



Chronos 1.4 is a 1.4 gigapixel-per-second handheld high-speed camera. Completely self-contained, you can take high-speed imaging with you anywhere. It records 1280x1024 video at 1057fps, and can record at up to 38 500fps at lower resolution. Video is saved in compressed h.264 or uncompressed RAW format to removable media. You can shoot for hours, saving hundreds of shots on a single card.

## Main Features

1.4Gpx/s, 1.3 megapixel image sensor captures 1280x1024 @ 1057fps, and up to 38500fps at lower resolution. Available in color and monochrome. The monochrome option has higher effective resolution and is twice as sensitive as color.

8GB, 16GB and 32GB memory options for 4, 8 and 16 second record time respectively.

High sensitivity of ISO 320-5 120 (Color), 740-11 840 (Monochrome) enables shooting with modest lighting.

Completely standalone, untethered operation with 1.5hr internal battery. Runs indefinitely on AC adapter.

"Run-n-Gun" record mode allows you to forget about saving. Take bursts of video by holding the shutter button, and the video is automatically saved to card. You can continue to shoot and view live video while saving, no waiting for the save to complete as long as buffer is available.

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

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



## Resolutions and Frame rates

| Resolution  | Max FPS | Record time (sec) (8GB) | Record time (sec) (16GB) | Record Time (sec) (32GB) |
|-------------|---------|-------------------------|--------------------------|--------------------------|
| 1280 x 1024 | 1 057   | 4.13                    | 8.26                     | 16.52                    |
| 1280 x 720  | 1 502   | 4.13                    | 8.27                     | 16.54                    |
| 1280 x 512  | 2 111   | 4.14                    | 8.27                     | 16.54                    |
| 1280 x 360  | 2 999   | 4.14                    | 8.28                     | 16.56                    |
| 1280 x 240  | 4 489   | 4.15                    | 8.30                     | 16.6                     |
| 1280 x 120  | 8 923   | 4.17                    | 8.35                     | 16.62                    |
| 1280 x 96   | 11 119  | 4.19                    | 8.38                     | 16.76                    |
| 1024 x 768  | 1 771   | 4.11                    | 8.22                     | 16.44                    |
| 1024 x 576  | 2 359   | 4.11                    | 8.23                     | 16.46                    |
| 800 x 600   | 2 873   | 4.15                    | 8.30                     | 16.6                     |
| 800 x 480   | 3 587   | 4.15                    | 8.31                     | 16.62                    |
| 640 x 480   | 4 436   | 4.20                    | 8.40                     | 16.8                     |
| 640 x 360   | 5 903   | 4.21                    | 8.42                     | 16.84                    |
| 640 x 240   | 8 816   | 4.23                    | 8.45                     | 16.9                     |
| 640 x 120   | 17 424  | 4.28                    | 8.56                     | 17.12                    |
| 640 x 96    | 21 649  | 4.30                    | 8.61                     | 17.22                    |
| 336 x 252   | 15 200  | 4.43                    | 8.87                     | 17.74                    |
| 336 x 190   | 20 020  | 4.47                    | 8.94                     | 17.88                    |
| 336 x 120   | 31 192  | 4.53                    | 9.07                     | 18.14                    |
| 336 x 96    | 38 565  | 4.60                    | 9.20                     | 18.4                     |

## Full Specifications

|                      |                                |  |
|----------------------|--------------------------------|--|
| <b>Camera</b>        | <i>Imaging</i>                 | 1280x1024 1057fps, 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 mount, C mount with included adapter                    |
|                      | <i>Backfocus</i>               | Field adjustable   |
|                      | <i>IR Filter</i>               | 650nm, user removable, 18 x 18 x 1.1mm                     |
|                      | <i>Display</i>                 | 5" 800x480 capacitive touchscreen                          |
|                      | <i>Enclosure</i>               | Anodized CNC machined aluminum                             |
|                      | <i>Cooling</i>                 | Active cooling, variable-speed fan                         |
|                      | <i>Dimensions</i>              | 155mm x 96mm x 67.3mm (6.11" x 3.78" x 2.65") without lens |
| <i>Weight</i>        | 1.06kg (2.34 lbs) without lens |  |
| <b>Video formats</b> | <i>H.264</i>                   | Industry-standard mp4 files at bitrates up to 60Mbps       |
|                      | <i>cinemaDNG Raw</i>           | Standard Adobe cinemaDNG raw files                         |

