

INFINITY DIGITAL MICROSCOPY CAMERAS

Produce crystal clear, vibrant images with Lumenera's INFINITY microscopy cameras. Our user friendly USB 2.0 cameras range in resolution from 1.4 to 32 megapixel and feature CMOS, CCD, High Definition (HD), low light CCD, large format, research-grade and pixel shifting technologies. As one of the most respected digital camera manufacturers in the scientific market, we install thousands of INFINITY cameras each year into life science, clinical and industrial applications. Trust Lumenera to provide high quality, scientific-grade cameras complete with feature rich software packages at the best price-to-performance ratio in the market.

Contact us to determine how you can benefit from Lumenera's high-quality, reliable products.



www.lumenera.com

Why Lumenera, Why INFINITY

Extensive Product Line

Life science researchers, clinical pathologists and industrial technicians count on our exceptional color reproduction, lasting quality microscopy cameras, complete with user friendly software packages. Select from Lumenera's cost-effective CMOS cameras with extremely fast frame rates, our HD camera with full 1080p60 preview and superb color reproduction, or our CCD solutions with high dynamic range and outstanding color fidelity. Don't regret your camera purchase decision - choose Lumenera.

Centralized Research, Development & Manufacturing

Research, development and manufacturing are tightly controlled in one location ensuring the highest standard of quality from design to delivery. To ensure a timely product supply, Lumenera has established close, collaborative relationships with vendors and provides its own in-house manufacturing inspection and quality controls. As a testament to our high quality standards we continue to invest in research and development in order to maintain our reputation as a leading provider of high-performance digital imaging solutions. As a Lumenera customer you will benefit from our ongoing success and solid growth for years to come.

Industry Leading Technical Assistance Center

Realize your vision needs through our Technical Assistance Center (TAC). Core competencies include microscopy, software development, color algorithms, opto-electronics, laser physics, remote sensing, sensor architecture and optics. Receive timely, accurate information from our skilled team. With a focus on complete satisfaction, we draw on a large pool of expertise found throughout the company to help provide solutions to your toughest application or design challenges. Lumenera's TAC team is customer focused and prides itself on delivering timely responses to your questions.

Intuitive Software Package

Included with your USB 2.0 camera purchase is INFINITY ANALYZE and INFINITY CAPTURE software. Together, the camera and software create a complete imaging solution for your application. Take advantage of features ranging from full camera control to advanced capabilities such as measurement, video recording, annotation and the pseudo-coloring of fluorescent images. INFINITY ANALYZE is translated into eight languages (Latin Spanish, Castilian Spanish, Italian, Russian, Japanese, Chinese, Korean and French), providing life science, clinical and industrial researchers native language support. Also included is a Mac camera driver and ImageJ plug-in for select INFINITY cameras.

Research-Grade Cameras

Lumenera is integrating research-grade cameras into its product line with low noise electronics, high grade components, and Lumenera's unique thermal management technology. The end result is high quality images with extremely low noise and high dynamic range. Research-grade cameras are denoted with an R in the ordering part number. Watch for more camera models over the coming months.

USB 3.0 Cameras

Lumenera also offers USB 3.0 camera solutions. Contact us for more information.

Helpful Tools

INFINITY cameras are well known for their ease of set up and use. For immediate instruction on software features available, visit our popular step-by-step tutorials, as well as our FAQs and Knowledge Base at www.lumenera.com.

3rd Party Software Integration

Lumenera is integrated with leading software technology partners:

- Image Pro
- LanSchool
- LabVIEW
- Mideo Systems
- MATLAB
- MetaMorph
- Promicra
- Streampix
- Visiopharm
- ZView

Contact us regarding additional software packages.

Life Science & Clinical Applications

Genetics/Biology/Pathology



Fluorescence

Producing clear, well-contrasted fluorescent images is a challenge due to the extremely low light signals produced by the sample. Typically, images tend to be noisy and preview frame rates are reduced to a point where noticeable lag occurs. Lumenera's INFINITY cameras offer a higher dynamic range and optional thermoelectric cooling to address these challenges, resulting in smooth clear images and faster preview speeds.

Stained Samples

To ensure proper identification and diagnosis of stained samples, precise color is required. Benefit from years of INFINITY software development to produce excellent color in your biological sample. Difficult transition colors such as pinks, purples and browns that competitive cameras have difficulty duplicating, are easily reproduced by Lumenera's advanced algorithms.

