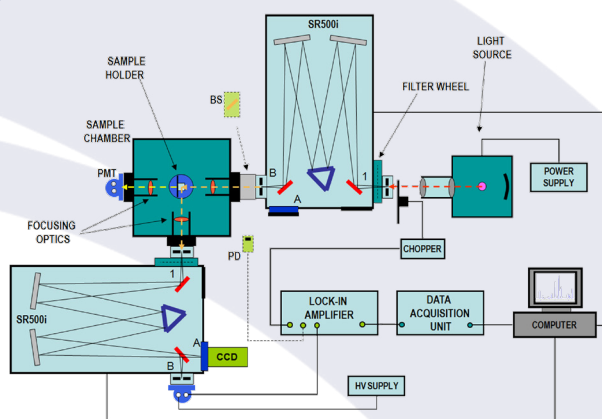


# Single Point Detectors

## Accessories for scanning monochromators



Example layout for Fluorescence spectrometer

### Features and Benefits

- ✓ **Extended detection to LWIR region**  
Wide range of flanged single point detectors for detection up to 12  $\mu\text{m}$
- ✓ **Plug-and-play controllers**  
USB-driven data acquisition unit and simple universal BNC connection to detectors
- ✓ **User-friendly detection configuration**  
All single point detector fitted as standard with adapters to Shamrock spectrographs for easy integration and in-field upgradability
- ✓ **Comprehensive experiment builder interface**  
Pre-acquisition programming of complex wavelength scanning sequences including synchronisation of gratings & filters, shutters and up to 2 detectors and monochromators
- ✓ **Dedicated Scanning software**  
Interactive graphical interface with Quick-access bar for rapid monochromators, detectors and motorized accessories set-up
- ✓ **3 main software acquisition modes**  
Scanning, photon counting and time-resolved / lifetime analysis
- ✓ **Software-controlled lock-in amplifier and chopper options**  
Prerequisite for Signal-to-Noise enhancement
- ✓ **Monochromator IR optics coatings**  
Optional silver-protected coated mirrors and gratings for maximum efficiency in the near infrared region
- ✓ **Standard gold-plated focusing optics for MCT and InSb**  
Maximizes collection in the LWIR region

### Extending Spectroscopy into SWIR and LWIR

This latest addition to the Andor Spectroscopy portfolio provides a perfect complement to Andor extensive range of market leading CCD, InGaAs ICCD and EMCCD detectors. Shamrock spectrograph dual detector outputs configurations allow combination of multiple detectors for acquisition from 180 nm to 12  $\mu\text{m}$  in one single setup.

Solis Scanning software is a dedicated single interface for seamless set-up and synchronization of single point detectors, spectrographs, monochromators data acquisition unit and lock-in amplifiers, with an intuitive interface for complex experiment acquisition sequences.

### Specifications Summary

Model number	Detector type	Wavelength coverage	Active area (mm)	Cooling
ACC-SR-ASM-0042	MCT*	2 - 12 $\mu\text{m}$	1 x 1	LN <sub>2</sub>
ACC-SR-ASM-0043	InSb *	1 - 5.5 $\mu\text{m}$	$\varnothing$ 2	LN <sub>2</sub>
ACC-SR-ASM-0044	InGaAs	0.8 - 1.9 $\mu\text{m}$	$\varnothing$ 3	-40°C TE
ACC-SR-ASM-0046	Si	200 - 1100 nm	$\varnothing$ 11.28	Uncooled
ACC-SR-ASM-0047	PMT (R928)	185 - 900 nm	8 x 24	Uncooled
ACC-SR-ASM-0048	PMT (R1527P)	185 - 680 nm	8 x 24	Uncooled

