

Technical Specifications

System Specifications ^{*2}

	Ultra 888		Ultra 897	
Sensor QE options	#BV: Back Illuminated, standard AR coated BVF: Back Illuminated, standard AR coated with fringe suppression UVB: Back Illuminated, standard AR with additional lumogen coating #EX: Back illuminated, dual AR coated EXF: Back illuminated, dual AR coated with fringe suppression			
Fringe Suppression	Available on EX2 and BV sensor options			
Active pixels	1024 x 1024		512 x 512	
Pixel size	13 x 13 μm		16 x 16 μm	
Image area	13.3 x 13.3 mm with 100% fill factor		8.2 x 8.2 mm with 100% fill factor	
Pixel Readout Rate	10 MHz	30 MHz ^{*3}	10 MHz	17 MHz
Minimum temperature, air cooled, ambient 20°C	-80°C	-60°C	-80°C	-80°C
Chiller liquid cooling, coolant @ 10°C, >0.75l/min	-95°C	-75°C	-100°C	-100°C
Thermostatic Precision	$\pm 0.01^\circ\text{C}$			
Triggering	Internal, External, External Start, External Exposure, Software Trigger			
System window type	#BV and BVF: UV-grade fused silica, Broadband Visible-Near Infrared, 0.5 degree wedge UVB, #EX, EXF: UV-grade fused silica, Broadband Vacuum Ultraviolet-Near Infrared, 0.5 degree wedge			
Blemish specification	Grade 1 sensor from supplier. Camera blemishes as defined by Andor Grade A www.andor.com/learning-academy/ccd-blemishes-and-non-uniformities-black-pixels-and-hot-pixels-on-a-ccd-sensor			
Digitization	16-bit (at all speeds)			
PC Interface	USB 3.0 ^{*12}		USB 2.0	
Lens Mount	C-mount			
Direct Data Access	Camera Link 3-tap output			

Advanced Performance Specifications ^{*2}

	Ultra 888						Ultra 897						
Dark current and background events ^{*4,5}													
Dark current (e⁻/pixel/sec) @ -80°C	0.00025						0.00030						
Dark current (e⁻/pixel/sec) @ max cooling	0.00011						0.00015						
Spurious background (events/pix) @ 1000x gain / -85°C	0.005						0.0018						
Active area pixel well depth	80,000 e ⁻						180,000 e ⁻						
Gain register pixel well depth ^{*7,6}	730,000 e ⁻						800,000 e ⁻						
Pixel readout rates	EM Amplifier: 30, 20, 10 & 1 MHz Conventional Amplifier: 1 & 0.1 MHz						EM Amplifier: 17, 10, 5 & 1 MHz Conventional Amplifier: 3, 1 & 0.08 MHz						
Read noise (e⁻) ^{*7}	EMCCD Amplifier			Conventional Amplifier			EMCCD Amplifier			Conventional Amplifier			
MHz	30	20	10	1	1	0.1	17	10	5	1	3	1	0.08
Without Electron Multiplication	130	80	40	12	6	3.5	89	65	37	15	9.6	5.3	2.7
With Electron Multiplication	< 1	< 1	< 1	< 1	< 1	-	< 1	< 1	< 1	< 1	-	-	-
Linear absolute Electron Multiplier gain	1 - 1000 times via RealGain™ (calibration stable at all cooling temperatures)												
Linearity ^{*8}	Better than 99.9%												
Vertical clock speed	0.6 to 4.33 μs (user selectable)						0.3 to 3.33 μs (user selectable)						
Timestamp accuracy	10 ns												

iXon Ultra 888 Frame Rates

Standard Mode ^{*3,9}

Binning	1024 x 1024	512 x 512	256 x 256	128 x 128	1024 x 100	1024 x 32	1024 x 1
1 x 1	26	50	95	171	220	498	1163
2 x 2	50	94	170	285	368	699	-
4 x 4	92	167	281	426	552	870	-

Crop Mode - Optically Centred frame rates in brackets ^{*3,9}

Binning	512 x 512	256 x 256	128 x 128	64 x 64	1024 x 100	1024 x 32	1024 x 1
1 x 1	93 (78)	190 (251)	670 (697)	2053 (1319)	259	778	9690
2 x 2	170 (143)	350 (426)	1150 (1019)	3123 (1646)	492	1416	-
4 x 4	291 (245)	601 (653)	1772 (1504)	4109 (1857)	887	2370	-

iXon Ultra 897 Frame Rates

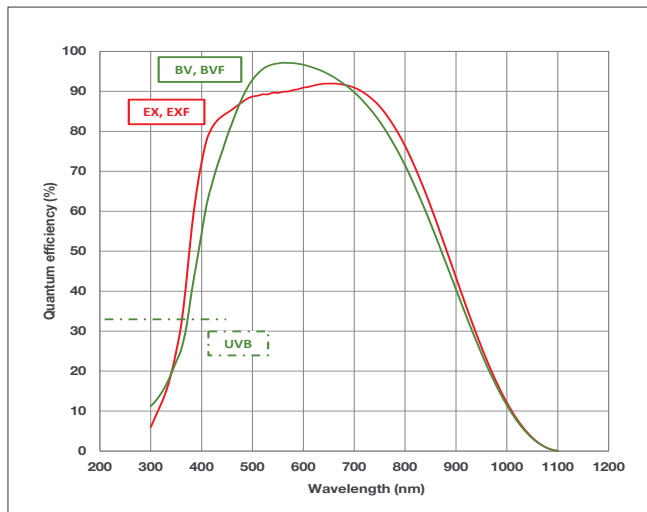
Standard Mode ^{*10}

Binning	512 x 512	256 x 256	128 x 128	64 x 64	512 x 100	512 x 32	512 x 1
1 x 1	56	110	212	397	277	704	2,857
2 x 2	109	210	394	699	503	1,136	-
4 x 4	206	385	680	1,099	840	1,613	-

Crop Mode - Optically Centred frame rates in brackets ^{*10}

Binning	256 x 256	128 x 128	64 x 64	32 x 32	512 x 100	512 x 32	512 x 1
1 x 1	111 (174)	595 (569)	1,433 (1,492)	3,532 (3,024)	296	857	11,074
2 x 2	215 (329)	1,085 (1,014)	2,433 (2,329)	5,325 (4,054)	570	1,589	-
4 x 4	402 (594)	1,802 (1,662)	3,577 (3,237)	6,579 (5,252)	1,050	2,682	-

Quantum Efficiency (QE) Curve ^{**11}



QE vs. Fluorophore Emissions

