PRODUCT DATASHEET

RETIGA-4000DC

FAST 1394

Deep-Cooled, High-Dynamic-Range 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.

RETIGA™ Series

applications

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

features	benefits
HPR Technology	▪ Ultimate reduction of hot pixels
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
Computer Platforms/ Operating Systems	Windows® 7, Vista and XP (32/64 bit)
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

camera models

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

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

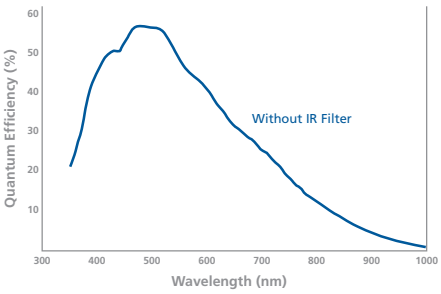
camera options

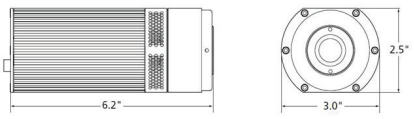
- Removable IR-Cutoff Filter
- RGB Color Filter for monochrome cameras (F-mount interface required), refer to the RGB filter datasheet for more details

Retiga-4000DC 4x4 and 8x8 binning not supported with the RGB filter

- Extended Warranty

spectral response





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