pixelfly
high performance digital 12bit CCD camera system

- superior quantum efficiency up to 65%
- ultra compact design
- 12bit dynamic range
- high resolution (1392 x 1024pixel, pixelfly qe)
- temperature compensated
- exposure times from 5µs – 65s
- readout noise typ. 7e⁻ rms
- serial high speed data transfer up to 12m / 500m optical
- standard PCI or compact PCI control board
- free software camware and software development kit included

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1288 EMVA Standard Compliant

data available on www.pco.de

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This high performance digital 12bit CCD camera system features state of the art in CCD and electronics technology. The system consists of an ultra compact camera head, which either connects to a standard PCI or a compact PCI board via a high speed serial data link. The available exposure times range from 5µs to 65s. A digital temperature compensation is integrated instead of a space consuming thermo–electrical cooling unit. All camera functions can be remotely accessed and controlled via digital interface. This compact digital CCD camera system is perfectly suited for many scientific and industrial imaging applications, like microscopy, spectroscopy and quality control. Both cameras are available in the double shutter version featuring 5µs interframing time for PIV (particle image velocimetry) applications. The pixelfly qe has an extraordinary quantum efficiency of up to 65%. The camera is hardened against high magnetic fields.

technical data

	unit	setpoint	pixefly VGA	pixelfly qe
resolution (hor x ver) [1]	pixel		640 x 480	1392 x 1024
pixel size (hor x ver)	µm²		9.9 x 9.9	6.45 x 6.45
sensor format / diagonal	inch / mm		1/2" / 7.9	2/3" / 11.14
peak quantum efficiency	%	@ 500nm typical	40	62
full well capacity	e^-		30 000	18 000
image sensor			ICX414AL	ICX285AL
dynamic range	dB	CCD + camera	68.7	69.5
dynamic range A/D [2]	bit		12	12
readout noise	e^- rms	range / typical	11..14 / 12	6..9 / 7
imaging frequency, frame rate	fps	@full frame / @binning 2x ver / @binning 4x ver	50 / 95 / 177	12 / 23 / –
pixel scan rate	MHz		20	20
A/D conversion factor	e^- / count		6.5	3.8
spectral range	nm		290..1100	290..1100
exposure time	s		5µs..65s	5µs..65s
anti–blooming factor		@ 100ms exposure time	> 1000	> 400 @ standard / >4 @ low light mode
smear	%		0.005	> 0.002
binning horizontal	pixel		1, 2	1, 2
binning vertical	pixel		1, 2, 4	1, 2

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technical data

region of interest			no	no
extinction ratio		@ 1ms exposure time	1 : 2000	1 : 2000
non linearity (differential)	%	full temperature range	< 2	< 2
uniformity darkness DSNU [3]	count	@ 90% center zone	1	1
uniformity brightness PRNU [4]	%	typical	1.0	1.0
trigger, auxiliary signals		internal / external	software / TTL level, 24V	software / TTL level, 24V
power consumption	W		12	12
power supply	VAC		via PCI board	via PCI board
camera dimensions (w x h x l)	mm³		39 x 39 x 53	39 x 39 x 53
weight	kg	camera	0.26	0.26
operating temperature range	°C		+10..+40	+10..+40
operating humidity range	%	non condensing	10..90	10..90
storage temperature range	°C		–20..+70	–20..+70
optical input			c–mount	c–mount
optical input window			fused silica	fused silica
data interface			PCI, compact PCI	PCI, compact PCI
CE certified			yes	yes
CCD temperature control			digital compen–sation	digital compen–sation

[1] horizontal versus vertical
[2] Analog–to–Digital–converter
[3] dark signal non–uniformity
[4] photo response non–uniformity

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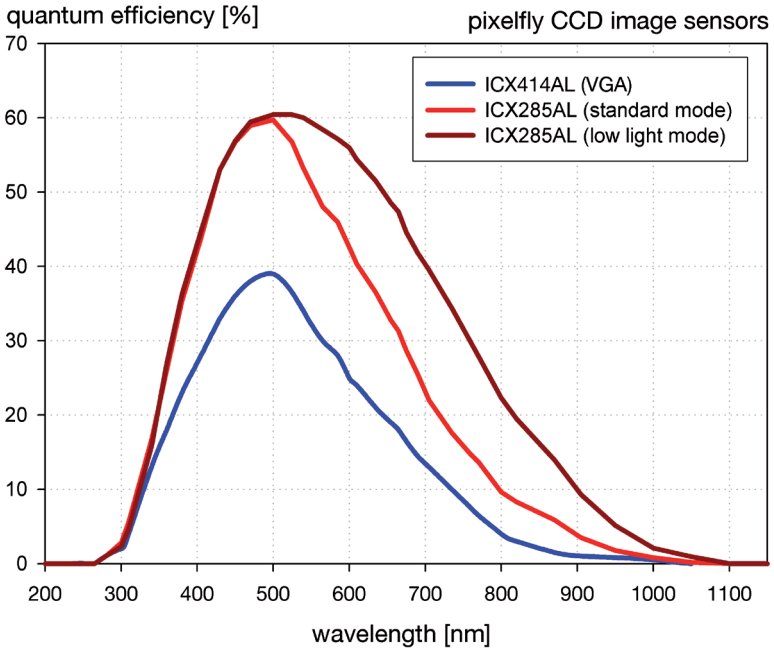
CCD sensors	all image sensors are available in black & white and color version	
data transfer to PC	high speed serial LVDS shielded ethernet patch cable RJ45 connector	
frontend processor	type	Atmel AT90S8515
	speed	8 Mips
	download	via PCI bus
	interface	6 optocoupler input 5V, 12V or 24V TTL I/O
connector	high density DSUB 26Pin	
software	camware software for camera control, display, storage and printing of image data under WindowsXP, Windows2000 and Vista; software development kit (SDK) with demo software for the above mentioned operating systems and Linux; TWAIN driver; drivers or plug–ins for popular third party image processing products	
options	custom–made versions power supply for compact PCI, 24 VDC input 4 highside driver 12V / 24V	

