
CoaXPress

Monochrome / Color CMOS Camera

STC-LBGP251BCXP124

(25M / Monochrome / High speed / CXP-12x4 / Connector on rear)

STC-LCGP251BCXP124

(25M / Color / High speed / CXP-12x4 / Connector on rear)

STC-LBGP251BCXP124-T

(25M / Monochrome / High speed / CXP-12x4 / Connector on top)

STC-LCGP251BCXP124-T

(25M / Color / High speed / CXP-12x4 / Connector on top)

Product Specifications and User's Guide

OMRON SENTECH CO., LTD.

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Precautions for safety

Please read carefully this "Precautions for safety" before use the camera. Then the camera uses correctly with agreeing with below notes.

In this "Precautions for safety", notes divides into "Warning" and "Caution" to use the camera safety and prevent to harm and damage.

 Warning	This shows, assumption for possibility of serious accident leading death or serious injury if ignore this note and camera uses incorrectly.
 Caution	This shows, assumption for possibility of bear the damage or physical damage if ignore this note and camera uses incorrectly.

About Graphic symbols



This symbol shows general prohibition.



This symbol shows completion or instruction.

[Environment / condition]

 Warning	
 Do not use flammable or explosiveness atmospheres. This will cause of personal injury or fire.	 Do not use for "safety for human body" related usage. This camera is designed for use "do not harm human body immediately" if by any chance the camera has malfunction.
 Caution	
 Use and store under specified environmental conditions (Vibration, shock, temperature, humidity) in the specifications for this camera. This will cause of fire or damage the camera.	

[Installation and cable wiring]

 Warning	
 Do not use with out of power voltage range that is specified in the specifications for this camera. This will cause of fire, electrification or malfunction.	 Do not wrong wiring. This will cause of fire or malfunction.

Caution	
Do not grounding DC power (+) of all devices that are connect to the camera. The camera housing is connecting to 0 V line of camera inside circuit. There is a risk of short circuit between camera inside ciurcuit and frame ground. This will cause of malfunction.	It is necessary to wiring and mounting that is specified in the specifications for this camera. This will cause of fire or malfunction.
It is necessary to wiring with turn off the camera. This will cause of electrification or malfunction.	It is necessary to mounting the camera without stress for the cable. This will case of electrification or fire.
Do not use CoaXPress un-supported cable and board. There is a risk of malfunction if the camera connects with wrong environment and turn on the camera.	

[Usage instruction]

Warning	
Do not touch the terminal and PCB board While turn on the camera. This will cause of electrification or accident caused by malfunction.	Do not put combustibles near the camera. This will cause of fire.
Do not use without usage that is specified in the specifications for this camera. This will cause of personal injury or malfunction.	Do not push metals including screw driver into radiation holes. This will cause of electrification or malfunction.
Do not touch the camera housing while or afterusing the camera. There is a risk of get burned.	
Caution	
Do not push contamination into opening of the camera. This will cause of electrification or malfunction.	Do not block the radiation holes. This will cause of fire due to increase the camera inside temperature.

[Maintenance]

Caution	
Do not disassemble or repair the camera. This will cause of fire, electrification or malfunction.	It is turn off the camera when maintaining or inspecting the camera. This will cause of electrification.

[Disposal]

 Caution	
 It is necessary to dispose as industrial waste. It is necessary to dispose of accordance with WEEE directive. 	

[Security Measures, Anti-virus protection]

 Warning	
 Install the latest commercial-quality antivirus software on the computer connected to the control system and maintain to keep the software up-to-date.	

1 Product Precautions

- Do not give shock to the camera.
 - Do not haul or damage the camera cable.
 - Do not wrap the camera with any material while using the camera. This will cause the internal camera temperature to increase.
 - When the camera moving or using the place that temperature difference is extreme, countermeasure for dew condensation (heat removal / cold removal) is necessary.
 - While the camera is not using, keep the lens cap on the camera to prevent dust or contamination from getting in the sensor or filter and scratching or damaging it.
- Do not keep the camera under the following conditions.
- In wet, moist, high humidity or dusty place
 - Under direct sunlight
 - In extreme high or low temperature place
 - Near an object that releases a strong magnetic or electric field
 - Place with strong vibrations
- Apply the power that satisfies the specified in specifications for the camera.
 - The defective pixels may appear due to the sensor characteristics.
 - Use below recommend materials (or equivalent materials) to clean the surface of glass.
 - Air dust: Non Freon air duster (NAKABAYASHI Co., LTD.)
 - Alcohol: Propan-2-ol (SAN'EI KAKO Co., LTD.)
 - Non-woven: nikowipe clean room (NKB)
 - Use a soft cloth to clean the camera.

2 Product conformity / compliance

Please confirm regulation in each country by responsibility of exporter and importer when exporting this product from Japan.

3 Warranty

■Warranty period

One year after delivery (However, the camera had malfunction with camera uses correctly)

In below case for a fee even within warranty period.

- The malfunction caused by incorrect usage, incorrect modify or repair.
- The malfunction caused by external shock including the camera dropping after delivery the camera.
- The malfunction caused by fire, earthquake, flood disaster, thunderbolt struck, other natural disaster or wrong voltage.

■Warranty coverage

Exchange or repair the malfunction camera if the malfunction is occurred by our responsibility.

“Warranty” mean is warranty for the delivered camera itself. Please accept the induction damage by the camera malfunction is not included.

4 Overview

This document describes the specifications of the following cameras

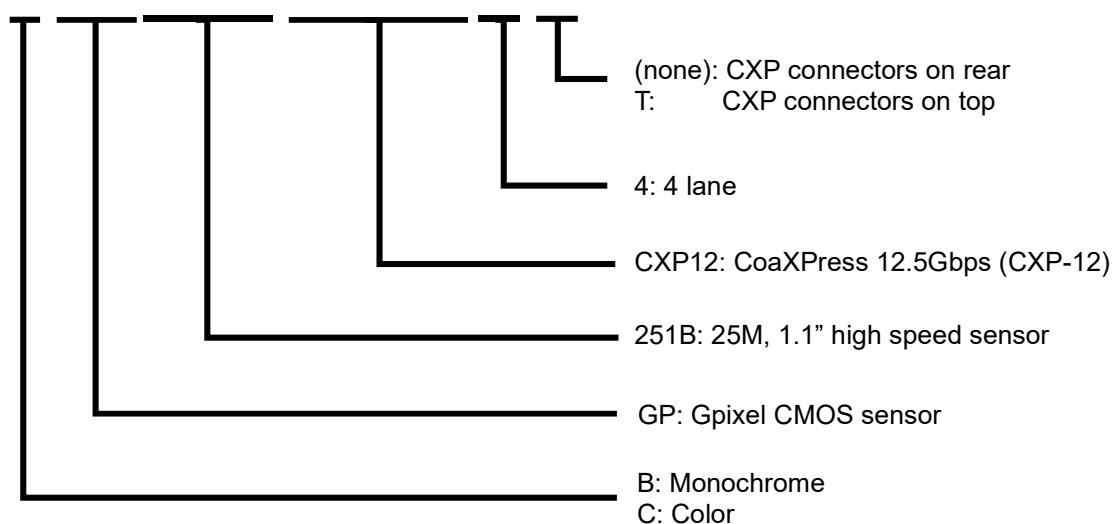
STC-LBGP251BCXP124 / STC-LCGP251BCXP124
STC-LBGP251BCXP124-T / STC-LCGP251BCXP124-T

4.1 Features

- CoaXPress (CXP) Interface: CXP-12 / CXP-6 / CXP-3, 4 lane / 2 lane / 1 lane
- PoCXP (Power Over CoaXPress) support
- Maximum frame rate (Full resolution): 150 fps @ 25M 8bits
- CMOS (Global Shutter)
- Up to 2,048 Pixel Defect Correction (Default: ON)
- 8bits, 10bits output

4.2 Product Number Naming Method

STC-LxGP251BCXP124-T



5 Specifications

5.1 Electronic Specifications

Model Number		STC-LBGP251BCXP124 / STC-LBGP251BCXP124-T	STC-LCGP251BCXP124 / STC-LCGP251BCXP124-T
Image Sensor		1.1" 25M Progressive Monochrome CMOS (Gpixel: GMAX0505)	1.1" 25M Progressive Monochrome CMOS (Gpixel: GMAX0505)
Shutter Type		Global Shutter	
Active Picture Elements		5,120 (H) x 5,120 (V)	
Cell Size		2.5 (H) x 2.5 (V) μ m	
Scanning System		Full scanning / ROI	
Frame Rate (Full resolution)	CXP-12 4 Lane	8bits: 150 fps , 10bits: 141 fps	
	CXP-6 4 Lane	8bits: 86 fps, 10bits: 70 fps	
	CXP-3 4 Lane	8bits: 43 fps, 10bits: 35 fps	
	CXP-12 2 Lane	8bits: 86 fps, 10bits: 70 fps	
	CXP-6 2 Lane	8bits: 43 fps, 10bits: 35 fps	
	CXP-3 2 Lane	8bits: 21 fps, 10bits: 17 fps	
	CXP-12 1 Lane	8bits: 43 fps, 10bits: 35 fps	
	CXP-6 1 Lane	8bits: 21 fps, 10bits: 17 fps	
	CXP-3 1 Lane	8bits: 10 fps, 10bits: 8 fps	
ADC bit width (*1)		10bits	
Image Output Format (*1) (*2)		Mono8 / Mono10	BayerRG8 / BayerRG10
CoaXPress Data Output		CXP-12 (12.500 Gbps) 4 Lane / CXP-6 (6.250 Gbps) 4 Lane / CXP-3 (3.125 Gbps) 4 Lane CXP-12 (12.500 Gbps) 2 Lane / CXP-6 (6.250 Gbps) 2 Lane / CXP-3 (3.125 Gbps) 2 Lane CXP-12 (12.500 Gbps) 1 Lane / CXP-6 (6.250 Gbps) 1 Lane / CXP-3 (3.125 Gbps) 1 Lane	
Noise Level	8bits output	Less than 4 digits (Gain 0 dB)	
	10bits output	Less than 16 digits (Gain 0 dB)	
Sensitivity (*3)		500 Lux	1,000 Lux
Exposure Time		8 μ seconds to 16.777 seconds (Default: 6.626 μseconds)	
Gain	Analog	x1.5 / x2 / x2.5 (Default: x2.5)	
	Digital	x1 to x7 (Default: x1)	
Black Level		8bits: 0 to 31 digits (Default: 10) 10bits: 0 to 127 digits	
White Balance Gain		N/A	0 (Black Level) to x7.98 (Default: x1)
ROI		Horizontal: 256 to 5,120 pixels / Vertical: 4 to 5,120 lines (Default: 5,120 x 5,120) Adjustable Steps for size: 8 pixels in horizontal direction / 2 lines in vertical direction Adjustable Steps for offset: 2 pixels in horizontal direction / 2 lines in vertical direction	
Multi ROIs		Eight Regions (Horizontal 1 x Vertical 8 regions) (Default: One region)	
Gamma		Gamma 0.01 to 4.00 (Default: 1.00)	
Binning		2 x 2 / Off	N/A
Decimation		1/2 x 1/2, Off	
Image Flip		Horizontal / Vertical / Horizontal and Vertical / Off	
FFC (Flat Field Correction)		Support	
Defective Pixel Correction		Up to 2,048 points	
Auto Image Control	Auto Exposure	N/A	
	Auto Gain	N/A	
	Auto White Balance	N/A	Off / Once / Continuous / Disable
Operational Mode		Edge Preset Trigger / Pulse Width Trigger / CXP Trigger Packet / Free Run	
Interface		CoaXPress	
Protocol		CoaXPress Standard Version 2.0 and GenICam SFNC 2.6 compliant	
I/O		4 GPIOs	
Power	Input Voltage	PoCXP (+18.5 to +26 Vdc) / External power (+18.5 to +26 Vdc)	
	Consumption	Maximum: Less than 10.5 W, Typical: 9.3 W	

Bold: Default

Precautions

- (*1) When Image Format is changed, ADC bits width also changes.
The ADC bits width cannot be changed.

