

## Features and Benefits

- TE cooling to -100°C**  
 Critical for elimination of dark current detection limit
- QE<sub>max</sub> 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<sub>max</sub> 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 <sup>-</sup> |
| Maximum readout rate         | 2.5 MHz                |
| Read noise                   | 3 e <sup>-</sup>       |
| Maximum cooling              | -100°C                 |
| Frame rate                   | 8.1 fps (full frame)   |

## System Specifications<sup>\*2</sup>

|  |  |
|--|--|
| Sensor options   | BV: Back Illuminated CCD, Vis optimized<br>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 <sup>*3</sup><br>Air cooled<br>Coolant recirculator<br>Coolant chiller, coolant @ 10°C, 0.75l/min | -80°C<br>-95°C<br>-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<sup>\*2</sup>

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

## Frame Rates<sup>\*7</sup>

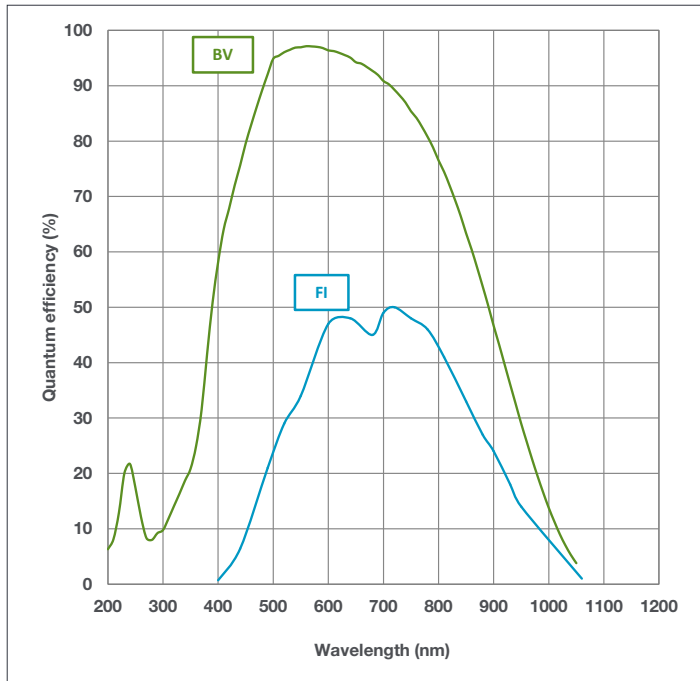
| 50 kHz  |            |           |           |         |
|---------|------------|-----------|-----------|---------|
| Binning | Full Frame | 256 x 256 | 128 x 128 | 64 x 64 |
| 1 x 1   | 0.2        | 0.4       | 0.7       | 1.4     |
| 2 x 2   | 0.7        | 0.9       | 1.5       | 2.7     |
| 4 x 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 <sup>\*8</sup>

20°C



## 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<sup>EM</sup>, 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<sup>EM</sup> 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

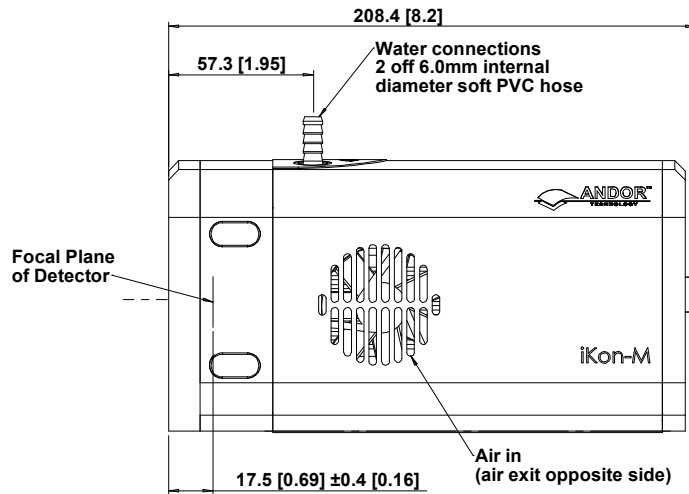
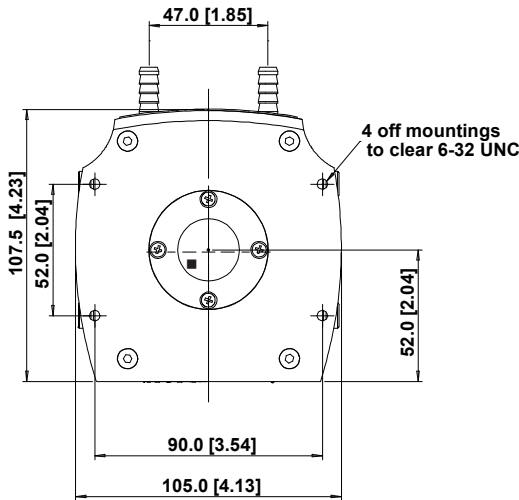
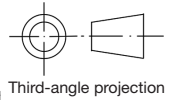
**OA-ECMT** Auto ext. tubes (set of 3) for C-mount

**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]



■ = 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

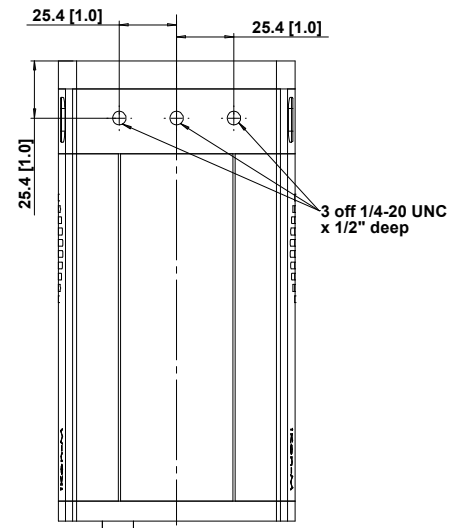
Connector type: SMB, provided with SMB - BNC cable  
Fire (Output), External Trigger (Input), Shutter (Output)

### I<sup>2</sup>C connector

Compatible with Fischer SC102A054-130  
Shutter (TTL), I<sup>2</sup>C Clock, I<sup>2</sup>C Data, +5 Vdc, Ground

### Minimum cable clearance required at rear of camera

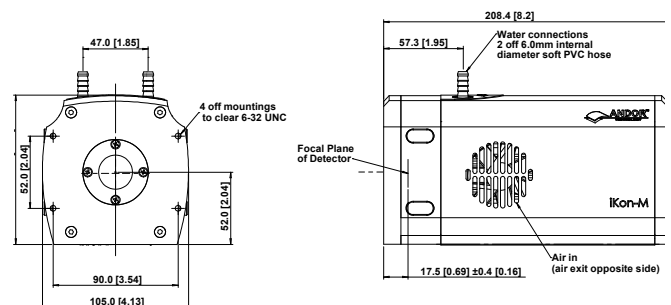
90 mm



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            |



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](http://www.andor.com/contact)

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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



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Labview is a registered trademark of National Instruments.  
Matlab is a registered trademark of The MathWorks Inc.