

Features and Benefits

- **Peak QE up to 95%**
Visible-optimized 'BV' & infrared-optimized 'BR-DD' model
- **Fringe suppression technology as standard**
Fringing eliminated (Deep-Depletion) or greatly minimized (Back-Thinned)
- **TE cooling down to -100°C**
Critical for elimination of dark current detection limit - no inconvenience associated with LN₂
- **Ultravac™**
Critical for sustained vacuum integrity and to maintain unequalled cooling and QE performance, year after year
- **Single UV-grade silica window**
Best UV-NIR throughput performance, specific AR coating and wedge options available
- **USB 2.0 connection**
Universal plug-and-play capability, ideal for laptop operation
Seamless operation alongside USB-based Shamrock spectrograph family
- **26 x 26 µm pixels**
Optimized pixel format for high dynamic range and resolution
- **Software-selectable pre-amplifier gain**
Choice of best SNR performance of dynamic range at the touch of a button
- **Compact and rugged platform**
Ideal for OEM integration & laboratory setups
- **Solis software for Spectroscopy**
Comprehensive, user-friendly interface for simultaneous detector & spectrograph control
- **Software Development Kit (SDK)**
Ease of control integration into complex setups: Matlab, Labview, Visual Basic or C/C++

Workhorse laboratory and OEM CCD platform

The USB2.0-based iDus series is a compact, yet feature-rich platform suitable for demanding spectroscopy applications such as low-light UV/NIR Photoluminescence or Raman spectroscopy, as well as day-to-day routine laboratory operation and integration into industry-grade systems.

The iDus 401 boasts market-leading deep thermo-electric cooling to -100°C, complemented by Andor's Ultravac™ technology with its un-matched reliability track record in the scientific and industrial community. The iDus low-noise electronics allows seamless access to the best signal-to-noise ratio performance for the widest range of photon detection regimes.

Anti-fringing comes as standard on back-thinned & back-illuminated sensors for this 1024 x 127, 26 µm pixels array optimized for high dynamic range, high resolution and rapid data acquisition from Far UV to NIR.

Specifications Summary

Active pixels	1024 x 127
Pixel size (W x H)	26 x 26 µm
Image area	26.6 x 3.3 mm
Register well depth (typical)	1,000,000 e ⁻
Maximum cooling	-100°C
Maximum spectra per sec	88
Read noise	As low as 3 e ⁻
Dark current	As low as 0.0005 e ⁻ /pixel/sec

Key Specifications *2

Model number	DV401A	DU401A	DU401A BR-DD
Sensor options	<ul style="list-style-type: none"> • BV: Back Illuminated CCD, Vis optimized + anti-fringing • FI: Front Illuminated CCD 	<ul style="list-style-type: none"> • BV: Back Illuminated CCD, Vis optimized + anti-fringing • FI: Front Illuminated CCD 	<ul style="list-style-type: none"> • BR-DD: Back Illuminated CCD, Deep Depletion with fringe suppression. Optimum sensor for Near IR applications
Active pixels *3	1024 x 127		
Pixel size	26 x 26 μm		
Image area	26.6 x 3.3 mm with 100% fill factor		
Cooler type	DV	DU	DU
Minimum temperatures *4			
Air cooled	-55°C	-80°C	-80°C
Coolant recirculator	-65°C	-95°C	-95°C
Coolant chiller, coolant @ 10°C, 0.75l/min	-70°C	-100°C	-100°C
Max spectra per second *5	88 (10 row crop mode), 81 (Full Vertical Bin)		
System window type	Single quartz window, uncoated. Various AR coatings & MgF ₂ options available	Single quartz window, uncoated. Various AR coatings & MgF ₂ options available	Single quartz window; 1° wedge, AR coated on both sides, optimized at 900 nm
Blemish specifications	Grade 1 as per sensor manufacturer definition		

