DIAGNOSTIC instruments, inc.

SPOT Xplorer™-XS

Monochrome | 1.4 MP

The **Xplorer™ - XS 1.4 MP Monochrome** camera is a deep cooled, low noise, high speed digital camera designed for researchers who have quantitative scientific applications. The 1.4 MP model is optimized for speed over resolution. Key applications include ion imaging, FRET, FRAP, TIRF, SMF and particle tracking, chemiluminescence and bioluminescence.

The benchmark cooling of the Xplorer™-XS Monochrome in combination with its other features makes this the premier CCD camera for cutting edge scientific research applications.

KEY FEATURES AND BENEFITS

High speed image capture	Nearly 11 full frames per second
-42° C regulated cooling	Dark noise reduction and repeatable dark frame correction
Enhanced IR Mode	Increases the Sensitivity for wavelengths > 525 nm (see QE chart)
No Glow Mode	Turns off all sources of On-CCD circuit glow during exposure. Important for long exposure
Dual speed readout	Allows users to select between maximum speed or lowest noise level
Live mode gain	Provides real time viewing of low light specimens
14 bit digitization	Over-sampled bit depth ensures best data quality
Interline progressive scan CC	Electronic shuttering eliminates mechanical shutter shortcomings related to speed, wear, and vibration
Exposure while downloading	Allows user to overlap exposure with previous image download to increase the frame rate
Data /device streaming	Allows the highest speed experiment image captures
SPOT™ Software for Mac® and Windows® operating systems	Provides essential tools for modern microscopy and is widely supported by 3rd party software companies. (SDK available for OEM development)

CCD Information

Sony ICX285AL with cover glass

Monochrome Progressive scan interline CCD

1360 x 1024, 6.45µm square pixels

8.77 x 6.60 mm active area

100x anti-blooming

CCD Grade: Sony Grade 0

Cooling

Peltier thermoelectric cooling, -42°C regulated, -73° C maximum differential cooling from ambient

Digitization information:

Correlated dual sampling at CCD sensor

Live Mode: 8 bit x 20 MHz

Capture mode: 14 bit (selectable 10 or 20 MHz)

A-D converter full scale set to 16,000 e-(no binning); 24,600 e-(with binning)

Nonlinearity: <1%

Saved bit depths: 8, 12, or 16 bit; Monochrome

Noise specifications:

Read noise: 4.5 e @ 10 MHz.; 5.5 e @ 20 MHz

Dark current: 0.00013 e/p/s

Exposure:

Minimum: 100 µs

Maximum: >48 hrs

Captured and live mode automatic exposure

Captured and live mode manual exposure

Lens mount: C-Mount with adjustable back focus

Sealing window: Corning 7980 fused silica 320 nm – 820 nm anti-refelection coating

Computer interface: PCI Universal or PCI Express

External device control: TTL level output with programmable delay

External trigger input: TTL level input with programmable active state and delay. Manual and bulb exposure modes.

Mechanical

Tripod mount: 1/4-20 UNC

Camera head: 5.00" (127mm) x 4.40" (112mm) x 7.13" (181mm), 4.55 lbs. (2.1 kg)

**Power supply:** 3.61" (92mm) x 3.90" (99 mm) x 8.13" (207mm), 3.2 lbs. (1.5 kg)

Operating environment: 0-30°C ambient, 0-80% relative humidity noncondensing

Power requirements: 100-240 VAC, 3A

SPOT Basic Software Features

Color live mode viewing window & controls, auto-exposure live and capture modes, image capture window, predefined and custom image setups, auto white balance, flat field correction, image enhancement tools in three color spaces (RGB, HSL, HSV), pan and zoom windows, multiple customizable floating taskbars, spot metering, non-destructive annotations, non-destructive calibration marks, measurement tools, sequential image capture and playback, exportable image archiving database (PC only), report generator, macro scripting, interactive print dialog, online help menu, Correct Color Technology™.

Quantum Efficiency
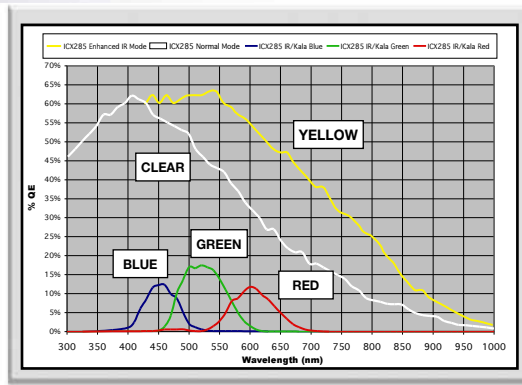
Quantum Efficiency

Captured Frames per Second*

Binning	REGION OF INTEREST				
	1360 x 1024	640 x 480	512 X 512	256 x 256	50 x 50
None	10.8	21.1	20.1	35.0	92.4
2 x 2	19.7	37.1	34.8	58.2	114.0
3 x 3	27.4	48.4	46.3	74.4	124.6
4 x 4	33.8	59.2	57.4	84.6	130.0
8 x 8	55.3	83.6	83.2	108.7	138.8

*1ms exposure with post-processing deferred, taken with 2.6 Ghz Xeon processor running Windows XP.
Capture rates on other computers OS platforms may vary.

