

## Device Information

|             |              |
|-------------|--------------|
| Model Name  | VCXG.2-32M.I |
| Vendor Name | Baumer       |

## Sensor Information

|             |                              |
|-------------|------------------------------|
| Sensor Name | Sony IMX265 Gen2             |
| Type        | 1/1.8" progressive scan CMOS |
| Shutter     | Global Shutter               |
| Resolution  | 2048 x 1536 pixels           |
| Scan Area   | 7.06 mm x 5.29 mm            |
| Pixel Size  | 3.45 µm x 3.45 µm            |

## Data Quality

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

|                           |                      |
|---------------------------|----------------------|
| Dark Noise ( $\sigma$ )   | 2 e- typical         |
| Saturation                | 9500 e- typical      |
| Dynamic Range             | 71 dB typical        |
| SNR                       | 40 dB typical        |
| Quantum efficiency $\eta$ | 66% @ 536 nm typical |

## Acquisition

|   |  |             |   |
|---|--|-------------|---|
| Resolution  | 2048 px x 1536 px  |             |   |
| Interface Frame Rate<br>(depends on used interface performance) | Format   | Resolution  | max. Frame Rate<br>(@ Trigger Mode) <sup>2)</sup> |
|   | Full Frame   | 2048 x 1536 | 39 fps  |
|   | Binning 2x2  | 1024 x 768  | 56 fps  |
|   | Binning 2x1  | 1024 x 1536 | 56 fps  |
|   | Binning 1x2  | 2048 x 768  | 56 fps  |
| Acquisition Frame Rate <sup>1)</sup><br>(Burst Mode)            | 56 fps   $t_{\text{readout}} = 17.8$ 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<br>Width: minimum 16, increment 16<br>Height: minimum 1, increment 1 |             |   |
| 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   |             |   |

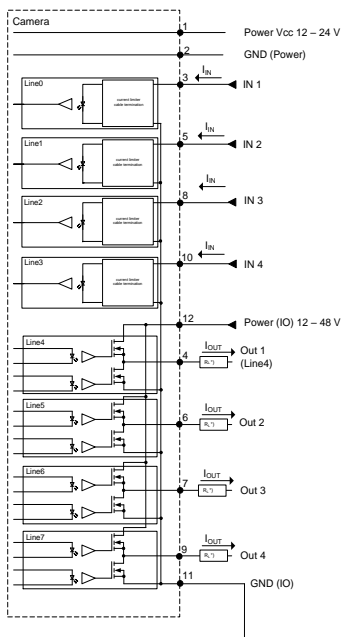
## Image Pre-Processing

|                  |   |
|------------------|---|
| Analog Controls  | Exposure Time (1 µsec ... 60 sec   Step Size 1 µsec)<br>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 | -   |

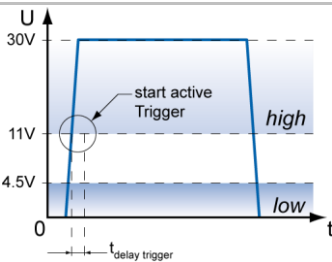
<sup>1)</sup> Sensor readout, different from pixel format

<sup>2)</sup> 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 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<br>fixed Trigger Delay out of t <sub>readout</sub> : <sup>1)</sup><br>66.7 µsec @ 12 bit<br>max. Trigger Delay during t <sub>readout</sub> : <sup>1)</sup><br>73.1 µsec @ 12 bit |
| Trigger Delay        | 0 ... 2 sec, Tracking and buffering of up to 256 triggers   |
| External Flash Sync  | via Exposure Active<br>t <sub>delay flash</sub> ≤ 3 µsec, t <sub>duration</sub> = t <sub>exposure</sub>   |
| 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<br>ReadoutActive,<br>UserOutput 1-4 and TriggerReady  |
| Line Format (Output)   | yes, Tri-State, PushPull, OpenDrain, OpenSource   |
| PWM function (Output)  | yes, Line 4 .. 7<br>PWM Mode: Off, One Pulse, FixedFrequency<br>PWM feature: PWMDuration, PWMDutyCycle<br>Configuration Mode for lightning protection:<br>MaxPWMDuration, MaxPWMDutyCycle |
| Line Debouncer (Input) | Low and high signal separately selectable<br>Debouncing Time 0 ... 5 msec, Step Size: 1 µsec  |

