

## MEGAPLUS TEM 16000

4872 x 3248 · 7.4 μm x 7.4 μm

The MEGAPLUS TEM 16000 is an actively cooled, high resolution, 16 megapixel digital camera uniquely designed to separate and isolate the camera's primary electronics from the sensor cooling path, resulting in true 12-bits per pixel at virtually any operating temperature. Using Peltier cooling, both dark noise and thermal drift are significantly reduced, making this camera the perfect solution for the most demanding scientific and industrial applications. Capable of cooling the sensor to 12°C below ambient temperature, the TEM 16000 is a wise choice for Transmission Electron Microscopy applications needing close proximity of optics to the CCD combined with exceptional low noise performance. The TEM 16000 supports the latest GigE Vision interface as well as Firewire and CameraLink interfaces, making it one of the most versatile imaging platforms on the market.

FEATURE	BENEFITS
16 megapixel resolution (4872 x 3248 pixels)	Resolves fine detail
Close proximity of the CCD to the front plate of the camera	Enables optimized optical integration
Simultaneous exposure and readout with triggering	Fastest frame rate possible while triggering
Partial scanning (AOI)	Increased 1:1 frame rate for focus modes
Full 35 mm image sensor (36 mm x 24 mm)	Enables large scanning areas optimized for standard optics
Actively cooled camera	Enables long integration times while minimizing dark noise; Consistent imaging performance over long periods of time
12-bits per pixel	Quantifies full range of light levels in a single image
Interline Transfer Progressive Scan CCD	Eliminates camera vibration; Facilitates fast triggering
Cameralink interface	High bandwidth; Continuous data interface
GigE Vision interface	Ideal for plug-and-play operation over extended distances
Firewire (IEEE-1394a) Interface	Seamless, plug-and-play connection to PC notebooks and desktops
Compact design	Small footprint/design is optimized for integration into applications where space is at a premium



*Applications:*  
Machine Inspection & Calibration,  
Scientific & Document Imaging and  
Flat Panel Inspection

## SPECIFICATIONS

<b>CCD Imager</b>	
Imaging Device	KAI-16000, CCD, available in mono only
Sensor Readout	Interline, progressive scan
Pixel Size	7.4 $\mu\text{m}$ x 7.4 $\mu\text{m}$
Resolution	4872 x 3248, 16 megapixels
Imager Size (diagonal)	43.3 mm
Active Area	36 mm (horizontal) x 24 mm (vertical)
Aspect Ratio	3:2
Sensor Dynamic Range	65 dB
Readout Noise	16 electrons rms
Shuttering	Electronic
<b>Imaging Performance</b>	
Output Bit Depth	8-, 10- or 12-bits per pixel
Sensor Clock Rate	30 MHz (optional - over clocked to 38 MHz)
Controller Clock Rate	60 MHz (over clocked to 76 MHz)
Maximum Frame Rate (CameraLink)	3.2 fps (frames per second) @ 30 MHz
Maximum Frame Rate (IEEE-1394a)	1.6 fps (monochrome)
Maximum Frame Rate w/2 x 2 binning	5.4 fps @ 30 MHz      6.8 fps @ 38 MHz
Maximum Frame Rate w/3 x 3 binning	7.5 fps @ 30 MHz      9.6 fps @ 38 MHz
Maximum Frame Rate w/4 x 4 binning	9 fps @ 30 MHz      11.7 fps @ 38 MHz
<b>Exposure Settings</b>	
Maximum Integration Time	10 minutes
Gain Settings	0 - 36 dB
Binning	YES
Anti-blooming	YES
Trigger Modes	Edge; Level; Double Exposure; Periodic Interval (self); Overlap trigger modes
<b>Cooling Performance</b>	
Cooling Method	Peltier (TE: Thermo Electric)
Standard Cooling	~5°C below ambient (0 - 40°C)
Cooling with Integrated Fan	~12°C below ambient (0 - 40°C)
Dark Current Doubling Temperature	7°C

