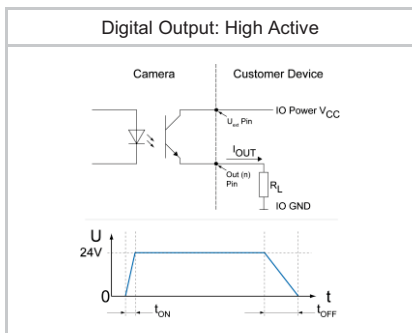
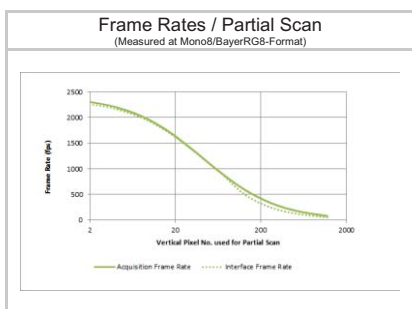
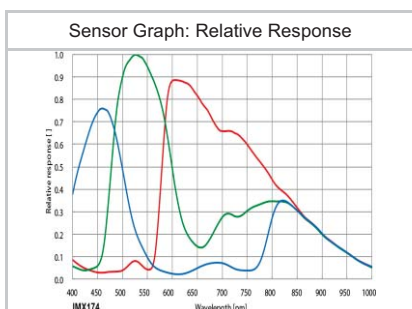




<sup>1)</sup> Sensor readout, different from pixel format

<sup>2)</sup> depends on the used interface



### Sensor Information

|            |                              |
|------------|------------------------------|
| Model Name | Sony IMX174                  |
| Type       | 1/1.2" progressive scan CMOS |
| Shutter    | Global Shutter               |
| Resolution | 1920 × 1200 pixels           |
| Scan Area  | 11.25 mm x 7.03 mm           |
| Pixel Size | 5.86 µm x 5.86 µm            |

### Data Quality

@ 20 °C, gain = 1, exposure time = 4 msec

|                           |                                                     |
|---------------------------|-----------------------------------------------------|
| Dark Noise ( $\sigma$ )   | 6.5 e- typical                                      |
| Saturation                | 29000 e- typical                                    |
| Dynamic Range             | 72 dB typical                                       |
| SNR                       | 45 dB typical                                       |
| Quantum efficiency $\eta$ | 56 % @ 465 nm, 61 % @ 536 nm, 46 % @ 631 nm typical |

### Acquisition

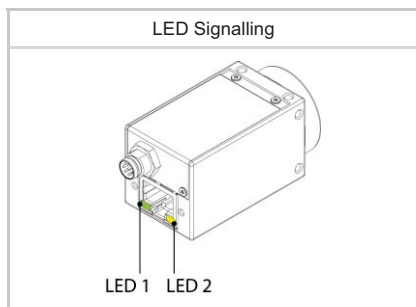
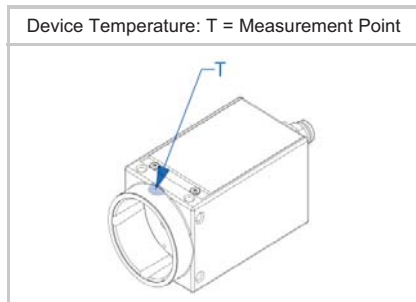
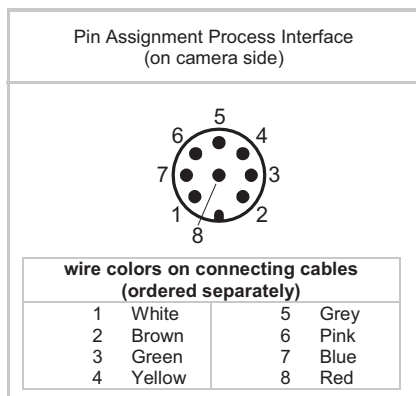
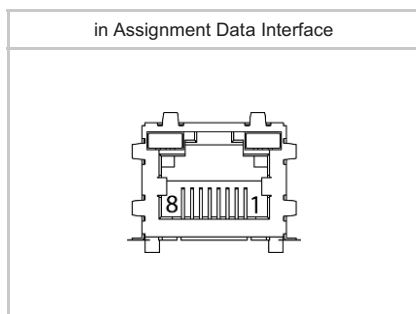
|                                                                 |                                                                                                                                                                      |             |                                                   |
|-----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|---------------------------------------------------|
| Resolution                                                      | 1920 px x 1200 px                                                                                                                                                    |             |                                                   |
| Interface Frame Rate<br>(depends on used interface performance) | Format                                                                                                                                                               | Resolution  | max. Frame Rate<br>(@ Trigger Mode) <sup>2)</sup> |
|                                                                 | Full Frame                                                                                                                                                           | 1920 x 1200 | 53 fps                                            |
|                                                                 | Binning 2x2                                                                                                                                                          | 960 x 600   | 81 fps                                            |
|                                                                 | Binning 2x1                                                                                                                                                          | 960 x 1200  | 81 fps                                            |
|                                                                 | Binning 1x2                                                                                                                                                          | 1920 x 600  | 81 fps                                            |
| Acquisition Frame Rate <sup>1)</sup><br>(Burst Mode)            | 81 fps   $t_{\text{readout}} = 12.3 \text{ msec}$ (max. Res. Full Frame) @ 10 bit                                                                                    |             |                                                   |
|                                                                 | 64 fps   $t_{\text{readout}} = 15.5 \text{ msec}$ (max. Res. Full Frame) @ 12 bit                                                                                    |             |                                                   |
| Pixel Formats                                                   | BayerRG8, BayerRG10, BayerRG12, BayerRG12p, Mono8, Mono10, Mono12, Mono12p, RGB8, BGR8                                                                               |             |                                                   |
| Partial Scan                                                    | True Partial Scan with increasing Frame Rate on Y direction, Region of Interest (ROI) arbitrary<br>Width: minimum 16, increment 16<br>Height: minimum 4, increment 4 |             |                                                   |
| Adjustable Acquisition Frame Rate                               | Off or Off or 0,01 ... 2202 Hz                                                                                                                                       |             |                                                   |
| Acquisition Mode                                                | Continuous, Single Frame and Multi Frame                                                                                                                             |             |                                                   |
| Acquisition Status                                              | AcquisitionActive, AcquisitionTrigger Wait                                                                                                                           |             |                                                   |
| Exposure Mode                                                   | Timed                                                                                                                                                                |             |                                                   |
| Readout Mode                                                    | Overlapped, Sequential                                                                                                                                               |             |                                                   |

