Newton SY

High Energy Spectroscopy
Light Tight, -100°C
Direct Detection

ANDOR
an **Oxford Instruments** company

High Energy Detection

5 YEAR VACUUM WARRANTY

Features and Benefits

- **'Standalone' Beryllium window** [1]
  200 μm thick Beryllium foil window as standard

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

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

- **Multi-Megahertz readout**
  High repetition rates achievable with low noise electronics

- **Down to 13.5 x 13.5 μm pixel size**
  Optimal balance of dynamic range and resolution

- **Crop mode operation**
  Specialized acquisition mode for continuous imaging with fast temporal resolution

- **USB 2.0 connection**
  USB plug and play – no controller box

- **Enhanced baseline clamp**
  Quantitative accuracy of dynamic measurements

- **Software-selectable pre-amplifier gain**
  Choice of best SNR performance or dynamic range at the touch of a button

- **Software Development Kit (SDK)**
  Ease of control integration into complex setups: Linux, Matlab, Labview, Visual Basic or C/C++

- **Integrated in EPICS**
  Platform is fully integrated into the EPICS control software

'Standalone' Soft X-ray Spectroscopy @ -100°C

Andor's Newton SY series features high-QE sensors ideal for direct detection of low flux and low energy photons such as soft X-rays. A convenient thin Beryllium foil window blocks visible wavelengths with minimal 'Beam Hardening' of X-ray energies. The maintenance free vacuum design allows for long exposures at the highest sensitivity. Variable readout rates enable data readout at up to 3 Megahertz, through the plug and play USB interface.

The camera utilizes a 1024 x 255 (1024 x 256 for BR-DD model) or 2048 x 512 array of 26 x 26 μm or 13.5 x 13.5 μm pixels, with thermoelectric cooling down to -100°C, resulting in negligible dark current and provides unrivalled performance for spectroscopic applications.

Specifications Summary [2]

Active pixels	**1024 x 255 (1024 x 256 for BR-DD model) or 2048 x 512**
Pixel size (W x H)	**26 x 26 or 13.5 x 13.5 μm**
Image area	**Up to 27.6 x 6.9 mm**
Register well depth	
Standard mode	**1,000,000 e-**
High Capacity mode	**600,000 e-**
High Sensitivity mode	**150,000 e-**
Maximum cooling	**-100ºC**
Maximum spectra rate [3]	**1,612 spectra/sec**
Read noise	**2.5 e-**
Dark current	**As low as 0.0001 e-/pixel/sec**
Beryllium foil thickness	**200 μm**

System Specifications •2

Model number	DY920P	DY920P BR-DD	DY940P
Sensor options	• **BN:** Back Illuminated CCD • **FI:** Front Illuminated CCD	• **BR-DD:** Back Illuminated, Deep Depletion CCD	• **BN:** Back Illuminated CCD • **FI:** Front Illuminated CCD
Active pixels •4	1024 x 255	1024 x 256	2048 x 512
Pixel size	26 x 26 µm	26 x 26 µm	13.5 x 13.5 µm
Image area	26.7 x 6.7 mm with 100% fill factor	26.7 x 6.7 mm with 100% fill factor	27.6 x 6.9 mm with 100% fill factor
Minimum temperatures •5 Air cooled Coolant recirculator Coolant chiller, coolant @ 10ºC, 0.75l/min		-80ºC -95ºC -100ºC	
Blemish specifications		Grade 1 sensor as per sensor manufacturer definition	

