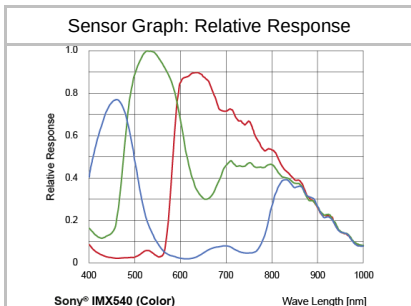




Device Information

Model Name	VCXG-241C.I.XT
Vendor Name	Baumer

Sensor Information

Model Name	Sony IMX540 Gen4
Type	1.2" progressive scan CMOS
Shutter	Global Shutter
Resolution	5312 × 4592 pixels
Scan Area	14.55 mm × 12.58 mm
Pixel Size	2.74 µm × 2.74 µm

Data Quality

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

Dark Noise (σ)	2.3 e- typical
Saturation	9000 e- typical
Dynamic Range	70 dB typical
SNR	40 dB typical
Quantum efficiency η	45% @ 465 nm, 52% @ 536 nm, 41% @ 631 nm typical

Acquisition

Resolution	5312 px x 4592 px		
Interface Frame Rate (depends on used interface performance)	Format	Resolution	max. Frame Rate (@ Trigger Mode) ²⁾
	Full Frame	5312 x 4592	5 fps
	Binning 2x2	2656 x 2296	5 fps
	Binning 2x1	2656 x 4592	5 fps
	Binning 1x2	5312 x 2296	5 fps

Acquisition Frame Rate ¹⁾ (Burst Mode)	5 fps $t_{\text{readout}} = 174$ msec (max. Res. Full Frame) @ 10 bit
	5 fps $t_{\text{readout}} = 174$ msec (max. Res. Full Frame) @ 12 bit

Pixel Formats	BayerRG8, BayerRG10, BayerRG12, BayerRG12p, Mono8, Mono10, Mono12, Mono12p, RGB8, BGR8
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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
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Adjustable Acquisition Frame Rate	Off or 0.01 ... 65535 Hz
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Acquisition Mode	Continuous, Single Frame and Multi Frame
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Acquisition Status	AcquisitionActive, AcquisitionTrigger Wait
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Exposure Mode	Timed
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Readout Mode	Overlapped, Sequential
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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)
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Auto Function	ExposureAuto and GainAuto with BrightnessAutoPriority based on BrightnessAuto ROI BalanceWhiteAuto and ColorTransformationAuto based on BalanceWhiteAuto ROI
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LUT	Luminance (12 bit)
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Color Models	Mono, Raw Bayer, RGB and BGR
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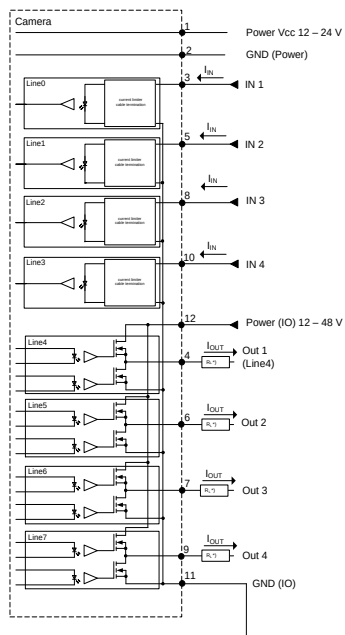
Color Processing	Integrated color processor for high quality color calculation
------------------	---

Color Adjustment	Manual White Balance Automatic White Balance (Once or Continuous) based on Region of Interest (ROI)
------------------	--

¹⁾ Sensor readout, different from pixel format

²⁾ depends on the used interface

Digital Input / Output: principle circuit diagram



Trigger Mode: Start up time and valid Trigger

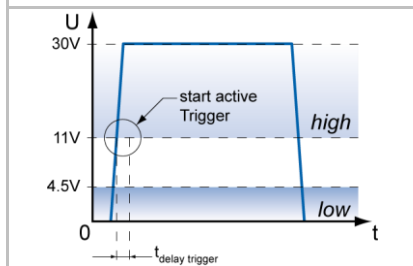


Image Pre-Processing

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 treadout: ¹⁾ 315 µsec @ 12 bit max. Trigger Delay during treadout: ¹⁾ 315 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 .. 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	140 MB 2 Images (Trigger Mode) / 1 Image (Free Running Mode)
Non-volatile Memory	128 kb

