Technical Application Note TAN2004005

1.1.   Subject

Technical Application Note (TAN2004005): IBIS5 Burned Pixel Specification.

1.2.   Applicable Product(s)

All PGR *Scorpion* cameras containing the FillFactory IBIS5 sensor, models SCOR-13FFX-XX and SCOR-IBXXX-XX, with firmware versions 0.9.1.8 or higher. Consult Knowledge Base Article 94 to determine camera firmware versions.

1.3.   Application Note Description

The purpose of this Technical Application Note is to describe the specification that the Applicable Product(s) must satisfy in order to be shipped, specifically in terms of the number of bright or "burned" pixels allowed.
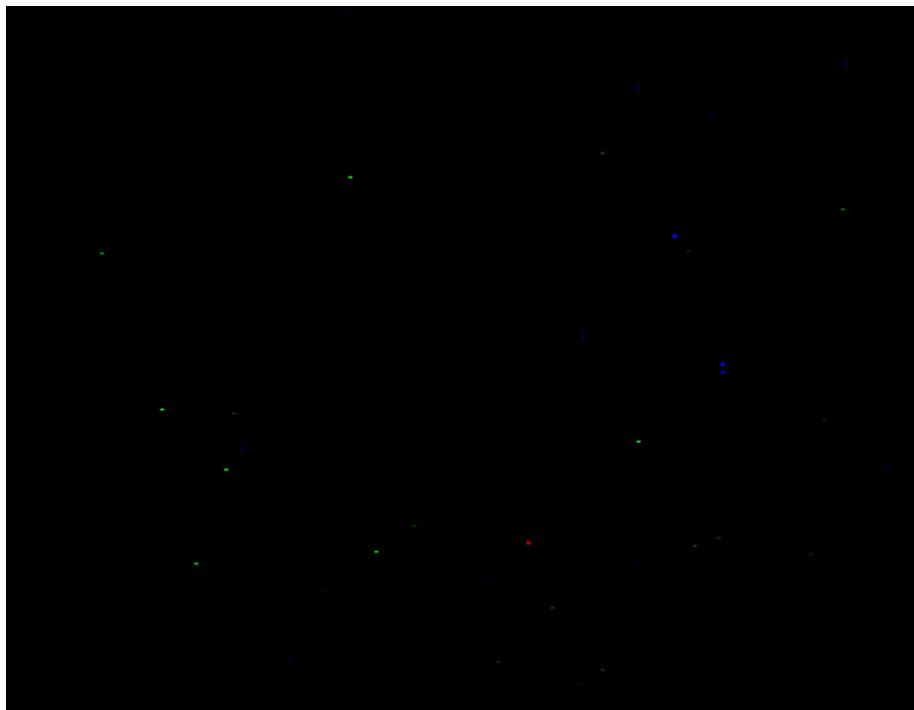
Example of burned pixels in a dark image (color IBIS5 sensor).

1.3.1.   FillFactory Defect Specifications

FillFactory, the makers of the [IBIS5 sensor](), have several criteria which limit the number of defects of different types found in their sensors. These include the number of "bright" pixels (<26) found in "dark" images, the number of "off-average" pixels (<76) found in a flat grey image, and the number of "clusters" of defective pixels (a cluster being 2-4 adjacent defective pixels; spec is 0 allowed in central ¼ of the image, and <11 in outer ¾ of the image). For a copy of the IBIS5 defect specification, contact [info@FillFactory.com]() with a request for Doc Nr. IBIS5A-1300 Defect, Issue 1.0, 17-Mar-04.

1.3.2.   FillFactory "Dark Image" Test

In the FillFactory "dark image" test, a flat image is acquired with image average < 15000 GSU in 16-bit mode. The number of pixels with value greater than 32K (half of the maximum value) is limited to be < 26. The readings are taken at room temperature, with gain at unity and shutter at 16ms. Readings are taken both with rolling and global shutter.

1.3.3.   PGR Burned Pixel Testing

PGR has created its own specification, with a test similar to the FillFactory "dark image" test. For the PGR "dark image" test, the lens cap is put on the camera. The camera is placed into global shutter mode. The video mode is set at 1280x960, and the frame rate at 15 Hz. Gain and shutter are set to maximum values (about 14dB and 276ms, respectively), while brightness is set to 0. For color cameras, Bayer gains are set to unity, and color processing is turned off. We run in 8-bit mode. A bright pixel is considered any pixel with value greater than 128, and the number of bright pixels must be less than 45.

The tests are performed at room temperature (about 20 degrees Celsius). We have noted that the number of bright pixels detected using these criteria varies according to the length of time that a camera is capturing images, presumably due to temperature increase within the camera. A typical graph of performance over time is shown for a period of 2 hours. It is expected that PGR's test will be performed on cameras plugged in for small amount of time, i.e. the *best case* scenario. As can be seen from the graph, a camera in use for longer periods of time (or run at a higher ambient temperature) may experience a greater number of bright pixels than that in the specification.