ANDOR

Ultra Sensitive Imaging

Features and Benefits

- **TE cooling to -100°C**
  Critical for elimination of dark current detection limit

- **QE$_{max}$ 95% from back-illuminated sensor (BV model)**
  Highest photon collection efficiency

- **Ultra low noise readout**
  Intelligent low-noise electronics offer the most 'silent' system noise performance available

- **Multi-Megahertz pixel readout**
  High frame rates achievable

- **UltraVac™ •1**
  Critical for sustained vacuum integrity and to maintain unequalled cooling and QE performance, year after year

- **24 x 24 μm pixel size**
  Excellent dynamic range and photon collection area

- **USB 2.0 connection**
  Simple Plug & Play connection

- **Integrated shutter**
  C-mount shutter as standard. Closed during readout to avoid vertical smear

- **Fast Kinetics & Cropped Sensor modes**
  For fast temporal resolution down to sub-millisecond

- **Windows, Linux & Labview**
  Andor's user-friendly SDK supports both Windows and Linux OS. Labview VI package available

Industry-Leading Ultra-Sensitive Imaging Technology

Andor's iKon-M 912 series cameras are designed to offer the ultimate in back-illuminated, low noise performance, ideal for demanding imaging applications.

The 512 x 512 CCD array with 24 μm pixels has been optimized for the best signal-to-noise and dynamic range. It boasts 95% QE$_{max}$ and exceptionally low readout noise.

The iKon-M 912 series benefit from negligible dark current with industry-leading thermoelectric cooling down to -100°C, enabling use of significantly longer exposure times than offered by any other camera on the market using this same sensor. The iKon-M platform offers Multi-Megahertz readout for more rapid acquisition or fast focusing, along with direct USB 2.0 connectivity to PC.

Specifications Summary

Active pixels	**512 x 512**
Sensor size	**12.3 x 12.3 mm**
Pixel size (W x H)	**24 μm x 24 μm**
Active area pixel well depth	**300,000 e$^-$**
Maximum readout rate	**2.5 MHz**
Read noise	**3 e$^-$**
Maximum cooling	**-100°C**
Frame rate	**8.1 fps (full frame)**

System Specifications[2]

Sensor options	BV: Back Illuminated CCD, Vis optimized FI: Front Illuminated CCD
Active pixels	512 x 512
Pixel size	24 x 24 μm
Image area	12.3 x 12.3 mm with 100% fill factor
Minimum temperatures [3] Air cooled Coolant recirculator Coolant chiller, coolant @ 10°C, 0.75l/min	-80°C -95°C -100°C
Digitization	16-bit
Blemish specifications	Grade 1 as per sensor manufacturer definition
System window type	Single UV-grade fused silica window; AR coated on both sides
Interface	USB 2.0
Lens mount	C-mount

Advanced Performance Specifications[2]

Dark current, e-/pixel/sec [4] @ -80°C @ -100°C	0.0011 0.0006
Pixel readout rates	2.5, 1, 0.05 MHz
Pixel well depth	300,000 e-
Read noise (e-) [5] 0.05 MHz 1 MHz 2.5 MHz	3.0 10.4 13.2
Linearity [6]	Better than 99%
Vertical clock speed	11.4 to 45 μs (software selectable)

Frame Rates[7]

50 kHz				
Binning	Full Frame	256 x 256	128 x 128	64 x 64
1 x 1	0.2	0.4	0.7	1.4
2 x 2	0.7	0.9	1.5	2.7
4 x 4	2.3	2.1	3.1	5
8 x 8	6.5	4.1	5.6	8.3
16 x 16	12.6	7.2	9.1	12.3

1 MHz				
Binning	Full Frame	256 x 256	128 x 128	64 x 64
1 x 1	3.5	6.7	12.6	22.3
2 x 2	10.3	14.9	23.8	37
4 x 4	23.6	27.6	38.8	53.4
8 x 8	40.7	43	54.7	68
16 x 16	55.1	57.6	68.2	78.5

2.5 MHz				
Binning	Full Frame	256 x 256	128 x 128	64 x 64
1 x 1	8.1	15	26.3	42.2
2 x 2	18.2	28.2	43	60.4
4 x 4	32.9	44.7	60.6	76.2
8 x 8	48.7	60.9	75.2	87.3
16 x 16	61.5	73.4	85.3	94

Quantum Efficiency Curves [8]

