The SPOT™ BOOST™ BT 2000 back illuminated EMCCD has single photon detection capability without an image intensifier, combined with greater than 90% QE of a back-illuminated sensor. Containing a 512 x 512 L3Vision™ Frame Transfer CCD sensor from E2V Technologies, it enables charge to be multiplied on the sensor before it is read out, while utilizing the full QE performance of the CCD sensor. The EMCCD gain of the camera can be varied from unity up to a thousand times directly through the software. The system offers up to 10 MHz pixel readout rate, both EMCCD and conventional amplifier outputs and benefits from minimized dark current with unequaled thermoelectric cooling down to –100° C.

**Camera Specs**

- EMCCD Technology
- True Linear gain
- > 90% QE back-illuminated sensor
- Variable readout rates up to 10 MHz
- Vacuum sealed cooling
- Thermoelectric cooling to –100° C possible
- 512 x 512 Frame Transfer sensor
- High dynamic range
- Built-in C-mount compatible shutter
- EM protect

**Camera Overview**

- Active Pixels: 512 x 512
- Pixel Size (WxH; µm): 16 x 16
- Image Area (mm): 8.2 x 8.2
- Active Area pixel well depth (e-: typical): 200,000
- Gain Register pixel well depth (e-: typical): 800,000
- Max Readout Rate (MHz): 10
- Frame Rate (frames per sec): 35 to >500
- Read Noise (e-): <1 EM gain < 50 conventional @ 10 MHz

**System Characteristics**

- Peak QE: >92%
- Pixel Readout Rate (MHz): 10, 5, 3, 1
- Electron Multiplying Amplifier: 3 and 1
- Conventional Amplifier: True 14-bit (16-bit available-See Boost model BT-2001)
- Digitization @ 10, 5, 3 & 1 MHz readout rate: (variable)
- Vertical Clock Speed (µs): 0.3 to 3.3
- Linear Electron Multiplier Gain (software controlled): 1 – 1000 times
- Non-Linearity: <1%
- Triggering: Internal, external, external start
- Camera window type: Single window with double-sided AR coating–standard for BV model
**Dark Current & Dark Current Background Events**

@ -85°C (e-/pix/sec) 0.001

EMCCD-Amplified Background 0.005

Events (events/pix)@ 1000 x gain and -85°C

**Noise**

System Readout Noise (typical; e-) Typical with Electron Multiplication

<table>
<thead>
<tr>
<th>10MHz through EMCCD amplifier</th>
<th>49</th>
<th>&lt;1</th>
</tr>
</thead>
<tbody>
<tr>
<td>5MHz through EMCCD amplifier</td>
<td>40</td>
<td>&lt;1</td>
</tr>
</tbody>
</table>

**Operating & Storage Conditions**

Operating Temperature 0°C to 30°C ambient

Relative Humidity < 70% (non-condensing)

Storage Temperature -25°C to 55°C

**Computer Requirements**

To handle data transfer rates of 10MHz readout over extended sequential (kinetic) series, a powerful computer is recommended, e.g:

- 3 GHz Pentium (or better)
- 1GB RAM
- 10,000 rpm SATA hard drive, preferred for extended kinetic series

**Power Requirements**: 0.6A @ +12V | 0.3A @ -12V | 3.0A @ +5V

**Also**: PCI-compatible computer

- PCI slot must have bus master capability
- Available auxiliary internal power connector
- 32 Mbytes free hard disc space

Operating System: Windows 2000 or XP operating system

Need more information?
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website: www.diaginc.com
For footnote review: www.diaginc.com/boostnotes

**Noise & EMCCD Gain**

Variation of Readout Noise with EMCCD Gain at 10MHz Readout Rate

**Quantum Efficiency**

Quantum Efficiency at 575nm and -20°C

**Full Frame Rate**

Max Frames per sec

Array size 512 x 512 256 x 256 128 x 128 512 H x 100 V

Binning (full frame)

| 1x1 | 35 | 68 | 132 | 168 |
| 2x1 | 68 | 132 | 248 | 313 |
| 2x2 | 68 | 132 | 248 | 313 |
| 4x1 | 131 | 246 | 439 | 549 |
| 4x4 | 131 | 246 | 439 | 549 |