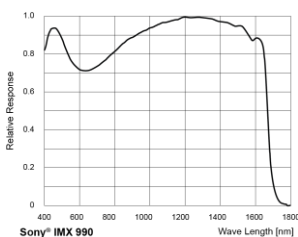
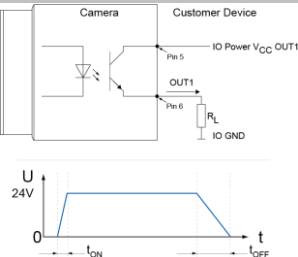




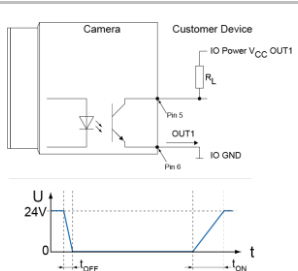
Sensor Graph: Relative Response



Digital Output: High Active



Digital Output: Low Active



ATTENTION: This product is subject to statutory export control regulations and may require written information on intended end use and final destination! Dual Use Classification ECCN/AL: 6A003B

Device Information

Model Name	VCXG-14SWIR.XC
Vendor Name	Baumer

Sensor Information

Sensor Name	Sony IMX990
Type	1/2" progressive scan CMOS
Shutter	Global Shutter
Resolution	1296 x 1032 pixels
Scan Area	6.48 mm x 5.16 mm
Pixel Size	5 µm x 5 µm

Data Quality

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

Dark Noise (σ)	260 (until 06-2024: 300) e- typical
Saturation	180000 e- typical
Dynamic Range	57 (until 06-2024: 52) dB typical
SNR	52.7 dB typical
Quantum efficiency η	69% @ 536 nm, 65% @ 631 nm typical

Acquisition

Resolution	1296 px x 1032 px		
Interface Frame Rate (depends on used interface performance)	Format	Resolution	max. Frame Rate (@ Trigger Mode) ²⁾
	Full Frame	1296 x 1032	92 fps
	Binning 2x2	648 x 516	97 fps
	Binning 2x1	648 x 1032	97 fps
	Binning 1x2	1296 x 516	97 fps

Acquisition Frame Rate ¹⁾	97 fps $t_{\text{readout}} = 10.3 \text{ msec}$ (max. Res. Full Frame) @ 10 bit
(Burst Mode)	71 fps $t_{\text{readout}} = 14 \text{ msec}$ (max. Res. Full Frame) @ 12 bit

Pixel Formats	Mono8, Mono10, Mono12, Mono12p
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Partial Scan	True Partial Scan with increasing Frame Rate on Y direction, Region of Interest (ROI) arbitrary
	Width: minimum 16, increment 16
	Height: minimum 2, increment 2

Adjustable Acquisition Frame Rate	Off or 0.01 ... 65535 Hz
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Acquisition Mode	Continuous, Single Frame and Multi Frame
Acquisition Status	AcquisitionActive, AcquisitionTrigger Wait
Exposure Mode	Timed
Shutter Mode	Global
Readout Mode	Sequential

Image Pre-Processing

Analogue Controls	Exposure Time (20 µsec ... 60 sec Step Size 1 µsec) Gain (0...48 dB), Offset (0 ... 255 LSB 12 bit)
Auto Function	ExposureAuto and GainAuto with BrightnessAutoPriority based on BrightnessAuto ROI
LUT	Luminance (12 bit)
Color Models	Mono
Color Processing	-
Color Adjustment	-

¹⁾ Sensor readout, different from pixel format

²⁾ depends on the used interface

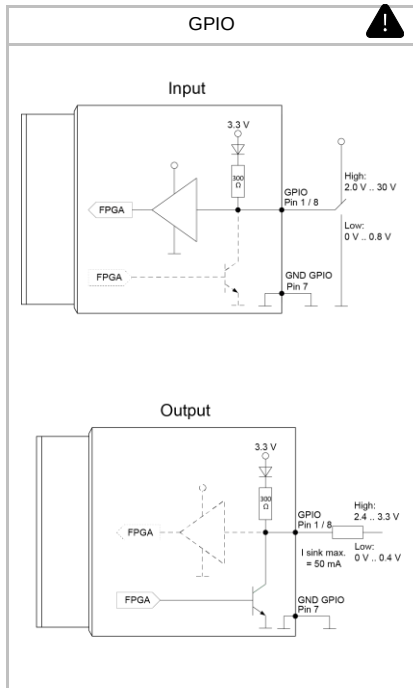
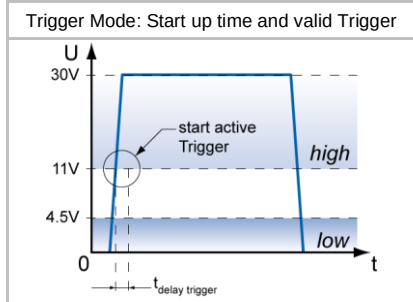
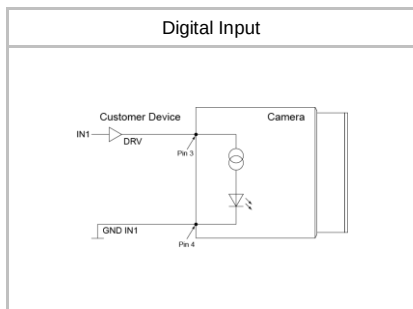


