

### Sensor Information

Model Name	Sony IMX174
Type	1/1.2" progressive scan CMOS
Shutter	Global Shutter
Resolution	1920 x 1200 pixels
Scan Area	11.25 mm x 7.03 mm
Pixel Size	5.86 $\mu\text{m}$ x 5.86 $\mu\text{m}$

### Data Quality

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

Dark Noise ( $\sigma$ )	6.5 e- typical
Saturation	28500 e- typical
Dynamic Range	72 dB typical
SNR	44.5 dB typical
Quantum efficiency $\eta$	71.3% @ 536 nm typical

### Acquisition

Resolution	1920 px x 1200 px		
Interface Frame Rate (depends on used interface performance)	Format	Resolution	max. Frame Rate (@ Trigger Mode) <sup>2)</sup>
	Full Frame	1920 x 1200	159 fps
	Binning 2x2	960 x 600	166 fps
	Binning 2x1	960 x 1200	166 fps
	Binning 1x2	1920 x 600	166 fps
Acquisition Frame Rate <sup>1)</sup>	166 fps   $t_{\text{readout}} = 6.02$ msec (max. Res. Full Frame) @ 10 bit		
	129 fps   $t_{\text{readout}} = 7.73$ msec (max. Res. Full Frame) @ 12 bit		
Pixel Formats	Mono8, Mono10, Mono12, Mono12p		
Partial Scan	True Partial Scan with increasing Frame Rate on Y direction, Region of Interest (ROI) arbitrary		
	Width: minimum 16, increment 16		
	Height: minimum 1, increment 1		
Adjustable Acquisition Frame Rate	Off or 0,01 ... 65535 Hz		
Acquisition Mode	Continuous, Single Frame and Multi Frame		
Acquisition Status	AcquisitionActive, AcquisitionTrigger Wait		
Exposure Mode	Timed		
Shutter Mode	Global		
Readout Mode	Overlapped, Sequential		

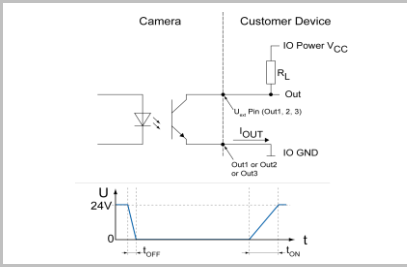
### Image Pre-Processing

Analog Controls	Exposure Time (28 $\mu\text{sec}$ ... 60 sec   Step Size 1 $\mu\text{sec}$ ) Gain (0...48 dB), Offset (0 ... 255 LSB   12 bit)
Auto Function	ExposureAuto and GainAuto with BrightnessAutoPriority based on BrightnessAuto ROI
Gamma Correction	Gamma (0.1 ... 2   available if LUT is enabled)
LUT	Luminance (12 bit)
Color Models	Mono
Color Processing	-
Color Enhancement	-

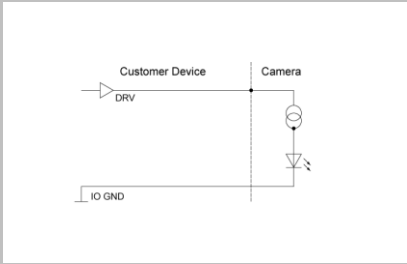
<sup>1)</sup> Sensor readout, different from pixel format