## Memory

|                     |   |
|---------------------|---|
| Image Buffer        | 72 MB   |
| Non-volatile Memory | 8 Images (Trigger Mode) / 1 Image (Free Running Mode)<br>128 kb |

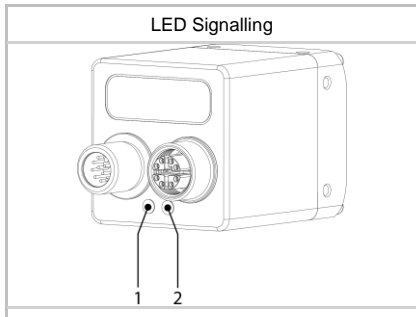
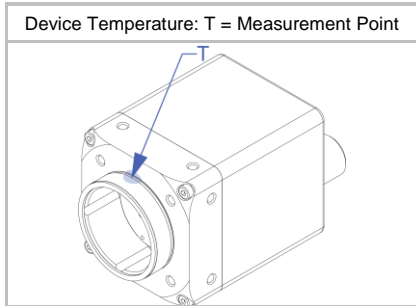
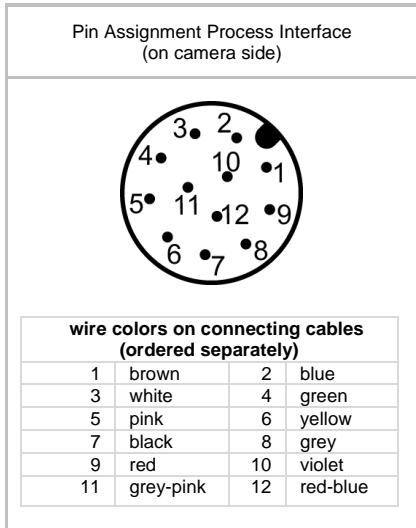
## Network Interface Data

|                           |  |
|---------------------------|--|
| Interface                 | Gigabit Ethernet 1000BASE-T 1000 Mbits/sec<br>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,<br>Transmission via Asynchronous Message Channel<br>ExposureEnd, ExposureStart, FrameEnd, FrameStart,<br>FrameTransferSkipped, GigEVisionError,<br>GigEVisionHeartbeatTimeOut, PrimaryApplicationSwitch,<br>Line0..7 FallingEdge, Line0..7 RisingEdge,<br>TransferBufferFull, TransferBufferReady,<br>TriggerOverlapped, TriggerReady, TriggerSkipped |
| Action CMD    | yes, Action 1 for Trigger  |
| Frame Counter | up to 2 <sup>32</sup>  |
| Payload Size  | 0 ... 6291680 Byte   |

<sup>1)</sup> Sensor readout, different from pixel format



## GigE Vision® Features

|               |   |
|---------------|---|
| Timestamp     | 64 bit, resolution in nsec, increment = 8 |
| Packet Delay  | 0 .. 2 <sup>32</sup> - 1 nsec             |
| Packet Resend | Resend Buffer: 48 MB (8 Images)           |
| GigE Vision   | v2.0                                      |

## Interfaces and Connectors

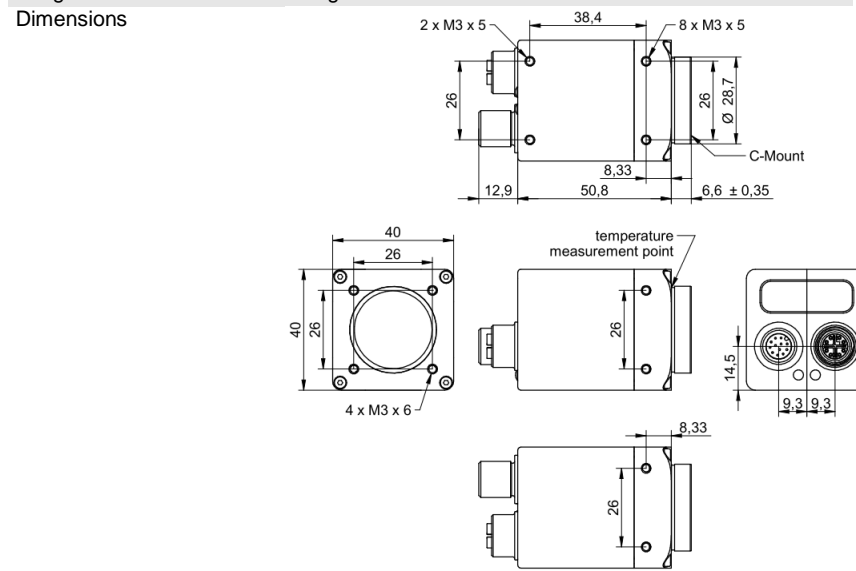
|                          |                  |  |                  |
|--------------------------|------------------|--|------------------|
| Data and Power Interface | Gigabit Ethernet | Transfer Rate  | 1000 Mbits/sec   |
|                          | Fast Ethernet    | Transfer Rate  | 100 Mbits/sec    |
|                          | Connector:       | M12 / 8-pol x-coded<br>(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<br>(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

