KRON TECHNOLOGIES
HIGH-SPEED IMAGING

CHRONOS 2.1-HD HIGH-SPEED CAMERA

The Chronos 2.1-HD high-speed camera offers an all-in-one, high-definition, high frame-rate solution that empowers data analysis from some of the top R&D and Aerospace facilities, Universities, and Media Producers in the world.

The budget-friendly camera is ideal for a range of applications and measurement techniques such as Vibration Analysis, Schlieren Imaging, and Particle Image Velocimetry (PIV).

Get up and running in minutes with the easy-to-use 5" touchscreen interface and extend the functionality with accessories such as microscope lenses, and high-speed specific lighting.

Lens not included

MAIN FEATURES

HD-Resolution: 1920x1080p @ 1,000FPS (max res)

High Frame-Rate: 4/3" format image sensor captures up to 24,046 Frames Per Second (FPS) at lower resolution.

All-in-One: Completely standalone, untethered operation with a 5" inch touchscreen display and battery for portability.

Internal Storage: 8GB, 16GB, and 32GB RAM memory options allow for 2.7, 5.5, and 11 second recording times. Store footage via the SD card slot.

Recording Modes: Standard, Segmented, Running, Gated Burst and Live Slow Motion offer versatile image capture options for dynamic environments.

Lens Mounting: Nikon F, Canon EF and C mounts available as field-swappable options

Color or Monochrome: High sensitivity ISO 500-8,000 (Color) and 1,000-16,000 (Monochrome) allows filming in dynamic lighting conditions.

Trigger Options: I/O ports enable synchronization and remote triggering via cable, sound, and web-triggers.

Focus Peaking: Highlights sharp edges for quick and clear focus with zebra lines help define correct exposure.

API: Open source, REST-based Application Programming Interface (API) is included for integration into custom software or control environments.

RESOLUTION/FRAME-RATE

CHRONOS 2.1-HD		RECORD TIME (seconds)		
RESOLUTION	MAX FPS	8 GB	16 GB	32 GB
1920 x 1080	1,000	2.76	5.51	11.02
1920 x 512	2,095	2.78	5.55	11.11
1440 x 1080	1,434	2.56	5.12	10.25
1440 x 720	2,142	2.57	5.14	10.29
1280 x 1024	1,512	2.88	5.77	11.55
1280 x 720	2,142	2.90	5.79	11.59
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
640 x 240	10,488	3.54	7.07	14.14
640 x 96	24,046	3.87	7.74	15.49

DIMENSIONS/WEIGHT

Lens mount: CS/C mount (provided). Nikon F-C and Canon EF-C Adapters (optional)

Length: 96mm/3.78"

Width: 67.3mm/2.65"

Height: 155mm/6.11"

Weight: 1.06 kg (2.34 lbs) without lens

Image Sensor: 4/3"

Battery: EN-EL4a

CAMERA SPECIFICATIONS - CHRONOS 2.1-HD HIGH-SPEED CAMERA

CAMERA	
Imaging	1920x1080 @ 1000FPS
Memory	8GB, 16GB, or 32GB
Record Time (in seconds)	2.7 (8GB), 5.5 (16GB), 11 (32GB) at max resolution
Lens Mount	CS/C mount (options available)
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)
Dimensions	155mm x 96mm x 67.3mm (6.11" x 3.78" x 2.65") w/o lens
Weight	1.06 kg (2.34 lbs) without lens

VIDEO FORMATS	
H.264	Standardized MP4 files at bitrates up to 60Mbps
Cinema DNG 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 maximum
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
Runtime	1 hour recording
Charge Time	2 hours (0-80%) with in-camera charger

INPUTS/OUTPUTS	
Power Input	17-20V 40W (5.5/2.5mm barrel jack, positive tip)
Network	Gigabit Ethernet
Trigger	2 trigger inputs/ frame strobe outputs (BNC & Aux) Adjustable input threshold 0 to 6.6V Electrically isolated trigger input (Aux connector) Trigger with sound, laser, and lightning using accessories
Video	HDMI output 720p or 1080p (default) @ 60FPS, video only

INPUTS/OUTPUTS CONTINUED	
USB	USB type A (host) and micro-B (device)
SATA	eSATA 3Gbps to SATA 2.5" lll SSD (5V power)

TRIGGER MODES	
End Trigger	Records until a defined delay after trigger
Toggle	Starts and stops with button press
Exposure Trigger	External signal sets synchronization frame rate
Shutter Gating	External signal sets the exposure synchronization and frame-rate
Frame Sync Output	Outputs a signal indicating its frame rate and exposure

TRIGGER PORTS	
BNC	Female BNC connector
AUX	Phoenix 1778890 8-pin terminal block connector, including isolated trigger input.

SOFTWARE	
Control	Through web page or REST interface with USB or CAT ethernet cable
Stream	Live or Playback Mode network streaming via RTSP stream and VLC player.
APIs	HTTP REST Interface, open-source codebase

NETWORK CONTROL	
Network Control	Through web page or REST 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

NORMAL SPEED RECORDING	
Continuous	Video is saved continuously at up to 60FPS to MP4 files on removable storage. Operates like a standard 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)

CHRONOS 1.4
HIGH-SPEED CAMERA

The Chronos 1.4 high-speed camera offers an all-in-one, high-resolution, high frame-rate solution that empowers data analysis from some of the top R&D and Aerospace facilities, Universities, and Media Producers in the world.