Advanced Performance Specifications •2

Dark current, e⁻/pixel/sec @ max cooling •6 FI BN BR-DD		DY920P			DY920P BR-DD			DY940P		
Dark current, e⁻/pixel/sec @ max cooling •6 FI BN BR-DD		0.0002 0.0003 -			- - 0.001			0.00003 0.0001 -		
Register well depth Standard mode High Sensitivity mode High Capacity mode		1,000,000 e⁻ - -			1,000,000 e⁻ - -			- 150,000 e⁻ 600,000 e⁻		
Read noise (e⁻) •7	50 kHz	1 MHz	3 MHz	50 kHz	1 MHz	3 MHz	50 kHz	1 MHz	3 MHz	
Standard mode: Typ (Max)	4 (8)	12 (18)	17 (25)	4 (8)	12 (18)	17 (25)	-	-	-	
High Sensitivity mode: Typ (Max)	-	-	-	-	-	-	2.5 (4)	7 (12)	11 (15)	
High Capacity mode: Typ (Max)	-	-	-	-	-	-	9 (12)	27 (32)	37 (50)	
Sensitivity (e⁻/count) Standard mode High Sensitivity mode High Capacity mode		Adjustable from 2.5 - 10 - -			Adjustable from 2.5 - 10 - -			- Adjustable from 1 - 4 Adjustable from 4 - 16		
Vertical clock speed •9		Software selectable between 2 - 179 µs								
Linearity •8		Better than 99%								
Digitization		16-bit								

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Quantum Efficiency Curves [10]
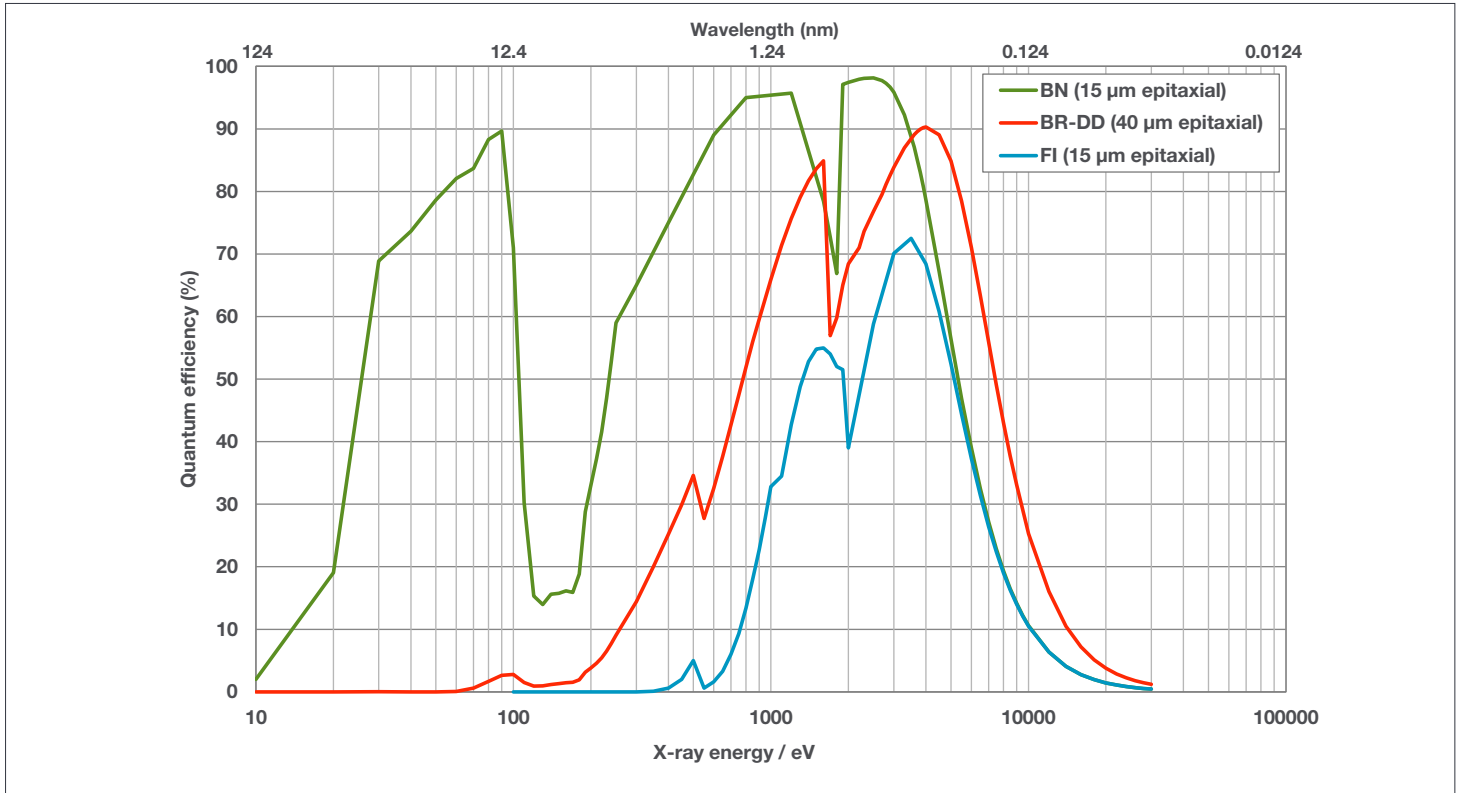
200 µm Beryllium Foil Transmission
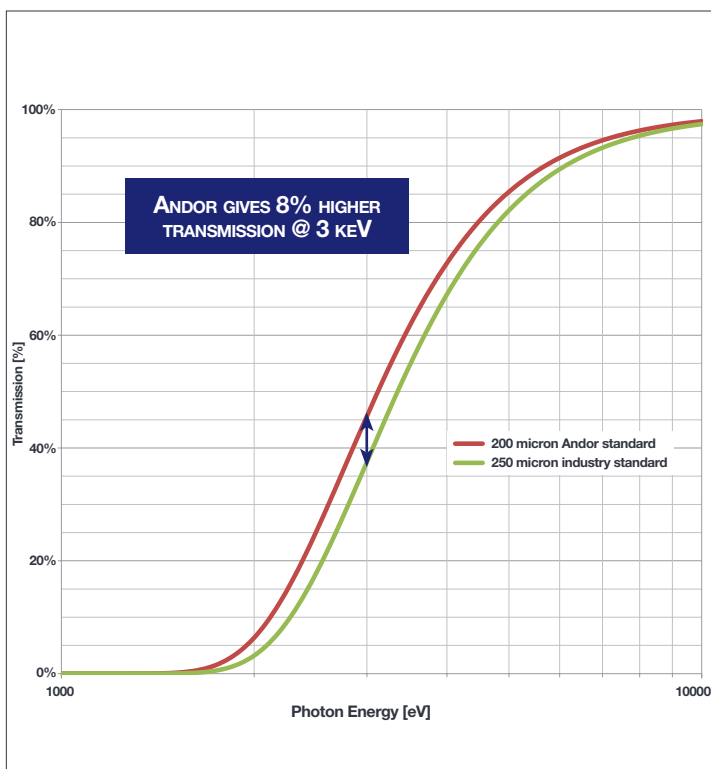
Photoelectrons v Incident X-rays [11]