20°C

Bioluminescence image showing an agar plate streaked with an *Escherichia coli* strain containing bioluminescence genes
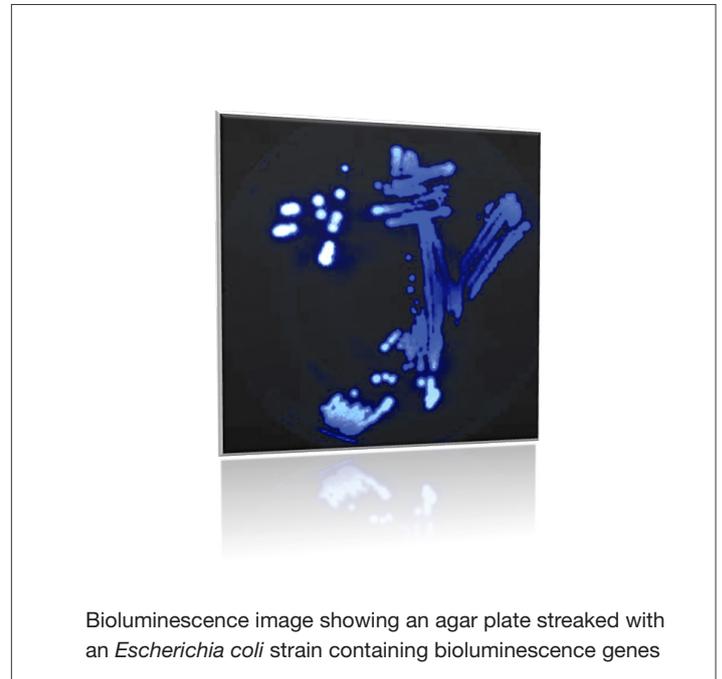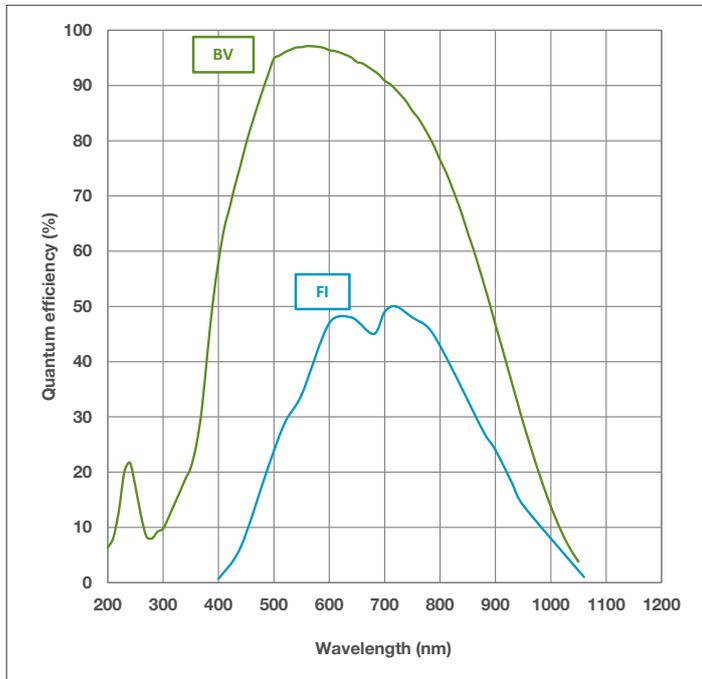
Have you found what you are looking for?

Need a larger sensor? The iKon-L 936 houses a 4 megapixel, back-illuminated CCD sensor (27.6 mm x 27.6 mm), cooling to -100°C, low noise performance and up to 5 MHz readout.

Need the ultimate in sensitivity? The iXon back-illuminated EMCCD series offers > 90% QE and single photon sensitivity, combined with fast frame rate performance.

Need faster frame rates? The Neo and Zyla sCMOS deliver up to 100 frames/sec (full frame).

Need smaller pixels? Check out the Luca[EM], Clara Interline CCD and the Neo and Zyla sCMOS.

Need sensitive performance in the red/NIR with zero fringing (etaloning)? The iKon-M 934 BEX2-DD is a deep depletion CCD with superb red/NIR quantum efficiency, also incorporating fringe suppression technology. The single photon sensitive iXon EMCCD cameras also offers excellent sensitivity across the red/NIR wavelength region with zero fringing.

Need a price/performance EMCCD? The Luca[EM] R is a compact 1 Megapixel EMCCD USB 2.0 camera, offering high resolution and ultra-sensitivity at 12.4 frames/sec.

Need a customised version? Please contact us to discuss our Customer Special Request options.

Check out Andor's New Neo and Zyla sCMOS. *Simultaneously* offering, ultra-sensitivity, high speed, high-resolution, large field of view & high dynamic range!

Creating The Optimum Product for You

How to customise the iKon-M 912:

Step 1.

The iKon-M 912 comes with 2 options for sensor types. Please select the sensor which best suits your needs.

Step 2.

Please indicate which software you require.

Step 3.

For compatibility, please indicate which accessories are required.

DU912N- BV
example shown

Step 1.