\* Including gold coated focusing mirror for maximum collection efficiency

# Photomultiplier Tubes

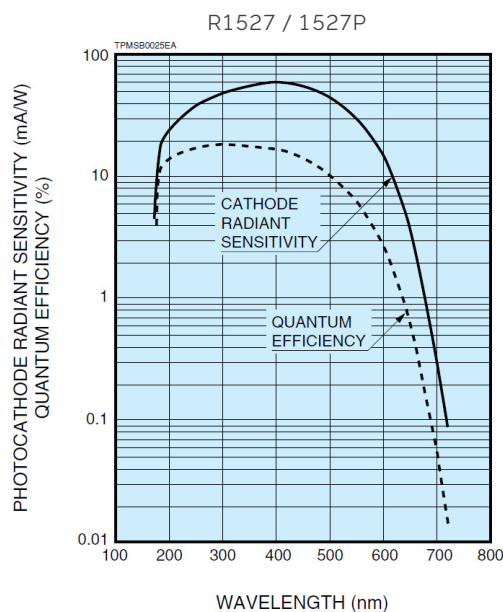
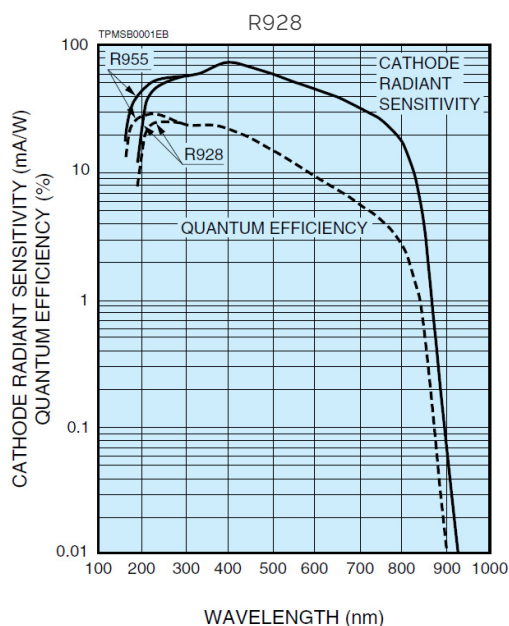
## Features

- Enclosure for electromagnetic and optical shielding
- Standard mounting flange for Shamrock monochromator and sample chamber
- R1527P option optimized for low dark current – ideal for VIS photon counting applications
- Other types available on request
- Ideal for applications such as broadband Absorption – Transmission, Luminescence or Spectrophotometry and low-light acquisition down to single photon
- Requires ACC-SR-ASZ-0053 high voltage power supply unit



## Specifications<sup>•1</sup>

Model number	ACC-SR-ASM-0047	ACC-SR-ASM-0048
Photomultiplier type	R928	R1527P
Configuration	Side window housing	Side window housing
Photocathode material	Multialkali	Bi-Alkali
Spectral range (nm)	185 - 900	185 - 680
Active area (min., mm)	8 x 24	8 x 24
Wavelength maximum response (nm)	400 nm	400 nm
Cathode radiant sensitivity @ peak wavelength (mA/W, typ.)	74	60
Supply voltage anode - cathode (maximum, V)	1250	1250
Equivalent Noise Input - ENI (W, typ.)	1.30E <sup>-16</sup>	3.70E <sup>-17</sup>
Anode dark current (nA, typ @ +25°C ambient [max])	3 [50]	0.1 [0.5]
Anode dark counts (cts, typ. @ +25°C ambient)	-	10 [50]
Anode pulse rise time (ns, typ.)	2.2	2.2
Electron transit time (ns, typ.)	22	22
Cooling	Room temperature	Room temperature
Window material	UV glass	UV glass
Storage temperature (°C)	-30 to +50	-80 to +50



Graphs courtesy of Hamamatsu Photonic UK Limited

# Photomultiplier Accessories

## High voltage power supply unit

This unit provides the choice of software-controlled or manual DC voltage supply to photomultipliers for detector gain adjustment. It simply connects through a BNC cable to Andor photomultiplier units and data acquisition unit for remote operation and synchronization.



