

# Chronos Software Version 0.6.0

## Release Notes



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### **Purpose**

This document outlines the improvements to Chronos 1.4 and 2.1 software as released in Version 0.6.0, instructions on how to install the software itself, and finally how to calibrate the camera after an update.

2021-02-08, Kron Technologies Inc.

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### **New Features and Improvements**

- Chronos 2.1 models benefit from an improved sensor driver configuration. The analog gain values of the LUX2100 sensor have been modified to reduce noise at higher levels of analog gain (also referred to as ISO), such as 6dB, 12dB, and 18dB. This translates to less vertical banding than in prior software versions. Adequate lighting is still highly recommended.

A demonstration video with before and after footage can be found here:  
<https://drive.google.com/file/d/1cs2wY871PTShXGqHuRUbtpEreOeSPkl0/view?usp=sharing>

**Note:** Please download the video to desktop to ensure quality is not lost to online streaming compression. The most significant improvements can be seen along the left and right sides of the frame, and especially at 12dB

- Chronos 2.1 models no longer require special factory calibration files. All calibrations required to use the camera with the best possible image quality can be performed by a customer in the field within 5 minutes via the **Util -> Factory -> Column Gain Calibration** function.
- Chronos 2.1 models benefit from newly generated Color Matrix presets, as found in **White Bal -> Color Matrix**. Previous software versions had color matrices that were optimal for the LUX1310 sensor in the Chronos 1.4, instead of the LUX2100 sensor found in the Chronos 2.1.
- A list of saved files on external media can now be browsed via **Util -> Storage -> List Files**. The same functionality exists to make it easier for users to select the save destination in **Play -> Settings -> Pick Folder**. The file browser also allows for users to **delete** files on external storage devices. This functionality is mirrored in the web page.
- Monochrome cameras can no longer open Color Matrix settings. This was mistakenly enabled in 0.5.0.

- Frame counts are no longer cut-off on the right-hand side of the display when in the **Play** screen when frame counts are six-digits long.

## **Known Issues**

- If the camera is being controlled via the web page, no messages will be shown on the back-of-camera display if the video output mode is changed between LIVE/RECORDING and PLAYBACK through the web interface.
- If the camera is powered on while connected to 10/100 (non-gigabit) network equipment, the back-of-camera display will fail to start.
- When using Live Record Mode to simultaneously record 60 FPS MP4 footage to an external storage device, the video display may momentarily blank or freeze while the stream is being written to the storage device. This will not affect the high-speed recording.
- Saving speed to external devices may be slower than in software versions 0.3.2 or older.
- A blank/black screen will be displayed if certain combinations of higher frame rates and higher analog gain levels are used.

Specific common resolutions where this will occur:

1024 x 768 at or above 18dB

1024 x 576 at or above 18dB

800 x N at or above 12dB

640 x N at or above 12dB

## **Updating Your Camera**

**Please Note:** At the time of the writing of this procedure, we are currently having issues with the over-the-network update functionality, therefore the prescribed update method involves creating a new software image on the microSD card, which can then be loaded into the microSD card slot on the bottom of the camera. This update cannot be applied with the network update functionality found in Util -> Storage -> Apply Software Update.

If a spare microSD of similar size and quality to the factory microSD card is available, it is highly recommended to save the current card while updating a new card with the latest software.

If you are updating from 0.4.0 or older, the power controller will also be updated, which will cause the power status indicator LED on the top of the camera to blink green and red while the fan runs at 100% momentarily. Do not interrupt or power down the camera while this is taking place.

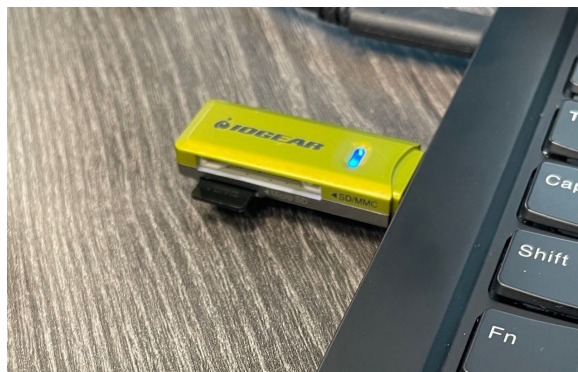
- 1) Download the software update package here:  
[http://debian.krontech.ca/manualBuilds/chronos-20210205\\_manualBuild.img.xz](http://debian.krontech.ca/manualBuilds/chronos-20210205_manualBuild.img.xz)

