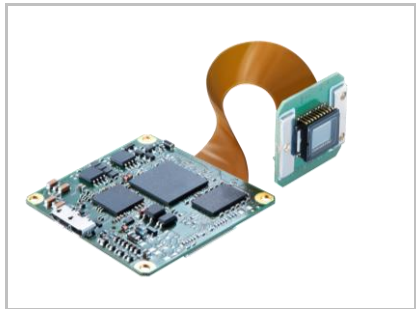




MXU02c

Technical Data

 Art. No.
1115786


Digital Color Matrix Camera Module, USB 3.0

Sensor Information

Model Name	SONY ICX618
Type	1/4" progressive scan CCD, EXview HAD technology
Shutter	Global
Native Resolution	656 x 490 pixels
Scan Area	3.67 mm x 2.74 mm
Pixel Size	5.6 μm x 5.6 μm

Data Quality

@ 20 °C, gain = 1, exposure time = 32 msec

Readout Noise (σ)	0.2 LSB @ 8 bit, 3.5 LSB @ 12 bit (typical)
Dynamic Range	61 dB (typical)

Acquisition Formats

Image Formats	Format	Resolution	Frame Rate	t_{readout}
	Full Frame	656 x 490	160 fps	6.25 msec
Pixel Formats	Mono8, BayerRG8, BayerRG12, RGB8, BGR8, YUV411_8_UYYVYY, YUV422_8_UYVY, YUV8_UYV			
Partial Scan	True Partial Scan, Region of Interest (ROI) arbitrary			

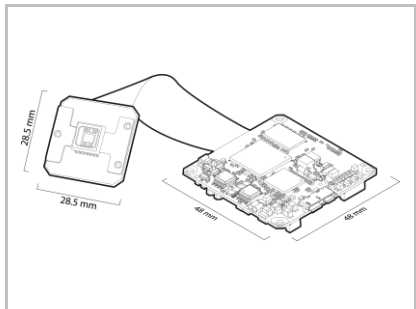
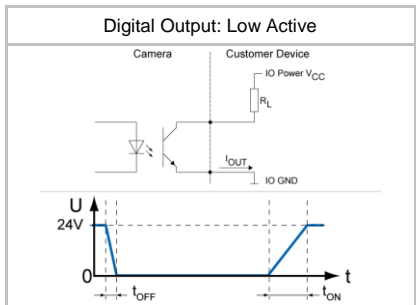
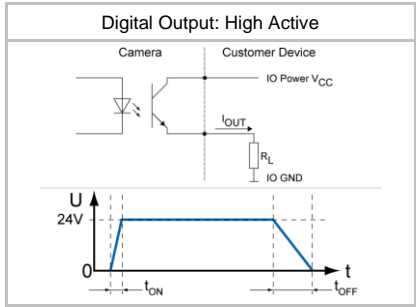
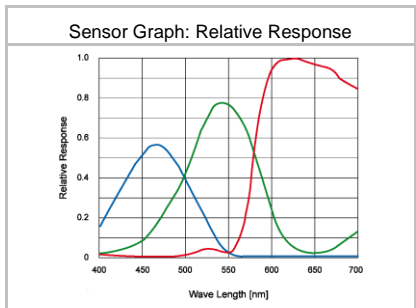


Image Pre-Processing

Analog Controls	Exposure Time (4 μsec ... 60 sec Step Size 1 μsec) Gain (0 ... 29.5 dB), Offset (0 ... 1023 LSB 14 bit)
Gamma Correction	Gamma (0.1 ... 2 available if LUT is enabled)
LUT	Luminance (12 bit)
Color Models	RGB, YUV, Mono
Color Processing	Integrated color processor for high quality color calculation
Color Adjustment	White Balance (manual & one push)
Binning Horizontal	1 or 2 (color binning)
Binning Vertical	1 or 2 (color binning)
Image Flipping	Horizontal
Defect Pixel Correction	via Defect Pixel List with up to 511 Pixel Coordinates



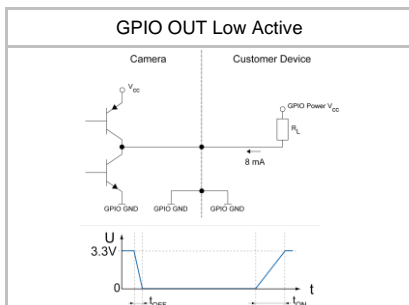
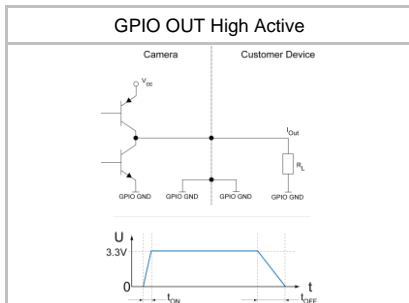
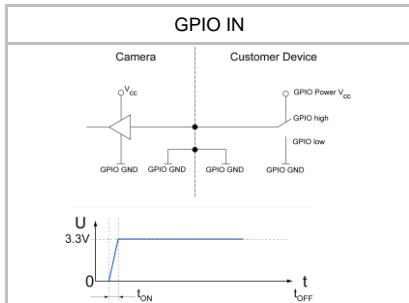
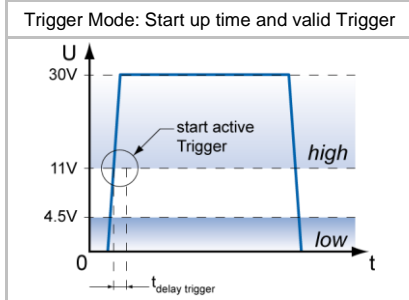
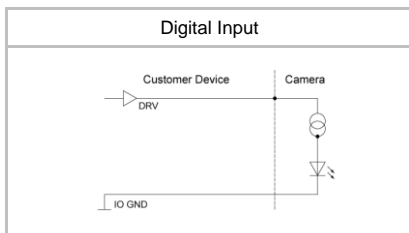
Process Synchronization

