, simply and accurately.

The colors of the immunoenzyme technique are recorded faithfully.

Red is enhanced.

Image capture in the immunoenzyme technique mode

Image capture in the bright field mode

With the DS-L2 camera control unit, operation is even simpler - just click the E-LA icon on the monitor.

High-speed cooled monochrome camera head

DS-Qi1

High speed High sensitivity Quantitative

The DS-Qi1 is the definitive camera for time-lapse fluorescence observation. By combining low-noise electronics and a high-quantum efficiency detector, the DS-Qi1 can capture a wide dynamic range of intensities while maintaining quantitative linearity. Added features such as a fast analog-to-digital converter (ADC), very low read noise, and programmable gain control make the DS-Qi1 an ideal detector for fluorescence imaging applications.

* Nikon recommends using the DS-U3 control unit.

Faint fluorescence detection

The high-sensitivity CCD, which has outstanding quantum efficiency (>60% at 500nm), combined with low read noise, allows the capture of even low-light fluorescence signals. Intensity and time of fluorescence excitation can therefore be minimized to reduce photobleaching.

Clear, high-contrast images

The Peltier cooling mechanism cools the CCD down to 10°C below ambient temperature, reducing the average dark current to 0.7e-/pixel. Also, the readout noise is reduced to 8e- rms with the newly developed CCD drive circuit. Thus, clear, high-contrast fluorescence images can be captured at a dynamic range of over 2000:1.

Smooth live image display

A high frame rate of up to 32fps with 640 x 480 pixel image size (2 x 2 binning) is possible, using a fast 36MHz analog-to-digital converter. As images can be displayed near real time, focusing and positioning is easy, even in fluorescence. The CCD can also be binned and/or subregioned. Thus, the duration of a specimen’s exposure to the excitation light can be reduced, resulting in less photobleaching.

Quantum efficiency

Quantum efficiency

932x680
Choose from two types of control units.

Select a stand-alone unit that does not require a computer, or a PC-based unit for integration with image processing software.

Stand alone control unit

DS-L2

No PC required. Simple operation with a mouse. Live observation and camera control are possible on the large built-in LCD monitor.

Built-in LCD display

A large 8.4-inch high-definition LCD monitor (XGA) is built into the controller. Image capture can begin simply by turning on power. No PC required!

On-screen GUI

All operations can be performed by clicking on-screen menus. Users can concentrate on observing live images thanks to simple image capture while viewing the monitor.

Exceptional color representation

Nikon has created a system producing life-like color rendition by using newly-developed image processing technology, thereby enabling true natural color representation, so what is acquired as an image is perfectly matched to what you see in the microscope. The controller has seven default gamma (TONE) correction presets and another seven that can be customized by the user. It also allows the user to create an original look-up table (LUT), all features to satisfy exceptional color rendition for a variety of microscope applications.

Time-lapse recording

Image acquisition over periods of time can be performed using the DS-L2.

Scene mode enabling optimal image capture with a single click

Anyone can easily configure optimal image capture settings simply by selecting the observation method, such as brightfield or darkfield, and the type of sample. In the Biological Scene Mode, there is even a mode optimized for HE and ELA (Enzyme labeled antibody) stained specimens for use with medical specimens that require subtle color reproduction. There are also seven user-customizable modes.

Save data without a PC

• USB memory stick
• CompactFlash card
• Mass storage class: Data on a CF card inserted into the DS-L2 can be read at high speed using a PC connected via the USB 2.0 interface.
• Network: Image files can be transferred (stored) at high speed to any connected server using the FTP client function. This enables you to capture images without worrying about storage space.

High expandability

Supports large screen output

A digital output port conforming to DVI 1.0 is provided. This enables the display of high-definition images on a large external display with no loss of image quality, as only digital imaging can do. Applications include observation by large numbers of people at conferences.

Supports direct printing (PicBridge)

No computer is required to print out images with a single click. Simply connect the unit’s USB port to a printer supporting the PicBridge standard.

Shortcut menu for greater ease of use

Functions that are used frequently are displayed as buttons. This enables operation without obstructing the display of captured images. The buttons can also be customized.

PC control-based control unit

DS-U3

Using NIS-Elements imaging software (=./page 10), you can perform image acquisition, processing, and analysis with integrated control of the camera and microscope peripherals.

The IEEE 1394b device port enables high-speed live image display and fast response at speeds surpassing the previous model.

Sophisticated thin and compact design.
Software that offers a total solution for microscope imaging

NIS-Elements, imaging software developed by Nikon, is an integrated platform for control of image acquisition and document data management using the DS-series of cameras. NIS-Elements supports multi-dimensional imaging tasks, including control of integrated motorized microscope components and peripheral devices. There are 3 packages available to match your needs and applications:

- **NIS-Elements AR** is optimized for advanced research applications. It features fully automated acquisition and device control through full 6D (X, Y, Z, λ (Wavelength), Time, Multipoint) image acquisition and analysis.
- **NIS-Elements BR** is suited for standard research applications. It features acquisition and device control through 4D (up to four dimensions can be selected from X, Y, Z, λ (Wavelength), Time, Multipoint) acquisition.
- **NIS-Elements D** supports color documentation requirements in bio-research, clinical and industrial applications, with basic measuring and reporting capabilities.

Various convenient plug-ins are available for advanced imaging and analysis capabilities

- **Multidimensional Capturing**
  NIS-Elements can combine X, Y, Z, λ (wavelength), Time and Multipoint within one integrated platform for multidimensional imaging (depends on the capability of the software). All combinations of multidimensional images can be linked together in one ND2 file sequence using an efficient workflow and intuitive GUI.

- **Extended Depth of Focus**
  With the Extended Depth of Focus (EDF) plug-in, images that have been captured in a different Z-axis can be used to create an all-in-focus image. Also, it is possible to create stereovision images & 3D surface images to achieve virtual 3D imaging.

- **3D/2D Real Time Deconvolution**
  Haze and blur of the fluorescence image can be eliminated from the captured 3D image or from the 2D live preview image. (Separate plug-in for 3D and 2DRT) (Ar package)

- **Database**
  NIS-Elements has a powerful image database module that supports image and meta data. Various databases & tables can easily be created and images can be saved to the database via one simple mouse-click. Filtering, sorting and multiple grouping are also available according to the database field given for each image.

- **Object Counting**
  Using the Object Counting module, get real time analysis of morphometric features of objects. Apply thresholds to define objects, and classify objects by a range of morphometrics features all from a single, easy to use graphic user interface (GUI).

- **Large Image**
  You can easily join (stitch) adjacent image fields together into a single, high-resolution result image by manually moving the microscope stage, or with optional modules, do it automatically using a motorized stage.

Visit www.nis-elements.com for more detailed information.