

Features and Benefits

- **1 e⁻ read noise**
Lower detection limit than any CCD
- **5.5 megapixel sensor format and 6.5 μm pixels**
Extremely sharp resolution over a 22 mm field of view: Ideal for cell microscopy and astronomy
- **TE cooling to -40°C**
Minimization of dark current and pixel blemish
- **Rapid frame rates**
100 fps Full Frame; 208 fps @ 1.4 megapixel ROI; 1688 fps @ 144 x 128 ROI
- **Dual-Gain amplifiers**
Extensive dynamic range of 25,000:1 @ 30 frames/sec
- **UltraVac™ *1**
Sustained sensor protection and unequalled cooling with 5 year warranty
- **Rolling and global shutter**
Maximum flexibility across all applications
- **Data flow monitor**
Innovatively manage acquisition capture rates vs data bandwidth limitations
- **4 GB on-head memory**
Allows maximum frame rate burst at 16-bit data range
- **Dynamic Baseline Clamp**
Ensures quantitative stability
- **iCam**
Fast exposure switching
- **Single input window**
Ensures maximum photon throughput

Vacuum cooled Scientific CMOS with 1 e⁻ read noise

In a -40°C vacuum cooled platform, loaded with FPGA intelligence, Andor's Neo sCMOS camera is designed exclusively to drive optimal performance from this exciting and innovative new technology development.

Unlike any CMOS or CCD technology to come before it, Neo sets radical new benchmarks in its unique ability to simultaneously deliver highest specifications in sensitivity, resolution, speed, dynamic range and field-of-view: true scientific imaging, without compromise.

Specifications Summary

Active pixels (W x H)	2560 x 2160 (5.5 Megapixel)
Sensor size	16.6 x 14.0 mm (21.8 mm diagonal)
Pixel size (W x H)	6.5 μm
Pixel well depth (typical)	25,000 e ⁻
Pixel readout rate (MHz)	560, 400, 200
Read noise	1 e ⁻
Maximum cooling	-40°C
Maximum frame rate	100 fps @ full frame 1688 fps @ 144 x 128 ROI

System Specifications^{*2}

Sensor type	Front Illuminated Scientific CMOS
Active pixels (W x H)	2560 x 2160 (5.5 Megapixel)
Sensor size	16.6 x 14.0 mm, 21.8 mm diagonal
Pixel size (W x H)	6.5 µm
Pixel readout rate (MHz)	560 (280 MHz x 2 sensor halves) 400 (200 MHz x 2 sensor halves) 200 (100 MHz x 2 sensor halves)
Read noise (e⁻)^{*3}	
200 MHz	1
400 MHz	1.2
560 MHz	1.4
Minimum temperature air cooled^{*4}	-30°C
Minimum temperature coolant	-40°C
Dark current, e⁻/pixel/sec^{*5}	
@ -30°C	0.07
@ -40°C	0.03
Data range	11 bit & 16 bit
Maximum Quantum Efficiency	57%
Readout modes	Rolling Shutter and Global Shutter (Rolling Shutter only variant available)
Internal memory buffer size	4 GB
Maximum frame rates	
2560 x 2160 (full frame)	100 fps Rolling Shutter, 50 fps Global Shutter
144 x 128 ROI	1688 fps Rolling Shutter, 844 fps Global Shutter
Pixel well depth (e⁻)	25,000