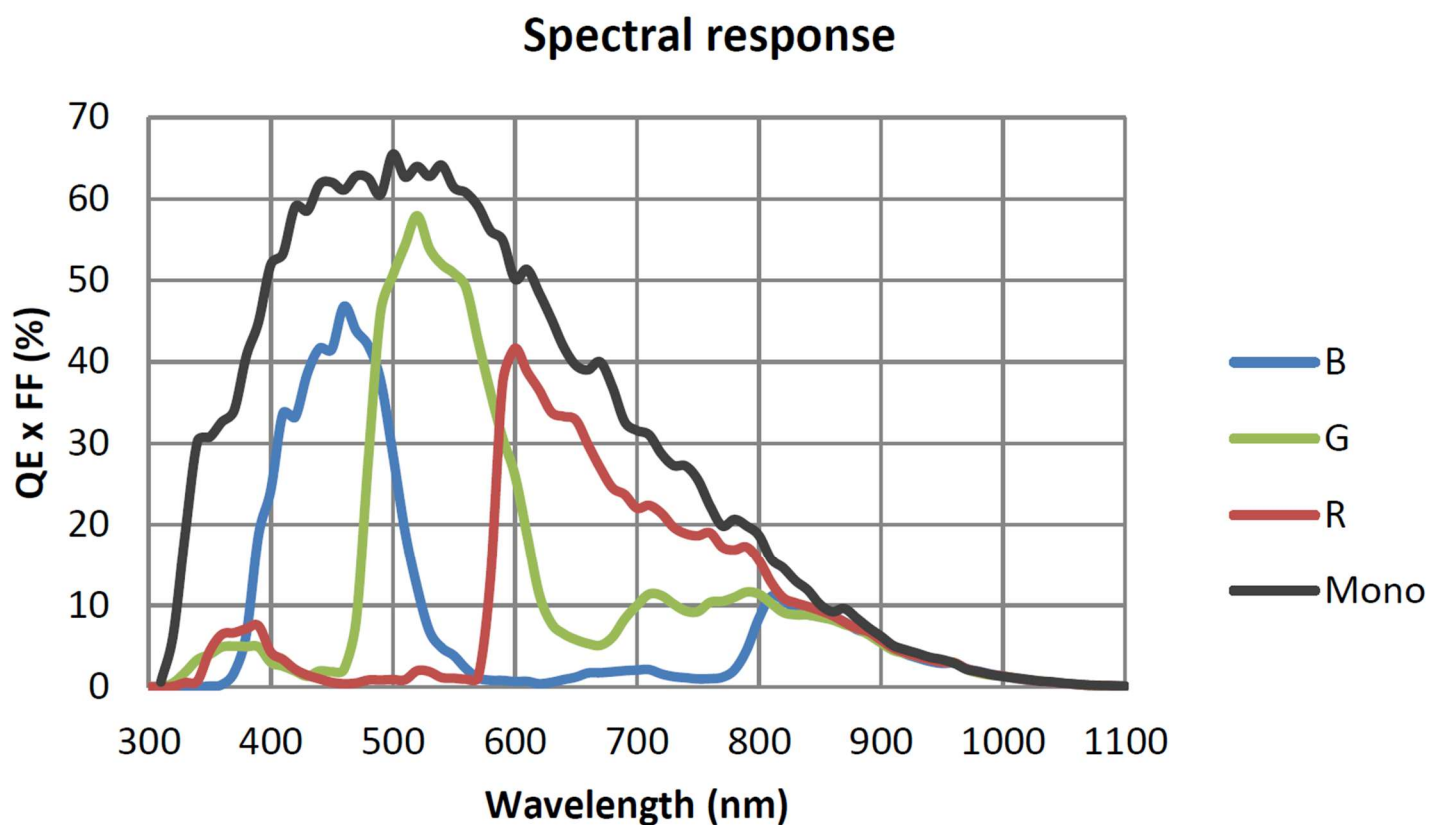
Image Format		ADC bits width
Mono8 / BayerRG8	->	10bits
Mono10 / BayerRG10	->	10bits

- (*2) The pixel format (Bayer pattern) for color model is changed when image is flipping with image flip function.
The Bayer pattern in this document is Bayer pattern of image flip function Off.

- (*3) The sensitivity is measuring the luminance when white level achieved 100 % in below conditions.

Camera Setting		Environment	
Parameter	Setting	Parameter	Setting
Gain Up	Factory Setting	Light Source	Light Box (White)
AGC	Off	Color temperature	5,100K
White Balance	Optimum	Lens	
Electrical Shutter	1/30 seconds	F on Lens	F5.6
Black Level	Optimum	Target Luminance	IM-600 (Topcon)
Gamma	Factory Setting		

5.2 Spectral Sensitivity Characteristics



5.3 Mechanical Specifications

Model Number	STC-LBGP251BCXP124 / STC-LCGP251BCXP124	STC-LBGP251BCXP124-T / STC-LCGP251BCXP124-T
Dimensions	68 (W) x 68 (H) x 53.5 (D) mm (*1)	
Optical Filter	No Optical Filter	
Optical Center Accuracy	Positional accuracy in Horizontal and Vertical directions: +/- 0.5 mm Rotational accuracy of Horizontal and Vertical: +/- 1.5 deg.	
Material	Aluminum alloy	
Lens Mount	C Mount	
Interface Connector	CXP connector: Micro BNC, 75 Ohm x 4 Power/IO connector: HR10A-7R-6PB (Hirose) or equivalent x 1	
Camera Mounting	Twenty M4 screw holes (Four on Front, top, bottom and both side plates)	Eighteen M4 screw holes (Two on top, Four on Front, bottom and both side plates)
Weight	Approximately 460 g	

(*1) Excluding connectors

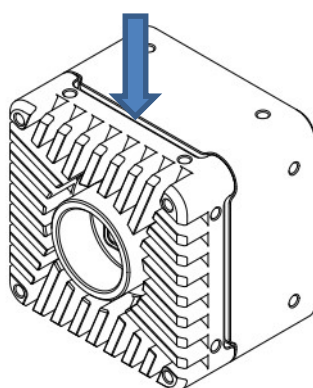
5.4 Environmental Specifications

Model Number		STC-LBGP251BCXP124 STC-LCGP251BCXP124	STC-LBGP251BCXP124-T STC-LCGP251BCXP124-T
Operational Temperature / Humidity	Minimum	Environmental Temperature: 0 deg. C, Environmental Humidity: 20 to 85 %RH (No Condensation)	
	Maximum	Environmental Temperature: +37 deg. C or Camera housing temperature (top plate) shall not exceed +60 deg. C (*1) Environmental Humidity: 20 to 85 %RH (No Condensation)	
Storage Temperature / Humidity		Environmental Temperature: -20 to +75 deg. C, Environmental Humidity: 20 to 85%RH (No Condensation)	
Vibration		20 Hz to 200 Hz to 20 Hz (5 min. / cycle), acceleration 10G, XYZ 3 directions 30 min. each	
Shock		Acceleration 38 G, half amplitude 6 mseconds, XYZ 3 directions 3 times each	
Standard Compliance		EMS: EN61000-6-2:2005, EMI: EN61000-6-4:2007+A1:2011	
RoHS		RoHS Compliance	

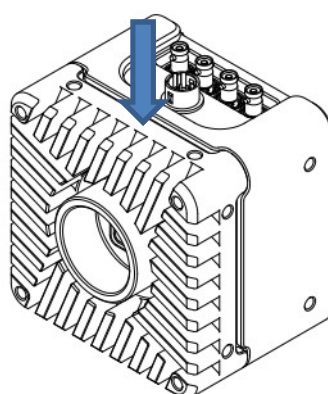
- (*1) Please insure the camera is installed with appropriate heat dissipation to keep camera housing temperature (top plate) is less than +60 deg. C when camera using ambient temperature is exceeded +37 deg. C. If the camera has a mounted lens and a tripod with an aluminum plate, this could decrease camera housing temperature for heat dissipation.
- When the internal temperature sensor (Device Temperature Selector = Sensor) on the camera shows less than +65 deg. C, the camera housing temperature (top plate) will be less than +60 deg. C.

Upper side of camera

Measuring point

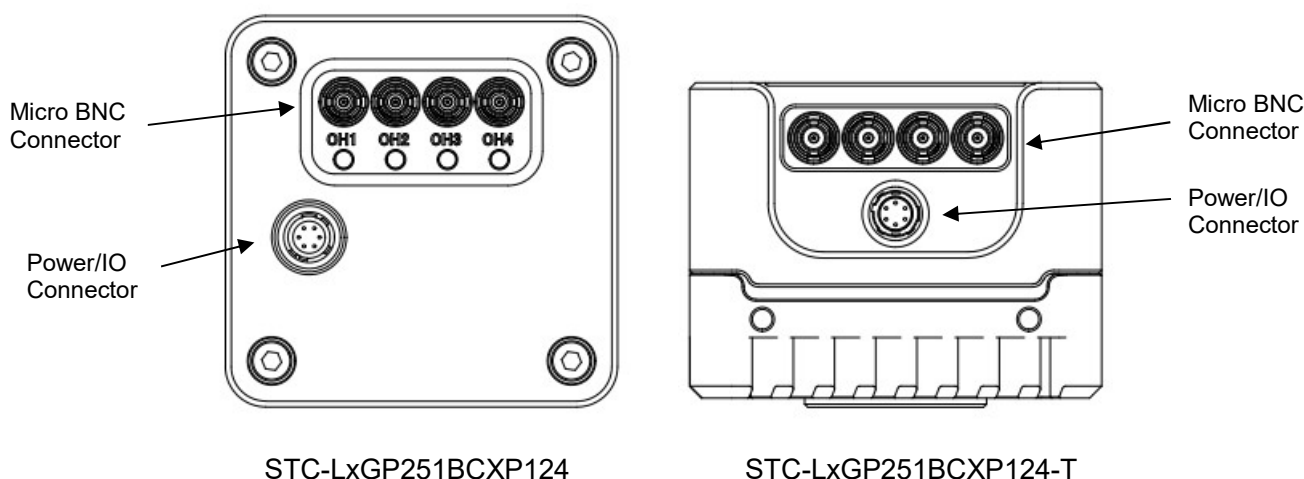


STC-LxGP251BCXP124



STC-LxGP251BCXP124-T

5.5 External Connector Specifications



5.5.1 Micro BNC Connector

Micro BNC, 75 Ohm or equivalent x 4

This camera is PoCXP supported CoaXPress camera.

The CoaXPress frame grabber board is supplied power to camera through Micro BNC connector.

Please using CXP12 supported cable.

When CH1 was connected to Frame Grabber (FG), FG provides power to camera through PoCXP. Some FG starts discovery CXP camera when CH1 was connected. If CH1 connecting first, camera may recognize as CXP12, CXP6 or CXP3 (12.5Gbps, 6.25Gbps or 3.125Gbps) 1 Lane configuration.

To recognize as CXP12, CXP6 or CXP3 2 Lane or 4 Lane configurations, please connect CH1 after connected from CH2 to CH4, or re-discovery after all CH is connected.

5.5.2 Power/IO Connector

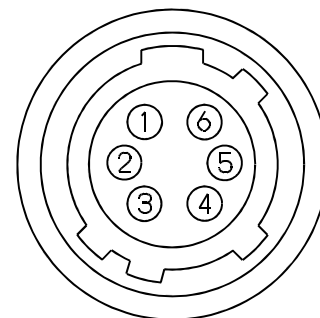
HR10A-7R-6PB (Hirose) or equivalent.

This connector is for external power supply and, input and output signals.

As for the cable part (Female connector), HR10A-7P-6S (Hirose) or equivalent can be used.

Pin assignment

Pin No.	Signal Name	IN/OUT	Signal Voltage
1	GND	IN	0 V
2	Line3	IN/OUT	+3.3 V
3	Line2	IN/OUT	+3.3 V
4	Line1	IN/OUT	+3.3 V
5	Line0	IN/OUT	+3.3 V
6	+24 V	IN	+24 V

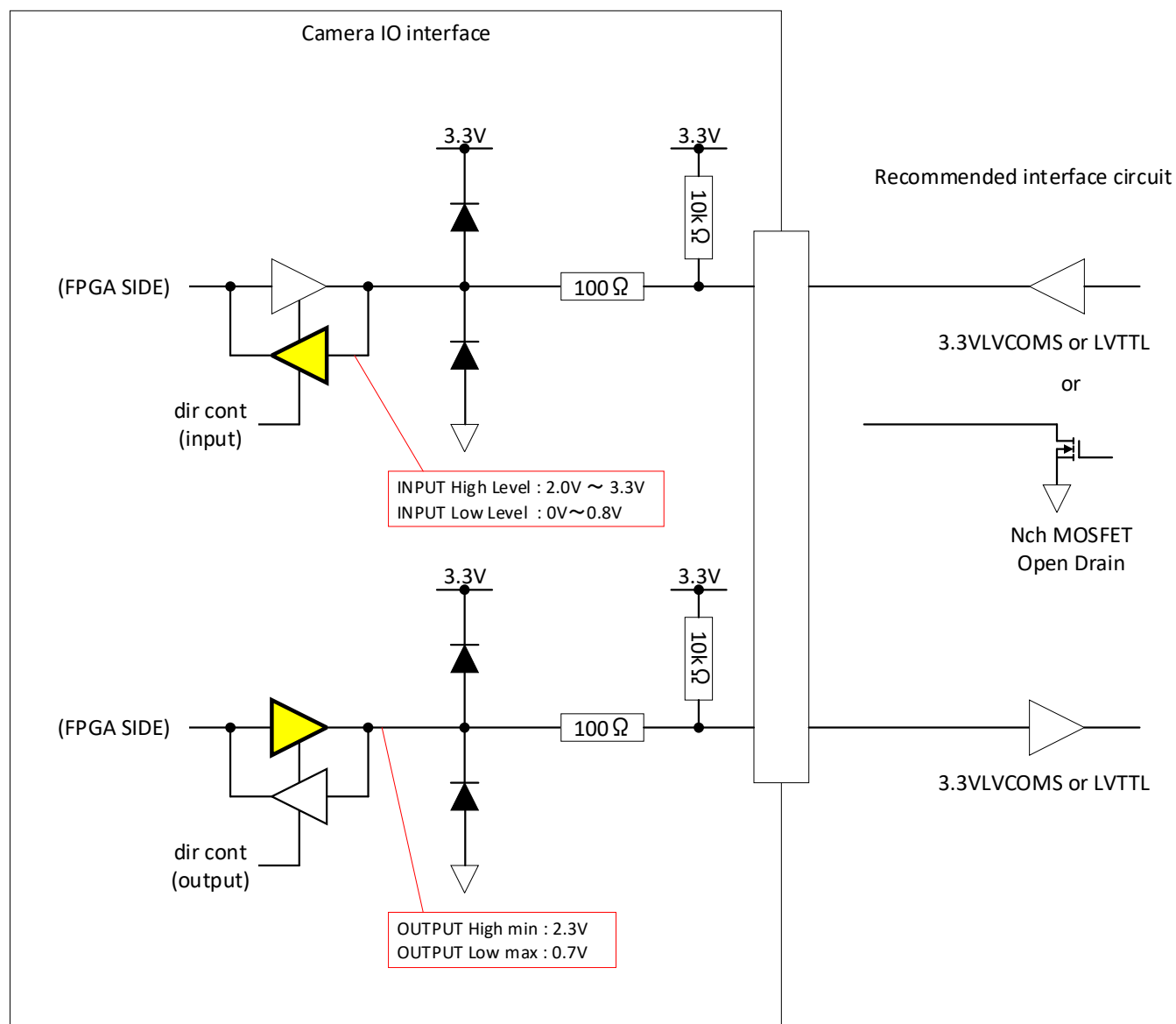


Output signal selection for Line 0 to 3

The output signal can be selectable from below:

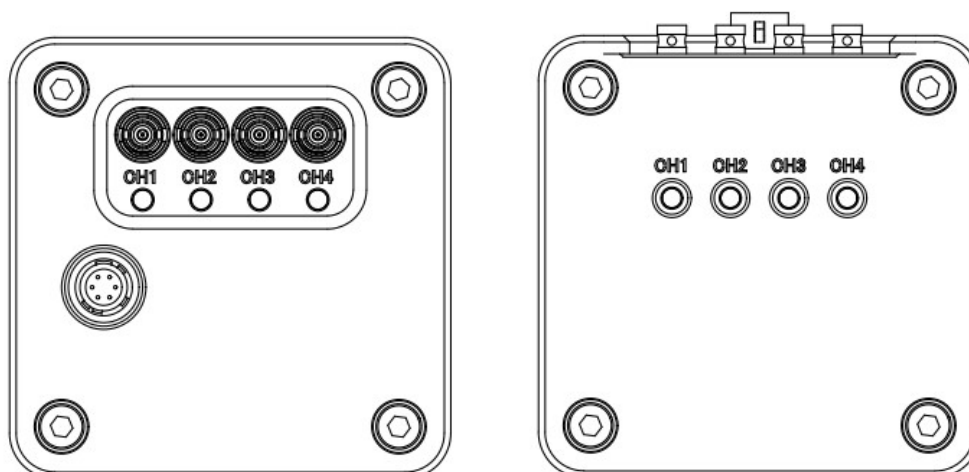
GenICam
Off
User Output
Trigger Out
Trigger Through Out
Exposure End Out
Frame End Out
Frame Trigger Wait
Transfer End Out
Sensor Read Out
Strobe Out
Exposure Active

● Block diagram of IO connector



5.5.3 Connector indicator lamp

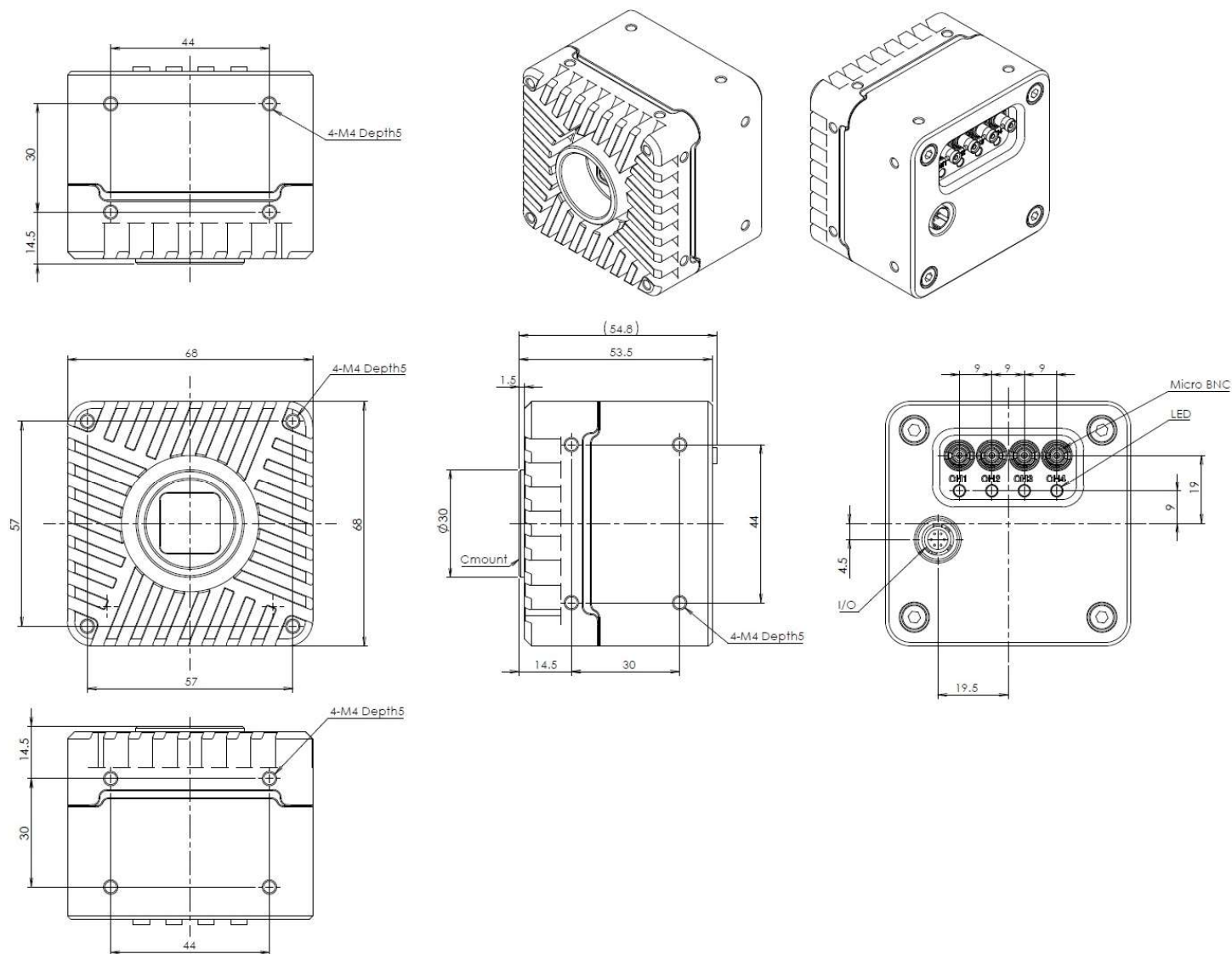
Connector indicator LED exists beside of Micro BNC connector.
LED informs status of communication. The detail of status is as following table.



Status	LED Blinking Pattern
No power	Off
System booting	Solid orange
Device / Host no connection	When using PoCXP: : (No such case) When using external power: : Slow flash red
Detecting Device / Host connection	When using PoCXP: : Fast flash alternating green / orange When using external power: : Fast flash orange
Device / Host connecting Failed	When using PoCXP: : Slow flash alternating red / green When using external power : Slow flash alternating red / orange
Device / Host connected, but no data being transferred	Solid green
Device / Host connected, waiting for trigger	Slow flash orange
Device / Host connected, data being transferred	Fast flash green
Device / Host connected, data transferring error	Solid red (500 mseconds)
Device / Host connected, while sending Test Packet	Slow flash alternating green / orange
System Error	Fast flash red

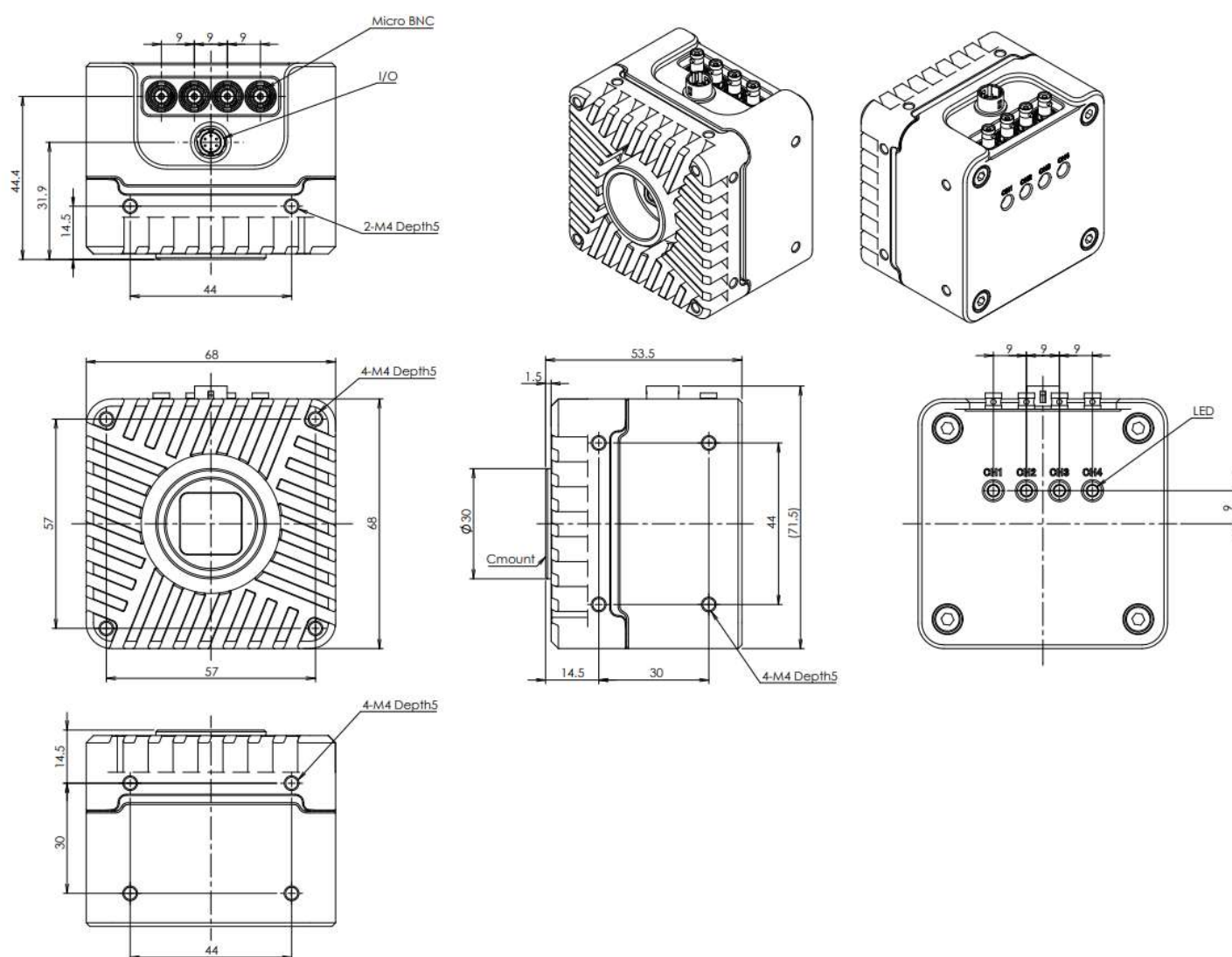
6 Dimensions

6.1 STC-LBGP251BCXP124 / STC-LCGP251BCXP124



Unit: mm

6.2 STC-LBGP251BCXP124-T / STC-LCGP251BCXP124-T

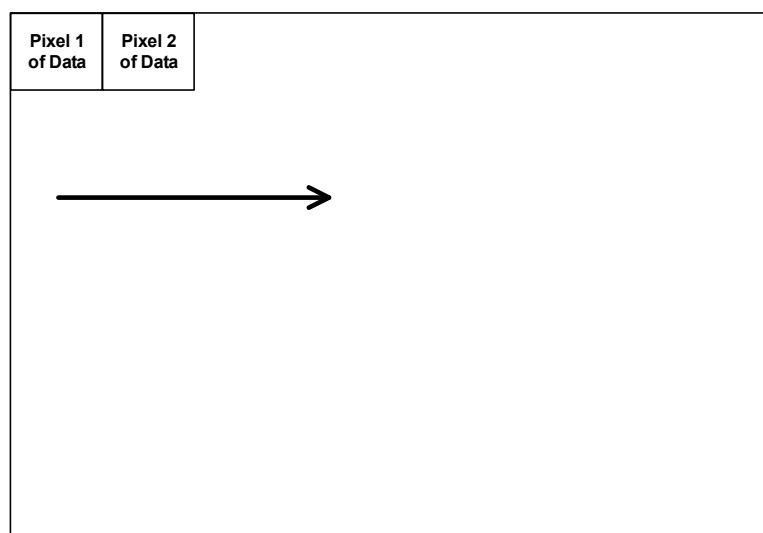


Unit: mm

7 Sensor Information

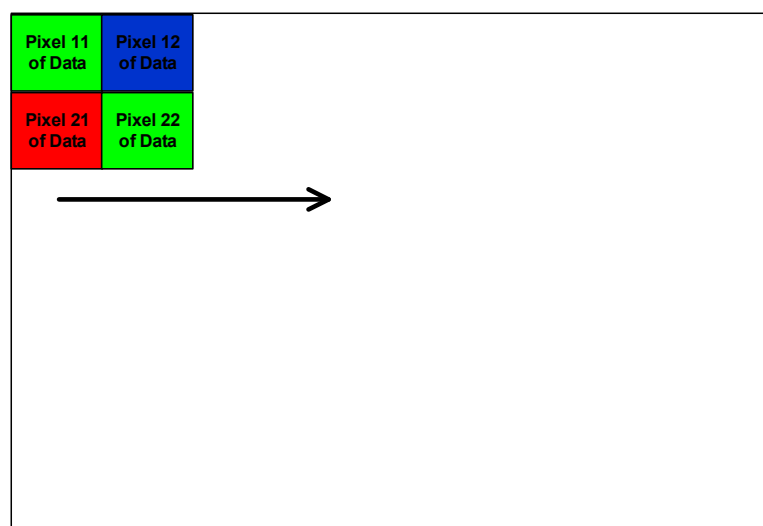
7.1 Pixel Transferring Image

STC-LBGP251BCXP124 / STC-LBGP251BCXP124-T (Monochrome)



Pixel (n) of Data: nth pixel being transferred

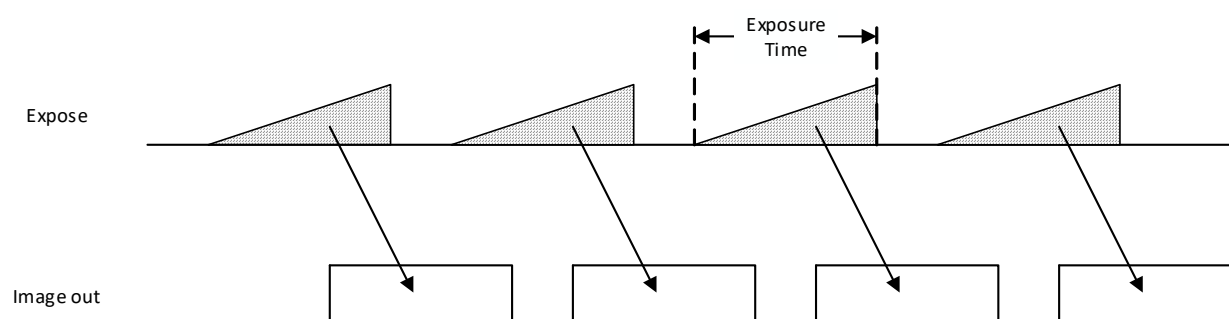
STC-LCGP251BCXP124 / STC-LCGP251BCXP124-T (Color)



Pixel (m, n) of Data: nth pixel of mth line being transferred

8 Camera Operational Modes

8.1 Normal Mode



8.2 Edge Preset Trigger Mode

In this trigger mode with positive polarity, the expose starts at rising edge of trigger signal.
The exposure duration time is based on preset exposure setting stored by camera setting communication.
In this trigger mode with negative polarity, the expose starts at falling edge of trigger signal.
The exposure duration time is based on preset exposure setting stored by camera setting communication.