Image Pre-Processing

Color Enhancement	-
Color Tolerance	-
Binning Horizontal	1 or 2
Binning Vertical	1 or 2
Defect Pixel Correction	yes, static DPC: Defect Pixel List with up to 8167 Pixel Coordinates, dynamic DPC: Threshold
Image Flipping	Horizontal, vertical
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, Action CMD (Action 1), All or Off fixed Trigger Delay out of treadout: ¹⁾ 34 µsec @ 10 bit 50 µsec @ 12 bit max. Trigger Delay during treadout: ¹⁾ 34 µsec @ 10 bit 50 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
Line Sources (Output)	Off, ExposureActive, Timer1, ReadoutActive, UserOutput 1-3 and TriggerReady
Line Debouncer (Input)	Low and high signal separately selectable Debouncing Time 0 ... 5 msec, Step Size: 1 µsec

Memory

Image Buffer	5.2 MB 2 Images (Trigger Mode) / 1 Image (Free Running Mode)
Non-volatile Memory	128 kb

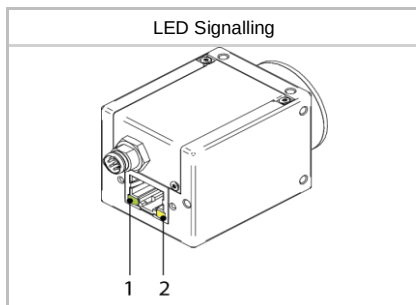
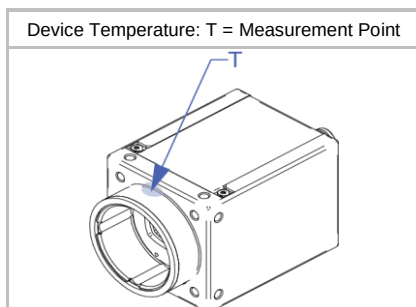
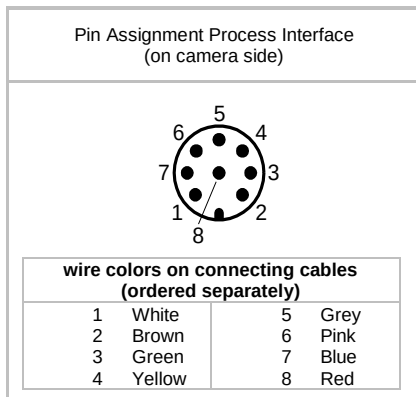
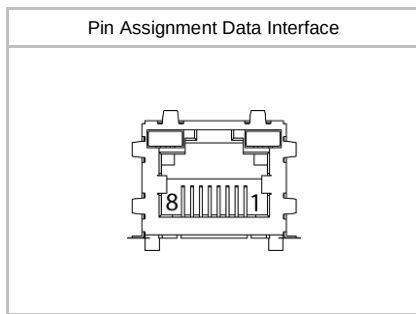
Network Interface Data

Interface	Gigabit Ethernet 1000BASE-T 1000 Mb/s/sec Fast Ethernet 100 BASE-T 100 Mb/s/sec
Ethernet IP Configuration	Persistent IP, DHCP, LLA
Packet Size	576 ... 9000 Byte, Jumbo Frames supported

GigE Vision® Features

Events Transmission via Asynchronous Message Channel	DeviceTemperatureStatusChanged, EventLost, ExposureEnd, ExposureStart, FrameEnd, FrameStart, FrameTransferSkipped, GigEVisionError, GigEVisionHeartbeatTimeout, PrimaryApplicationSwitch, Line0..2 FallingEdge, Line0..2 RisingEdge, TransferBufferFull, TransferBufferReady, TriggerOverlapped, TriggerReady, TriggerSkipped
Action CMD	yes, Action 1 for Trigger
Frame Counter	up to 2^{32}
Payload Size	0 ... 2873312 Byte
Timestamp	64 bit, resolution in nsec, increment = 8
Packet Delay	0 .. $2^{32} - 1$ nsec
Packet Resend	Resend Buffer: 6 MB (2 Images)
GigE Vision	v2.0

¹⁾ 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), screwable TYPE090 (according to GigE Vision Mechanical Supplement)	
	Assignment:	1 - MX1+	2 - MX1-
		3 - MX2+	4 - MX3+
		5 - MX3-	6 - MX2-
		7 - MX4+	8 - MX4-
Process Interface	Connector:	M8/8-pin (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.