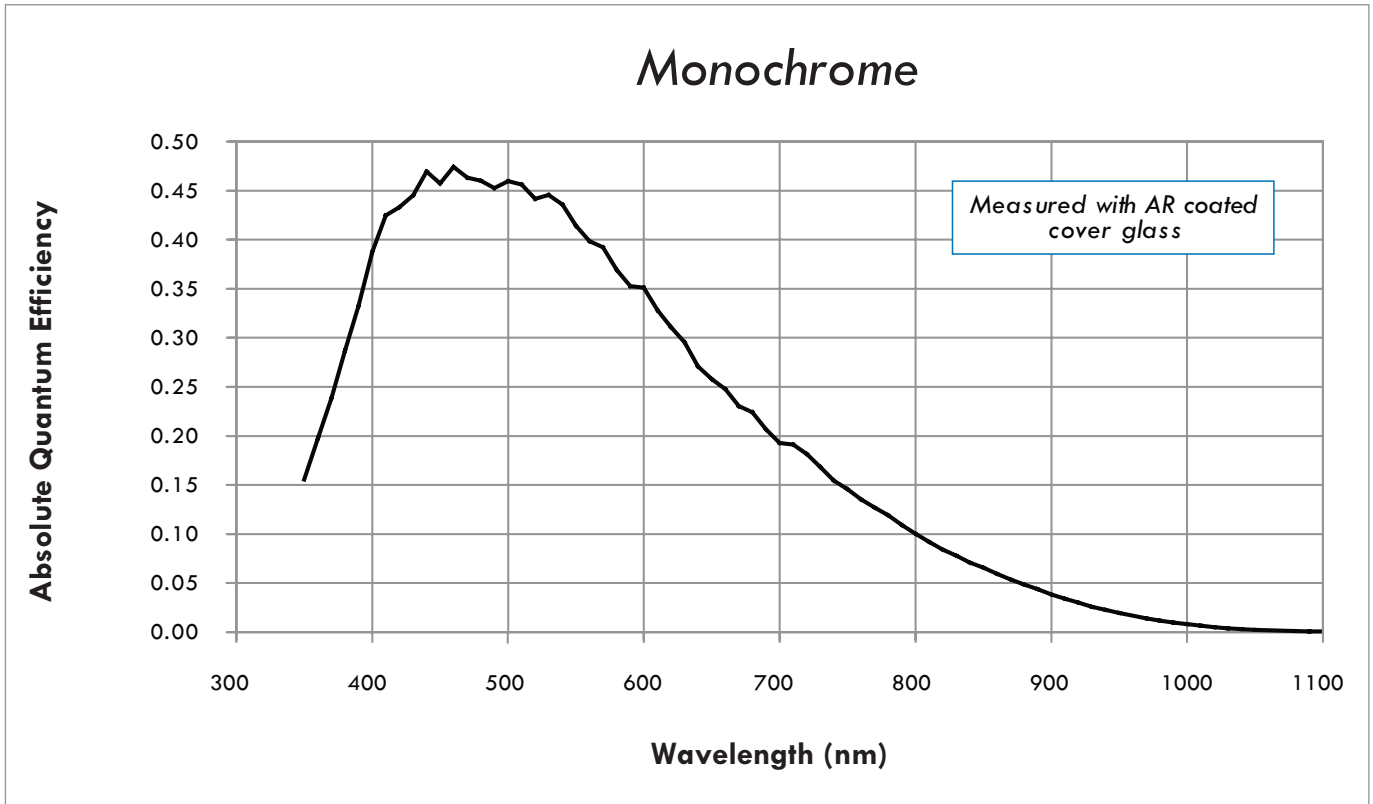
NOTE: All specifications subject to change

## SPECIFICATIONS

<b>Mechanical Description</b>	
Lens Mount	Supplied without mount - ready for custom optics integration
Camera Head Cable	0.5 M; 2 M; 5 M; 7 M
Camera Head Dimensions (F-mount)	123.83 mm x 89.34 mm x 98.43 mm (LxDxH)
Camera Head Weight	1004 grams / 2.2 lbs
Controller Dimensions	161 mm x 158 mm x 51 mm (LxDxH) multi-head controller (CameraLink & Firewire) 159 mm x 152 mm x 38 mm (LxDxH) single-head controller (CameraLink) 159 mm x 152 mm x 54 mm (LxDxH) single-head controller (GigE Vision)
Controller Weight	1140 grams / 2.5 lbs - multi-head controller 992 grams / 2.2 lbs - single-head controller (CameraLink) 1124 grams / 2.47 lbs - single-head controller (GigE Vision)
<b>Environmental</b>	
Operating Temperature	0 - 40°C, non-condensing
Vibration	3G, sinusoidal from 10 to 500 Hz
Shock	5G
Power Consumption (Single Head with Controller)	15 watts
Certification	FCC Part 15, Class A and CE
<b>Input / Output</b>	
GigE Vision	1000 Base-T (GigE Vision compliant)
CameraLink	Base, Medium, Dual Base
Firewire	1394a
Serial	RS232
Trigger In	BNC, TTL
Trigger Out	BNC, TTL
Diagnostics	10/100 (for diagnostics and firmware updates only)

NOTE: All specifications subject to change

## QE CURVES



## OUTLINE DRAWING