The budget-friendly camera is ideal for a range of applications and measurement techniques such as Vibration Analysis, Schlieren Imaging, and Particle Image Velocimetry (PIV).

Get up and running in minutes with the easy-to-use 5" touchscreen interface and extend the functionality with accessories such as microscope lenses, and high-speed specific lighting.

MAIN FEATURES

High-Resolution: 1280x1024 @ 1,069FPS (max res)

High Frame-Rate: 2/3" format image sensor captures up to 40,413 Frames Per Second (FPS) at lower resolution.

All-in-One: Completely standalone, untethered operation with a 5" inch touchscreen display and battery for portability.

Internal Storage: 8GB, 16GB, and 32GB RAM memory options allow for 4, 8, and 16 second recording times. Store footage via the SD card slot.

Recording Methods: Standard, Segmented, Running, Gated Burst and Live Slow Motion offer versatile image capture options in dynamic environments.

Lens Mounting: Nikon F, Canon EF and C mounts available as field-swappable options.

Color or Monochrome High sensitivity ISO 320-5,120 (Color) and 740-11,840 (Monochrome) allows filming in dynamic lighting conditions.

Trigger Options: I/O ports enable synchronization and remote triggering via cable, sound, and web-triggers.

Focus Peaking: Highlights sharp edges for quick and clear focus with zebra lines to help correct exposure.

API: Open source, REST-based Application Programming Interface (API) is included for integration into custom software or control environments.

RESOLUTION/FRAME-RATE

CHRONOS 1.4		RECORD TIME (seconds)		
RESOLUTION	MAX FPS	8 GB	16 GB	32 GB
1280 x 1024	1,069	4.08	8.16	16.33
1280 x 720	1,519	4.08	8.17	16.34
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	8.30	16.58
640 x 240	8,810	4.21	8.42	16.84
640 x 120	17,391	4.22	8.45	16.91
336 x 120	31,294	4.46	8.93	17.86
320 x 240	32,667	4.42	8.81	17.63
320 x 96	40,413	4.42	8.85	17.70

DIMENSIONS/WEIGHT

Lens mount: CS/C mount (provided). Nikon F-C and Canon EF-C Adapters (optional)

Length: 96mm/3.78"

Width: 67.3mm/2.65"

Height: 155mm/6.11"

Weight: 1.06 kg (2.34 lbs) without lens

Image Sensor: 2/3"

Battery: EN-EL4a

CAMERA SPECIFICATIONS - CHRONOS 1.4 HIGH-SPEED CAMERA

CAMERA	
Imaging	1280x1024 @ 1069FPS
Memory	8GB, 16GB, or 32GB
Record Time (in seconds)	4 (8GB), 8 (16GB), 16 (32GB) at max resolution
Lens Mount	CS/C mount included (options available)
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)
Dimensions	155mm x 96mm x 67.3mm (6.11" x 3.78" x 2.65") w/o lens
Weight	1.06 kg (2.34 lbs) without lens

VIDEO FORMATS	
H.264	Standardized MP4 files at bitrates up to 60Mbps
Cinema DNG 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	1280x1024p maximum
Speed	1.4Gpx/s
Dimensions	8.45 x 6.76mm (2/3" format, 1.3-Megapixel, 3.9x Crop Factor)
Pixel Pitch	6.6um
Sensitivity (ISO)	Color - ISO 320 to 5120 Mono - ISO 740 to 11840
Shutter	Electronic global shutter, 1/fps to 1us (1/1,000,000 s)
Dynamic Range	10.3 stops (62.4 dB)
Bit Depth	12-bit

BATTERY	
Type	EN-EL4a
Runtime	1.5 hour recording
Charge Time	2 hours (0-80%) with in-camera charger

INPUTS/OUTPUTS	
Power Input	17-20V 40W (5.5/2.5mm barrel jack, positive tip)
Network	Gigabit Ethernet
Trigger	2 trigger inputs/frame strobe outputs (BNC & Aux) Adjustable input threshold 0 to 6.6V Electrically isolated trigger input (Aux connector) Trigger with sound, laser, and lightning using accessories
Video	HDMI output 720p or 1080p (default) @ 60FPS, video only

INPUTS/OUTPUTS CONTINUED	
USB	USB type A (host) and micro-B (device)
SATA	eSATA 3Gbps to SATA 2.5" III SSD (5V power)

TRIGGER MODES	
End Trigger	Records until a defined delay after trigger
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TRIGGER PORTS	
BNC	Female BNC connector
AUX	Phoenix 1778890 8-pin terminal block connector, including isolated trigger input.

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NETWORK CONTROL	
Network Control	Through web page or REST 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

NORMAL SPEED RECORDING	
Continuous	Video is saved continuously at up to 60FPS to MP4 files on removable storage. Operates like a standard 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)

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HIGH-SPEED IMAGING

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