SPECTROSCOPY

" New USB Camera for Spectroscopy "

Andor's DV420A CCD camera with USB offers the best price/performance for a wide range of spectroscopy applications. The 1024 x 255 array with 26μm² pixels offers the best dynamic range versus resolution. The system boasts minimal dark current with thermoelectric cooling down to -70˚C.

• Peak QE of 95%	…. High detector sensitivity
• Min operating temp of –70˚C with TE cooling	…. Negligible dark current without the aggravation or safety concerns associated with LN_2
• Guaranteed hermetic vacuum seal	…. Optimizes sensor performance (through higher QE and lower dark current) and ensures that this performance is retained year after year
• Simple USB Connection	…. USB connection direct from back of the camera – no controller box
• Single window design	…. Delivers maximum photon throughput
• Front or back illuminated sensor	…. Offers the ultimate in price/performance options
• 26 x 26μm pixel size	…. Optimised pixel size for high dynamic range and resolution
• Andor-MCD software	…. Friendly Windows user interface offers system integration, automation and advanced data manipulation facilities
• Software selectable pre-amplifier gain (PAG)	…. Offers best choice for noise and dynamic range

• Camera Overview

Active Pixels •1	1024 x 255
Pixel Size (WxH; μm)	26x26
Image Area (mm)	26.6 x 6.7
Pixel Well Depth (e⁻, minimum) [OE] **(typical) [OE]**	300,000 [200,000] 465,000 [395,000]
Register Well Depth (e⁻, typical) •2	1,000,000
Max spectra per sec (FVB) •3, 6	75
Read Noise (e⁻, typical)* *** Noise quoted is for an OE device**	4 @ 33 kHz

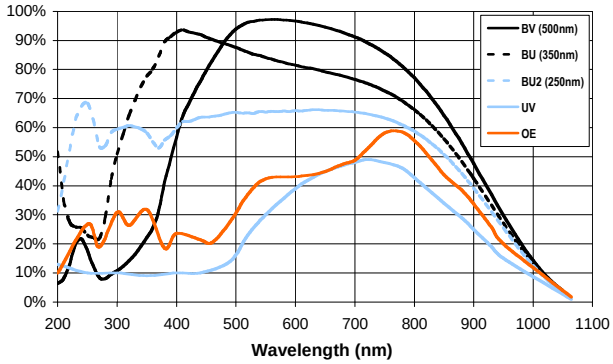
System Characteristics

Dummy Pixels [4]		8, 8, 0, 0	
Linearity (%, maximum) [5]		1	
Vertical Clock Speed (µs) [6]		8, 16, 32	
Sensitivity (e-/count) typical values		***PAG x1***	***PAG x1.7***
	@ 33 KHz	2	N/A
	@ 50 KHz	3.5	2.5
	@ 100 KHz	14	9
Digitization		16-bit	
Camera window type		Single quartz window; AR coating and MgF_2 window available	

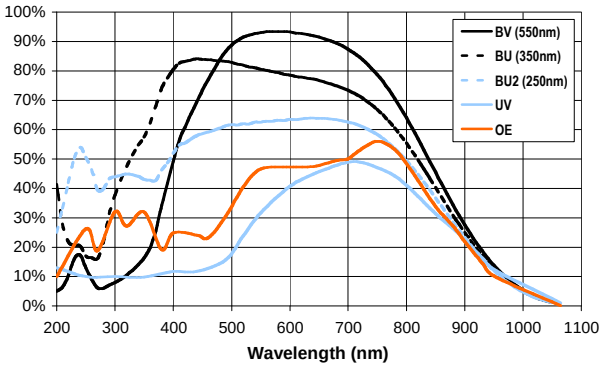
Noise

System Readout Noise (e-) [7] [BI]	*Typical*	*Maximum*
33 kHz pixel readout rate	4 [5]	6 [8]
50 kHz pixel readout rate	5 [6]	8 [9]
100 kHz pixel readout rate	8 [11]	12 [15]

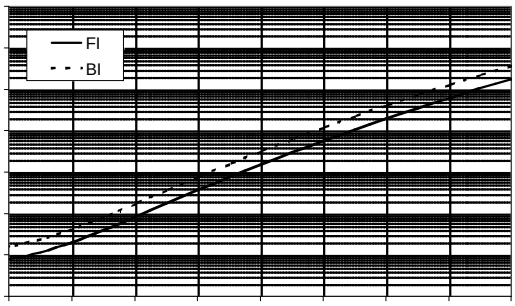
Quantum Efficiency at Room Temp [8]



Quantum Efficiency at –100˚C



Dark Current [9]