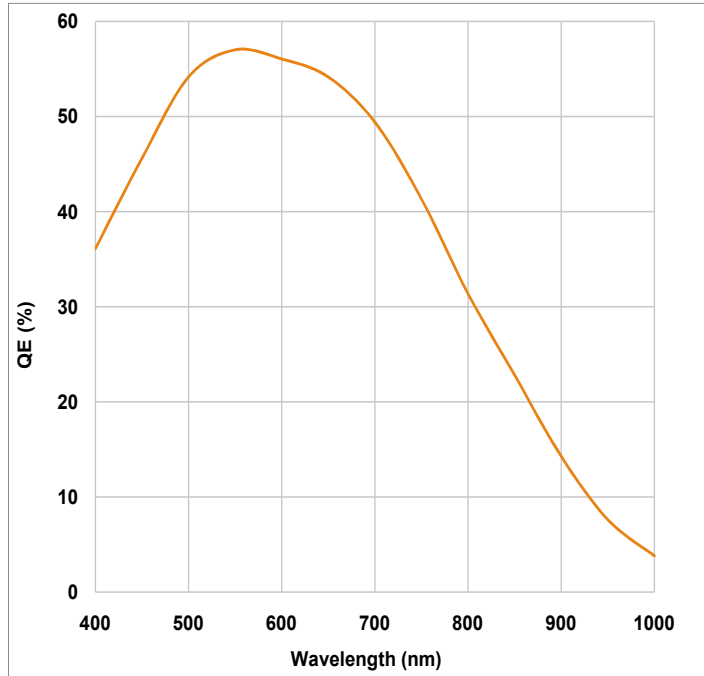
Advanced Performance Specifications^{*2}

Maximum dynamic range	25,000:1
Linearity (% , maximum)^{*6}	Better than 99%
MTF (Nyquist @ 555 nm)	45%
Photon Response Non-Uniformity (PRNU)	< 2% (uncorrected)
Sub-array	4 MP, 3 MP, HD, 1.4 MP, 528 x 512, 144 x 128
Triggering	External Trigger, Fire, Arm
System window type	Single window with double-sided AR coating
Software interface	Solis Imaging, iQ, Andor SDK, 3 rd party interfaces
Anti-blooming factor	x 10,000

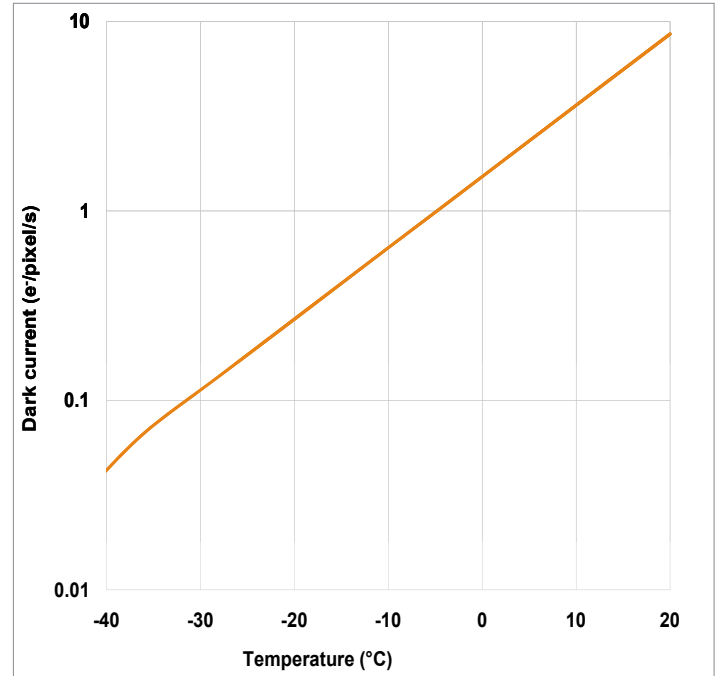
Maximum Frame Rate Table^{*7}

Array Size	Cameralink - Extended Kinetic Series		Burst to 4 GB Internal Memory	
	Rolling Shutter	Global Shutter	Rolling Shutter	Global Shutter
2560 x 2160 (full frame)	30	15	100	50
2064 x 2048	32	16	106	54
1392 x 1040	63	31	208	105
528 x 512	125	62	403	211
144 x 128	530	265	1688	844

