

CHRONOS 2.1-HD DATASHEET



The Chronos 2.1-HD High-Speed Camera is an ideal choice for capturing beautifully framed cinematic shots, filming fast-paced sporting events, and getting the most detailed imaging for research. This camera offers the highest resolution and is compatible with more lens options than Chronos 1.4. Video is saved to removable media in compressed H.264 (MPEG-4) or uncompressed DNG format. You can save hundreds of shots on a single SD card.

Main Features

1920x1080p, 4/3" format image sensor captures 2.1 gigapixels per second for 1000 Frames Per Second (FPS) at full resolution, and up to 24 046fps at lower resolution. Available in color and monochrome. The monochrome option has higher effective resolution and is twice as sensitive as the color option.

8GB, 16GB, and 32GB high-speed RAM buffer options for 2.7, 5.5, and 11 second record time respectively.

High sensitivity of ISO 500-8000 (Color) and 1000-16000 (Monochrome) enables shooting with modest lighting.

Completely standalone, untethered operation. Field-swappable internal battery lasts for upto 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.

Continuous record mode records normal rate video (60FPS) continuously to storage devices while simultaneously recording bursts of high-speed video.

I/O ports enable synchronization and remote triggering through electrical signals, audio, and web interface. An open source, REST-based Application Programming Interface (API) is also included for integrations into custom software or control environments.

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



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Resolutions and Framerrates

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

Resolution	Max FPS	Record Time (sec)		
		(8GB)	(16GB)	(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 1024	1 512	2.88	5.77	11.55
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

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Full Specifications

Camera	Imaging	1920x1080 1000FPS, 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 (Provided). Nikon F-C and Canon EF-C Adapters (optional accessory)
	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 (fan-off option supported)
	Dimensions	155mm x 96mm x 67.3mm (6.11" x 3.78" x 2.65") without lens
	Weight	1.06 kg (2.34 lbs) without lens
Video Formats	H.264	Industry-standard mp4 (MPEG-4) files at bitrates up to 60Mbps
	CinemaDNG Raw	Standard Adobe CinemaDNG raw files
	TIFF	Standard TIFF raw files with timestamps
	Storage Devices	SD, USB, SSD, or SMB/NFS network drives
Image Sensor	Resolution	1920x1080 @ 1000FPS
	Speed	2.1Gpx/s
	Dimensions	19.2 x 10.8mm (4/3" format, 2.1-Megapixel, 2x Crop Factor)
	Pixel Pitch	10um
	Sensitivity (ISO)	Color - ISO 500 to 8000 Mono - ISO 1000 to 16000
	Shutter	Electronic global shutter, 1/fps to 10us (1/100 000 s)
	Dynamic Range	10.3 stops (62.4 dB)
	Bit Depth	12-bit
Battery	Type	EN-EL4a
	Maximum Run Time	1 hour recording
	Charge Time	2 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