Minimum Temperature (˚C) [10]

	PS-24
Air-cooled ***(ambient air @ 20˚C)***	-55
Re-circulator (RC-180) ***(ambient air @ 20˚C)***	-65
Water-cooled ***(@ 10˚C, 0.75 l / min)***	-70

Max Spectra per sec [3,6]	**Full Vertical Binning**	75 spectra/s

Computer Requirements	**Minimum:**	**Also:**
	800MHz Pentium + 256Mbytes RAM	• Minimum of 25MB free hard disc to install software
		• USB 2.0
	Recommended:	
	2.4GHz Pentium (or better) + 512 Mbytes RAM	

Operating & Storage Conditions	**Operating Temperature**	0˚C to 30˚C ambient
	Relative Humidity	< 70% (non-condensing)
	Storage Temperature	-25˚C to 55˚C

Ordering Information

To order this camera quote model number

DV420A- **BV:** back illuminated – AR coated for optimal performance in the visible region
BU: back illuminated – AR coated for optimal performance in the 350 nm region
BU2: back illuminated – AR coated for optimal performance in the 250 nm region
UV: front illuminated device with UV coating
OE: open electrode device

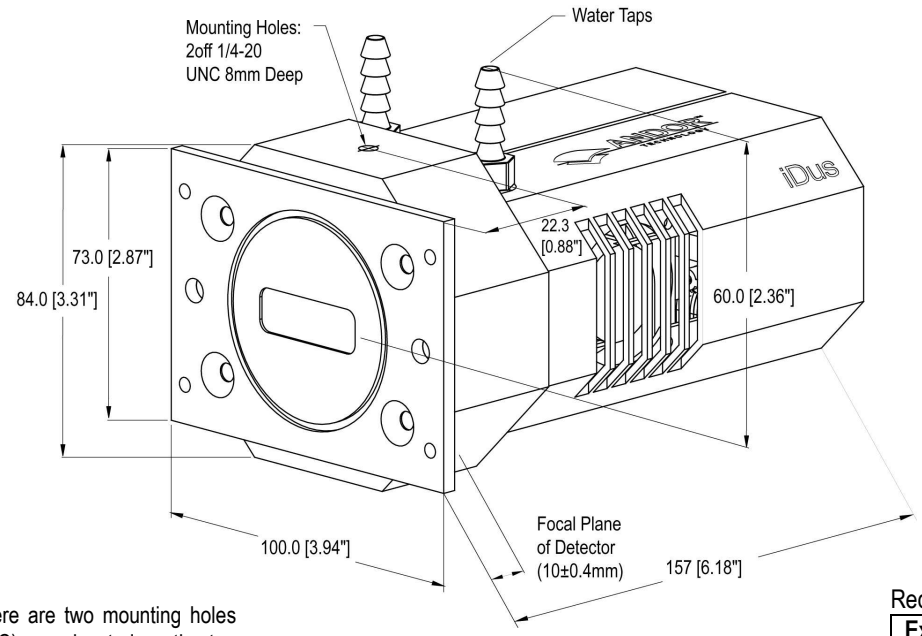
The DV420A is supplied with the following:
PS-24 Power supply

The DV420A also requires one of the following software options:
Andor MCD – a ready-to-run Windows 2000 or XP-based package with rich functionality for data acquisition and processing
Andor-SDK-CCD – a DLL driver and software development kit that let you create your own applications for the Andor camera. Available for Windows 2000 or XP and Linux.

The DV420A is available with the following input window options – must be ordered at time of build:
OPTION-C1-AR1 AR coated quartz window (broadband visible 400-900nm)
OPTION-C1-MGF2 Magnesium Fluoride window

The DV420A may be used with the following accessories:
RC180 200W Re-circulator for enhanced cooling performance
SD-166 iDus shutter driver
P25 Shutter Prontor 25mm shutter

Contact Andor for any of your custom requirements. (Contact details on back page)



