

ORCA[®]-Lightning X X-ray sCMOS camera

C15606 series



The C15606 series is a high-sensitivity X-ray sCMOS camera with a field of view that is approximately twice that of Hamamatsu's conventional model. It achieves both a high resolution of 12 million pixels and a high readout speed of 121 frames/s, allowing the imaging of faster phenomena than those that used to be captured in the past, with a wide field of view and high resolution.

Features

- Wide field of view
25.344 mm × 14.256 mm
- Effective number of pixels
4608(H) × 2592(V)
- Frame rate 121 frames/s
(Standard Full Well Capacity mode, full resolution)

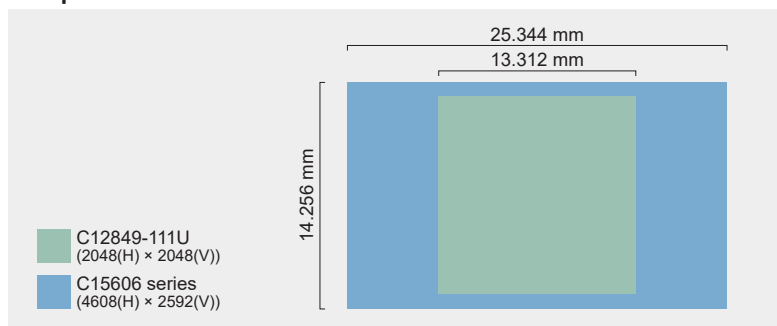
Applications

- X-ray Micro CT
- High resolution X-ray imaging
- X-ray diffraction
- XAFS

Adopting a large area sensor

A large area sensor of 25.344 mm × 14.256 mm is adopted to achieve a field of view that is approximately twice that of the conventional model C12849-111U. With a high resolution of 12 million pixels, wide-field imaging is achieved.

Comparison of field of view

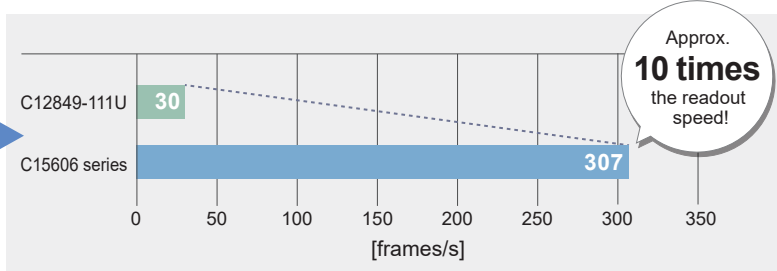


Achieving high-speed imaging

While maintaining the same level of readout noise as the C12849-111U, it achieves high-speed imaging at a readout speed of approximately 10 times as compared with the same number of pixels. It can capture high-speed phenomena that could not be fully captured in the past.

Comparison of readout speed

Effective number of pixels (H)×(V)	Frame rate (frames/s)	
	C15606 series*	C12849-111U
4608×2592	121	–
2560×2560	221	–
2048×2048	307	30
1024×1024	610	60
512×512	1201	400
256×256	2332	801
2048×8	26 438	7894
2048×4	31 725	–



* Standard Full Well Capacity mode

Specifications

Product number		C15606-101P	C15606-102P
Imaging device	Scientific CMOS image sensor		
Effective number of pixels	4608(H) × 2592(V)		
Pixel size	5.5 μm(H) × 5.5 μm(V)		
Effective area	25.344 mm(H) × 14.256 mm(V)		
Scintillator	Material	GOS(P43)	
	Thickness	10 μm	20 μm
FOP	1:1		
Cooling method	Air cooled (Peltier cooling + Forced-air cooled), Water cooled		
Cooling temperature	Air cooled (Ambient temperature: +25 °C)	+30 °C	
	Water cooled (Water temperature: +25 °C)	+30 °C	
Dark current (typ.)	20 electrons/pixel/s (air cooled, Cooling temperature: +30 °C)		
Binning	2×2, 4×4		
Sub-array	Yes		
External trigger input mode	Edge trigger, Level trigger, Synchronous readout trigger, Global reset edge trigger, Global reset level trigger, Start trigger		
Trigger output	Global exposure timing output, Programmable timing outputs, Trigger ready output, High output, Low output		
Interface	CoaXPress (Quad CXP-6)		
Recommended X-ray tube voltage range	25 kV to 70 kV		
Power supply	AC100 V to AC240 V, 50 Hz/60 Hz		
Power consumption	Approx. 200 VA		
Ambient operating temperature *1	+15 °C to +29 °C		
Ambient operating humidity *1	30 % to 60 % Forced-air cooled (with no condensation)		
Ambient storage temperature	-10 °C to +50 °C		
Ambient storage humidity	80 % max. (with no condensation)		

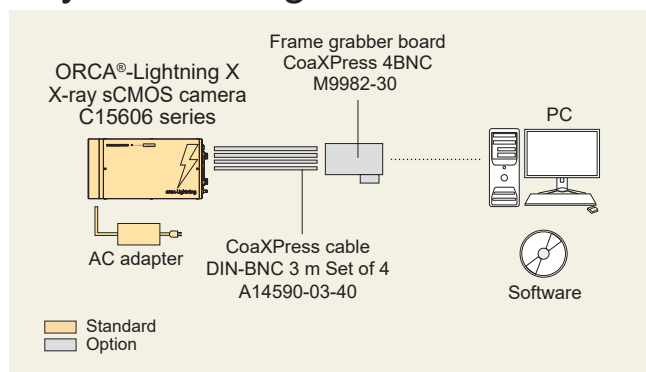
	Standard Full Well Capacity mode	High Full Well Capacity mode
Full well capacity (typ.)	1000 electrons	38 000 electrons
Frame rate (4608 × 2592)	121 frames/s	30 frames/s
Readout noise (typ.)	2.2 electrons (rms)	3.0 electrons (rms)
Dynamic range *2	550: 1	15 000: 1
Digital output	12 bit	16 bit
Exposure time	6.304 μs to 1 s *3	50.432 μs to 1 s

*1 If the operating ambient temperature or operating ambient humidity is not satisfied, the cooling process is stopped to protect the camera, and the digital data of the image is set to 0 counts, which is notified.

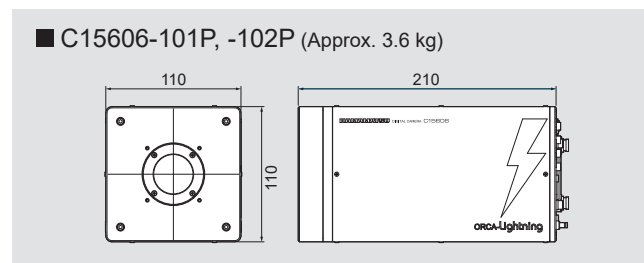
*2 Calculated from the ratio of the full well capacity and the readout noise (median).

*3 If a long exposure time is set, saturated pixels may occur. In such cases, use of a High Full Well Capacity mode is recommended.

System configuration



Dimensional outlines (Unit: mm)



Options

Product number	Product name
A14491-01	Base plate for C14120-20P
A12106-05	External trigger cable SMA-BNC 5 m
A12107-05	External trigger cable SMA-SMA 5 m
M9982-30	Frame grabber board CoaXPress 4BNC
A14590-03-40	CoaXPress cable DIN-BNC 3 m Set of 4

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