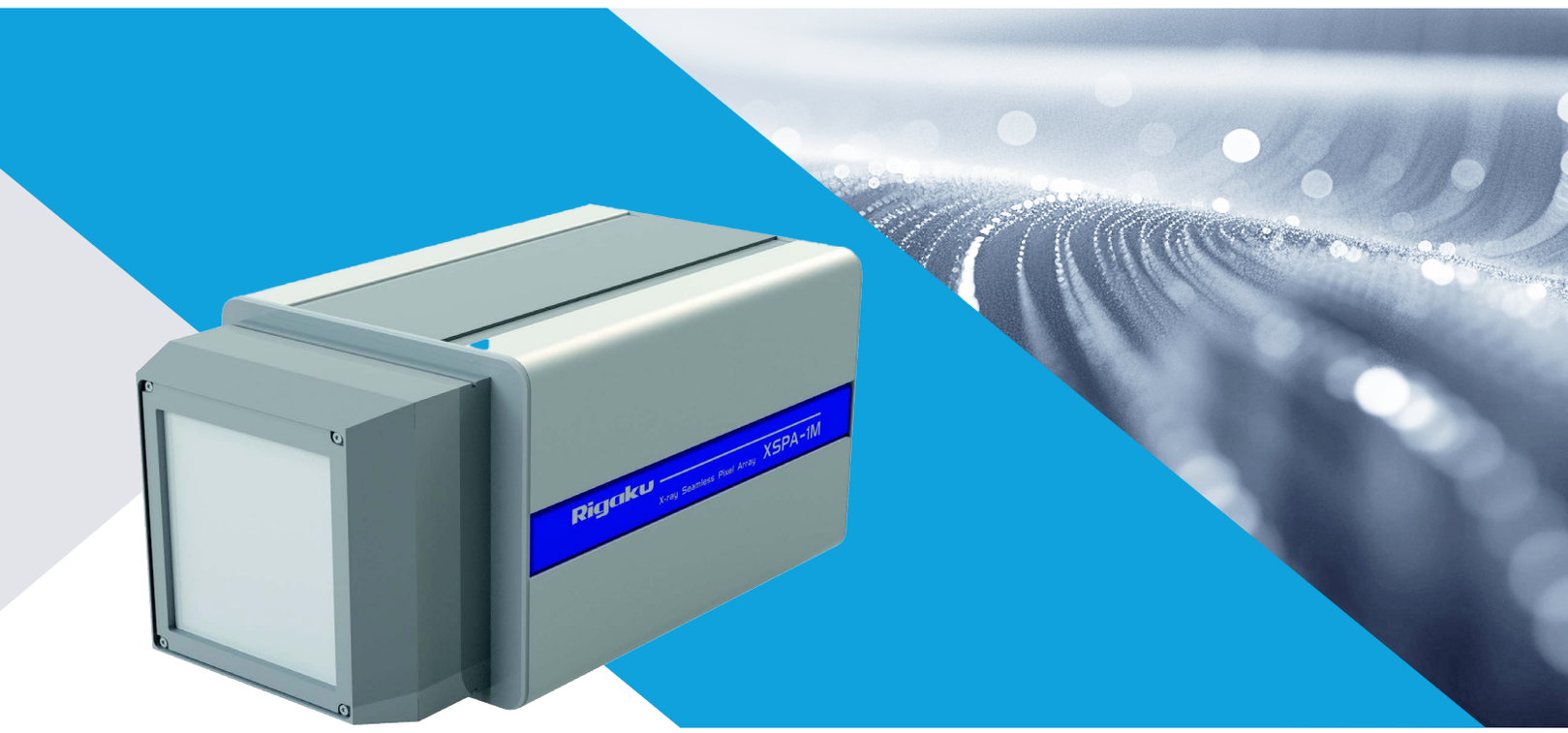
XSPA Series

Ultrahigh-speed Hybrid Photon Counting 2D X-ray Detector

Gap-free interchip modules for true uniformity.