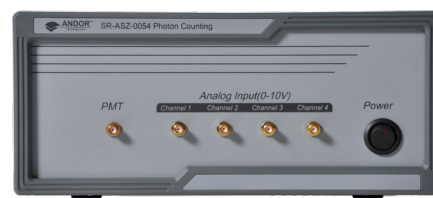
### Specifications<sup>•1</sup>

Model number	ACC-SR-ASZ-0053
Output voltage	0 - 1500 V DC, negative voltage*
Maximum output current	0.6 mA
Footprint (W x H x D, mm)	240 x 120 x 240
Power supply	AC 110 V / 220 V

\* The output voltage can be changed manually and can also be controlled through from an external voltage input (0 - 10 V) by PC or D/A converter.

## Photon counting unit

Used in conjunction with Andor photomultipliers and high voltage power supply unit, this USB-controlled accessory allows analysis of individual incoming photon events on the detector photocathode, resulting in a series of electrical pulses that can be discriminated and counted. This unit is used independently from the data acquisition unit.



The photon counting unit offers 4 analog inputs and 2 analog outputs for connection to lock-in amplifier & chopper or photomultiplier high voltage power supply unit, that can also as act as TTL triggers for shutter or light sources.

### Specifications<sup>•1</sup>

Model number	ACC-SR-ASZ-0054
Maximum adjustable input pulse threshold	100 Mcps
Sampling speed	1 MB/s
Input signal	(4 channels) analog voltage, 0 - 10 V, 16 bits
Output signal	(2 channels) analog voltage, 0 - 10 V, 16 bits
Interface	USB 2.0
Footprint (W x H x D, mm)	240 x 120 x 240
Power supply	AC 110 V / 220 V

# Si photodiodes

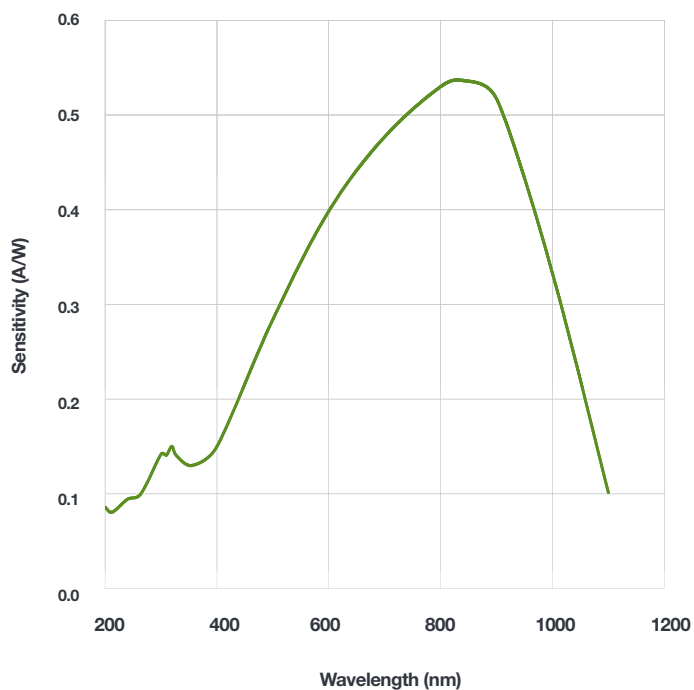
## Features

- Super-blue enhanced for wide wavelength coverage from 200 to 1100 nm
- Standard mounting flange for Shamrock monochromator and sample chamber
- Simple BNC connection to data acquisition unit
- Price performance option for wide range of non-light starved UV-NIR Spectroscopy applications
- No need for I-V amplifier – already integrated into data acquisition unit



## Specifications<sup>\*1</sup>

Model number	ACC-SR-ASM-0046
Photodiode material	UV-enhanced silicon
Spectral range (nm)	200 - 1100
Active area (mm)	Ø 11.28
Wavelength maximum response (nm)	~ 840
Sensitivity @ peak wavelength (A/W, typ.)	0.54
Sensitivity @ 254 nm (A/W, typ. Imin.)	0.14 [0.09]
Rise time (µs, typ.)	5.9
NEP @ 254 nm (W.Hz <sup>-1</sup> , typ.)	4.50E <sup>-13</sup>
Cooling	Room temperature
Operating ambient temperature (°C)	-10 to +60
Storage temperature (°C)	-20 to +70