If you wish to verify the file integrity of the software above, the SHA-256 checksum is: C4A96D4B2B7967BC8956A8B36EE3A04DCB07CDAEF4DD4A1E2CEBB5A7A7165C68

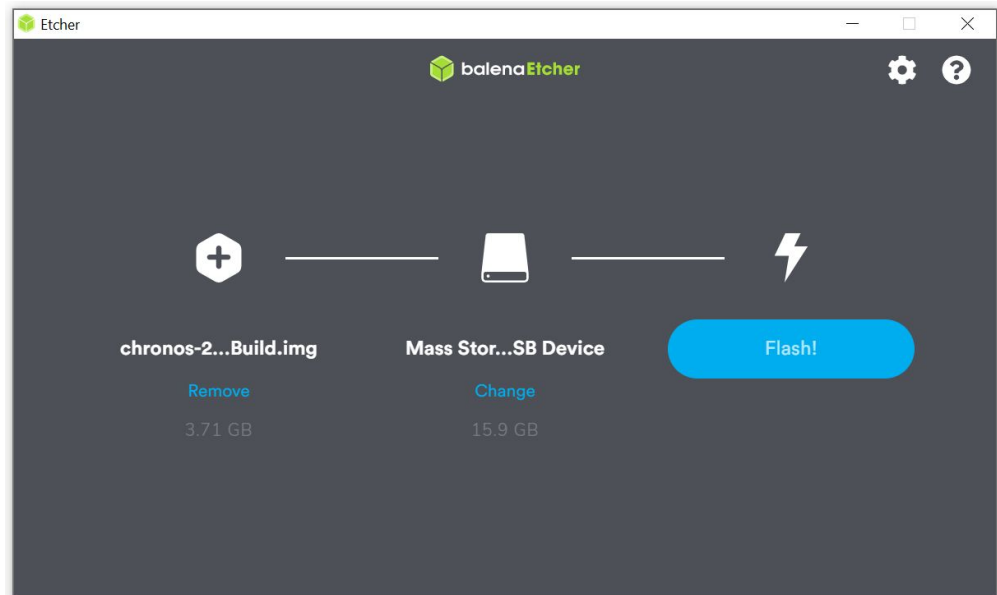
- 2) Use [Balena Etcher](#) to write the software to a microSD card. This is recommended as it verifies the integrity of the data written to the microSD card.
  - a) Remove the microSD card from the bottom of the camera, or supply an extra microSD card if you wish to leave the current software version on a space backup card. The card uses a push-push mechanism for insertion and removal. A ballpoint pen can be used to push down on the card until it ejects.



- b) Insert the microSD card into your computer. You can safely ignore Windows messages and warnings about problems with the device.

