Digital Color Cameras

PS 40 – 285 | 274 | 205 | 1020 FW

FireWire

Digital camera
Color
FireWire
12 bit digital signal processing
Progressive scan
Megapixel resolution
External trigger, reset/restart
Partial scan | Binning
Gamma correction
Automatic functions
Long time integration
Cooled camera PS 40C – 285 FW

The digital PS cameras have been designed especially for software integration.

The matching Kappa sdk3 offers a state-of-the-art software environment based on .net and C-API. In combination with the sdk or a detailed interface description the PS cameras convince as high-performance components in all measuring and testing machines.

The camera series is based on variable camera electronics, low power consumption and advanced circuitry, providing both an extremely rugged design and excellent signal quality.

The user can choose from a range of high-quality CCD sensors with megapixel resolution by Sony and Kodak.

As standard the series comes in a block housing, but for the individual touch it is also available in a striking hexagonal design housing.

The digital Kappa camera systems comply with the highest standards and offer outstanding Kappa-specific technological highlights, such as rugged design, excellent highly linear signal quality, extraordinary signal-to-noise ratio, long-time exposure and, optionally, a second serial interface with bespoke configuration of functions. High frame rates are achieved by binning and partial scan, while the image size remains freely adjustable.

Real-time Color Signal Processing

The camera-internal color processing algorithm is FPGA-based and works independently of specific signal processors. Maximum true color rendition is achieved by adapting the color image reproduction for different lighting conditions to the sensor. Reproducibility of the results in other cameras is also ensured. Further features are high detail sharpness, edge enhancement, contrast enhancement and variable Gamma correction.

Technical Data

Sensor-specific data

PS 40 – 285 FW | PS 40C – 285 FW

CCD sensor	2/3″ interline transfer CCD progressive scan with micro lenses (Sony ICX285AQ, EXview HAD)
Pixel size (H x V)	6.45 µm x 6.45 µm
Light-sensitive area (H x V)	8.93 mm x 6.66 mm
Number of pixels (H x V)	1434 x 1050, total
Spectral sensitivity (without IR-filter)	320 nm – 1100 nm color: B = 470 nm, G = 540 nm, R = 630 nm (peak sensitivity)
Full well capacity	23 000 e^-
A/D-conversion factor	5.6 e^- / increment
Filter	RGB Bayer filter
Dynamic range	63 dB (measured in dark image, at 66 ms exposure time and 0 dB gain)
Sensitivity	(measured at 18 dB gain, gamma = 1, and 50 % level, 3000 K) 0.35 lx at 100 ms exposure time 0.00029 lx at 120 s exposure time 0.000029 lx at 20 min exposure time (Cooled camera PS 40C – 285 FW)

PS 40 – 274 FW

CCD sensor	1/1.8″ interline transfer CCD progressive scan with micro lenses (Sony ICX274AQ, EXview HAD)
Pixel size (H x V)	4.40 µm x 4.40 µm
Light-sensitive area (H x V)	8.50 mm x 6.80 mm
Number of pixels (H x V)	1688 x 1248, total
Spectral sensitivity (without IR-filter)	320 nm – 1100 nm color: B = 460 nm, G = 535 nm, R = 620 nm (peak sensitivity)
Full well capacity	5 500 e^-
A/D-conversion factor	1.3 e^- / increment
Filter	RGB Bayer filter
Dynamic range	52 dB (measured in dark image, at 115 ms exposure time and 0 dB gain)
Sensitivity	(measured at 18 dB gain, gamma = 1, and 50 % level, 3000 K) 0.69 lx at 100 ms exposure time 0.00058 lx at 120 s exposure time

PS 40 – 205 FW

CCD sensor	1/2″ interline transfer CCD progressive scan with micro lenses (Sony ICX205AK, EXview HAD)
Pixel size (H x V)	4.65 µm x 4.65 µm
Light-sensitive area (H x V)	7.6 mm x 6.2 mm
Number of pixels (H x V)	1434 x 1050, total
Spectral sensitivity (without IR-filter)	320 nm – 1100 nm, color: B = 470 nm, G = 540 nm, R = 630 nm (peak sensitivity)
Full well capacity	12 000 e^-
A/D-conversion factor	2.9 e^- / increment
Filter	RGB Bayer filter
Dynamic range	55 dB (measured in dark image, at 66 ms exposure time and 0 dB gain)
Sensitivity	(measured at 18 dB gain, gamma = 1, and 50 % level, 3000 K) 0.61 lx at 100 ms exposure time 0.00051 lx at 120 s exposure time