Formats and Tiff Sizes

File formats:

Bitmap, TIFF, TIFF-JPEG, JPEG-2000, PICT, AVI (PC, export only), Quicktime (Mac, export only)

TIFF File sizes:

8 bit monochrome: 1.33 MB	24 bit RGB: 3.99 MB
12 bit monochrome: 2.00 MB	36 bit RGB: 6.00 MB
16 bit monochrome: 2.66 MB	48 bit RGB: 7.98 MB

Driver Information

Drivers included:

Twain for supported Windows® operating systems
AppleEvent for supported Mac® operating systems

Native drivers for 3rd party software:

Call or visit our website (www.diaginc.com)

Computer Requirements

Minimum system requirements:

PC: Pentium® based processor or equivalent @ 1 GHz or greater with Windows 2000, XP, Vista, one available PCI or PCI Express slot.

Mac: Power PC G4 or greater with OS 10.3.9 or higher, 512 MB of RAM, available PCI or PCI Express slot.

Video card: 24 bit RGB @ 1024 x 768 or greater

Items included:

Camera head, PCI or PCI Express card, power supply, power cord, communication cable, SPOT software install CD (includes drivers), electronic software user guide. Quick Start Installation Guide. Includes a 2 year warranty.

Mac® is a registered trademark of Apple Computers, Inc.
Windows ® is a registered trademark of Microsoft.
Specifications are typical and subject to change without notice.
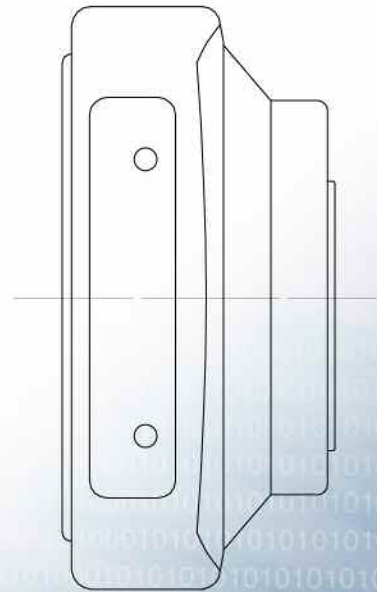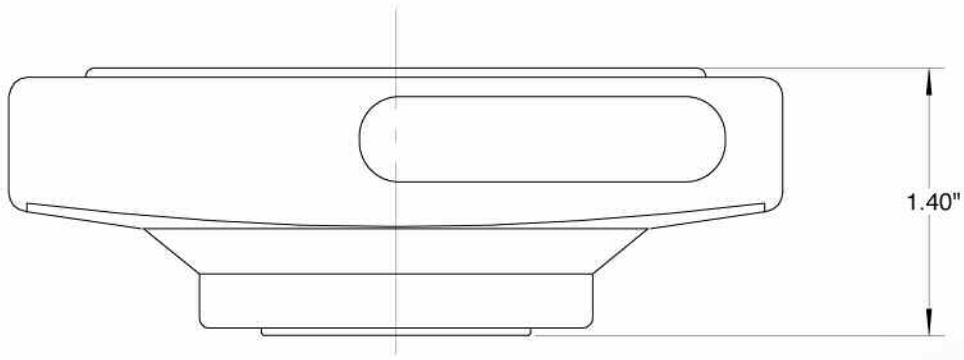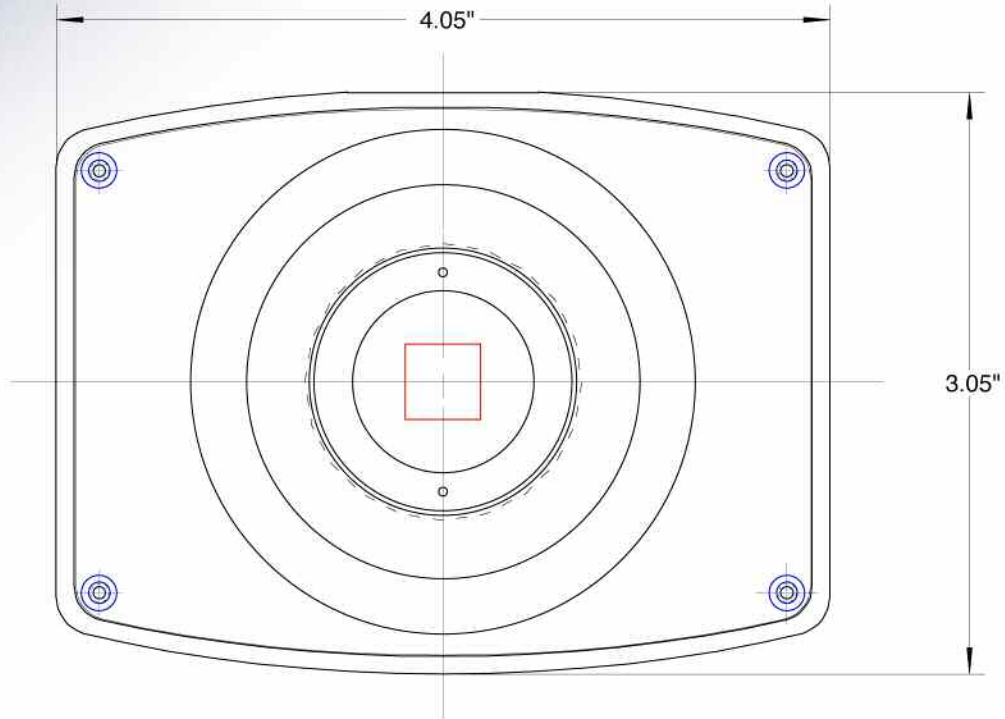Ambient temperature is defined as 20°C.