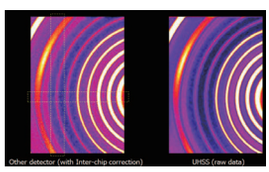
Key features of the XSPA Series:

- The XSPA 2D X-ray detector is the performance leader in Hybrid Photon Counting (HPC) detectors as a consequence of Rigaku's patented sensor technology combined with a state of-the-art readout chip.
- This patented sensor technology is unique in HPC detectors, making the XSPA the only HPC detector where all the pixels in a module have the same dimensions, yielding statistically uniform data in the raw images.
- XSPA detectors achieve high frame rates in Zero Dead Time (ZDT) mode: 56 kfps with 2-bit image depth and 8.5 kfps mode with 16-bit image depth, for example.
- XSPA detectors can also operate in Burst mode, at significantly higher frame rates, with the rate dependent on bit depth.

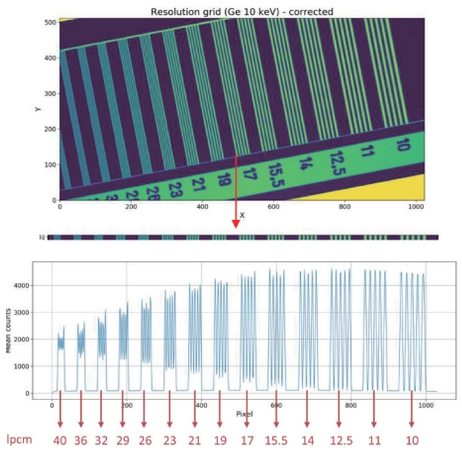
Ultrahigh-speed hybrid photon counting 2D X-ray detector

Gap-free modules with uniform pixels

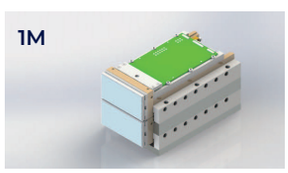
Due to the limitations of readout chip tiling, Hybrid Photon Counting (HPC) detectors have required irregular pixel sizes at the junctions between chips with an associated correction that adds noise to the data. The XSPA employs a unique technological solution that eliminates these interchip gaps and the additional noise.

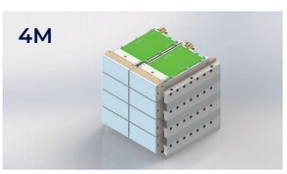


Resolution grid measurement



Multi-module configuration examples





Basic specifications

		500k		1M		4M	
		Bus connection	Parallel connection	Bus connection	Parallel connection	Bus connection	Parallel connection
Detection area		77.8 x 38.9 mm		77.8 x 77.8 mm		155.6 x 155.6 mm	
Pixels		1024 x 512		1024 x 1024		2048 x 2048	
Pixel size		76 µm					
Counter depth		14-bit (Max. 28-bit)					
Image size		1,048,576 Byte (16-bit data depth)		2,097,152 Byte (16-bit data depth)		8,388,608 Byte (16-bit data depth)	
Built-in counter		Max. 28-bit / pixel (LongCounterMode)					
Count rate		> $2x10^6$ cps/pixel					
Energy range		4.5 keV~30 keV					
Energy resolution		20% or less (at Cu)					
Max. frame rate	ZD 2bit	≈40 kfps	≈56 kfps	≈20 kfps	≈56 kips	≈5 kfps	≈56 kfps
	Burst Mode (2-bit, duty cycle 1.12%)	≈970 kips	≈970 kfps	≈970 kfps	≈970 kfps	≈970 kfps	≈970 kfps
	ZD 16-bit	≈5,000 fps	≈8500 fps	≈2,500 fps	≈8500 fps	≈625 fps	≈8500 fps
I/F		Optical cable					
Trigger		Optical cable					
Input voltage		DC19.5 V		DC24 V		AC100~240 V	
Power consumption (At 20°c water)		Approx. 130 W	Detector: 130 W I/FBOX: 90 W	Approx. 210 W	Detector: 210 W I/F BOX: 190 W	Approx. 690 W	Detector: 690 W I/F BOX: 190 Wx2 I/F BOX: 140 Wx1
Dimension		100 x 150 x 208 mm		150 x 150 x 270 mm		250 x 230 x 400 mm	
Cooling method		Water cooling type					
Weight		4.6 kg		8.1 kg		Approx. 25 kg	

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