PS 40 – 1020 FW

CCD sensor	2/3″ interline transfer CCD progressive scan with micro lenses (Kodak KAI 1020 CM)
Pixel size (H x V)	7.4 µm x 7.4 µm
Light-sensitive area (H x V)	7.4 mm x 7.4 mm
Number of pixels (H x V)	1028 x 1008, total
Quantum efficiency	max. 41% at 470 nm
Spectral sensitivity (without IR- filter)	320 nm – 1000 nm, color: B = 470 nm, G = 535 nm, R = 620 nm (peak sensitivity)
Full well capacity	42 000 e^-
A/D-conversion factor	10.3 e^- / increment
Readout noise	50 e^- ms
Filter	RGB Bayer filter
Dynamic range	57 dB (measured in a dark image, at 33 ms exposure time and 0 dB gain)
Sensitivity	(measured in a dark image at 18 dB gain, gamma = 1, and 50 % level, 3000 K) 0.65 lx at 100 ms exposure time 0.00054 lx at 120 s exposure time

Technical Data

Interface-specific data

PS 40 – 285 FW | PS 40C – 285 FW

Color coding	YUV 4:2:2, RGB 24, Mono 16 (RAW data)			
Camera output (IIDC Format 7)*	full frame:	1430 x 1046 pixels	YUV 4:2:2	11 fps
	b/w-binning:	2 fold	4 fold	8 fold
	image size (pixels)	715 x 523	357 x 261	178 x 130
	frame rate:	25 fps	41 fps	62 fps
	partial scan:	image size freely adjustable		
Camera output (IIDC Format 2)*	mode 1	1280 x 960 pixels	RGB 24 bit	7.5 fps
	mode 0	1280 x 960 pixels	YUV 4:2:2	7.5 fps
Exposure	manual:	1 µs to 120 s (Cooled camera: up to 20 min)		
	automatic (AE):	1 µs to 66 ms at 1280 x 960 pixels		
Power supply	9-36 V DC, 3.6 W			

PS 40 – 274 FW

Color coding	YUV 4:2:2, RGB 24, Mono 16 (RAW data)			
Camera output (IIDC Format 7)*	full frame:	1684 x 1244 pixels	YUV 4:2:2	8 fps
	binning:	2 fold (color or b/w)	4 fold (b/w)	8 fold (b/w)
	image size (pixels):	842 x 622	421 x 311	210 x 155
	frame rate:	15 fps	26 fps	40 fps
	partial scan:	image size freely adjustable		
Camera output (IIDC Format 2)*	mode 4	1600 x 1200 pixels	RGB 24 bit	3.75 fps
	mode 3	1600 x 1200 pixels	YUV 4:2:2	7.5 fps
Exposure	manual:	1 µs to 120 s		
	automatic (AE):	1 µs to 115 ms at 1600 x 1200 pixels		
Power supply	9-36 V DC, 3.6 W			

PS 40 – 205 FW

Color coding	YUV 4:2:2, RGB 24, Mono 16 (RAW data)			
Camera output (IIDC Format 7)*	full frame:	1430 x 1046 pixels	YUV 4:2:2	11 fps
	b/w-binning:	2 fold	4 fold	8 fold
	image size (pixels)	715 x 523	357 x 261	178 x 130
	frame rate:	25 fps	41 fps	62 fps
	partial scan:	image size freely adjustable		
Camera output (IIDC Format 2)*	mode 1	1280 x 960 pixels	RGB 24 bit	7.5 fps
	mode 0	1280 x 960 pixels	YUV 4:2:2	7.5 fps
Exposure	manual:	1 µs to 120 s		
	automatic (AE):	1 µs to 66 ms at 1280 x 960 pixels		
Power supply	9-36 V DC, 3.6 W			

PS 40 – 1020 FW

Color coding	YUV 4:2:2, RGB 24, Mono 16 (RAW data)			
Camera output (IIDC Format 7)*	full frame:	1024 x 1004 pixels	YUV 4:2:2	16 fps
	b/w-binning:	2 fold	4 fold	8 fold
	image size (pixels):	512 x 502	256 x 251	128 x 125
	frame rate:	36 fps	60 fps	90 fps
	partial scan:	image size freely adjustable		
Camera output (IIDC Format 1)*	mode 1	800 x 600 pixels	RGB 24 bit	15 fps
	mode 0	800 x 600 pixels	YUV 4:2:2	30 fps
Exposure	manual:	1 µs to 120 s		
	automatic (AE):	1 µs to 33 ms at 800 x 600 pixels		
Power supply	9-36 V DC, 3.4 W			

Signal processing | Development tools

Development tool	software development kit, Kappa sdk3 (.Net-class library/C-function library, API)	
	order-no.:	771-5757
System	12 bit digital	
Color processing	light source type, color balance (RGB), automatic white-set, color saturation	
Gain	manual/automatic (AGC): 0 to 18 dB	
Enhancement	contrast:	1.0 to 8.0 fold
	brightness:	subtraction, 0 to 4095 LSB, max. 50% of the output level
	edge:	adjustable
Gamma	0.3 to 2.2	
Diagnostics	camera name, serial number, revision number, temperature of sensor and camera, built-in test, image size, frame rate, test pattern	
Line generator	2 reticles:	position, color and style adjustable
Measuring window	position and size adjustable	
Synchronization	intern/extern, reset/restart (delay <10 µs)	
Hardware Trigger	Minimum trigger delay 4.2µs - 8.2µs depending on the sensor type Frame on Demand	
Software Trigger	via IIDC register	