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|                        |                             |  |
|------------------------|-----------------------------|--|
| <b>Image Sensor</b>    | <i>Resolution</i>           | 1280x1024 @ 1057fps  |
|                        | <i>Speed</i>                | 1.4Gpx/s - Full throughput down to 336 pixel image width   |
|                        | <i>Dimensions</i>           | 8.45 x 6.76mm  |
|                        | <i>Pixel pitch</i>          | 6.6um  |
|                        | <i>Sensitivity (ISO)</i>    | Color - ISO 320 to 5 120   |
|                        |                             | Mono - ISO 740 to 11 840   |
|                        | <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   |
|                        | <b>Battery</b>              | <i>Type</i>  |
| <i>Runtime</i>         |                             | 1.5 hours recording  |
| <i>Charge time</i>     |                             | 2 hours (0-80%) with in-camera charger   |
| <b>IO</b>              |                             |  |
|                        | <i>Power Input</i>          | 17-20V 40W<br>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)<br>Adjustable input threshold 0 to 6.6V<br>Electrically isolated trigger input (Aux connector)                                       |
|                        | <i>Audio*</i>               | Microphone/Line input, headphone output  |
|                        | <i>Video*</i>               | HDMI output, video or video+menus  |
|                        | <i>USB</i>                  | Two USB host ports (one on mini-B via USB OTG cable)   |
|                        | <i>SATA</i>                 | eSATA 3G   |
|                        | <i>Analog input*</i>        | 1MSa/s 12-bit, 200kHz bandwidth, +/- 1V full scale   |
| <b>Trigger modes</b>   | <i>Normal triggered</i>     | Camera records until a defined delay after a trigger   |
|                        | <i>Triggered start</i>      | Camera starts recording a defined delay after a trigger  |
| <b>Trigger Sources</b> | <i>Electrical</i>           | 0-6.6V threshold, optional button debounce and pullup  |
|                        | <i>Audio*</i>               | Trigger on loud sounds   |
|                        | <i>Acceleration*</i>        | Trigger on camera motion, tilt or shock  |
|                        | <i>Image*</i>               | Trigger on image changes   |
| <b>Recording modes</b> | <i>Normal</i>               | Records into the circular buffer. Once a trigger occurs, video can be reviewed and saved   |
|                        | <i>Segmented</i>            | RAM is divided into segments, each recording as in the Normal mode above. Number of segments is user selectable.   |
|                        | <i>Continuous*</i>          | Video is saved continuously at up to 60fps to mp4 files on removable storage. Operates like a normal video camera.   |
|                        | <i>Run-n-Gun*</i>           | Bursts of video are saved to RAM while holding down the shutter button. Video is saved to storage devices automatically. More bursts can be captured simultaneously while video is saving. |
|                        | <i>Gated burst</i>          | Frames are captured while trigger is active  |
|                        | <i>Normal + continuous*</i> | High-speed video is recorded to the RAM buffer while simultaneously 60fps videos is saved to removable storage   |

|                       |                       |  |
|-----------------------|-----------------------|--|
| <b>Shutter timing</b> | <i>Normal</i>         | Frame rate and exposure time are controlled by camera  |
|                       | <i>Edge triggered</i> | A single frame is captured on each rising or falling edge of an external input. Exposure is controlled by camera |
|                       | <i>Shutter gating</i> | Image sensor shutter is directly controlled by an external input, exposing while the input is active             |
| <b>Assistive</b>      | <i>Focus Peaking</i>  | Highlights sharp edges to aid focusing   |
|                       | <i>Zebra</i>          | Rolling diagonal lines indicate clipped (overexposed) areas  |
|                       | <i>Focus Aid</i>      | 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.