Advanced Specifications *2

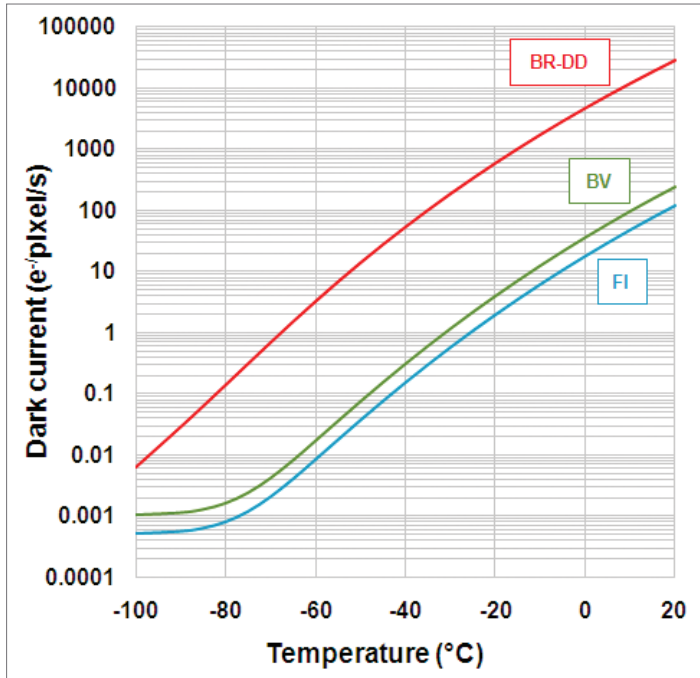
Dark current, e ⁻ /pixel/sec @ max cooling									
FI	0.002			0.0005			-		
BV / BR-DD	0.004			0.001			0.006		
Register well depth	1,000,000 e ⁻								
Read noise (e ⁻) *6	33 kHz	50 kHz	100 kHz	33 kHz	50 kHz	100 kHz	33 kHz	50 kHz	100 kHz
FI: Typ (Max)	3 (5)	4 (6)	8 (12)	3 (5)	4 (6)	9 (12)			
BV: Typ (Max)	7 (8)	10 (12)	12 (15)	6 (8)	10 (12)	12 (15)			
BR-DD: Typ (Max)							5 (8)	6 (12)	12 (15)
Sensitivity (e ⁻ /count)	33 kHz	50 kHz	100 kHz	33 kHz	50 kHz	100 kHz	33 kHz	50 kHz	100 kHz
High Dynamic Range mode	2	3.5	14	2.5	3.5	16	2.5	3.5	20
High Sensitivity mode	-	2.5	9	-	2.5	11	-	2.5	12
Linearity *7	Better than 99%								
Digitization	16 bit								
Vertical clock speed *8	8, 16, 32, 64 μs (software selectable)								

Have you found what you are looking for?

- Need a larger sensor?** The iDus 420 series is similar to the 401 series with 26.6 x 6.6 mm format with 1024 x 255 pixels.
- Need to work further into the NIR?** The iDus InGaAs series, with up to 1024 pixel linear array with transmission to 2.2 μm .
- Need a faster or more sensitive CCD?** The Newton series offers over 1,600 spectra per second and EM technology.
- Need more UV sensitivity?** The iDus 420 series is similar to the 401 series with a range of UV optimized sensors.
- Need a customized version?** Please contact us to discuss our Customer Special Request options.

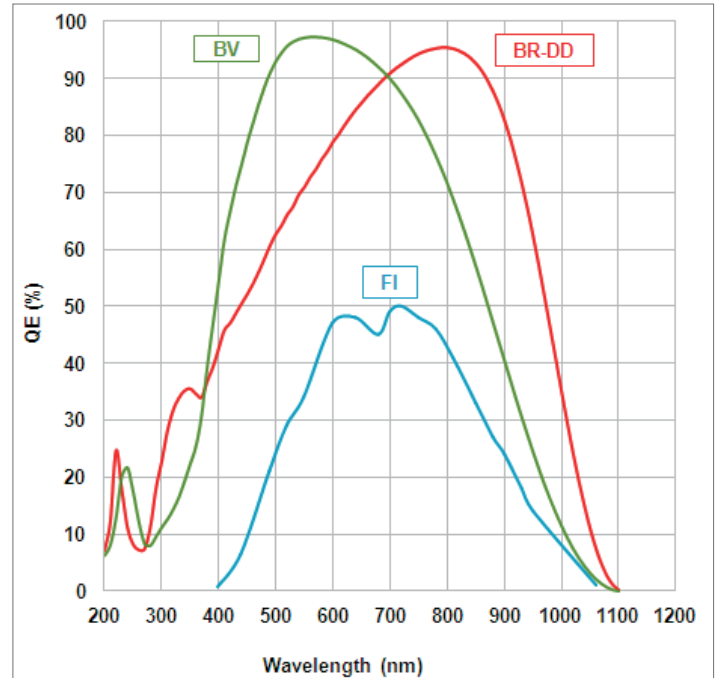
The iDus series combines seamlessly with Andor's research grade Shamrock Czerny-Turner spectrographs.

