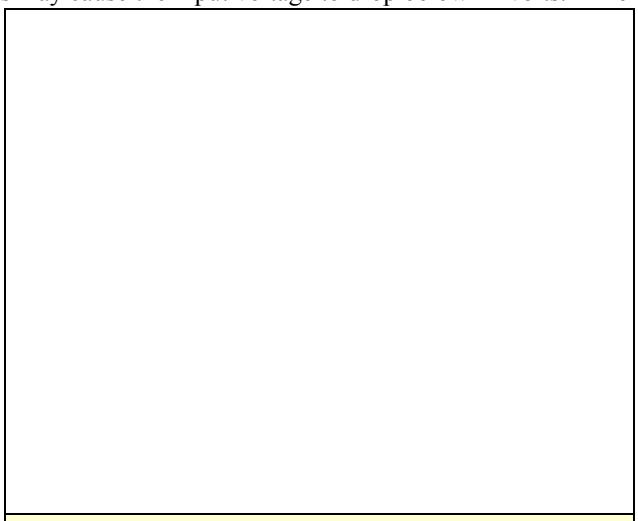
SBIG Research Series
STL-1001E, STL-1302E, STL-4020M, STL-6303E and STL-11000M
Large Format CCD Cameras

Santa Barbara Instrument Group, Inc.
147-A Castilian Drive
Santa Barbara, CA 93117
Tel: (805) 571-7244 ◊ Fax: (805) 571-1147
E-mail: sbig@sbig.com ◊ Web site: http://www.sbig.com

quick and easy transition between filter sets. A shutter mechanism is also located inside the camera body, between the filter wheel and the sealed CCD chamber.

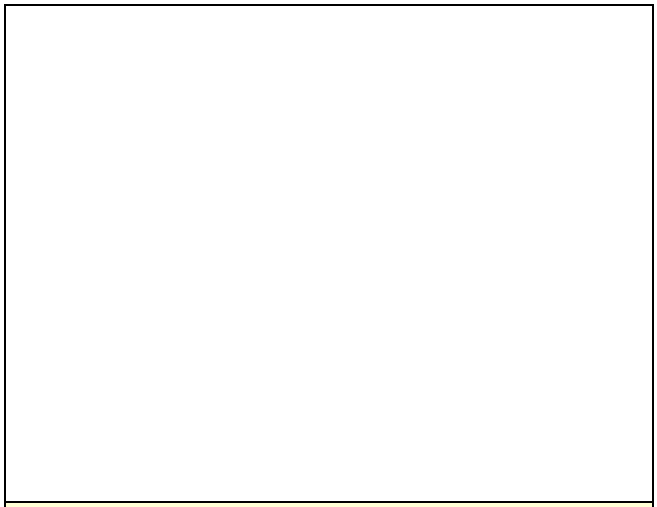
We have added an internal 12VDC regulated power supply to the camera for simplified power requirements and greater tolerance of input voltage variation. When operating in the field from a 12V battery, current drain, power cord extensions and cold temperatures may cause the input voltage to drop below 12 volts. The internal regulated supply will accommodate some variation in input voltage (from about 10 volts to 18 volts) and keep the camera operating normally. This will allow for longer power cords to be used with less concern for voltage drops so long as the input voltage stays within a certain range. A set of indicator LEDs will let you know if your input voltage at the camera is getting too low for normal operation. A universal 90-240VAC, 50-60 Hz power supply is also included for operation from virtually any line voltage in the world.



Filter Carousel with 2" Filters Inside Front Cover

The standard cooling design utilizes a very efficient two-stage TE cooler for maximum performance with large format detectors. Each camera is also liquid assist ready so that additional cooling in warm climates may be achieved by circulating water if needed. We are currently testing a special magnetic levitating fan to eliminate even the smallest vibration. Cooling to -50 Degrees C below ambient can be achieved with this system.

