

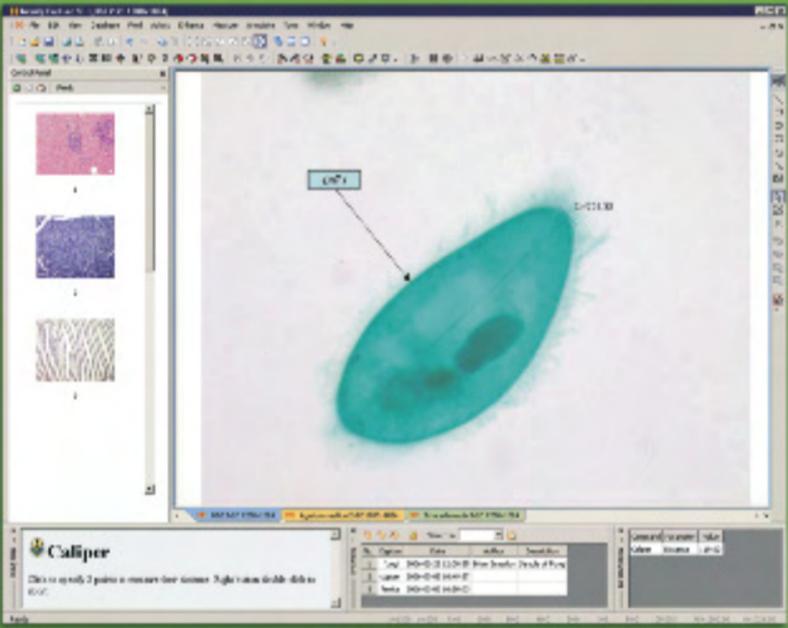


NOW MAC COMPATIBLE

# INFINITY

DIGITAL MICROSCOPY CAMERAS





## › INFINITY ANALYZE Software

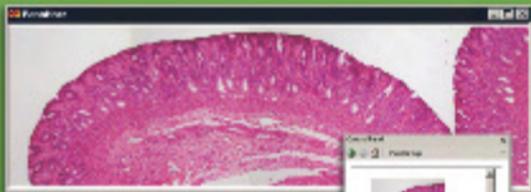
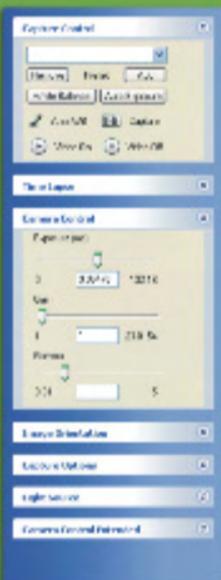
All Lumenera INFINITY cameras include INFINITY ANALYZE software, allowing complete camera control and advanced image acquisition and analysis. Features include:

- 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 excel for analysis
- Save and restore camera settings
- Context sensitive help for all functions
- Optional focus enhancement

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).

### Camera Control

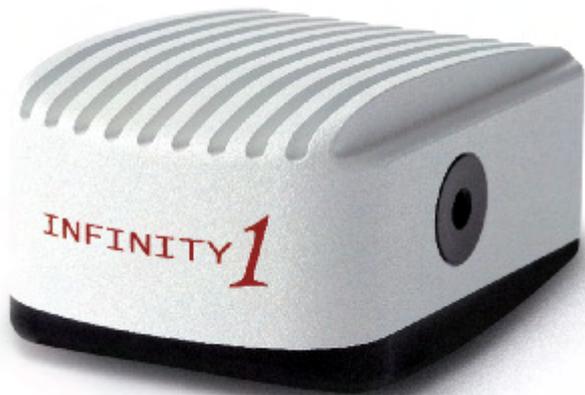


### Stitching

Stitch small images into a large seamless image along vertical or horizontal planes

### Multi-Focus Enhancement Option





## > INFINITY 1 CMOS Cameras

### Highlights

- 1, 3 and 5 megapixel resolution
- Perfect for documentation and archiving applications
- Fast frame rates

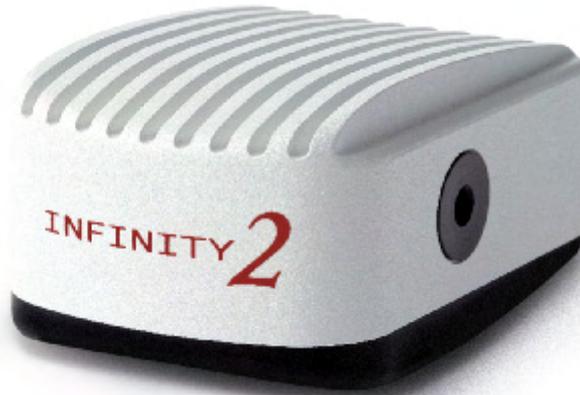
The INFINITY 1 CMOS USB 2.0 cameras are designed to be a cost-effective, versatile solution for a variety of microscopy imaging applications. Features include auto white balance, full exposure control, programmable gain, sub-windowing and region of interest. An excellent fit for documentation and archiving applications.