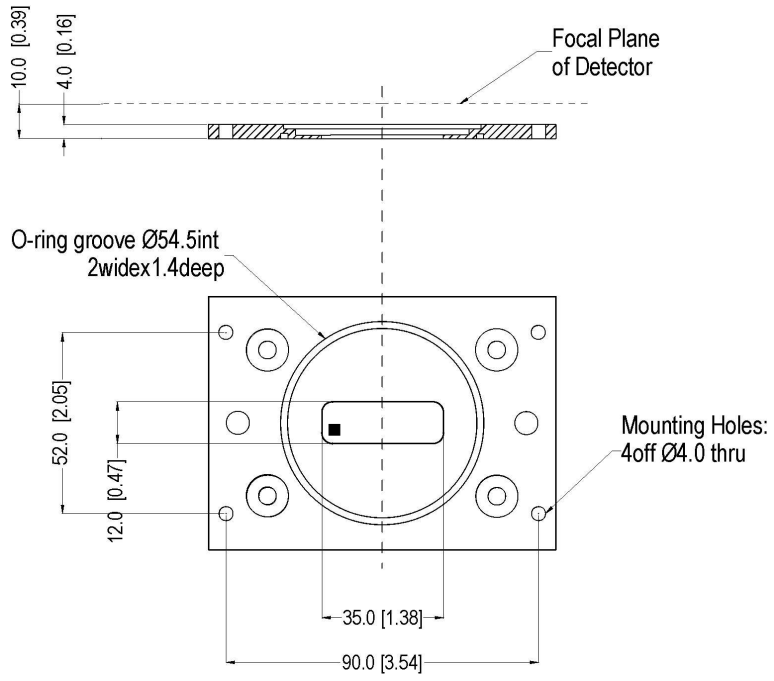
Dimensions in mm unless otherwise indicated.

Weight: 2 Kg [4 lb 8 oz]

Note: There are two mounting holes (1/4-20UNC), one located on the top of the CCD head and one on the bottom. They are positioned centrally at a distance of 22mm from the front of the front face.

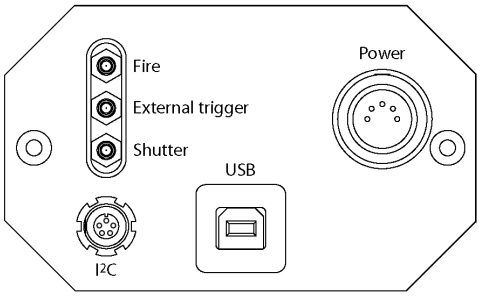
Required Cable Clearance at back:

Exit connector type	Clearance
PS24	90 mm
USB cable	60 mm
Right angled variant of PS24	40 mm



■ = position of pixel (1,1)

Connectors on backplate



NOTE - Specifications are subject to change without notice.

♦1 Edge pixels may exhibit a partial response.

♦2 The register well depth that is actually accessible by the CCD system is dependant on the sensitivity setting.

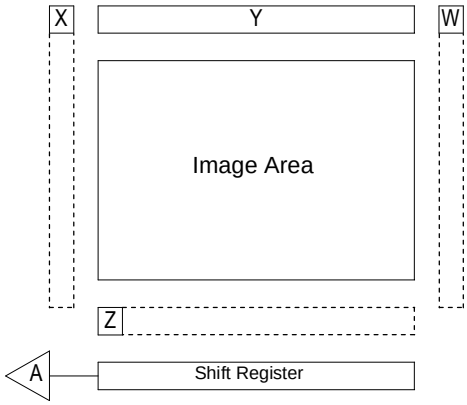
♦3 Based on a Horizontal Pixel Readout of 100KHz and a vertical pixel shift of 8µS.

♦4 Chip manufacturers may include a number of pixels or elements that are neither active nor part of the shift register. Andor refers to these pixels as dummy pixels and represents them in a 4-part notation (*W,X,Y,Z*), where:

W = dummy pixels to the right of the shift register (non-amplifier end)
X = dummy pixels to the left of the shift register (amplifier end)
Y = dummy pixels at the top of the image area
Z = dummy pixels between the shift register and the image area.

A = position of output amplifier

It should be noted that the elements can be made up of either pixels, rows or columns.
The diagram shows what is seen when looking at the front of the CCD.



♦5 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.

♦6 Vertical speeds are software selectable. With the exception of Open Electrode devices, all sensors are guaranteed to operate at 16µs vertical pixel shift and most can be clocked faster. At these faster speeds there may be some degradation of Charge Transfer Efficiency (C.T.E.). Open Electrode devices are guaranteed to have full C.T.E. at 32µS, but will operate at 16µS vertical pixel shift with a maximum rep rate of 65Hz.

♦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 –50˚C and minimum exposure time under dark conditions. Noise is measured at the highest available pre-amplifier gain for each speed.

♦8 Quantum efficiency of the CCD sensor is measured by the CCD Manufacturer.

♦9 The graph shows typical dark current level as a function of temperature for front illuminated (FI) and back illuminated (BI) CCDs. The dark current measurement is averaged over the CCD area excluding any regions of blemishes.

♦10 Cooling is provided by the use of an external mains driven power brick. Minimum temperatures listed are typical values. Systems are specified in terms of minimum dark current achievable rather than absolute temperature.

Need more information? Contact us on:

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