# InGaAs TE cooled detectors

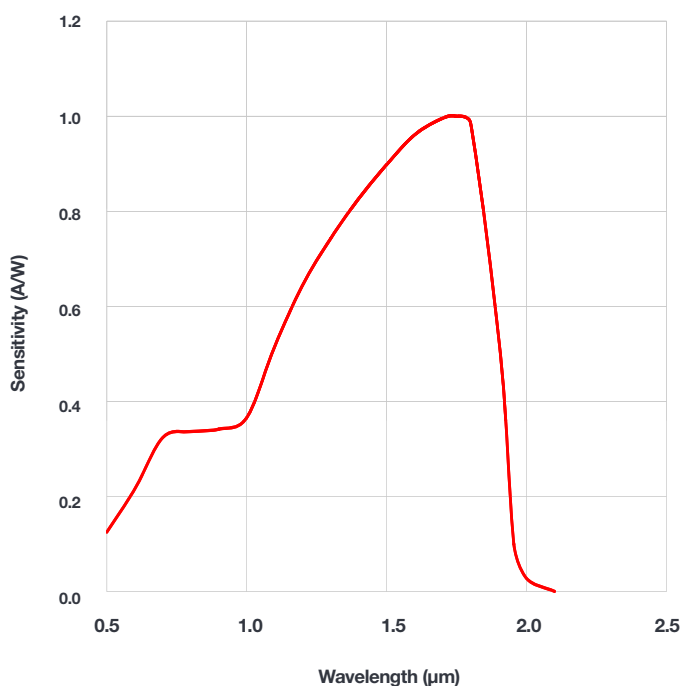
## Features

- Standard option for detection up to 1.75  $\mu\text{m}$
- Thermoelectric cooling down to  $-40^{\circ}\text{C}$
- Standard mounting flange for Shamrock monochromator and sample chamber
- Simple BNC connection to data acquisition unit
- Includes external power supply for TE cooler operation
- No need for I-V amplifier – already integrated into data acquisition unit
- Applications include NIR Photoluminescence and Absorption as well as laser diode monitoring



## Specifications<sup>1</sup>

Model number	ACC-SR-ASM-0044
Photosensitive material	Indium-Gallium-Arsenide
Spectral range (nm)	800 - 1900
Active area (min., mm)	$\varnothing 3$
Wavelength max. response ( $\mu\text{m}$ )	$\sim 1.75$
Cut-off wavelength ( $\mu\text{m}$ , 50%)	$1.83 \pm 0.1$
Responsivity @ peak wavelength (A/W, typ.)	1
$D^*$ at peak wavelength ( $\text{cm.H}^{1/2}\text{.W}^{-1}$ , 1 kHz bandwidth, typ.)	$9.0\text{E}^{12}$
NEP at peak wavelength ( $\text{W.H}^{-1/2}$ , 1 kHz bandwidth, typ.)	$2.90\text{E}^{-14}$
Cooling ( $^{\circ}\text{C}$ )	$-40$ (TE cooler)
Operating ambient temperature ( $^{\circ}\text{C}$ )	$-55$ to $+80$
Storage temperature ( $^{\circ}\text{C}$ )	$-55$ to $+60$



## InSb Detectors

### Features

- Detection up to 5.5  $\mu\text{m}$
- $\text{LN}_2$  Dewar for up to 8 hours holding time
- Includes gold-plated mirror for enhanced collection efficiency
- Standard mounting flange for Shamrock monochromator and sample chamber
- Simple BNC connection to data acquisition unit
- Recommended operation with lock-in amplifier for higher Signal-to-Noise ratio
- No need for I-V amplifier – already integrated into data acquisition unit