Choose sensor type

BV: Back Illuminated CCD, Vis optimized
FI: Standard front illuminated device

Step 2.

The iKon-M requires at least one of the following software options:

Solis Imaging A 32-bit application compatible with 32 and 64-bit Windows (XP, Vista 7 and 8) offering rich functionality for data acquisition and processing. AndorBasic provides macro language control of data acquisition, processing, display and export.

Andor SDK A software development kit that allows you to control the Andor range of cameras from your own application. Available as 32 and 64-bit libraries for Windows (XP, Vista, 7 and 8), compatible with C/C++, C#, Delphi, VB6, VB.NET, LabVIEW and Matlab. Linux SDK compatible with C/C++.

**Third party software compatibility**
Drivers are available so that the iKon-M 912 range can be operated through a large variety of third party imaging packages. See Andor web site for detail: http://www.andor.com/software/

Step 3.

The following accessories are available:
XW-RECR Re-circulator for enhanced cooling performance
ACC-XW-CHIL-160 Oasis 160 Ultra compact chiller unit
OA-CCFM C-mount to Canon F-mount adapter
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 ext. tubes (set of 3) for Canon AF
OA-ECMT Auto ext. tubes (set of 3) for C-mount
OA-ENAF Auto ext. tubes (set of 3) for Nikon AF
XU-RECR/TRANS USB 2.0 - Transmitter and Receiver, including 2 power supplies

Product Drawings

Dimensions in mm [inches]

Third-angle projection

47.0 [1.85]

4 off mountings to clear 6-32 UNC

107.5 [4.23]

52.0 [2.04]

52.0 [2.04]

90.0 [3.54]

105.0 [4.13]

208.4 [8.2]

57.3 [1.95]

Water connections 2 off 6.0mm internal diameter soft PVC hose

Focal Plane of Detector

iKon-M

17.5 [0.69] ±0.4 [0.16]

Air in (air exit opposite side)
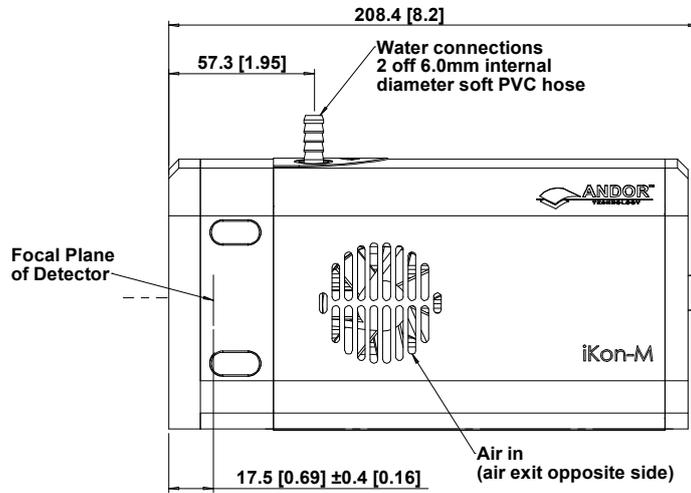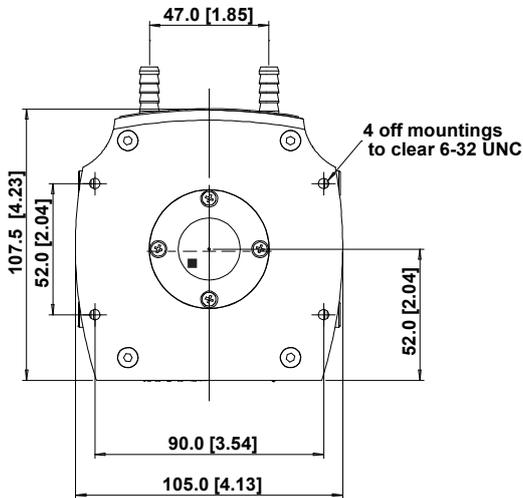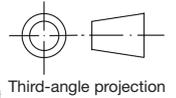
■ = position of pixel 1,1

Weight: 2.2 kg [4 lb 13 oz]

Connecting to the iKon-M

Camera Control
Connector type: USB 2.0

TTL / Logic
Connector type: SMB, provided with SMB - BNC cable
Fire (Output), External Trigger (Input), Shutter (Output)

I²C connector
Compatible with Fischer SC102A054-130
Shutter (TTL), I²C Clock, I²C Data, +5 Vdc, Ground

Minimum cable clearance required at rear of camera
90 mm

25.4 [1.0]

25.4 [1.0]

25.4 [1.0]

