ILA.PIV.sCMOS Camera

The ILA.PIV.sCMOS camera comes with the scientific CMOS (sCMOS) imager, which enables image acquisition with high resolution, highest dynamical range available, high quantum efficiency and extremely low noise. With this camera, larger regions of interest are possible compared to the standard CCD cameras. Furthermore, what makes this camera suitable for PIV measurements is the very short interframing time and the integrated remote focus control. The standard edition of this camera has the EOS controller ring build-in, compatible with the Canon EF lenses. Hence, the lens’s aperture and focus can be adjusted remotely.
Specifications

**Image Sensor**

- **type of sensor**: scientific CMOS (sCMOS)
- **image sensor**: CIS2051
- **resolution (h x v)**: 2560 x 2160 pixels
- **pixel size (h x v)**: 6.5 µm x 6.5 µm
- **sensor size**: 16.6 mm x 14.0 mm
- **diagonal**: 21.8 mm
- **shutter modes**: rolling and global (snapshot)
- **dynamic range**: 22 000 : 1 (86.9 dB)
- **quantum efficiency**: 57% @ peak
- **spectral range**: 370 nm .. 1100 nm
- **anti blooming factor**: 1:10 000
- **MTF**: 76.9 lp/mm (theoretical)
- **fullwell capacity**: 30 000 e-
- **readout noise (< 2.0 rms / 1.7 median e- @ (rs1, fsc2))**:
  - 2 .. 6 e/pixels/s (rs1)
  - 2 .. 6 e/pixels/s + 0.6 e/pixel (gs1)
- **DSNU**: < 2 e-rms
- **PRNU**: < 0.5%

**Camera**

- **frame rate**: 100fps @ 2560 x 2610 pixels (rs1, fsc2)
- **exposure / shutter time**: 500 µs .. 2 s (rs1)
- **interframing time**: 10 µs .. 100 ms (gs1)
- **as low as 200 ns**: 16 bit2.5
- **A/D conversion factor**: 0.46 e/count
- **pixel scan rate**: 286 MHz (fsc2)
- **pixel data rate**: 190.7 Mpixel/s / 572 Mpixel/s
- **region of interest**: selectable
- **non linearity**: < 1% (range of 5 .. 90% signal)
- **cooled image sensor temp**: +5 °C (@ +10 °C .. +30 °C, controlled)
- **cooling method**: Peltier with forced air (fan)
- **trigger input signals**: frame or sequence trigger
- **trigger output signals**: exposure, busy
- **data interface**: dual Camera Link (full, 10 taps)
- **time stamp**: in image (1 µm resolution)

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1. rs = rolling shutter / gs = global shutter
2. fsc = fast scan mode. Visually lossless decompression for data transfer in fsc and horizontal resolution greater than 1920 pixel (due to Camera Link limitations).
3. The readout noise values are given as root mean square (rms) and median (med) values, due to the different noise models, which can be used for evaluation.
4. The dark current in global shutter mode consists of an exposure time related part and of a sensor readout time related part, which is constant for a given pixelclock 0.6 e- @ 286 MHz and frame size (here full frame). A smaller ROI reduces the latter part of the dark current accordingly.
5. The high dynamic signal is simultaneously converted at high and low gain by two 11 bit A/D converters and the two 11 bit values are sophistically merged into one 16 bit value.

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**General**

- **power supply**: 12..24 VDC (±10%)
- **power consumption**: 20 W max (typ. 10 W @ 20 °C)
- **weight**: 700 g
- **operating temp.**: +10 °C .. +40 °C
- **operating humidity**: 10% .. 80% (non-condensing)
- **storage temp range**: -10 °C .. +60 °C
- **optical interface**: Canon EF lens mount*
- **CE / FCC certified**: yes

* F-mount available upon request

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**Frame rate table**

<table>
<thead>
<tr>
<th>typical resolutions</th>
<th>fast scan2</th>
<th>rolling sh.</th>
<th>global sh.</th>
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</thead>
<tbody>
<tr>
<td>2560 x 2160</td>
<td>100 fps</td>
<td>50 fps</td>
<td></td>
</tr>
<tr>
<td>1920 x 1080</td>
<td>200 fps</td>
<td>100 fps</td>
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<tr>
<td>1600 x 1200</td>
<td>180 fps</td>
<td>90 fps</td>
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<tr>
<td>1280 x 1024</td>
<td>210 fps</td>
<td>105 fps</td>
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<tr>
<td>640 x 480</td>
<td>450 fps</td>
<td>225 fps</td>
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<tr>
<td>320 x 240</td>
<td>900 fps</td>
<td>450 fps</td>
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