System Features[*1]

- **High Resolution Sensor**
  4.2 Megapixel sensor with 13.5 µm pixels delivers a large field of view with high resolution.
- **Programmable TE cooling down to 50°C below ambient**
  Ideal for detection of weak chemiluminescence or astronomy images, enabling long exposure acquisitions with optimised signal to noise ratio.
- **USB 2.0 interface**
  Direct 'Plug and Play' simplicity of USB 2.0.
- **16-Bit digitization**
  High photometric accuracy.
- **High longevity shutter**
  Shutter during readout and take dark reference frames - 43 mm.
- **Programmable I/O port**
  Synchronization with intricate experimental set-ups.
- **Remote Triggering**
  LVTTL input allows exposure to start within 25 microseconds of the rising edge of the trigger.
- **Focusing mode**
  Faster readout option, ideal for focus optimisation.
- **Andor OEM optimisation**
  Compact and robust, Andor integration support, Andor quality enhancement, Andor post-sale support. Now also supported by 'Andor SDK'

Apogee Alta F42: Compact, 4.2 Megapixel CCD

Ideal for OEM and astronomy applications, the Apogee Alta family has been a mainstay of high end imaging for many years, offering a wide range of full frame and interline CCDs. Cooling performance down to 50ºC below ambient ensures optimal signal to noise for long exposure applications. A USB 2.0 interface offers the convenience of simple, robust connection to PC.

The Alta F42 has a back-illuminated full frame 4.2 megapixel CCD with very high quantum efficiency (>90% @550nm) and without anti-blooming structures to further improve sensitivity. The midband coating provides the highest peak in the visible range. Cooling down to 50ºC below ambient results in a low dark current contribution. These features combine to make the Alta F42 an exceptionally versatile performer, and an ideal solution for many astronomy or physical science applications that require high sensitivity and a large field of view.

Specifications Summary[*1]

Array Size (pixels)	2048 x 2048 (4.2 Megapixel)
Pixel Size	13.5 x 13.5 µm
Sensor Size	27.6 x 27.6 mm (764 mm^2) 39.1 mm diagonal
Pixel Well Depth (typical)	77,000 e^-
Dark Current[*2]	0.1125 e^-/pixel/sec
Read Noise[*3]	8 e^- (RMS @ 0.67 MHz)
Maximum Dynamic Range	79.7 dB (9625:1)
Quantum Efficiency	>90% @550 nm 52% @400 nm

SPECIFICATIONS

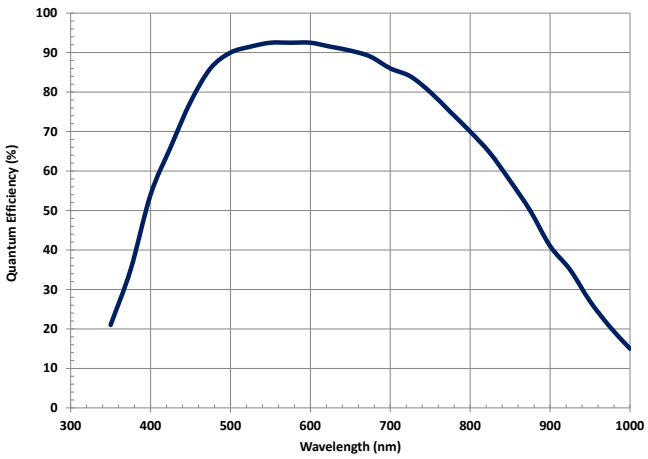
Technical Specifications[*1]

Sensor Type	CCD42-40 (E2V)
Active pixels	2048 x 2048 W x H (4.2 Megapixel)
Sensor Size	27.6 x 27.6 mm (764 mm^2) 39.1 mm diagonal
Pixel Size	13.5 x 13.5 µm
Pixel Well Depth	77,000 e^-
Read Noise [*3]	8 e^- (RMS @ 0.67 MHz)
Pixel Binning	1 x 1 to 8 x 2048 on chip
Quantum Efficiency [*4]	>90% @550 nm 52% @400 nm
Cooling	Maximum cooling up to 50°C below ambient temperature; -25°C at 25°C ambient Thermoelectric cooler with forced air.
Temperature Stability	+/- 0.1°C
Dark Current [*3]	0.1125 e^-/pixel/sec
Blemish Specification	Grade 1 as standard, as per sensor manufacturer definition
Anti-blooming factor	None
Maximum Dynamic Range	79.7 dB (9625:1)
Linearity	Better than 99%
Frame Rate (fps) [*5]	0.15 Full frame (@0.67 MHz) 0.46 Full frame (@2.11 MHz, focusing mode)
Frame Sizes	Full frame, sub-frame
Digital Resolution	16-bit
Camera Window	UV-grade fused silica

General Specifications

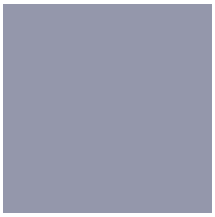
Interface Options	USB 2.0
Remote Triggering	LVTTL trigger input, expose strobe output
Peripheral communications	8 pin mini-DIN I/O connector
Image Sequencing	1 to 65535 image sequences under software control
Exposure Time	95 minutes (max) (1.33 microsecond increments)