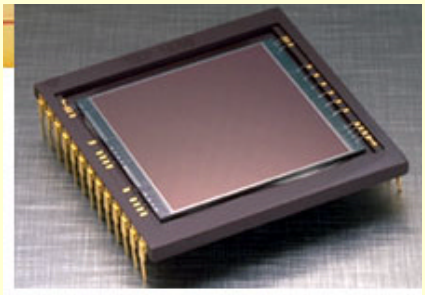
A set of five LED indicator lights on the side panel of the camera provides critical camera status information. The green LED lets you know the camera is booting up and gives camera exposure status during normal operation. One red LED provides a warning if the heat-sink gets too hot. This could happen, for instance, if you were running high power to the cooler and the fan failed for some reason. In this case the camera automatically reduces power to the two-stage cooler to prevent damage. One amber LED warns of an input voltage drop to 11 volts or less but the camera will continue functioning normally. The second amber LED warns of an input voltage drop to 10 volts but the camera will still continue functioning normally. The last red LED warns of an input voltage drop to 9 volts or less. In this case, the camera automatically turns off the TE cooler and continues to operate normally without cooling until the voltage drops to the point that the camera shuts down (around < 7 volts).



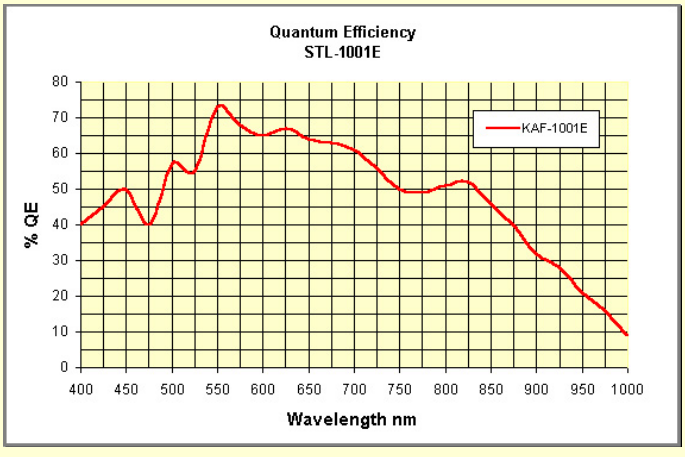
Power Supply and Heat Exchanger Inside Back Cover

All of these unique features make the Research Series cameras unmatched in features and flexibility. For more information please visit the SBIG web site at http://www.sbig.com or contact SBIG at (805) 571-7244, e-mail to sbig@sbig.com

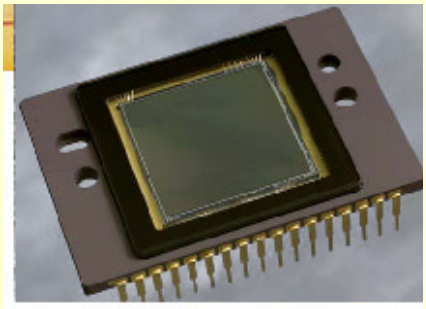
Model STL-1001E Typical Specificaitons	
CCD SPECIFICATIONS	
Imaging CCD	Kodak Enhanced KAF-1001E
Pixel Array	1024 x 1024 pixels, 24.6 x 24.6 mm
Total Pixels	1.0 million
Pixel Size	24 x 24 microns
Full Well Capacity (NABG)	150,000 e-
Dark Current	34 e-/pixel/second at 0 degrees C (~1e-/pixel/second at –30 degrees C)
Antiblooming	NABG only
READOUT SPECIFICATIONS	
Shutter	Electromechanical
Exposure	0.11 to 3600 seconds, 10ms resolution
Correlated Double Sampling	Yes
A/D Converter	16 bits
A/D Gain	2.2e^-/ADU
Read Noise	15e^- RMS
Binning Modes	1 x 1, 2 x 2, 3 x 3
Full Frame Download	2.5 seconds
SYSTEM SPECIFICATIONS	
Cooling - standard	Two-Stage Thermoelectric, Water Assist, -50 C from Ambient Typical
Temperature Regulation	±0.1°C
Power	10 - 18VDC, 12VDC nominal, Universal AC to 12VDC desktop supply
Computer Interface	USB 1.1
Computer Compatibility	Windows 95/98/NT/2000/Me/XP
Guiding	Dual CCD Self-Guiding Standard, Remote Guiding Head Optional
PHYSICAL SPECIFICATIONS	
Dimensions	6.5 x 6 x 3.5” (16.5 x 15.2x8.9cm)
Weight	4 pounds (1.8 Kg) without filters
Internal Filter Carousel	5 positions for 48mm threaded cells or 2” unmounted filters (optional)
Mounting	2” nosepiece included
Backfocus	Approximately 1.7 inches (~4.3 cm) with 2" nosepiece attached



