

## IMAGING

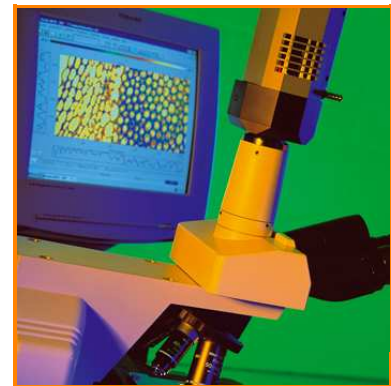


Andor's DV437 frame transfer camera is ideal for the fast imaging required by demanding scientific and industrial applications. The 512 x 512 array and 13 $\mu\text{m}^2$  pixels give excellent resolution and dynamic range. The camera is equally effective for both low and high light imaging and is ideal for use with a microscope. The system also benefits from negligible dark current with thermoelectric cooling down to  $-75^\circ\text{C}$ .

- Peak QE of 95%
  - .... High detector sensitivity
- Min operating temp of  $-75^\circ\text{C}$  with TE Cooling
  - .... Negligible dark current without the aggravation or safety concerns associated with  $\text{LN}_2$
- Guaranteed hermetic vacuum seal
  - .... Optimises sensor performance (through higher QE and lower dark current) and ensures that this performance is retained year after year
- Single window design
  - .... Delivers maximum photon throughput
- Front or back illuminated sensor
  - .... Offers the best price/performance options
- 13 x 13 $\mu\text{m}$  pixel size
  - .... Optimized pixel size for dynamic range and high resolution
- Frame Transfer technology
  - .... Ideal for fast imaging with the advantage of having no moving parts or concerns about mechanical vibration  
Increased duty cycle when imaging very low photon fluxes i.e. minimal loss of signal while reading out the CCD
- Andor Solis software
  - .... Friendly Windows user interface offers system integration, automation and advanced data manipulation facilities

### ● Camera Overview

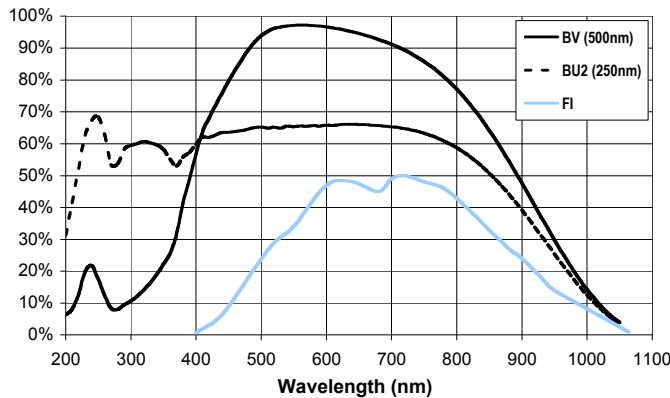
Active Pixels	512 x 512
Pixel Size (WxH; $\mu\text{m}$ )	13 x 13
Image Area (mm)	6.6 x 6.6
Pixel Well Depth ( $e^-$ , typical)	100,000
Register Well Depth ( $e^-$ , typical) *1	200,000
Max full frames per sec @ 1MHz digitization (typical)	3
Read Noise ( $e^-$ , typical)	7.5 @ 1 MHz



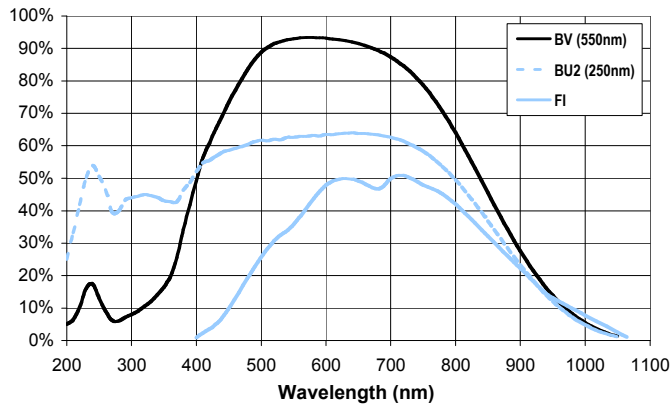
● System Characteristics	Dummy Pixels *2	24, 24, 16, 528
	Linearity (% , maximum) *3	1
	Vertical Clock Speed (μs)	16
	Sensitivity (e-/count) @ 1&2, 16, 32 μs	2, 1.4, 0.7
	Camera window type	Single quartz window, AR coating available

● Noise	<b>System Readout Noise (typical; e-) *4</b>	<b>Typical</b>	<b>Maximum</b>
	31 kHz pixel readout rate	2.6	4.5
	1 MHz pixel readout rate	7.5	12

