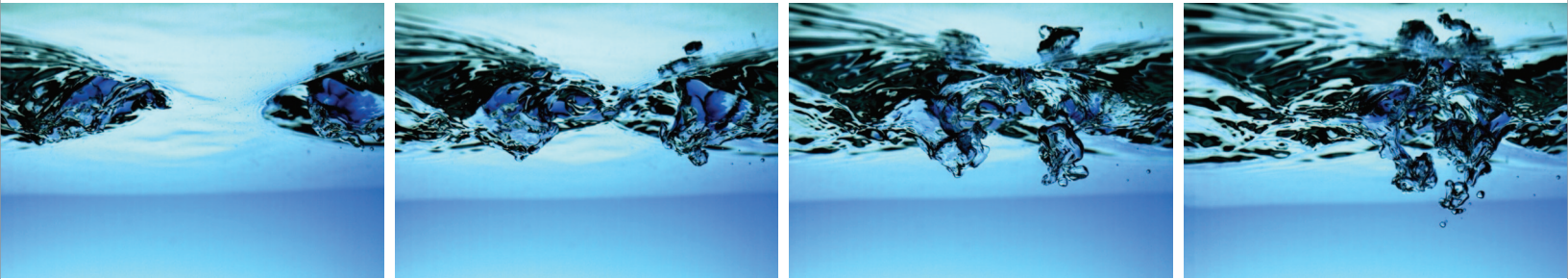


# FASTCAM SA-X

## HIGH PERFORMANCE HIGH-SPEED CAMERA SYSTEM



In order to meet the requirements of the most demanding high speed imaging applications a balance of high frame rate, image resolution, dynamic range and light sensitivity is required. The FASTCAM SA-X high speed camera system has been designed to provide a careful balance of all these sometimes conflicting requirements.

FASTCAM SA-X brings together unique CMOS image sensor technologies and digital imaging expertise to provide optimum imaging performance. The system offers recording rates up to 10,000 fps at Megapixel image resolution with 12 bit dynamic range and high image quality.

Light sensitivity is often the most critical performance criteria in high speed imaging. Without high light sensitivity imaging at high frame rates and with short exposure times is not possible. A camera system providing high light sensitivity allows objective lenses and lighting techniques to be optimized to visualize complex high speed phenomena.

The FASTCAM SA-X system may be controlled via the optional keypad or over a high speed Gigabit Ethernet network. The system is provided with an integrated capping shutter to facilitate automated image calibration and enhance ease of operation. The system is supplied with intuitive Photron FASTCAM Viewer (PFV) software and Photron Device Control SDK (software development kit) allowing integration with user specific software.

### Target applications include:

- Materials Science
- Combustion Research
- Fluid dynamics (PIV)
- Defense and aerospace research
- Ballistic Imaging
- Shock Waves and Detonations

## Benefits

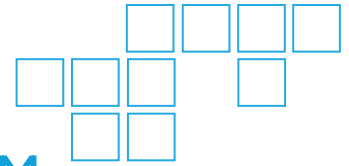
- Frame Rate Performance examples:
  - 10,000 fps at 1024x1024 pixel resolution
  - 13,500 fps at 1024x768 pixel resolution
  - 30,000 fps at 512x512 pixel resolution
  - 54,000 fps at 512x256 pixel resolution
  - 72,000 fps at 256x256 pixel resolution
- Market leading light sensitivity  
ISO 12232 Ssat: ISO 25,000 monochrome
- High Speed GigaBit Ethernet interface provides reliable system communication and image download rates
- Flexible frame synchronization to external devices. Frame rate may be synchronized to external non-stable frequencies
- Fast acting image trigger allows automated camera trigger operation
- Integrated mechanical calibration shutter, Nikon G type lenses mount allowing use of current D SLR lenses and optional control keypad



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### Specifications: Partial Frame Rate / Recording Duration Table