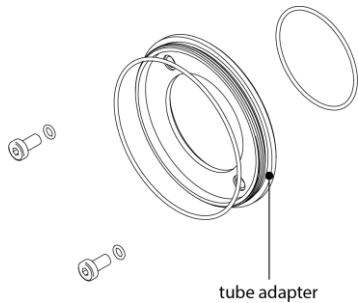
|                |         |
|----------------|---------|
| Lens Mount     | C-Mount |
| Optical Filter | -       |

## Mechanical Data

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

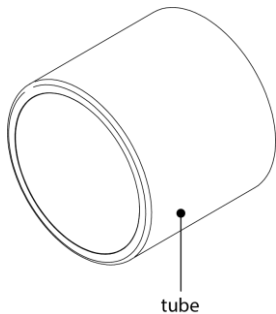


**Optional accessories for IP65/67 protection (ordered separately)**

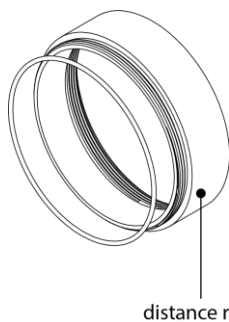


including seals and screws

| 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 |



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



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<br>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  |

<sup>1)</sup> 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         | LED 2        |           |
|-----|---------------|--------------|-----------|
|     | Yellow static | Green static | Error     |
|     | Yellow flash  | Green flash  | TX active |
|     |               |              | Link ON   |
|     |               |              | RX active |

**Electrical Data**

|                     |  |
|---------------------|--|
| Power Supply (ext.) | VCC: 12 ... 24 V DC ± 20%<br>I: 118 ... 238 mA   |
| Power over Ethernet | Class 1 device<br>VCC: 36 ... 57 V DC<br>I: 74 mA @ 48 VDC   |
| Power Consumption   | approx. 2.8 W @ 12 VDC and 39 fps<br>approx. 3.5 W @ 48 VDC (PoE) and 39 fps<br>(Factory Setting "Default")  |
| Digital Input       | Isolated, short circuit protection<br>U <sub>IN(low)</sub> : 0.0 ... 4.5 VDC<br>U <sub>IN(high)</sub> : 11.0 ... 30.0 VDC<br>I <sub>IN</sub> : 3.0 ... 10.0 mA<br>min. Impulse Length: 2.0 µsec  |
| Digital Output      | Isolated, short circuit protected<br>U <sub>EXT</sub> : 12 ... 48 V DC [Power (IO)]<br>(See documentation for guidelines when using >30V.)<br><br>I <sub>OUT</sub> : Continuously: max. 1.5 A<br>PWM t <sub>ON</sub> max 1s /<br>Duration max 40%: max. 2.5 A<br>(Max. current can be used with one output or as a sum of all outputs used.)<br><br>t <sub>ON</sub> = < 0.2 µsec      t <sub>OFF</sub> = < 0.2 µsec<br>max. Frequency: 500 kHz |
| GPIO                | no   |

**Conformity**

|                            |  |
|----------------------------|--|
| Conformity                 | CE, RoHS, REACH  |
| KC Registration No. / Date | - / -  |
| MTBF                       | 42 years @ T = 45 °C / 28 years @ T = 60 °C<br>T = Measurement Point |

