



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 μm x 5.86 μm

Data Quality

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

Dark Noise (σ)	6.5 e- typical
Saturation	28500 e- typical
Dynamic Range	72 dB typical
SNR	44.5 dB typical
Quantum efficiency η	60 % @ 465 nm, 65 % @ 536 nm, 49 % @ 631 nm typical

Acquisition

Resolution	1920 px x 1200 px
Interface Frame Rate (depends on used interface performance)	Format Resolution max. Frame Rate (@ Trigger Mode) ²⁾
	Full Frame 1920 x 1200 166 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 ¹⁾	165 fps $t_{\text{readout}} = 6.04 \text{ msec}$ (max. Res. Full Frame) @ 10 bit 129 fps $t_{\text{readout}} = 7.75 \text{ msec}$ (max. Res. Full Frame) @ 12 bit

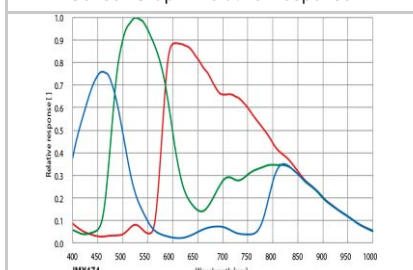
Pixel Formats	BayerRG8, BayerRG10, BayerRG12, BayerRG12p
Partial Scan	True Partial Scan with increasing Frame Rate on Y direction, Region of Interest (ROI) arbitrary Width: minimum 16, increment 16 Height: minimum 4, increment 4
Adjustable Acquisition Frame Rate	Off or 0.01 ... 4464 Hz

Acquisition Mode	Continuous, Single Frame and Multi Frame
Acquisition Status	AcquisitionActive, AcquisitionTrigger Wait
Exposure Mode	Timed
Shutter Mode	-
Readout Mode	Overlapped, Sequential

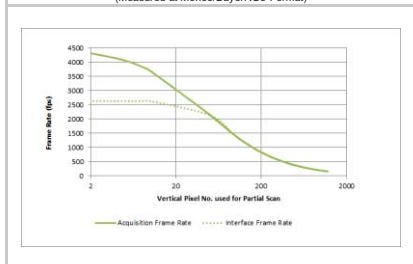
Image Pre-Processing

Analog Controls	Exposure Time (28 μsec ... 60 sec Step Size 1 μsec) 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 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	

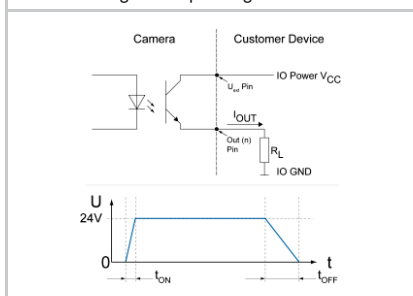
Sensor Graph: Relative Response



Frame Rates / Partial Scan
(Measured at Mono8/BayerRG8-Format)



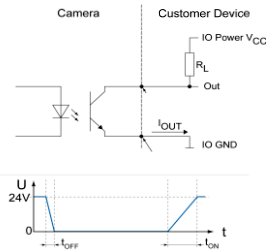
Digital Output: High Active



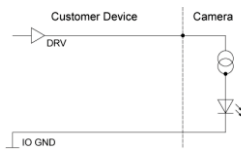
¹⁾ Sensor readout, different from pixel format

