Device Information

Model Name	VCXG.2-15C.I
Vendor Name	Baumer

Sensor Information

Sensor Name	Sony IMX273 Gen2
Type	1/2.9″ progressive scan CMOS
Shutter	Global Shutter
Resolution	1440 × 1080 pixels
Scan Area	4.96 mm x 3.72 mm
Pixel Size	3.45 µm x 3.45 µm

Data Quality

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

Dark Noise (σ)	2 e- typical
Saturation	9500 e- typical
Dynamic Range	71 dB typical
SNR	40 dB typical
Quantum efficiency η	48% @ 465 nm, 58% @ 536 nm, 54% @ 631 nm typical

Acquisition

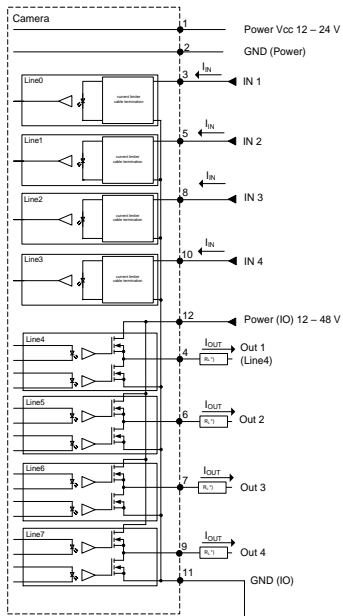|			
Resolution	1440 px x 1080 px		
Interface Frame Rate (depends on used interface performance)	Format	Resolution	max. Frame Rate (@ Trigger Mode) [2]
	Full Frame	1440 x 1080	79 fps
	Binning 2x2	720 x 540	120 fps
	Binning 2x1	720 x 1080	120 fps
	Binning 1x2	1440 x 540	120 fps
Acquisition Frame Rate [1] (Burst Mode)	121 fps | $t_{readout}$ = 8.26 msec (max. Res. Full Frame) @ 10 bit 111 fps | $t_{readout}$ = 9.01 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 Width: minimum 16, increment 16 Heigth: minimum 2, increment 2		
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

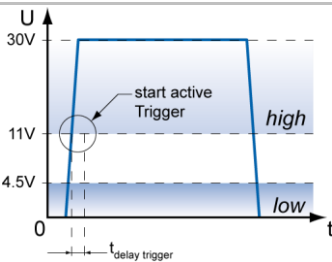|	
Analog Controls	Exposure Time (1 µsec … 60 sec | Step Size 1 µsec) Gain (0…48 dB), Offset (0 ... 255 LSB | 12 bit)
Auto Function	ExposureAuto and GainAuto with BrightnessAutoPriority based on BrightnessAuto ROI BalanceWhiteAuto and ColorTransformationAuto based on BalanceWhiteAuto ROI
LUT	Luminance (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) based on Region of Interest (ROI)

Sensor Graph: Relative Response

IMX 273

[1] Sensor readout, different from pixel format

[2] depends on the used interface

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

TDS_VCXG.2-15C.I
03.11.2022

1

Baumer Optronic GmbH
Radeberg, Germany

[1] Sensor readout, different from pixel format

Image Pre-Processing

Color Enhancement	Color Transformation to sRGB color space by optimized Matrix for 3000 K, 5000 K, 6500 K and 9500 K Lightsource or User defined Matrix
Color Tolerance	-
Binning Horizontal	1 or 2
Binning Vertical	1 or 2
Defect Pixel Correction	via Defect Pixel List with up to 512 Pixel Coordinates
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, 3), Software, Counter 1, 2 End, Action CMD (Action 1), All or Off fixed Trigger Delay out of $t_{readout}$: [1] 54.9 µsec @ 10 bit 56.8 µsec @ 12 bit max. Trigger Delay during $t_{readout}$: [1] 57.3 µsec @ 10 bit 60 µsec @ 12 bit
Trigger Delay	0 ... 2 sec, Tracking and buffering of up to 256 triggers
External Flash Sync	via Exposure Active $t_{delay\ flash} \leq 3$ µsec, $t_{duration} = t_{exposure}$
Encoder Function	yes, via Counter and Trigger Source
PTP Function	-

