800S CCD Camera

SI’s 800S camera is designed for uncompromising camera performance in a TEC camera unit. Cooling to -60°C in the versatile 800S camera body is available with some CCDs. Large CCDs (4k x 4k) with fiber optic tapers can be installed as well, with cooling to -20°C. Back illuminated CCDs along with industry-leading low read noise creates the perfect camera for low-light level applications such as astronomy, bioluminescence and plate reading for drug discovery.

Features

- Available CCD operating temperatures of -20 to -60°C, depends on the variety of CCDs, and fiber optics this camera can accommodate. Water and air cooled models are available.
- Multiple read speeds available; from low noise speeds of 100kHz up to four MHz pixel rates.
- High dynamic range; low noise performance with 16-bit digitization and high full well provide large dynamic range imaging.
- Many sensors available; large sized 4k x 4k, down to 1k x 1k full frame and frame transfer devices available; front or backside illuminated.
- Binning and region of interest imaging; high performance with binning, and ROI imaging for small area high speed available.
- Multi-port readout; one to four port readout.
- Power supply options; both our standard ‘desktop’ power supply (see next page) and a DC-DC option are available for the 800S camera line.
- Shutter available; shutters can be mounted on the camera and driven by the camera itself and configured by software.
- Fiber optic communication; standard communication to computer by fiber optic cable to proprietary PCI or PCIe card.
- Software included with every camera; SI Image software suite for camera control, data manipulation and archiving. Native file format is FITS. C++ and LabView SDK available upon request.

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**Camera Details**

<table>
<thead>
<tr>
<th>Water cooling required</th>
<th>1 lpm @ 20°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Window details</td>
<td>Many AR coatings available with custom order. Typical Broadband specs: &lt;1% Reflectivity per surface, 450-800 nm</td>
</tr>
<tr>
<td>Window heater</td>
<td>Generally unnecessary, but available</td>
</tr>
<tr>
<td>CCD to mounting surface</td>
<td>~20mm, depends on CCD and options</td>
</tr>
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</tr>
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<td>Camera weight</td>
<td>About 6lbs, depending on options</td>
</tr>
</tbody>
</table>

**Typical Camera performance 47-10 CCD**

- Read noise @ 100kHz: 2.8e-
- Read noise @ 200kHz: 3.3e-
- Read noise @ 400kHz: 4.5e-
- Read noise @ 800kHz: 11.0e-
- Dark current @ -35°C: <0.1e-/pixel/s
- Full well: 100ke-
- Linearity: <1%, 200e- to 100ke-
- CCD size: 13.3mm x 13.3mm
- CCD pixel size: 13.0μm
- CCD pixel dimension: 2048x2048
- Backside AR coatings available: Midband, Broadband, none, Enhanced UV

**Typical Camera performance 47-20 CCD**

- Read noise @ 3MHz, 14-bit: 14e-
- Dark current @ -60°C: 0.005e-/pixel/s
- Full well: 90ke-
- Linearity: <1%, 200e- to 90ke-
- CCD size: 13.3x13.3mm (imaging area)
- CCD pixel size: 13μm
- CCD pixel dimension: 1024x1024 imaging 1024x1024 frame transfer
- Backside AR coatings available: Midband, Broadband, none, and Enhanced UV

**Power Supply**

Approximate of 100W continuous 120-220V 50/60Hz input
800S CCD Camera

Water cooling required 1 lpm @ 20°C

Window details: Many AR coatings available with custom order.

Typical Broadband specs: <1% Reflectivity per surface, 450-800nm

Window heater: Generally unnecessary, but available

CCD to mounting surface: ~20mm, depends on CCD and options

Read speeds: Software selectable, customizable

Camera weight: About 6lbs, depending on options

Typical Camera performance:

47-20 CCD
Read noise @ 3MHz, 14-bit 14e-
Dark current –60°C 0.005e-/pixel/s
Full well 90ke-
Linearity <1%, 200e- to 90ke-
CCD size 13.3x13.3mm (imaging area)
CCD pixel size 13µm
CCD pixel dimension 1024x1024

Backside AR coatings available
Midband, Broadband, none, Enhanced UV

Typical Camera performance:

47-10 CCD
Read noise @ 100kHz 2.8e-
Read noise @ 200kHz 3.3e-
Read noise @ 400kHz 4.5e-
Read noise @ 800kHz 11.0e-
Dark current –35°C <0.1e-/pixel/s
Full well 100ke-
Linearity <1%, 200e- to 100ke-
CCD size 13.3mm x 13.3mm
CCD pixel size 13.0µm
CCD pixel dimension 1024x1024

Backside AR coatings available
Midband, Broadband, none, Enhanced UV

Typical Camera performance:

42-40 CCD
Read noise 100kHz 3.6e-
Read noise 200kHz 4.2e-
Read noise 500kHz 5.4e-
Read noise 800kHz 11.7e-
Dark current -35°C 0.05e-/pixel/s
Full well 90ke-
Linearity <1%, 200e- to 100ke-
CCD size 27.4mm x 27.4mm
CCD pixel size 13.5µm
CCD pixel dimension 2048x2048

Backside AR coatings available
Midband, Broadband, none, Enhanced UV

Power Supply
Approximate of 100W continuous
120-220V 50/60Hz input

800S with a 2k x 2k CCD with a window and shutter

800S air cooled back-plate with a 4k x 4k CCD and a 1:1 fiber faceplate

800S camera with a 4k x 4k CCD bonded to a 2.1:1 fiber optic taper, air cooled backplate
800 Series cameras have been extensively used for diagnostics on many large laser systems. The OMEGA laser facility at the University of Rochester’s Laboratory for Laser Energetics conducts high energy laser experiments for the inertial confinement fusion community. The versatile 800S camera line has the capability of incorporating many different sensors, fiber optic inputs or windows. This, included with the options for power supply inputs, has given the camera product line wide adoption at the LLE facility.

The 800S is incorporated in other companies’ products for x-ray or faint signal imaging such as that needed for 3D tomography or DNA sequencing. Spectral Instruments specializes in the development and manufacture of custom cameras for OEM and unique applications that can’t be purchased off the shelf. Contact SI directly to discuss your imaging needs and define a camera solution for your application.

Typical QE performance from e2v sensors shown below. Refer to e2v and other CCD manufacturers for up to date QE and blemish specifications.

**e2v QE Chart**

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**Grade 1 CCD Cosmetics (42-40)**

| Column Defects | 3 |
| Dark pixels    | 150 |
| Bright pixels  | 150 |
| Traps          | 20 |

CCD cosmetics subject to change
Contact SI if other requirements must be met
See www.e2v.com for the latest specifications