²⁾ depends on the used interface

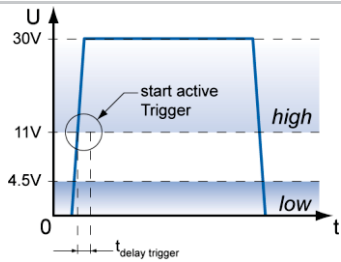
Digital Output: Low Active



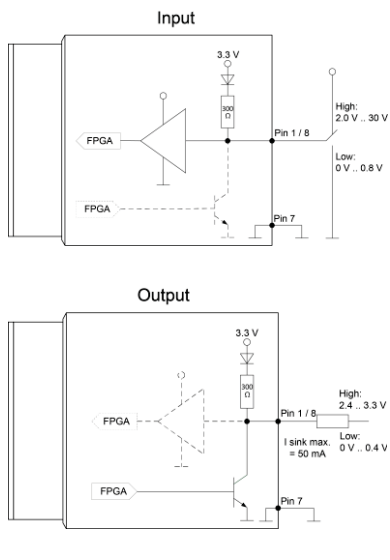
Digital Input



Trigger Mode: Start up time and valid Trigger



GPIO



Process Synchronization

Trigger Mode	Off (Free Running), On (Trigger)
Trigger Overlap Type	Readout
Trigger Sources	Hardware (Line0,1,2), Software, All or Off fixed Trigger Delay out of $t_{readout}$: ¹⁾ 14.1 μ sec @ 10 bit 16.8 μ sec @ 12 bit max. Trigger Delay during $t_{readout}$: ¹⁾ 14.6 μ sec @ 10 bit 18.7 μ sec @ 12 bit
Trigger Delay	0 ... 2 sec, Tracking and buffering of up to 256 triggers
External Flash Sync	via Exposure Active $t_{delay\ flash} \leq 3\ \mu$ sec, $t_{duration} = t_{exposure}$

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 μ sec

Memory

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

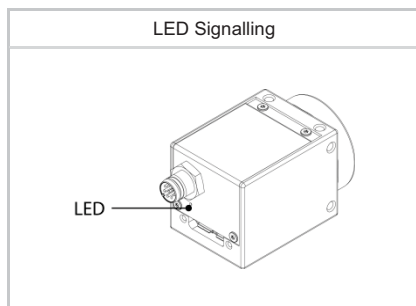
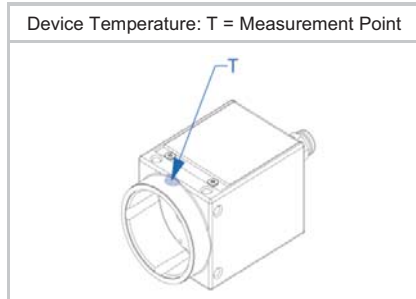
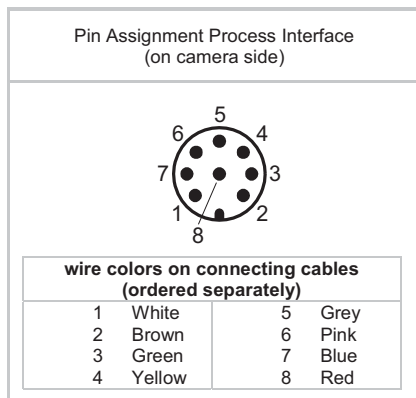
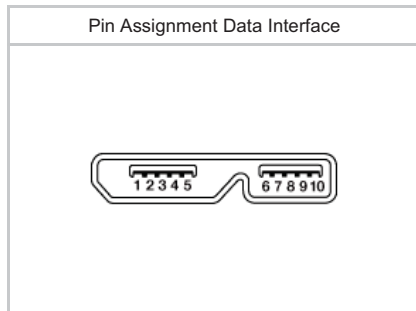
Interface Data

Interface	USB3.0 (5000 Mbits/sec)
USB Vendor ID / Product ID	0x2825 / 0x129

USB 3 Vision® Features

Events	DeviceTemperatureStatusChanged, EventLost, ExposureEnd, ExposureStart, FrameEnd, FrameStart, FrameTransferSkipped, Line0..3 FallingEdge, Line0..3 RisingEdge, TransferBufferFull, TransferBufferReady, TriggerOverlapped, TriggerReady, TriggerSkipped
Transmission via Asynchronous Message Channel	
Frame Counter	up to 2 ³²
Payload Size	0 ... 6912200 Byte
Timestamp	64 bit
USB Vision	v1.0.1

¹⁾ Sensor readout, different from pixel format



Interfaces and Connectors

Data and Power Interface	USB 3.0 USB 2.0 Connector:	Transfer Rate 5000 Mbits/sec Transfer Rate 480 Mbits/sec 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 MicB_SSRX- MicB_SSRX+
Process Interface	Connector: Assignment:	M8/8-pin (SACC-DSI-M8MS-8CON-M8-L180) 1 - GPIO (Line2) 2 - not connected 3 - IN1 (Line0) 4 - GND IN1 5 - Power VCC OUT1 6 - OUT1 (Line3) 7 - GND GPIO 8 - GPIO (Line1)

