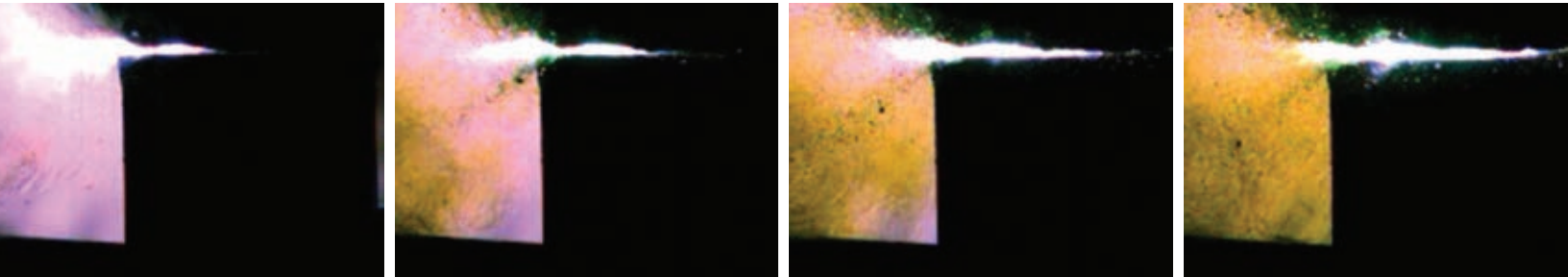


# FASTCAM SA-Z

HIGH PERFORMANCE HIGH-SPEED CAMERA SYSTEM



The Photron FASTCAM SA-Z offers scientists, researchers and engineers the ability to capture high resolution digital images at ultra-high speeds to see and understand previously invisible processes and events. Using Photron's proprietary CMOS image sensor technology, FASTCAM SA-Z combines high recording rates with outstanding light sensitivity and excellent image quality to provide the most versatile ultra-high speed digital camera available today.

The ultra-high speed FASTCAM SA-Z provides mega pixel resolution to a blistering 21,000 frames per second (fps) from its very light sensitive (ISO 25,000) 20  $\mu\text{m}$  square pixels, with 12-bit pixel depth (ADC) delivering incredible image quality. The FASTCAM SA-Z can operate at reduced resolution beyond two million frames per second.

A global electronic shutter, 1  $\mu\text{s}$  standard, but capable of operating down as fast as 159 nanoseconds (export restrictions apply) ensures the 12-bit monochrome, 36-bit color images are crystal clear and blur free as you have come to expect from Photron high speed imaging products.

The square image format is ideal for any application requiring recording through a round or square viewing ports, such as combustion research, and has the added benefit of enabling users to rotate their camera if required without having to sacrifice horizontal resolution as is required when a camera with a rectangular aspect ratio is mounted on its side. Tools within Photron's PFV camera control / replay/ editing software allow the displayed image to be rotated to reflect the true view.

## Target applications include:

- Materials Science
- Combustion Research
- Fluid dynamics (PIV)
- Ballistic Imaging
- Defense and aerospace research
- Plasma and arc studies
- Shock Waves and Detonation

## Benefits

- Powerful performance with many usable resolution and speed combinations, including:
  - 20,000 fps at 1,024 x 1,024 pixels resolution
  - 40,000 fps at 1,024 x 512 pixel resolution
  - 100,000 fps at 640 x 280 pixel resolution
  - 200,000 fps at 384 x 176 pixel resolution
- Reduced resolution operation to over 2M frames per second
- Market leading light sensitivity (ISO Ssat 12232 standard)
  - ISO 25,000 monochrome
  - ISO 10,000 color
- Global electronic shutter as fast as 159ns (dependant on frame rate selected), freezing the fastest motion without blur
- Two SD card slots and dual Gigabit Ethernet ports enable easy and very fast image off load
- Available with four onboard memory options: 8GB, 16GB, 32GB, 64GB

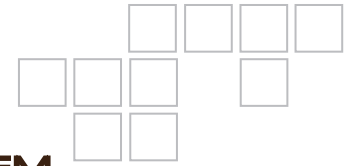


# Photron

[www.photron.com](http://www.photron.com)

