

# RETIGA-4000R *FAST1394*

## High-Sensitivity IEEE 1394 FireWire® Digital CCD Camera – Monochrome or Color

The **QImaging® Retiga-4000R** digital camera features enhanced well capacity and resolution resulting in high sensitivity that is perfect for brightfield, LCD inspection, and automated imaging applications. A progressive-scan interline CCD sensor gives a resolution of 4.19 million pixels with an aspect ratio of 1:1 in a 12-bit digital output — making it ideally suited for the 22mm light column provided by many microscope camera mounts. High-speed, low-noise electronics provide linear digital data for rapid image capture. The IEEE 1394 FireWire digital interface allows ease of use and installation with a single wire. No framegrabber or external power supply is required. The Retiga 4000R includes QCapture software (Windows® and Mac OS) for real-time image preview and capture. A **Software Development Kit (SDK)** is available upon request for interfacing with custom software.

### camera models

*Includes: IEEE 1394 FireWire cable, IEEE 1394 PCI card, QCapture software, and access to SDK*

■ **Monochrome Retiga 4000R:**

Model: RET-4000R-F-M-12-C

■ **Color Retiga 4000R:**

Model: RET-4000R-F-CLR-12-C

### camera options

- RGB Color Filter for monochrome cameras (F-mount interface required), refer to data sheet for more details



- Extended Warranty



*Note: Lens shown for illustration only and is not included.*

features	benefits
High-Resolution, 4.19-Million-Pixel Sensor	<ul style="list-style-type: none"> <li>■ Highly detailed, sharp images</li> </ul>
Large Pixels (7.4µm x 7.4µm)	<ul style="list-style-type: none"> <li>■ High sensitivity, high dynamic range, large well capacity</li> </ul>
ROI (Region of Interest)	<ul style="list-style-type: none"> <li>■ Higher frame rates for precise analysis of rapidly changing specimens</li> </ul>
Low-Noise Electronics	<ul style="list-style-type: none"> <li>■ Quantitation &amp; imaging of low light levels</li> </ul>
12-Bit Digitization/ 36-Bit Color Digitization (with Optional RGB Filter)	<ul style="list-style-type: none"> <li>■ 4096 grey levels for precise light-intensity discrimination</li> <li>■ 4096 levels per channel for superior color images</li> </ul>
External Sync & Trigger	<ul style="list-style-type: none"> <li>■ Tight synchronization with flashlamps, automated filters, shutters, &amp; microscope stages</li> </ul>
Peltier Cooling	<ul style="list-style-type: none"> <li>■ Minimizes thermal noise during low-light, long-exposure imaging</li> </ul>
Binning	<ul style="list-style-type: none"> <li>■ Increases sensitivity for quantitation &amp; imaging of very low light levels</li> <li>■ Increases frame rate</li> </ul>
IEEE 1394 FireWire Connection	<ul style="list-style-type: none"> <li>■ Simple connectivity</li> <li>■ Ease of use &amp; installation</li> <li>■ Portability with laptop computer</li> <li>■ Simultaneous use of multiple cameras through a single port</li> <li>■ Single-cable operation (no external power supply or control unit)</li> </ul>
Extensive Application Software Support	<ul style="list-style-type: none"> <li>■ Choose from a large selection of life science &amp; industrial software for microscopy, machine vision, &amp; video-streaming functions</li> </ul>

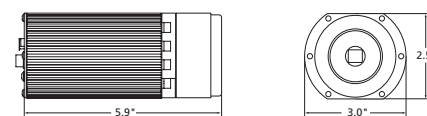
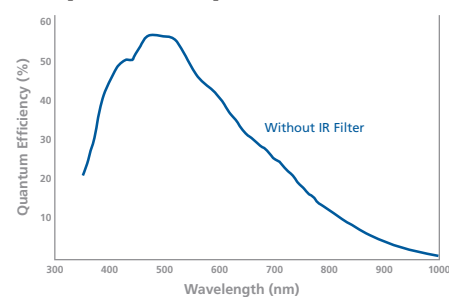
# RETIGA-4000R FAST1394 Specifications

ccd sensor	
Light-Sensitive Pixels	4.19 million; 2048 x 2048
Binning Modes	2x2, 4x4, 8x8
ROI (Region of Interest)	From 1x1 pixels up to full resolution, continuously variable in single-pixel increments
Exposure/Integration Control	10 $\mu$ s to 17.9min in 1 $\mu$ s increments
Sensor Type	Kodak <sup>®</sup> KAI-4021 progressive-scan interline CCD (monochrome or color)
Pixel Size	7.4 $\mu$ m x 7.4 $\mu$ m
Linear Full Well	40,000e- (1x1); 80,000e- (2x2)
Read Noise	12e- @ 20MHz
Dark Current	1.64e-/pix/s
Cooling Type	Peltier thermoelectric cooling to 25°C below ambient
Digital Output	12 bits
Readout Frequency	20, 10, 5MHz
Frame Rate	4fps full resolution @ 12 bits (125fps maximum with binning and ROI functions)
camera	
Computer Platforms/ Operating Systems	Windows <sup>®</sup> & Mac OS*
Digital Interface	IEEE 1394 FireWire
Sustained Image Data Rate	40MB/s
Shutter Control	Electronic shutter, no moving parts
External Trigger	TTL Input
Trigger Types	Internal, Software, External
External Sync	TTL Output
Gain Control	0.549 to 26.2x
Offset Control	-2048 to 2047
Optical Interface	F-mount optical format; aspect ratio 1:1
Threadmount	1/4" — 20 mount
Power Requirements	17W
Weight	845g
Warranty	2 years
Operating Environment	0 to 50°C (32 to 122°F)
Storage Temperature	-10 to 60°C
Humidity	Less than 80% non-condensing at 35 °C (95°F)

## applications

- Brightfield, Phase-Contrast, & Darkfield Microscopy
- Fluorescence Imaging
- Pathology, Histology, & Cytology
- DNA Analysis
- Metallurgical Microscopy
- LCD Inspection
- Manufacturing Quality Control
- Failure Analysis
- Forensic Analysis
- Automated Imaging

## spectral response



\*Refer to QImaging website for detailed listing of supported operating systems.  
 Note: Specifications are nominal and subject to change.

FireWire and Mac OS are trademarks of Apple Computer, Inc., registered in the U.S. and other countries. Kodak is a registered trademark of Eastman Kodak Company. Windows is a registered trademark of Microsoft Corporation in the United States and other countries. Other brand and product names are the trademarks or registered trademarks of their respective owners and manufacturers.