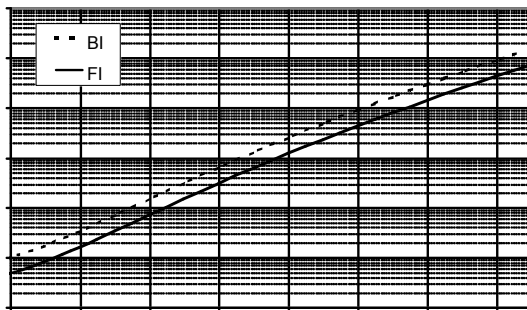
● Quantum Efficiency at Room Temp \*5



● Quantum Efficiency at -100°C



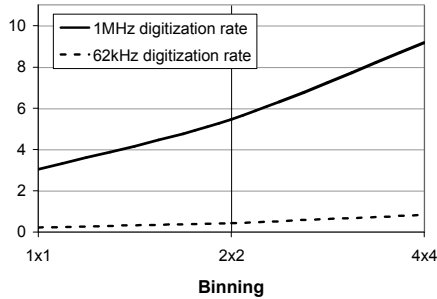
● Dark Current \*6



● Minimum Temperature (°C)

	Auxiliary Cooling Connector	External PSU PS150
Air-cooled (ambient air @ 20 °C)	-50	-60
Re-circulator (RC180) (ambient air @ 20 °C)	-60	-70
Water-cooled (@ 10 °C, 0.75 l / min)	-65	-75

● **Max Frames per sec** <sup>\*7</sup>



● **Power Requirements** <sup>\*8</sup>

(for kHz [MHz] operation)		No Auxiliary Cooling Connector		Auxiliary Cooling Connector	
No cooling	slot	2.4A	[3A]	2.4A	[3A]
	connector	-	-	-	-
TE cooler on	slot	1.5A	[1.5A]	0A	[0A]
	connector	-	-	2.2A	[2.2A]
<b>Total</b>		<b>3.9A</b>	<b>[4.5A]</b>	<b>4.6 A</b>	<b>[5.2A]</b>

(Power drawn from +5V power supply; Optional external power supply (PS150) plugs into the mains)

● **Computer Requirements**

Minimum:	Also:
800MHz Pentium + 256Mbytes RAM	<ul style="list-style-type: none"> <li>• PCI-compatible computer</li> <li>• PCI slot must have bus master capability</li> </ul>
Recommended:	
2.4GHz Pentium (or better) + 512 Mbytes RAM	<ul style="list-style-type: none"> <li>• Available auxiliary internal power connector</li> <li>• Minimum of 25MB free hard disc to install software</li> </ul>

● **Operating & Storage Conditions**

<b>Operating Temperature</b>	0°C to 30°C ambient
<b>Relative Humidity</b>	< 70% (non-condensing)
<b>Storage Temperature</b>	-25°C to 55°C

● **For complete system use with...**

The DV437 requires one of the following controller card options:

- CCI-001** PCI Controller card with 16-bit 62KHz & 31KHz pixel readout rate options
- CCI-010** PCI Controller card with 16-bit 1MHz, 500KHz, 62KHz & 31KHz pixel readout rate options

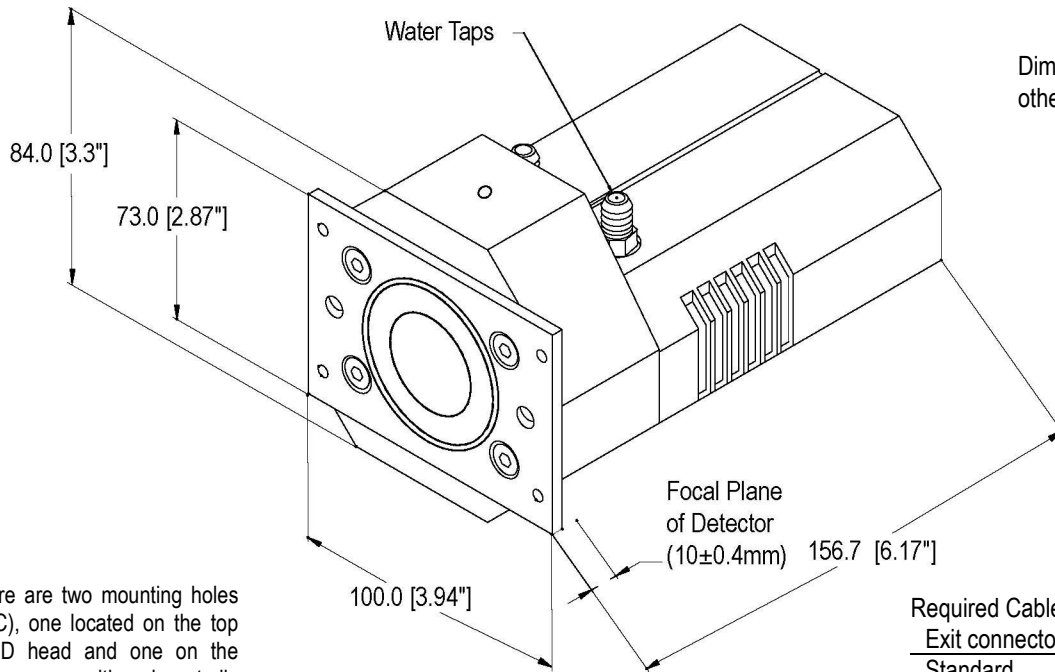
The DV437 also requires one of the following software options:

- Andor Solis Software** – 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.