Digital I/Os

Lines	Input: Line 0 .. 3, Output: Line 4 .. 7, GPIO: no
Line Sources (Output)	Off, Line 0-3, ExposureActive, Timer1Active ReadoutActive, UserOutput 1-4 and TriggerReady
Line Format (Output)	yes, Tri-State, PushPull, OpenDrain, OpenSource
PWM function (Output)	yes, Line 4 .. 7 PWM Mode: Off, One Pulse, FixedFrequency PWM feature: PWMDuration, PWMDutyCyle Configuration Mode for lightning protection: MaxPWMDuration, MaxPWMDutyCycle
Line Debouncer (Input)	Low and high signal separately selectable Debouncing Time 0 … 5 msec, Step Size: 1 µsec

Memory

Image Buffer	36 MB 8 Images (Trigger Mode) / 1 Image (Free Running Mode)
Non-volatile Memory	128 kb

Network Interface Data

Interface	Gigabit Ethernet	1000BASE-T	1000 Mbits/sec
	Fast Ethernet	100 BASE-T	100 Mbits/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..7 FallingEdge, Line0..7 RisingEdge, TransferBufferFull, TransferBufferReady, TriggerOverlapped, TriggerReady, TriggerSkipped
Action CMD	yes, Action 1 for Trigger
Frame Counter	up to 2^{32}
Payload Size	0 … 4665824 Byte

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

TDS_VCXG.2-15C.I   2   Baumer Optronic GmbH
03.11.2022   Radeberg, Germany

Pin Assignment Data Interface

Pin Assignment Process Interface
(on camera side)

wire colors on connecting cables (ordered separately)			
1	brown	2	blue
3	white	4	green
5	pink	6	yellow
7	black	8	grey
9	red	10	violet
11	grey-pink	12	red-blue

Device Temperature: T = Measurement Point

LED Signalling
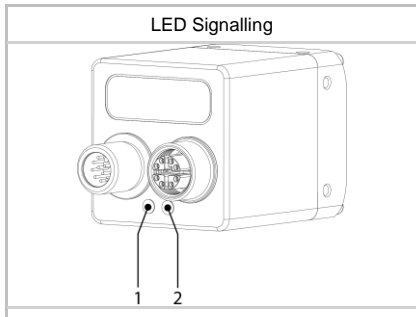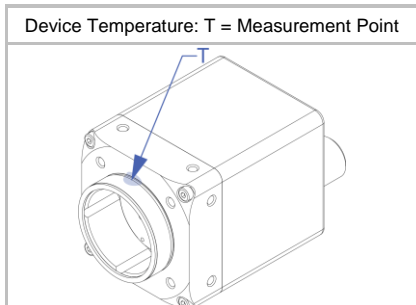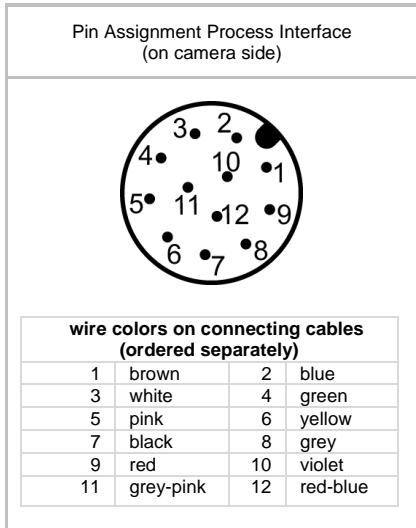
GigE Vision® Features

Timestamp	64 bit, resolution in nsec, increment = 8
Packet Delay	0 .. $2^{32}-1$ nsec
Packet Resend	Resend Buffer: 36 MB (8 Images)
GigE Vision	v2.0

Interfaces and Connectors

Data and Power Interface	Gigabit Ethernet	Transfer Rate	1000 Mbits/sec
	Fast Ethernet	Transfer Rate	100 Mbits/sec
	Connector:	M12 / 8-pol x-coded (SACC-CI-M12FS-8CON-L180-10G)	
	Assignment:	1 - MX1+	2 - MX1-
		3 - MX2+	4 - MX2-
		5 - MX4+	6 - MX4-
		7 - MX3-	8 - MX3+
Process Interface	Connector:	M12/12-pin a-coded (SACC-CI-M12MS-12CON-L180)	
	Assignment:	1 - Power Vcc	2 - GND (Power)
		3 - IN1 (Line0)	4 - OUT1 (Line4)
		5 - IN2 (Line1)	6 - OUT2 (Line5)
		7 - OUT3 (Line6)	8 - IN3 (Line2)
		9 - OUT4 (Line7)	10 - IN4 (Line3)
		11 - GND (IO)	12 - Power (IO)