### Specifications<sup>1</sup>

Model number	ACC-SR-ASM-0043
Photosensitive material	Indium-Antimony
Spectral range ( $\mu\text{m}$ )	1 - 5.5
Active area (min., mm)	$\varnothing$ 2
Wavelength max. response ( $\mu\text{m}$ )	~ 4.8
Responsivity @ peak wavelength (A/W, typ.)	3
$D^*$ at peak wavelength ( $\text{cm}\cdot\text{H}^{1/2}\cdot\text{W}^{-1}$ , 1 kHz bandwidth, typ.)	$1.0\text{E}^{-11}$
NEP at peak wavelength ( $\text{W}\cdot\text{H}^{-1/2}$ , 1 kHz bandwidth, typ.)	$1.60\text{E}^{-12}$
Cooling	$\text{LN}_2$ to 77K, Dewar holding time ~ 8 hours
Dark current @ minimum temperature ( $\mu\text{A}$ )	30
Window material	Sapphire

## MCT Detectors

### Features

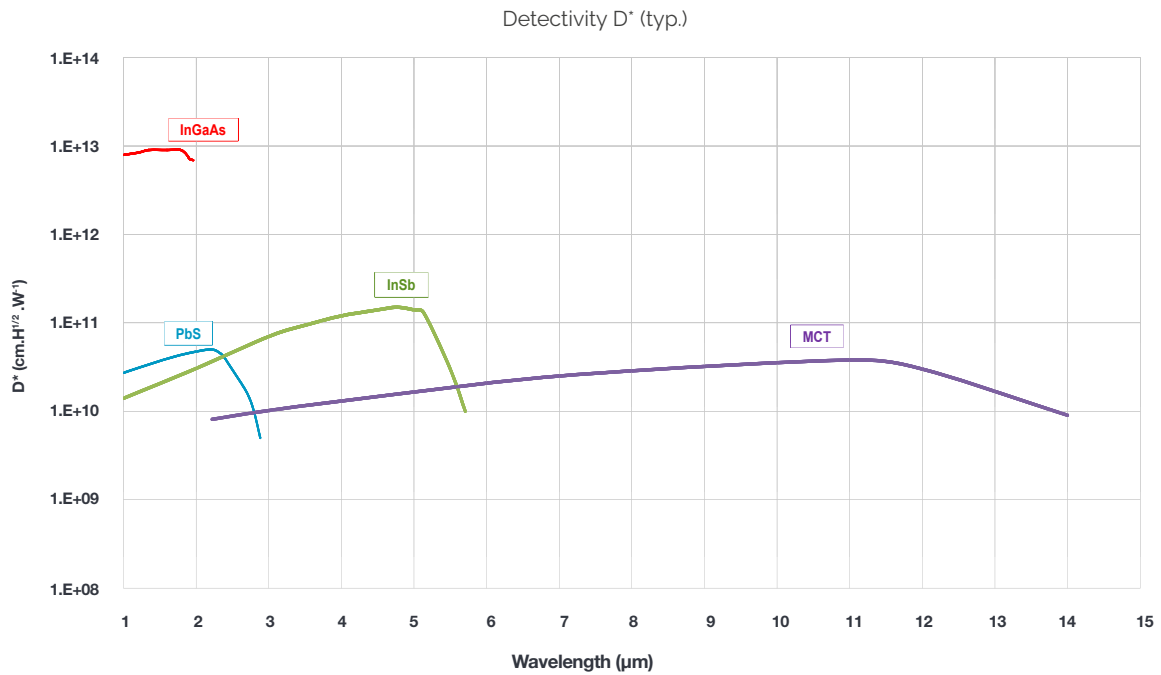
- Standard option for detection up to 12  $\mu\text{m}$
- $\text{LN}_2$  Dewar for up to 8 hours holding time
- Includes gold-plated mirror for enhanced collection efficiency
- Standard mounting flange for Shamrock monochromator and sample chamber
- Simple BNC connection to data acquisition unit
- Recommended operation with lock-in amplifier for higher Signal-to-Noise ratio
- No need for I-V amplifier – already integrated into data acquisition unit



