PHOTOMETRICS®
a division of Roper Scientific, Inc.

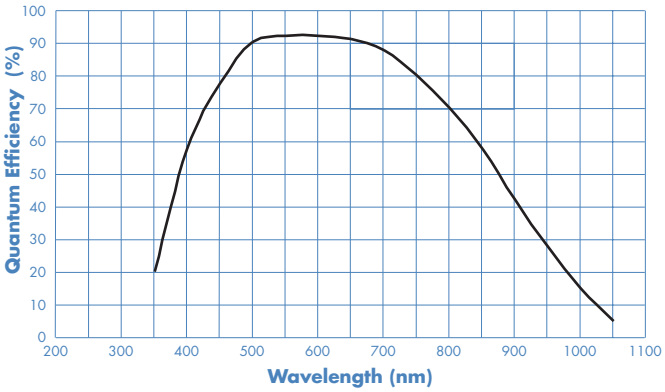
Cascade:128+

128 x 128 imaging array | 24 x 24-µm pixels

The Cascade:128+ digital imaging system from Photometrics® uses a high-QE, back-illuminated CCD with *on-chip multiplication gain* to provide extraordinary sensitivity for low-light-level, live-cell microscopy applications. Its thermoelectrically cooled detection array features square, 24-µm pixels in a 128 x 128, frame-transfer format. The state-of-the-art camera can collect more than 500 full frames of true 16-bit data per second — faster frame rates are achievable via subregion readout or binning. This unprecedented combination of speed and sensitivity makes the Cascade:128+ a perfect choice for neuroscience applications and single-molecule fluorescence (SMF) imaging.

Features	Benefits
On-chip multiplication gain	Very high sensitivity Low-noise, impact-ionization process
Back-illuminated CCD	Highest available quantum efficiency (>90% peak QE)
128 x 128 imaging array 24 x 24-µm pixels	Small array facilitates fast readout Good resolution
12-MHz readout	Excellent for live-cell microscopy
16-bit digitization	Wide dynamic range allows detection of bright and dim signals in the same image
Frame-transfer CCD	100% duty cycle to collect continuous data No mechanical shutter required
Thermoelectric cooling	Detector cooled to reduce background for high sensitivity
C-mount	Easily attaches to microscopes, standard lenses, or optical equipment
Acquisition software	Captures, analyzes, and saves high-resolution images
PCI interface	High-bandwidth, uninterrupted data transfer
PVCAM® Circular buffers Device sequencing	Supported by numerous third-party software packages Real-time focus Precise integration with shutters, filter wheels, etc. *Compatible with Windows® 2000/XP, Mac OS X, and Red Hat® Linux® 9.0 (kernel version 2.4)*

Cascade® Photometrics



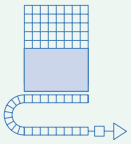
Binning	Region: 128 x 128	64 x 64	32 x 32
1 x 1	510	926	1684
2 x 2	926	1610	2732
3 x 3	1272	2227	3676
4 x 4	1656	2703	4149

(Frames per second)

Note: Frame rates are measured at 12 MHz with 0-second exposure times.

Specifications

CCD image sensor	e2v CCD60; back-illuminated, frame-transfer CCD with on-chip multiplication gain
CCD format	128 x 128 imaging pixels; 24 x 24-µm pixels; 3.072 x 3.072-mm imaging area (optically centered)
Linear full well single pixel* output node	 250 ke- 750 ke- (with on-chip multiplication gain enabled)
Digitizer type	16 bits @ 12 MHz
Read noise	<65 e- rms @ 12 MHz *Read noise effectively reduced to <1 e- rms with on-chip multiplication gain enabled*
On-chip multiplication gain	1 to 500x (guaranteed) 1 to 1,000x (typical) Software controlled in 4,096 steps
Parallel (vertical) shift rate	83 nsec/row
CCD temperature	-30°C (regulated)
Dark current	≤1 e-/p/s @ -30°C
Binning	Flexible binning capabilities in parallel direction; 1 through 4 binning in serial direction
Operating environment	0 to 30°C ambient, 0 to 80% relative humidity noncondensing



Note: Specifications are typical and subject to change.

* Single-pixel full well up to 450 ke- can be achieved using custom mode of operation.

ISO 9001:2000 Registered

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Cascade:128+ Rev B0