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.

<table>
<thead>
<tr>
<th>Vendor</th>
<th>MATRIX VISION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>mvBlueCOUGAR-X105C</td>
</tr>
<tr>
<td>Serial number</td>
<td>GX008114</td>
</tr>
<tr>
<td>Sensor diagonal</td>
<td>7.13 mm</td>
</tr>
<tr>
<td>Lens category</td>
<td>C-Mount</td>
</tr>
<tr>
<td>Resolution</td>
<td>2592 × 1944, 12 bit</td>
</tr>
<tr>
<td>Pixel size</td>
<td>2.20 μm × 2.20 μm</td>
</tr>
<tr>
<td>Sensor type</td>
<td>CMOS</td>
</tr>
<tr>
<td>Shutter type</td>
<td>Rolling</td>
</tr>
<tr>
<td>Overlap capabilities</td>
<td>Pipelined</td>
</tr>
<tr>
<td>Maximum frame rate</td>
<td>11.7 Hz</td>
</tr>
<tr>
<td>Interface type</td>
<td>GigE Vision</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of data presented</th>
<th>Single</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation point 1, (page 5)</td>
<td></td>
</tr>
<tr>
<td>Wavelength centroid</td>
<td>467.3 nm</td>
</tr>
<tr>
<td>Wavelength FWHM</td>
<td>20.5 nm</td>
</tr>
<tr>
<td>Gain, offset</td>
<td>Gain = 0dB, Offset = 0</td>
</tr>
<tr>
<td>Operation point 2, (page 17)</td>
<td></td>
</tr>
<tr>
<td>Wavelength centroid</td>
<td>534.2 nm</td>
</tr>
<tr>
<td>Wavelength FWHM</td>
<td>30.9 nm</td>
</tr>
<tr>
<td>Gain, offset</td>
<td>Gain = 0dB, Offset = 0</td>
</tr>
<tr>
<td>Operation point 3, (page 29)</td>
<td></td>
</tr>
<tr>
<td>Wavelength centroid</td>
<td>629.5 nm</td>
</tr>
<tr>
<td>Wavelength FWHM</td>
<td>13.1 nm</td>
</tr>
<tr>
<td>Gain, offset</td>
<td>Gain = 0dB, Offset = 0</td>
</tr>
<tr>
<td>Optional data measured</td>
<td>None</td>
</tr>
</tbody>
</table>

Spectral sensitivity m0156, 11.11.2014

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EMVA 1288 Summary Sheet for Operating Point 1

Type of data: Single
Exposure time: 2.0 ms
Frame rate: 0.0 Hz
Data transfer mode: BayerGR12

Gain, offset
Gain = 0 dB, Offset = 0

Environmental temperature
23.6 °C

Camera temperature
34.7 °C

Wavelength, centr., FWHM
467 nm, 20.5 nm

Quantum efficiency
η = 0.403

Gain
K (DN/e) = 0.534
1/K (e/DN) = 1.874

Dark noise & DSNU
σ_d (DN) = 3.53
σ_0 (e) = 6.6
DSNU_{1288} (DN) = 0.78
DSNU_{1288} (e) = 1.47

Signal-to-noise ratio & PRNU
SNR_{max} = 84
SNR_{max} (dB) = 38.5
SNR_{max} (bits) = 6.4
1/SNR_{max} (%) = 1.19
PRNU_{1288} (%) = 2.759

Nonlinearity
LE (%) = 0.07

Sensitivity & saturation
µ_{p, min} (p) = 17.7
µ_{e, min} (e) = 7.1
µ_{p, sat} (p) = 17398
µ_{e, sat} (e) = 7020

Dynamic range
DR = 983
DR (dB) = 59.9
DR (bit) = 9.9

Dark current
µ_c, mean (DN/s) = 140.63
µ_c, mean (e/s) = 263.57
µ_c, var (e/s) = 22.16
EMVA 1288 Summary Sheet for Operating Point 2