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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
<b>Model 480K</b>										
50	1,024	1,024	109.10	218.32	436.78	873.68	5,455	10,916	21,839	43,684
500	1,024	1,024	10.91	21.83	43.68	87.37	5,455	10,916	21,839	43,684
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
10,000	1,024	1,024	0.55	1.09	2.18	4.37	5,455	10,916	21,839	43,684
20,000	1,024	1,024	0.27	0.55	1.09	2.18	5,455	10,916	21,839	43,684
21,000	1,024	1,000	0.27	0.53	1.07	2.13	5,586	11,178	22,363	44,733
25,000	1,024	840	0.27	0.53	1.07	2.13	6,650	13,308	26,623	53,254
40,000	1,024	512	0.27	0.55	1.09	2.18	10,912	21,835	43,680	87,371
60,000	640	488	0.31	0.61	1.22	2.45	18,320	36,656	73,327	146,670
75,000	512	456	0.33	0.65	1.31	2.62	24,508	49,036	98,092	196,204
100,000	640	280	0.32	0.64	1.28	2.56	31,931	63,887	127,801	255,627
120,000	512	264	0.35	0.70	1.41	2.82	42,333	84,700	169,433	338,900
200,000	384	176	0.42	0.85	1.69	3.39	84,669	169,402	338,869	677,803
480,000	512	56	0.42	0.83	1.66	3.33	199,580	399,309	798,766	1,597,681
<b>Model 2100K</b>										
525,000	384	64	0.44	0.89	1.78	3.55	232,844	465,861	931,894	1,863,962
700,000	256	56	0.57	1.14	2.28	4.57	399,162	798,620	1,597,535	3,195,365
900,000	128	56	0.89	1.77	3.55	7.10	798,327	1,597,242	3,195,073	6,390,733
1,008,000	256	24	0.92	1.84	3.69	7.39	931,382	1,863,450	3,727,585	7,455,855
1,200,000	128	32	1.16	2.33	4.66	9.32	1,397,075	2,795,176	5,591,379	11,183,784
2,100,000	128	8	2.66	5.32	10.65	21.30	5,588,307	11,180,712	22,365,523	44,735,144

Model 2100K subject to export license control restrictions where applicable

<b>Sensor</b>	20 µm pixel size, 12-bit ADC (Bayer system color, single sensor)	<b>Trigger Delay</b>	Programmable delay on selected input and output triggers, 100ns resolution
<b>Shutter</b>	Global electronic shutter from 1ms to 1 µs independent of frame rate (sub-microsecond shutter available subject to export license control)	<b>Timing</b>	Internal clock or external source
<b>Lens Mount</b>	Interchangeable Nikon F-mount (compatible with Nikon G type lenses), C-mount using supplied adapters. Optional Canon EF remote control mount	<b>Phase Lock</b>	Enables cameras to synchronize precisely to a master camera or external signal source
<b>Extended Dynamic Range</b>	Selectable in twenty steps (0 to 99% in 5% increments) to prevent pixel over-exposure	<b>Event Markers</b>	Ten user specified event markers indicate specific events within an image sequence in real time. Immediately accessible through software
<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>Trigger Modes</b>	Start, End, Center, Manual, Random, Random Reset, Random Center, Random Manual
<b>Recording bit depth</b>	Selectable 8-bit or 12-bit recording	<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>Video Output</b>	Live and playback video through Two HD-SDI or Dual RS-170 (NTSC/PAL) outputs	<b>Data Display</b>	Frame Rate, Shutter Speed, Trigger Mode, Date or Time, Status (Playback/Record), Real Time, Frame Count and Resolution
<b>Nonvolatile Data Storage</b>	2x SD/SDHC/SDXC memory Card drives provided. Compatible with UHS-I (SDR104)	<b>Partitioning</b>	Up to 64 memory segments for capturing multiple recordings into camera memory
<b>Camera Control</b>	Remote computer control via high-speed dual port Gigabit Ethernet or optional local control via handheld keypad with LCD monitor	<b>Data Acquisition</b>	Supports Photron and National Instruments DAQ options
<b>User Preset Switches</b>	Four user schedulable camera function controls mounted on the camera's rear panel	<b>Operating Temperature</b>	0 - 45 degrees
<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>	3 x 1/4-20 UNC, 3 x 3/8-16 UNC
<b>Triggering</b>	Selectable positive or negative TTL or switch closure	<b>Dimensions</b>	261mm (10.2")H x 150mm (5.9")W x 375mm (14.7")D <sup>excluding protrusions</sup>
		<b>Weight</b>	10.4 kg (22.93 lbs) <sup>excluding protrusions</sup>
		<b>Power Requirements</b>	100V-240V AC 50-60Hz DC operation 20-36 VDC, 230VA

Specifications subject to change without notice



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