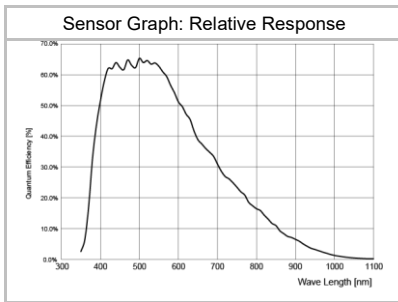




¹⁾ Sensor readout, different from pixel format

²⁾ Depends on the used interface



Sensor Information

Model Name	Gpixel GMAX3249
Type	2" progressive scan CMOS
Shutter	Global Shutter
Resolution	7008 × 7000 pixels
Scan Area	22.4 mm x 22.4 mm
Pixel Size	3.2 µm x 3.2 µm

Data Quality

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

Dark Noise (σ)	5 e- typical
Saturation	10000 e- typical
Dynamic Range	66 dB typical
SNR	40 dB typical
Quantum efficiency η	61% @ 536 nm typical

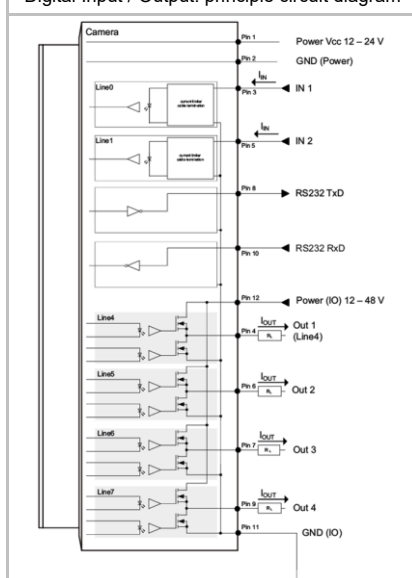
Acquisition

Resolution	7008 px x 7000 px		
Interface Frame Rate (depends on used interface performance)	Format	Resolution	max. Frame Rate (@ Trigger Mode) ²⁾
	Full Frame	7008 x 7000	23 fps
	Binning 2x2	3504 x 3500	23 fps
	Binning 2x1	3504 x 7000	23 fps
	Binning 1x2	7008 x 3500	23 fps
Acquisition Frame Rate ¹⁾ (Burst Mode)	23 fps $t_{\text{readout}} = 43.4 \text{ msec}$ (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 64, increment 32 Height: minimum 1, increment 1		
Multi ROI	Up to 8 non-overlapping regions		
Ad. 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		
Readout Mode	Overlapped, Sequential		

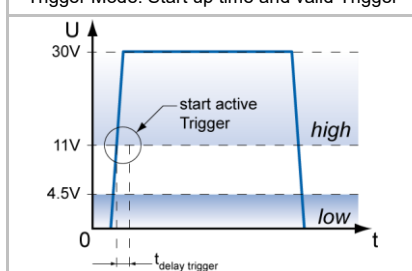
Image Pre-Processing

Analog Controls	Exposure Time (20 µsec ... 60 sec Step Size 1 µsec) Gain (0...30 dB), Offset (-256 ... 255 LSB 12 bit)
Auto Functions	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	-
Color Tolerance	-
Binning	Horizontal: 1 or 2, Vertical: 1 or 2
Image Flipping	Horizontal, vertical
Defect Pixel Correction	via Defect Pixel List with up to 512 Pixel Coordinates
Shading Correction	Brightness correction per tile of 64x64 pixels
Sharpening	-
HDR	Yes, up to +25 dB, non-linear output with tone mapping
Image Compression	-

