

Apogee Alta Series

System Features^{*1}

- High Resolution Sensors**
 1.6 Megapixel sensor with 9 μm pixels deliver 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 - 25 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 F2: Compact, 1.6 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 F2 has a 1.6 megapixel full frame sensor with very high quantum efficiency and high dynamic range when compared to interline CCDs. Low noise and large field-of-view make the Alta F2 a versatile performer suitable for OEMs, biological sciences, spectroscopy, and astronomy.

Specifications Summary^{*1}

Array Size (pixels)	1536 x 1024 (1.6 Megapixel)
Pixel Size	9 x 9 μm
Sensor Size	13.8 x 9.2 mm (127 mm ²) 16.6 mm diagonal
Pixel Well Depth (typical)	107,000 e ⁻
Dark Current^{*2}	0.0159 e ⁻ /pixel/sec
Read Noise^{*3}	8.5 e ⁻ (RMS @ 0.8 MHz)
Maximum Dynamic Range	82 dB (12588:1)
Quantum Efficiency	82% maximum @640 nm 44% @400 nm

SPECIFICATIONS

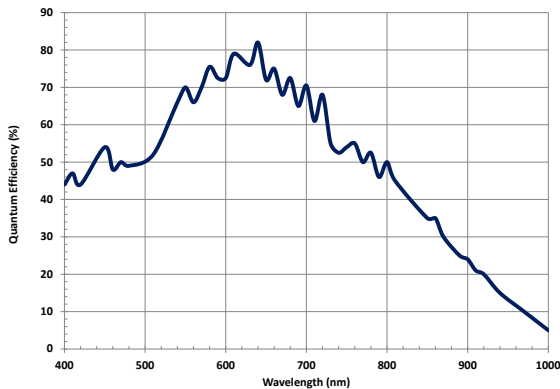
Technical Specifications^{*1}

Sensor Type	KAF-1603 (ON Semiconductor)
Active pixels	1536 x 1024 W x H (1.6 Megapixel)
Sensor Size	13.8 x 9.2 mm (127 mm ²) 16.6 mm diagonal
Pixel Size	9 x 9 μm
Pixel Well Depth	107,000 e ⁻
Read Noise ^{*3}	8.5 e ⁻ (RMS @0.8 Mhz)
Pixel Binning	1 x 1 to 8 x 1024 on chip
Quantum Efficiency ^{*4}	82% maximum @640 nm 44% @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}	0.0159 e ⁻ /pixel/sec
Blemish Specification	Grade S as per sensor manufacturer definition
Anti-blooming factor	None
Maximum Dynamic Range	82 dB (12588:1)
Linearity	Better than 99%
Frame Rate (fps) ^{*5}	0.48 Full frame (@0.8 MHz) 2.50 Full frame (@5.68 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	LVTTTL 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}

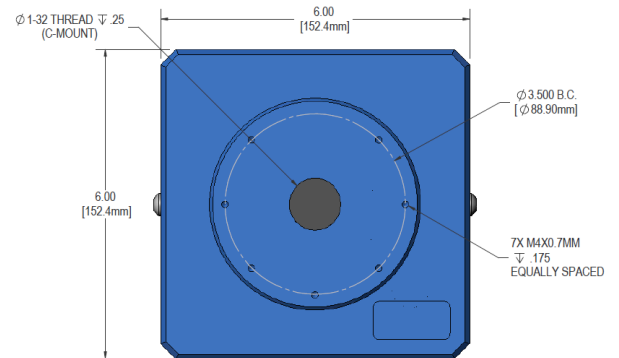
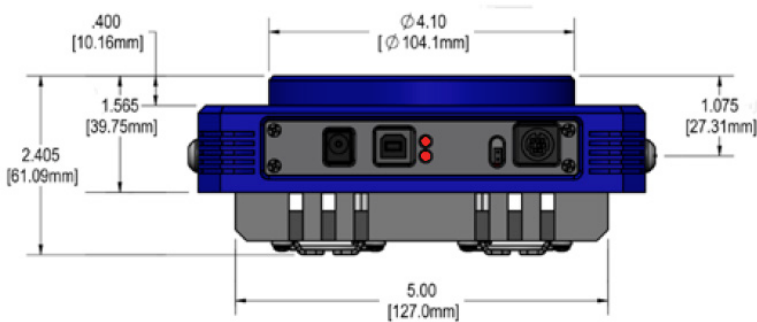


Size of CCD Imaging Area

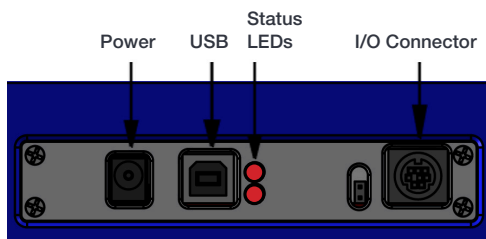
13.8 x 9.2 mm



Mechanical Drawings



Connections



Mechanical Specifications

Camera Housing	Aluminum, hard anodized (D01)
Camera Head Size	6" x 6" x 2.5" (15x15x6.25 cm)
Back Focal Distance	0.69" (1.75cm) [optical]
Mounting	3.5" bolt circle. C-mount (1" 32 TPI thread). Optional Nikon F-mount or Canon FD.
Shutter	25 mm shutter.
Weight	3.1 lb. (1.4 kg)

CREATING THE OPTIMUM PRODUCT FOR YOU

How to customize the Apogee Alta F2:

Step 1: Select your camera type

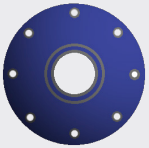


Camera

Description	Part Code
Apogee Alta F2 1.6 Megapixel Full frame CCD camera Grade S sensor and 25 mm Shutter	F2-S-D01-S25



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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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.



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)

