EMVA 1288 Summary Sheet

This datasheet describes the specification according to the standard 1288 for Characterization and Presentation of Specification Data for Image Sensors and Cameras of the European Machine Vision Association (EMVA) (see www.standard1288.org). The measurements were performed with an AEON ACC3 RGB Release 3, 20.01.2104, SN 0005(). The performance parameters and estimated accuracy of the measurements are described in the technical report for the instrument, its calibration in the corresponding calibration report.

Vendor: MATRIX VISION
Model: mvBlueFOX3-1012dC
Serial number: F0500058
Sensor diagonal: 6.00 mm
Lens category: C-Mount
Resolution: 1280 × 960, 10 bit
Pixel size: 3.75 µm × 3.75 µm
Sensor type: CMOS
Shutter type: rolling
Overlap capabilities
Maximum frame rate: 40.6 Hz
Interface type: USB3 Vision

Type of data presented: Single

Operation point 1, (page 5)
Wavelength centroid: 467.3 nm
Wavelength FWHM: 20.5 nm
Gain, offset: Gain = 0dB, Offset = 0.45

Operation point 2, (page 17)
Wavelength centroid: 534.2 nm
Wavelength FWHM: 30.9 nm
Gain, offset: Gain = 0dB, Offset = 0.45

Operation point 3, (page 29)
Wavelength centroid: 629.5 nm
Wavelength FWHM: 13.1 nm
Gain, offset: Gain = 0dB, Offset = 0.45

Optional data measured: None

Spectral sensitivity m0441, 31.07.2015

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EMVA 1288 Summary Sheet for Operating Point 1

<table>
<thead>
<tr>
<th>Type of data</th>
<th>Single</th>
<th>Gain, offset</th>
<th>Gain = 0dB, Offset = 0.45</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exposure time</td>
<td>8.0 ms</td>
<td>Environmental</td>
<td>26.4°C</td>
</tr>
<tr>
<td>Frame rate</td>
<td>0.0 Hz</td>
<td>temperature</td>
<td>Camera temperature</td>
</tr>
<tr>
<td>Data transfer mode</td>
<td>BayerGR10</td>
<td>Wavelength,</td>
<td>467 nm, 20.5 nm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>centr., FWHM</td>
<td></td>
</tr>
</tbody>
</table>

Quantum efficiency
\[ \eta = 0.516 \]

Gain
\[ K (DN/e) = 0.172 \]
\[ 1/K (e/DN) = 5.830 \]

Dark noise & DSNU
\[ \sigma_d (DN) = 0.62 \]
\[ \sigma_0 (e) = 3.2 \]
DSNU\textsubscript{1288} (DN) = 0.98
DSNU\textsubscript{1288} (e) = 5.69

Signal-to-noise ratio & PRNU
SNR\textsubscript{max} = 76
SNR\textsubscript{max} (dB) = 37.6
SNR\textsubscript{max} (bits) = 6.2
1/SNR\textsubscript{max} (%) = 1.32
PRNU\textsubscript{1288} (%) = 0.606

Nonlinearity
\[ LE (%) = 0.32 \]

Sensitivity & saturation
\[ \mu_{p, \text{min}} (p) = 8.0 \]
\[ \mu_{e, \text{min}} (e) = 4.1 \]
\[ \mu_{p, \text{sat}} (p) = 11047 \]
\[ \mu_{e, \text{sat}} (e) = 5702 \]

Dynamic range
\[ DR = 1380 \]
\[ DR (dB) = 62.8 \]
\[ DR (bit) = 10.4 \]

Dark current
\[ \mu_{c, \text{mean}} (DN/s) = 2.78 \]
\[ \mu_{c, \text{mean}} (e/s) = 16.20 \]
\[ \mu_{c, \text{var}} (e/s) = 149.80 \]
# EMVA 1288 Summary Sheet for Operating Point 2

<table>
<thead>
<tr>
<th>Type of data</th>
<th>Single</th>
<th>Gain, offset</th>
<th>Gain = 0dB, Offset = 0.45</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exposure time</td>
<td>8.0 ms</td>
<td>Environmental temperature</td>
<td>26.4°C</td>
</tr>
<tr>
<td>Frame rate</td>
<td>0.0 Hz</td>
<td>Camera temperature</td>
<td>35.3°C</td>
</tr>
<tr>
<td>Data transfer mode</td>
<td>BayerGR10</td>
<td>Wavelength, centr., FWHM</td>
<td>534 nm, 30.9 nm</td>
</tr>
</tbody>
</table>