Modes	Free Running, Trigger
Free Running	Continuous or Adjustable Acquisition Frame Rate ¹ (0 ... 1072 Hz)
Trigger Sources	Hardware, Software, All or Off
Trigger Delay	0 ... 2 sec, Tracking and buffering of up to 256 triggers
Sequencer Characteristics	up to 128 sets of parameters, up to 65536 loop passes, up to 65536 repetitions of sets of parameters, up to 65536 images per trigger event
Sequencer Parameters	Exposure Time, Gain Factor, Output Line, ROI Offset x, ROI Offset y
External Flash Sync	via Exposure Active $t_{\text{delay flash}} \leq 3 \mu\text{sec}$, $t_{\text{duration}} = t_{\text{exposure}}$

Digital I/Os

Lines	Input: Line 0, Output: Line3, GPIO: Line 1, Line 2
Circuit Times	Digital Output: $t_{\text{ON}} = \text{typ. } 3 \mu\text{sec}$ $t_{\text{OFF}} = \text{typ. } 40 \mu\text{sec}$ GPIO: $t_{\text{ON}} = \text{typ. } 1.6 \text{ nsec}$ $t_{\text{OFF}} = \text{typ. } 3 \text{ nsec}$
Output Sources	Off, ExposureActive, Line 0, Timer1 ... 3, ReadoutActive, User0 ... 2, TriggerReady, TriggerOverlapped, TriggerSkipped, Sequencer Output 0 ... 2
Line Debouncer	Low and high signal separately selectable Debouncing Time 0 ... 5 msec, Step Size: 1 μsec

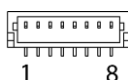
¹ Max. Acquisition Frame Rate can be achieved by using the following camera settings: min. Exposure + max. Binning + ROI | min. Size Y + Mono8



Pin Assignment Data Interface



Pin Assignment Power and Process Interface



Interfaces and Connectors

Data Interface	USB 3.0	Transfer Rate	5000 Mbits/sec
	Connector:	USB 3.0 Micro B	
	Pin Assignment:	1 – VBUS	6 – MicB_SSTX-
		2 – D-	7 – MicB_SSTX+
		3 – D+	8 – GND_DRAIN
		4 – ID	9 – MicB_SSRX-
		5 – GND	10 – MicB_SSRX+
Process Interface	Connector:	JST BM08B-SRSS-TB	
	Assignment:	1 – Shielding	5 – GPIO1*
		2 – IN1	6 – GPIO2*
		3 – IO GND	7 – IO Power VCC
		4 – OUT 1	8 – GPIO_GND

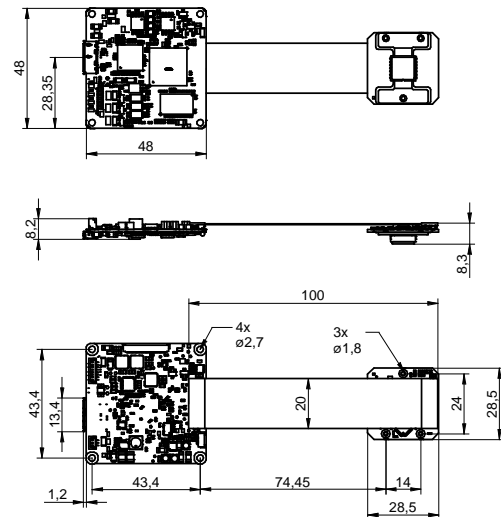


* The GPIO's are configured as input by default camera settings. They must be connected to GPIO_GND if not used or not configured as output.

