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<https://www.teledynedalsa.com/Genie-Nano>

G3-AN0007-V2: Optimizing Color Rendering of Genie Nano GigE Cameras

Generating Color Correction Coefficients Using the Spera LT Color Calibration Tool

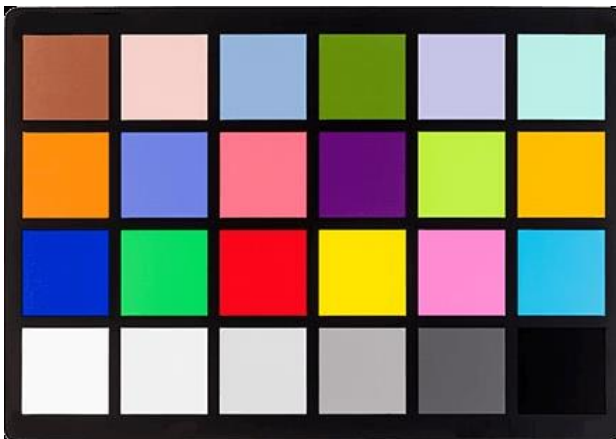
For Nano models with P/N: G3-GCXXX with RGB output firmware 1.08 (or greater)

Overview

This application note describes how to generate user defined color correction coefficients using the Spera LT Color Calibration tool. The Spera LT Color Calibration tool is included as part of the Spera LT SDK installation to generate a matrix of color correction coefficients used by supported Teledyne DALSA color cameras (such as the Genie Nano C1280) to apply color correction to acquired images.

Prerequisites

To perform color calibration a color correction chart is required. The [X-Rite ColorChecker](#) chart is an industry standard 24 patch classic target used to create custom camera profiles.



Sapera LT SDK (version 8.32 or greater required for GigE camera color correction), the image acquisition and control SDK for Teledyne DALSA cameras and frame grabbers is available for download from the Teledyne DALSA website <http://teledynedalsa.com/imaging/support/downloads/sdks/>



Access to certain drivers and SDK updates are restricted to Teledyne DALSA customers that have registered their development package (SDK). If you have not yet done so, please [register your software](#) before proceeding.

[Go back to support downloads](#)

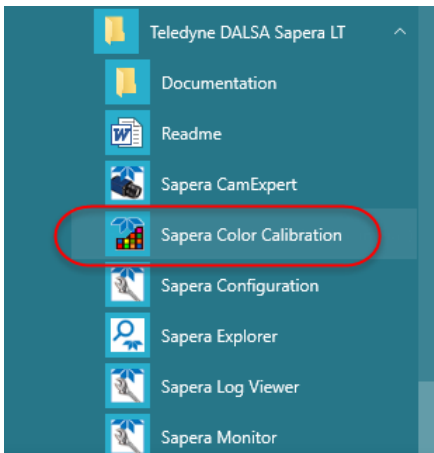
Description	Version	Release date
Sapera LT SDK (full version) - Free Download	8.32	2018-06-20



