

CHRONOS 1.4 DATASHEET



The Chronos 1.4 High-Speed Camera is the ideal choice for research and development, engineering, and manufacturing work that requires relatively high frame rates for review and analysis. Compared to the Chronos 2.1-HD, our 1.4 model has the capacity for high frame rates at lower resolutions and is the best choice for lower budgets. Video is saved in compressed H.264 (MPEG-4) or uncompressed RAW format to removable media. You can save hundreds of shots on a single SD card.

Main Features

1.4Gpx/s, 1.3-megapixel image sensor captures 1280x1024 @ 1069 Frames Per Second (FPS), and up to 40413FPS 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 4, 8, and 16 second record time respectively.

High sensitivity of ISO 320-5120 (Color) and 740-11840 (Monochrome) enables shooting with modest lighting.

Completely standalone, untethered operation. Field-swappable internal battery lasts for upto 1.5 hours of recording. Runs indefinitely on AC adapter or external power source.

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.



Resolutions and Framerates

Resolution is adjustable in 16x2 increments. Some example combinations of resolution and frame rate are shown below:

Resolution	Max FPS	Record Time (sec)		
		(8GB)	(16GB)	(32GB)
1280 x 1024	1 069	4.08	8.16	16.33
1280 x 720	1 519	4.08	8.17	16.34
1280 x 512	2 134	4.09	8.18	16.36
1280 x 360	3 030	4.09	8.18	16.37
1280 x 240	4 532	4.11	8.22	16.44
1280 x 120	8 986	4.12	8.25	16.51
1280 x 96	11 184	4.16	8.33	16.66
1024 x 768	1 770	4.11	8.22	16.44
1024 x 576	2 357	4.11	8.23	16.46
800 x 600	2 871	4.15	8.30	16.60
800 x 480	3 585	4.14	8.29	16.58
640 x 480	4 434	4.20	8.40	16.80
640 x 360	5 899	4.20	8.40	16.80
640 x 240	8 810	4.21	8.42	16.84
640 x 120	17 391	4.22	8.45	16.91
640 x 96	21 598	4.31	8.62	17.25
336 x 240	15 968	4.37	8.75	17.50
336 x 120	31 294	4.46	8.93	17.86
336 x 96	38 726	4.51	9.02	18.04
320 x 240	16 682	4.44	8.81	17.63
320 x 120	32 667	4.42	8.85	17.70
320 x 96	40 413	4.42	8.85	17.70

Full Specifications

Camera	<i>Imaging</i>	1280x1024 1069FPS, see resolution table for details
	<i>Memory</i>	8GB, 16GB, or 32GB
	<i>Record time</i>	4 seconds (8GB), 8 seconds (16GB), 16 seconds (32GB)
	<i>Lens mount</i>	CS/C mount
	<i>Backfocus</i>	Field adjustable
	<i>IR Filter</i>	650nm, user removable, 24 x 16 x 1.1mm
	<i>Display</i>	5" 800x480 capacitive touchscreen, 1000 nit daylight visible
	<i>Enclosure</i>	Anodized CNC machined aluminum
	<i>Cooling</i>	Active cooling, variable-speed fan (fan-off option supported)
	<i>Dimensions</i>	155mm x 96mm x 67.3mm (6.11" x 3.78" x 2.65") without lens
<i>Weight</i>	1.06 kg (2.34 lbs) without lens	
Video Formats	<i>H.264</i>	Industry-standard mp4 (MPEG-4) files at bitrates up to 60Mbps
	<i>CinemaDNG Raw</i>	Standard Adobe CinemaDNG raw files
	<i>TIFF</i>	Standard TIFF raw files with timestamps
	<i>Storage Devices</i>	SD, USB, SSD, or SMB/NFS network drives
Image Sensor	<i>Resolution</i>	1280x1024p @ 1069FPS
	<i>Speed</i>	1.4Gpx/s – Full throughput down to 320-pixel image width
	<i>Dimensions</i>	8.45 x 6.76mm (2/3" format, 1.3-Megapixel, 3.9x Crop Factor)
	<i>Pixel Pitch</i>	6.6um
	<i>Sensitivity (ISO)</i>	Color - ISO 320 to 5120
		Mono - ISO 740 to 11840
	<i>Shutter</i>	Electronic global shutter, 1/fps to 1us (1/1 000 000 s)
	<i>Dynamic Range</i>	56.7 dB
	<i>Bit Depth</i>	12-bit
Battery	<i>Type</i>	EN-EL4a
	<i>Maximum Run Time</i>	1.5 hours recording
	<i>Charge Time</i>	2 hours (0-80%) with in-camera charger
IO	<i>Power Input</i>	17-20V 40W (5.5/2.5mm barrel jack, positive tip)
	<i>Network</i>	Gigabit Ethernet
	<i>Trigger</i>	Two trigger inputs/frame strobe outputs (BNC and Aux) Adjustable input threshold 0 to 6.6V Electrically isolated trigger input (Aux connector)