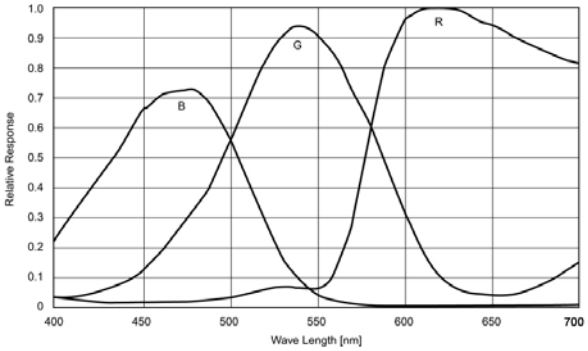
*Format and mode according to "IIDC 1394-based specification for digital camera version 1.3"

General Technical Data

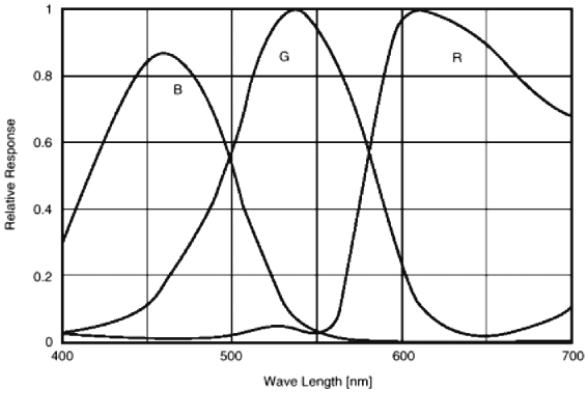
Interfaces	IEEE 1394a / FireWire, 2 Ports (6-pin) with 400 Mbit/s system connector (power supply, additional RS 232, control and trigger signals)
Lens mount	C-mount, focal plane adjustable, CS-mount on request
Filter	IR-filter, removable
Temperature	operating temperature -20°C to +60°C, storage temperature -30°C to +70°C
Dimensions | Weight	block housing: 60 x 60 x 55 mm; 275 g design housing: diameter 75 mm, length 55 mm; 410 g cooled camera: 73 x 69 x 115 mm; 860 g
Cable length	FireWire cable up to 10 m (other cable lengths on request)
System requirements	hardware: connection 1394a OHCI (6 pin) or equivalent, minimum 1.8 GHz, minimum 512 MB RAM, DirectX9-enabled graphics card with at least 64 MB operating system: Microsoft Windows 2000 ®, Microsoft Windows XP ® (32 Bit Edition), Microsoft Windows Vista ® (32 Bit Edition)
Order-no. block housing	PS 40-285 FW 963-1719 PS 40-274 FW 963-1723 PS 40-205 FW 963-1718 PS 40-1020 FW 963-1703
Order-no. design housing (red)	PS 40-285 FW 963-1719R PS 40-274 FW 963-1723R PS 40-205 FW 963-1718R PS 40-1020 FW 963-1703R
Order-no. Cooled camera	PS 40C-285 FW 963-1725
Standard equipment	camera
In addition for cooled version	power supply ACC 2 (incl. control cable 4 m and power supply cable)

Spectral Sensitivity Characteristics (without IR-filter)

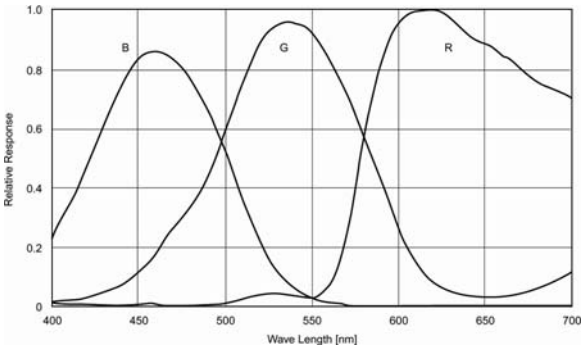
PS 40 – 285 FW



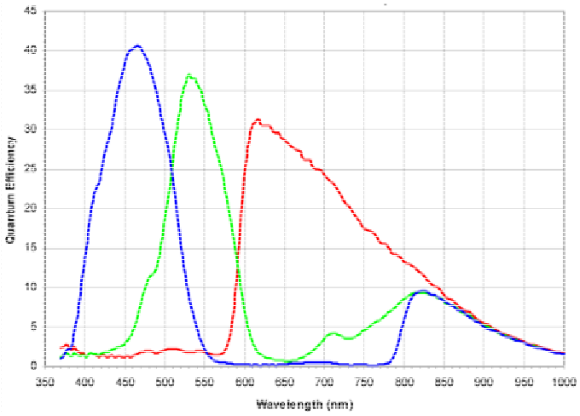
PS 40 – 205 FW



PS 40 – 274 FW



PS 40 – 1020 FW



We are constantly checking the accuracy of the technical data. We are prepared to provide more detailed information on request.
Technical data are subject to change without notice!

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