Optical Data

Lens Mount	C-Mount
Optical Filter	IR cut filter

Mechanical Data

|	
Housing	aluminum, hard anodized
Protection Class	IP40 (with mounted lens and GigE cable)
	IP54 (with mounted lens and GigE cable)
	IP65/67 (with mounted tube and cable)
	IP69k (with stainless steel housing system)
Weight	137 g
Dimensions	

tube adapter
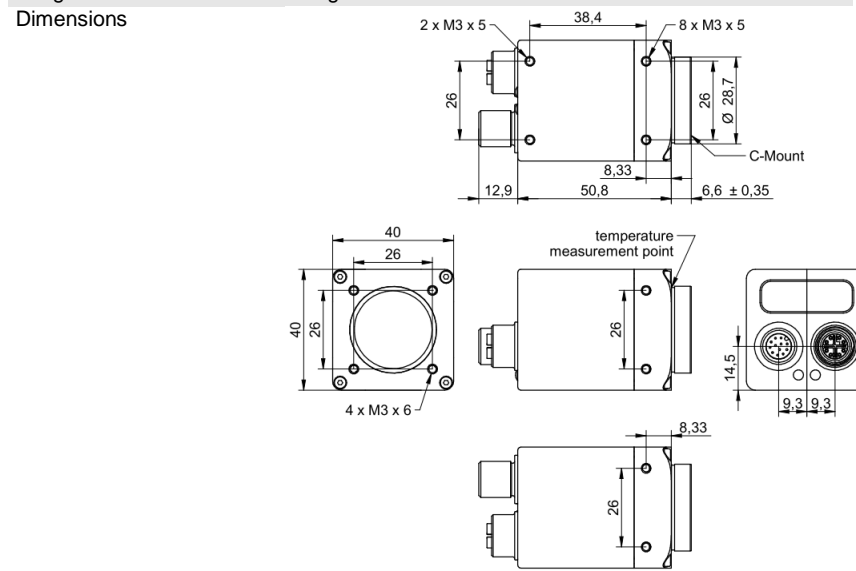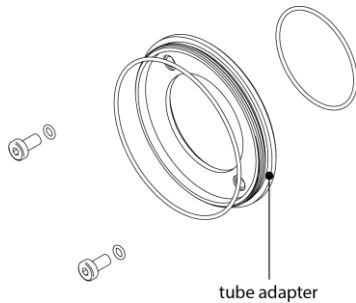
including seals and screws

Article Number	Diameter	Length
11185373	Ø 49,5 mm	5,25 mm
11185377	Ø 65 mm	5,25 mm
11704311	Ø 95 mm	5,25 mm

tube
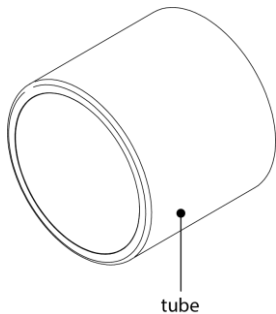
Article Number	Diameter	Cover Glass	Length
11185370	Ø 49,5 mm		44 mm
11185374	Ø 65 mm	PMMA (Acryl)	58 mm
11704312	Ø 95 mm		70 mm
11701124	Ø 49,5 mm	Tempered laminated safety glass	44 mm
11701125	Ø 65 mm		58 mm

distance ring
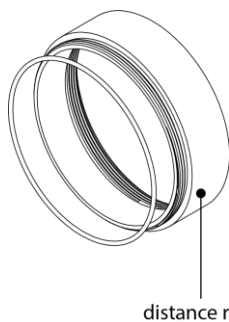
including seal

Article Number	Diameter	Length
11185372	Ø 49,5 mm	6 mm
11185371	Ø 49,5 mm	12 mm
11211571	Ø 49,5 mm	36 mm
11185376	Ø 65 mm	6 mm
11185375	Ø 65 mm	12 mm
11198906	Ø 65 mm	36 mm
11704395	Ø 95 mm	6 mm
11704397	Ø 95 mm	12 mm
11704394	Ø 95 mm	36 mm