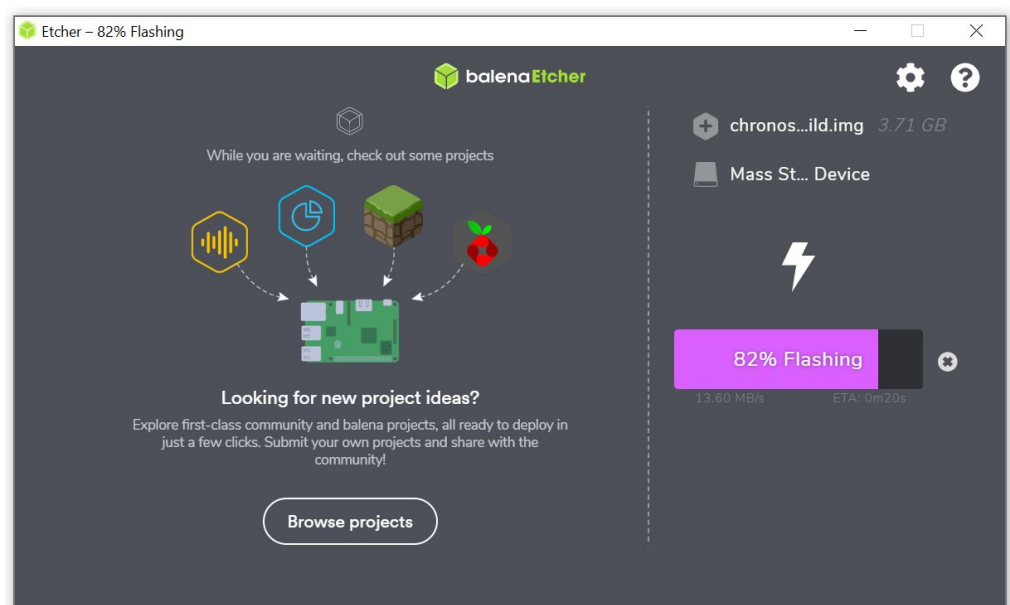


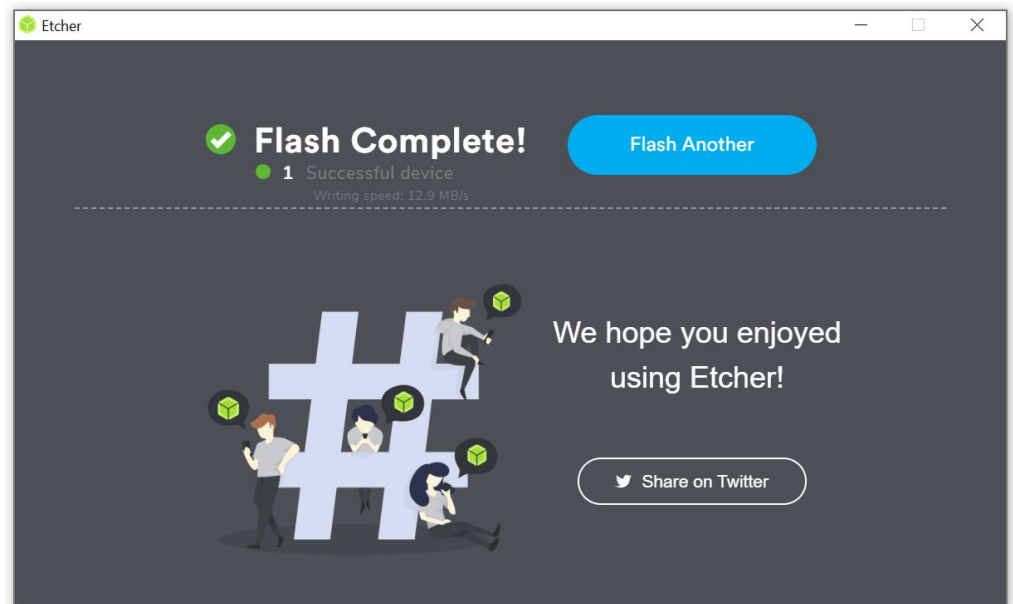
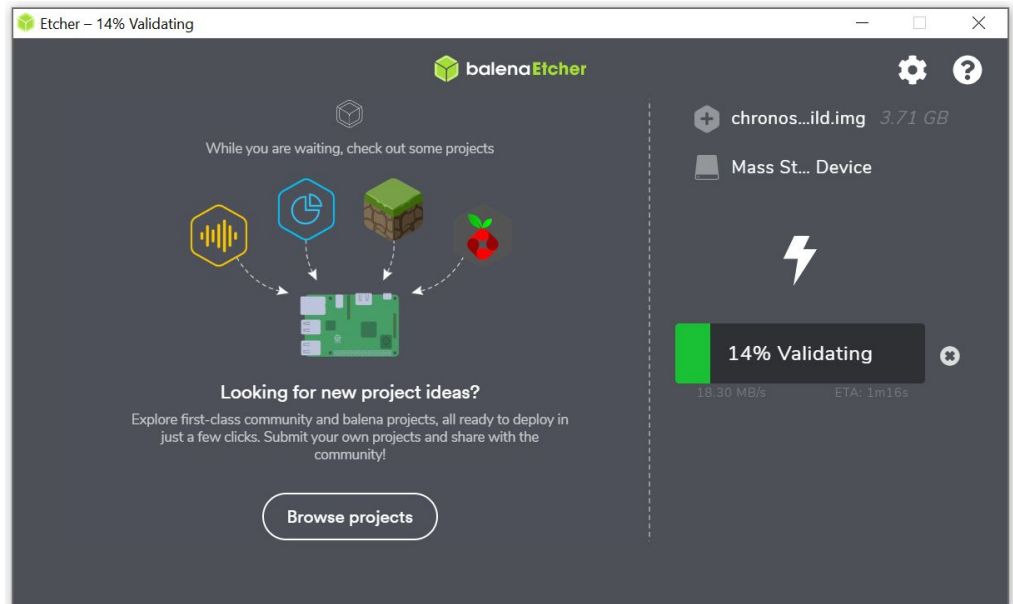
- c) Open Balena Etcher and select the **chronos-20210205\_manualBuild.img.xz** file as downloaded to your computer in Step 1. Balena Etcher should automatically select the microSD card that will be overwritten.



