

# 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 12,500 fps at Megapixel image resolution with 12 bit ADC 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:
  - 12,500 fps at 1024x1024 pixel resolution
  - 15,000 fps at 896x896 pixel resolution
  - 36,000 fps at 640x480 pixel resolution
  - 60,000 fps at 384x384 pixel resolution
  - 100,000 fps at 256x256 pixel resolution
- Market leading light sensitivity  
ISO 25,000 - monochrome (ISO Ssat 12232 standard)
- High Speed Dual 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
- Available with mechanical calibration shutter and Nikon G type lenses mount for use with current D SLR lenses

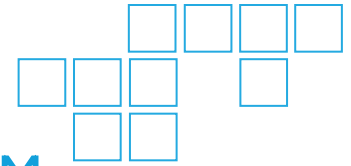


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Specifications: Partial Frame Rate / Recording Duration Table

FRAME RATE (fps)	MAXIMUM RESOLUTION Horizontal Vertical		RECORD DURATION (12-BIT)							
			TIME (Sec.)				FRAMES			
			8GB	16GB	32GB	64GB	8GB	16GB	32GB	64GB
1,000	1,024	1,024	5.46	10.92	21.84	43.68	5,455	10,916	21,839	43,684
2,000	1,024	1,024	2.73	5.46	10.92	21.84	5,455	10,916	21,839	43,684
5,000	1,024	1,024	1.09	2.18	4.37	8.74	5,455	10,916	21,839	43,684
7,250	1,024	1,024	0.75	1.51	3.01	6.03	5,455	10,916	21,839	43,684
10,000	1,024	1,024	0.55	1.09	2.18	4.37	5,455	10,916	21,839	43,684
12,500	1,024	1,024	0.44	0.87	1.75	3.49	5,455	10,916	21,839	43,684
13,500	1,024	896	0.46	0.92	1.85	3.70	6,234	12,476	24,959	49,925
15,000	896	896	0.48	0.95	1.90	3.80	7,125	14,259	28,525	57,058
20,000	768	768	0.48	0.97	1.94	3.88	9,699	19,408	38,827	77,663
27,000	640	640	0.52	1.04	2.07	4.14	13,968	27,949	55,911	111,835
36,000	640	480	0.52	1.04	2.07	4.14	18,625	37,267	74,549	149,115
50,000	512	384	0.58	1.16	2.32	4.66	29,103	58,230	116,485	232,993
60,000	384	384	0.65	1.29	2.59	5.18	38,805	77,641	155,314	310,658
100,000	256	256	0.87	1.75	3.49	6.99	87,315	174,696	349,459	698,984
259,200	128	64	2.69	5.39	10.79	21.57	698,536	1,397,587	2,795,688	5,591,891
324,000	128	32	4.31	8.63	17.26	34.52	1,397,075	2,795,176	5,591,379	11,183,784

OPTION SUBJECT TO EXPORT LICENSE CONTROL RESTRICTIONS WHERE APPLICABLE

<b>Sensor</b>	20 μm 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, such as IRIG/GPS time codes
<b>Shutter</b>	Global electronic shutter from 1ms to 1 μs independent of frame rate (0.293 μs shutter available subject to export license control)	<b>Event Markers</b>	Ten user entered event markers mark specific events within the image sequence in real time. Immediately accessible through software
<b>Lens Mount</b>	Interchangeable Nikon F-mount (compatible with Nikon G type lenses), C-mount using supplied adapters	<b>Trigger Modes</b>	Start, End, Center, Manual, Random, Random Reset, Random Center, Random Manual, Image Trigger
<b>Extended Dynamic Range</b>	Selectable in twenty steps (0 to 95% in 5% increments) to prevent pixel over-exposure	<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>Memory</b>	8GB (standard: 5,455 frames @ maximum resolution) 16GB (option: 10,916 frames @ maximum resolution) 32GB (option: 21,839 frames @ maximum resolution) 64GB (option: 43,684 frames @ maximum resolution)	<b>Data Display</b>	Frame Rate, Shutter Speed, Trigger Mode, Date or Time, Status (Playback/Record), Real Time, Frame Count and Resolution
<b>Video Output</b>	Live and playback video through Dual HD-SDI or Dual RS-170 (NTSC/PAL) outputs	<b>Partitioning</b>	Up to 64 memory segments for multiple recording in memory
<b>Camera Control</b>	High speed Dual Gigabit Ethernet or optional handheld keypad	<b>Data Acquisition</b>	Supports Photron DAQ options
<b>User Preset Switches</b>	Four user schedulable camera function controls mounted on the camera's rear panel	<b>Cooling</b>	Actively cooled
<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>Operating Temperature</b>	0 - 40 degrees (32 - 104 degree F)
<b>Triggering</b>	Selectable positive or negative TTL 5Vp-p or switch closure	<b>Mounting</b>	1 x 1/4 - 20 UNC, 1 x 3/8 - 16 UNC, 6 x M5
<b>Trigger Delay</b>	Programmable delay on selected input and output triggers, 100ns resolution	<b>Dimensions</b>	171mm (6.7")H × 160mm (6.3")W × 311mm(12.2")D *excluding protrusions
<b>Timing</b>	Internal clock or external source	<b>Weight</b>	8.6 kg (19 lbs) *excluding protrusions
		<b>Power Requirements</b>	100V - 240V AC 50-60Hz DC operation 18 - 36 VDC, 210VA

Specifications subject to change without notice

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SLOW MOTION IMAGING SOLUTIONS