CHRONOS 2.1-HD DATASHEET

Chronos 2.1-HD is a 1080p, 2.1 gigapixel-per- second handheld high-speed camera. Completely self-contained, you can take high-speed imaging with you anywhere! It records 1080p video at 1000fps, and can record at up to 24 046fps at lower resolutions. Video is saved to removable media in compressed h.264 or uncompressed dng format. You can shoot for hours, saving hundreds of shots on a single card.

Main Features

1080p, 4/3” format image sensor captures 2.1 gigapixels per second for 1000fps at full resolution, and up to 24 046fps at lower resolutions.

8GB, 16GB and 32GB high-speed RAM buffer options for 2.7, 5.5 and 11.0 second record time respectively.

High sensitivity base ISO of 500 (Color) and 1000 (Monochrome) enables shooting with modest lighting.

Completely standalone, untethered operation. Field-swappable internal battery lasts for 1 hour of recording. Runs indefinitely on AC adapter or external power source.

Many lenses supported: Nikon F, Canon EF and C mounts available as field-swappable options.

Focus peaking highlights sharp edges for quick and perfect focus. Zebra lines help you set correct exposure.

Resolutions and Frame rates

Resolution is adjustable in 32x2 increments. Some example combinations of resolution and frame rate are shown below:

Resolution	Max FPS	Record time (sec) (8GB)	Record time (sec) (16GB)	Record time (sec) (32GB)
1920 x 1080	1 000	2.76	5.51	11.02
1920 x 720	1 495	2.77	5.53	11.06
1920 x 512	2 095	2.78	5.55	11.11
1920 x 360	2 963	2.79	5.58	11.16
1920 x 240	4 403	2.80	5.60	11.21
1920 x 120	8 569	2.89	5.78	11.56
1920 x 96	10 569	2.94	5.87	11.74
1440 x 1080	1 434	2.56	5.12	10.25
1440 x 720	2 142	2.57	5.14	10.29
1440 x 512	2 997	2.59	5.18	10.36
1440 x 240	6 265	2.63	5.26	10.53
1440 x 96	14 825	2.77	5.54	11.08
1280 x 1080	1 434	2.88	5.77	11.53
1280 x 720	2 142	2.90	5.79	11.59
1280 x 512	2 996	2.91	5.82	11.65
1280 x 360	4 230	2.93	5.86	11.72
1280 x 240	6 265	2.97	5.94	11.89
1280 x 120	12 075	3.07	6.14	12.28
1280 x 96	14 825	3.14	6.28	12.56
1024 x 768	2 531	2.88	5.75	11.50
1024 x 576	3 358	2.89	5.77	11.55
800 x 600	4 352	2.73	5.47	10.94
800 x 480	5 406	2.73	5.47	10.94
640 x 480	5 406	3.44	6.88	13.76
640 x 360	7 135	3.48	6.95	13.90
640 x 240	10 488	3.54	7.07	14.14
640 x 120	19 783	3.72	7.43	14.86
640 x 96	24 046	3.87	7.74	15.49

Full Specifications

Camera	*Imaging*	1920x1080 1 000fps, see resolution table for details
	Memory	8GB, 16GB, or 32GB
	Record time	2.7 seconds (8GB), 5.5 seconds (16GB), 11 seconds (32GB)
	Lens mount	CS/C mount. Nikon F, Canon EF with adapter
	Backfocus	Field adjustable
	IR Filter	650nm, user removable, 24 x 16 x 1.1mm
	Display	5" 800x480 capacitive touchscreen, 1000 nit daylight visible
	Enclosure	Anodized CNC machined aluminum
	Cooling	Active cooling, variable-speed fan
	Dimensions	155mm x 96mm x 67.3mm (6.11" x 3.78" x 2.65") without lens
	Weight	1.06kg (2.34 lbs) without lens
Video formats	*H.264*	Industry-standard mp4 files at bitrates up to 60Mbps
	cinemaDNG Raw	Standard Adobe cinemaDNG raw files
Image Sensor	*Resolution*	1920x1080 @ 1 000fps
	Speed	2.1Gpx/s
	Dimensions	19.2 x 10.8mm (4/3” format)
	Pixel pitch	10um
	Sensitivity (ISO)	Color - ISO 500 base
		Mono - ISO 1000 base
	Shutter	Electronic global shutter, 1/fps to 10us (1/100 000 s)
	Dynamic range	10.3 stops (62.4 dB) (preliminary)
	Bit depth	12-bit
Battery	*Type*	EN-EL4a
	Runtime	1 hour recording
	Charge time	1.5 hours (0-80%) with in-camera charger
IO	*Power Input*	17-20V 40W
		5.5/2.5mm barrel jack, positive tip
	*Network**	Gigabit Ethernet
	Trigger	Two Trigger inputs/frame strobe outputs (BNC and Aux)
		Adjustable input threshold 0 to 6.6V
		Electrically isolated trigger input (Aux connector)
	*Audio**	Microphone/Line input, headphone output
	Video	HDMI monitor output
	USB	USB type A (host) and micro B (device)
	SATA	eSATA 3Gbps
	*Analog input**	1MSa/s 12-bit, 200kHz bandwidth, +/- 1V full scale
Trigger modes	*Normal triggered*	Camera records until a defined delay after a trigger
	Triggered start	Camera starts recording a defined delay after a trigger

Trigger Sources	*Electrical*	0-6.6V threshold, optional button debounce and pullup
	*Audio**	Trigger on loud sounds
	*Acceleration**	Trigger on camera motion, tilt or shock
	*Image**	Trigger on image changes
Recording modes	*Normal*	Records into the circular buffer. Once a trigger occurs, video can be reviewed and saved
	Segmented	RAM is divided into segments, each recording as in the Normal mode above. Number of segments is user selectable.
	*Continuous**	Video is saved continuously at up to 60fps to mp4 files on removable storage. Operates like a normal video camera.
	Gated burst	Frames are captured while trigger is active
Shutter timing	*Normal*	Frame rate and exposure time are controlled by camera
	Edge triggered	A single frame is captured on each rising or falling edge of an external input. Exposure is controlled by camera
	Shutter gating	Image sensor shutter is directly controlled by an external input, exposing while the input is active
Assistive	*Focus Peaking*	Highlights sharp edges to aid focusing
	Zebras	Rolling diagonal lines indicate clipped (overexposed) areas
	Focus Aid	Zooms in to allow easier focusing

*These features are fully supported in the camera's hardware, but are not yet supported in software. They will be added in a free software update after the camera's initial release.