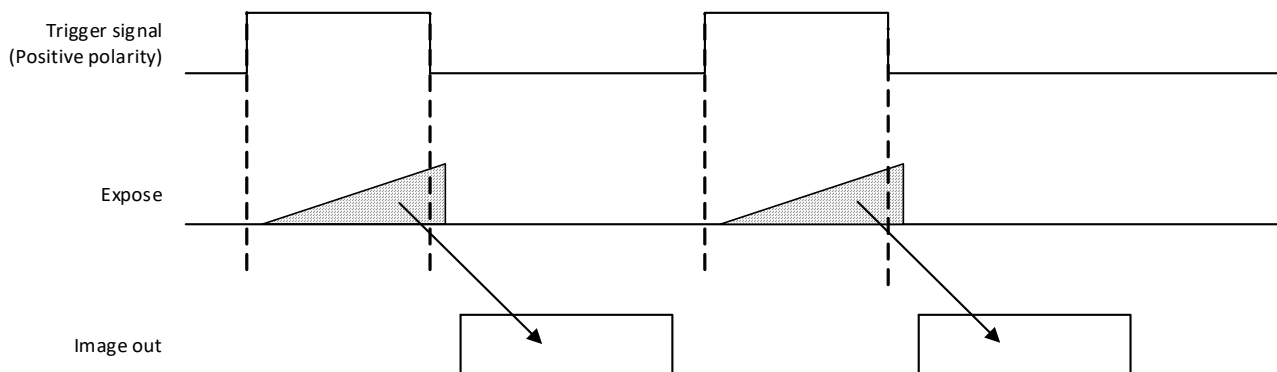
Trigger signal
(Positive polarity)

Expose

Image out

8.3 Pulse width trigger mode

In this trigger mode with positive polarity, the expose starts at rising edge of trigger signal and stops at falling edge of trigger signal. The expose period is high states of trigger signal.
In this trigger mode with negative polarity, the expose starts at falling edge of trigger signal and stops at rising edge of trigger signal. The expose period is low states of trigger signal.



8.4 Frame rate

The frame rate of camera calculates with below formula with ROI and exposure time settings.

● Formula of frame rate

$$\text{Frame rate [fps]} = 1,000,000 / (\text{Number of lines for one frame} \times 1 \text{ H time [usec.]})$$

$$1 \text{ H time [usec.]} = \text{"Hnum" value} / 96$$

Hnum value

	CXP-12, 4 Lane		CXP-12, 2 Lane / CXP6, 4 Lane	
	8bits	10bits	8bits	10bits
Full resolution	124	132	216	264
Decimation	124	132	216	264
Binning	124	132	216	264

	CXP-12, 1 Lane / CXP-6, 2 Lane / CXP-3, 4 Lane		CXP6, 1 Lane CXP-3, 2 Lane	
	8bits	10bits	8bits	10bits
Full resolution	428	528	852	1,056
Decimation	428	528	852	1,056
Binning	428	528	852	1,056

	CXP-3, 1 Lane	
	8bits	10bits
Full resolution	1,700	2,108
Decimation	1,700	2,108
Binning	1,700	2,108

* Number of lines for one frame is one of great value of below two values:

- (a) Number of lines for one frame = Number of lines of sensor frame + 35
- (b) Number of lines for one frame = Number of lines for exposing + 25

* Number of lines of sensor frame

When full resolution, Number of lines of sensor frame = Height setting of camera

When using decimation: Number of lines of sensor frame = Height setting of camera

When using binning: Number of lines of sensor frame = (Height setting of camera) x 2

* Number of lines for exposing = ((Exposure time [usec.] – 7.729) / 1 H time [usec.])

* Integer value (round down)

8.5 The interval of trigger input

The minimum interval of trigger input is changed based on trigger overlap setting (TriggerOverlap).
The trigger input that does not match minimum interval condition, is invalid.
Please refer "Frame rate" section for "Number of sensor frame line" and "1 H time" in this section.

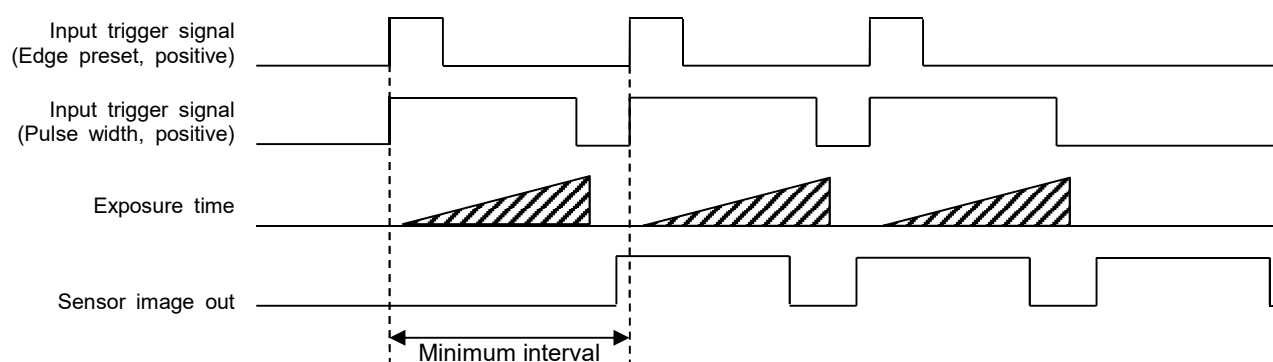
The minimum interval of trigger input is possible to check with "Frame Trigger Wait" signal through IO port.
When "Frame Trigger Wait" signal is Low status, input trigger signal is invalid.

8.5.1 The interval of trigger input when trigger overlap is disabling

The minimum interval of trigger input when trigger overlap is disabling:

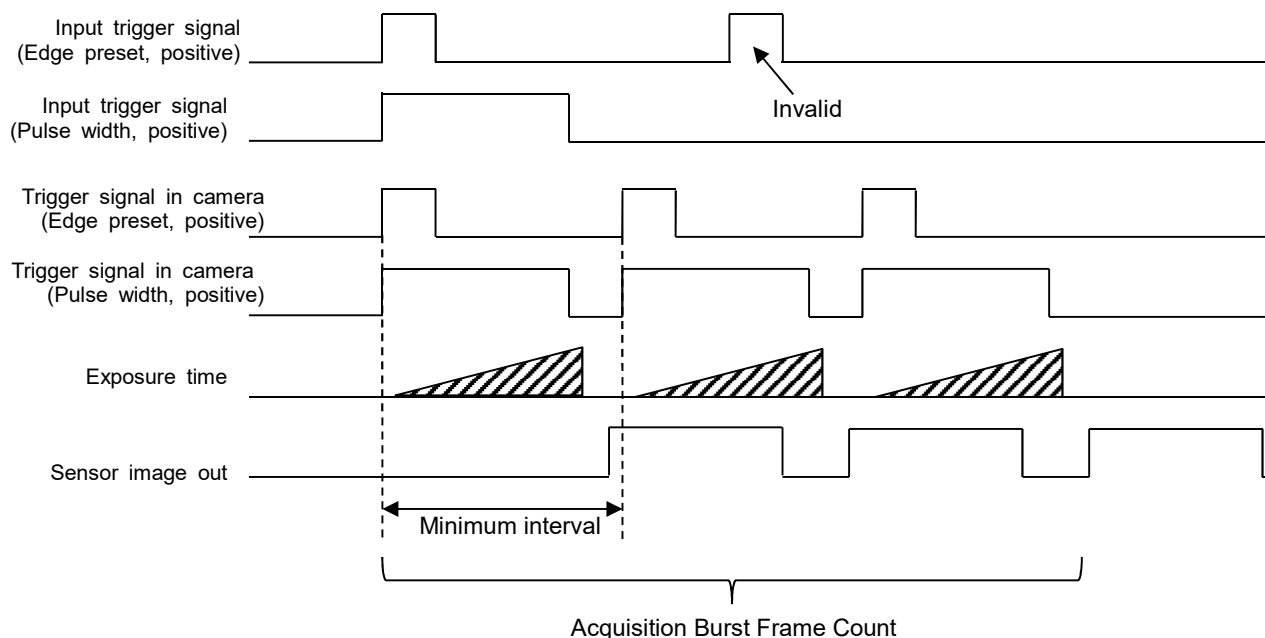
Minimum interval [usec.] = Greater one of below two:

- (a) Exposure time [usec.] + (19 x 1 H time [usec.])
- (b) (([Number of lines of sensor frame] + 35) x 1 H time [usec.])



8.6 Burst trigger

When selecting the burst trigger (Frame Burst Start) operation, number of images acquiring by one trigger signal with minimum acquisition interval. The number of acquisition images can be set at AcquisitionBurstFrameCount. The another trigger signal input while acquiring images with burst trigger, is invalid.



9 Camera Functions

This chapter describes the camera functions.

9.1 CXP Configuration

This parameter sets the CoaXPress configuration mode.

GenICam Parameters

CxpLink Configuration	IEnumeration Type	Sets CXP configuration mode. CXP12_X4: CXP-12 (12.500Gbps) 4 lane (Default) CXP6_X4: CXP-6 (6.250Gbps) 4 lane CXP3_X4: CXP-3 (3.125Gbps) 4 lane CXP12_X2: CXP-12 (12.500Gbps) 2 lane CXP6_X2: CXP-6 (6.250Gbps) 2 lane CXP3_X2: CXP-3 (3.125Gbps) 2 lane CXP12_X1: CXP-12 (12.500Gbps) 1 lane CXP6_X1: CXP-6 (6.250Gbps) 1 lane CXP3_X1: CXP-3 (3.125Gbps) 1 lane
-----------------------	-------------------	--

CXP configuration setting when power on camera

CXP configuration setting can be save as "default CXP configuration" in to "UserSet data" to use default settings of power on camera.

1. Selects CXP configuration mode when power on camera.
2. Selects UserSet (0 to 7) at UserSetSelector.
3. Executes UserSetSave.
4. Selects UserSet (0 to 7), which is selected above "2." at UserSetDefault.

* The CXP configuration mode does not change when loading saved UserSet data using by "UserSetLoad".

9.2 Device Indicator Mode

This parameter sets the LED indicator operation mode.

GenICam Parameters

Device IndicatorMode	IEnumeration Type	LED indicator operation mode. Inactive: Off Active: Indicates communication status (Default) Error Status: Off while normal operation and indicates system error only. Boot Status: Off while normal operation and indicates while booting camera or system error only.
----------------------	-------------------	---

9.3 Pixel Format

This parameter sets the image format from camera can be set on Pixel Format.

GenICam Parameters

PixelFormat	IEnumeration Type	Sets Pixel Format.
-------------	-------------------	--------------------

The following chart shows available Pixel Formats on camera:

Output Bit	Pixel Format	
	Monochrome	Color
8bits	Mono8 (Default)	BayerRG8 (Default)
10bits	Mono10	BayerRG10

The format specified on GenICam PFNC (Pixel Format Naming Convention).

9.4 Frame rate

This parameter sets the frame rare (fps) of output image from camera.

GenICam Parameters

AcquisitionFrameRate	IFloat Type	Sets frame rate in Hz unit (*1) Range is changed with exposure time and pixel format settings Default: 150.183036 (at CXP-12, 4 lane, 8bits)
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(*1) The approximate value of set value, sets to camera and display it.

9.5 Exposure Time

This parameter sets variable exposure time.

GenICam Parameters

ExposureMode	IEnumeration Type	Exposure control selection Selection: "Off", "Timed" and "TriggerWidth" Off: Exposure time is "1 / Frame rate" (Default) Timed: Exposure time is "ExposureTime" TriggerWidth: Exposure time is active pulse duration of trigger signal
ExposureTime [ExposureTime Selector]	IFloat Type	Exposure time (in μ second) (*1) Range: 8.000000 to 16,777,215.000000 Default: 6,626

(*1) The approximate value of set value, sets to camera and display it.