Live Imaging

Combine INFINITY software with our high-speed USB 2.0 cameras for smooth responsive live video preview, with up to 90 fps in some models deploying reduced output sizes. Use INFINITY CAPTURE to record brief video clips or use INFINITY ANALYZE to capture time lapse sequences.

Material Science—Quality Control

Metrology/Mineralogy/Metallurgy

Defect Analysis



Measurement and annotation are an important part of any quality control process. Obtain precise reproducible results through a variety of features found in INFINITY software such as simple calibration as well as extensive measurement options.

Stereo and Macro Imaging

Samples with reflection, shadowing and low-light conditions commonly found in the QC environment can be quite difficult to image. Effectively deal with washed out or dark areas, bright spots or poorly lit samples with our high dynamic range INFINITY CCD cameras, whose high sensitivity allows for proper imaging. Perform depth of focus and spherical aberration correction with the Advanced Features Module (available as an accessory).

INFINITY Camera Selection

High to Moderate Illumination
10-bit Quantitative Analysis

Brightfield/Darkfield
DIC
Live Cell Imaging
Histology/Pathology/Cytology
Semiconductor Inspection
Metrology
Documentation and Archiving
Tumor Review Boards
Education

INFINITY1
INFINITY1-2
INFINITY1-3
INFINITY1-5
INFINITYHD

Moderate to Low Illumination
12 and 14-bit Quantitative Analysis

Brightfield/Darkfield
DIC
Live Cell Imaging
Histology/Pathology/Cytology
Semiconductor Inspection
Metrology
Documentation and Archiving

INFINITY2
INFINITY2-1
INFINITY2-1R
INFINITY2-2
INFINITY2-3
INFINITY2-5
INFINITY4
INFINITY4-11

Moderate Light Fluorescence
Gel Documentation

INFINITYX
INFINITYX-32

High Sensitivity
12 and 14-bit Quantitative Analysis

Brightfield/Darkfield
DIC
Live Cell Imaging
Histology/Pathology/Cytology
Semiconductor Inspection
Metrology
Documentation and Archiving
Gel Documentation

INFINITY3
INFINITY3-1
INFINITY3-1UR

Low Light Fluorescence
Chemiluminescence
Bioluminescence
Flow Analysis
GFP
FISH
NIR
FRET



INFINITY1

CMOS Cameras for Photo Documentation and High-Speed Imaging

Highlights:

- 2, 3 and 5 megapixel resolutions
- Extremely high frame rates
- High quality, cost-effective solution
- 8 or 10-bit output

The INFINITY1 series of CMOS USB 2.0 digital microscopy cameras, with resolutions as high as 5 megapixel, is specifically designed to be a cost-effective, versatile solution for a wide variety of microscopy photo documentation applications including life science, pathology, industrial inspection and geology.

Benefit from outstanding color, clarity and image detail. Easy-to-use and extremely fast frame rates are achieved through the plug-and-play, low noise USB 2.0 data interface to maximize your workflow. Combine our powerful feature-rich software package, together with the INFINITY1 series of cameras to produce accurate, reproducible results.

Models:

- INFINITY1-2C 2.0 MP CMOS Color Camera
- INFINITY1-3C 3.1 MP CMOS Color Camera
- INFINITY1-5C 5.0 MP CMOS Color Camera
- INFINITY1-5M 5.0 MP CMOS Mono Camera

Progressive Scan CMOS and CCD Sensors

INFINITY cameras include a progressive scan sensor, ideal for imaging moving or changing objects. Progressive scan provides consistent live previews when focussing or imaging moving samples, without the tearing or color blurring normally found in interlaced cameras. This is due to the sensor array being read in its entirety versus field by field. Additionally, no settle time is required before image capture.

Please note: The INFINITY2-3 is not progressive scan.

PENICILLIUM TAKEN WITH INFINITY2-2C

INFINITY2

CCD Cameras for Photo Documentation with Challenging Lighting and Color Conditions, as well as Quantitative Analysis

Highlights:

- 1, 2, 3 and 5 megapixel resolutions
- Excellent light sensitivity
- Superior color reproduction
- 12 or 14-bit output for quantitative applications
- Research-grade camera with low dark current noise

Effortlessly capture challenging images of samples in complex lighting situations with the INFINITY2 CCD series. If precise color reproduction is critical, the exceptional quality of the INFINITY2's Sony sensor meets the requirements of the most demanding applications. The INFINITY2 series of cameras offer consistent results with resolutions as high as 5 megapixel, positioning them as an ideal solution for challenging photo documentation and quantitative analysis applications in high-end scientific, medical, ophthalmic and life science applications.