Caution

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

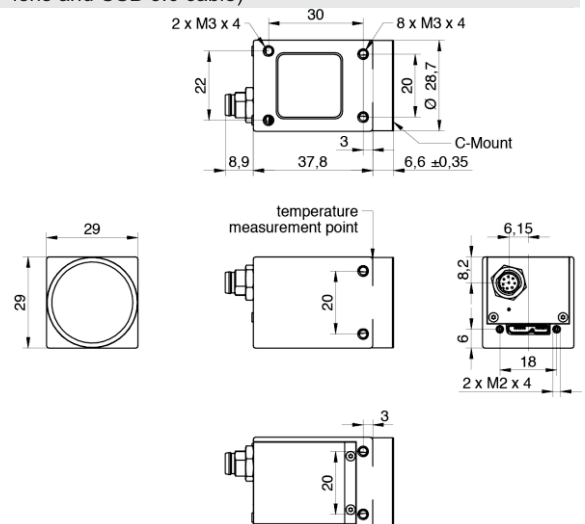
Optical Data

Lens Mount	C-Mount
Optical Filter	IR cut filter

Mechanical Data

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



Weight	90 g
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Environmental Data


Storage Temperature	-10 °C ... +70 °C
Operating Temperature *)	+5 °C ... +65 °C @ T = Measurement Point or +5 °C ... +72 °C @ internal Temperature Sensor Ambient temperature above 35 °C requires heat dissipation measures.
Int. Temperature Sensor	yes, accuracy: ±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 Green Red Yellow Red flash	Power on, no link active Link active USB 3.0 Error or Link active USB 2.0 Sensor Readout activity Update
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Electrical Data

Power Supply	bus powered via USB3.0 interface
Power Consumption	approx. 2.8 W @ 166 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 μ sec
Digital Output	Optocoupler U_{EXT} : 5 ... 30 V DC I_{OUT} : max. 50 mA t_{ON} = typ. 3 μ sec t_{OFF} = typ. 40 μ 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 μ 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	 <p>* 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.</p>

Conformity

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

GenlCam™ Features

Short Exposure Range	-
Timer	Timer Selector: Timer Selector: Timer 1 TimerTriggerSource: Line0, SoftwareTrigger, ExposureStart, ExposureEnd, FrameTransferSkipped, TriggerSkipped, Off TimerDelay: 0 μ sec ... 2 sec, Step Size: 1 μ sec TimerDuration: 4 μ sec ... 2 sec, Step Size: 1 μ sec
Counter	Counter Selector: Counter 1, Counter 2 CounterValue: 0 ... 65535 Counter Event Source: Counter1End or Counter2End, ExposureActive, FrameTransferSkipped, FrameTrigger, TriggerSkipped and Off Counter Reset Source: Counter1End, Counter2End, Line0 and Off
Sequencer	Sequencer Characteristics: up to 128 sets, up to 4 possible paths for triggered set transitions, 6 trigger sources: Counter1End, Counter2End, ExposureActive, Line0, 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, Black Level, DeviceTemperature, ExposureTime, FrameID, Gain, Height, Image, ImageControl, LineStatusAll
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
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 ²⁾
Full HD	1920 x 1080	183	169
SXGA	1280 x 1024	192	192
XGA	1024 x 768	253	253
SVGA	800 x 600	320	320
VGA	640 x 480	393	393
CIF	352 x 288	622	622
QCIF	176 x 144	1101	1101
LineScan	1920 x 1024	190	186
	1920 x 512	370	360
	1920 x 256	710	710
	1920 x 128	1232	1201
	1920 x 64	1890	1889
	1920 x 32	2746	2746
	1920 x 16	3499	3436
	1920 x 8	4045	4019
	1920 x 4	4390	4253
	1920 x 2	4394	4261
	1920 x 1	-	-

²⁾ depends on the used interface

Distribution in the UK & Ireland



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Measurement &
Analysis**

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