9.6 Trigger

These parameters set operational mode (trigger mode) and trigger type.

The selectable trigger types are listed in below table

GenICam Parameters

TriggerSelector	IEnumeration Type	Trigger function selection Frame Start: Normal trigger function (Default) Frame Burst Start: Burst trigger function
TriggerMode	IEnumeration Type	Operational mode (trigger mode) selection Off: Free run operation (Default) On: Trigger operation
TriggerSource	IEnumeration Type	Trigger type selection * Please refers below table for details of trigger type
TriggerOverlap	IEnumeration Type	Trigger Overlap function selection Off: Trigger overlap function is disabled (Default) ReadOut: Trigger overlap function is enabled
Acquisition BurstFrameCount	IInteger Type	Frame Burst Start Sets the number of frames that acquiring with trigger. Range: 1 to 16,777,216 Default: 1

<TriggerSource selection>

Software	Software trigger signal that generates by TriggerSoftware (Default)
Line0	External hardware trigger through Line0
Line1	External hardware trigger through Line1
Line2	External hardware trigger through Line2
Line3	External hardware trigger through Line3
LinkTrigger0	CXP trigger packet trigger

9.7 Image Flip

Flip the image through ReverseX and ReverseY.

GenICam Parameters

ReverseX	IBoolean Type	Switch ON / OFF at Horizontal False: Horizontal Flip Off, True: Horizontal Flip On. Default: False
ReverseY	IBoolean Type	Switch ON / OFF at Vertical False: Vertical Flip Off, True: Vertical Flip On. Default: False

9.8 Black Level

This parameter sets the black level (clamp level for black signal).

The lower limit of signal is clamped at this setting level. The signal does not lower than this.

GenICam Parameters

BlackLevel [BlackLevelSelector]	IFloat Type	Black Level Range: 8bits output: 0 to 31 10bits output: 0 to 127 Default: 10 (at 8bits)
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9.9 Gain

The gain has Analog Gain and Digital Gain.

9.9.1 Analog Gain

This parameter sets analog gain.

GenICam Parameters

GainSelector	IEnumeration Type	AnalogAll
Gain [GainSelector]	IFloat Type	Analog Gain (*1) Selection: 1: x1.5, 2: x2, 3: x2.5 Default: 3 (x2.5)

(*1) When selecting other than "3", image may not saturate due to characteristic of image sensor.

(*1) It takes about 140 msec when changing this parameter.

9.9.2 Digital Gain

This parameter sets digital gain.

GenICam Parameters

GainSelector	IEnumeration Type	DigitalAll
Gain [GainSelector]	IFloat Type	Digital Gain Range: 0 to 1,536 Default: 0

Digital Gain Formula

Gain (x times) = 1 + (Digital Gain / 256)

9.10 White Balance (Only available for color model)

The color compensates by gain adjustment for each individual color.

The gain for each color has to adjust to same brightness with flat white target.

The white balance control methods are listed in below:

GenICam Parameters

BalanceWhiteAuto	IEnumeration Type	White balance control method selection. Selection: Off, Once, Continuous and Disable Default: Off (Manual)
BalanceRatioSelector	IEnumeration Type	White balance control target color selection. Selection: Red, Green or Blue
BalanceRatio	IFloat Type	Color gain setting for selected color selects at "BalanceRatioSelector". Range: 0 to 511

White Balance Gain Formula

Gain (x times) = BalanceRatio / 64

9.10.1 Disable

Disabled white balance gain and each color gain set as x1.

Setting Procedure

1. Sets "Disable" at "BalanceWhiteAuto"

9.10.2 Manual (Off)

The optimized BalanceRatio (Red, Green or Blue) for white balance.

Setting Procedure

1. Sets "Red" (when Red gain set) at "BalanceWhiteSelector"
2. Sets value at "BalanceRatio"
3. Sets "Green" at "BalanceWhiteSelector"
4. Sets value at "BalanceRatio"
5. Sets "Blue" (when Blue gain set) at "BalanceWhiteSelector"
6. Sets value at "BalanceRatio"
7. Sets "Off" at "BalanceWhiteAuto"

9.10.3 Auto White Balance (Continuous)

Optimizes white balance gain each frame automatically.

Setting Procedure

1. Sets "Continuous" at "BalanceWhiteAuto"

9.10.4 Push to Set White Balance (Once)

The white balance gain adjusts once after selecting this white balance method. Then each gain set to "BalanceWhite (Red, Green and Blue)".

Sets "Off" at "BalanceWhiteAuto" automatically after set "WhiteBalanceGain".

Setting Procedure

1. Sets the flat white target (To process white balance correctly)
2. Sets "Once" on "BalanceWhiteAuto"

9.11 Binning (Only available for monochrome model)

Binning is summing and averaging beside pixels into one pixel.
The pixel data inside of red square add or average as one pixel.

Binning X (OFF: 1), Y (OFF: 1) Binning X (ON: 2), Y (ON: 2)

GenICam Parameters

BinningHorizontalMode	IEnumeration Type	Sets Binning mode on horizontal direction Sum: Summing mode (Default) Average: Average mode
BinningHorizontal	Integer Type	Sets Binning on horizontal direction 1: Disable Binning 2: Binning 2 Pixel Default: 1
BinningVerticalMode	IEnumeration Type	Sets Binning mode on vertical direction Sum: Summing mode (Default) * Does not support Average for vertical direction
BinningVertical	Integer Type	Sets Binning on vertical direction 1: Disable Binning 2: Binning 2 Pixel Default: 1

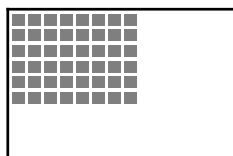
- * Note.1: It is necessary to set setting for “BinningHorizontal” and “BinningVertical”.
- * Note.2: It is necessary to set less than “1 frame period time” exposure time to increase frame rate.
- * Note.3: Binning and Decimation function cannot be use simultaneously.

9.12 Decimation

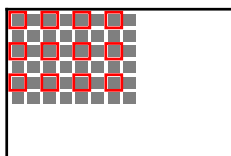
When using Decimation mode, decimated image can be output.

The images below show decimated pixels (red squares) where they are output.

<Monochrome>

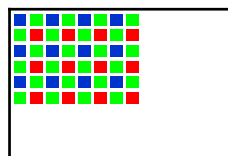


Decimation X (OFF), Y (OFF)

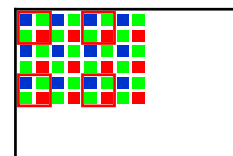


Decimation X (ON), Y (ON)

<Color>



Decimation X (OFF), Y (OFF)



Decimation X (ON), Y (ON)

GenICam Parameters

DecimationHorizontal	Integer Type	Sets decimation on horizontal direction 1: Disable Decimation, 2: Decimate one of two pixels Default: 1
DecimationVertical	Integer Type	Sets decimation on vertical direction 1: Disable Decimation, 2: Decimate one of two pixels Default: 1

* Note.1: It is necessary to set setting for “DecimationHorizontal” and “DecimationVertical”.

* Note.2: It is necessary to set less than “1 frame period time” exposure time to increase frame rate.

* Note.3: Binning and Decimation function cannot be use simultaneously.

9.13 ROI (Region of Interest)

This sets the ROI in order to output selected area of image.

The frame rate increases when reducing height of image. The frame rate does not change when reducing width of image.

Please use "Multi ROI" settings when setting multi ROI.

When selecting Binning or Decimation function, setting value of Width, Height, OffsetX and OffsetY will be half of full resolution image. (Minimum value and setting steps do not change)

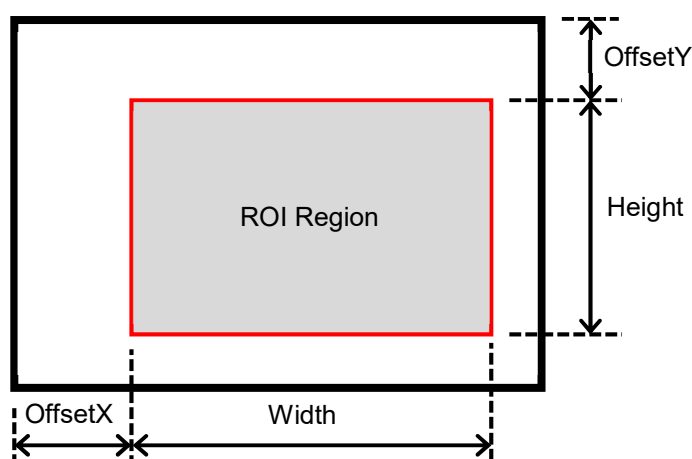
The frame rate does not increase when selecting Binning or Decimation function.

9.13.1 ROI (One Region)

GenICam Parameters

Width	Integer Type	Horizontal (Pixel) size Range: 256 to 5,120 pixels Default: 5,120 pixels Setting steps: 8 pixels Sets the width of image. "Width + OffsetX" should not exceed maximum width.
Height	Integer Type	Vertical (Line) size Range: 4 to 5,120 lines Default: 5,120 lines Setting steps: 2 lines Sets the height of image. "Height + OffsetY" should not exceed maximum height. When using multi ROI, please sets total height of multiple ROIs.
OffsetX	Integer Type	Horizontal (Pixel) offset Range: 0 to 4,864 pixels Default: 0 pixels Setting steps: 2 pixels
OffsetY	Integer Type	Vertical (Line) offset Range: 0 to 5,116 lines Default: 0 lines Setting steps: 2 lines

The parameters define as following chart.



9.14 Multi ROI

The maximum eight ROI regions (one horizontal region x eight vertical regions) are configurable.

Each region must not overlap other regions.

Please set each region (Region0 to 7) from top of image to bottom of image and must not overlap other regions.

The width of multi ROI sets at "Width" parameter. Same size of width applies for all regions.

The total height of multi ROI sets at "Height" parameter.

The frame rate can be increase when decreasing total image height (total of MultiHeight). The size of image width does not affect frame rate.

When selecting Binning or Decimation function, setting value of Width, Height, OffsetX and OffsetY will be half of full resolution image. (Minimum value and setting steps do not change)

The frame rate does not increase when selecting Binning or Decimation function.

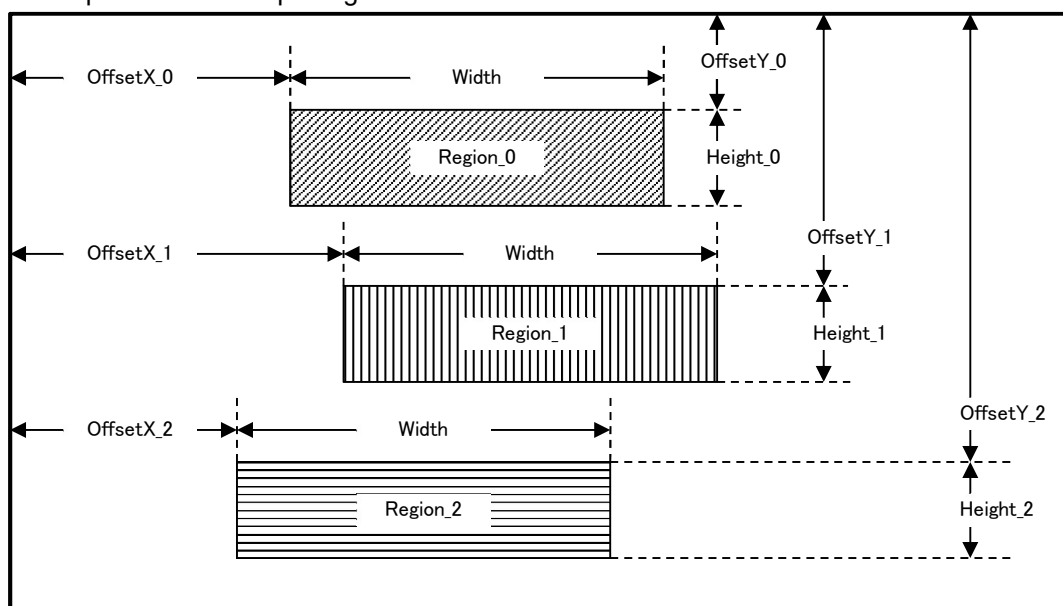
GenICam Parameters

MultiRegionSelector	IEnumeration Type	Selects the Multi Region of interest to control. Range: Region 0 to 7 Default: Region 0
MultiRegionMode [MultiRegionSelector]	IBoolean Type	Multi ROI function On / Off selection Off: Off (Default) On: On
MultiHeight [MultiRegionSelector]	Integer Type	Vertical lines of selected region of multi ROI Range: 4 to 5,120 lines, Default: 4 lines Setting steps: 2 lines
MultiOffsetX [MultiRegionSelector]	Integer Type	Horizontal offset of selected region of multi ROI Range: 0 to 4,864 pixels, Default: 0 pixels Setting steps: 2 pixels
MultiOffsetY [MultiRegionSelector]	Integer Type	Vertical offset of selected region of multi ROI Range: 0 to 5,116 lines, Default: 0 line Setting steps: 2 lines

*Note.1: (OffsetX + Width) and (OffsetY + Height) should not be smaller than maximum values.

*Note.2: The maximum frame rate will be change depending on setting of OffsetY when using same height of region.

<Example> Three multiple regions:



9.15 Flat Field Correction Control

Flat Field Correction (FFC) function is correcting shading on image that caused by characteristics of lens (amount of through light difference at center and edge of lens) and characteristics of light (uneven brightness level).