### Specifications<sup>1</sup>

Model number	ACC-SR-ASM-0042
Photoconductive material	Mercury-Cadmium-Telluride
Spectral range ( $\mu\text{m}$ )	2 - 12
Active area (min., mm)	1 x 1
Wavelength max. response ( $\mu\text{m}$ )	$11 \pm 1$
$D^*$ at peak wavelength ( $\text{cm}\cdot\text{H}^{1/2}\cdot\text{W}^{-1}$ , 10 kHz bandwidth, typ.)	$4.0\text{E}^{-10}$
Cooling	$\text{LN}_2$ to 77K, Dewar holding time ~8 hours
Time constant ( $\mu\text{s}$ , typ.)	0.5
Window material	ZnSe

## Choosing the appropriate detector for your wavelength of interest



## Third-party Hardware - Lock-in Amplifier

To enhance detection schemes involving MCT or InSb detectors, Andor recommends using SR830 lock-in amplifier & SR540 chopper units. For further information please log on to <http://www.thinksrs.com/products/sci.htm>



SR540 chopper & chopper control unit



SR830 lock-in amplifier

# Data Acquisition Unit

This unit is a low noise, high gain, trans-impedance amplifier and data acquisition platform positioned at the heart of every Andor scanning solution. This USB 2.0-driven interface controls and synchronizes up to 2 single point detectors and HV control for PMTs, monochromator shutters, lock-in amplifier + chopper and features built-in I-V amplifiers. It combines with Andor Solis scanning to offer a user-friendly, fully software-controlled solution for seamless setup and acquisition.



## Specifications<sup>1</sup>

Model number	ACC-SR-ASZ-0055	
Analog inputs for single point detectors (Channel A and B)	Current ± 10 mA (± 10 nA)	Voltage ± 10 V (± 10 μV)
Auxiliary analog input for lock-in amplifier (AUX)	0 to 10 V DC	
Temperature transducer input (AD590)	-30°C to ~ +100°C	
Digitization for analog inputs	16 bits	
Shutter output	5 V TTL	
High voltage power supply analog output	0 to 10 V DC	
Chopper analog output	0 to 10 V DC	
Digitization for analog outputs	12 bits	
External trigger	5 V TTL	
Burst mode	Up to 2000 data point storage in RAM	
Interface	USB 2.0	
Footprint (W x H x D, mm)	240 x 120 x 240	
Power supply	AC 100 - 240 V, 50/60 Hz (7.2 W)	



# Control Software

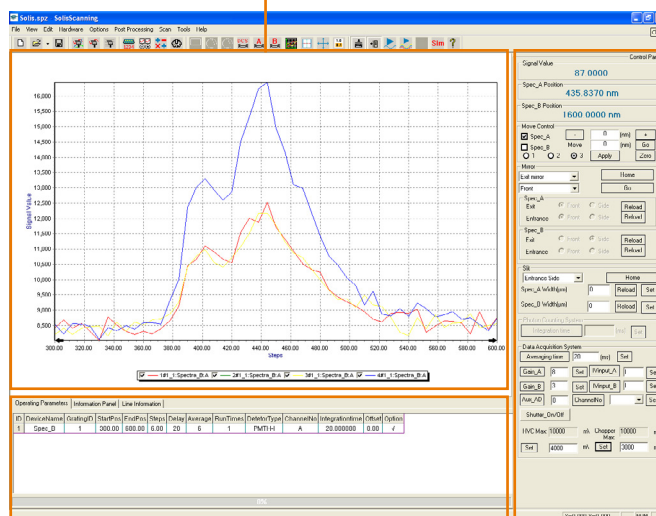
## Solis Scanning

Solis Scanning offers a dedicated platform for scanning monochromator applications. Monochromators, detectors, data acquisition unit, lock-in amplifier / chopper and motorised accessories can all be conveniently synchronised through a series of intuitive interfaces.

