

SiS1-m30bi



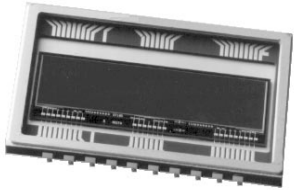
BACKILLUMINATED SENSOR SPECTROSCOPIC 16-BIT DYNAMIC SCIENTIFIC IMAGING SYSTEM



The Scientific Imaging System SiS1-m30bi is a high resolution 16-bit camera system designed for all kinds of industrial and scientific applications. The E2V CCD30-11bi image sensor with 26.6mm x 6.7mm active image area and square pixel of 26 μ m x 26 μ m size fits optimally with flatfield-features of many spectrometers. The ultra high quantum efficiency of the backilluminated image sensor is adapted to the different spectral ranges by an antireflex-coating of the sensor surface. The dynamic range up to 19-bit (524,288 : 1) allows flexible usage in different fields of UV, VIS, IR spectroscopy. The framing-features incorporate high-speed spectroscopic applications.

Features	
Highest Sensitivity ▶	Low readout noise of 7e ⁻ /pixel/s because of the special "correlated double sampling" signal processing technique, a quantum efficiency >85% and pixel size of 26 μ m x 26 μ m.
18-bit Digitalization ▶	Internal 18-bit digitalization and 16-bit data transfer provide 65,536 grayscales, 16-times better than 12-bit systems, important for photometric and spectroscopic measurements. Averaging of statistical noise with image accumulation for image- and spectral-recordings offers 19-bit dynamic.
Low Dark Current ▶	The MPP-structure of the image sensor reduces the dark current for μ -Lux imaging with long time integration.
Photometric Linearity ▶	Proportionality of measured counts to incoming light intensity better than 0.4%, optimizable to linearities < 0.1% with correction tables.
100% Fill Factor ▶	High precision measurements require full sensitivity of the whole image area, because otherwise small image structures result in moiré-effects.
High Resolution ▶	Full frame image sensor E2V CCD30-11bi with 26.6mm x 6.7mm image area and 1024 x 256 square pixel with a size of 26 μ m x 26 μ m.
External Timing ▶	Asynchronous electronic integration time control by external gate input. Integration times from 10ms up to > 100s, optionally expandable.
Super Pixel Binning ▶	Selectable binning of charges of adjacent pixels onto the CCD Chip with single readout increases linearly the signal to noise ratio by reduced spatial resolution. The binning up to full height of the represented spectrum is important for spectrometric applications. It also leads to an increase of the frame rate.
High Full Well Capacity ▶	Photon statistics S/N= \sqrt{S} determines the signal to noise ratio SNR up from average intensities. High dynamic demands high electron capacity.
WinSIS-Software ▶	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.

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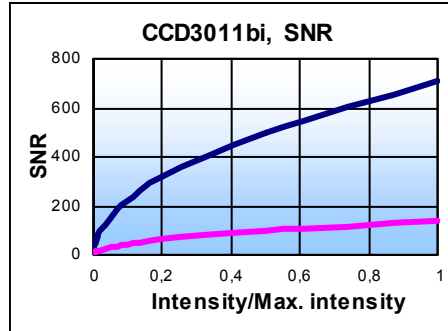
CCD Image Sensor
E2V CCD30-11bi

Specifications

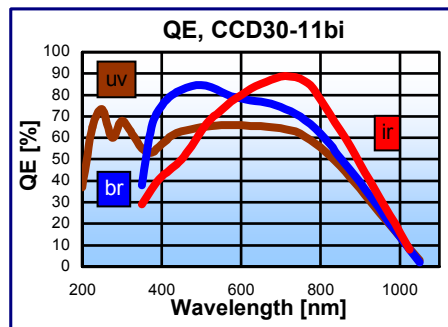
CCD Image Sensor	E2V CCD30-11bi
Sensor Type	Full Frame
Sensor Format	4 : 1
Image Size	26.6mm x 6.7mm, 27.43mm diagonal
Pixel Size	26µm x 26µm
Pixel Count	1024 (H) x 256 (V)
Electron Capacity	500,000e ⁻
Readout Noise, rms	7e ⁻
Dynamic	55,000 : 1
Dark Current @ 15°C	550e ⁻ / pixel / s
Quantum Efficiency	> 85%
Anti-Blooming	1
Binning	horizontal, vertical up to full image height
Digitalization	14-bit, 16,384 : 1 16(18)-bit, 65,536 : 1
Readout Frequency	6 MHz; 3 MHz (14-bit) 1 MHz (16(18)-bit)
Integration Time	10ms to >100s
Frame Rates	20 Hz; 10 Hz; 3.5 Hz
Optical Mount	special
Mech. Dim. (DiaxH)	80mm x 100mm
Weight	800g
Operational Temperature	0 ... +40°C

THETA SYSTEM Elektronik GmbH

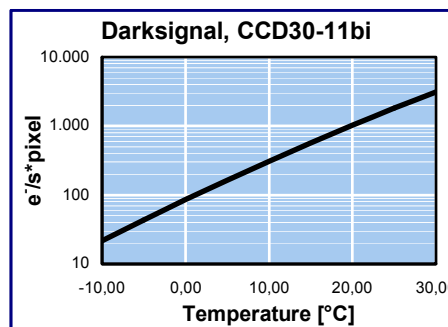
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At high light intensities the Signal to Noise Ratio SNR is mainly determined by the full well capacity (CCD3011oe: 300,000e⁻) of the CCD image sensor. The chart shows the graph of an interline transfer sensor (purple, FW: 18,000e⁻) for comparison.



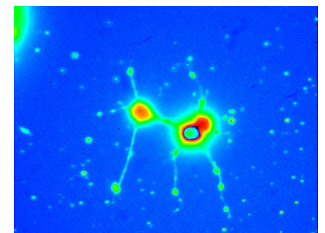
The quantum efficiency QE is defined as the percentage of the incoming photons, which generate an electronic charge.



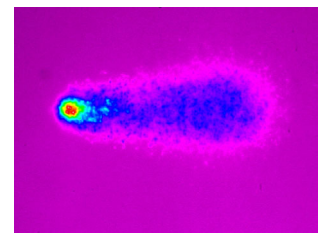
The temperature depending dark current of a CCD image sensor results from the thermal generation of electrons. The increase of the temperature of 6°C to 9°C doubles the dark current.

Applications

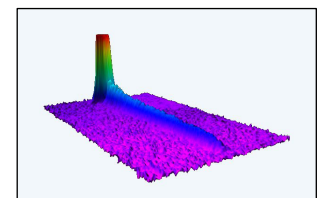
- ▶ LowLightLevel Imaging
- ▶ Fluorescence
- ▶ Luminescence
- ▶ Chemiluminescence
- ▶ Comet Assay
- ▶ FISH
- ▶ Spectroscopy
- ▶ Electrophoresis
- ▶ Gel-applications
- ▶ Astronomy
- ▶ Combustion processes
- ▶ Quality control
- ▶ Process control
- ▶ BEC



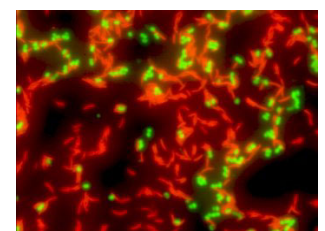
FURA, calciumfluorescence
of a cancer cell



DAPI, Comet Assay



Absorption,
atom laser beam



FISH Megapec