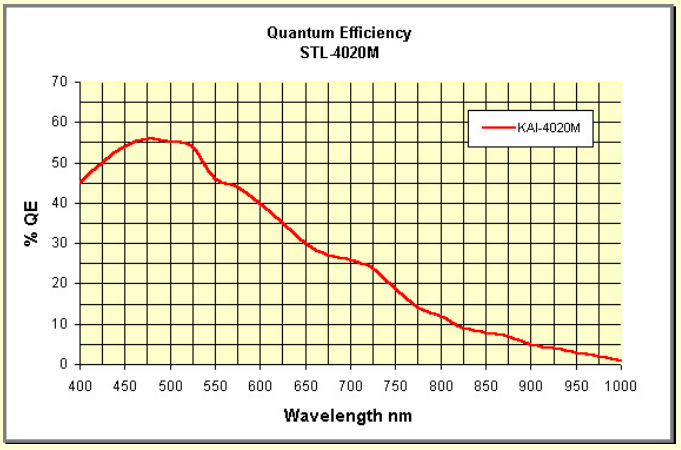
KAF-1001E
Quantum Efficiency
(Spectral Response)



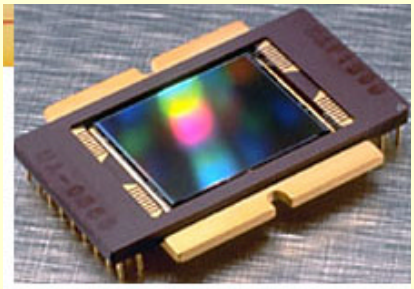
Model STL-4020M Typical Specificaitons	
CCD SPECIFICATIONS	
Imaging CCD	Kodak Enhanced KAI-4020M (Class 2)
Pixel Array	2048 x 2048 pixels, 15.2 x 15.2 mm
Total Pixels	4.2 million
Pixel Size	7.4 x 7.4 microns
Full Well Capacity (NABG)	40,000 e-
Dark Current	1e-/pixel/second @ 0 degrees C
Antiblooming	ABG only
READOUT SPECIFICATIONS	
Shutter	Electromechanical
Exposure	0.01 to 3600 seconds, 10ms resolution
Correlated Double Sampling	Yes
A/D Converter	16 bits
A/D Gain	0.72e^-/ADU
Read Noise	<15e^- RMS
Binning Modes	1 x 1, 2 x 2, 3 x 3
Full Frame Download	9.8 seconds
SYSTEM SPECIFICATIONS	
Cooling - standard	Two-Stage Thermoelectric, Water Assist, -50 C from Ambient Typical
Temperature Regulation	±0.1°C
Power	10 – 18VDC, 12VDC nominal, Universal AC to 12VDC desktop supply
Computer Interface	USB 1.1
Computer Compatibility	Windows 95/98/NT/2000/Me/XP
Guiding	Dual CCD Self-Guiding Standard, Remote Guiding Head Optional
PHYSICAL SPECIFICATIONS	
Dimensions	6.5 x 6 x 3.5” (16.5 x 15.2x8.9cm)
Weight	4 pounds (1.8 Kg) without filters
Internal Filter Carousel	5 positions for 48mm threaded cells or 2” unmounted filters (optional)
Mounting	2” nosepiece included
Backfocus	Approximately 1.7 inches (~4.3 cm) with 2" nosepiece attached



