ORIUS® SC1000
Model 832 TEM CCD Camera

The SC1000 ORIUS® CCD camera is the latest generation of large format (11 Megapixel) retractable and fiber-optical coupled CCD cameras. Built with state-of-the-art CCD electronics and improved mechanical design, this new family of TEM camera provides high image quality with real-time speed that guarantees the best price-performance value in the market.

RAPID VIEWING: The SC1000 offers a high speed (>14 fps - frames per second) image viewing mode. This allows the user to search areas within the sample quickly and efficiently. The high speed viewing mode also allows the user to replace the traditional TEM viewing screen. Operations such as microscope alignments, stigmation, and focus can be performed with high precision using the camera display instead of the TEM viewing screen. The real-time fast fourier transform (FFT) functions (built-in to DigitalMicrograph® software) make these complicated and tedious operations painless.

IN-SITU OBSERVATION AND DIGITAL STREAMING VIDEO (DSV): Another benefit of the high frame rate of the SC1000 is the capability of TEM in-situ observations. The SC1000 can output high quality (dark and gain corrected) LIVE images via a digital video stream. The digital video stream can then be recorded by using any third party video capture/editing software and saved in industry standard format (AVI and MPEG). Utilizing DSV your images can also be viewed by a remote computer via the internet or high speed network for purposes of remote education and diagnosis.

LARGE FIELD OF VIEW: For applications requiring a large field of view, the 35mm port SC1000W allows the user to view and record images from a sample area larger than conventional photographic film. This is the preferred configuration for most imaging applications in life science that require large fields of view.

HIGH RESOLUTION: The bottom mount SC1000B allows the user to view and record high resolution images with ease. This is the preferred configuration for most materials science imaging applications.

<table>
<thead>
<tr>
<th>Features</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>14 frames per second readout speed (full CCD, 4x binning)</td>
<td>High speed image viewing mode allows the user to search areas and perform TEM adjustments quickly, replacing the TEM viewing screen. In-situ observation and recording</td>
</tr>
<tr>
<td>11 Megapixel CCD sensor (4008 x 2672)</td>
<td>High resolution, side and bottom mount</td>
</tr>
<tr>
<td>HCR™ fiber optical coupling</td>
<td>High resolution and sensitivity</td>
</tr>
<tr>
<td>14-bit data digitization</td>
<td>High image quality and diffraction</td>
</tr>
<tr>
<td>IEEE 1394b FireWire interface</td>
<td>Industry standard. Fastest FireWire data transfer to the PC</td>
</tr>
</tbody>
</table>

DIFFRACTION: Viewing and recording electron diffraction patterns have been one of the most challenging tasks for CCD cameras. Charge overflow to the neighboring CCD pixels (blooming) can occur due to pixel saturation from the high intensity diffraction spots. This produces strong intensity streaks in the recorded diffraction patterns. The CCD sensor in the SC1000 eliminates any streaking with the excellent built-in anti-blooming capability (100x full-well).

ANALYTICAL COMPATIBILITY: The retractability of the SC1000 ensures complete compatibility with a wide range of TEM equipment, such as Gatan GIF® or ENFINA® spectrometer systems. This provides you with a TEM that has both high-resolution digital imaging and analytical capabilities.

Images: (Top) Renal tissue biopsy recorded with 35mm port mounted ORIUS SC1000 CCD camera on a 120kV TEM at 400x magnification. (Bottom) [111] HREM image of a mesoporous silica sphere (space group Ia-3d) recorded with a bottom mount ORIUS SC1000 CCD camera at a TEM magnification of 60,000x and 200kV. Image courtesy of Daliang Zhang, Berzelii Centre EXSELENT on Porous Materials, Stockholm University, Sweden.
### Specifications

**Camera construction**
Retractable CCD sensor fiber optically coupled to high-resolution phosphor scintillator (HCR™ technology)