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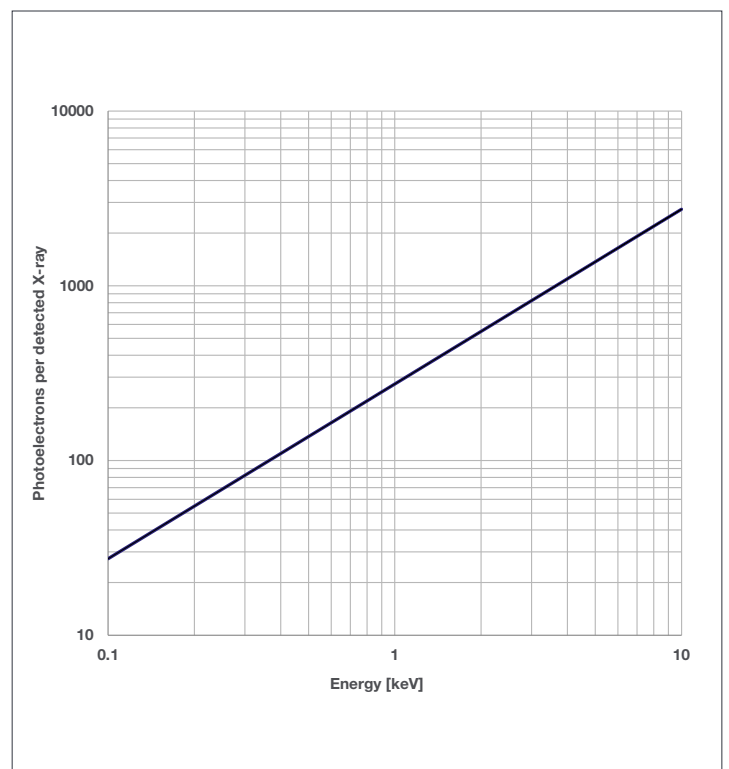
Creating The Optimum Product for You