This function is supported by StViewer in SentechSDK (v1.1.1 or later).

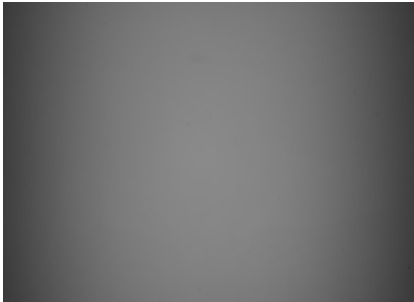
The shading on image is correcting by using FFC correcting value for each pixel of image.

FFC correcting value for FFC function is calculate by following methods.

- FFC correcting value calculates automatically by StViewer in SentechSDK (v1.1.1 or later)
- FFC correcting value calculates from image data of multiple images.

Please refers below procedure for FFC function used by StViewer in SentechSDK (v1.1.1)

GenICam Parameters

FFCEnable	Boolean Type	FFC function ON / OFF selection Selection: "True" (On), "False" (Off) Default: False True: FFC applied image is acquired. False: None FFC applied image is acquired.
FFCIndex	Integer Type	The index of area for FFC function Range: 0 to 6,560 0 81  6,479 6,560
FFCValue	Integer Type	The FFC value for selected index area. Range: 0 to 1,023

9.15.1 FFC function procedure

FFC function procedure

1. Selects "Start calculating FFC correction values" under "File" on menu at "StViewer".
2. The FFC correction values calculate automatically. The image stops while FFC correction values are calculating.
3. When FFC correcting values are calculated, sets "True" at "FFC Enable" automatically and FFC function applied image are acquired.
4. It is necessary to save FFC settings to memory on camera used by "UserSet Control". Please refers "Save and load camera settings_

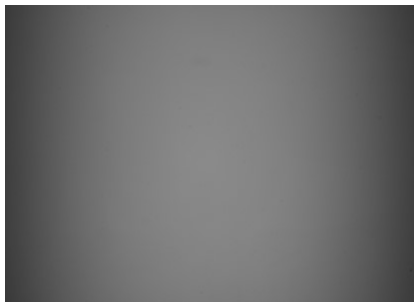


Image before FFC function

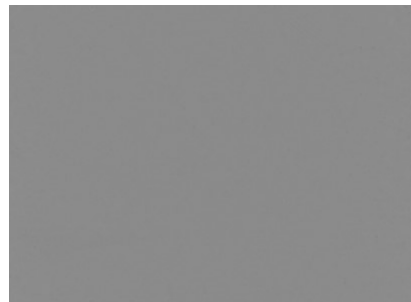


Image after apply FFC function

- * Note1: Please sets "OFF" for "Trigger mode" as free-run operation when using FFC function.
- * Note2: Please adjusts "Exposure Time" to acquiring "50%" brightness level of image when using FFC function.
- * Note3: Please uses FFC function again when changing lens or light source

9.16 Gamma Table

The linearity of gradient of image can be correct by gamma table on camera.

GenICam Parameters

Gamma	IFloat Type	Gamma Range: 0.01 to 4.00, Default: 1.00, Adjustment step: 0.01
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Gamma Formula

For 10bits image

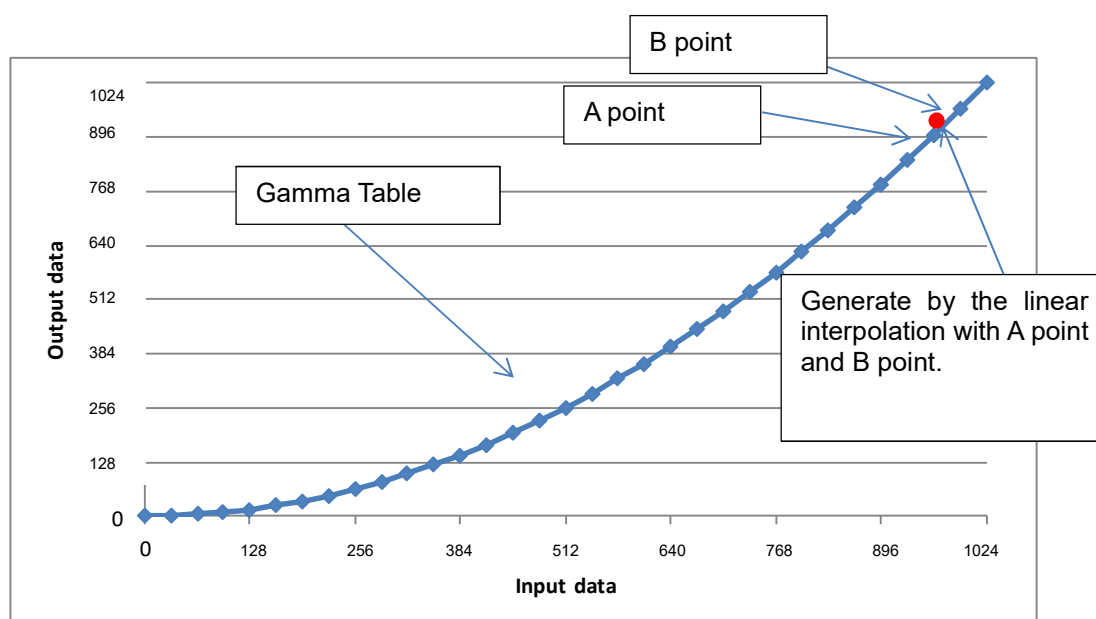
$$\text{Output data} = 1,024 \times \left(\frac{\text{Input data}}{1,024} \right)^{\gamma}$$

For 8bits image

$$\text{Output data} = 256 \times \left(\frac{\text{Input data}}{256} \right)^{\gamma}$$

The input signal divides into 32 equal part and have 33 points of gamma table.
The between points is generates by linear interpolation.

For 10bits image (Gamma = 2.0)



9.17 Pixel Defect Correction

The defected pixel corrects with horizontally beside pixel information.

The defected pixel corrects with horizontally beside same color pixel information for color model.

The coordination of defected pixels can be save to camera (UserSetSave) or load from camera (UserSetLoad).

When selecting "Default" UserSet, it is factory default data and cannot overwrite.

The coordination of defected pixels is one common data for UserSet0 to UserSet7.

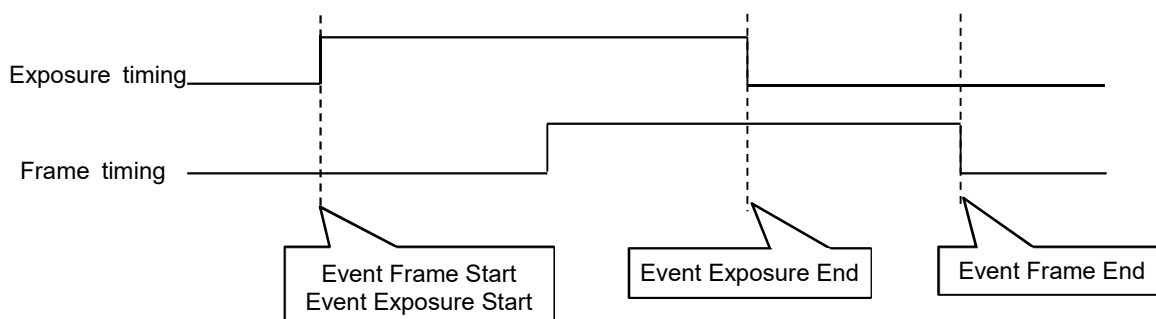
GenICam Parameters

PixelCorrectionAllEnabled	Boolean Type	Switch ON / OFF for Pixel Defect Correction True: On (Default), False: Off
PixelCorrectionEnabled	Boolean Type	Switch ON / OFF for pixel defect correction for Index was selected at "PixelCorrectionIndex" True: On, False: Off (Default)
PixelCorrectionIndex	Integer Type	Pixel Correction Index Range: 0 to 2,047 Default: 0
PixelCorrectionX	Integer Type	Defect position on X coordinate for Index was selected at "PixelCorrectionIndex" Range: 0 to 5,119 Default: 0
PixelCorrectionY	Integer Type	Defect position on Y coordinate for Index was selected at "PixelCorrectionIndex" Range: 0 to 5,119 Default: 0

9.18 Event Control

The camera internal signal can be output as specified event information, like “exposure end”, to PC.

e.g. Event control



GenICam Parameters

EventSelector	IEnumeration Type	Event notification selection Exposure Start Exposure End Frame Trigger Frame Start Frame End Line 0 Rising Edge Line 0 Falling Edge Line 1 Rising Edge Line 1 Falling Edge Line 2 Rising Edge Line 2 Falling Edge Line 3 Rising Edge Line 3 Falling Edge Link Trigger 0 Frame Trigger Missed Test
Event Notification	IEnumeration Type	Event notification ON / OFF selection On: Enable event notification Off: Disable event notification (Default)

Note: Only Euresys CXP frame grabber board supported Event function (at March 2022)
It is necessary to use StViewer of Sentech SDK v1.1.2_Update6 or later to display Event.
(Viewer from Euresys does not support Event display)

9.19 Save and load camera settings

The camera has camera setting save function, camera setting including factory default loads function.

The camera has below two camera settings.

Default: The factory default settings (This setting cannot change)

UserSetX: Over writeable camera settings (X: 0 to 7)

Data type	Camera settings	FFC data	Coordination of defective pixel
Default	Factory default data	Factory default data (FFC is disabled)	Factory default data
UserSet0 to 7	Camera settings for each UserSet	FFC data for each UserSet	One common coordination of defective pixel data for all UserSet

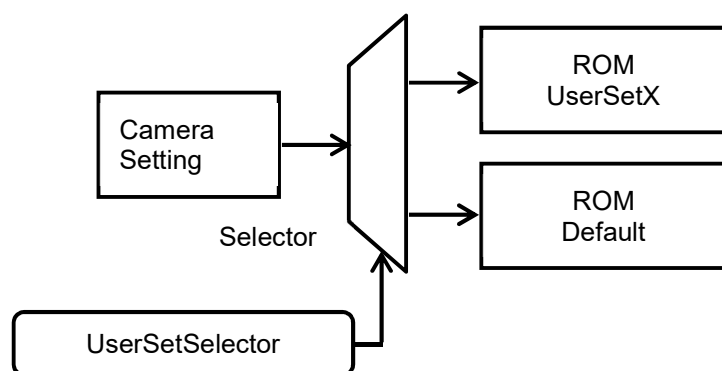
The camera settings saving and loading is controllable with Parameters (UserSetSelector, UserSetDefault), and commands (UserSetLoad, UserSetSave) in UserSetControl category of GenICam.

The details of parameters and functions are in table below:

GenICam Parameters

UserSetSelector	IEnumeration Type	Select "Default" or "UserSet1" UserSetLoad or UserSetSave process for selected settings.
UserSetLoad	ICommand Type	The camera settings load from ROM to register in RAM.
UserSetSave	ICommand Type	The camera settings at register in RAM save to ROM.
UserSetDefault	IEnumeration Type	Select which settings ("Default or UserSet X) load automatically when camera power is on. This selection saves automatically.

9.19.1 Saving the Camera Settings



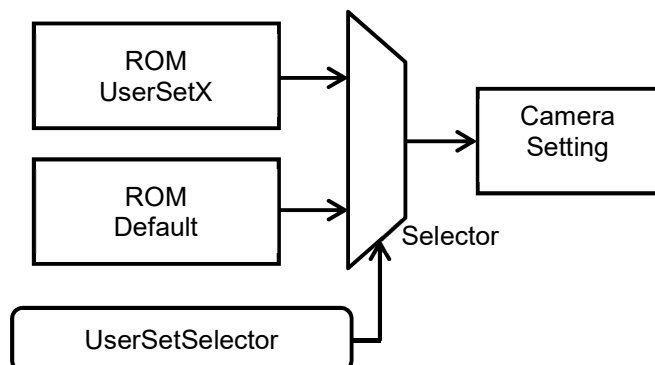
When UserSetSave is executing, the camera settings at register in RAM are saved to ROM that is selected at UserSetSelector.

Caution:
UserSetSave cannot execute when "Default" was selected at "UserSetSelector"

Setting Procedure

1. Selects "UserSetX" at "UserSetSelector"
2. Execute "UserSetSave"

9.19.2 Loading Camera Settings

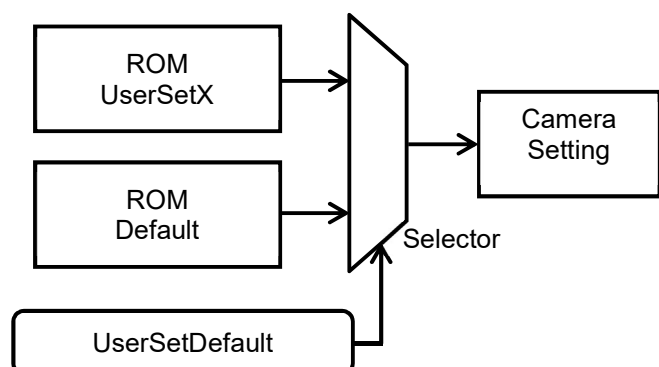


When UserSetLoad is executing, the camera settings load from selected ROM that was selected at "UserSetSelector" to register at RAM.

Setting Procedure

1. Select "UserSetX" (or Default) at "UserSetSelector"
2. Execute "UserSetLoad"

9.19.3 Loading Camera Settings when the Camera Power is on



When the camera power is on, the camera settings load from selected ROM that was selected at "UserSetDefault" to register at RAM.

Setting Procedure

1. Set "UserSetX" or "Default" at "UserSetDefault"

9.19.4 Camera Settings Initialization

Please follow the below procedure for camera settings put back to factory default settings.

