

# i.CAM-hqM



- 12-BIT DIGITALIZATION ◀
- UP TO 60Hz FRAME RATE ◀
- 1,45 MEGAPIXEL, 2/3" ◀
- B/W CCD IMAGE SENSOR ◀
- FIREWIRE-INTERFACE ◀
- EXTERNAL TIMING ◀
- NOTEBOOK COMPATIBLE ◀
- COMPACT DESIGN ◀



The i.Cam-hqM is a high-resolution 12-bit camera system, designed for various industrial and scientific applications. Due to square pixel with a size of  $6.45\mu\text{m} \times 6.45\mu\text{m}$  for highest sensitivity and very low dark current, the Sony ICX285AL image sensor is perfectly suited to all microscopic applications, especially to fluorescence microscopy. Because of the hot-plug compatible FireWire HighSpeed Interface, it is very simple to connect the i.Cam-hqM to any computer which provides a standard OHCI IEEE1394 compatible interface via only one cable. In particular, this offers the possibility of using a notebook as a very flexible and transportable image processing system. Multiple camera systems can operate completely asynchronously with only one PC. All camera functions, e.g. amplification, exposure timing and automatic functions can be adjusted through the software.

Features	
<b>Highest Sensitivity</b> ▶	Highest sensitivity for low light level imaging due to the high peak quantum efficiency of 65% (>50% in the whole visible range) and a SNR of <math>15e^- \text{ rms}</math> .
<b>12-bit Digitalization</b> ▶	12-bit digitalization provides a 16-times higher intensity resolution for the examination of structures of low contrast. Averaging of statistical noise with image accumulation offers 13-bit dynamic.
<b>Photometric Linearity</b> ▶	Proportionality of measured counts to incoming light intensity better than 1%, optimizable to linearities <math>< 0.5\%</math> with correction tables.
<b>High Resolution</b> ▶	1.45 Megapixel 2/3" image sensor Sony ICX285AL with interline transfer and 1392 x 1040 square pixel with a size of $6.45\mu\text{m} \times 6.45\mu\text{m}$ .
<b>Anti-Blooming Function</b> ▶	Blooming from one overexposed pixel to adjacent pixels will be avoided by an efficiency of an overexposure factor of > 200 relative to the full well capacity (typ. 1000x).
<b>External Timing</b> ▶	Asynchronous electronic integration time control by external gate input. Integration times from $20\mu\text{s}$ up to 4s.
<b>Partial Scan + Binning</b> ▶	On-chip-accumulation of charges of lines and columns (binning) increases the sensitivity. Line-binning and the readout of regions of interest (partial scan) speed the frame rate up to 60Hz and simultaneously reduce the memory consumption per image.
<b>16 Frame Buffer</b> ▶	16 integrated frame buffers offer various additional features like auto shading corrections, pre-processing and background corrections.
<b>FireWire Interface</b> ▶	Single-Cable-Connection with 400-Mbits/s due to FireWire-HighSpeed Interface. Compatible with every standard OHCI IEEE 1394 interface. Works easily with notebooks. Optional fiber optics interface for cable lengths >100m.
<b>WinSIS-Software</b> ▶	WinSIS6 for WinXP/2000/NT/9x controls all camera functions and integration timing. The concept of intuitive easy-to-use operation for all imaging and processing functions with integrated job creation and macro definition offers a fast realization of complex applications without long training periods. SDK for personal programming.

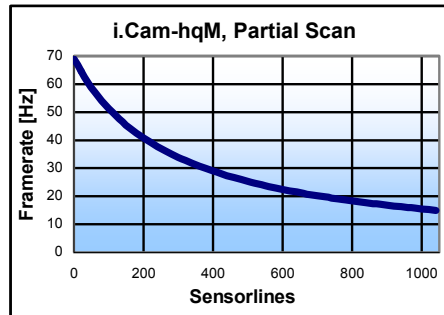
# i.CAM-hqM



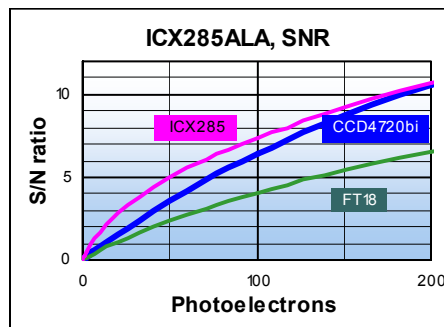
Monochrome,  
Progressive Scan  
2/3"-CCD Image Sensor  
Sony ICX285AL