How to customize the Newton SY series:

Step 1.

Simply select from the three sensor array types that which best suits your needs.

Step 2.

The Newton CCD comes with three options for sensor types. Please select the sensor that best suits your needs.

Step 3.

Please indicate which software you require.

Step 4.

For compatibility, please indicate which accessories are required.

Step 5.

Please indicate any special requirements.

DY (940) P - (FI) - T2

example shown

Step 1.

Choose sensor array

920: 1024 x 256 pixel array (BR-DD)
920: 1024 x 255 pixel array (FI, BN)
940: 2048 x 512 pixel array (BN, FI)

Step 2.

Choose sensor type

BN: Back Illuminated CCD, with no AR coating
FI: Front Illuminated CCD
BR-DD: Back Illuminated, Deep Depletion CCD with fringe suppression (920P only)

Step 3.

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

Solis Imaging A 32-bit and fully 64-bit enabled application for 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++.

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
XU-RECR/TRANS USB 2.0 - Transmitter and Receiver, including 2 power supplies

Have you found what you are looking for?

Need a square field of view? Andor's iKon-M SY 934 boasts a 13.3 x 13.3 mm active image area.
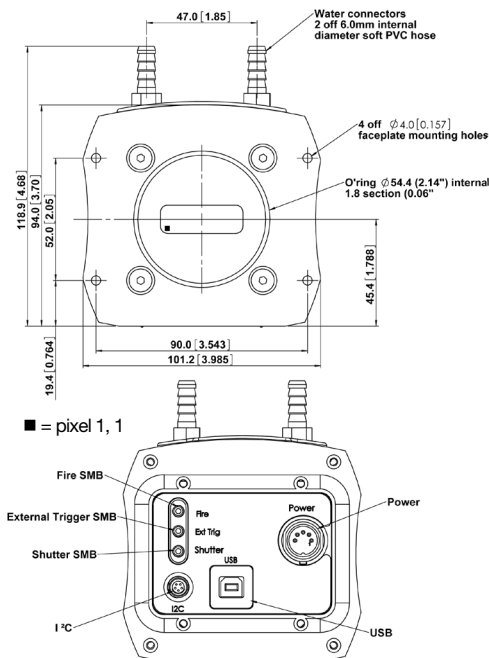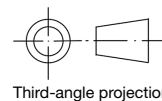
Need to detect harder X-rays? Andor offers a range of Indirect Detection cameras (HH/HF range) that are compatible with with industry-standard scintillators.

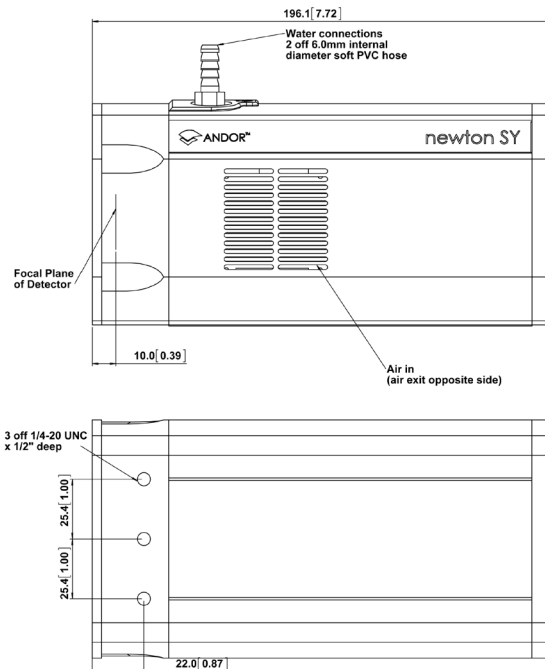**Need a specific mounting?** Contact our experienced design team so we can make the perfect fit.