Environmental Data

Storage Temperature	-20 °C … + 70 °C
Operating Temperature *)	0 °C … +65 °C @ T = Measurement Point or 0 °C … +70 °C @ internal Temperature Sensor Note: Ambient temperature above 45 °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 55 °C @ Measurement Point or up to 59 °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 ± 20% I: 123 … 248 mA
Power over Ethernet	Class 1 device VCC: 36 … 57 V DC I: 77 mA @ 48 VDC
Power Consumption	approx. 3.0 W @ 12 VDC and 79 fps approx. 3.7 W @ 48 VDC (PoE) and 79 fps (Factory Setting "Default")
Digital Input	Isolated, short circuit protection $U_{IN(low)}$: 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 µsec
Digital Output	Isolated, short circuit protected U_{EXT}: 12 … 48 V DC [Power (IO)] (See documentation for guidelines when using >30V.) I_{OUT}: Continuously: max. 1.5 A PWM t_{ON} max 1s / Duration max 40%: max. 2.5 A (Max. current can be used with one output or as a sum of all outputs used.) t_{ON} = < 0.2 µsec t_{OFF} = < 0.2 µsec max. Frequency: 500 kHz
GPIO	no

Conformity

Conformity	CE, RoHS, REACH
KC Registration No. / Date	- / -
MTBF	46 years @ T = 45 °C / 30 years @ T = 60 °C T = Measurement Point

TDS_VCXG.2-15C.I
03.11.2022

4

The Information in this document is subject to change without notice.
Baumer Optronic GmbH
Radeberg, Germany

GenICam™ Features

Short Exposure Range	yes, ShortExposureTimeEnable Short Exposure Range 1 μsec … 60 sec Default Exposure Range 15 μsec … 60 sec
Timer	Timer Selector: Timer 1 TimerTriggerSource: Line0, SoftwareTrigger, ExposureStart, ExposureEnd, FrameTransferSkipped, TriggerSkipped, Off TimerDelay: 0 μsec … 2 sec, Step Size: 1 μsec TimerDuration: 4 μsec … 2 sec, Step Size: 1 μsec
Counter	Counter Selector: Counter 1, Counter 2 CounterValue: 0 … 65535 Counter Event Source: Counter1End or Counter2End, ExposureActive, FrameTransferSkipped, FrameTrigger, TriggerSkipped, Line0..3 and Off Counter Reset Source: Counter1End, Counter2End, Line0..3 and Off
Sequencer	Sequencer Characteristics: up to 128 sets, up to 4 possible pathes for triggered set transitions, 6 trigger sources: Counter1End, Counter2End, ExposureActive, Line0..3, 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 9.1 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 with CustomDataKonfiguration Mode
Calibration Data	yes, camera calibration values can stored: CalibrationMatrix, CalibrationMatrixNew, CalibrationFocalLenght, CalibrationAngularAperture, GeometryDistortionValue: k1, k2, p1, p2, k3, CalibrationVector: tvec, rvec and CalibrationDataVersion
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	BayerRG8
Partial Scan	Off
Acquisition Frame Rate	Off
Timer/Counter/Sequencer	Off
Defect Pixel Correction	ON
Fixed Pattern Noise Correction	-
Digital Input	Line0 .. 3, invert = false, line format = Tri State
Digital Output	Line4 .. 7, invert = false, line source = Off, line format = Open Source
GPIO 1/2	no
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	127	94
HD720	1280 x 720	177	133
XGA	1024 x 768	167	156
SVGA	800 x 600	210	210
VGA	640 x 480	258	258
CIF	352 x 288	405	405
QVGA	320 x 240	472	472
QCIF	176 x 144	708	708
LineScan	1440 x 1024	127	83
	1440 x 512	243	167
	1440 x 256	447	334
	1440 x 128	772	668
	1440 x 64	1212	1212
	1440 x 32	1695	1695
	1440 x 16	2116	2116
	1440 x 8	2415	2415
	1440 x 4	2600	2600
	1440 x 2	2703	2703
	1440 x 1	-	-

[2] depends on the used interface