Cascade® 128+ Datasheet

128 x 128 imaging array
24 x 24-μm pixels

The Cascade 128+ camera from Photometrics® uses a high-QE, back-illuminated CCD with EM 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
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EM gain | Very high sensitivity
Back-illuminated EMCCD | Highest available quantum efficiency (>90% peak QE)
128 x 128 imaging array 24 x 24-μm pixels | Small array facilitates fast readout
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 EMCCD | 100% duty cycle to collect continuous data
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® | Supported by numerous third-party software packages
Circular buffers | Real-time focus
Device sequencing | Precise integration with shutters, filter wheels, etc.

Compatible with Windows® XP/Vista, Mac OS X, and Linux® (kernel versions 2.4 and 2.6.8)

Primary applications
- Neurosciences
- Single-molecule fluorescence
- Live-cell microscopy
- Spinning-disc confocal microscopy
### Specifications

**EMCCD image sensor**
e2v CCD60; back-illuminated, frame-transfer CCD with EM gain

**EMCCD 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*: 250 ke- (with EM gain enabled)
- output node: 750 ke-

**Digitizer type**
16 bits @ 12 MHz

**Read noise**
<65 e- rms @ 12 MHz
*Read noise effectively reduced to <1 e- rms with EM gain enabled*

**EM gain**
1 to 500x (guaranteed)
1 to 1,000x (typical)
Software controlled in 4,096 steps

**Parallel (vertical) shift rate**
83 nsec/row

**EMCCD 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

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Note: Specifications are typical and subject to change.

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

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