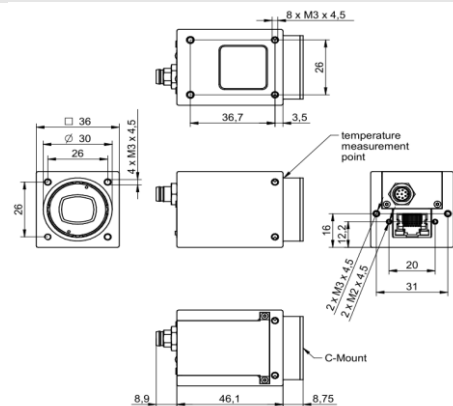
Optical Data

Lens Mount	C-Mount
Optical Filter	-

Mechanical Data

Housing	aluminum, baked varnish
Protection Class	IP40 (with mounted lens and GigE cable)
Weight	110 g

Dimensions



Additional Cooling Pipe	yes, connection with M3 for Push-in fitting
Cooling medium:-	compressed air, tested according ISO 8573-1:2010 classes [1:4:2]
	- liquid, compatible with aluminum, must contain bio-growth inhibitors and corrosion protection
	- maximum pressure 6 bar for compressed air and liquid

Environmental Data

Storage Temperature	-20 °C ... + 70 °C
Operating Temperature	0 °C ... +65 °C @ T = Measurement Point or 0 °C ... +75 °C @ internal Temperature Sensor
	Note: Ambient temperature above 32 °C requires heat dissipation measures.
Int. Temperature Sensor	yes, InHouse: step size 0.0625 °C, accuracy ±0.5 °C (typ) 0 °C ... +85 °C, Sensor: step size 0.125 °C, accuracy not specified
Humidity	10 % ... 90 % non-condensing

^{*)} the maximum temperature for Sony sensor characteristics (sensor performance) are guaranteed up to 49 °C @ Measurement Point or up to 60 °C @ internal temperature sensor

LED Signalling

LED	LED 1	Yellow static - Error Yellow flash - TX active
	LED 2	Green static - Link ON Green flash - RX active

Electrical Data

Power Supply (ext.)	VCC: 12 ... 24 V DC $\pm$ 20% I: 92 ... 185 mA
Power over Ethernet	-
Power Consumption	approx. 2.2 W @ 12 VDC and 92 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 	* 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, UL Recognized, KC
KC Registration No. / Date	R-R-BkR-VCXG-14SWIRXC / 16.12.2024
MTBF	53 years @ T = 45 °C / 34 years @ T = 60 °C T = Measurement Point

GenlCam™ Features

Short Exposure Range	-
Timer	Timer Selector: Timer 1 TimerTriggerSource: Line0, SoftwareTrigger, ExposureStart, ExposureEnd, FrameTransferSkipped, TriggerSkipped, Action 1 and 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, Line0..2 and Off Counter Reset Source: Counter1End, Counter2End, Line0..2 and Off

GenICam™ Features

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
User Sets	Factory Settings: UserSet0 (read only) Freely Programmable: UserSet1, UserSet2, UserSet3 Parameters: any user definable Parameter
Acquisition Abort	Delay up to 14 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 and Sensor InHouse: Event generation, if temperature status changed from Normal to Underrun, Normal to High, High to Exceeded and Exceeded to Normal Exceeded (no image transfer) = max. internal temperature sensor + 1 °C Underrun (no image transfer) = min. internal temperature sensor - 1 °C
Device Link Throughput Limit	yes, up to max. Device Link Speed
Custom Data	yes, 128 Byte with CustomDataKonfiguration Mode
Optical Black Pixel Area	yes, On / Off extends the right image area by 96 optical black pixels, full frame resolution changed to 1392 px x 1032 px
Black Level Auto Adjust	yes, On / Off
Calibration Data	yes, camera calibration values can stored: CalibrationMatrix, CalibrationMatrixNew, CalibrationFocalLenght, CalibrationAngularAperture, GeometryDistortionValue: k1, k2, p1, p2, k3, CalibrationVector: tvec, rvec and CalibrationDataVersion
Device Indicator Mode (LED)	Active (not switchable)
SFNC Version	2.4.0

Factory Settings after Start-Up

Ethernet IP Configuration	DHCP, LLA
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	static DPC: On, dynamic DPC: On (Threshold 15 [DN8])
Fixed Pattern Noise Correction	-
Optical Black Pixel Area	Off
Black Level Auto Adjust	On
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 ²⁾
SXGA	1280 x 1024	126	94
HD720	1280 x 720	175	133
XGA	1024 x 768	165	156
SVGA	800 x 600	207	207
VGA	640 x 480	253	253
CIF	352 x 288	399	399
QVGA	320 x 240	463	463
QCIF	176 x 144	709	709
SXGA	1280 x 1024	126	94
HD720	1280 x 720	175	133
XGA	1024 x 768	165	156
SVGA	800 x 600	207	207
VGA	640 x 480	253	253
CIF	352 x 288	399	399
QVGA	320 x 240	463	463
QCIF	176 x 144	709	709

²⁾ depends on the used interface