Dark Current ^{*9}

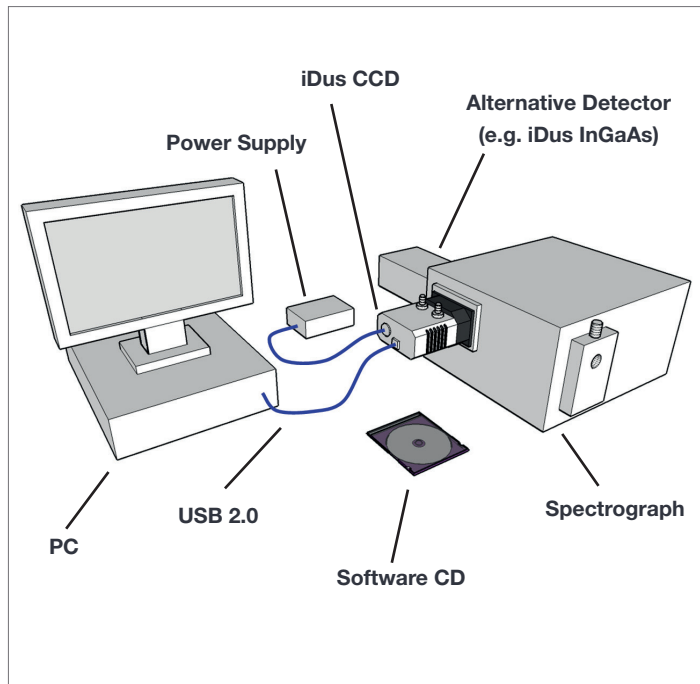


Quantum Efficiency Curves ^{*10}

25°C

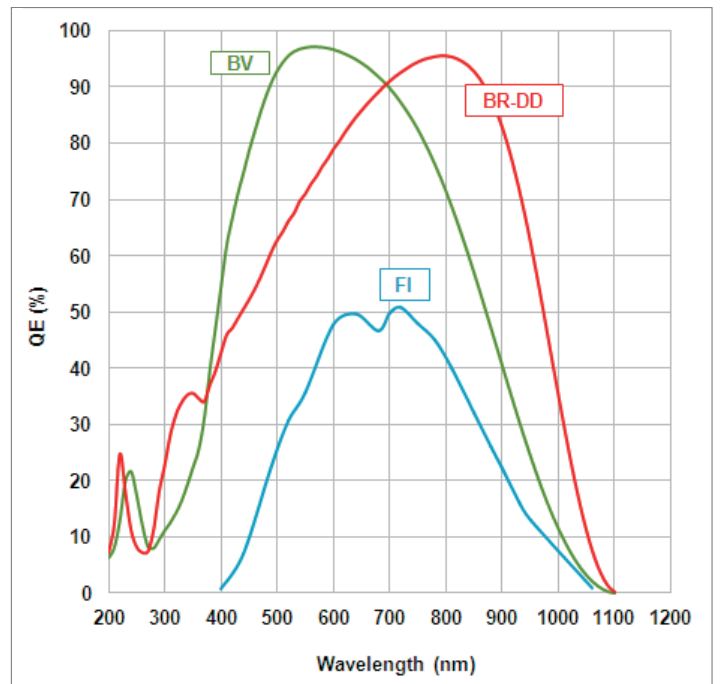


Typical Setup



Quantum Efficiency Curves ^{*11}

-100°C



Creating The Optimum Product for You

How to customize the iDus 401A :

Step 1.

Simply select from the 2 cooler types that best suit your needs from the selection opposite.

Step 2.

The iDus 401A comes with 3 options for sensor types. Please select the sensor which best suits your needs.

Step 3.

Please indicate if you wish to select an alternative window and which software you require.

Step 4.