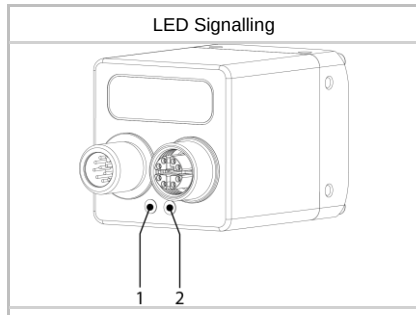
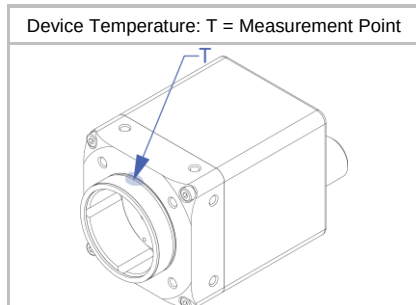
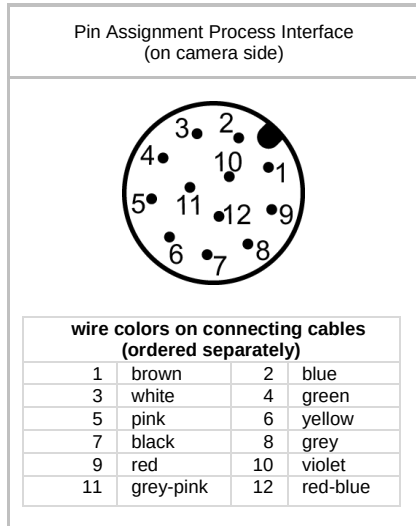
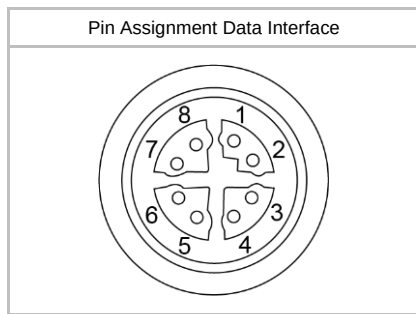
Network Interface Data

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	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 ... 73178336 Byte

¹⁾ Sensor readout, different from pixel format



GigE Vision® Features

Timestamp	64 bit, resolution in nsec, increment = 8
Packet Delay	0 .. 2^{32} - 1 nsec
Packet Resend	Resend Buffer: 140 MB (2 Images)
GigE Vision	v2.0

Interfaces and Connectors

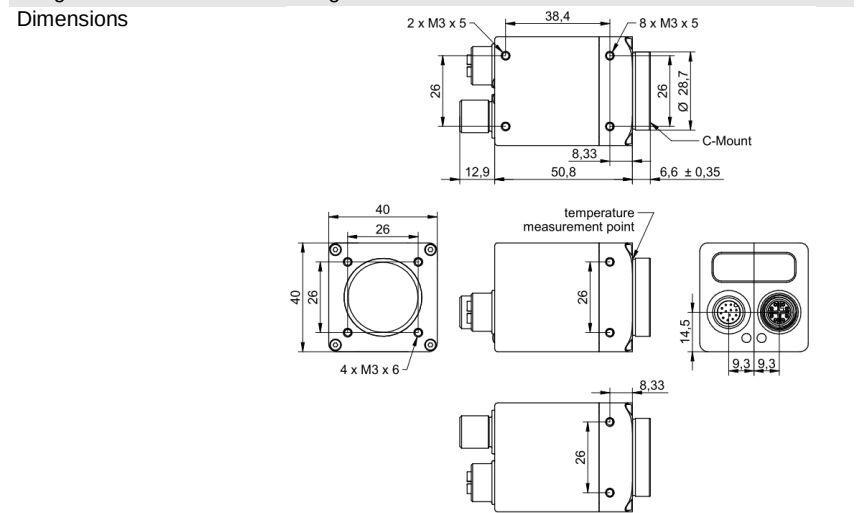
Data and Power Interface	Gigabit Ethernet	Transfer Rate	1000 Mbits/sec
	Fast Ethernet	Transfer Rate	100 Mbits/sec
	Connector:	M12 / 8-pol x-coded (SACC-CI-M12FS-8CON-L180-10G)	
	Assignment:	1 - MX1+	2 - MX1-
		3 - MX2+	4 - MX2-
		5 - MX4+	6 - MX4-
		7 - MX3-	8 - MX3+
Process Interface	Connector:	M12/12-pin 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