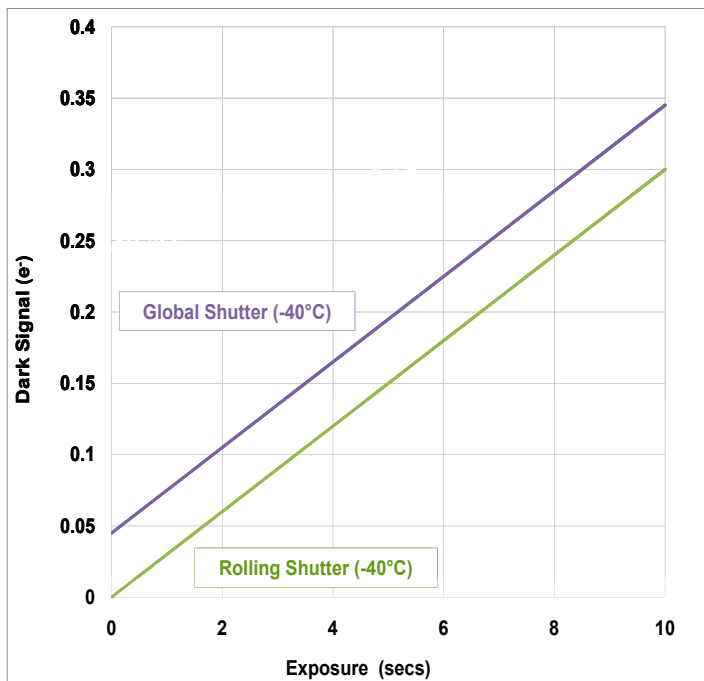
Quantum Efficiency (QE) Curve⁸



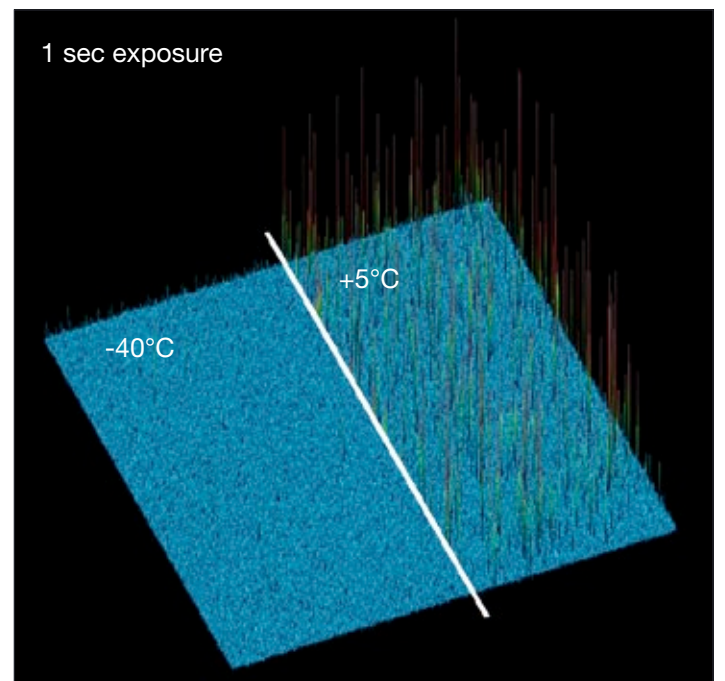
Dark Current vs Cooling Temperature⁵



Dark Signal vs Exposure Time (Rolling and Global Shutter Modes)⁹



Hot Pixels v Cooling Temperature



Comparison of hot pixel blemishes at cooling temperatures of +5°C and -40°C @ 1s exposure time; rolling shutter readout mode.

Creating The Optimum Product for You

How to customise the Neo :

Step 1.

Verify lens mount suitability.

Step 2.

The Neo comes with 2 readout mode options. Please select the option which best suits your needs.

Step 3.

Please indicate which software you require.

Step 4.

For compatibility, please indicate which accessories are required.

DC-152Q-**C****R**0-FI
example shown

Step 1.

Choose lens mount option

C: C-mount
F: F-mount

Step 2.