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

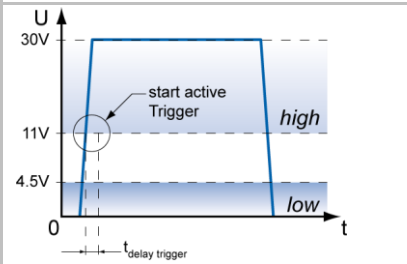
### Digital Output: Low Active



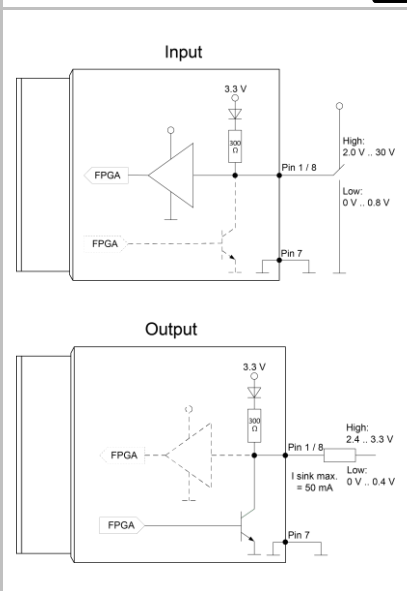
### Digital Input



### Trigger Mode: Start up time and valid Trigger



### GPIO



## Image Pre-Processing

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	-

## Process Synchronization

Trigger Mode	Off (Free Running), On (Trigger)
Trigger Overlap Type	Readout
Trigger Sources	Hardware (Line0, 1, 2), Software, Counter 1, 2 End, All or Off fixed Trigger Delay out of treadout: <sup>1)</sup> 14,1 µsec @ 10 bit 16,9 µsec @ 12 bit max. Trigger Delay during treadout: <sup>1)</sup> 14,6 µsec @ 10 bit 18,8 µsec @ 12 bit
Trigger Delay	0 ... 2 sec, Tracking and buffering of up to 256 triggers
External Flash Sync	via Exposure Active $t_{\text{delay flash}} \leq 3 \mu\text{sec}$ , $t_{\text{duration}} = t_{\text{exposure}}$
Encoder Function	yes, via Counter and Trigger Source
PTP Function	-

## Digital I/Os

Lines	Input: Line 0, Output: Line3, GPIO: Line 1, Line 2
Output Sources	Off, ExposureActive, Timer1, ReadoutActive, UserOutput 1-3 and TriggerReady
Line Debouncer	Low and high signal separately selectable Debouncing Time 0 ... 5 msec, Step Size: 1 µsec

## Memory

Image Buffer	469 MB 71 Images (Trigger Mode) / 1 Image (Free Running Mode)
Non-volatile Memory	128 kb

## Interface Data

Interface	USB3.0 (5000 Mbits/sec)
USB Vendor ID / Product ID	0x2825 / 0x128

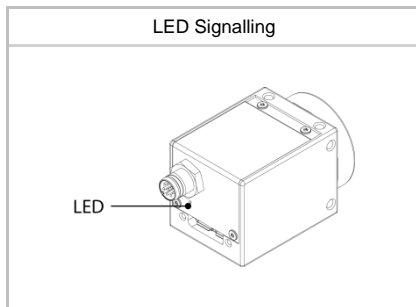
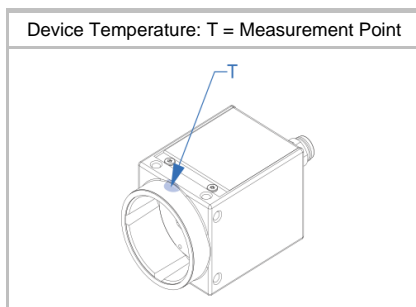
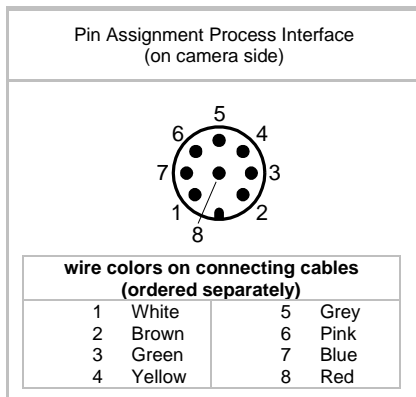
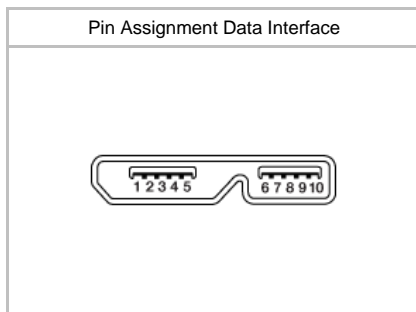
## USB 3 Vision® Features

Events Transmission via Asynchronous Message Channel	DeviceTemperatureStatusChanged, EventLost, ExposureEnd, ExposureStart, FrameEnd, FrameStart, FrameTransferSkipped, Line0..2 FallingEdge, Line0..2 RisingEdge, TransferBufferFull, TransferBufferReady, TriggerOverlapped, TriggerReady, TriggerSkipped
Frame Counter	up to 2 <sup>32</sup>
Payload Size	0 ... 4608224 Byte
Timestamp	64 bit, resolution in nsec, increment = 10
USB Vision	v1.0.1

## Interfaces and Connectors

Data and Power Interface	USB 3.0 Transfer Rate 5000 Mbits/sec	USB 2.0 Transfer Rate 480 Mbits/sec
Connector:	USB 3.0 Micro B	
Pin Assignment:	1 - VBUS 2 - D- 3 - D+ 4 - ID 5 - GND	6 - MicB_SSTX- 7 - MicB_SSTX+ 8 - GND_DRAIN 9 - MicB_SSRX- 10 - MicB_SSRX+

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



## Interfaces and Connectors

Process Interface	Connector:	M8/8-pin (SACC-DSI-M8MS-8CON-M8-L180)
	Assignment:	1 - GPIO (Line2)    5 - Power VCC OUT1 2 - not connected    6 - OUT1 (Line3) 3 - IN1 (Line0)    7 - GND GPIO 4 - GND IN1    8 - GPIO (Line1)