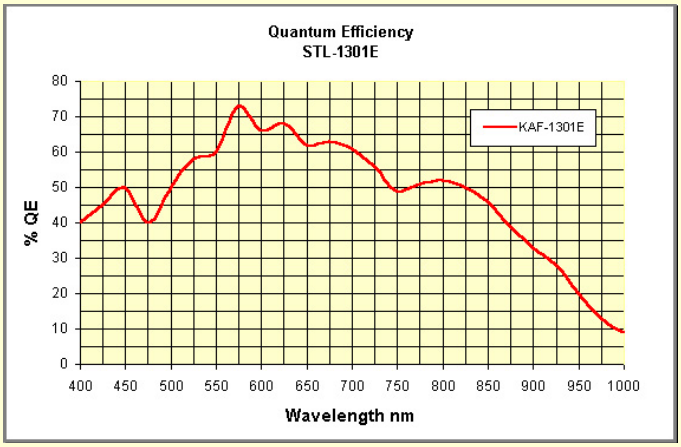
KAI-4020M CCD Quantum Efficiency (Spectral Response)



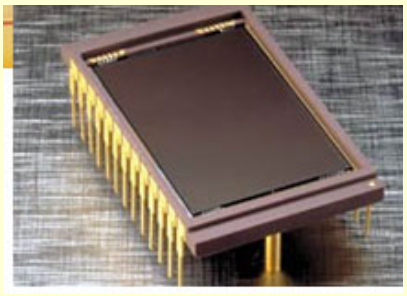
Model STL-1301E Typical Specificaitons	
CCD SPECIFICATIONS	
Imaging CCD	Kodak Enhanced KAF-1301E
Pixel Array	1280 x 1024 pixels, 20.5 x 16.4 mm
Total Pixels	1.3 million
Pixel Size	16 x 16 microns
Full Well Capacity (NABG)	150,000 e-
Dark Current	5.6 e-/pixel/second @ 0 degrees C.
Antiblooming	NABG standard, ABG optional
READOUT SPECIFICATIONS	
Shutter	Electromechanical
Exposure	0.11 to 3600 seconds, 10ms resolution
Correlated Double Sampling	Yes
A/D Converter	16 bits
A/D Gain	2.3e^-/ADU
Read Noise	15e^- RMS
Binning Modes	1 x 1, 2 x 2, 3 x 3
Full Frame Download	3 seconds
SYSTEM SPECIFICATIONS	
Cooling - standard	Two-Stage Thermoelectric, Water Assist, -50 C from Ambient Typical
Temperature Regulation	±0.1°C
Power	10 - 18VDC, 12VDC nominal, Universal AC to 12VDC desktop supply
Computer Interface	USB 1.1
Computer Compatibility	Windows 95/98/NT/2000/Me/XP
Guiding	Dual CCD Self-Guiding Standard, Remote Guiding Head Optional
PHYSICAL SPECIFICATIONS	
Dimensions	6.5 x 6 x 3.5” (16.5 x 15.2x8.9cm)
Weight	4 pounds (1.8 Kg) without filters
Internal Filter Carousel	5 positions for 48mm threaded cells or 2” unmounted filters (optional)
Mounting	2” nosepiece included
Backfocus	Approximately 1.7 inches (~4.3 cm) with 2" nosepiece attached



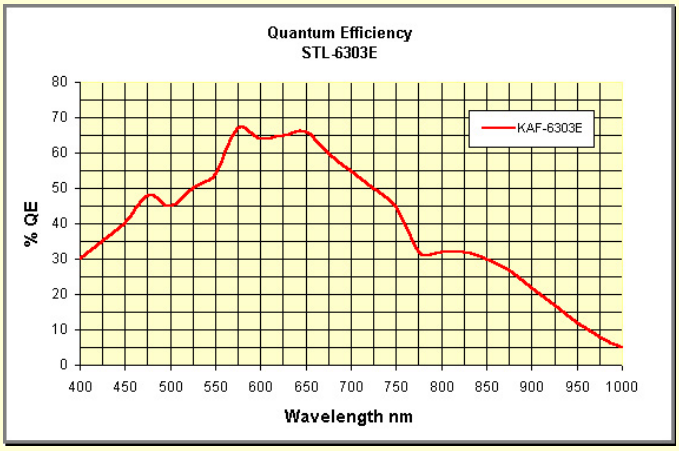
KAF-1301E
Quantum Efficiency
(Spectral Response)