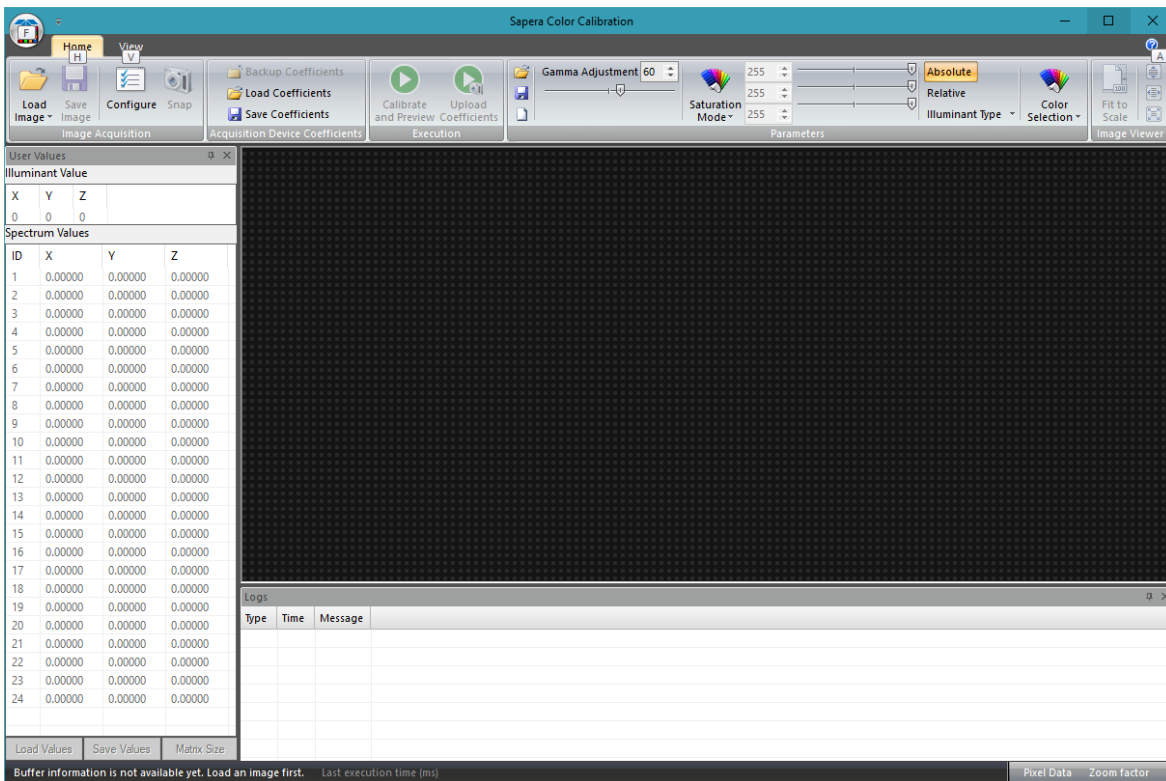
Note: Administrative privileges are required to install the Sapera LT SDK.

1. Launch the Sapera Color Calibration Tool

The Sapera Color Calibration tool is available from the Windows Start Menu:

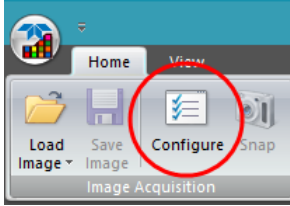


The Sapera Color Calibration tool uses a command ribbon to organize parameters.

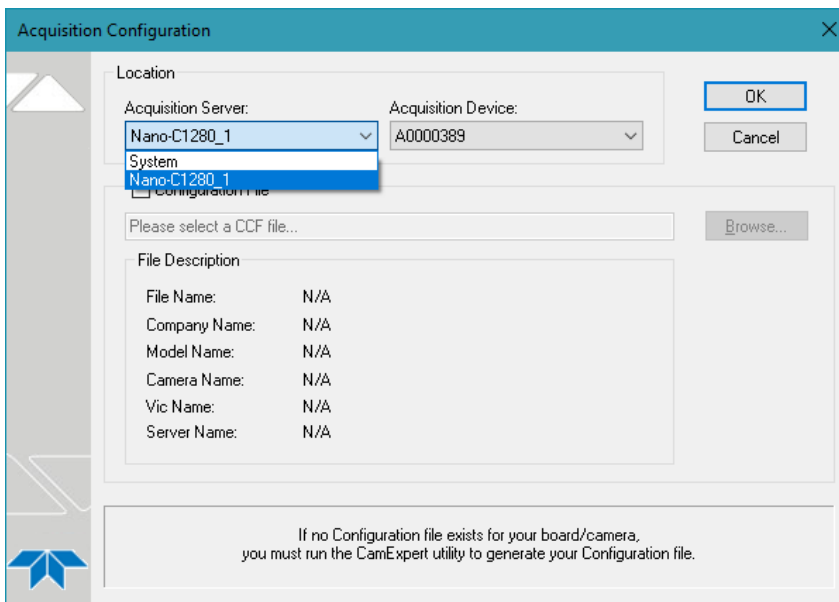


2. Select the Acquisition Device

To select the acquisition device for which to generate color coefficients, click the **Configure** button in the command ribbon (available on the Home tab).