A single software package features a comprehensive step-by-step experiment building interface for setting up and synchronizing all components of the detection chain. Complex scanning sequences involving multiple gratings, filters and up to 2 monochromators can be seamlessly captured prior to acquisition start and executed without further intervention of the user.

Solis Scanning can also handle multiple detectors control and data display for Absorption/Transmission/Reflection Spectroscopy, while offering post acquisition mathematical data processing ranging from simple ratios and lifetime measurements to fast phenomena analysis.

Dynamic display interface

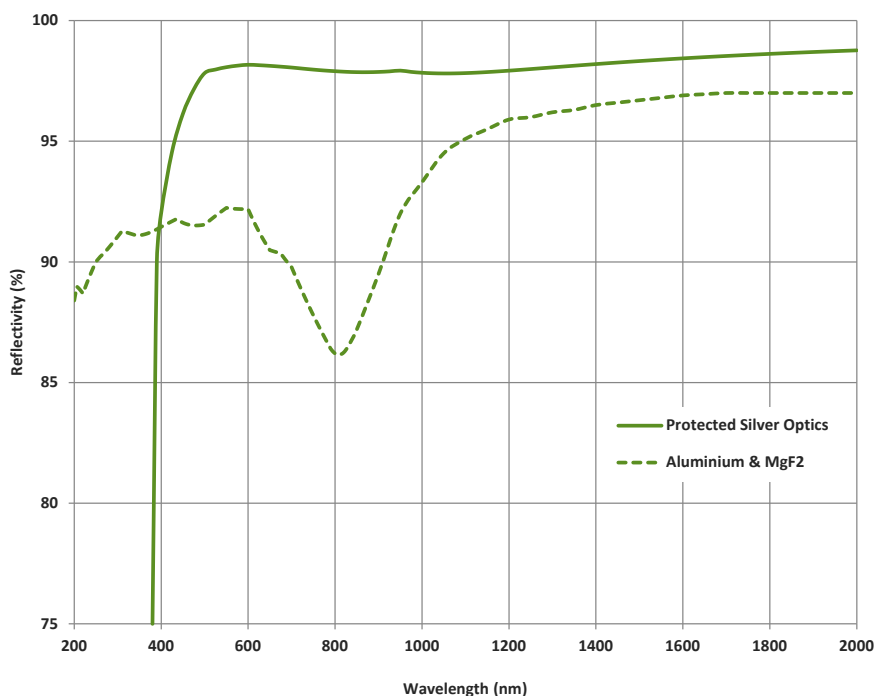


Experiment building interface

Quick set-up interface

## Working in the Near-Infrared

Andor offers optional protected silver coated optics for maximum throughput and efficiency to guarantee the best detection possible in the SWIR and LWIR regions. Please contact your local Sales representative for further details.