### Models

INFINITY 1-1C	1.3 Megapixel CMOS Color Camera
INFINITY 1-1M	1.3 Megapixel CMOS Monochrome Camera
INFINITY 1-3C	3.1 Megapixel CMOS Color Camera
INFINITY 1-5C	5.0 Megapixel CMOS Color Camera

### Applications

Brightfield, Darkfield, DIC, Live Cell Imaging, Histology, Pathology, Cytology, Defect Analysis, Semiconductor Inspection, Metrology



## > INFINITY 2 CCD Cameras

### Highlights

- 1, 2 and 3 megapixel resolution
- Higher dynamic range for quantitative analysis
- Fast frame rates
- Low noise electronics

Equipped with a high-quality, Sony CCD sensor, INFINITY 2 CCD USB 2.0 cameras offer excellent sensitivity, high dynamic range and a 12-bit digital output. Features include binning, auto white balance, full exposure control, programmable gain, sub-windowing and region of interest. Ideal for higher-end scientific, medical, ophthalmic and life science applications.

### Models

INFINITY 2-1C	1.4 Megapixel CCD Color Camera
INFINITY 2-1M	1.4 Megapixel CCD Monochrome Camera
INFINITY 2-2C	2.0 Megapixel CCD Color Camera
INFINITY 2-2M	2.0 Megapixel CCD Monochrome Camera
INFINITY 2-3C	3.3 Megapixel CCD Color Camera

### Applications

Brightfield, Darkfield, DIC, Live Cell Imaging, Histology, Pathology, Cytology, Defect Analysis, Semiconductor Inspection, Metrology, Gel Documentation, Moderate Light Fluorescence

## > 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

#### INFINITY 1

INFINITY 1-1  
INFINITY 1-3  
INFINITY 1-5

#### INFINITY X

INFINITY X-21

### Moderate to Low Illumination

12-bit Quantitative Analysis

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

Moderate Light Fluorescence  
Gel Documentation

#### INFINITY 2

INFINITY 2-1  
INFINITY 2-2  
INFINITY 2-3

#### INFINITY 4

INFINITY 4-11

### High Sensitivity

12-bit Quantitative Analysis

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

Low Light Fluorescence  
Chemiluminescence  
Bioluminescence  
Flow Analysis  
GFP  
FISH  
NIR  
FRET

#### INFINITY 3

INFINITY 3-1

## > INFINITY3 Cooled CCD Cameras

### Highlights

- 1 megapixel resolution
- Cooling to 25°C below ambient
- High signal to noise ratio for low light, long exposure applications
- Fast frame rates
- Low noise electronics

For low light fluorescence applications the INFINITY3 cooled CCD USB 2.0 cameras offer cooling to 25°C below ambient. The Sony ICX285 ExView HAD sensor has a very high dynamic range, excellent sensitivity and a 12-bit digital output. Features include binning, auto white balance, full exposure control, programmable gain, sub-windowing and region of interest.

### Models

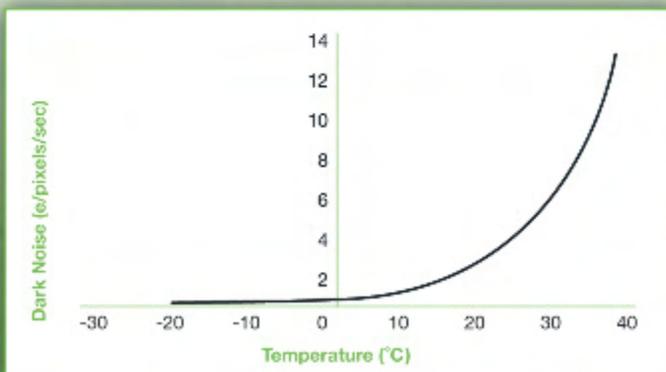
- INFINITY3-7C 1.4 Megapixel Cooled CCD Color Camera  
 INFINITY3-7M 1.4 Megapixel Cooled CCD Monochrome Camera

### Applications

Brightfield, Darkfield, DIC, Live Cell Imaging, Histology, Pathology, Cytology, Defect Analysis, Semiconductor Inspection, Metrology, Low Light Fluorescence, Chemiluminescence, Bioluminescence, Flow Analysis, GFP, FISH, NIR, FRET



### Dark Current Noise vs. Temperature



### Low Light and Long Exposure Times (Cooled CCD)

INFINITY3 cameras are cooled to 25°C below ambient to reduce dark current noise to a negligible level. This results in a 50% decrease in dark current noise for every 6 to 8°C in temperature below ambient.

## > INFINITY4 Large Format CCD Cameras

### Highlights

- 11 megapixel resolution
- Large format sensor
- Superior light sensitivity with high fidelity color reproduction
- Low noise electronics
- F-mount lens adapter

The INFINITY4 camera series offers large format megapixel Kodak sensors 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, auto white balance, programmable gain, sub-windowing and region of interest — ideal for high end ophthalmic, medical, clinical and life science applications.

