pixelfly
high performance digital 12bit CCD camera system

- ultra compact design
- 12bit dynamic range
- high resolution (1360 x 1024pixel, HiRes)
- temperature compensated
- exposure times from 10µs – 10s
- readout noise typ. 12e^- rms
- serial high speed data transfer up to 10m
- standard PCI or compact PCI control board
- integrated front-end processor with opto-coupler input and highside driver
- free software camware included

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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 10µs to 10s. 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.

technical data

	unit	setpoint	pixefly VGA	pixelfly HiRes
resolution (hor x ver) [1]	pixel		640 x 480	1360 x 1024
pixel size (hor x ver)	µm²		9.9 x 9.9	4.65 x 4.65
sensor format / diagonal	inch / mm		1/2" / 7.9	1/2" / 7.86
peak quantum efficiency	%	@ 500nm typical	40	40
full well capacity	e-		30 000	13 000
image sensor			ICX414AL	ICX205AL
dynamic range	dB	CCD + camera	68.7	61
dynamic range A/D [2]	bit		12	12
readout noise	e- rms	range / typical	11..14 / 12	11..18 / 14
imaging frequency, frame rate	fps	@full frame / @binning 2x ver / @binning 4x ver	50 / 95 / 177	9.5 / 18 / -
pixel scan rate	MHz		20	16
A/D conversion factor	e- / count		6.5	3
spectral range	nm		290..1100	290..1100
exposure time	s		10µs..10s	10µs..10s
anti-blooming factor		@ 100ms exposure time	> 1000	> 1000
smear	%		0.005	0.005
binning horizontal	pixel		1, 2	1, 2
binning vertical	pixel		1, 2, 4	1, 2
region of interest			no	no
extinction ratio		@ 1ms exposure time	1 : 2000	1 : 2000

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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 68	39 x 39 x 68
weight	kg	camera	0.25	0.25
ambient 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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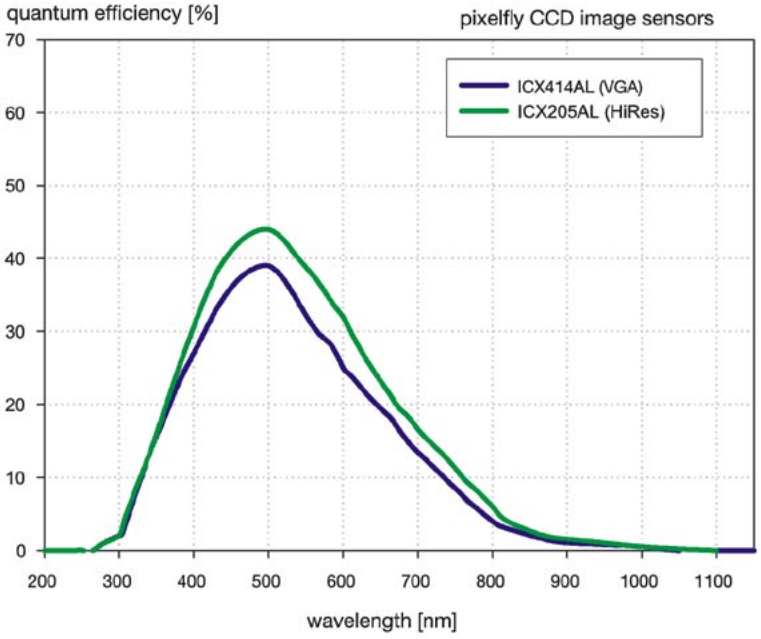
CCD sensors	all image sensors are available in black & white and color version	
data transfer to PC	high speed serial LVDS shielded ethernet patch cable cat. 5 (2 – 10 m) RJ45 connector	
frontend processor	type	Atmel AT90S8515
	speed	8 Mips
	download	via PCI bus
	interface	6 optocoupler input 5V, 12V or 24V TTL I/O
connector	high density DSUB 26Pin	
software	camware software for camera control, display, storage and printing of image data under Windows9x, ME, XP, WindowsNT, Windows2000; 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	hardened against high magnetic field custom-made versions power supply for compact PCI, 24 VDC input integrated photometer for exposure control 4 highside driver 12V / 24V	

quantum efficiency



(measured by pco).

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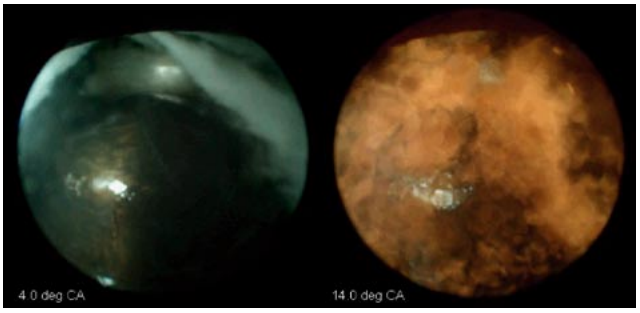
areas of application

- low light level imaging
- combustion analysis
- 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)

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. They where recorded at different cylinder positions 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.

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View of a row of empty bottles in an empty bottle inspection system, which uses pixelfly cameras for the improved resolution inspection (IRIS).

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Krones AG, Neutraubling, Germany, www.krones.com

Cu(111) surface state dispersion imaged by a pixelfly.

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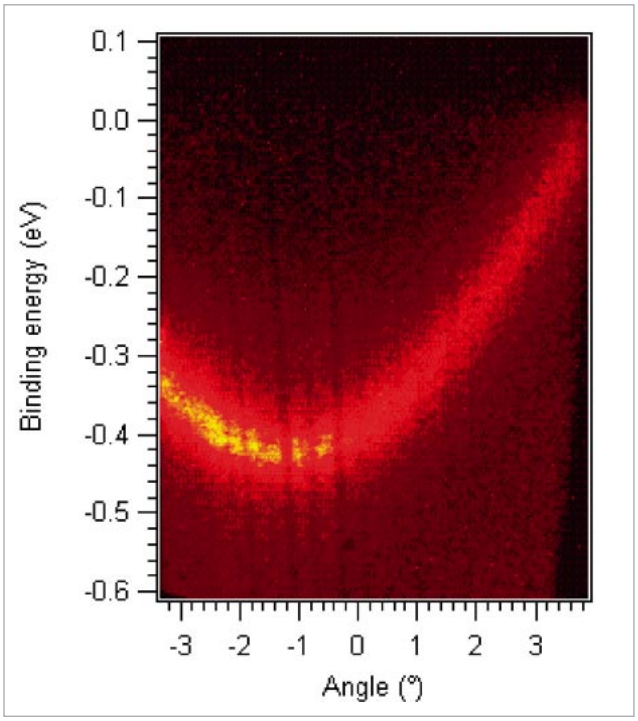
Specs GmbH - Surface Analysis and Computer Technology, Berlin,
Germany, www.specs.de



contact

PCO AG
Donaupark 11
93309 Kelheim, Germany

fon +49 (0)9441 2005 0
fax +49 (0)9441 2005 20

info@pco.de
www.pco.de

pixelfly 08/2003

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