In addition to the features provided by this family of cameras, the INFINITY2-1R now offers a reduced dark current noise, providing long exposures for research applications.

Models:

- INFINITY2-1RC 1.4 MP CCD Color Camera
- INFINITY2-1RM 1.4 MP CCD Mono Camera
- INFINITY2-2C 2.0 MP CCD Color Camera
- INFINITY2-2M 2.0 MP CCD Mono Camera
- INFINITY2-3C 3.3 MP CCD Color Camera
- INFINITY2-5C 5.0 MP CCD Color Camera
- INFINITY2-5M 5.0 MP CCD Mono Camera

INFINITY3

CCD Cameras for Low Light Conditions and Quantitative Analysis

Highlights:

- Ultra-sensitive Sony ICX285 1.4 megapixel sensor
- Thermoelectric cooled and uncooled camera models
- Fast frame rates
- 14-bit output for quantitative applications
- GPIO provided standard on cooled models
- Research-grade camera with extremely high dynamic range 

For challenging low-light applications the INFINITY3 series employs the ultra-sensitive Sony ICX285 CCD sensor. Two high dynamic range camera models are available:

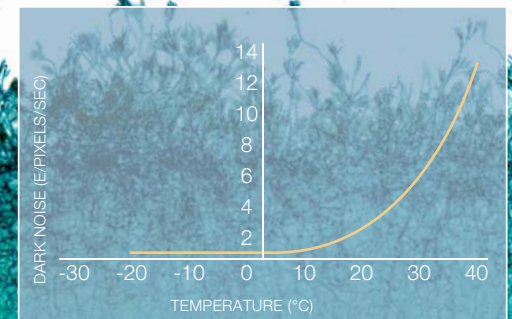
- The INFINITY3-1 is thermoelectrically cooled to 25 °C below ambient and features a high signal to noise ratio, positioning it as an ideal solution for applications with extremely long integration times where dark noise must be eliminated.
- The uncooled INFINITY3-1UR is a cost-effective solution that has unmatched light sensitivity needed for low light applications including fluorescence. Highlights include an extremely high dynamic range, large 6.45 μm pixels and outstanding color reproduction.

Models:

- INFINITY3-1C 1.4 MP Cooled CCD Color Camera
- INFINITY3-1M 1.4 MP Cooled CCD Mono Camera
- INFINITY3-1URC 1.4 MP CCD Color Camera
- INFINITY3-1URM 1.4 MP CCD Mono Camera

Dark Current Noise vs. Temperature

INFINITY3 cameras are cooled to 25°C below ambient to reduce dark current noise to a negligible level.





INFINITY4

Large Format CCD Cameras with a Large Field of View and High Resolution

Highlights:

- 11 megapixel resolution
- Large format sensor
- 12-bit output for quantitative applications

The INFINITY4 camera series offers a large format megapixel Kodak sensor for a wide field of view. The perfect choice for demanding high resolution imaging requiring excellent color rendition. Features include a 12-bit digital output, binning, progressive scan electronic shutter, full exposure control, programmable gain, sub-windowing and region of interest. Ideal for high-end ophthalmic, medical, clinical and life science applications. GPI/O for control of peripheral devices is available upon request.

Models:

INFINITY4-11C 10.7 MP CCD Color Camera
INFINITY4-11M 10.7 MP CCD Mono Camera



INFINITYX

Extremely High Resolution Pixel Shifting Cameras

Highlights:

- 32 megapixel resolution for viewing fine detail
- CCD sensors provide application versatility
- INFINITYX-32 has 12-bit output for quantitative applications

The INFINITYX-32 digital camera's sub-pixel shifting technology provides variable resolution capture at 2, 8, 16 and 32 megapixel. High resolution, combined with the excellent sensitivity of a CCD, make this an excellent general camera for virtually any application. In addition to high resolution, pixel-shifting cameras have the added advantage of acquiring all three color channels for each pixel, ensuring the highest possible quality of color reproduction.

Models:

INFINITYX-32C 32 MP CMOS Color Camera
INFINITYX-32M 32 MP CMOS Mono Camera



INFINITYHD

1080p60 High Definition(HD) Camera, Direct-Connect to HDMI Monitor

Highlights

- 1080p60 HD camera
- Direct output to HDMI monitor
- 1/3" (16:9) CMOS 2 megapixel sensor
- 3 on-camera buttons for power, white balance and real-time, low latency capture

A stand-alone, high definition camera offering full 1080p60 preview with superb color reproduction and smooth sample manipulation on the preview without any lag. Runs at the required 60 fps needed for true high definition. Stream live video direct-to-HDMI monitor (no need for a PC), or capture images via USB 2.0. Extremely fast response times quickly react to lighting changes in any life science, clinical or material application. INFINITYHD software included.