Choose readout mode option

0: Rolling & Global shutter
R: Rolling shutter only

Step 3.

The Neo also requires at least one of the following software options:

Solis Imaging A 32-bit application compatible with 32-bit Windows (XP, Vista and 7) offering rich functionality for data acquisition and processing. AndorBasic provides macro language control of data acquisition, processing, display and export.

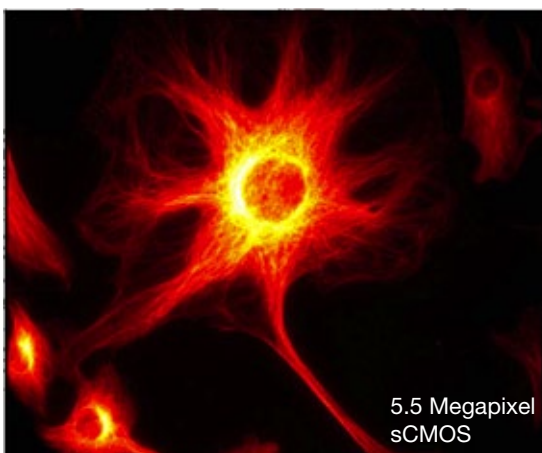
Andor iQ A comprehensive multi-dimensional imaging software package. Offers tight synchronization of camera with a comprehensive range of microscopy hardware, along with comprehensive rendering and analysis functionality. Modular architecture for best price/performance package on the market. Compatible with 32-bit Windows (XP, Vista and 7).

Andor SDK Andor's Software Developers Kit DLL allows you to control the Andor range of cameras from your own application. Available for 32-bit and 64-bit Windows (XP, Vista and 7) and Linux.

Step 4.

The following accessories are available:

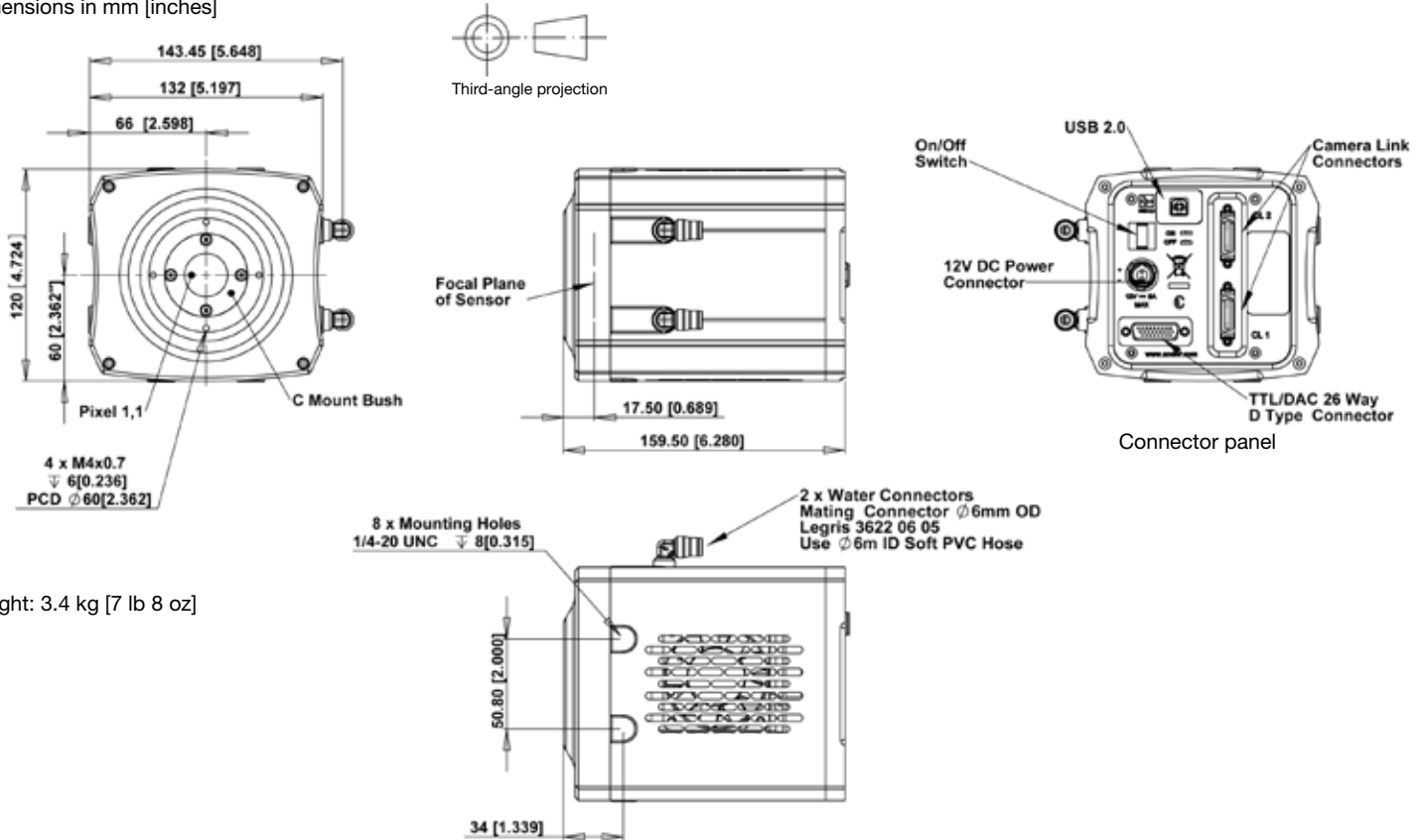
- XW-RECR** Re-circulator for enhanced cooling performance
- ACC-XW-CHIL-160** Oasis 160 Ultra compact chiller unit
- OA-CNAF** C-mount to Nikon F-mount adapter
- OA-COFM** C-mount to Olympus F-mount adapter
- OA-CTOT** C-mount to T-mount adapter
- OA-ECAF** Auto extension tubes (set of 3) for Canon AF
- OA-ECMT** Auto extension tubes (set of 3) for C-mount
- OA-ENAF** OA-ENAF Auto extension tubes (set of 3) for Nikon AF