3 off 1/4-20 UNC x 1/2" deep
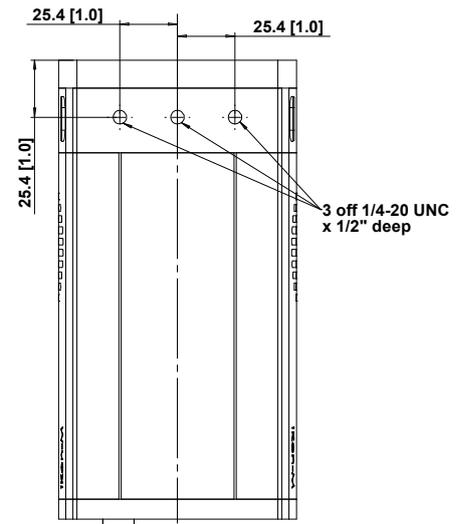
Mounting hole locations

Typical Applications

Astronomy
Biochip reading
Bioluminescence/Chemiluminescence
Bose-Einstein Condensation (BEC)
High Throughput Screening
Hyper-Spectral Imaging
Laser Induced Fluorescence (LIF)
Neutron Radiography
Pressure Sensitive Paints
Raman Imaging
Semiconductor analysis

47.0 [1.85]

4 off mountings to clear 6-32 UNC

52.0 [2.04]

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90.0 [3.54]

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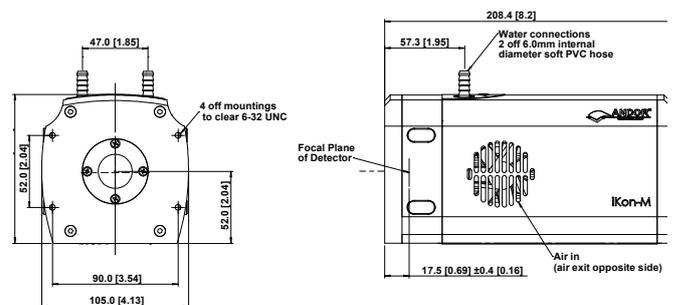
Rear connector panel

Order Today

Need more information? At Andor we are committed to finding the correct solution for you. With a dedicated team of technical advisors, we are able to offer you one-to-one guidance and technical support on all Andor products. For a full listing of our regional sales offices, please see: **www.andor.com/contact**

Our regional headquarters are:

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Fax +44 (28) 9031 0792

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Fax +81 (3) 3518 6489

North America
Connecticut, USA
Phone +1 (860) 290 9211
Fax +1 (860) 290 9566

China
Beijing
Phone +86 (10) 5129 4977
Fax +86 (10) 6445 5401

Items shipped with your camera

1x 2 m BNC - SMB connection cable
1x 3 m USB 2.0 cable Type A to Type B
1x Power supply with mains cable
1x Quick launch guide
1x CD containing Andor user guides
1x Individual system performance booklet

Footnotes: Specifications are subject to change without notice

1. Assembled in a state-of-the-art cleanroom facility, Andor's UltraVac™ vacuum process combines a permanent hermetic vacuum seal (no o-rings), with a stringent protocol to minimize outgassing, including use of proprietary material.
2. Figures are typical unless otherwise stated.
3. Specified minimum air cooled temperature assumes ambient temperature of 25°C. Specified minimum temperature with coolant assumes coolant temperature of 10°C.
4. The dark current measurement is averaged over the sensor area excluding any regions of blemishes.
5. Readout noise is for the entire system. It is a combination of sensor readout noise and A/D noise. Measurement is for Single Pixel readout with the sensor at a temperature of -80°C and minimum exposure time under dark conditions.
6. Linearity is measured from a plot of counts vs exposure time under constant photon flux up to the saturation point of the system.
7. The frame rates shown are for a range of binning or array size combinations. All measurements are made with 11.4 μs vertical shift speed. It also assumes internal trigger mode of operation and minimum exposure time.
8. Quantum efficiency of the sensor at 20°C as supplied by the sensor manufacturer.

Minimum Computer Requirements:
• 3.0 GHz single core or 2.4 GHz multi core processor
• 2 GB RAM
• 100 MB free hard disc to install software (at least 1GB recommended for data spooling)
• USB 2.0 High Speed Host Controller capable of sustained rate of 40MB/s
• Windows (XP, Vista, 7 and 8) or Linux

Operating & Storage Conditions
• Operating Temperature: 0°C to 30°C ambient
• Relative Humidity: < 70% (non-condensing)
• Storage Temperature: -25°C to 50°C

Power Requirements
• 110 - 240 VAC, 50 - 60 Hz

bsi. ISO 9001 Quality Management FM40523
bsi. ISO 14001 Environmental Management EMS91062
CE

Diffraction Limited
Linux
LabVIEW
MATLAB

Windows XP
Windows Vista
Windows 7
Windows 8

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Matlab is a registered trademark of The MathWorks Inc.

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