### Image Pre-Processing

|                         |                                                                                                                    |
|-------------------------|--------------------------------------------------------------------------------------------------------------------|
| Analogue Controls       | Exposure Time (35 µsec ... 60 sec   Step Size 1 µsec)<br>Gain (0...48 dB), Offset (0 ... 255 LSB   12 bit)         |
| Gamma Correction        | Gamma (0.1 ... 2   available if LUT is enabled)                                                                    |
| LUT                     | Luminance (12 bit)                                                                                                 |
| Color Models            | Mono, Raw Bayer, RGB and BGR                                                                                       |
| Color Processing        | Integrated color processor for high quality color calculation                                                      |
| Color Adjustment        | Manual White Balance<br>Automatic White Balance (Once or Continuous)                                               |
| Color Enhancement       | Color Transformation to sRGB color space by optimized Matrix for 6500 K, 3000 K Lightsource or User defined Matrix |
| Color Tolerance         | -                                                                                                                  |
| Binning Horizontal      | 1 or 2                                                                                                             |
| Binning Vertical        | 1 or 2                                                                                                             |
| Image Flipping          | Horizontal, vertical                                                                                               |
| Defect Pixel Correction | via Defect Pixel List with up to 512 Pixel Coordinates                                                             |
| Fix Pattern Noise       | -                                                                                                                  |
| Correction              | -                                                                                                                  |

The Information in this document is subject to change without notice.

<sup>1)</sup> Sensor readout, different from pixel format



## Interfaces and Connectors

|                          |                                                     |                                           |                |
|--------------------------|-----------------------------------------------------|-------------------------------------------|----------------|
| Data and Power Interface | Gigabit Ethernet                                    | Transfer Rate                             | 1000 Mbits/sec |
|                          | Fast Ethernet                                       | Transfer Rate                             | 100 Mbits/sec  |
| Connector:               |                                                     | 8P8C Modular Jack (RJ45), screw lock type |                |
| Assignment:              | 1 - MX1+                                            | 2 - MX1-                                  |                |
|                          | 3 - MX2+                                            | 4 - MX3+                                  |                |
|                          | 5 - MX3-                                            | 6 - MX2-                                  |                |
|                          | 7 - MX4+                                            | 8 - MX4-                                  |                |
| Process Interface        | Connector: M8/8-pin<br>(SACC-DSI-M8MS-8CON-M8-L180) |                                           |                |
|                          | Assignment:                                         |                                           |                |
|                          | 1 - GPIO (Line2)                                    | 2 - Power Vcc                             |                |
|                          | 3 - IN1 (Line0)                                     | 4 - GND IN1                               |                |
|                          | 5 - Power VCC OUT                                   | 6 - OUT1 (Line3)                          |                |
|                          | 7 - GND (Power, GPIO)                               | 8 - GPIO (Line1)                          |                |

Caution



\* Note GPIOs: Ground loops are to be avoided and can lead to destruction of the device.

