

CCD-Camera for X-Ray Imaging

HiRes2-XR(S)



Especially for radiological applications Kappa opto-electronics has developed the high resolution CCD camera series HiRes2-XR(S). It marks a major advance in contrast to conventional video CCD cameras and pick-up devices. This camera series offers the latest technology. The fully digital design meets the demands of high-end X-ray applications.

A special modular design with miniaturized components allows an optimized integration into the X-ray processing chain. In connection with X-ray optics the camera can be adapted easily to an image intensifier. The family comes with reduced power consumption.

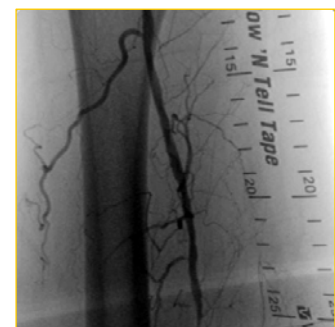
Progressive scan CCD
30 frames per second
12 bit real time signal processing (DSP)
Various signal outputs: CameraLink 12 bit parallel RS 644/RS 422
Number of picture elements: 1000 (H) x 1000 (V)
Size of picture elements: 7.4 μm x 7.4 μm
Image area: 7.4 mm (H) x 7.4 mm (V)

HiRes2-XR will support your application

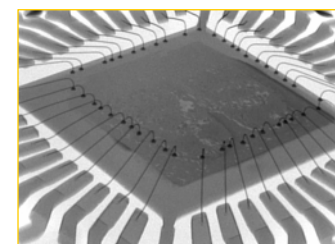
Modular design	The very flat design of the camera is perfect for an integration in x-ray c-arms and makes the it suitable for different applications.
Various signal outputs	CameraLink (incl. serial communication), 12 bit parallel RS 644/RS 422
Video gain control	can be done automatically (AGC) or fixed. In case of AGC, different control functions can be adjusted.
Frame on demand mode	the camera is synchronized with the x-ray generator
Circular blanking	is adjustable in diameter and location
Shading correction	is horizontally and vertically adjustable to minimize image intensifier vignetting
Gamma corrections	compensates the non-linearity of the x-ray intensifier
Edge enhancement	function for more sharpness
Negative Image	for more contrast visualization
Frames per second	30

Additional features: HiRes2-XRS

Recursive filter	with the factors 2, 4, 8, 16 for noise reduction is integrated
Last image hold	stores the last image in the digital image memory
Horizontal and Vertical image flip	can be switched on or off independently
Negative image	yes



Medical Diagnostics

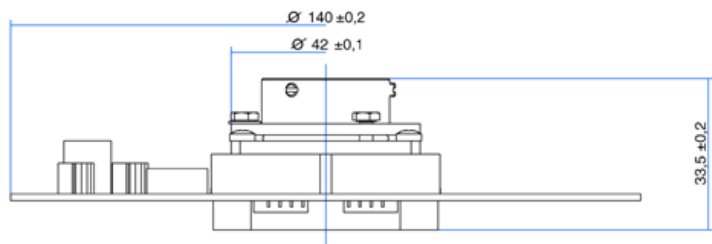


Non-Destructive Testing

CCD-Camera for X-Ray Imaging

HiRes2-XR(S)

Technical Data



Sensor

Sensor	interline transfer CCD progressive scan with microlenses
Number of picture elements	1000 (H) x 1000 (V)
Size of picture elements	7.4 µm x 7.4 µm
Sensor format	2/3"
Light-sensitive area	7.4 mm x 7.4 mm
Quantum efficiency	max. 42% at 490 nm
Spectral sensitivity	300 nm to 1000 nm
Full well capacity	42 000 e ⁻
A/D-conversion	12 Bit
A/D-conversion factor	10 e ⁻ /increment
Readout noise	50 e ⁻ rms
Signal/Noise ratio	61 dB (measured in dark image at 33 ms integration time and 0 dB gain)

Signal Processing

System	12 bit digital signal processing
Asynchronous image capture and readout	yes
Bad pixel compensation	max. 7 pixel
Frame rate	30 fps
Shading correction	horizontal and vertical, tilt and dome correction
Circular blanking	yes, adjustable diameter and location
Gamma	gamma correction, adjustable
Contrast	edge enhancement
Negative image	yes

Additional features (HiRes-2XRS)

Image memory	1 image
Noise reduction	recursive filter with the factor 2, 4, 8 and 16
Image flip	horizontal and / or vertical
Image subtraction	yes

Interfaces

Video outputs	CameraLink 12 bit parallel RS644/RS422
Camera control interface	RS232, digital I/Os via optocoupler and TTL
Lens mount	C-Mount
CCD position accuracy	+/- 5 pixel

General

Power supply	12 V – 32 V DC, 4 W
Operating temperature	-20°C to +60°C

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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