Models:

INFINITYHD 2 MP CMOS HD Color Camera

INFINITY Software

All Lumenera INFINITY cameras include INFINITY ANALYZE software at no extra charge, allowing complete camera control and advanced image acquisition and analysis.

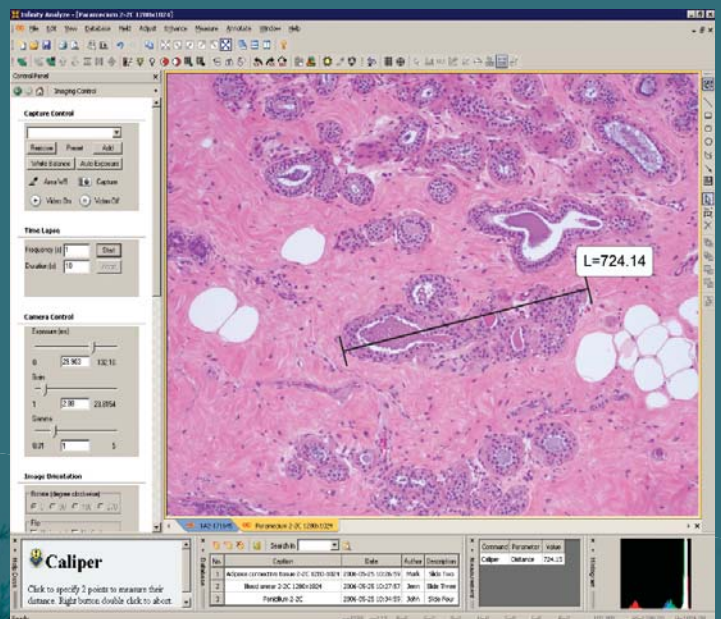
Also included is INFINITY CAPTURE, an intuitive user interface that contains all of the basic features needed to control the camera and capture images.

Easily integrate your INFINITY camera with 3rd party software applications through our TWAIN and DirectX/WDM interface (included) as well as 3rd party drivers for most image analysis packages.




An Advanced Features Model is available as an accessory to perform depth of focus and spherical aberration correction.

INFINITY ANALYZE Features Include:

- Real time video preview
- Measurement and annotation
- Archiving with search for date, author, description
- Fluorescent image composition including RGB Look-Up Tables (LUT)
- Single capture and time lapse
- Image stitching
- Automatic/manual exposure and white balance
- Hue, saturation, gain, contrast, brightness and gamma controls
- Advanced image processing
- Customize interface for specific applications
- Thumbnail worksheet
- Drag and drop measurement data to Microsoft Excel for analysis
- Save and restore camera settings
- Context sensitive help for all functions
- Optional focus enhancement
- Interactive color composition
- Available in 9 languages: English, Latin Spanish, Castilian Spanish, Italian, Russian, Japanese, Chinese, Korean and French



Note: INFINITY ANALYZE not included with INFINITYHD, only the INFINITYHD software.