Caution



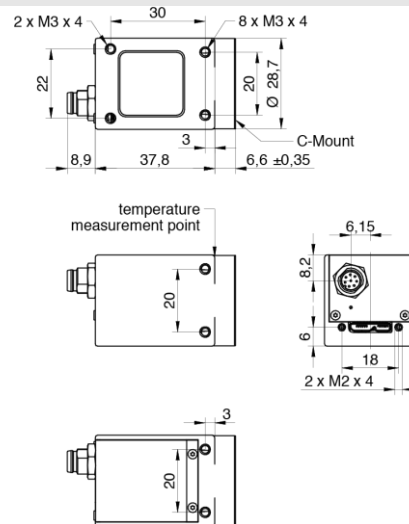
\* Note GPIOs: Ground loops are to be avoided and can lead to destruction of the device.

## Optical Data

Lens Mount	C-Mount
Optical Filter	-

## Mechanical Data

Housing	Zinc die casting, nickel-chrome-plated, IP40 (with mounted lens and USB 3.0 cable)
Protection Class	IP40 (with mounted lens and USB 3.0 cable)
Weight	90 g
Dimensions	



## Environmental Data


Storage Temperature	-10 °C ... + 70 °C
Operating Temperature	0 °C ... +65 °C @ T = Measurement Point or 0 °C ... +72 °C @ internal Temperature Sensor )
Int. Temperature Sensor	yes, accuracy: ±2 °C (typ) -40 °C ... 0 °C ±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 52°C @ Measurement Point or 58°C @ internal temperature sensor

## LED Signalling

LED	Green flash	Power on, no link active
	Green	Link active USB 3.0
	Red	Error or Link active USB 2.0
	Yellow	Sensor Readout activity
	Red flash	Update

## Electrical Data

Power Supply	bus powered via USB3.0 interface
Power Consumption	approx. 2.8 W @ 159 fps (Factory Setting "Default")
Digital Input	Optocoupler $U_{IN(low)}$ : 0.0 ... 4.5 VDC $U_{IN(high)}$ : 11.0 ... 30.0 VDC $I_{IN}$ : 3.0 ... 10.0 mA min. Impulse Length: 2.0 $\mu$ sec
Digital Output	Optocoupler $U_{EXT}$ : 5 ... 30 V DC $I_{OUT}$ : max. 50 mA $t_{ON}$ = 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 $U_{IN(high)}$ : 2.0 ... 30.0 VDC min. Impulse Length: 2.0 $\mu$ sec
GPIO used as Output:	$U_{Out(low)}$ : 0.0 ... 0.4 VDC ( $I_{sink\ max}$ : 50 mA) $U_{Out(high)}$ : 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. Ground loops are to be avoided and can lead to destruction of the device.

## Conformity

Conformity	CE, RoHS, REACH, EAC
KC Registration No. / Date	- / -
MTBF	63 years @ T = 45 °C / 41 years @ T = 60 °C T = Measurement Point

## GeniCam™ Features

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

## GenICam™ Features

User Sets	Factory Settings: UserSet0 (read only) Freely Programmable: UserSet1, UserSet2, UserSet3 Parameters: any user definable Parameter
Acquisition Abort	Delay up to 7.8 msec
Chunk Data	yes, Chunk Selector: Binning, BlackLevel, CounterValue, DeviceTemperature, ExposureTime, FrameID, Gain, Height, Image, ImageControl, LineStatusAll, OffsetX, OffsetY, PixelFormat, SequencerSetActive, Timestamp, Width
Device Temperature	InHouse Event generation for Normal to High, High to Exceeded and Exceeded to Normal Exceeded (no image transfer) = max. internal temperature sensor + 1 °C
Device Link Throughput Limit	yes, up to max. Device Link Speed
Custom Data	yes, 128 Byte
SFNC Version	v2.4

## Factory Settings after Start-Up

Trigger Mode	Off (Free Running)
Analog Controls	Exposure Time: 4 msec, Gain: 0 dB, Offset: 0
Pixel Format	Mono8
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 (monochrome camera) or BayerRG8 (color camera)

	Resolution	max. fps acquisition	max. fps interface <sup>2)</sup>
Full HD	1920 x 1080	183	183
SXGA	1280 x 1024	193	193
HD720	1280 x 720	271	271
XGA	1024 x 768	254	254
SVGA	800 x 600	321	321
VGA	640 x 480	396	396
CIF	352 x 288	628	628
QVGA	320 x 240	735	735
QCIF	176 x 144	1119	1119
LineScan	1920 x 1024	193	193
	1920 x 512	373	373
	1920 x 256	695	695
	1920 x 128	1226	1226
	1920 x 64	1981	1981
	1920 x 32	2863	2863
	1920 x 16	3683	3683
	1920 x 8	4298	4298
	1920 x 4	4690	4690
	1920 x 2	4914	4914
	1920 x 1	5034	5034

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