Setting Procedure

1. Selects "Default" at "UserSetSelector".
2. Executes "UserSetLoad".
3. Selects "UserSetX" at "UserSetSelector"
4. Execute "UserSetSave"

10 IO Function

This chapter describes IO functions.

In this chapter, the IO Port places as "Line". The follow chart details relationship of Line and IO Port.

IO Port Pin No.	Line number
2	Line3
3	Line2
4	Line1
5	Line0

GenICam Parameters

LineSelector	IEnumeration Type	Select Line
LineMode	IEnumeration Type	Switch input / output direction for Line that was selected at LineSelector. Input: set as input, Output: set as output
LineInverter	IBoolean Type	Switch polarity inversion ON / OFF for Line that was selected at LineSelector. False: polarity inversion Off (Active-High), True: polarity inversion On (Active-Low)
LineStatus	IBoolean Type	Line status (High / Low)
LineSource	IEnumeration Type	Set function for Line that was selected at LineSelector
UserOutputSelector	IEnumeration Type	Select UserOutput
UserOutputValue	IBoolean Type	Switch voltage level of UserOutput that was selected at UserOutputSelector False: Low voltage level, True: High voltage level

10.1 Input Port Function

This function sets the input on Line Mode, then assigns Line as input.

The following functions can be assigned as input.

10.1.1 Trigger Input

When select "input" assign port at TriggerSource, input signal can be assigned as Trigger.

The input signal can be switched to Active-Low (LineInverter: true) or Active-High (LineInverter: false).

(*) When the Line polarity changing by LineInverter, active polarity of input trigger signal is changed.

10.1.2 LineStatus

This function monitors the signal status on input Line.

The High level (LineStatus: true) or Low level (LineStatus false) status can be seen through software.

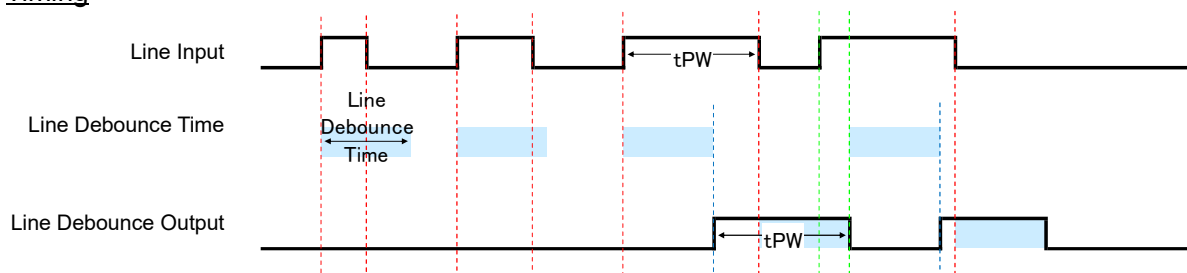
10.1.3 Line Debouncer

Line Debouncer can reduce the wrong input signal detection that is noise on signal or chattering, by filtering input signal.

GenICam Parameters

LineDebounceTime	Integer Type	Line Debounce Time Range: 0 to 10,000 μ seconds, Default: 1 μ seconds
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Timing



10.1.4 Trigger Delay

As mentioned in the previous chapter, "Image acquisition and Camera Mode", each trigger can add to duration of input signal

This TriggerDelay can add to duration per μ second.

GenICam Parameters

TriggerDelay	Integer Type	Trigger Delay Range: 0 to 262,143 μ seconds, Default: 0 μ second
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10.2 Output Port Function

This function sets the Output to LineMode, and then Line is assigned as output.

The following functions can be assigned when IO port is used as output signal port.

10.2.1 LineSource

The following list shows the configurable functions available through LineSource.

The function that describes as “Enable” on “Changeable Polarity” is configurable polarity on LineInverter (true, false).

No.	Function Name
1)	Off (Default)
2)	User Output
3)	Trigger Out
4)	Trigger Through Out
5)	Exposure End Out
6)	Frame End Out
7)	Frame Trigger Wait
8)	Transfer End Out
9)	Sensor Read Out
10)	Strobe Out
11)	Exposure Active

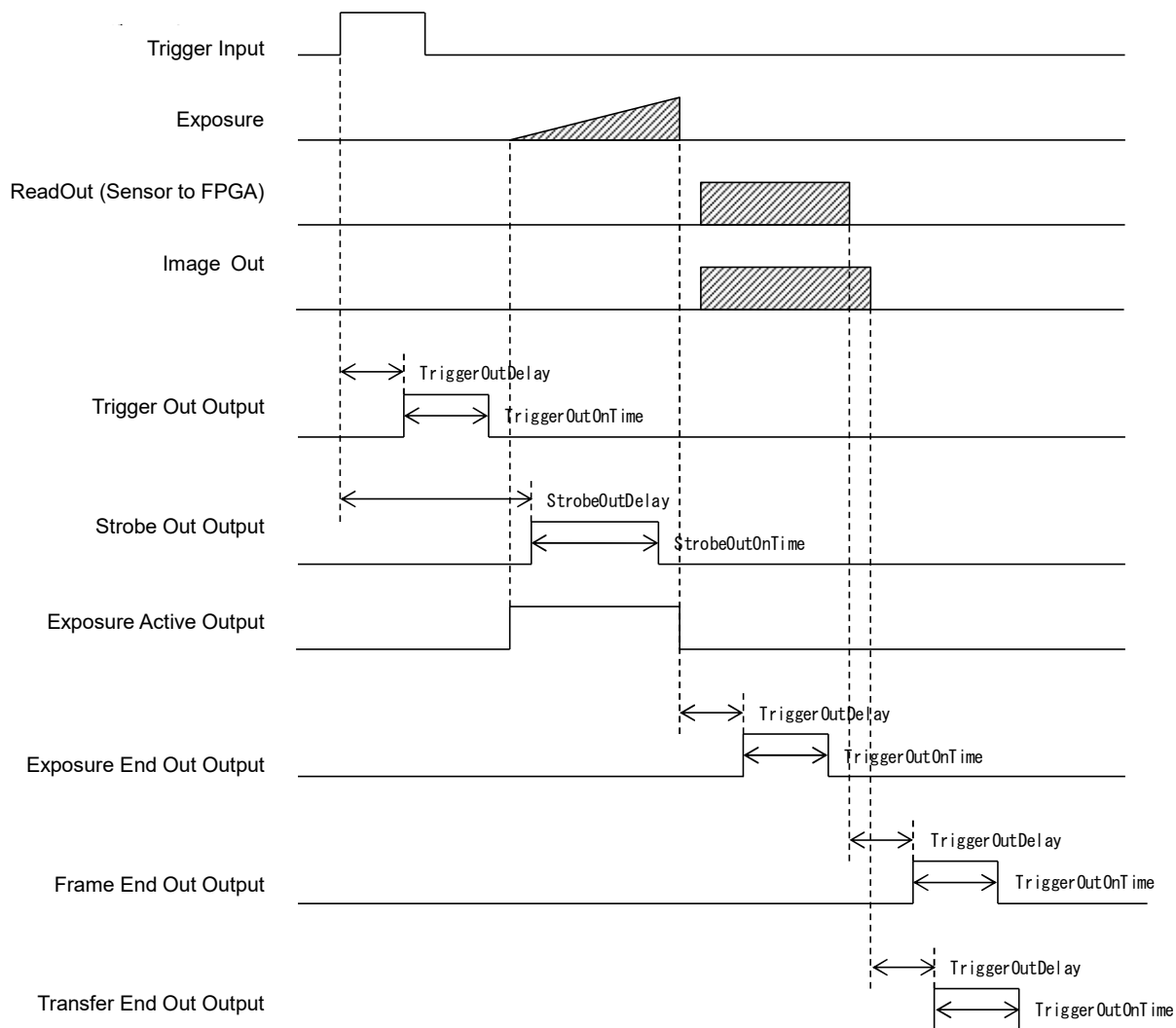
- 1) Off (Disable)
Disable the output signal.
- 2) User Output (General Output)
High or Low level signal that sets on software is output.
- 3) Trigger Out (Trigger Output)
The trigger signal that added “TriggerOutDelay (Output pulse delay time)” and “TriggerOutOnTime (Output pulse width)” is output.
- 4) Trigger Through Out (Trigger Output)
The trigger signal that added “TriggerOutDelay (Output pulse delay time)” and “TriggerOutOnTime (Output pulse width)” is output.
- 5) Exposure End Out (Exposure End)
“TriggerOutOnTime (Output pulse width)” activation time signal with set “TriggerOutDelay (Output pulse delay time)” is output when expose was finished.
- 6) Frame End Out (Sensor Readout End)
“TriggerOutOnTime (Output pulse width)” activation time signal with set “TriggerOutDelay (Output pulse delay time)” is output when sensor read out was finished.
- 7) Frame Trigger Wait (Trigger wait Output)
“Frame Trigger Wait” signal to determine whether camera can be receiving and process trigger signal or not.
- 8) Transfer End Out (Transfer end Output)
“TriggerOutOnTime (Output pulse width)” activation time signal with set “TriggerOutDelay (Output pulse delay time)” is output when one frame image out from camera was finished.
- 9) Sensor Read Out (Sensor Readout Output)
“High” state signal is output while image output from image sensor (FVAL period)
- 10) Strobe Out (Strobe Output)
“StrobeOutOnTime (Output pulse width)” activation time signal with set “StrobeOutDelay (Strobe output delay time)” is output when trigger signal is received.

11) Exposure Active (In Exposure Period)

The signal that activation time is exposure time is output.

(*) Actual exposure period = Output signal pulse width + Minimum exposure time 13.73 μ seconds

Line Source Timing



(*) This timing chart does not include delay of IO circuit

10.2.2 User Output

High or low level signal that was configured on software is output.

Setting Procedure

Selects LineN (N: any number from 0, 1 or 2)

- 1) Sets the UserOutputN (N is Line number) as LineSource
- 2) Selects UserOutputN (N is same as selected Line number on UserOutput) on UserOutputSelector
- 3) Sets the value (True: High level, False: Low level) on UserOutputValue

10.2.3 LineStatus

Monitor the status on output port.

Monitor the output voltage level High (LineStatus: true) or Low (LineStatus: false) through software.

10.2.4 Output signal duration setting and Pulse width setting

Some selectable functions can be modified in order to add to duration or pulse width on Line Source.

The configurable parameters are shown in chart below.

Please refer to LineSource for applicable functions of parameters.

GenICam Parameters

TriggerOutDelay	Integer Type	Trigger Out Delay Time Range: 0 to 262,143 μ seconds, Default: 0 μ second
TriggerOutOnTime	Integer Type	Trigger Out On Time Range: 4 to 262,143 μ seconds, Default: 32 μ seconds
StrobeOutDelay	Integer Type	Strobe Out Delay Time Range: 0 to 262,143 μ seconds, Default: 30 μ seconds
StrobeOutOnTime	Integer Type	Strobe Out On Time Range: 4 to 262,143 μ seconds, Default: 32 μ seconds

11 GenICam command list

11.1 DeviceControl

Name	Description
DeviceType	Returns the device type.
DeviceScanType	Scan type of the sensor of the device.
DeviceVendorName	Name of the manufacturer of the device.
DeviceModelName	Model of the device.
DeviceManufacturerInfo	Manufacturer information about the device.
DeviceVersion	Version of the device.
DeviceSerialNumber	Device's serial number. This string is a unique identifier of the device.
DeviceUserID	User-programmable device identifier.
DeviceSFNCVersionMajor	Major version of the Standard Features Naming Convention that was used to create the device's GenICam XML.
DeviceSFNCVersionMinor	Minor version of the Standard Features Naming Convention that was used to create the device's GenICam XML.
DeviceSFNCVersionSubMinor	Sub minor version of Standard Features Naming Convention that was used to create the device's GenICam XML.
DeviceManifestEntrySelector	Selects the manifest entry to reference.
DeviceManifestXMLMajorVersion	Indicates the major version number of the GenICam XML file of the selected manifest entry.
DeviceManifestXMLMinorVersion	Indicates the minor version number of the GenICam XML file of the selected manifest entry.
DeviceManifestXMLSubMinorVersion	Indicates the sub minor version number of the GenICam XML file of the selected manifest entry.
DeviceManifestSchemaMajorVersion	Indicates the major version number of the schema file of the selected manifest entry.
DeviceManifestSchemaMinorVersion	Indicates the minor version number of the schema file of the selected manifest entry.
DeviceManifestSchemaSubMinorVersion	Indicates the sub minor version number of the schema file of the selected manifest entry.
DeviceTLType	Transport Layer type of the device.
DeviceTLVersionMajor	Major version of the Transport Layer of the device.
DeviceTLVersionMinor	Minor version of the Transport Layer of the device.
DeviceTLVersionSubMinor	Sub minor version of the Transport Layer of the device.
DeviceCharacterSet	Character set used by the strings of the device's bootstrap registers.
DeviceReset	Resets the device to its power up state.
DeviceIndicatorMode	Controls the behavior of the indicators (such as LEDs) showing the status of the Device.
DeviceRegistersEndianness	Endianness of the registers of the device.
DeviceTemperatureSelector	Selects the location within the device, where the temperature will be measured.
DeviceTemperature	Device temperature in degrees Celsius (C). It is measured at the location selected by DeviceTemperatureSelector.
DeviceClockSelector	Selects the clock frequency to access from the device.
DeviceClockFrequency [DeviceClockSelector]	Returns the frequency of the selected device.