For compatibility, please indicate which accessories are required.



iDus CCD mounted on a Shamrock 500 mm triple grating imaging spectrograph, ideal for high resolution spectroscopy.



Step 1.

Choose cooler type

DV: Standard cooling, to -75°C
(not a valid option with the BR-DD model)
DU: Deep cooling, to -100°C

Step 2.

Choose sensor type

BR-DD: Back Illuminated, Deep Depletion CCD with fringe suppression
BV: Back Illuminated CCD, Vis optimized
FI: Front Illuminated CCD

Step 3.

The 401 FI & BV models are supplied with an uncoated Quartz window as standard. BR-DD models are provided with an NIR optimized AR coating. The following alternative window choices are available and must be ordered at time of build (if selected):

OPTION-C1-AR1 AR coated quartz window (optimized broadband visible 400-900nm).
50% transmission at 180 nm

OPTION-C1-MGF2 Magnesium Fluoride window for transmission in the VUV.
50% transmission at 120 nm

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

Solis for Spectroscopy A 32-bit application compatible with 32 and 64-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. Control of Andor Shamrock spectrographs and a very wide range of 3rd party spectrographs is also available, see list below.

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 and 7) and Linux. Compatible with C/C++, C#, Delphi, VB6, VB.NET, LabVIEW and Matlab.

Step 4.

The following accessories are available:

XW-RECR Coolant re-circulator for enhanced cooling performance

ACC-XW-CHIL-160 Oasis 160 Ultra Compact Chiller Unit (tubing to be ordered separately)

ACC-6MM-TUBING-2xxxxM 6 mm tubing option for ACC-XW-CHIL-160

LM-C C-mount lens adaptor

LM-NIKON-F C-mount lens adaptor

LMS-NIKON-F-NS25B Nikon F-mount lens adaptor with shutter

ACC-SD-VDM1000 Shutter Driver for NS25B Bistable Shutter (not needed for Shamrock spectrographs)

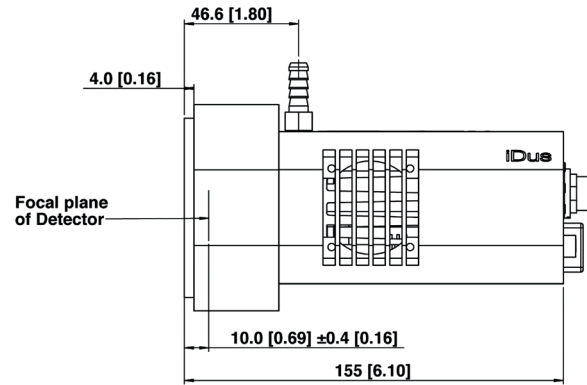
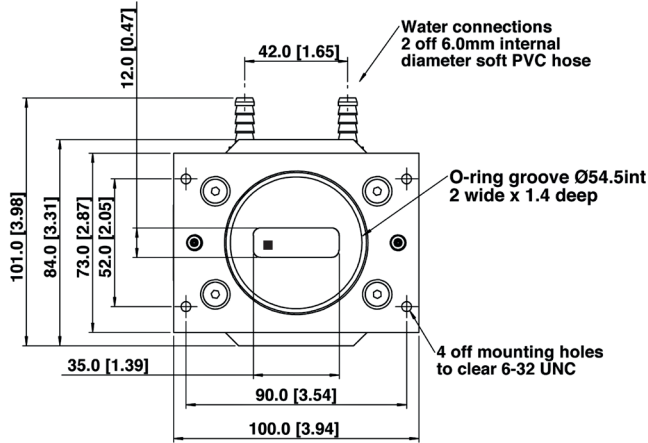
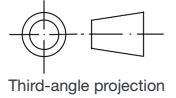
ACC-SHT-NS25B Bistable Shutter, Standalone (not needed for Shamrock spectrographs)

Spectrograph Compatibility

The iDus series is fully compatible with Andor's Shamrock spectrograph (163 - 750 nm focal lengths) family. Spectrograph mounting flanges and software control are available for a wide variety of 3rd party spectrographs including McPherson (including 1 m and greater focal length option), JY/Horiba (excluding USB models), PI/Acton, Chromex/Bruker, Oriel/Newport, Photon Design, Dongwoo, Bentham, Solar TII and others.