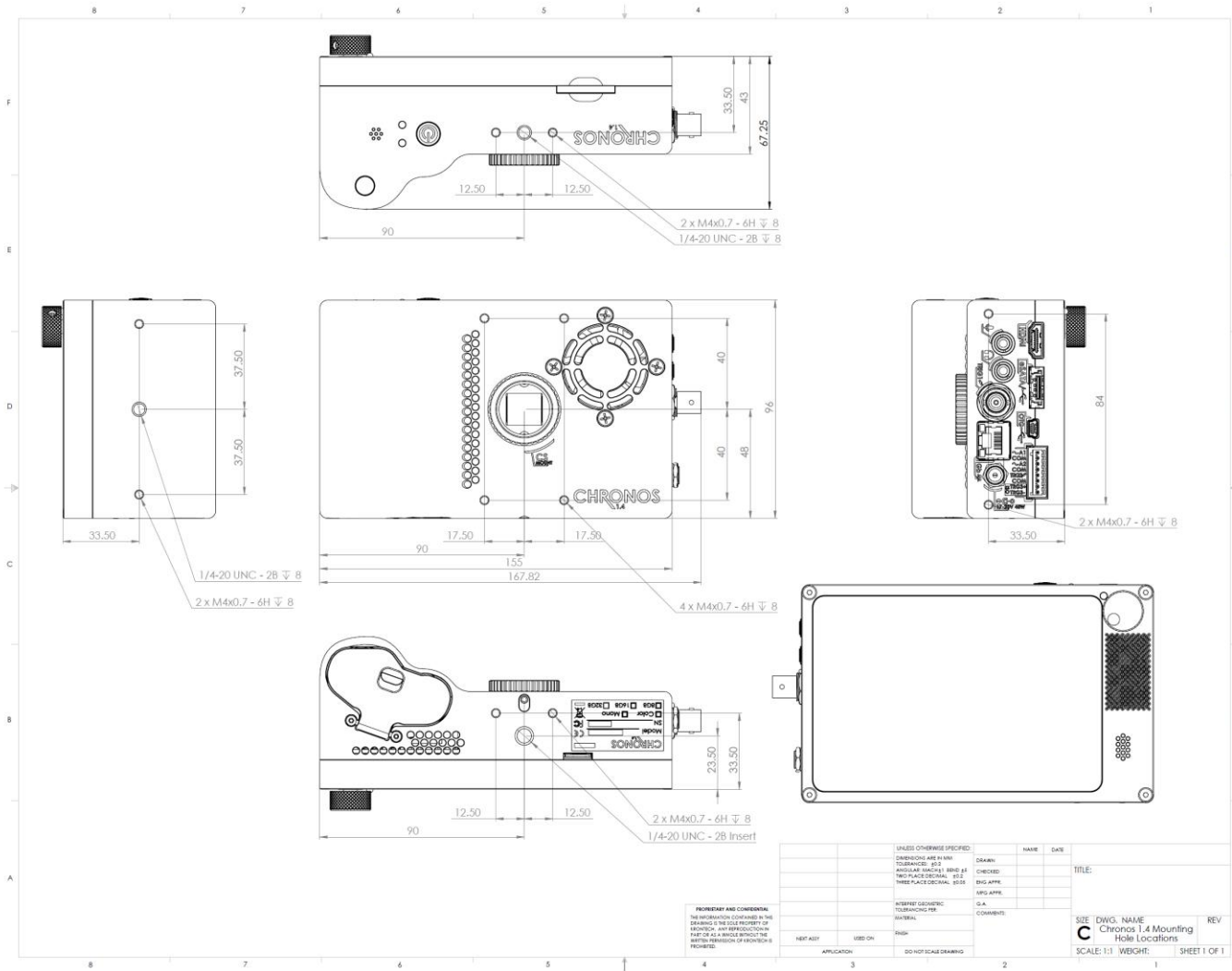
CHRONOS 1.4 DATASHEET

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

Specifications are subject to change without notice.

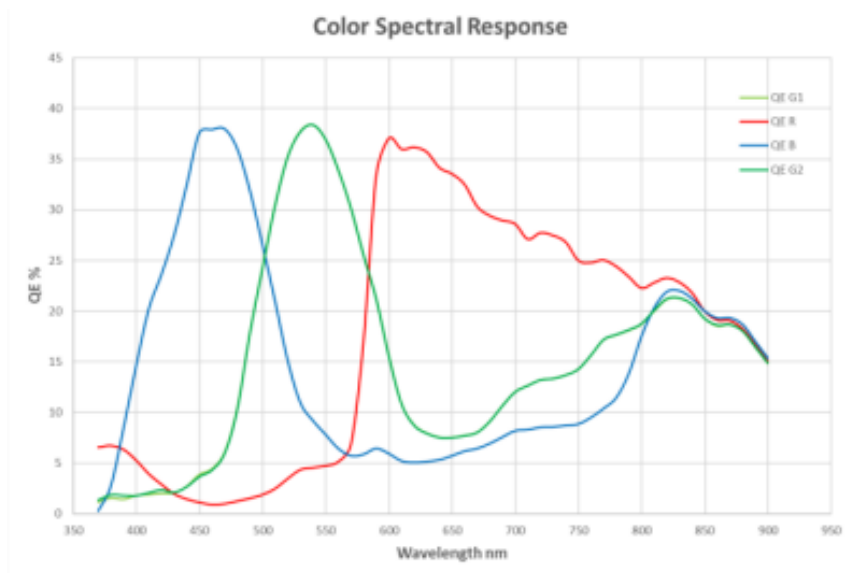
CHRONOS 1.4 DATASHEET