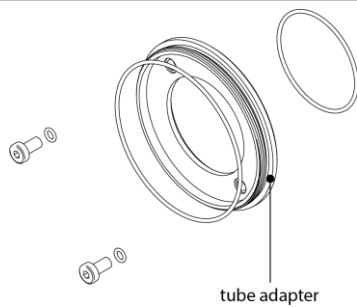
Lens Mount	C-Mount
Optical Filter	IR cut filter

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



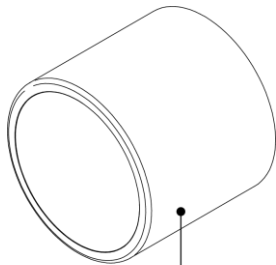
Optional accessories for IP65/67 protection (ordered separately)



tube adapter

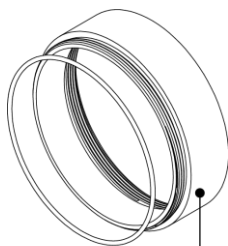
including seals and screws

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



tube

Article Number	Diameter	Cover Glass	Length
11185370	Ø 49,5 mm	PMMA (Acryl)	44 mm
11185374	Ø 65 mm		58 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

Environmental Data

Storage Temperature	-40 °C ... + 70 °C
Operating Temperature ^{*)}	-40 °C ... +65 °C @ T = Measurement Point or -40 °C ... +75 °C @ internal Temperature Sensor
	Note: Ambient temperature above 40 °C requires heat dissipation measures.
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 from -10 °C up to 50 °C @ Measurement Point or from -10 °C 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: 120 ... 242 mA
Power over Ethernet	Class 1 device VCC: 36 ... 57 V DC I: 78 mA @ 48 VDC
Power Consumption	approx. 2.9 W @ 12VDC and 5 fps approx. 3.7 W @ 48 VDC (PoE) and 5 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	43 years @ T = 45 °C / 29 years @ T = 60 °C T = Measurement Point

GenICam™ Features

Short Exposure Range	yes, ShortExposureTimeEnable Short Exposure Range 1 ... 3 µsec - 39 µsec ... 60 sec Default Exposure Range 39 µsec ... 60 sec
Timer	Timer Selector: Timer 1 TimerTriggerSource: Line0, SoftwareTrigger, ExposureStart, ExposureEnd, FrameTransferSkipped, TriggerSkipped, Action 1 and 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 174 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
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	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⁾
HXGA	4096 x 3072	8	8
UHD (4K)	3840 x 2160	11	11
Full HD	1920 x 1080	22	22
SXGA	1280 x 1024	23	23
HD720	1280 x 720	32	32
XGA	1024 x 768	30	30
SVGA	800 x 600	37	37
VGA	640 x 480	45	45
CIF	352 x 288	67	67
QVGA	320 x 240	76	76
QCIF	176 x 144	105	105
LineScan	5312 x 4096	6	5
	5312 x 2048	12	11
	5312 x 1024	23	22
	5312 x 512	43	43
	5312 x 256	73	73
	5312 x 128	112	112
	5312 x 64	152	152
	5312 x 32	185	185
	5312 x 16	208	208
	5312 x 8	222	222
	5312 x 4	222	222
	5312 x 2	222	222
	5312 x 1	-	-

²⁾ depends on the used interface