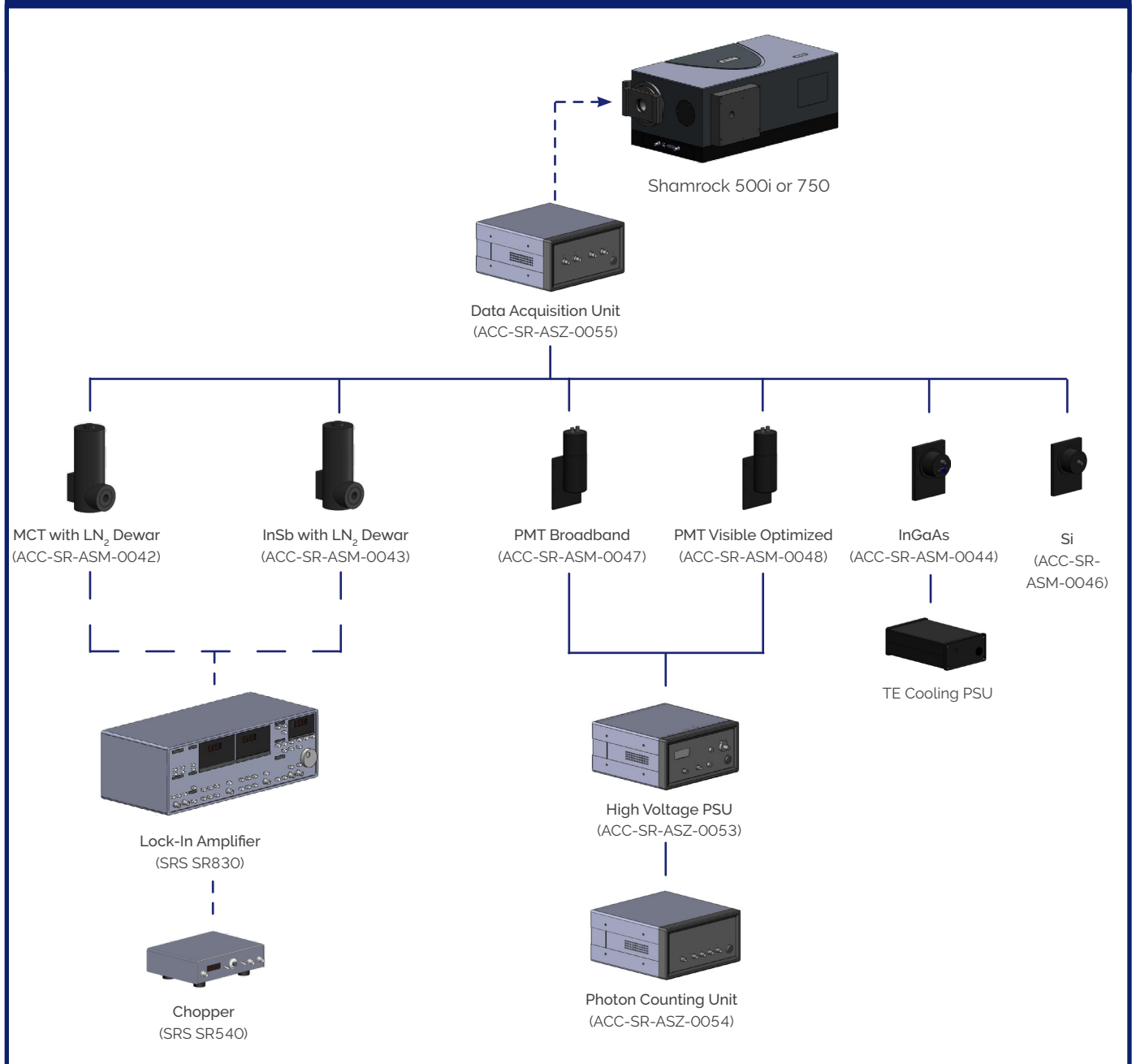


# Creating the optimum product for you<sup>2</sup>

## Step 1. Choose the appropriate monochromator configuration

Refer to [Shamrock specification sheets](#) for further details on output ports, accessories, including gratings and optimized optics coatings.

## Step 2. Select the most appropriate detector and associated accessories from the below:



## Step 3. Select the required software



The following software is required:

Solis Scanning A 32-bit and fully 64-bit enabled application for Windows (8, 8.1 and 10) providing a dedicated platform for scanning monochromator applications. Control complex scanning experimental set-ups and analyze your data.

# 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.

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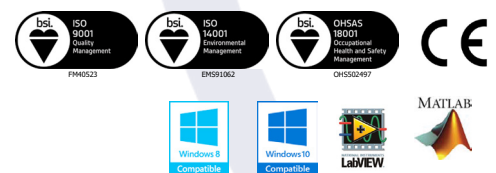


### Footnotes: Specifications are subject to change without notice

1. Figures are typical unless otherwise indicated. Sensitivity graphs are as stated by the manufacturer
2. Ordering information for other detectors is available on request.

### Minimum Computer Requirements:

- 3.0 GHz single core or 2.4 GHz multi core processor
- 2GB 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 (8, 8.1 or 10) or Linux



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Matlab is a registered trademark of The MathWorks Inc.

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