| Cat. # (Color/Mono) | Megapixel | Resolution | Sensor | C-Mount Coupler | Pixel Pitch | Frame Rate | Bit Depth | Read Noise | Binning/ Sub Sampling | Region of Interest |
|--|-----------|------------|--------------------------|-------------------|-------------|------------|-----------|------------|--------------------------|--------------------|
| INFINITY1 | | | | | | | | | | |
| INFINITY1-2 C | 2.0 | 1600x1200 | 1/2" CMOS | 0.5X | 4.20 | 15 | 8 or 10 | 20 e- | N/Y | Y |
| INFINITY1-3 C | 3.1 | 2048x1536 | 1/2" CMOS | 0.5X | 3.20 | 12 | 8 or 10 | 20 e- | N/Y | Y |
| INFINITY1-5 C or M | 5.0 | 2592x1944 | 1/2.5" CMOS | 0.5X | 2.20 | 5 | 8 or 10 | 20 e- | N/Y | Y |
| INFINITY2 | | | | | | | | | | |
|  INFINITY2-1R C or M | 1.4 | 1392x1040 | 1/2" CCD | 0.5X | 4.65 | 15 | 8 or 14 | 8.5 e- | Y/Y | Y |
| INFINITY2-2 C or M | 2.0 | 1616x1216 | 1/1.8" CCD | 0.5X | 4.40 | 12 | 8 or 12 | 12 e- | Y/Y | Y |
| INFINITY2-3 C | 3.3 | 2080x1536 | 1/1.8" CCD | 0.5X | 3.45 | 5 | 8 or 12 | 12 e- | Y/Y | Y |
| INFINITY2-5 C or M | 5.0 | 2448x2048 | 2/3" CCD | 0.63X | 3.45 | 8 | 8 or 12 | 12 e- | Y/Y | Y |
| INFINITY3 | | | | | | | | | | |
| INFINITY3-1 C or M | 1.4 | 1392x1040 | 2/3" Cooled CCD | 0.67X | 6.45 | 15 | 8 or 12 | 8 e- | Y/Y | Y |
|  INFINITY3-1UR C or M | 1.4 | 1392x1040 | 2/3" CCD | 0.67X | 6.45 | 30 | 8 or 14 | 6 e- | Y/Y | Y |
| INFINITY4 | | | | | | | | | | |
| INFINITY4-11 C or M | 10.7 | 4008x2672 | 35mm Format CCD (43.3mm) | Custom F-Mount | 9.00 | 3.5 | 8 or 12 | 12 e- | Y/Y | Y |
| INFINITYX | | | | | | | | | | |
| INFINITYX-32 C or M | 32 | 6464x4864 | 1/1.8" CCD | 0.5X | 4.40 | 12 | 8 or 12 | 12 e- | Y/Y | Y |
| INFINITYHD | | | | | | | | | | |
|  INFINITYHD C | 2.0 | 1920x1080 | 1/3" CMOS | 0.33, 0.4 or 0.5X | 2.70 | 60 | 8 | 8.7 e- | N/A | N/A |

INFINITY Camera Specifications

- Auto/Manual Exposure
- Manual White Balance
- 1 to 10x Programmable Gain (varies by model)
- USB 2.0 High-Speed Interface (480 MB/s)
- *Power:*
INFINITY1, 2 & 3-1UR: USB Bus Power
INFINITY3 Cooled/INFINITYX: External 5 V DC – 1 A
INFINITY4: External 12 V DC – 1 A
INFINITYHD: External 5 V DC – 500 mA
- *Operating Temp:* 0 to 50 °C
- *Operating Humidity:* 5 to 95 %, Non-condensing
- *Operating Systems:*
PC: Windows XP, Windows Vista and Windows 7, 32 and 64-bit
Mac: 32 and 64-bit (10.6 or higher)


OEM Custom Camera Design


As a Lumenera OEM customer you can now leverage the success of the INFINITY camera line through our custom camera development. Our unique options for OEM custom software features and hardware camera design offer the following advantages:

- Improve Time-to-Market
- Reduce Development Costs
- Differentiate from the Competition

Comparing USB 2.0 to FireWire

Video performance in digital cameras is defined by the maximum frame rate at a given resolution and is measured in frames per second (fps). Both FireWire and high-speed USB 2.0 digital cameras exhibit almost identical frame rates by resolution. These frame rates are usually limited by the sensor read-out rate – not the physical interface. As an example, a 1 megapixel CCD sensor using a FireWire or USB 2.0 interface is limited to 15 or 30 fps depending on the camera model. As resolution increases, frame rates decrease.

 **USB 2.0:** 480 Mbit/s, 15 fps, plug-and-play. 99% of computers have USB 2.0 ports.

 **Firewire:** 400 Mbit/s, 15 fps. Most computers need a FireWire card installed – some laptops may not have the space required.

USB 2.0 is an ideal interface for scientific cameras, offering plug-and-play with all computers, while providing more than enough throughput for its selected image sensors.

INFINITY Mac Software

A Mac Camera Driver and ImageJ Plug-In are available for the following INFINITY cameras:

- INFINITY1-2
- INFINITY1-3
- INFINITY1-5
- INFINITY2-1R
- INFINITY2-2
- INFINITY2-5
- INFINITY3-1
- INFINITY3-1UR
- INFINITY4-11

Visit www.lumenera.com/support/downloads/microscopy-downloads.php to download the latest version.

* Mac Software is not available for the INFINITY2-3, INFINITYHD or INFINITYX cameras.

For more information e-mail scientificsales@lumenera.com

To better serve you, Lumenera has forged strategic partnerships with distributors and system integrators world wide. Please contact us at 1 (613) 736-4077 or scientificsales@lumenera.com for details on how to order, or to join our partner program.



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