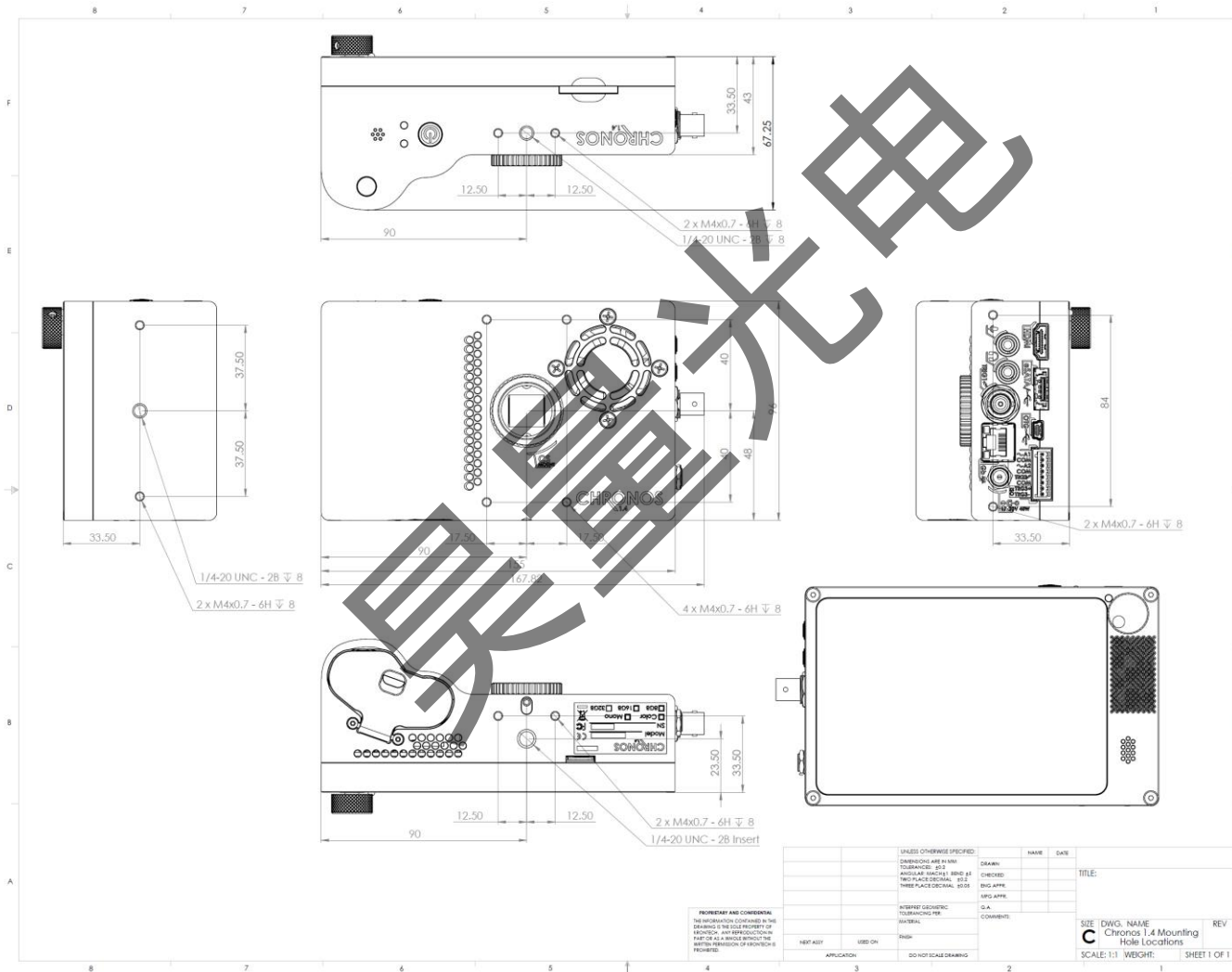
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IO (Continued)	Trigger (Continued)	Electrically isolated trigger input (Aux connector) Trigger with sound, laser, and lighting using accessories
	Audio	Microphone/Line input using continuous live mode @ 60FPS
	Video	HDMI output 720p or 1080p (default) @ 60FPS, video only
	USB	USB type A (host) and micro-B (device)
	SATA	eSATA 3Gbps to SATA 2.5" III SSD (5V power)
Trigger Modes	End Trigger	Camera records until a defined delay after trigger
	Toggle	Camera starts recording with one button press, and stops recording with a subsequent button press
	Exposure Trigger	External signal sets the frame rate for synchronization
	Shutter Gating	External signal sets the frame rate and controls the exposure for synchronization
	Frame Sync Output	The camera outputs a signal indicating its frame rate and exposure
Trigger Ports	BNC	Female BNC connector
	Phoenix	Pluggable black phoenix terminal block (8-pin)
	Network Control	Through web page or REST API based interface with USB or CAT ethernet cable
Recording Modes	Normal	Records into the ring buffer. Once a trigger occurs, video can be reviewed and saved.
	Segmented	Video memory is divided into segments, each recording as in the Normal mode above. Number of segments is user selectable.
	Gated Burst	Frames are captured while trigger is active
	Live Slow Motion	Continuously records a short slow-motion video and immediately plays it back then repeats.
Normal Speed Recording	Continuous	Video is saved continuously at up to 60FPS to mp4 (MPEG-4) files on removable storage. Operates like a normal video camera.
	Assistive	
	Focus Aid	Highlights sharp edges to aid focusing
	Zebras	Rolling diagonal lines indicate clipped (overexposed) areas
	Viewfinder Zoom	Zooms in to allow easier focusing
	Overlay	Displays frame and time information on top of footage
Environmental	Operating Temperature	-20 °C to +40 °C (-4 °F to +104 °F)