### Models

- INFINITY4-17C 10.7 Megapixel CCD Color Camera  
 INFINITY4-17M 10.7 Megapixel CCD Monochrome Camera

### Applications

Brightfield, Darkfield, DIC, Live Cell Imaging, Histology, Pathology, Cytology, Defect Analysis, Semiconductor Inspection, Metrology, Gel Documentation, Moderate Light Fluorescence



### Quantitative Analysis, Cooled CCD

Quantitative Analysis (CCD) Demands a High Grayscale Level:

- CMOS (10-bit) 1024 Grayscale Levels  
 CCD (12-bit) 4096 Grayscale Levels  
 Cooled CCD (12-bit) 4096 Grayscale Levels

### Bit Depth, Gray Levels and Sensor Dynamic Range

Bit Depth	Grayscale Levels	Dynamic Range
1	2	6 db
2	4	12 db
3	8	18 db
4	16	24 db
5	32	30 db
6	64	36 db
7	128	42 db
8	256	48 db
9	512	54 db
10	1024	60 db
11	2048	66 db
12	4096	72 db

## > INFINITYX High Resolution CMOS Cameras

### Highlights

- 1, 5, 10 and 21 megapixel resolution
- Ideal for archiving and documentation
- Fast frame rates

Sub pixel shifting technology provides variable resolution capture at 1.3, 5, 10 and 21 megapixel resolution with precise color and good sensitivity. The INFINITYX USB 2.0 camera is an essential tool for clinical, life science and educational professionals where high resolution image archiving and publication quality images are critical. Features include auto white balance, full exposure control, programmable gain, sub-windowing and region of interest.

### Models

INFINITYX-21C 21 Megapixel CMOS Color Camera

INFINITYX-21M 21 Megapixel CMOS Monochrome Camera

### Applications

High Resolution, Brightfield, Darkfield, DIC, Live Cell Imaging, Histology, Pathology, Cytology, Defect Analysis, Semiconductor Inspection, Metrology



## > 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.

CONNECTION	TRANSFER RATE	FRAME RATE	INSTALLATION
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.

## > Camera Specifications

Mega-pixel	Resolution	Sensor	FPS	Bit Depth	Read Noise	Binning/ Sub Sampling	Region of Interest	Cat # (Color/Mono)
<b>INFINITY1</b>								
1.3	1280X1024	1/2" CMOS	15	8 or 10	20 e <sup>-</sup>	N/Y	Y	INFINITY1-1C or M
3.1	2048X1536	1/2" CMOS	6	8 or 10	20 e <sup>-</sup>	N/Y	Y	INFINITY1-3C
5.0	2592x1944	1/2.5" CMOS	5	8 or 10	20 e <sup>-</sup>	N/Y	Y	INFINITY1-5C
<b>INFINITY2</b>								
1.4	1392x1040	1/2" CCD	15	8 or 12	12 e <sup>-</sup>	Y/Y	Y	INFINITY2-1C or M
2.0	1616x1216	1/1.8" CCD	12	8 or 12	12 e <sup>-</sup>	Y/Y	Y	INFINITY2-2C or M
3.3	2080x1536	1/1.8" CCD	5	8 or 12	12 e <sup>-</sup>	Y/Y	Y	INFINITY2-3C
<b>INFINITY3</b>								
1.4	1392x1040	2/3" Cooled CCD	15	8 or 12	8 e <sup>-</sup>	Y/Y	Y	INFINITY3-1C or M
<b>INFINITY4</b>								
10.7	4008x2672	35mm Format CCD (43.3mm)	3.5	8 or 12	12 e <sup>-</sup>	Y/Y	Y	INFINITY4-11C or M
<b>INFINITYX</b>								
1.3, 5 10, 21	1280X1024 to 5120X4096	Pixel Shifting 1/2" CMOS	15 (SXGA)	8 or 10	20 e <sup>-</sup>	N/Y	Y	INFINITYX-21C or M

## > INFINITY Camera Specifications

- Auto/Manual Exposure
- Auto/Manual White Balance
- Programmable Gain, 1 to 10X Optimizable
- INFINITY 1, 2, 3, X — C-Mount Lens Adapter; INFINITY4 — F-Mount Lens Adapter
- USB 2.0 High-Speed Interface (USB 480 MB/s vs. Firewire 400 MB/s)
- Power: INFINITY1 & 2 — USB Bus Power  
INFINITY3 — External 5VDC-500mA  
INFINITY4 — External 12VDC-1A  
INFINITYX — External 6VDC-500mA
- Operating Temperature 0°C to +50°C
- Operating Humidity 5% to 95%, Non-condensing

## > 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

For more information e-mail [scientificsales@lumenera.com](mailto:scientificsales@lumenera.com).

## > Mac Plug-In for INFINITY Cameras

- A Mac Plug-In for all INFINITY cameras is now available
- Compatible with Mac OS 10.4 (requires Quick Time V7)
- Visit Lumenera's web site to download the latest version



7 Capella Court, Ottawa, ON, Canada K2E 8A7  
**Phone:** 1.613.736.4077 **Fax:** 1.613.736.4071  
[www.lumenera.com](http://www.lumenera.com)