Mechanical Data

Housing	Board Level Module without Housing
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Dimensions



Weight	23 g (without Optics Adapter)
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Optical Data

Lens Mount	C-Mount (Adapter), S-Mount (Adapter)
Optical Filter	Dust Protection Glass

Electrical Data

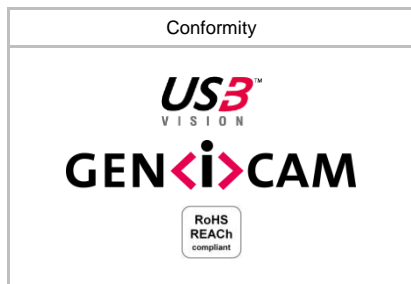
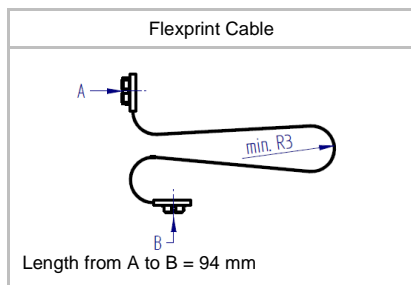
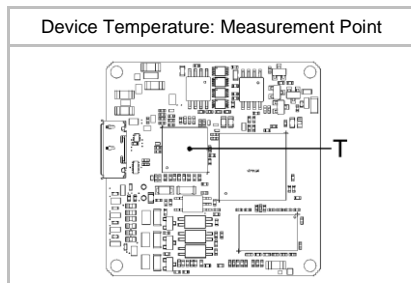
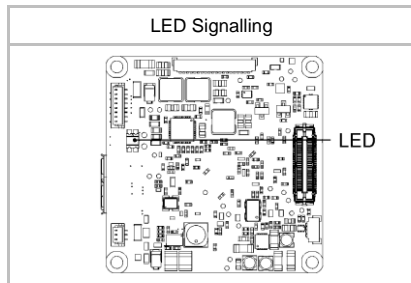
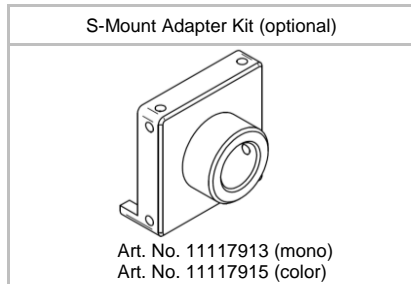
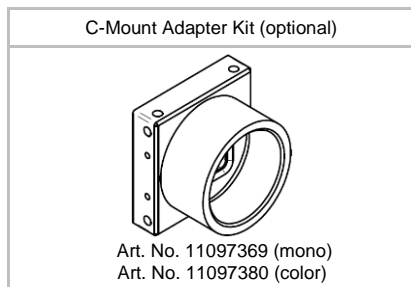
Power Supply	via USB3.0 interface	
Power Consumption	approx. 2.6 W @ 160 fps	
Digital Input	$U_{IN(low)}$:	0.0 ... 4.5 VDC
	$U_{IN(high)}$:	11.0 ... 30.0 VDC
	I_{IN} :	6.0 ... 10 mA
	min. Impulse Length:	2.0 µsec
	Trigger Delay out of t _{readout} :	1.0 µsec
	max. Trigger Delay during t _{readout} :	14.0 µsec

Digital Output	IO Power V _{CC} :	5 ... 30 V DC
	I _{OUT} :	max. 50 mA

GPIO	GPIO Power V _{CC} :	3.3 V DC*
	I _{OUT} :	max. 8 mA



* 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.



LED Signalling

LED	Green	USB3.0
	Green flash	Receiving
	Yellow	USB2.0

Environmental Data

Storage Temperature	-10 °C bis +70 °C	
Operating Temperature	Depends on the thermal encapsulation	
Device Temperature	T _{max} = 80 °C @ Measurement Point	
Humidity	10 % ... 90 % non-condensing	

Interface Data

Interface	USB3.0	5000 Mbits/sec
Image Buffer	16 Images	
USB Vendor ID / Product ID	0x2825 / 0x0101	

USB3 Vision® Features

Events Transmission via Asynchronous Message Channel	EventLost, EventDiscarded, Line0RisingEdge, Line0FallingEdge, Line1RisingEdge, Line1FallingEdge, Line2RisingEdge, Line2FallingEdge, Line3RisingEdge, Line3FallingEdge, ExposureStart, ExposureEnd, FrameStart, FrameEnd, TriggerReady, TriggerOverlapped, TriggerSkipped	
Frame Counter	up to 2 ³²	
Payload Size	0 ... 964.592 Byte	
Timestamp	64 bit	

GenICam™ Features

Timer	Timer Selector: Timer 1 ... 3 TimerTriggerSource: Line0, SoftwareTrigger, CommandTrigger, ExposureStart, ExposureEnd, FrameStart, FrameEnd, TriggerSkipped, Off TimerDelay: 0 µsec ... 2 sec, Step Size: 1 µsec TimerDuration: 10 µsec ... 2 sec, Step Size: 1 µsec	
User Sets	Factory Settings: UserSet0 (read only) Freely Programmable: UserSet1, UserSet2, UserSet3 Parameters: any user definable Parameter	
Acquisition Abort	Delay up to 6.3 msec	

Factory Settings after Start-Up

Operation Mode	Free Running
Analog Controls	Exposure Time: 4 msec, Gain: 0 dB, Offset: 0
Pixel Format	BayerRG8
Partial Scan	Off
Acquisition Frame Rate	Off
Timer	Off
Defect Pixel Correction	On
Digital Input	Line0, invert = false, trigger source = All
Digital Output	Line3, invert = false, line source = Off