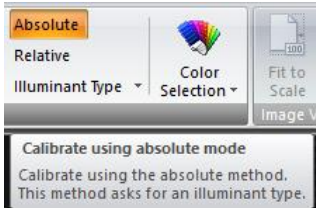
The Acquisition Configuration dialog opens; select the required acquisition server. Optionally, a camera configuration file (*.ccf) can be specified if available (not required).



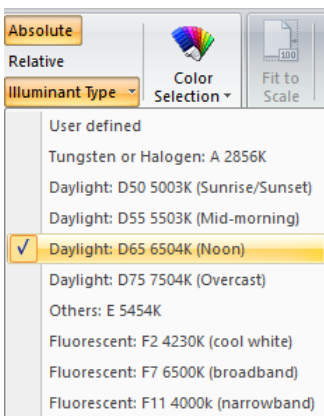
Supported input data formats are RGB 24/32-bit.

3. Specify the Color Calibration Parameters

In the application command ribbon Parameters section click **Absolute** to calibrate using the absolute method.



Use the Illuminant Type drop-down list to select the [standard illuminant](#) that is closest in color temperature and light type (daylight or fluorescent) to the light in the target scene.




4. Grab an Image of the Color Chart

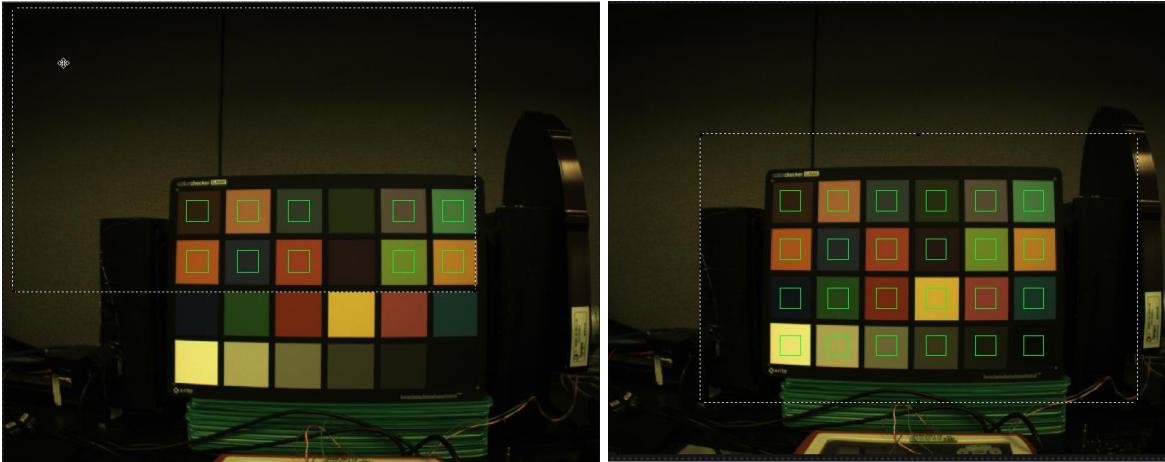
The target scene lighting must contain the color chart and be the same, or as close as possible, to the expected application lighting conditions. The light should be as uniform as possible; a well distributed light ensures maximal signal on every color square of the chart.

Adjust the light intensity and exposure time of the camera so that the DN (digital number) value of the brightest component is as high as possible, but not saturated. Teledyne DALSA recommends a value between 200 and 230 for the brightest component (for an 8-bit image) to allow for variations in the target scene without saturation.

Typically, the yellow (for low temperature illuminants) or white color squares are those with the highest component DN.

	Higher signal gives a more accurate calibration but saturation of any component results in an invalid calibration.
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If necessary, adjust the ROI such that it surrounds the chart; all 24 color squares must be located (a green square graphic overlay indicates a successfully located color square).