Digital Input / Output: principle circuit diagram



Trigger Mode: Start up time and valid Trigger



Process Synchronization

Trigger Mode	Off (Free Running), On (Trigger)
Trigger Overlap Type	Readout
Trigger Sources	Hardware (Line0,1), Software, All, ActionCMD (Action 1) or Off fixed Trigger Delay out of t _{readout} : ¹⁾ 17,8 µsec @ 12 bit max. Trigger Delay during t _{readout} : ¹⁾ 30,1 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} ≤ 1 µsec, t _{duration} = t _{exposure}
Encoder Function	yes, via Counter and Trigger Source
Precision Time Protocol (PTP) Function	IEEE1588-2008 clock synchronization, default profile 1.0, master and slave mode

Digital I/Os

Lines	Input: Line 0 .. 1, Output: Line 4 .. 7, GPIO: no, RS232: Line 2 .. 3 (reserved for future use)
Output Sources	Off, ExposureActive, Timer1, ReadoutActive, UserOutput 1-3 and TriggerReady
Output Line Mode	yes, Tri-State, PushPull, OpenDrain, OpenSource
Output PWM function	yes, Line 4 .. 7 PWM Mode: Off, One Pulse, FixedFrequency PWM feature: PWMDuration, PWMDutyCycle Configuration Mode for lightning protection: MaxPWMDuration, MaxPWMDutyCycle
Line Debouncer	Low and high signal separately selectable Debouncing Time 0 ... 5 msec, Step Size: 1 µsec

Memory

Image Buffer	1024 MB 21 Images (Trigger Mode) / 1 Image (Free Running Mode)
Non-volatile Memory	128 kb

Network Interface Data

Interface	10 Gigabit Ethernet 10GBASE-T 10.000 Mbits/sec 5 Gigabit Ethernet 5GBASE-T 5.000 Mbits/sec 2.5 Gigabit Ethernet 2.5GBASE-T 2.500 Mbits/sec Gigabit Ethernet 1000BASE-T 1.000 Mbits/sec Fast Ethernet 100BASE-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, Error, GigEVisionHeartbeatTimeOut, Line0..3 FallingEdge, Line0..3 RisingEdge, PrimaryApplicationSwitch, TransferBufferFull, TransferBufferReady, TriggerOverlapped, TriggerReady, TriggerSkipped
Action CMD	yes, Action 1 for Trigger
Frame Counter	up to 2 ³²
Payload Size	0 ... 98112240 Byte
Timestamp	64 bit, resolution in nsec, increment = 8
Packet Delay	0 .. 2 ³² - 1 nsec
Packet Resend	
GigE Vision	v2.0

A circular object, possibly a pizza, is divided into eight equal segments by two perpendicular lines. The segments are numbered 1 through 8 in a clockwise direction starting from the top right. Each segment contains a small circle with a dot inside. The segments are arranged as follows: 1 (top right), 2 (right), 3 (bottom right), 4 (bottom), 5 (bottom left), 6 (left), 7 (top left), and 8 (top).

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

-- C-/M58-/TFL-mount

A line drawing of the rear panel of the device. It features a square cutout at the top center. Below it, there are two circular ports. The left port is labeled '1' and the right port is labeled '2'. Both ports have a threaded outer ring and a central pin or contact point.

Data and Power Interface	10 Gigabit Ethernet	Transfer Rate	10,000 Mb/s/sec
	5 Gigabit Ethernet	Transfer Rate	5,000 Mb/s/sec
	2.5 Gigabit Ethernet	Transfer Rate	2,500 Mb/s/sec
	Gigabit Ethernet	Transfer Rate	1,000 Mb/s/sec
	Fast Ethernet	Transfer Rate	100 Mb/s/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 - RS232 TxD
		9 - OUT4 (Line7)	(Line2)
		11 - GND (IO)	10 - RS232 RxD
			(Line3)
	12 - Power (IO)		
Lens Control Interface (located within support)	Connector:	6 pin (JST BM06B-SRSS-TB)	
	Assignment:	1 - Power (lens)	2 - GND (lens)
		2 - UART Rx/D	4 - UART Tx/D
		5 - NC	6 - NC

