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: mvBlueCOUGAR-X120dC  
Serial number: GX008450  
Sensor diagonal: 8.04 mm  
Lens category: C-Mount  
Resolution: 776 × 580, 12 bit  
Pixel size: 8.30 µm × 8.30 µm  
Sensor type: CCD  
Readout type: Progressive  
Transfer type: Interline  
Maximum frame rate: 53.5 Hz  
Interface type: GigE Vision

Type of data presented: Single  
Operation point 1, (page 5)  
Wavelength centroid: 467.3 nm  
Wavelength FWHM: 20.5 nm  
Gain, offset: Gain = -5dB, Offset = 0.23  
Operation point 2, (page 10)  
Wavelength centroid: 534.2 nm  
Wavelength FWHM: 30.9 nm  
Gain, offset: Gain = -5dB, Offset = 0.23  
Operation point 3, (page 15)  
Wavelength centroid: 629.5 nm  
Wavelength FWHM: 13.1 nm  
Gain, offset: Gain = -5dB, Offset = 0.23  
Optional data measured: None

Spectral sensitivity m0284, 28.04.2015

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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 = -5dB, Offset = 0.23</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exposure time</td>
<td>11.0 ms</td>
<td>Environmental temperature</td>
<td>27.8°C</td>
</tr>
<tr>
<td>Frame rate</td>
<td>0.0 Hz</td>
<td>Camera temperature</td>
<td>40.8°C</td>
</tr>
<tr>
<td>Data transfer mode</td>
<td>BayerRG12</td>
<td>Wavelength, centr., FWHM</td>
<td>467 nm, 20.5 nm</td>
</tr>
</tbody>
</table>

## Photon Transfer

**Photon transfer m0284, 467nm, 28.04.2015**

<table>
<thead>
<tr>
<th>gray value - dark value (DN)</th>
<th>0</th>
<th>1.000</th>
<th>2.000</th>
<th>3.000</th>
<th>4.000</th>
</tr>
</thead>
<tbody>
<tr>
<td>blue: var(dark)</td>
<td>10.56 DN^2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>K</td>
<td>0.164 ± 0.1%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Signal-to-Noise Ratio

**SNR m0284, 467nm, 28.04.2015**

<table>
<thead>
<tr>
<th>SNR</th>
<th>1</th>
<th>10</th>
<th>100</th>
<th>1000</th>
<th>10000</th>
<th>1e+06</th>
<th>1e+07</th>
</tr>
</thead>
<tbody>
<tr>
<td>blue: SNR max (%)</td>
<td>151</td>
<td>43.6</td>
<td>7.2</td>
<td>0.66</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PRNU1288 (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Quantum Efficiency

\[
\eta = 0.341
\]

## Gain

\[
K \ (\text{DN/e}) = 0.164
\]

1/K (e/DN) = 6.079

## Dark Noise & DSNU

\[
\sigma_d \ (\text{DN}) = 3.25
\]

\[
\sigma_0 \ (\text{e}) = 19.7
\]

DSNU_{1288} (DN) = —

DSNU_{1288} (e) = —

## Nonlinearity

\[
\text{LE} \ (%) = 0.62
\]

## Sensitivity & Saturation

\[
\mu_{p,\min} \ (\text{p}) = 59.5
\]

\[
\mu_{e,\min} \ (\text{e}) = 20.3
\]

\[
\mu_{p,\text{sat}} \ (\text{p}) = 66940
\]

\[
\mu_{e,\text{sat}} \ (\text{e}) = 22800
\]

## Dynamic Range

\[
\text{DR} = 1125
\]

\[
\text{DR (dB)} = 61.0
\]

\[
\text{DR (bit)} = 10.1
\]

## Dark Current

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

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

\[
\mu_{c,\text{var}} \ (\text{e/s}) = —
\]
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 = -5dB, Offset = 0.23</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exposure time</td>
<td>11.0 ms</td>
<td>Environmental temperature</td>
<td>27.8°C</td>
</tr>
<tr>
<td>Frame rate</td>
<td>0.0 Hz</td>
<td>Camera temperature</td>
<td>40.8°C</td>
</tr>
<tr>
<td>Data transfer mode</td>
<td>BayerRG12</td>
<td>Wavelength, centr., FWHM</td>
<td>534 nm, 30.9 nm</td>
</tr>
</tbody>
</table>