Type of data  
Single

Exposure time  
2.0 ms

Frame rate  
0.0 Hz

Data transfer mode  
BayerGR12

Gain, offset  
Gain = 0dB, Offset = 0

Environmental temperature  
23.6°C

Camera temperature  
34.7°C

Wavelength, centr., FWHM  
534 nm, 30.9 nm

Photon transfer  
\eta = 0.411

Gain  
K (DN/e) = 0.541
1/K (e/DN) = 1.849

Dark noise & DSNU  
\sigma_d (DN) = 3.54
\sigma_0 (e) = 6.5
DSNU_{1288} (DN) = 0.81
DSNU_{1288} (e) = 1.50

Signal-to-noise ratio & PRNU  
SNR_{max} = 83
SNR_{max} (dB) = 38.4
SNR_{max} (bits) = 6.4
1/SNR_{max} (%) = 1.21
PRNU_{1288} (%) = 2.674

Nonlinearity  
LE (%) = 0.10

Sensitivity & saturation  
\mu_p,\text{min} (p) = 17.2
\mu_e,\text{min} (e) = 7.1
\mu_p,\text{sat} (p) = 16702
\mu_e,\text{sat} (e) = 6870

Dynamic range  
DR = 973
DR (dB) = 59.8
DR (bit) = 9.9

Dark current  
\mu_c,\text{mean} (DN/s) = -27.38
\mu_c,\text{mean} (e/s) = -50.64
\mu_c,\text{var} (e/s) = 86.81
## EMVA 1288 Summary Sheet for Operating Point 3

<table>
<thead>
<tr>
<th>Type of data</th>
<th>Single</th>
<th>Gain, offset</th>
<th>Gain = 0dB, Offset = 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exposure time</td>
<td>2.0 ms</td>
<td>Environmental temperature</td>
<td>23.6°C</td>
</tr>
<tr>
<td>Frame rate</td>
<td>0.0 Hz</td>
<td>Camera temperature</td>
<td>34.7°C</td>
</tr>
<tr>
<td>Data transfer mode</td>
<td>BayerGR12</td>
<td>Wavelength, centr.,</td>
<td>630 nm, 13.1 nm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FWHM</td>
<td></td>
</tr>
</tbody>
</table>

### Quantum efficiency

\[
\eta = 0.277
\]

Gain

\[
K (\text{DN/e}) = 0.527
\]

\[
1/K (\text{e/ DN}) = 1.897
\]

### Dark noise & DSNU

\[
\sigma_d (\text{DN}) = 3.54
\]

\[
\sigma_0 (\text{e}) = 6.7
\]

\[
\text{DSNU}_{1288} (\text{DN}) = 0.80
\]

\[
\text{DSNU}_{1288} (\text{e}) = 1.52
\]

### Signal-to-noise ratio & PRNU

\[
\text{SNR}_{\text{max}} = 83
\]

\[
\text{SNR}_{\text{max}} (\text{dB}) = 38.4
\]

\[
\text{SNR}_{\text{max}} (\text{bits}) = 6.4
\]

\[
1/\text{SNR}_{\text{max}} (%) = 1.20
\]

\[
\text{PRNU}_{1288} (%) = 5.080
\]

### Nonlinearity

\[
\text{LE} (%) = 0.24
\]

### Sensitivity & saturation

\[
\mu_{p, \text{min}} (\text{p}) = 26.1
\]

\[
\mu_{e, \text{min}} (\text{e}) = 7.2
\]

\[
\mu_{p, \text{sat}} (\text{p}) = 25106
\]

\[
\mu_{e, \text{sat}} (\text{e}) = 6949
\]

### Dynamic range

\[
\text{DR} = 960
\]

\[
\text{DR (dB)} = 59.6
\]

\[
\text{DR (bit)} = 9.9
\]

### Dark current

\[
\mu_{c, \text{mean}} (\text{DN/s}) = -67.80
\]

\[
\mu_{c, \text{mean}} (\text{e/s}) = -128.65
\]

\[
\mu_{c, \text{var}} (\text{e/s}) = -16.79
\]