DIGITAL IMAGING
made easy

RETIGA-4000DC FAST1394

Deep-Cooled, High-Dynamic-Range IEEE 1394 FireWire Digital CCD Camera

The **QImaging® Retiga-4000DC** CCD digital camera has been specially engineered for low-light, high-dynamic-range applications. An 80,000e- full well capacity, combined with a three-stage Peltier device using an all-metal, hermetic-vacuum-sealed CCD chamber, provides extreme dynamic range for applications such as chemiluminescence, live-cell imaging, and fluorescence. The camera's software-selectable regulated cooling enables precise control in single-degree increments down to -45˚C. The Retiga-4000DC features a 4-megapixel CCD, 12-bit digital output, and an IEEE 1394 interface for enhanced connectivity and noise-shielding performance. Additionally, the camera comes with Hot Pixel Reduction™ (HPR) technology, an innovative combination of a deep-cooled vacuum design and FPGA-based pixel clock timing that offers unbeatable performance in terms of dark current and generation of hot pixels.

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

camera models

Includes: IEEE 1394 FireWire cable, IEEE 1394 PCI card, power supply, hex key, QCapture Suite software, and access to SDK

- **Monochrome Retiga-4000DC:**
  Model: RET-4000DC-F-M-12-C

camera options

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

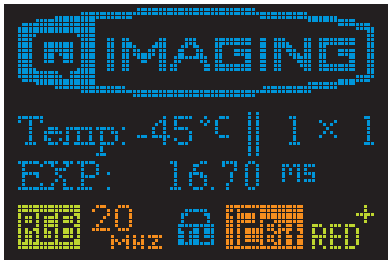
- Extended Warranty

features	benefits
HPR Technology	▪ Ultimate reduction of hot pixels
iGlo™	▪ OLED display for easy-to-verify key camera information in a simple, ergonomic design
Black-Out Mode	▪ Turns all lights off for low-light imaging applications
High-Resolution, 4-Million-Pixel Sensor	▪ Highly detailed, sharp images
Low-Noise Electronics	▪ Quantitation & imaging of low light levels
Optional/Removable IR-Cutoff Filter	▪ High-contrast, visible-range images with IR filter in place ▪ Removable for IR applications
Flexible Exposure Control from 10µs to 17.9min	▪ Optimal integration over a wide range of light levels
External Sync & Trigger	▪ Tight synchronization with flashlamps, automated filters, shutters, & microscope stages
Three-Stage Peltier Cooling w/ Vacuum Seal	▪ Reduced thermal noise for low-light, long exposures
Binning	▪ Increases sensitivity for quantitation & imaging of very low light levels ▪ Increases frame rate
IEEE 1394 FireWire Connection	▪ Simple connectivity ▪ Better noise performance ▪ Excellent connectivity ability ▪ Ease of use & installation ▪ Portability with laptop computer ▪ Simultaneous use of multiple cameras through a single port
Extensive Application Software Support	▪ Choose from a large selection of life science & industrial software for microscopy, machine vision, & video-streaming functions

RETIGA-4000DC FAST1394 Specifications

ccd sensor	
Light-Sensitive Pixels	4 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	10µs to 17.9min in 1µs increments
Sensor Type	Kodak® KAI-4022 progressive-scan interline CCD (monochrome)
Pixel Size	7.4µm x 7.4µm
Linear Full Well	40,000e- (1x1); 80,000e- (2x2)
Read Noise	12e- (at 20MHz)
Dark Current	0.031e-/pix/s
Cooling Technology	Three-stage Peltier cooling with all-metal, hermetic-vacuum-sealed chamber assembled in a Class 10,000 cleanroom
Cooling Type	Down to -45˚C, regulated, with software control in 1˚C increments
Digital Output	12 bits
Readout Frequency	20, 10, 5MHz
Frame Rate	4fps full resolution @ 12 bits (125fps maximum with binning and ROI functions)

camera	
HPR Technology	Offers unbeatable performance in terms of dark current and generation of hot pixels
Black-Out Mode	Turns all camera lights off to reduce light reflection during low-light applications; software controlled
iGlo Display	Provides key camera information to the user, allowing easy verification of camera settings
Computer Platforms/ Operating Systems	Windows®, Mac OS*, Linux® 2.67+ with raw 1394 support
Digital Interface	IEEE 1394 FireWire
External Trigger	TTL Input (optically coupled)
Trigger Types	Internal, Software, External
External Sync	TTL Output (optically coupled)
Gain Control	0.493 to 23.5 times
Offset Control	-2048 to 2047
Optical Interface	F-mount optical format; aspect ratio 1:1
Threadmount	1/4" – 20 mount
Power Requirements	30W; 12–24VDC
Weight	1.180kg
Warranty	2 years
Operating Environment	0 to 40˚C
Storage Temperature	0 to 50˚C
Humidity	Less than 80% relative humidity

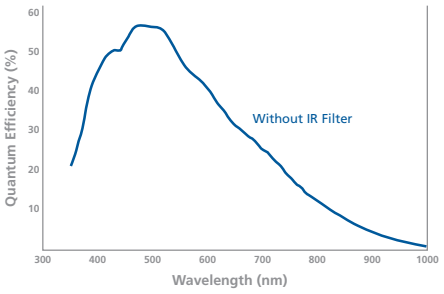


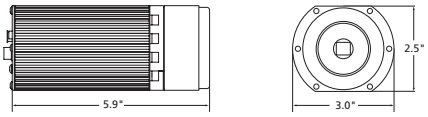
iGlo technology features essential information about camera settings.

applications

- Immunofluorescence
- Fluorescent protein imaging
- Semiconductor inspection
- Chemiluminescent gel imaging
- Particle tracking
- LCD inspection
- Fluorescent macro-imaging
- Fluorescent stereomicroscopy

spectral response





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

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