## Optical Data

|                |               |
|----------------|---------------|
| Lens Mount     | C-Mount       |
| Optical Filter | IR cut filter |

## Mechanical Data

|            |                                                                                 |
|------------|---------------------------------------------------------------------------------|
| Housing    | Zinc die casting, nickel-chrome-plated, IP40 (with mounted lens and GigE cable) |
| Dimensions |                                                                                 |
| Weight     | 120 g                                                                           |

## Environmental Data

|                       |                                                                                                                                                                         |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Storage Temperature   | -10 °C ... + 70 °C                                                                                                                                                      |
| Operating Temperature | +5 °C ... +65 °C @ T = Measurement Point or<br>*) +5 °C ... +72 °C @ internal Temperature Sensor<br>Ambient temperature above 32 °C requires heat dissipation measures. |
| Int. Temperature      | yes, accuracy:                                                                                                                                                          |
| Sensor                | ±1 °C (typ) 0 °C ... +85 °C                                                                                                                                             |
| Humidity              | 10 % ... 90 % non-condensing                                                                                                                                            |

\*) the maximum temperature for Sony sensor characteristics (sensor performance) are guaranteed up to °C @ Measurement Point or °C @ internal temperature sensor

## LED Signalling

|     |              |           |
|-----|--------------|-----------|
| LED | Green flash  | RX active |
|     | Green        | Link ON   |
|     | Yellow       | Error     |
|     | Yellow flash | TX active |

## Electrical Data

|                      |                                                                                                                                                                                                                                                                                           |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Power Supply (ext.)  | VCC: 12 ... 24 V DC $\pm$ 20%<br>I: 97 ... 196 mA                                                                                                                                                                                                                                         |
| Power over Ethernet  | Class 0 device<br>VCC: 36 ... 57 V DC<br>I: 59 mA @ 48 VDC                                                                                                                                                                                                                                |
| Power Consumption    | approx. 2.4 W @ 12VDC and 53 fps<br>approx. 2.8 W @ 48 VDC (PoE) and 53 fps<br>(Factory Setting "Default")                                                                                                                                                                                |
| Digital Input        | Optocoupler<br>$U_{IN(low)}$ : 0.0 ... 4.5 VDC<br>$U_{IN(high)}$ : 11.0 ... 30.0 VDC<br>$I_{IN}$ : 3.0 ... 10.0 mA<br>min. Impulse Length: 2.0 $\mu$ sec                                                                                                                                  |
| Digital Output       | Optocoupler<br>$U_{EXT}$ : 5 ... 30 V DC<br>$I_{OUT}$ : max. 50 mA<br>$t_{ON}$ = typ. 3 $\mu$ sec $t_{OFF}$ = typ. 40 $\mu$ sec                                                                                                                                                           |
| GPIO                 | direct, without optocoupler                                                                                                                                                                                                                                                               |
| GPIO used as Input:  | $U_{IN(low)}$ : 0.0 ... 0.8 VDC<br>$U_{IN(high)}$ : 2.0 ... 30.0 VDC<br>min. Impulse Length: 2.0 $\mu$ sec                                                                                                                                                                                |
| GPIO used as Output: | $U_{Out(low)}$ : 0.0 ... 0.4 VDC ( $I_{sink\ max}$ : 50 mA)<br>$U_{Out(high)}$ : 2.4 ... 3.3VDC ( $I_{max}$ : 1 mA)                                                                                                                                                                       |
| Caution              | * The General Purpose I/Os (GPIOs) are not potential-free and do not have an overrun cut-off. Incorrect wiring (overvoltage, undervoltage or voltage reversal) can lead to defects in the electronic system.<br>Ground loops are to be avoided and can lead to destruction of the device. |

## Conformity

|                            |                                                                      |
|----------------------------|----------------------------------------------------------------------|
| Conformity                 | CE, RoHS, REACH                                                      |
| KC Registration No. / Date | - / -                                                                |
| MTBF                       | 57 years @ T = 45 °C / 37 years @ T = 60 °C<br>T = Measurement Point |