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

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Product Drawings

Dimensions in mm [inches]

Third-angle projection

■ = pixel 1, 1

Rear connector panel

Weight: 2.7 kg [5 lb 15 oz]

Best Practice Guidelines

- When not in use the window should be covered and protected.
- Not suitable for mounting to vaccum chamber.
- Due to the exposed nature of the window, care should be taken with the camera, as damage can easily occur through mishandling or by contamination.
- If due to accident or misuse the window becomes contaminated, please contact Andor immediately for advice on cleaning.
- The Beryllium foil window is very brittle therefore extreme care should be taken to avoid shock damage. If the foil is broken there is a health risk. Please contact Andor for further information if required.

Connecting to the Newton SY

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

Applications Guide

- ☑ X-ray Laser Development
- ☑ X-ray Plasma Diagnostics
- ☑ Soft X-ray Imaging
- ☑ X-ray Diffraction (XRD)
- ☑ X-ray Fluorescence (XRF)
- ☑ X-ray Spectroscopy
- ☑ Phase Contrast Imaging

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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:

Europe
Belfast, Northern Ireland
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Fax +44 (28) 9031 0792

Japan
Tokyo
Phone +81 (3) 6732 8968
Fax +81 (3) 6732 8939

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

China
Beijing
Phone +86 (10) 8271 9066
Fax +86 (10) 8271 9055

Items shipped with your camera:

1 x 2 m SMB-BNC connection cable
1 x 3 m USB 2.0 cable Type A to Type B
1 x PS-25 power supply with mains cable
1 x CD containing Andor user guides
1 x Individual system performance booklet

Footnotes: Specifications are subject to change without notice

1. **IMPORTANT**: Due to the Be window there is a limited warranty on the sensor. For full details of Andor's Warranty Policy please refer to our webpage at http://www.andor.com/contact_us/support_request/. For key information on handling precautions for SY/HY systems, please refer to the Best Practice Guidelines on page 5. Note permanent damage can easily occur due to misuse.
2. Figures are typical unless otherwise stated.
3. Based on a 920 camera with a horizontal pixel readout rate of 3 MHz, a vertical shift speed of 12.9 μs and in crop mode for 20 Rows. Achievable spectral rates will vary with selected trigger mode.
4. Edge pixels may exhibit a partial response.
5. Stabilized cooling temperatures are given for slowest readout speed. Use of faster readout speeds (in order to achieve faster frame rates) may require a higher cooling temperature to be selected. Specified minimum air cooled temperature assumes ambient temperature of 25°C. Specified minimum temperature with coolant assumes coolant temperature of 10°C.
6. Dark current measurement is averaged over the CCD area excluding any regions of blemishes.
7. Readout noise is for the entire system and is taken as a mean over the sensor area excluding any regions of blemishes. It is a combination of sensor readout noise and A/D noise.
8. Linearity is measured from a plot of counts vs exposure time under constant photon flux up to the saturation point of the system.
9. Vertical speeds are software selectable. All sensors are designed to give optimum Charge Transfer Efficiency (CTE) at 12.9 μS (920 models) and 14.5 μS (940 models).
10. Quantum efficiency of the sensor at 20°C, as supplied by the sensor manufacturer.
11. The graph shows photoelectrons generated as a function of photon energy of incident X-ray.

Minimum Computer Requirements:

- 3.0 GHz single core or 2.4 GHz dual or quad 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 40 MB/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

- 100 - 240 VAC, 50 - 60 Hz

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

EPICS
Windows 7
Windows 8
Linux
LabVIEW
MATLAB

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