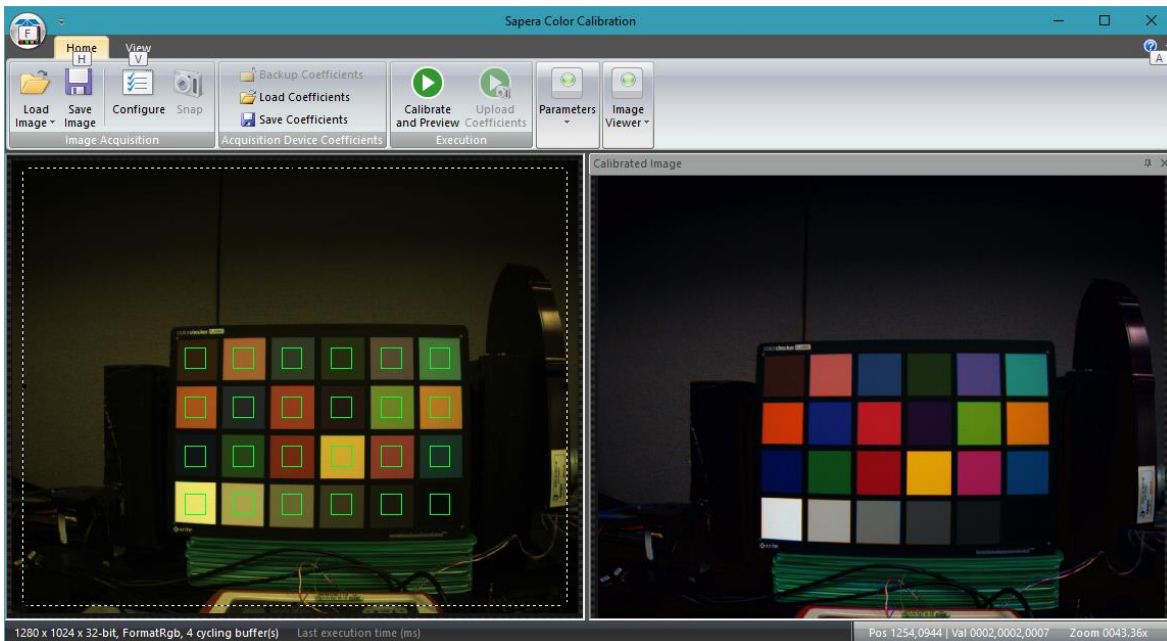


5. Compute and Verify the Color Calibration

Click **Calibrate and Preview** to compute the calibration coefficients.

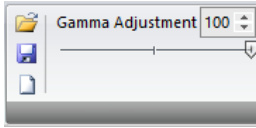


A calibrated image is displayed to validate if the resulting image is correctly calibrated.



For visualization purposes, the calibrated image's gamma can be adjusted.

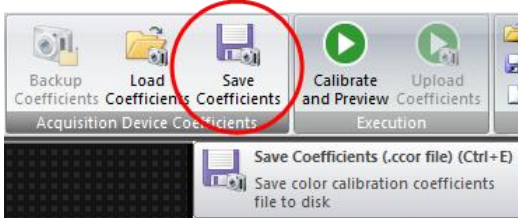
The Gamma Adjustment parameter can range from 5 to 100 and corresponds to a gamma of 0.05 to 1.0.



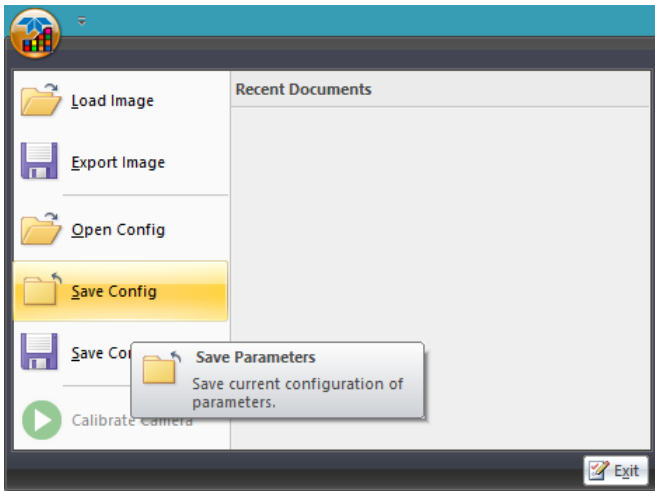
	Note the Gamma Adjustment parameter setting is not saved as part of the color correction file that is loaded to the camera (see step 9. Applying Gamma Correction in CamExpert).
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6. Save the Color Calibration Coefficients

If the color calibration is satisfactory, save the coefficients by clicking the **Save Coefficients** button. The coefficient matrix is saved as a color correction (*.ccor) file.



