



## System Features<sup>\*1</sup>

- High Resolution Sensor**  
 4.2 Megapixel sensor with 13.5  $\mu\text{m}$  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**  
 LVTTTL 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 50°C 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 50°C 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<sup>\*1</sup>

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

## SPECIFICATIONS

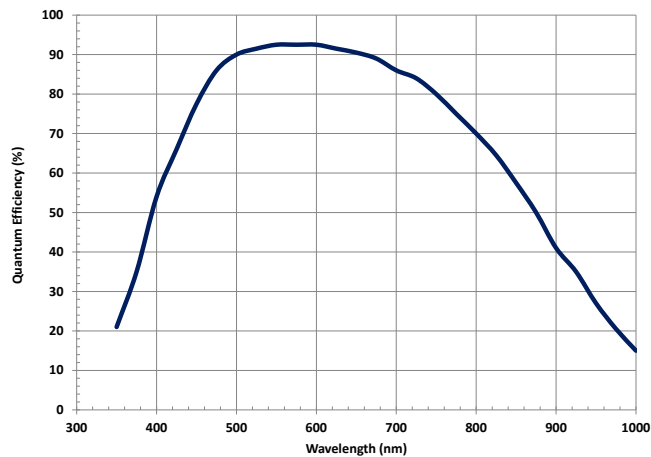
### Technical Specifications<sup>\*1</sup>

<b>Sensor Type</b>	CCD42-40 (E2V)
<b>Active pixels</b>	2048 x 2048 W x H (4.2 Megapixel)
<b>Sensor Size</b>	27.6 x 27.6 mm (764 mm <sup>2</sup> ) 39.1 mm diagonal
<b>Pixel Size</b>	13.5 x 13.5 $\mu$ m
<b>Pixel Well Depth</b>	77,000 e <sup>-</sup>
<b>Read Noise</b> <sup>*3</sup>	8 e <sup>-</sup> (RMS @ 0.67 MHz)
<b>Pixel Binning</b>	1 x 1 to 8 x 2048 on chip
<b>Quantum Efficiency</b> <sup>*4</sup>	>90% @550 nm 52% @400 nm
<b>Cooling</b>	Maximum cooling up to 50°C below ambient temperature; -25°C at 25°C ambient Thermoelectric cooler with forced air.
<b>Temperature Stability</b>	+/- 0.1°C
<b>Dark Current</b> <sup>*3</sup>	0.1125 e <sup>-</sup> /pixel/sec
<b>Blemish Specification</b>	Grade 1 as standard, as per sensor manufacturer definition
<b>Anti-blooming factor</b>	None
<b>Maximum Dynamic Range</b>	79.7 dB (9625:1)
<b>Linearity</b>	Better than 99%
<b>Frame Rate (fps)</b> <sup>*5</sup>	0.051 Full frame (@0.67 MHz) 0.46 Full frame (@2.11 MHz, focusing mode)
<b>Frame Sizes</b>	Full frame, sub-frame
<b>Digital Resolution</b>	16-bit
<b>Camera Window</b>	UV-grade fused silica

### General Specifications

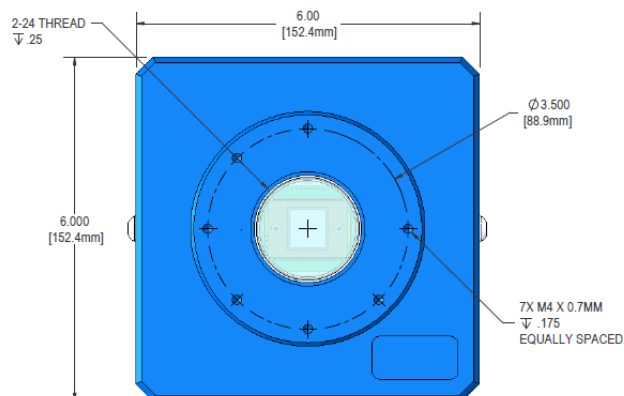
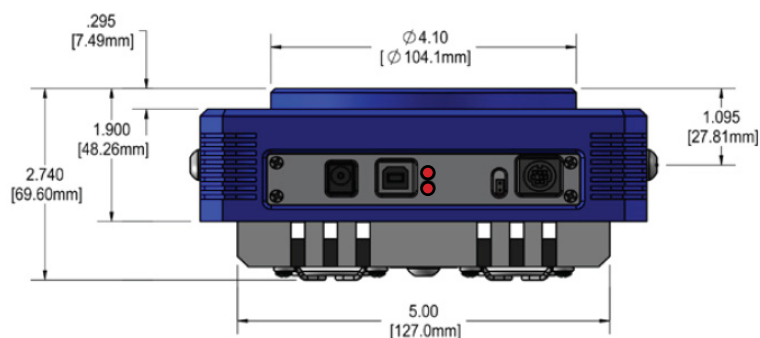
<b>Interface Options</b>	USB 2.0
<b>Remote Triggering</b>	LVTTTL trigger input, expose strobe output
<b>Peripheral communications</b>	8 pin mini-DIN I/O connector
<b>Image Sequencing</b>	1 to 65535 image sequences under software control
<b>Exposure Time</b>	95 minutes (max) (1.33 microsecond increments)

## Quantum Efficiency (QE) Curve<sup>\*5</sup>

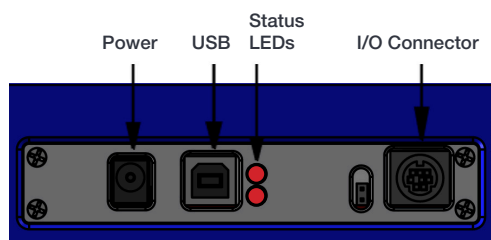


## Size of CCD Imaging Area

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

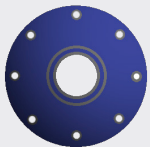


Camera

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 <a href="#">Apogee Downloads Page</a>
ASCOM Camera and Filter Wheel Driver	Please download from the <a href="#">Apogee Downloads Page</a>
Linux Driver CD	Please download from the <a href="#">Apogee Downloads Page</a>
Maxim DL Pro Software CD	MAXIM-DL/PRO-SW
MicroManager	Please see <a href="https://micro-manager.org/wiki/Apogee">https://micro-manager.org/wiki/Apogee</a>

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**China**

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## 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

**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)