Catalog Number: **XP2400**

Xplorer-XS™
Mono:1.4 MP 4.14.08

SPOT | DIAGNOSTIC instruments, inc.

idea™
dimensions

4.05"

3.05"

1.40"

IDEA™
Model:1.3 MP
5.08.07

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NOTE - Specifications are subject to change without notice.

1 Assembled in a state-of-the-art Class 10,000 cleanroom facility, the UltraVac™ vacuum process combines a permanent hermatic vacuum seal (no o-rings), with a stringent protocol to minimize outgassing, including use of proprietary materials. Outgassing is the release of trapped gases that would otherwise prove highly problematic for high-vacuum systems.

2 The clearance from the C-mount face plate to the shutter is 6mm. Please ensure, when fitting a lens, that it does not extend into the housing by more than 5mm.

3 The EM register on CCD97 sensors has a linear response up to typically 400,000 electrons and a full well depth of–800,000 electrons.

4 Linearity is measured from a plot of Counts vs. Signal up to the saturation point of the system. Linearity is expressed as a percentage deviation from a straight line fit.

5 This value is obtained using the traditional method of measuring dark current, as for any CCD camera, i.e. taking a long integration time (with no EM gain applied) to get a dark signal that is well above the read noise. The dark current measurement is averaged over the CCD area excluding any regions of blemishes.

6 Using Electron Multiplication (EM) the Boost camera is capable of detecting single photons, therefore the true camera detection limit is set by the number of 'dark' background events. These background events consist of both residual thermally generated electrons and Clock Induced Charge (CIC) electrons (also referred to as Spurious Charge), each appearing as random single spikes that are well above the read noise floor.

A thresholding scheme is employed to count these single electron events and is quoted as a probability of an event per pixel. Acquisition conditions are full resolution and max frame rate (10 MHz readout; Frame-transfer mode; 0.3 µs vertical clock speed; x1000 EM gain; 30 ms exposure; -85º C). It is important to realize that to get to this single photon detection regime there must be sufficient cooling, such that there is significantly less than 1 event per pixel.

7 System Readout noise is for the entire system. It is a combination of CCD readout noise and A/D noise. Measurement is for Single Pixel readout with the CCD at a temperature of -85º C and minimum exposure time under dark conditions. Under Electron Multiplying conditions, the effective system readout noise is reduced to sub 1e- levels. Noise values will change with pre-amplifier gain (PAG) selection. Values quoted are measured with highest available PAG setting.

8 These power requirements are the maximum load that will be drawn from the computer for the camera head and controller card combined.

9 Quantum efficiency of the CCD sensor as measured by the CCD Manufacturer.

10 The graph shows the full frame rates possible when reading out the sensor at 10, 5, 3 and 1 MHz pixel readout rates, and using 0.3 µs vertical clock speed.

11 The max frames / second for Boost imaging CCDs is the maximum speed at which the device can acquire images in a standard system. Shown are the frame rates at 10MHz digitization rates for a range of binning or array size combinations. All measurements are made with 0.3 µs vertical clock speed. It also assumes internal trigger mode of operation.

Optional: RC180 200W Re-circulator for enhanced cooling performance

Need more information?
Contact us at:
Phone: **586.731.6000**
Fax: **586.731.6469**
e-mail: **info@diaginc.com**
website: **www.diaginc.com**

IDEA™
Model: 1.3 MP
REV. C

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