Quantum efficiency
\[ \eta = 0.330 \]

Gain
\[ K \text{ (DN/e)} = 0.163 \]
\[ 1/K \text{ (e/DN)} = 6.136 \]

Dark noise & DSNU
\[ \sigma_d \text{ (DN)} = 3.26 \]
\[ \sigma_0 \text{ (e)} = 19.9 \]
\[ \text{DSNU}_{1288} \text{ (DN)} = - \]
\[ \text{DSNU}_{1288} \text{ (e)} = - \]

Signal-to-noise ratio & PRNU
\[ \text{SNR}_{\text{max}} \text{ (DN)} = 155 \]
\[ \text{SNR}_{\text{max}} \text{ (dB)} = 43.8 \]
\[ \text{SNR}_{\text{max}} \text{ (bits)} = 7.3 \]
\[ 1/\text{SNR}_{\text{max}} \% = 0.65 \]
\[ \text{PRNU}_{1288} \% = - \]

Nonlinearity
\[ \text{LE} \% = 0.62 \]

Sensitivity & saturation
\[ \mu_{p,\text{min}} \text{ (p)} = 62.0 \]
\[ \mu_{e,\text{min}} \text{ (e)} = 20.5 \]
\[ \mu_{p,\text{sat}} \text{ (p)} = 72451 \]
\[ \mu_{e,\text{sat}} \text{ (e)} = 23942 \]

Dynamic range
\[ \text{DR} = 1168 \]
\[ \text{DR (dB)} = 61.3 \]
\[ \text{DR (bit)} = 10.2 \]

Dark current
\[ \mu_{c,\text{mean}} \text{ (DN/s)} = - \]
\[ \mu_{c,\text{mean}} \text{ (e/s)} = - \]
\[ \mu_{c,\text{var}} \text{ (e/s)} = - \]
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 = -5dB, Offset = 0.23</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exposure time</td>
<td>11.0 ms</td>
<td>Environmental temperature</td>
<td>27.8°C</td>
</tr>
<tr>
<td>Frame rate</td>
<td>0.0 Hz</td>
<td>Camera temperature</td>
<td>40.8°C</td>
</tr>
<tr>
<td>Data transfer mode</td>
<td>BayerRG12</td>
<td>Wavelength, centr., FWHM</td>
<td>630 nm, 13.1 nm</td>
</tr>
</tbody>
</table>

**Photons transfer m0284, 630nm, 28.04.2015**

Quantum efficiency

\[ \eta = 0.253 \]

Gain

\[ K (\text{DN/e}) = 0.161 \]
\[ 1/K (\text{e/DN}) = 6.203 \]

Dark noise & DSNU

\[ \sigma_d (\text{DN}) = 3.26 \]
\[ \sigma_0 (\text{e}) = 20.1 \]
\[ \text{DSNU}_{1288} (\text{DN}) = 94944 \]
\[ \text{DSNU}_{1288} (\text{e}) = 24036 \]

Signal-to-noise ratio & PRNU

\[ \text{SNR}_{\text{max}} = 155 \]
\[ \text{SNR}_{\text{max}} (\text{dB}) = 43.8 \]
\[ \text{SNR}_{\text{max}} (\text{bits}) = 7.3 \]
\[ 1/\text{SNR}_{\text{max}} (%) = 0.65 \]
\[ \text{PRNU}_{1288} (%) = 0.59 \]

Nonlinearity

\[ \text{LE} (%) = 0.59 \]

Sensitivity & saturation

\[ \mu_{p,\text{min}} (\text{p}) = 81.8 \]
\[ \mu_{e,\text{min}} (\text{e}) = 20.7 \]
\[ \mu_{p,\text{sat}} (\text{p}) = 94944 \]
\[ \mu_{e,\text{sat}} (\text{e}) = 24036 \]

Dynamic range

\[ \text{DR} = 1161 \]
\[ \text{DR (dB)} = 61.3 \]
\[ \text{DR (bit)} = 10.2 \]

Dark current

\[ \mu_{c,\text{mean}} (\text{DN/s}) = 94944 \]
\[ \mu_{c,\text{mean}} (\text{e/s}) = 24036 \]
\[ \mu_{c,\text{var}} (\text{e/s}) = 0.59 \]