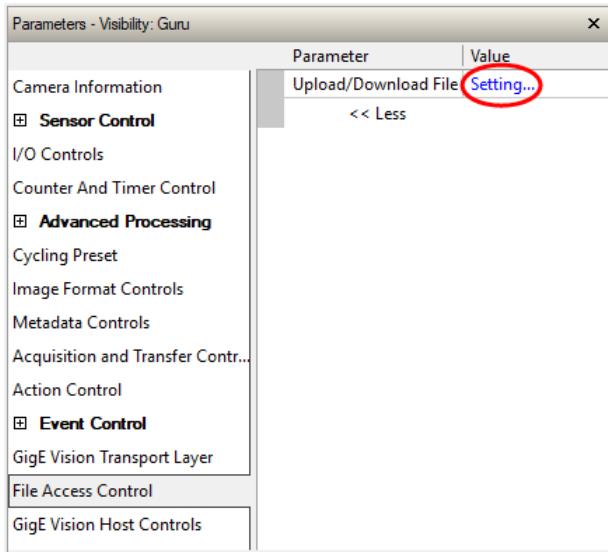
To save the current configuration (parameter settings) of the Sapera Color Calibration tool, click the application icon in the top left and use the **Save Config** command.



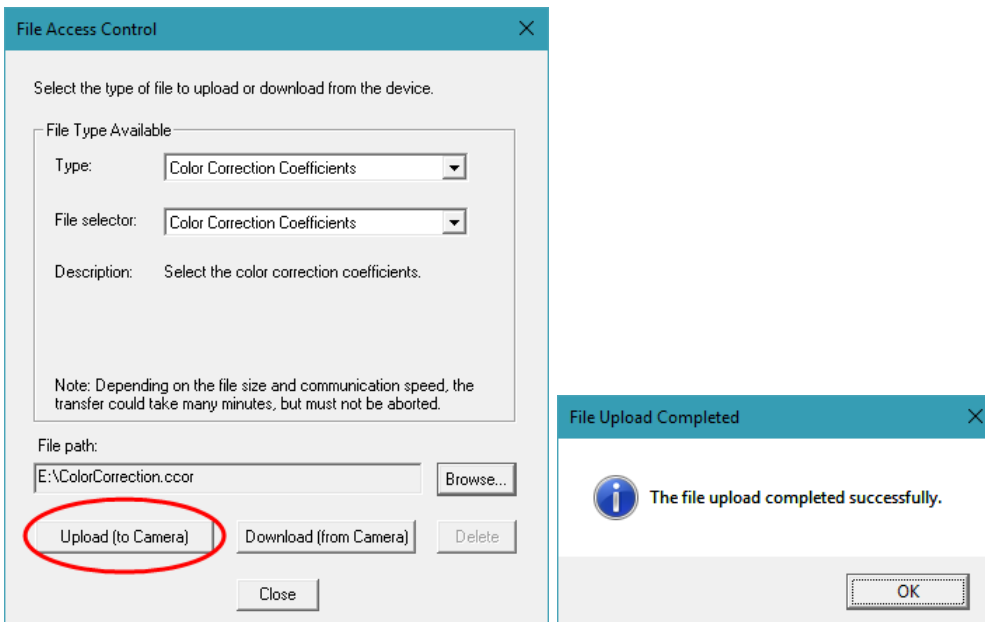
The configuration is saved as a Color Calib Parameters (*.ccal) file. This file includes information such as the calibration method and the color correction matrix and can be loaded using the Open Config command.

7. Load Coefficients to Camera with CamExpert

Use Spera CamExpert to load the color coefficients to the camera. In the File Access Control category, in the Upload/Download parameter field click on **Setting...** to open the File Access Control dialog.