Lens Mount	M58-Mount
Optical Filter	-

Housing aluminum, hard anodized,
IP40 (with mounted lens and 10 GigE cable)

Dimensions

Technical drawing of the Baumer IP40 camera housing, showing front, top, and side views with dimensions:

- Front View:** Shows the lens area with a diameter of $M58 \times 0,75$. The distance from the center of the lens to the bottom edge is labeled "Pixel 0,0".
- Top View:** Shows the overall width of $92,2$ and the mounting bracket width of $8,33$. The distance between the mounting holes is 26 . The mounting holes are labeled $10 \times M3 \times 5/7$.
- Side View:** Shows the height of the housing as $18,2$ and the distance from the bottom edge to the mounting holes as $12,9$. The total width including the mounting bracket is $103,82 \pm 0,4$.
- Bottom View:** Shows the overall width of $60 \pm 0,2$ and the distance between the mounting holes as $28,5$. The mounting holes are labeled $60 \pm 0,2$.
- Other Labels:** The Baumer logo is visible on the side view. A "temperature measurement point" is indicated on the top view.

Weight 485 g

Environmental Data

Storage Temperature	-30 °C ... + 70 °C
Operating Temperature	-30 °C ... +70 °C @ T = Measurement Point or -30 °C ... +70 °C @ internal Temperature Sensor Ambient temperature above 25 °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

LED Signaling

LED	Green flash	RX active
	Green	Link ON
	Yellow	Error
	Yellow flash	TX active



Electrical Data

Power Supply (ext.)	VCC: 24 V DC $\pm$ 20% I: 594 mA
Power over Ethernet	NA
Power Consumption	approx. 14.3 W @ 24VDC and 23 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 μ sec
Digital Output	Isolated, short circuit protected U_{EXT} : 12 ... 48 V DC [Power (IO)] I_{OUT} : Continuously: max. 1.5 A PWM t_{ON} max 1s / Duration max 40%: max. 2.5 A (Max. current for each output itself or summery of all outputs) t_{ON} = < 0.2 μ sec t_{OFF} = < 0.2 μ sec max. Frequency: 500 kHz
GPIO	NA
RS232 (reserved for future use)	RS232 compatible, not optically isolated Baud Rate: up to 115200, data bits: 8, stop bits: 1, Parity: none, flow control: none
Liquid lens control	NA

Conformity

Conformity	CE, RoHS, REACH, KC
KC Registration No. / Date	R-R-BkR-VLXT-650MI / 2022-11-25
MTBF	24 years @ T = 45 °C / 15 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 and Off Counter Reset Source: Counter1End, Counter2End, Line0 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, 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 43.4 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
Custom Data	yes, 128 Byte
SFNC Version	v2.4.0

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 .. 1, invert = false, line format = Tri State
Digital Output	Line4 .. 7, invert = false, line source = Off, line format = Open Source
GPIO	NA
TriggerSource	All

ROI Frame Rates, min Exposure, 8 bit sensor readout, Mono8 or BayerRG8

	Resolution	max. fps acquisition	max. fps interface ²⁾
HXGA	4096 x 3072	52	52
UHD (4K)	3840 x 2160	73	73
Full HD	1920 x 1080	145	145
SXGA	1280 x 1024	153	153
XGA	1024 x 768	202	202
SVGA	800 x 600	257	257
VGA	640 x 480	317	317
CIF	352 x 288	509	509
QCIF	176 x 144	930	930
Full Line	7008 x 4096	39	39
	7008 x 2048	77	77
	7008 x 1024	153	153
	7008 x 512	298	298
	7008 x 256	566	566
	7008 x 128	1024	1024
	7008 x 64	1720	1720
	7008 x 32	2609	2609
	7008 x 16	3505	3505
	7008 x 8	4250	4250
	7008 x 4	4733	4733
	7008 x 2	5043	5043
	7008 x 1	5043	5043

²⁾ depends on the used interface speed