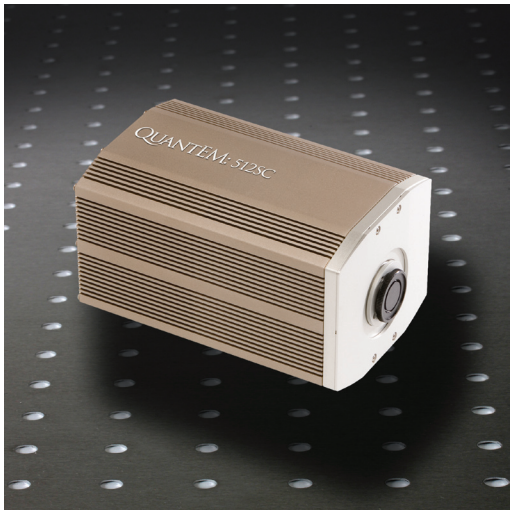

QUANTEM: 512SC

512 x 512 imaging array
16 x 16-µm pixels

The Photometrics® QuantEM™ 512SC is the world's first and only electron-multiplying CCD (EMCCD) camera to offer on-chip signal amplification with true quantitative stability across 16 bits at readout rates of 10, 5, and 1.25 MHz. The high-speed, high-performance QuantEM lets you conduct precision ratiometric analysis in time-course experiments, acquire reproducible data during long-term studies, and capture streaming data for multidimensional time-lapse investigations — all with single-molecule sensitivity. A patent-pending PAR™ feedback system provides exceptional stabilization of EM gain, while an intelligent FPGA design facilitates self-calibrating linearization of EM gain and prevents bias drift over time. Furthermore, patent-pending ACE™ technology enables superior timing resolution of the device's pixel clocks, allowing optimal signal-to-noise sampling and minimizing spurious charge.

Primary applications

Quantitative FRET

Multiprobe experiments

Ratiometric ion imaging

Confocal microscopy

Live-cell fluorescence imaging

Features	Benefits
EM gain	Very high sensitivity Low-noise, impact-ionization process
Back-illuminated EMCCD	Highest available quantum efficiency (>90% peak QE)
512 x 512 imaging array 16 x 16-µm pixels	Good field of view and sensitivity Good resolution
Intelligent FPGA design	Precise linearization of EM gain Self-calibrating linearization ensures truly quantitative data all the time Prevents bias drift over time to guarantee a stable background
PAR* feedback system (Photometrics Active Regulation)	Delivers unsurpassed EM gain stability for outstanding signal fidelity across 16 bits
ACE* technology (Advanced Clocking Enhancement)	Pixel-clock timing resolution 12x better than competing EMCCD cameras Provides lowest noise floor and minimizes generation of spurious charge and background events
10-MHz readout	Excellent for high-speed image visualization
5- and 1.25-MHz readout	Perfect for high-precision photometry
Dual amplifiers	Select readout mode via software for optimized (1) high-speed / high-sensitivity performance or (2) wide-dynamic-range performance
16-bit digitization	Wide dynamic range allows detection of bright and dim signals in the same image
Frame-transfer EMCCD	100% duty cycle to collect continuous data No mechanical shutter required
C- mount	Easily attaches to microscopes, standard lenses, or optical equipment
Turbo-1394™ interface (IEEE-1394a)	High-bandwidth, uninterrupted data transfer with no dropped frames Windows® XP/Vista 32 and Mac OS X compatibility
PVCam® Circular buffers Device sequencing	Supported by numerous third-party software packages Real-time focus Precise integration with shutters, filter wheels, etc.

* Patent-pending Photometrics technology

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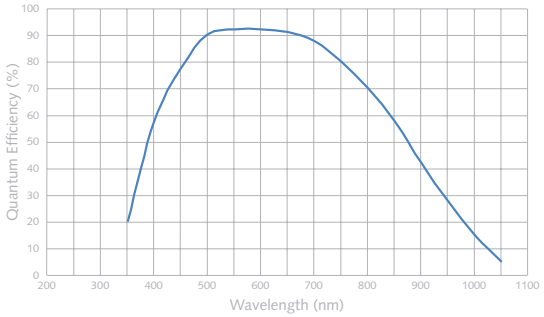
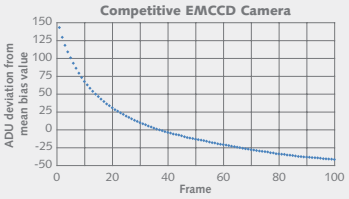
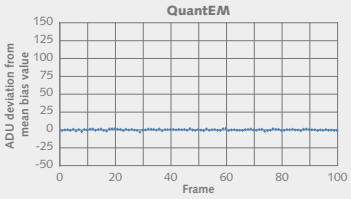


Binning	Region 512 x 512	256 x 256	128 x 128	64 x 64
1 x 1	31.5	56.5	94.4	140.3
2 x 2	58.6	100.9	155	217
4 x 4	104	160	233	270
8 x 8	157	237	257	279

(Frames per second)

Note: Frame rates are measured at 10 MHz with 0-second exposure times in expose mode ALT_ FT.

	Specifications	
EMCCD image sensor	e2v CCD97; back-illuminated, frame-transfer CCD with EM gain	
EMCCD format	512 x 512 imaging pixels; 16 x 16-µm pixels; 8.2 x 8.2-mm imaging area (optically centered)	
Linear full well single pixel output node	 200 ke- 800 ke- ("EM gain" amplifier)	
Digitizer type	Dual-selectable 14 bits/16 bits for all speeds and gains *16-bit digitization minimizes quantification error, enabling extreme low-light detection*	
	"EM gain" amplifier (port #1)	"Traditional" amplifier (port #2)
Read noise	37 e- rms @ 5 MHz 45 e- rms @ 10 MHz *Read noise effectively reduced to <1 e- rms with EM gain enabled*	7.5 e- rms @ 1.25 MHz 12.5 e- rms @ 5 MHz
EM gain	1 to 1,000x (typical) Self-calibrating linearization	Not applicable
Parallel (vertical) shift rate	2.0 µsec/row	
EMCCD temperature	-30˚C (regulated)	
Dark current	1 e-/p/s @ -30˚C (0.5 e-/p/s @ -30˚C typical)	
Binning	Flexible binning capabilities up to 256 in parallel direction; 1, 2, 4, 8 binning capabilities in serial direction	
Operating environment	0 to 30˚C ambient, 0 to 80% relative humidity noncondensing	
Typical bias (offset) stability *One hundred 70-ms bias frames were taken with 1000x EM gain and the average bias intensity was measured. Each frame's deviation from the sequence's mean value was plotted against the frame number.*		

Note: Specifications are subject to change.

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