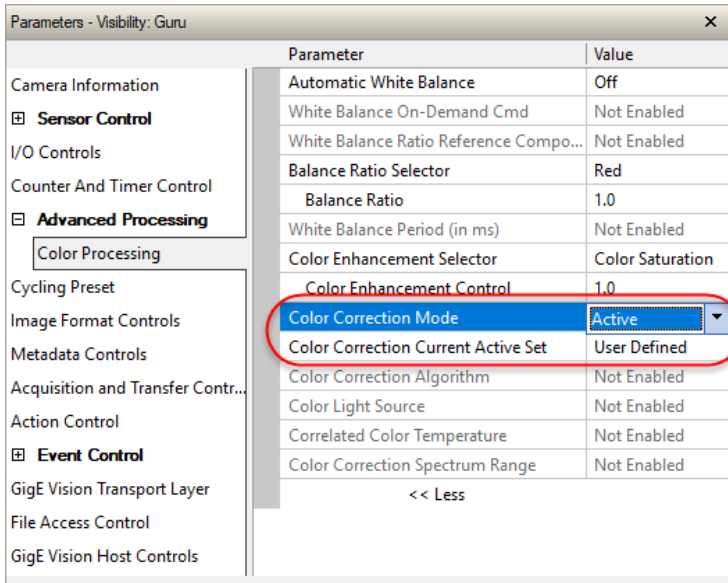
In the file Type field, select *Color Correction Coefficients*, click **Browse...** to select the *.ccor file, then click **Upload (to Camera)**.



A dialog confirms the file upload status.

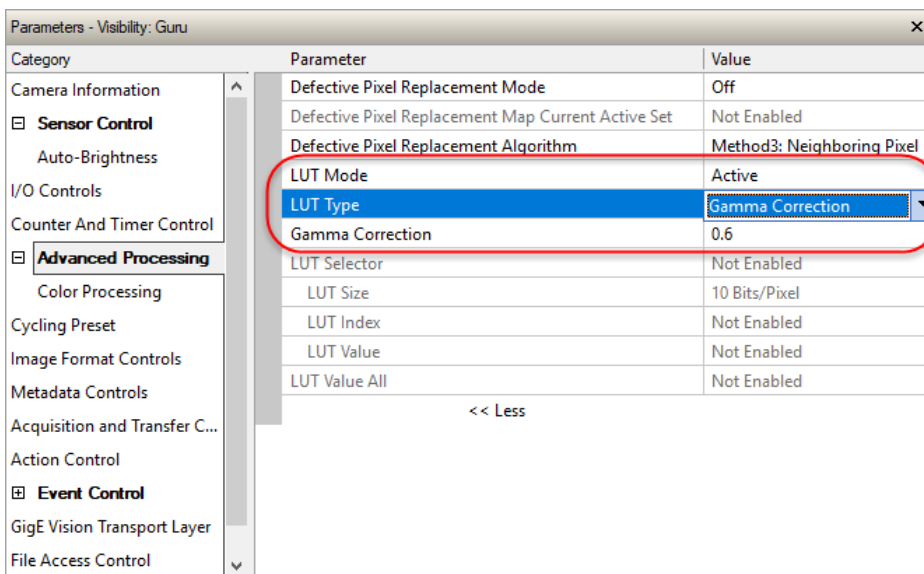
8. Activate Color Correction Mode Feature

To apply the user defined color correction coefficients to the camera, set the Color Correction Mode to Active and the Color Correction Current Active Set feature to User Defined. These features are available in the Advanced Processing > Color Processing sub-category.



9. Applying Gamma Correction

The gamma feature can be adjusted in CamExpert after applying the color calibration, if necessary. To enable gamma correction, set the LUT Mode feature to Active and the LUT Type feature to Gamma Correction. Specify the gamma value, from 0.0 to 2.0, in the Gamma Correction field. These features are available in the Advance Processing category.



Using Spera Processing SDK to Generate Color Calibration Coefficients

Color correction coefficients can also be generated using the Spera Processing SDK; the Spera Processing Color Demo saves both *.ccal and .ccor files.

When generating color coefficient files (*.ccor) for on-board color correction, Genie Nano cameras require color coefficients be generated using the 3x4 Transform option.