## GenlCam™ Features

|                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Short Exposure Range | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Timer                | Timer Selector: Timer 1<br>TimerTriggerSource:<br>Line0, SoftwareTrigger, ExposureStart, ExposureEnd, FrameTransferSkipped, TriggerSkipped, Action 1 and Off<br>TimerDelay: 0 $\mu$ sec ... 2 sec, Step Size: 1 $\mu$ sec<br>TimerDuration: 4 $\mu$ sec ... 2 sec, Step Size: 1 $\mu$ sec                                                                                                                                                                                                          |
| Counter              | Counter Selector: Counter 1, Counter 2<br>CounterValue: 0 ... 65535<br>Counter Event Source: Counter1End or Counter2End, ExposureActive, FrameTransferSkipped, FrameTrigger, TriggerSkipped and Off<br>Counter Reset Source: Counter1End, Counter2End, Line0 and Off                                                                                                                                                                                                                               |
| Sequencer            | Sequencer Characteristics:<br>up to 128 sets,<br>up to 4 possible pathes for triggered set transitions,<br>6 trigger sources: Counter1End, Counter2End, ExposureActive, Line0, ReadoutActive, Timer1End<br>Sequencer Parameters for Exposure, Gain, Trigger, ROI and Output:<br>ExposureTime, CounterDuration, CounterEventActivation, CounterEventSource, CounterResetSource, ExposureMode, ExposureTime, Gain, Height, OffsetX, OffsetY, TriggerMode, UserOutputValue, UserOutputValueAll, Width |

## GenICam™ Features

|                              |                                                                                                                                                                   |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| User Sets                    | Factory Settings: UserSet0 (read only)<br>Freely Programmable: UserSet1, UserSet2, UserSet3<br>Parameters: any user definable Parameter                           |
| Acquisition Abort            | Delay up to 15.5 msec                                                                                                                                             |
| Chunk Data                   | yes,<br>Chunk Selector: Binning, Black Level, DeviceTemperature, ExposureTime, FrameID, Gain, Height, Image, ImageControl, LineStatusAll                          |
| Device Temperature           | InHouse<br>Event generation for Normal to High, High to Exceeded and Exceeded to Normal<br>Exceeded (no image transfer) = max. internal temperature sensor + 1 °C |
| Device Link Throughput Limit | yes, up to max. Device Link Speed                                                                                                                                 |
| SFNC Version                 | v2.3                                                                                                                                                              |

## Factory Settings after Start-Up

|                                |                                                |
|--------------------------------|------------------------------------------------|
| Trigger Mode                   | Off (Free Running)                             |
| Analog Controls                | Exposure Time: 4 msec, Gain: 0 dB, Offset: 0   |
| Pixel Format                   | BayerRG8                                       |
| Partial Scan                   | Off                                            |
| Acquisition Frame Rate         | Off                                            |
| Timer/Counter/Sequencer        | Off                                            |
| Defect Pixel Correction        | ON                                             |
| Fixed Pattern Noise Correction | -                                              |
| Digital Input                  | Line0, invert = false                          |
| Digital Output                 | Line3, invert = false, line source = Off       |
| GPIO 1/2                       | Line1, Line2, invert = false, LineMode = Input |
| TriggerSource                  | All                                            |

## Partial Scan @ FullFrame, min Exposure, Mono8 or BayerRG8

|          | Resolution  | max. fps acquisition | max. fps interface <sup>2)</sup> |
|----------|-------------|----------------------|----------------------------------|
| Full HD  | 1920 x 1080 | 89                   | 60                               |
| SXGA     | 1280 x 1024 | 95                   | 95                               |
| XGA      | 1024 x 768  | 125                  | 125                              |
| SVGA     | 800 x 600   | 158                  | 158                              |
| VGA      | 640 x 480   | 194                  | 194                              |
| CIF      | 352 x 288   | 307                  | 307                              |
| QCIF     | 176 x 144   | 544                  | 544                              |
| LineScan | 1920 x 1024 | 96                   | 64                               |
|          | 1920 x 512  | 185                  | 120                              |
|          | 1920 x 256  | 344                  | 256                              |
|          | 1920 x 128  | 608                  | 512                              |
|          | 1920 x 64   | 963                  | 963                              |
|          | 1920 x 32   | 1363                 | 1363                             |
|          | 1920 x 16   | 1736                 | 1736                             |
|          | 1920 x 8    | 2012                 | 2012                             |
|          | 1920 x 4    | 2188                 | 2188                             |
|          | 1920 x 2    | 2186                 | 2186                             |
|          | 1920 x 1    | -                    | -                                |

<sup>2)</sup> depends on the used interface

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