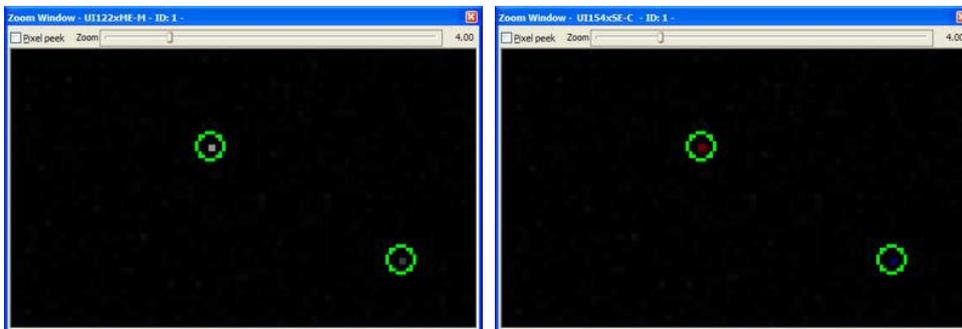


Defining hot pixels easily yourself: Using the uEye Hotpixel Editor

Hot pixels are pixels that do not react linearly to incident light or do not react at all. They occur for a variety of reasons, such as contamination during sensor production or sensor age, and can occur with both CCD and CMOS sensors. As a rule, CCD sensors have fewer hot pixels than CMOS sensors under the same operating conditions.



*Hot pixels detected in
a monochrome and
color camera*

With darkened sensors and longer exposure times hot pixels are visible as individual bright dots in the image. The following factors most favor the occurrence of hot pixels:

1. Long exposure times
2. High gain settings
3. High sensor operating temperature

Before uEye cameras leave production, every single sensor is checked for hot pixels in special facilities. During this process, images are taken with a darkened sensor and long exposure time. Pixels with a brightness that deviates from the average brightness by a certain value are classified as hot pixels. The hot pixels found are stored in the camera memory and can be corrected using the enabled Hotpixel correction function.

If the "Hotpixel correction" function is enabled in the uEye software, the software corrects the hot pixels in the captured image by determining the brightness value of two horizontally adjacent pixels. In the case of color sensors, hot pixels are corrected with the appropriate color in raw Bayer format, in other words, before color conversion.

TechTip

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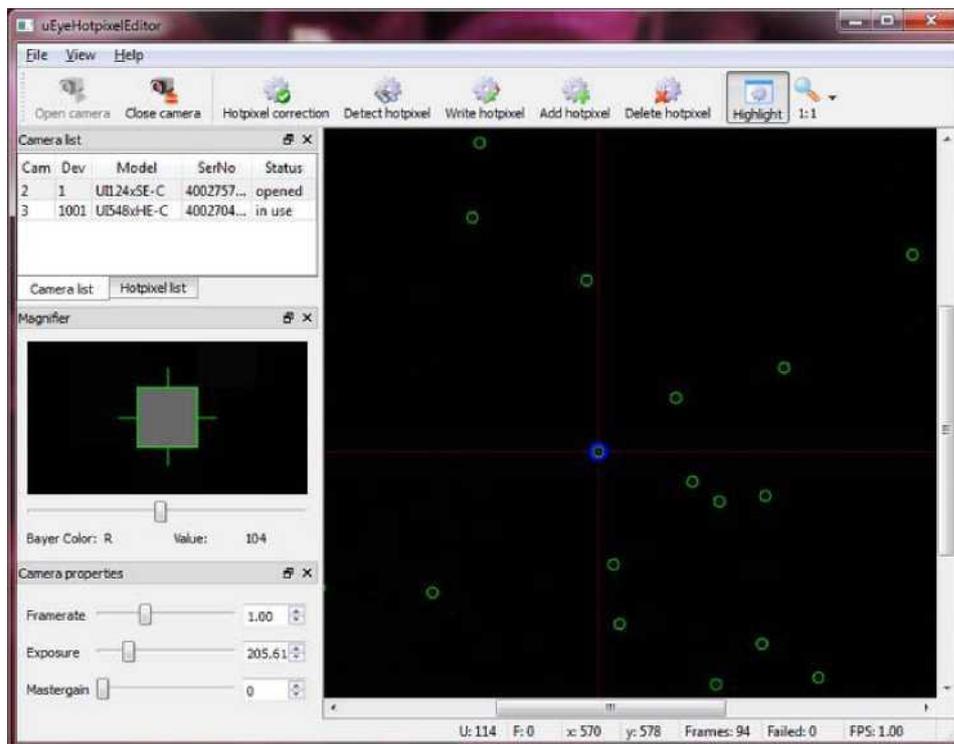
However, the pixels on the sensor are not fixed. Over time, other hot pixels may occur on the sensor due to the aging process of the pixel, heat or also cosmic radiation during transportation of the sensor. To avoid returning the camera to IDS when new hot pixels occur, you can use the Hotpixel Editor to define hot pixels in just a few steps.

Procedure

First, darken the sensor completely and bring it up to operating temperature. Then adjust the camera parameters so that they are as similar as possible to the target application. The exposure time and enhancement settings are especially important here.

There are two ways of defining hot pixels:

- define automatic hot pixel detection using the threshold value or
- define hot pixels yourself and add them to the hot pixel list



uEye Hotpixel Editor

The hot pixel list enables you to display hot pixels defined during production as well as those you have defined yourself.

Hot pixels added by the user are classified as "user". In contrast, hot pixels that were stored during production are classified as "ignore".

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uEye menu bar Hotpixel Editor



The menu bar provides the following functions:

- Hotpixel correction (switches hot pixel correction on or off)
- Detect hotpixel (opens the dialog for automatic hot pixel detection)
- Write hotpixel (writes the hot pixel list to the EEPROM)
- Add hotpixel (writes a selected hot pixel to the list)
- Delete hotpixel (deletes a hot pixel from the hot pixel list of the program)
- Highlight (indicates whether existing hot pixels should be selected)
- 1:1 (zoom factor of the image shown)

The "Detect Hotpixel" function enables you to search for hot pixels automatically and then add them to the hot pixel list.

Summary

Defining hot pixels locally offers a variety of advantages: You do not need to return the camera to IDS, which saves you time and money and also prevents any possibility of additional hot pixels occurring while the camera is being transported.

It also allows you to match the hot pixels perfectly to the camera parameters of the application. As a result, you can take ambient conditions (such as the ambient temperature) into account.

Finally, hot pixel correction enables optimum image quality as dead pixels can simply be removed.