11.2 ImageFormatControl

Name	Description
SensorWidth	Effective width of the sensor in pixels.
SensorHeight	Effective height of the sensor in pixels.
SensorShutterMode	Sets the shutter mode of the device.
WidthMax	Maximum width of the image (in pixels). The dimension is calculated after horizontal binning, decimation or any other function changing the horizontal dimension of the image.
HeightMax	Maximum height of the image (in pixels). This dimension is calculated after vertical binning, decimation or any other function changing the vertical dimension of the image.
RegionSelector	Selects the Region of interest to control. The RegionSelector feature allows devices that are able to extract multiple regions out of an image, to configure the features of those individual regions independently.
ComponentSelector	Selects a component to activate data streaming from.
ComponentEnable [ComponentSelector]	Controls if the selected component streaming is active.
Width	Width of the image provided by the device (in pixels).
Height	Height of the image provided by the device (in pixels).
OffsetX	Horizontal offset from the origin to the region of interest (in pixels).
OffsetY	Vertical offset from the origin to the region of interest (in pixels).
MultiRegionSelector	Selects the Multi Region of interest to control. The MultiRegionSelector feature allows devices that are able to extract multiple regions out of an image, to configure the features of those individual regions independently.
MultiRegionMode [MultiRegionSelector]	Controls if the selected Multi Region of interest is active and streaming.
MultiHeight [MultiRegionSelector]	Multi Height of the image provided by the device (in pixels).
MultiOffsetX [MultiRegionSelector]	Horizontal offset from the origin to the multi region of interest (in pixels).
MultiOffsetY [MultiRegionSelector]	Vertical offset from the origin to the multi region of interest (in pixels).
BinningSelector	Selects which binning engine is controlled by the BinningHorizontal and BinningVertical features.
BinningHorizontalMode [BinningSelector]	Sets the mode to use to combine horizontal photo-sensitive cells together when BinningHorizontal is used.
BinningHorizontal [BinningSelector]	Number of horizontal photo-sensitive cells to combine together. This increases the intensity (or signal to noise ratio) of the pixels and reduces the horizontal resolution (width) of the image.
BinningVerticalMode [BinningSelector]	Sets the mode used to combine vertical photo-sensitive cells together when BinningVertical is used.
BinningVertical [BinningSelector]	Number of vertical photo-sensitive cells to combine together. This increases the intensity (or signal to noise ratio) of the pixels and reduces the vertical resolution (height) of the image.
DecimationHorizontalMode	Sets the mode used to reduce the horizontal resolution when DecimationHorizontal is used.
DecimationHorizontal	Horizontal sub-sampling of the image. This reduces the horizontal resolution (width) of the image by the specified horizontal decimation factor.
DecimationVerticalMode	Sets the mode used to reduce the vertical resolution when DecimationVertical is used.
DecimationVertical	Vertical sub-sampling of the image. This reduces the vertical resolution (height) of the image by the specified vertical decimation factor.
ReverseX	This feature is used to flip horizontally the image sent by the device. The AOI is applied after the flipping.
ReverseY	This feature is used to flip vertically the image sent by the device. The AOI is applied after the flipping.
PixelFormat [ComponentSelector]	Format of the pixels provided by the device. It represents all the information provided by PixelCoding, PixelSize, PixelColorFilter combined in a single feature.
PixelFormatInfoSelector	Select the pixel format for which the information will be returned.
PixelFormatInfoID [PixelFormatInfoSelector]	Returns the value used by the streaming channels to identify the selected pixel format.
PixelSize [PixelFormatInfoSelector]	Total size in bits of a pixel of the image.
PixelColorFilter [PixelFormatInfoSelector]	Type of color filter that is applied to the image.

Name	Description
TestPatternGeneratorSelector	Selects which test pattern generator is controlled by the TestPattern feature.
TestPattern [TestPatternGeneratorSelector]	Selects the type of test pattern that is generated by the device as image source.
TestPatternInputValue [TestPatternGeneratorSelector]	Test Pattern Input Value

11.3 AcquisitionControl

Name	Description
AcquisitionMode	Sets the acquisition mode of the device. It defines mainly the number of frames to capture during an acquisition and the way the acquisition stops.
AcquisitionStart	Starts the Acquisition of the device. The number of frames captured is specified by AcquisitionMode.
AcquisitionStop	Stops the Acquisition of the device at the end of the current Frame. It is mainly used when AcquisitionMode is Continuous but can be used in any acquisition mode.
AcquisitionFrameRate	Controls the acquisition rate (in Hertz) at which the frames are captured.
TriggerSelector	Selects the type of trigger to configure.
TriggerMode [TriggerSelector]	Controls if the selected trigger is active.
TriggerSoftware [TriggerSelector]	Generates an internal trigger. TriggerSource must be set to Software.
TriggerSource [TriggerSelector]	Specifies the internal signal or physical input Line to use as the trigger source. The selected trigger must have its TriggerMode set to On.
TriggerOverlap [TriggerSelector]	Specifies the type trigger overlap permitted with the previous frame or line. This defines when a valid trigger will be accepted (or latched) for a new frame or a new line.
TriggerDelay [TriggerSelector]	Specifies the delay in microseconds (us) to apply after the trigger reception before activating it.
ExposureMode	Sets the operation mode of the Exposure (or shutter).
ExposureTimeSelector	Selects which exposure time is controlled by the ExposureTime feature. This allows for independent control over the exposure components.
ExposureTime [ExposureTimeSelector]	Sets the Exposure time when ExposureMode is Timed and ExposureAuto is Off. This controls the duration where the photosensitive cells are exposed to light.

11.4 TransportLayerControl

Name	Description
PayloadSize	Provides the number of bytes transferred for each image or chunk on the stream channel. This includes any end-of-line, end-of-frame statistics or other stamp data. This is the total size of data payload for a data block.
CxpLinkConfigurationStatus	This feature indicates the current and active link configuration used by the device.
CxpLinkConfigurationPreferred	Provides the link configuration that allows the Transmitter device to operate in this default mode.
CxpLinkConfiguration	This feature allows specifying the link configuration for the communication between the Receiver and Transmitter device.
CxpConnectionSelector	Selects the CoaXPress physical connection to control.
CxpConnectionTestMode [CxpConnectionSelector]	Enables the test mode for and individual physical connection of the device.
CxpConnectionTestErrorCount [CxpConnectionSelector]	Reports the current connection error count for test packets received by the device on the connection selected by CxpConnectionSelector.
CxpSendReceiveSelector	Selects which one of the send or receive features to control.
CxpConnectionTestPacketCount [CxpSendReceiveSelector]	Reports the current count for test packets received by the device on the connection selected by CxpConnectionSelector.
CxpErrorCounterSelector	Selects which Cxp Error Counter to read or reset.
CxpErrorCounterReset [CxpErrorCounterSelector]	Resets the selected Cxp Error Counter on the connection selected by CxpConnectionSelector. The counter starts counting events immediately after the reset.
CxpErrorCounterValue [CxpErrorCounterSelector]	Reads the current value of the selected Cxp Error Counter on the connection selected by CxpConnectionSelector.
CxpErrorCounterStatus [CxpErrorCounterSelector]	Returns the current status of the selected Cxp Error Counter on the connection selected by CxpConnectionSelector.
Image1StreamID	Gives the ID for the 1 st stream.

11.5 DigitalIOControl

Name	Description
LineSelector	Selects the physical line (or pin) of the external device connector to configure.
LineMode [LineSelector]	Controls if the physical Line is used to Input or Output a signal.
LineInverter [LineSelector]	Controls the inversion of the signal of the selected input or output Line.
LineStatus [LineSelector]	Returns the current status of the selected input or output Line.
LineSource [LineSelector]	Selects which internal acquisition or I/O source signal to output on the selected Line. LineMode must be Output.
UserOutputSelector	Selects which bit of the User Output register will be set by UserOutputValue.
UserOutputValue [UserOutputSelector]	Sets the value of the bit selected by UserOutputSelector.
StrobeOutDelay	Delay of StrobeOut signal when LineSource is set to StrobeOut (us).
StrobeOutOnTime	Duration of StrobeOut signal when LineSource is set to StrobeOut (us).
TriggerOutDelay	Delay of TriggerOut signal when LineSource is set to TriggerOut (us).
TriggerOutOnTime	Duration of TriggerOut signal when LineSource is set to TriggerOut (us).
LineDebounceTime	Sets the value of the input line debouncer time.

11.6 AnalogControl

Name	Description
GainSelector	Selects which Gain is controlled by the various Gain features.
Gain [GainSelector]	Controls the selected gain as an absolute physical value. This is an amplification factor applied to the video signal.
BlackLevelSelector	Selects which Black Level is controlled by the various Black Level features.
BlackLevel [BlackLevelSelector]	Controls the black level as an absolute physical value. This represents a DC offset applied to the video signal.
BalanceRatioSelector	Selects which Balance ratio to control.
BalanceRatio [BalanceRatioSelector]	Controls ratio of the selected color component to a reference color component. It is used for white balancing.
BalanceWhiteAuto	Controls the mode for automatic white balancing between the color channels. The white balancing ratios are automatically adjusted.
Gamma	Controls the gamma correction of pixel intensity.

11.7 LUTControl

Name	Description
PixelCorrectionAllEnabled	Enable pixel correction for all pixels.
PixelCorrectionEnabled	Determine if targeted pixel is enabled for pixel correction.
PixelCorrectionIndex	Determine index of targeted pixel for pixel correction.
PixelCorrectionX	Determine x-coordinate of targeted pixel for pixel correction.
PixelCorrectionY	Determine y-coordinate of targeted pixel for pixel correction.

11.8 Event Control

Name	Description
EventSelector	Selects which Event to signal to the host application.
EventNotification [EventSelector]	Activate or deactivate the notification to the host application of the occurrence of the selected Event.
EventExposureStart	Returns the unique Identifier of the Exposure Start type of Event.
EventExposureStartTimestamp	Returns the Timestamp of the Exposure Start Event.
EventExposureEnd	Returns the unique identifier of the ExposureEnd type of Event.
EventExposureEndTimestamp	Returns the Timestamp of the Exposure End Event.
EventFrameTrigger	Returns the unique Identifier of the FrameTrigger type of Event.
EventFrameTriggerTimestamp	Returns the Timestamp of the FrameTrigger Event.
EventFrameStart	Returns the unique Identifier of the Frame Start type of Event.
EventFrameStartTimestamp	Returns the Timestamp of the Frame Start Event.
EventFrameEnd	Returns the unique Identifier of the Frame End type of Event.
EventFrameEndTimestamp	Returns the Timestamp of the Frame End Event.
EventLine0RisingEdge	Returns the unique identifier of the Line0RisingEdge type of Event.
EventLine0RisingEdgeTimestamp	Returns the Timestamp of the Line0RisingEdge Event.
EventLine0FallingEdge	Returns the unique identifier of the Line0FallingEdge type of Event.
EventLine0FallingEdgeTimestamp	Returns the Timestamp of the Line0FallingEdge Event.
EventLine1RisingEdge	Returns the unique identifier of the Line1RisingEdge type of Event.
EventLine1RisingEdgeTimestamp	Returns the Timestamp of the Line1RisingEdge Event.
EventLine1FallingEdge	Returns the unique identifier of the Line1FallingEdge type of Event.
EventLine1FallingEdgeTimestamp	Returns the Timestamp of the Line1FallingEdge Event.
EventLine2RisingEdge	Returns the unique identifier of the Line2RisingEdge type of Event.
EventLine2RisingEdgeTimestamp	Returns the Timestamp of the Line2RisingEdge Event.
EventLine2FallingEdge	Returns the unique identifier of the Line2FallingEdge type of Event.
EventLine2FallingEdgeTimestamp	Returns the Timestamp of the Line2FallingEdge Event.
EventLine3RisingEdge	Returns the unique identifier of the Line3RisingEdge type of Event.
EventLine3RisingEdgeTimestamp	Returns the Timestamp of the Line3RisingEdge Event.
EventLine3FallingEdge	Returns the unique identifier of the Line3FallingEdge type of Event.
EventLine3FallingEdgeTimestamp	Returns the Timestamp of the Line3FallingEdge Event.
EventLinkTrigger0	Returns the unique Identifier of the Link Trigger 0 type of Event.
EventLinkTrigger0Timestamp	Returns the Timestamp of the Link Trigger 0 Event.
EventAcquisitionTriggerMissed	Returns the unique Identifier of the Acquisition Trigger Missed type of Event.
EventAcquisitionTriggerMissed Timestamp	Returns the Timestamp of the Acquisition Trigger Missed Event.
EventFrameTriggerMissed	Returns the unique Identifier of the Frame Trigger Missed type of Event.
EventFrameTriggerMissed Timestamp	Returns the Timestamp of the Frame Trigger Missed Event.

11.9 UserSetControl

Name	Description
UserSetSelector	Selects the feature User Set to load, save or configure.
UserSetLoad [UserSetSelector]	Loads the User Set specified by UserSetSelector to the device and makes it active.
UserSetSave [UserSetSelector]	Save the User Set specified by UserSetSelector to the non-volatile memory of the device.
UserSetDefault	Selects the feature User Set to load and make active by default when the device is reset.

11.10 FlatFieldCorrectionControl

Name	Description
FFCSelector	Selects which Correction is controlled by the FFC features.
FFCType	Returns the FFC Type.
FFCMeshWidth	Returns the Width of every mesh area for FFC table.
FFCMeshHeight	Returns the Height of every mesh area for FFC table.
FFCEnable	Activates the selected FFC.
FFCIndex	Control the index of the Value to access in the FFC table.
FFCValue	Returns the Value at entry FFCIndex of the FFC table.
FFCValueAll	Accesses all the FFC table coefficients in a single access without using individual FFCIndex. This feature can only be accessed programmatically.

12 Revision History

Rev	Date	Changes	Note
00	2022/08/30	● New Document	
		●	
		●	

Note: Product specifications would be changed without notification.

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