The DV437 may be used with the following accessories:

- PS150** Power Supply Module for achieving the lowest temperatures
- RC180** 200W Re-circulator for enhanced cooling performance
- IO160** Breakout box for interface signals
- IO165** Breakout box for additional interface signals
- LM-NIKON-F** Nikon F-mount lens adaptor
- LMS-NIKON-F** Nikon F-mount lens adaptor with shutter

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



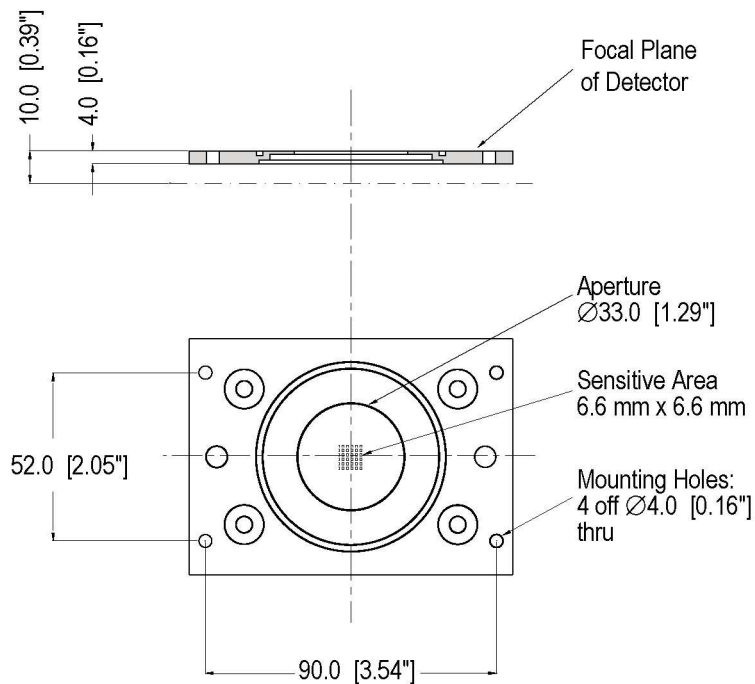
Dimensions in mm unless otherwise indicated.

**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
Standard	140 mm
45° angle	50 mm
90° angle	40 mm



**NOTE - Specifications are subject to change without notice.**

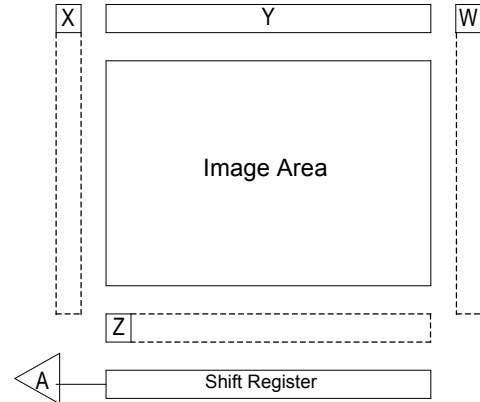
◆1 The register well depth that is actually accessible by the CCD system is dependant on the gain setting.

◆2 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.



◆3 Linearity is measured from a plot of Counts vs. Signal over the 16 bit dynamic range. Linearity is expressed as a percentage deviation from a straight line fit. This value is not measured on individual systems.

◆4 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.

◆5 Quantum efficiency of the CCD sensor is measured by the CCD Manufacturer.

◆6 The graph shows typical dark current level as a function of temperature for front illuminated (FI) and back illuminated (BI) CCDs. Systems are specified in terms of minimum dark current achievable. The dark current measurement is averaged over the CCD area excluding any regions of blemishes.

◆7 The max frames / second for imaging CCDs is the maximum speed at which the device can acquire images in a standard system. The graph shows the frame rate for both 1MHz and 62kHz digitization rates for a range of binning combinations. It also assumes internal trigger mode of operation. Note that higher frame rates are achievable by using crop mode.

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

### Ordering Information:

To order this camera

- quote model number **DV437-BV**: back illuminated – AR coated for optimal performance in the visible region
- BU2**: back illuminated – AR coated for optimal performance in the 250 nm region
- FI**: standard front illuminated device

Need more information? Contact us at:

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