**Photon Transfer**

- **Photon transfer m0441, 534nm, 31.07.2015**

  ![Graph of Photon Transfer](image)

  - **green1 data**
  - **green2 data**
  - **green1 fit**
  - **green2 fit**

  - Variance gray - dark value (DN^2)
  - Variance gray - dark value (DN)

  - green1: var(dark) = 0.39 DN^2, K = 0.171 ± 0.1%
  - green2: var(dark) = 0.39 DN^2, K = 0.171 ± 0.1%

**SNR m0441, 534nm, 31.07.2015**

- **SNR**
- **SNR max (dB)**
- **SNR max (bits)**
- **1/SNR max (%)**
- **PRNU1288 (%)**

  ![Graph of SNR](image)

  - **green1 data**
  - **green2 data**
  - **green1 fit total**
  - **green2 fit total**

  - SNR max = 77
  - SNR max (dB) = 37.7
  - SNR max (bits) = 6.3
  - 1/SNR max (%) = 1.30
  - PRNU1288 (%) = 0.661

**Quantum efficiency**

- η = 0.603

**Gain**

- K (DN/e) = 0.171
- 1/K (e/DN) = 5.852

**Dark noise & DSNU**

- σ_d (DN) = 0.62
- σ_0 (e) = 3.2
- DSNU_{1288} (DN) = 0.96
- DSNU_{1288} (e) = 5.61

**Signal-to-noise ratio & PRNU**

- **SNR**
- **SNR max (%)**
- **PRNU1288 (%)**

- LE (%) = 0.82

**Nonlinearity**

- LE (%) = 0.82

**Sensitivity & saturation**

- μ_p,min (p) = 6.9
- μ_e,min (e) = 4.2
- μ_p,sat (p) = 9847
- μ_e,sat (e) = 5933

**Dynamic range**

- **DR**
- **DR (dB)**
- **DR (bit)**

- μ_c,mean (DN/s) = 3.18
- μ_c,mean (e/s) = 18.61
- μ_c,var (e/s) = 153.95

**Dark current**

- μ_c,mean (DN/s) = 3.18
- μ_c,mean (e/s) = 18.61
- μ_c,var (e/s) = 153.95
EMVA 1288 Summary Sheet for Operating Point 3

Type of data: Single
Exposure time: 8.0 ms
Frame rate: 0.0 Hz
Data transfer mode: BayerGR10

Gain, offset:
- Gain = 0 dB, Offset = 0.45

Environmental temperature:
- Camera temperature: 35.3°C
- Environmental temperature: 26.4°C

Wavelength, centr., FWHM:
- 630 nm, 13.1 nm

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**Quantum efficiency**

\[ \eta = 0.482 \]

**Gain**

\[ K (DN/e) = 0.171 \]
\[ 1/K (e/DN) = 5.837 \]

**Dark noise & DSNU**

\[ \sigma_d (DN) = 0.62 \]
\[ \sigma_0 (e) = 3.2 \]
\[ DSNU_{1288} (DN) = 1.02 \]
\[ DSNU_{1288} (e) = 5.95 \]

**Signal-to-noise ratio & PRNU**

\[ SNR_{max} = 76 \]
\[ SNR_{max} (dB) = 37.6 \]
\[ SNR_{max} (bits) = 6.2 \]
\[ 1/SNR_{max} (%) = 1.32 \]
\[ PRNU_{1288} (%) = 0.631 \]

**Nonlinearity**

\[ LE(\%) = 0.37 \]

**Sensitivity & saturation**

\[ \mu_{p, min} (p) = 8.6 \]
\[ \mu_{e, min} (e) = 4.2 \]
\[ \mu_{p, sat} (p) = 11922 \]
\[ \mu_{e, sat} (e) = 5748 \]

**Dynamic range**

\[ DR = 1383 \]
\[ DR (dB) = 62.8 \]
\[ DR (bit) = 10.4 \]

**Dark current**

\[ \mu_c,mean (DN/s) = -1.45 \]
\[ \mu_c,mean (e/s) = -8.46 \]
\[ \mu_c, var (e/s) = 127.35 \]