## Spezifikationen

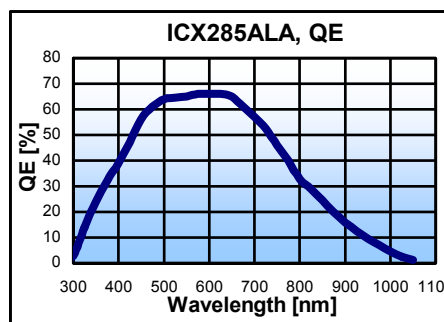
CCD Image Sensor	Sony ICX285AL
Sensor Type	Progressive Scan, inter-line transfer, Lens on chip
Sensor Format	4 : 3, 2/3"- Image Sensor
Image Size	9mm x 6.7mm, 11.2mm diagonal
Pixel Size	6.45µm x 6.45µm
Pixel Count	1392 (H) x 1040 (V)
Electron Capacity	18,000e <sup>-</sup>
Readout Noise, rms	< 15e <sup>-</sup>
Dynamic	1,200 : 1
Dark Current @ 20°C	< 2e <sup>-</sup> / pixel / s
Quantum Efficiency	> 60% @ 500nm
Anti-Blooming	> 200 x e <sup>-</sup> capacity
Binning	2 horizontal, 2 vertical
Partial Scan	Arbitrary, increases the frame rate up to 60Hz
Digitalization	12-bit, 4096 Grayscales
Frame Rate	11Hz, 12-bit, 15Hz, 8-bit
Integration Time	20µs to 4s
Frame Buffer	Up to 16 frame buffer for pre-processing
Amplification	1 – 30 (software)
Optical Mount	c-mount
Mech. Dim. (WxHxD)	45mm x 45mm x 115mm
Weight	230g
Operational Temperature	+5 ... +45°C



Line-binning and the readout of regions of interest (partial scan) speed the frame rate up to 60Hz and reduce the memory consumption per image. On-chip-accumulation of charges of lines and columns (binning) additionally increases the sensitivity and decreases the spatial resolution.



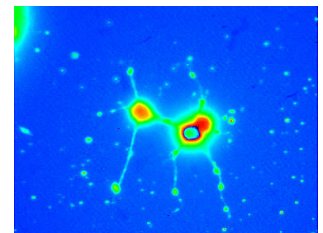
At low level lighting the Signal to Noise Ratio SNR is determined by the readout noise and by the quantum efficiency (ICX285: 2.5e<sup>-</sup>, QE > 60%) of the CCD image sensor. The chart shows the graph of the FT18 (green, QE >30%) and CCD4720bi (blue, QE >90%) frame transfer sensors for comparison.



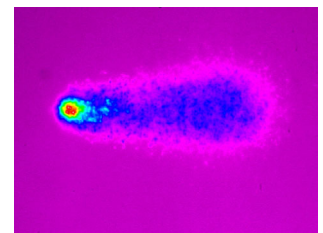
The quantum efficiency QE is defined as the percentage of the incoming photons, which generate an electronic charge. It is a measure of the efficiency of a CCD image sensor.

## Applications

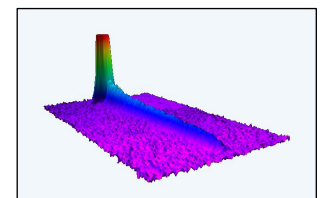
- ▶ LowLightLevel Imaging
- ▶ Fluorescence
- ▶ Luminescence
- ▶ Chemiluminescence
- ▶ Comet Assay
- ▶ FISH
- ▶ Spectroscopy
- ▶ Electrophoresis
- ▶ Gel-applications
- ▶ Astronomy
- ▶ Combustion processes
- ▶ Quality control
- ▶ Process control
- ▶ BEC



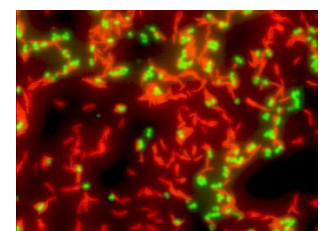
FURA, calciumfluorescence of a cancer cell



DAPI, Comet Assay



Absorption, atom laser beam



FISH Megapec

## THETA SYSTEM Elektronik GmbH

Rathausstraße 13  
D-82194 Gröbenzell  
Tel +49 (0)8142-4678 0  
Fax +49 (0)8142-4678 90  
info@theta-system.de  
www.theta-system.de