**Features** | **Benefits**
---|---
EM gain | Low-noise, impact-ionization process provides very high sensitivity
Back-illuminated EMCCD | Highest available quantum efficiency (>90% peak QE)
Deep cooling | Thermodiastic cooling to -60°C minimizes dark current and allows long exposure times
| No need for a bulky chilled-water circulator or cryogenic compressor, both of which are prone to leaks, blockages, and condensation
Lifetime vacuum | Permanent, all-metal vacuum seals guaranteed for lifetime of camera
| Maintenance-free operation
1024 x 1024 imaging array | Good field of view and sensitivity
| Good resolution
13 x 13-μm pixels | Excellent for high-speed image visualization
| Perfect for high-precision photometry
10-MHz readout | Select readout mode via software:
| (1) optimal high-speed / high-sensitivity performance
| (2) optimal wide-dynamic-range performance
5- and 1-MHz readout | Wide dynamic range allows detection of bright and dim signals in the same image
Dual amplifiers | 100% duty cycle for continuous data collection
| No mechanical shutter required
16-bit digitization | Single optical window
| Single vacuum window is the only optical surface between incident light and EMCCD surface
| No light loss from multiple optical surfaces
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
| Real-time focus
| Precise integration with shutters, filter wheels, etc.
Circular buffers | Compatible with Windows® XP/7
Device sequencing |
**EMCCD Technology**

![Quantum Efficiency vs Wavelength Graph]

**Specifications**

<table>
<thead>
<tr>
<th>Region</th>
<th>1024 x 1024</th>
<th>512 x 512</th>
<th>256 x 256</th>
<th>128 x 128</th>
<th>64 x 64</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Binning</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 x 1</td>
<td>8.5</td>
<td>16.7</td>
<td>32</td>
<td>60</td>
<td>104</td>
</tr>
<tr>
<td>2 x 2</td>
<td>16.7</td>
<td>32</td>
<td>60</td>
<td>104</td>
<td>163</td>
</tr>
<tr>
<td>4 x 4</td>
<td>32</td>
<td>60</td>
<td>103</td>
<td>163</td>
<td>234</td>
</tr>
<tr>
<td>8 x 8</td>
<td>59</td>
<td>103</td>
<td>164</td>
<td>231</td>
<td>291</td>
</tr>
</tbody>
</table>

(Regions per second)

Note: Frame rates are measured at 10 MHz with 1.2-μsec/row vertical shift speed.

**EMCCD Image Sensor**
e2v CCD201; back-illuminated, frame-transfer CCD with EM gain

**EMCCD Format**
1024 x 1024 imaging pixels; 13 x 13-μm pixels; 13.3 x 13.3-mm imaging area (optically centered)

**Linear Full Well**
80 ke- 730 ke- (“EM gain” amplifier)

**Digitizer Type**
16 bits @ 10 MHz, 5 MHz, and 1 MHz

<table>
<thead>
<tr>
<th>“EM gain” amplifier (port #1)</th>
<th>“Traditional” amplifier (port #2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read noise</td>
<td>Read noise effectively reduced to</td>
</tr>
<tr>
<td>-35 e- rms @ 5 MHz</td>
<td>&lt;1 e- rms with EM gain enabled</td>
</tr>
<tr>
<td>-45 e- rms @ 10 MHz</td>
<td>8 e- rms @ 1 MHz</td>
</tr>
</tbody>
</table>

**EM Gain**
1 to 1,000x (typical)

<table>
<thead>
<tr>
<th>Spurious events</th>
<th>0.01 e-/pixel/frame (typical)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controlled via software in 4,096 steps</td>
<td></td>
</tr>
</tbody>
</table>

**Parallel (vertical) Shift Rate**
1.2 μsec/row

**EMCCD Temperature @ 20˚C Ambient**
-60˚C (typical)

**Dark Current @ -60˚C**
0.005 e-/μs (typical)

**Binning**
Flexible binning capabilities in parallel direction; 1, 2, 4, and 8 binning in serial direction

**Operating Environment**
0 to 30˚C ambient, 0 to 80% relative humidity noncondensing

Note: Specifications are subject to change.

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