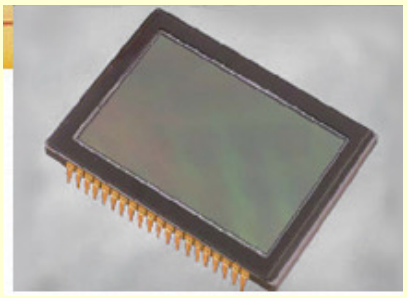
Model STL-6303E Typical Specificaitons	
CCD SPECIFICATIONS	
Imaging CCD	Kodak Enhanced KAF-6303E
Pixel Array	3060 x 2040 pixels, 27.5 x 18.4 mm
Total Pixels	6 million
Pixel Size	9 x 9 microns
Full Well Capacity (NABG)	100,000 e-
Dark Current	1e-/pixel/second @ 0 degrees C
Antiblooming	NABG standard, ABG optional
READOUT SPECIFICATIONS	
Shutter	Electromechanical
Exposure	0.11 to 3600 seconds, 10ms resolution
Correlated Double Sampling	Yes
A/D Converter	16 bits
A/D Gain	2.3e^-/ADU
Read Noise	15e^- RMS
Binning Modes	1 x 1, 2 x 2, 3 x 3
Full Frame Download	14 seconds
SYSTEM SPECIFICATIONS	
Cooling - standard	Two-Stage Thermoelectric, Water Assist, -50 C from Ambient Typical
Temperature Regulation	±0.1°C
Power	10 - 18VDC, 12VDC nominal, Universal AC to 12VDC desktop supply
Computer Interface	USB 1.1
Computer Compatibility	Windows 95/98/NT/2000/Me/XP
Guiding	Dual CCD Self-Guiding Standard, Remote Guiding Head Optional
PHYSICAL SPECIFICATIONS	
Dimensions	6.5 x 6 x 3.5” (16.5 x 15.2x8.9cm)
Weight	4 pounds (1.8 Kg) without filters
Internal Filter Carousel	5 positions for 48mm threaded cells or 2” unmounted filters (optional)
Mounting	2” nosepiece included
Backfocus	Approximately 1.7 inches (~4.3 cm) with 2" nosepiece attached



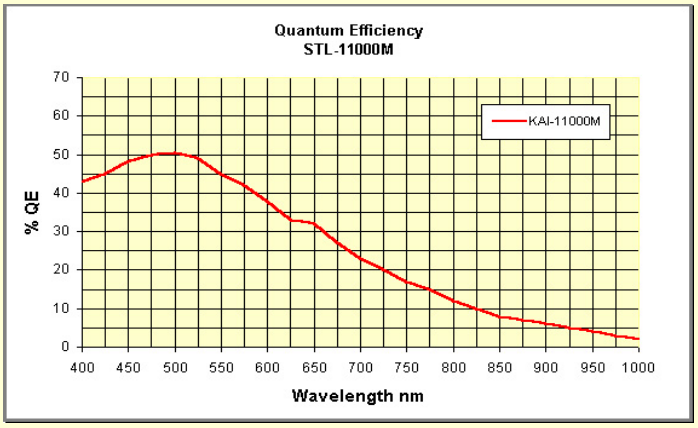
KAF-6303E
Quantum Efficiency
(Spectral Response)