Field of View (FoV) comparison: sCMOS v 1.4 megapixel interline CCD.

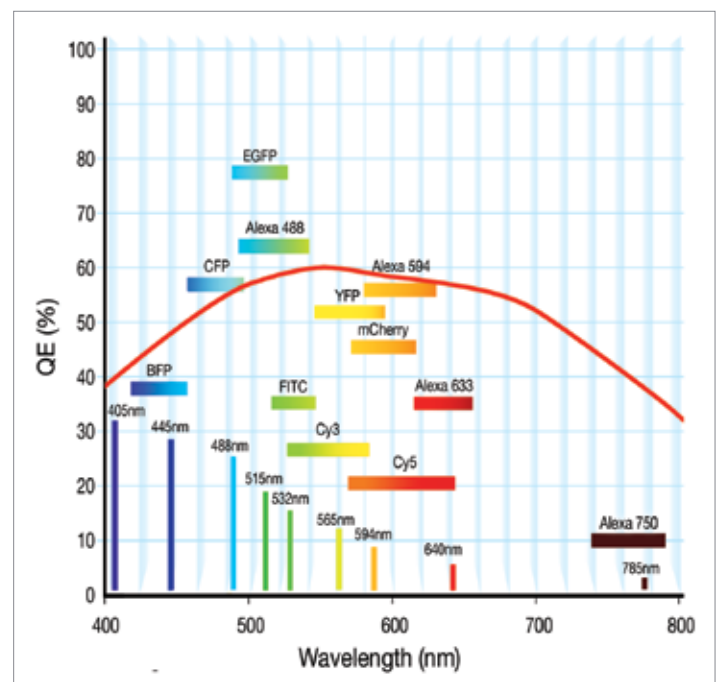
Product Drawings

Dimensions in mm [inches]