## GenICam™ Features

|                                 |  |
|---------------------------------|--|
| Short Exposure Range            | yes, ShortExposureTimeEnable<br>Short Exposure Range 1 µsec ... 60 sec<br>Default Exposure Range 15 µsec ... 60 sec  |
| Timer                           | Timer Selector: Timer 1<br>TimerTriggerSource:<br>Line0, SoftwareTrigger, ExposureStart, ExposureEnd,<br>FrameTransferSkipped, TriggerSkipped, Off<br>TimerDelay: 0 µsec ... 2 sec, Step Size: 1 µsec<br>TimerDuration: 4 µsec ... 2 sec, Step Size: 1 µsec  |
| Counter                         | Counter Selector: Counter 1, Counter 2<br>CounterValue: 0 ... 65535<br>Counter Event Source: Counter1End or Counter2End,<br>ExposureActive, FrameTransferSkipped, FrameTrigger,<br>TriggerSkipped, Line0..3 and Off<br>Counter Reset Source: Counter1End, Counter2End,<br>Line0..3 and Off   |
| Sequencer                       | Sequencer Characteristics:<br>up to 128 sets,<br>up to 4 possible paths for triggered set transitions,<br>6 trigger sources: Counter1End, Counter2End,<br>ExposureActive, Line0..3, ReadoutActive, Timer1End<br>Sequencer Parameters for Exposure, Gain, Trigger, ROI<br>and Output:<br>ExposureTime, CounterDuration, CounterEventActivation,<br>CounterEventSource, CounterResetSource,<br>ExposureMode, ExposureTime, Gain, Height, OffsetX,<br>OffsetY, TriggerMode, UserOutputValue,<br>UserOutputValueAll, Width |
| User Sets                       | Factory Settings: UserSet0 (read only)<br>Freely Programmable: UserSet1, UserSet2, UserSet3<br>Parameters: any user definable Parameter  |
| Acquisition Abort               | Delay up to 17.8 msec  |
| Chunk Data                      | yes,<br>Chunk Selector: Binning, BlackLevel, CounterValue,<br>DeviceTemperature, ExposureTime, FrameID, Gain,<br>Height, Image, ImageControl, LineStatusAll, OffsetX,<br>OffsetY, PixelFormat, SequencerSetActive, Timestamp,<br>Width   |
| Device Temperature              | InHouse<br>Event generation for Normal to High, High to Exceeded<br>and Exceeded to Normal<br>Exceeded (no image transfer) = max. internal temperature<br>sensor + 1 °C  |
| Device Link Throughput<br>Limit | yes, up to max. Device Link Speed  |
| Custom Data                     | yes, 128 Byte with CustomDataKonfiguration Mode  |
| Calibration Data                | yes, camera calibration values can stored:<br>CalibrationMatrix, CalibrationMatrixNew,<br>CalibrationFocalLenght, CalibrationAngularAperture,<br>GeometryDistortionValue: k1, k2, p1, p2, k3,<br>CalibrationVector: tvec, rvec<br>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                   | Mono8  |
| 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 <sup>2)</sup> |
|----------|-------------|----------------------|----------------------------------|
| Full HD  | 1920 x 1080 | 79                   | 59                               |
| SXGA     | 1280 x 1024 | 83                   | 83                               |
| HD720    | 1280 x 720  | 116                  | 116                              |
| XGA      | 1024 x 768  | 109                  | 109                              |
| SVGA     | 800 x 600   | 138                  | 138                              |
| VGA      | 640 x 480   | 170                  | 170                              |
| CIF      | 352 x 288   | 269                  | 269                              |
| QVGA     | 320 x 240   | 316                  | 316                              |
| QCIF     | 176 x 144   | 480                  | 480                              |
| LineScan | 2048 x 1024 | 83                   | 58                               |
|          | 2048 x 512  | 160                  | 117                              |
|          | 2048 x 256  | 299                  | 235                              |
|          | 2048 x 128  | 526                  | 470                              |
|          | 2048 x 64   | 848                  | 848                              |
|          | 2048 x 32   | 1222                 | 1222                             |
|          | 2048 x 16   | 1567                 | 1567                             |
|          | 2048 x 8    | 1825                 | 1825                             |
|          | 2048 x 4    | 1989                 | 1989                             |
|          | 2048 x 2    | 2082                 | 2082                             |
|          | 2048 x 1    | 2132                 | 2132                             |

<sup>2)</sup> depends on the used interface