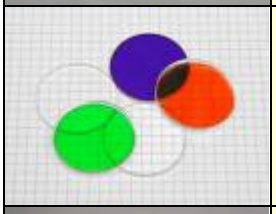
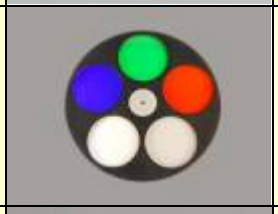
Model STL-11000M Typical Specificaitons	
CD SPECIFICATIONS	
Imaging CCD	Kodak Enhanced KAI-11000M
Pixel Array	4008 x 2745 pixels, 36 x 24.7 mm
Total Pixels	11 million
Pixel Size	9 x 9 microns
Full Well Capacity (NABG)	50,000 e-
Dark Current	1.5 e-/pixel/sec @ o degrees C
Antiblooming	ABG only
READOUT SPECIFICATIONS	
Shutter	Electromechanical
Exposure	0.01 to 3600 seconds, 10ms resolution
Correlated Double Sampling	Yes
A/D Converter	16 bits
A/D Gain	$0.8e^-$/ADU
Read Noise	$11e^-$ RMS
Binning Modes	1 x 1, 2 x 2, 3 x 3
Full Frame Download	26 seconds
SYSTEM SPEIFICATIONS	
Cooling - standard	Two-Stage Thermoelectric, Water Assist, -50 C from Ambient Typical
Temperature Regulation	±0.1°C
Power	10 - 18VDC, 12VDC, 4.5A nominal, Universal AC to 12VDC desktop supply
Computer Interface	USB 1.1
Computer Compatibility	Windows 95/98/NT/2000/Me/XP
Guiding	Dual CCD Self-Guiding Standard, Remote Guiding Head Optional
PHYSICAL SPECIFICATIONS	
Dimensions	6.5 x 6 x 3.5” (16.5 x 15.2x8.9cm)
Weight	4 pounds (1.8 Kg) without filters
Internal Filter Carousel	5 positions for 48mm threaded cells or 2” unmounted filters (optional)
Mounting	2” nosepiece included
Backfocus	Approximately 1.7 inches (~4.3 cm) with 2" nosepiece attached



KAI-11000M
Quantum Efficiency
(Spectral Response)



Remote Guiding Head Specifications (Typical)	
Dimensions	2.75 x 2 x 2 inches (7 x 5 x 5 cm) excluding nosepiece, desiccant plug and connector
Weight	Approx. 0.5 lbs. (0.23kg)
Camera Interface	A small flexible cable, 3’ long (6’ optional) to the camera provides power, control signal and image transfer.
Computer Interface	USB 1.1 through main camera to computer. Proprietary protocol between remote head and camera body.
Telescope Interface	T-thread or supplied 1.25" nosepiece, optional T-thread to C-mount and 35mm camera lens adapters are available
Shutter	Internal Mechanical Shutter for dark frames plus electronic shutter (frame transfer) for short exposures
Power Requirements	None (Remote head receives power through the head cable from the main camera)
Mounting connections	1/4-20 threaded holes on two sides of head
Cooling	Single-stage TE cooling to approximately –25 degrees C below ambient
	REMOTE GUIDING HEAD SENSOR **CCD:** Texas Instruments TC-237H **Pixel Array:** 657 x 495 pixels **Pixel Size:** 7.4 x 7.4 microns **CCD Size**:4.9 x 3.7 mm **Cooling;** Single-stage Thermoelectric **Antiblooming:** Yes

Optional Accessories for Research Series Cameras			
	Remote Guiding Head with cooled TC237H CCD, 3’ head cable included		Replacement 6' head cable for Remote Guiding Head
	50mm LRGBC Filter Set		Extra Filter Carousel
	12VDC Power Cable with CigaretteLighter Adapter		Nikon 35mm Lens Adapter
	12VDC Water Pump Cigarette Lighter Plug, Mounting Plate and tubing		Relay Adapter Box
9’ Extension cable for AC power supply	110VAC Transformer for Water Pump	50mm UBVRI Filter Set	50mm H-alpha and other narrow band filters