Weight: 3.4 kg [7 lb 8 oz]

QE v Fluorophore Emissions



Connecting to the Neo

Camera Control

Camera link (dual connectors are fitted to allow future upgrades to a higher bandwidth solution)

TTL / Logic

Connector type: 26 way D Type with TTL I/Os for External Trigger, Fire Pulse and Arm

Firmware updates through USB

Minimum cable clearance required at rear of camera
90 mm

Regulatory Compliance

Compliant with the requirements of the EU EMC and LV Directives through testing to EN 61326-1 and EN 61010-1

External power supply PSE-approved



Order Today

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China

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Fax +86 (10) 6445 5401

Items shipped with your camera

- 1x Andor ACZ-03452: 2m Multi I/O timing cable, offering Fire, External Trigger, Shutter and Arm
- 1x 3m USB 2.0 cable Type A → Type B
- 1x Cameralink card & cable
- 1x Power supply with mains cable
- 1x Quick launch guide
- 1x CD containing Andor user guides
- 1x Individual system performance sheet

Footnotes: Specifications are subject to change without notice

1. Assembled in a state-of-the-art Class 1,000 clean room facility, Andor's UltraVac™ vacuum process combines a permanent hermetic vacuum seal (no o-rings), with a stringent protocol to minimize out-gassing, including use of proprietary materials. Outgassing is the release of trapped gases that would otherwise prove highly problematic for sensor longevity.
2. Figures are typical unless otherwise stated.
3. Readout noise is presented for Rolling Shutter readout mode, defined as the median over the sensor area excluding any regions of blemishes. It is a combination of sensor readout noise and A/D noise.
4. Specified minimum air cooled temperature assumes ambient temperature of 25°C. Specified minimum temperature with coolant assumes coolant temperature of 16°C.
5. Dark current measurement is taken as a median over the sensor area excluding any regions of blemishes.
6. Linearity is measured from a plot of Signal vs. Exposure Time over the full dynamic range.
7. Maximum speed at which the camera can acquire images at full resolution and a range of sub-array sizes. The tables present (a) frame rates achieved during burst to 4 GB on-head camera memory; (b) frame rates achieved over extended kinetic series lengths of between 6,000 frames (full resolution) and 15,000 frames (144 x 128). Note that the write speed of hard drive and additional processing overheads can impact these figures. See technical note entitled '*Neo sCMOS Data Flow Considerations and PC Recommendations*' for further detail on speed tests, PC recommendations and sustained acquisition performance.
8. Quantum efficiency of the sensor as measured by the sensor manufacturer.
9. Total darksignal in Global Shutter mode carries an additional fractional fixed 'Global Shutter Darksignal' (GSD) contribution that is imposed during readout and is therefore independent of exposure time. GSD is equal to 0.11 e⁻ @ -30°C; 0.045 e⁻ @ -40°C. Darksignal for a given exposure time in Global Shutter mode is thus calculated by (dark current x exposure) + GSD. GSD represents the offset between the two curves shown for -40°C.

Recommended Computer Requirements:

- 2.68 GHz Quad Core + 4 GB RAM
NOTE: Increased RAM can be utilised for continuous fast data spooling
- Hard Drive: Minimum 250 MB/sec continuous write, e.g. OCZ Z-drive R2 P88, 1TB, 950 MB/sec
- PCIe x8 slot
- Windows (XP, Vista and 7)
- USB 2.0 (for future firmware upgrades): Intel 82801 (or equivalent) I/O controller hub to provide USB 2.0 interface
- See technical note entitled '*Neo sCMOS Data Flow Considerations and PC Recommendations*'

Operating & Storage Conditions

Operating Temperature 0°C to 40°C ambient
Relative Humidity < 70% (non-condensing)
Storage Temperature -25°C to 55°C

Power Requirements

110 - 240 VAC, 50 - 60 Hz



µManager



Windows is a registered trademark of Microsoft Corporation.
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