FRAME RATE (fps)	MAXIMUM RESOLUTION		MAXIMUM SHUTTER SPEED	RECORD DURATION (12-BIT)					
	Horizontal	Vertical		TIME (Sec.)			FRAMES		
				8GB	16GB	32GB	8GB	16GB	32GB
1,000	1,024	1,024	0.293 $\mu$ s 1/3,410,526 sec	5.46	10.92	21.84	5,455	10,916	21,839
2,000	1,024	1,024		2.73	5.46	10.92	5,455	10,916	21,839
5,000	1,024	1,024		1.09	2.18	4.37	5,455	10,916	21,839
7,250	1,024	1,024		0.76	1.52	3.03	5,455	10,916	21,839
10,000	1,024	1,024		0.55	1.09	2.18	5,455	10,916	21,839
15,000	1,024	704		0.53	1.06	2.12	7,935	15,879	31,767
20,000	1,024	512		0.55	1.09	2.18	10,912	21,835	43,680
30,000	512	512		0.73	1.46	2.91	21,827	43,672	87,363
40,000	512	376		0.74	1.49	2.97	29,723	59,469	118,963
50,000	512	284		0.79	1.58	3.15	39,352	78,735	157,501
60,000	384	272		0.91	1.83	3.65	54,785	109,612	219,267
72,000	256	256		1.21	2.43	4.85	87,315	174,696	349,459
80,000	256	224		1.25	2.50	4.99	99,789	199,653	399,382
90,000	256	192		1.29	2.59	5.18	116,421	232,929	465,946
100,000	256	168		1.33	2.66	5.33	133,052	266,205	532,510
120,000	256	128		1.46	2.91	5.82	174,632	349,395	698,920
200,000	256	56		2.00	3.99	7.99	399,162	798,620	1,597,535
259,200	128	32		5.39	10.78	21.57	1,397,075	2,795,176	5,591,379
324,000	128	16		8.62	17.25	34.51	2,794,152	5,590,355	11,182,760

<b>Sensor</b>	20 $\mu$ m pixel size, 12-bit ADC (Bayer system color, single sensor)	<b>Phase Lock</b>	Enable cameras to synchronized precisely together to a master camera or external source
<b>Shutter</b>	Global electronic shutter from 1ms to 0.293 $\mu$ s independent of frame rate	<b>Trigger Modes</b>	Start, End, Center, Manual, Random, Random Reset
<b>Lens Mount</b>	Interchangeable Nikon F/G-mount, C-mount using supplied adapters	<b>Saved Image Formats</b>	JPEG, AVI, TIFF, BMP, RAW, RAWW, MRAW, PNG, MOV and FTIF. Images can be saved with or without image or comment data
<b>Extended Dynamic Range</b>	Selectable in twenty steps (0 to 95% in 5% increments) to prevent pixel over-exposure	<b>Data Display</b>	Frame Rate, Shutter Speed, Trigger Mode, Date or Time, Status (Playback/Record), Real Time, Frame Count and Resolution
<b>Memory</b>	8GB (standard: 5,455 frames @ maximum resolution) 16GB (option: 10,916 frames @ maximum resolution) 32GB (option: 21,839 frames @ maximum resolution)	<b>Partitioning</b>	Up to 64 memory segments for multiple recording in memory
<b>Video Output</b>	Live and playback video through Dual HD-SDI or Dual RS-170 (NTSC/PAL) outputs	<b>Data Acquisition</b>	Supports Photron DAQ options
<b>Camera Control</b>	High speed Gigabit Ethernet or optional handheld keypad	<b>Cooling</b>	Actively cooled
<b>User Preset Switches</b>	Four user schedulable camera function controls mounted on the camera's rear panel	<b>Operating Temperature</b>	0 - 40 degrees (32 - 104 degree F)
<b>Low Light Mode</b>	Low light mode drops the frame rate and shutter time to their maximum values, while maintaining other set parameters, to enable users to position and focus the camera	<b>Mounting</b>	1 x 1/4 - 20 UNC, 1 x 3/8 - 16 UNC, 6 x M6
<b>Triggering</b>	Selectable positive or negative TTL 5Vp-p or switch closure	<b>Dimensions</b>	170mm (6.7")H x 160mm (6.3")W x 350mm(13.8")D
<b>Trigger Delay</b>	Programmable delay on selected input and output triggers, 100ns resolution	<b>Weight</b>	9 kg (19.8 lbs)
<b>Timing</b>	Internal clock or external source	<b>Power Requirements</b>	100V-240V AC ~ 1.5A, 50-60Hz DC operation 18-36 VDC, 180VA

Specifications subject to change without notice

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