Please note that no specific formatting of the card is required prior to this procedure. Balena Etcher automatically creates the necessary file systems from the image file provided in Step 1.

- d) Click **Flash!** The software will begin being loaded to the microSD card, with the following sequence of screens:





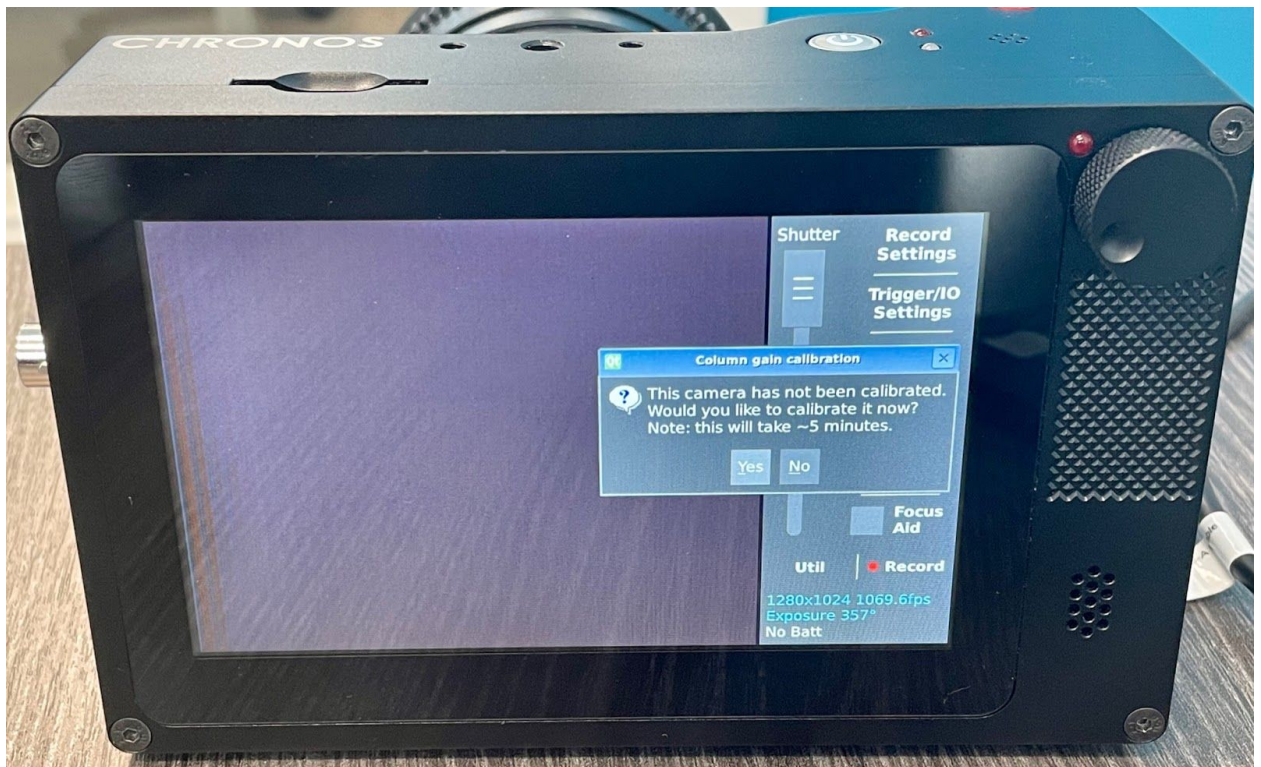
- 3) If Step 2 is successful, remove the microSD card and insert it into the bottom of the camera, ensuring to push the card in with a ballpoint pen until a click is heard.
- 4) Turn the camera on. Once it has booted, the next section may be followed to perform image calibration.