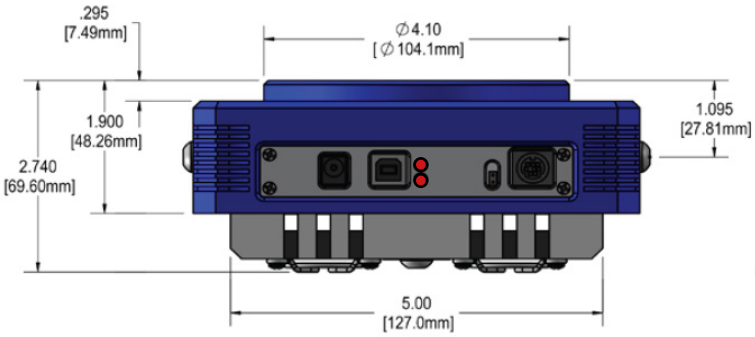
Quantum Efficiency (QE) Curve[*5]

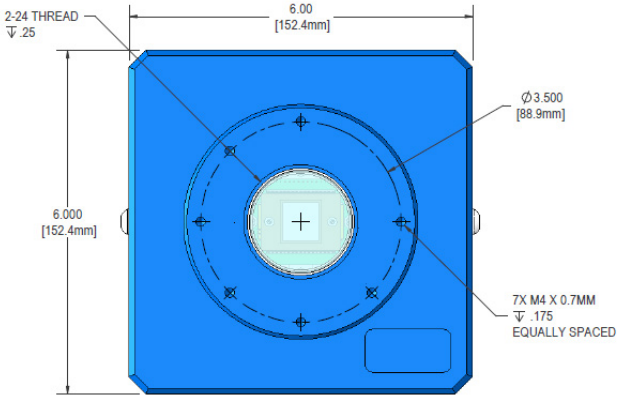


Size of CCD Imaging Area

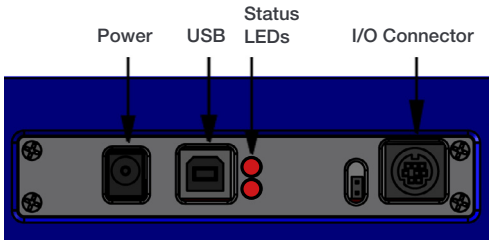
27.6 x 27.6 mm







Connections



Mechanical Specifications

Camera Housing	Aluminum, hard anodized (D02)
Camera Head Size	6”x6”x 2.5” (15x15x6.35 cm)
Back Focal Distance	1.025” (2.6 cm) [optical]
Mounting	3.5” bolt circle. 2” 24 TPI thread. Optional Nikon F-mount or Canon EOS/EF or FD mount.
Shutter	43 mm shutter.
Weight	3.1 lb. (1.4 kg)

CREATING THE OPTIMUM PRODUCT FOR YOU

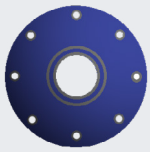
How to customize the Apogee Alta F42:

Step 1: Select your camera type

Camera

Description	Part Code
Apogee Alta F42 4.2 Megapixel Full frame CCD camera with grade 1 sensor, midband coating and 43 mm Shutter	F42-MB-1-D02-S43

Step 2: Please indicate which adapters and accessories are required



Adapters & Accessories

A wide range of mounting adapters and accessory options are available for the Alta. Please refer to the links below for further information on filters and adapters.

Filters

A comprehensive selection of Astrodon filters are available. Please refer to Apogee Filters

Lens Adapters and flanges

Select the required camera mounting option for your application, from our range of lens, telescope and slip-fit faceplate adapters. Please refer to Apogee Adapters

Step 3: Please indicate which software you require

Software

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

Description	Ordering Information
Windows SDK for Apogee	Please download from the Apogee Downloads Page
ASCOM Camera and Filter Wheel Driver	Please download from the Apogee Downloads Page
Linux Driver CD	Please download from the Apogee Downloads Page
Maxim DL Pro Software CD	MAXIM-DL/PRO-SW
MicroManager	Please see https://micro-manager.org/wiki/Apogee

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

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Europe
Belfast, Northern Ireland
Phone +44 (28) 9023 7126
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Japan
Tokyo
Phone +81 (3) 6732 8968
Fax +81 (3) 6732 8939

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

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

Footnotes

1. Figures are typical unless stated otherwise
2. At minimum temperature
3. Readout noise is for the entire system. It is a combination of sensor readout noise and A/D noise.
4. Quantum efficiency of the sensor at 25°C, as supplied by the sensor manufacturer.
5. Assumes internal trigger mode of operation and minimum exposure time.

Front page image M101, the Pinwheel Galaxy courtesy of Greg Morgan. Check out other astounding images captured with Apogee cameras at the Andor image gallery

OXFORD INSTRUMENTS
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PC 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 a sustained rate of 40MB/s
- Windows (7, 8, 8.1 and 10) or Linux (please contact us for specific build compatibility)

Operating and Storage Conditions
- Operating Temperature: 0 to 40°C
- Relative Humidity: < 70% (non-condensing)
- Storage Temperature: -25°C to 50°C
- Altitude up to 2000 m

Power Requirements
- 100-240V, AC 50-60Hz, or via alternate 12V input from user's source.
- 40W maximum power consumption (shutter open and cooling maximum)