

# Lm160 & Lm165

Ultra Sensitive 1.4 Megapixel  
Mini USB 2.0 Camera



## EXview HAD Global Shutter CCD

Lumenera's Lm165 digital camera is designed to be a compact, cost-effective, versatile solution for machine vision, 3D biometrics and low light imaging. The fully global electronic shutter, which looks and feels of a mechanical shutter, that can capture images of high speed motion with little to no blur and this camera provides many of the features needed for stop motion image captures. Combine this with the ultra high sensitivity and high dynamic range and you get a versatile camera that can be used in the most light challenging applications.

## High Dynamic Range in Low Light Applications

This camera utilizes its high quality CCD sensor to its maximum by providing either vivid color or highly sensitive visible light and near IR monochromatic images. Full streaming of uncompressed video along with still image captures are easily controlled through a set of stable and reliable USB device drivers. Region of interest and binning modes allow the camera to run at faster frame rates (30+ fps at 640x480 resolution) while only providing the image data you need. Image capture synchronization is achievable using either a hardware or software trigger and is complemented by 32MB of on board memory for frame buffering to ensure delivery of each image to your application.

## Small Size and Locking Connectors

The compact design of the Lm165, measuring 44x44x56mm, make it ideal for installation in small spaces or in compact enclosures. The fully locking USB 2.0 cabling and digital interface ensures a simple plug and play installation – and one standard cable minimizes camera clutter. No frame grabber required. Simplified and economical IO cabling is provided through a locking RJ45 connector supporting 2 optically isolated ports (1IN/1OUT) and 3 configurative bi-directional I/O ports.

## Write Your Own Vision Application

The Lumenera Camera SDK provides a full suite of features and functions that allow you to maximize the performance of your camera within your application. The SDK is compatible with all USB and GigE based cameras. Microsoft DirectX/DirectShow, Windows API and .NET API interfaces are provided allowing you the choice of application development environments from C/C++ to VB.NET or C#.NET. Full inline IntelliSense autocompletion and documentation is provided with the .NET API interface and is accompanied by a full API manual describing all the camera functions and properties.

## Any Questions?

All Lumenera cameras are supported by an experienced team of technical support and imaging experts. We understand your imaging needs and are here to help you get the most out of your camera.

## Features

- Small form factor measuring 44 x 44 x 56 mm
- High quality Sony HAD ICX205 CCD sensor
- Color or monochrome, interline transfer, progressive scan 1.4 MP CCD sensor
- Locking industrial mini USB and RJ45 GPI/O connector for control of peripherals and synchronization of lighting
- 3 software configurable bidirectional I/O ports and 2 optically isolated ports (1in/1out)
- 32 MB RAM frame buffer
- Excellent sensitivity
- Simplified cabling - video, power and full camera control over a single mini USB cable
- 8 mounting points
- Binning and Region of Interest (ROI) options improve sensitivity and provide higher frame rates
- FCC Class B, CE Certified
- Select 8 or 12-bit pixel data
- DirectX/DirectShow compatible
- Software compatible with Windows 10, Windows 8.1, Windows 7, Linux, 32 and 64-bit operating systems
- Complete SDK available
- Four (4) warranty

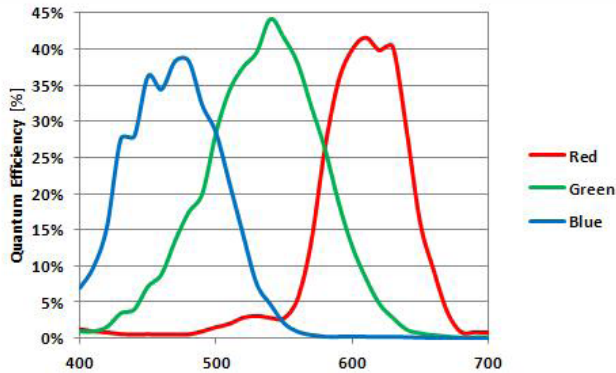


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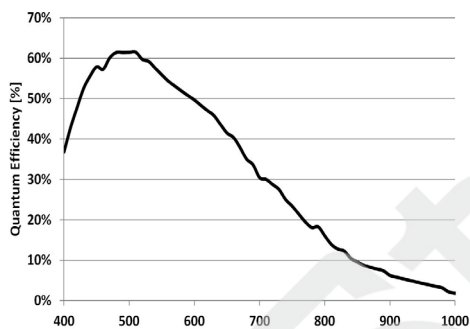
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Design, features, and specifications are subject to change without notice  
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Color Quantum Efficiency Curves



Monochrome Quantum Efficiency Curve



## Ordering Options

Lm165M	Monochrome Camera (Enclosed)
Lm165C	Color Camera (Enclosed)
LuSDK	Software Developer's Kit (web download)

## Camera Includes

Lu802m	Locking 2M USB 2.0 A to mini B cable
Lu906	Tripod mount

## Customization Options

-WOIR	Without IR Cut Filter (in optical path)
-WIR	With IR Cut Filter (in optical path)
-CS	With Adjustable CS-Mount Lens Mount