quantum efficiency



(measured by pco).

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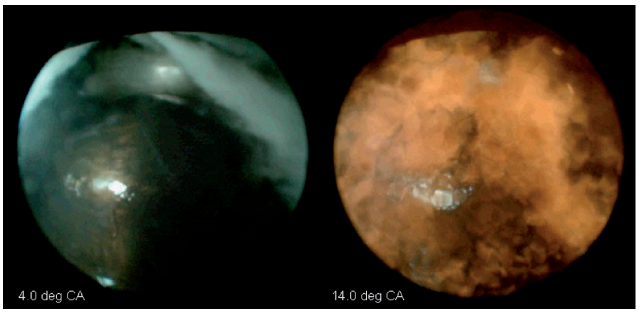
areas of application

- scientific imaging
- low light level imaging
- combustion imaging
- high resolution microscopy
- machine vision and industrial applications
- bioluminescence / chemoluminescence
- luminescence spectroscopy
- Red and NIR fluorescence applications
- spectroscopy
- imaging of bio markers (e.g. green fluorescent protein, GFP)
- quality control
- particle image velocimetry (PIV)
- flow visualization (hydrodynamics)
- fuel injection
- material testing
- scintillation recording

examples of applications

An endoscopic view in the combustion chamber of a Diesel engine. The two images show the injection and combustion of the Diesel fuel. They were recorded at different crank angles with the AVL VisioScope system.

...with friendly permission of: AVL List GmbH, Optical Technologies – Instrument and Test Systems, Graz, Austria, www.avl.com/visiolution



View of a raw image of a filled bottle inspection system.

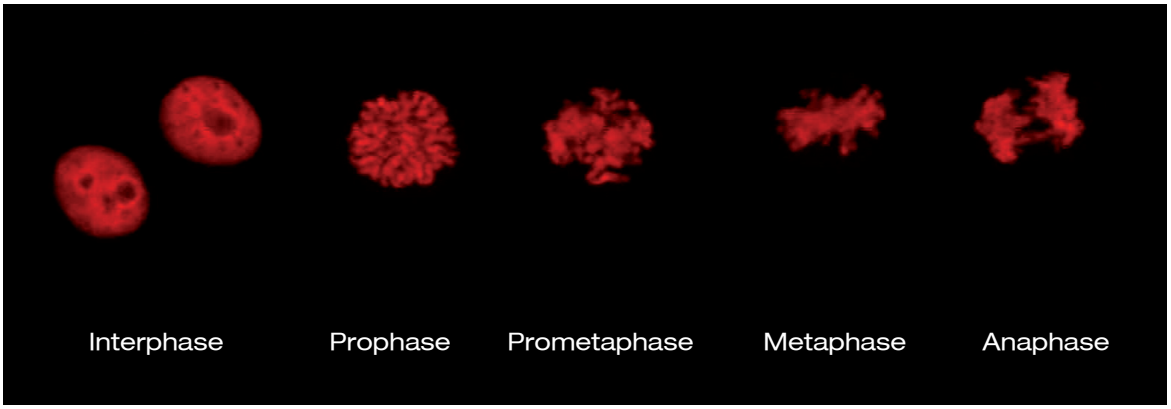
...with friendly permission of: Krones AG, Neutraubling, Germany, www.krones.com

View of a row of empty bot–tles in an empty bottle inspec–tion system, which uses pixelfly cameras for the improved reso–lution inspection (IRIS).

...with friendly permission of: Krones AG, Neutraubling, Ger–many, www.krones.com

Human Cervical Carcinoma Epithelial Cells (HeLa) stained with mCherry Fluorescent Protein Histone H2B.

The Cooke Corporation, www.cookecorp.com



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