**TEM operating voltage**
Up to 400kV (bottom mount) 200kV (side mount)

**CCD sensor**
Progressive interline device 4008 x 2672 pixels (9μm each)

**CCD active area**
36mm x 24mm

**Anti-blooming**
On-chip (100x full well)

**Scintillator**
High-resolution phosphor

**Coupling**
Fiber optics (1:1)

**Binning**
1x, 2x, 3x, 4x

**CCD readout**
Full or sub area

**Magnification with respect to film**
About 1/3 for 35mm port and 1.3-1.5x for bottom mount

**Readout speed**
30MHz / 5MHz

**Dynamic range**
14 bits

**Frame rate**
> 14 fps @ 4x binning full CCD area (1002 x 668 pixels) 30MHz dual port CCD readout

**Readout time**
~ 2.5 sec full frame @ 1x binning 5MHz single CCD readout

**Peltier cooling**
+10°C regulated

**Dark current**
< 2 counts /pixel/sec (1x binning)

**Readout noise**
7-10 counts

**Mounting position**
On-axis TEM bottom port or 35mm port

**Gain uniformity**
Transparent gain correction and dark subtraction; better than 10% r.m.s. in uncorrected images; better than 0.5% r.m.s. in gain corrected image

**Conversion efficiency**
2-8 counts/primary e- at 100kV

**Resolution (Nyquist freq.)**
> 0.5 @ 100kV at 1x binning

**Saturation (1x binning)**
> 50,000 CCD e-

**Non-linearity**
< 2%

**Exposure setting**
1 msec – 30 min

**TEM shutter**
Optional

**CCD overheat protection**
Yes

**Camera dimensions**
Depends on TEM configuration and mounting position

**Power requirement**
< 100W. 100-240V, 50/60HZ

**Average shipping weight**
30 – 90 kg depending on configuration

**Computer-camera interface**
IEEE 1394b (Firewire 800); compatible with IEEE 1394a (slower frame rate)

**Computer platform**
Windows® 2000 Professional and XP

**Water connection**
Yes, interconnect to existing TEM water line

**Water failure protection**
Yes

**X-ray radiation safety**
PTB standard

**Regulatory compliance**
EN 61326-1: 2002

### Ordering information

<table>
<thead>
<tr>
<th>Model</th>
<th>Configuration</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>832.10W</td>
<td>SC1000W</td>
<td>35mm port, up to 120kV, 11 megapixels. Includes Gatan Microscopy Suite® (GMS) software</td>
</tr>
<tr>
<td>832.20W</td>
<td>SC1000W</td>
<td>35mm port, up to 200kV, 11 megapixels. Includes GMS software</td>
</tr>
<tr>
<td>832.10B</td>
<td>SC1000B</td>
<td>Bottom mount, up to 120kV, 11 megapixels. Includes GMS software</td>
</tr>
<tr>
<td>832.20B</td>
<td>SC1000B</td>
<td>Bottom mount, up to 200kV, 11 megapixels. Includes GMS software</td>
</tr>
<tr>
<td>832.40B</td>
<td>SC1000B</td>
<td>Bottom mount, up to 400kV, 11 megapixels. Includes GMS software</td>
</tr>
</tbody>
</table>

Computer and monitor are not included. Please consult Gatan for a recommended PC specification. Accessories and optional software are not listed. Please consult with your sales representative for details.

### Primary applications

- **Life Science**
- **Viruses**
- **Materials**
- **Diffraction**

Images above courtesy of K. Tiekotter, Univ. of Portland; B.D. Miller, D.D. Graham, I.M. Robertson, Univ. of Illinois-UC; D. Zhang, Stockholm Univ.

Note: Specifications are subject to change. Gatan, the Gatan logo, ORIUS®, GIF®, ENFINA®, and Gatan Microscopy Suite® are registered trademarks of Gatan, Inc. FireWire is a trademark of Apple Computer, Inc., registered in the U.S. and other countries. Windows is a registered trademark of Microsoft Corporation in the United States and other countries. All other brand and product names are the trademarks or registered trademarks of their respective owners and manufacturers.