## Sensor Specifications

Image Sensor	Sony ICX285, CCD, Color or Mono
Optical Format	2/3"
Imager Size	Diagonal 11 mm
Pixel Size	6.45um x 6.45um
Resolution	1392 x 1040 pixels
Region of Interest Control	Any multiple of 8 x 8 pixels, 16 x 16 pixels minimum

## Camera Specifications

Frame Rate	15 fps at full resolution, 30fps at 640 x 480 (at 2x binning or with ROI)
Bit Depth	8 or 12 bits
Binning / Subsampling Modes	2x and 4x binning modes for color and 2x, 3x and 4x binning modes for monochrome
Exposure Control	Manual and automatic control
Exposure Range	3.5us - 528ms (video), 43.74us - 71m (snapshot)
White Balance	Manual and automatic control
Gain Control	Manual and automatic control
Gain Range	1-23.815
Trigger Modes	Hardware and software triggerable

## Camera Characteristics

Sensitivity	5.3 DN(nJ/cm <sup>2</sup> ) @ 8-bit, 1 x gains
Dynamic Range	65dB
Pixel Well Depth	18,000 e-
Quantum Efficiency	62% (mono peak), 44% (color peak)
Signal To Noise Ratio	9 bits mono, 8 bits color
Read Noise	8 e-
Dark Current Noise	<1 e-/s at 22 °C

## Mechanical Specifications

Data Interface	USB 2.0, locking mini-B connector
General Purpose I/O	Locking RJ45
Lens Mount	Adjustable C-Mount standard, optional adjustable CS-mount available
Dimensions (HxWxD)	44 x 44 x 56 mm (enclosed) 2 x 2.5 x 0.75 inch (enclosed)
Mass	~130 grams
Operating Temperature	0°C - 50°C
Storage Temperature	-30°C - 70°C
Operating Humidity	5%-95%
Shock / Vibration	50g shock, 5g (2-200Hz) vibration
Onboard Memory	Camera has onboard non-volatile memory storage

## Camera Software

Operating Systems	Windows 10, Windows 8.1, Windows 7, Linux, 32 and 64-bit operating systems
Software Interfaces	Windows API, .NET, DirectX

## Power and Emissions

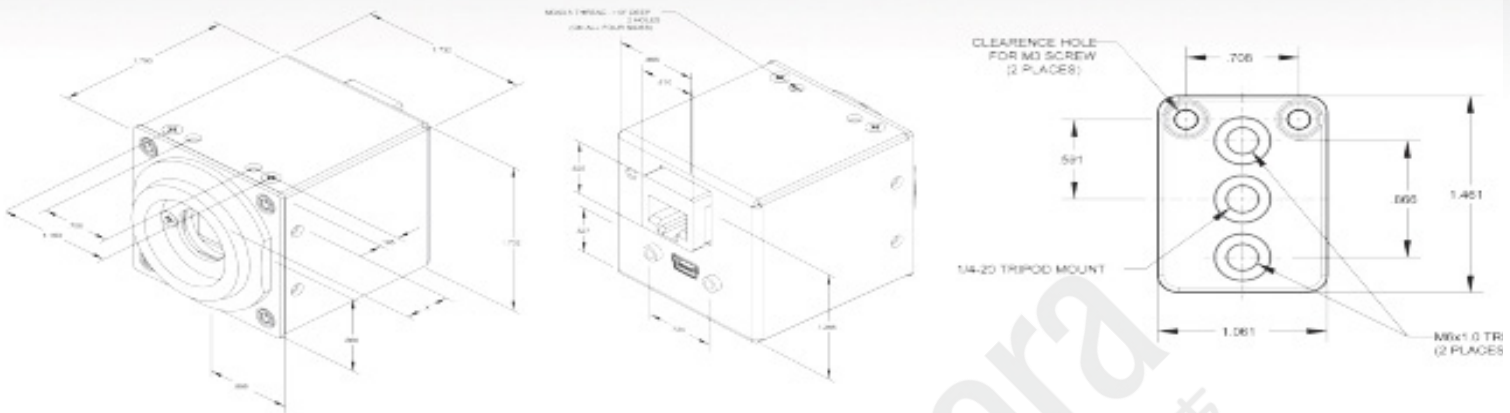
Power Consumption	~2.5 Watts
Power Requirement	USB bus power only
Emissions Compliances	FCC Class BE, CE Certified
Hazardous Materials	RoHS, WEEE Compliant
Warranty	Four (4) year

## System Requirements

Recommended PC Specs	<ul style="list-style-type: none"> <li>Pentium 4, 1.3 GHz or higher</li> <li>512 Mb RAM</li> <li>60 MB hard drive free space or more</li> <li>USB 2.0 Port</li> <li>Windows 10, 8.1, 7; Linux</li> </ul>
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## Enclosed Mechanical Drawings



## Board Level Mechanical Drawings