Specifications are subject to change without notice.

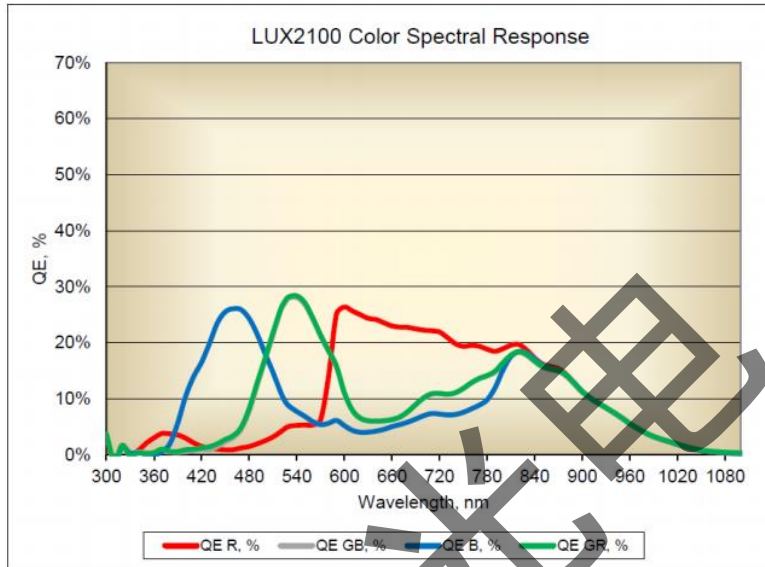
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Mechanical Drawing – Dimensions and Mounting Holes

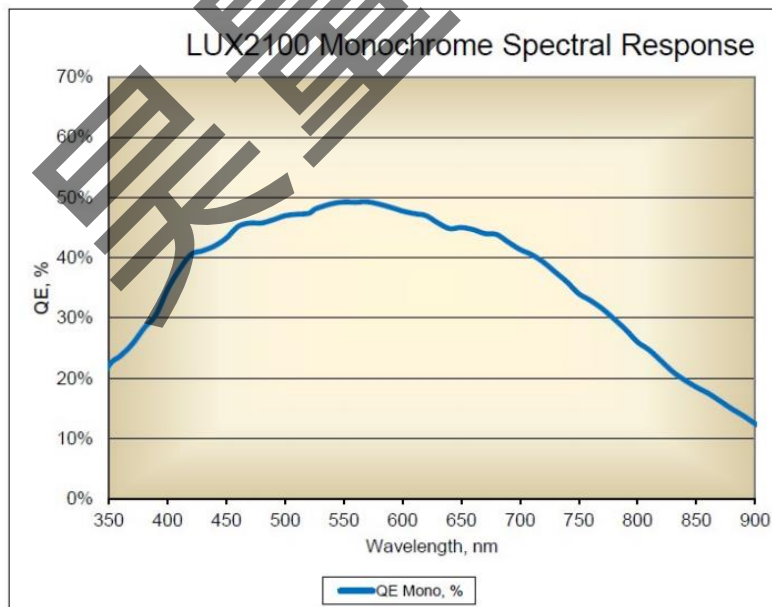


Spectral Response

Chronos 2.1 - Color Option Spectral Response



Chronos 2.1 - Monochrome Option Spectral Response



NOTE: The spectral response curves are measured without IR filters in units of quantum efficiency