Mechanical Drawing – Dimensions and Mounting Holes

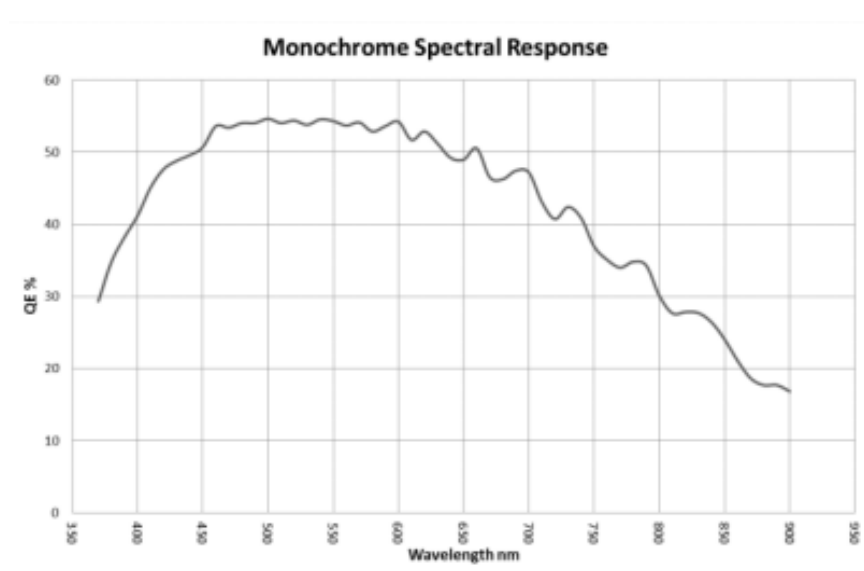


Spectral Response

Chronos 1.4 - Color Option Spectral Response



Chronos 1.4 - Monochrome Option Spectral Response



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