## **Calibrating Your Camera**

With software version 0.6.0, Kron Technologies is pleased to announce that there are no longer any special factory files that must be generated at our facilities. Both Chronos 1.4 and 2.1 models may be fully calibrated by owners within 10-15 minutes.

- 1) **[Chronos 2.1 ONLY - Chronos 1.4 users please skip to Step 2]** On the first bootup with software version 0.6.0, the camera will prompt the user for a Column Gain Calibration, as shown below:

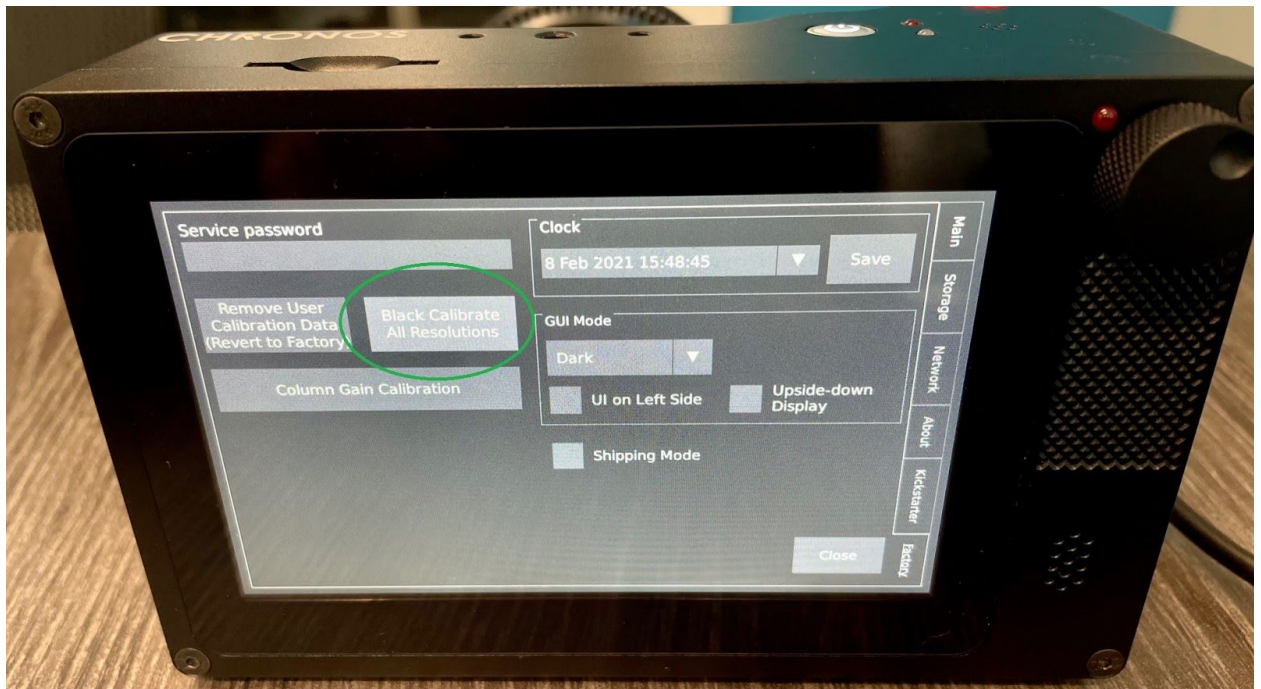


Wait for 15 minutes to let the camera and image sensor reach their operating temperatures, then press **Yes**. This procedure can be redone at any time via the Util -> Factory screen.

A message will be displayed as the viewfinder of the camera flickers. This is normal, as the sensor is being put into various modes automatically.

When the *Computing column gain calibration complete.* message is displayed, press OK and then power the camera down.

- 2) Power on the camera and wait 15 minutes to let it reach operating temperature if Step 1 was skipped.
- 3) Install a lens cap or CS-mount cap as supplied with the camera to block out any light from entering the image sensor path.
- 4) Navigate to **Util -> Factory** and select **Black Calibrate All Resolutions**. This is the final step required for a full calibration of both Chronos 1.4 and 2.1 cameras.



The camera will display a progress bar as it begins to perform a Black Calibration for each standard resolution and analog gain. This process will take approximately 10 minutes and display a completion message once finished.

- 5) Calibration of the camera is complete. It may now be used to capture high-speed footage with optimal image quality.