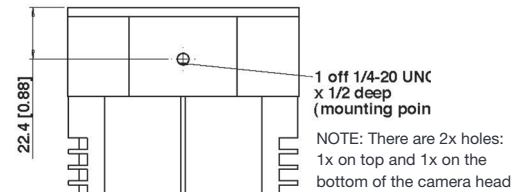
Product Drawings

Dimensions in mm [inches]

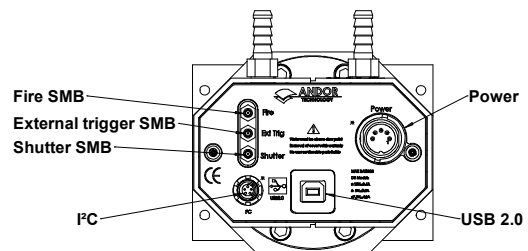


■ = position of pixel 1,1

Weight: 2 kg [4 lb 8 oz]



Mounting hole locations



Rear connector panel

Connecting to the iDus

Camera Control

Connector type: USB 2.0

TTL / Logic

Connector type: SMB, provided with SMB - BNC cable

1 = Fire (Output), 2 = External Trigger (Input), 3 = Shutter (Output)

I²C connector

Compatible with Fischer SC102A054-130

1 = Shutter (TTL), 2 = I²C Clock, 3 = I²C Data, 4 = +5 Vdc, 5 = Ground

Minimum cable clearance required at rear of camera

90 mm

Applications Guide

	DV 401 FI	DV 401 BV	DU 401 FI	DU 401 BV	DU 401 BR-DD
Absorption/Transmittance/Reflection	✓	✓	✓	✓	✓
Atomic Emission Spectroscopy				✓	
Fluorescence & Luminescence	✓	✓	✓	✓	✓
NIR Spectroscopy			✓		✓
Raman Spectroscopy (244 – 488 nm)	✓	✓		✓	
Raman Spectroscopy (514, 532, 633 nm)	✓	✓	✓	✓	
Raman Spectroscopy (785, 830 nm)	✓		✓		✓

✓ = Suitable

✓ = Optimum



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 local sales offices, please see: andor.com/contact

Our regional headquarters are:

Europe

Belfast, Northern Ireland
 Phone +44 (28) 9023 7126
 Fax +44 (28) 9031 0792

Japan

Tokyo
 Phone +81 (3) 3518 6488
 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 2m BNC - SMB connection cable
- 1x 3m USB 2.0 cable Type A → Type B
- 1x Set of Allen keys (7/64" & 3/32")
- 1x Power supply with mains cable
- 1x Quick launch guide
- 1x CD containing Andor user guides
- 1x Individual system performance booklet
- 1x CD containing either Solis software or SDK (if ordered)

Footnotes: Specifications are subject to change without notice

1. Assembled in a state-of-the-art facility, Andor's UltraVac™ vacuum process combines a permanent hermetic vacuum seal (no o-rings), with a stringent protocol and proprietary materials to minimize outgassing. Outgassing is the release of trapped gases that would otherwise degrade cooling performance and potentially cause sensor failure.
2. Figures are typical unless otherwise stated.
3. Edge pixels may exhibit a partial response.
4. Minimum temperatures listed are typical values with ambient temperature of 20°C.
5. Based on a Horizontal Pixel Readout of 100 kHz and a vertical pixel shift of 8 μs.
6. System Readout Noise is for the entire system. It is a combination of CCD readout noise and A/D noise. Measurement is for Single Pixel readout with the CCD at a temperature of -50°C (BR-DD models tested at -80°C) and minimum exposure time under dark conditions. Noise is measured at the highest available pre-amplifier gain for each speed.
7. Linearity is measured from a plot of counts vs exposure time under constant photon flux up to the saturation point of the system.
8. Vertical speeds are software selectable. All sensors are designed to give optimum ChargeTransfer Efficiency (CTE) at 16 μs vertical pixel shift, some decrease in CTE may be observed at faster shift speeds.
9. The graph shows typical dark current level as a function of temperature. The dark current measurement is averaged over the CCD area excluding any regions of blemishes.
10. Quantum efficiency of the sensor as measured 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 1 GB recommended for data spooling)
- USB 2.0 High Speed Host Controller capable of sustained rate of 40 MB/s
- Windows (XP, Vista and 7) 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



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

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