See the possibilities

User Manual

GOX-5105M-CXP GOX-5105C-CXP
GOX-8105M-CXP GOX-8105C-CXP
GOX-12405M-CXP GOX-12405C-CXP
GOX-16205M-CXP GOX-16205C-CXP
GOX-20405M-CXP GOX-20405C-CXP
GOX-24505M-CXP GOX-24505C-CXP

CMOS Digital Progressive Scan
Monochrome and Color Camera with CoaXPress Interface

Document Version: 1.4
Go-X_Series_CXP_Manual_Ver.1.4_2022-06-22

Thank you for purchasing this product.

⚠Be sure to read this documentation before use.

This documentation includes important safety precautions and instructions on how to operate the unit. Be sure to read this documentation to ensure proper operation.

The contents of this documentation are subject to change without notice for the purpose of improvement.

Table of Contents

About Technical Note

Some additional technical information is provided on the JAI website as Technical Notes. In this manual, if a technical note is available for a particular topic, the above icon is shown. Please refer to the following URL for Technical notes.

https://www.jai.com/support-software/technical-notes

Notice/Warranty/Certifications

Notice

The material contained in this manual consists of information that is proprietary to JAI Ltd., Japan, and may only be used by the purchasers of the product. JAI Ltd., Japan makes no warranty for the use of its product and assumes no responsibility for any errors which may appear or for damages resulting from the use of the information contained herein. JAI Ltd., Japan reserves the right to make changes without notice.

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Warranty

For information about the warranty, please contact your factory representative.

Certifications

CE Compliance

As defined by the Directive 2004/108/EC of the European Parliament and of the Council, EMC (Electromagnetic compatibility), JAI Ltd., Japan declares that GOX-5105M-CXP, GOX-5105C-CXP, GOX-8105M-CXP, GOX-8105C-CXP, GOX-12405M-CXP, GOX-12405C-CXP, GOX-16205M-CXP, GOX-16205C-CXP, GOX-20405M-CXP, GOX-20405C-CXP, GOX-24505M-CXP, and GOX-24505C-CXP comply with the following provisions applying to their standards.

EN 55032:2015(CISPR32:2015)

EN 55035:2017(CISPR35:2016)

FCC

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

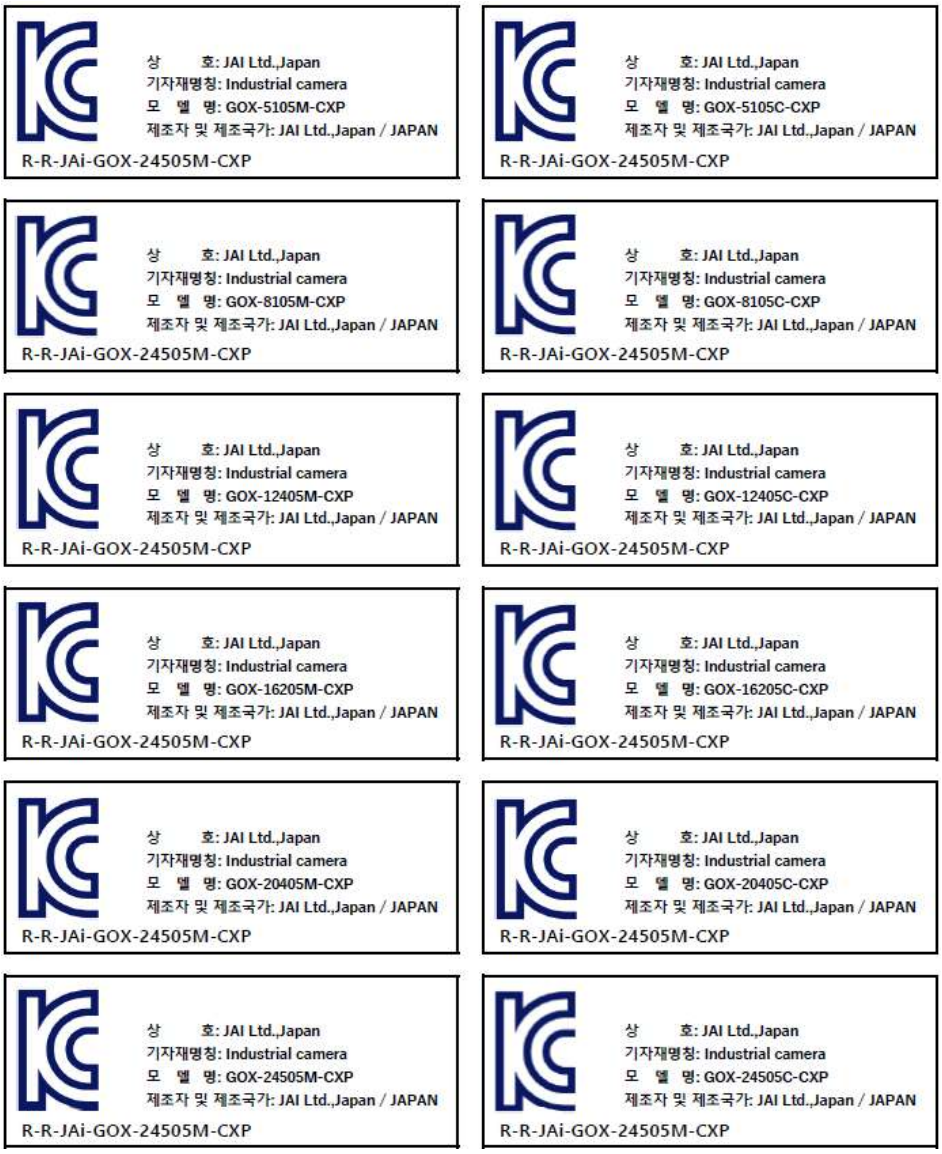
- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Warning

Changes or modifications to this unit not expressly approved by the party responsible for FCC compliance could void the user's authority to operate the equipment.

KC



제조년월은 제품상자의 라벨을 참조하십시오.

Supplement

The following statement is related to the regulation on “Measures for the Administration of the Control of Pollution by Electronic Information Products “, known as “China RoHS“. The table shows contained Hazardous Substances in this camera.

mark shows that the environment-friendly use period of contained Hazardous Substances is 15 years.

Applicable models: GOX-5105M-CXP, GOX-8105M-CXP, GOX-12405M-CXP, GOX-16205M-CXP, GOX-20405M-CXP, GOX-24505M-CXP

重 要 注 意 事 项

有毒，有害物质或元素名称及含量表

根据中华人民共和国信息产业部『电子信息产品污染控制管理办法』， 本产品《 有毒，有害物质或元素名称及含量表》如下.

部件名称	有毒有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr (VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
电路板	×	○	○	○	○	○
螺丝	×	○	○	○	○	○
插座	×	○	○	○	○	○
.....	.....	.....	.....	.....	.....	.....

○:表示该有毒有害物质在该部件所有均质材料中的含量均在GB/T 26572-2011规定的限量要求以下。

×:表示该有毒有害物质至少在该部件的某一均质材料中的含量超出GB/T 26572-2011规定的限量要求。

环保使用期限

电子信息产品中含有的有毒有害物质或元素在正常使用的条件下不会发生外 泄或突变、电子信息产品用户使用该电子信息产品不会对环境造成严重污染 或对其人身、财产造成严重损害的期限。

数字「15」为期限15年。

Supplement

The following statement is related to the regulation on “Measures for the Administration of the Control of Pollution by Electronic Information Products “, known as “China RoHS“. The table shows contained Hazardous Substances in this camera.

mark shows that the environment-friendly use period of contained Hazardous Substances is 15 years.

Applicable models: GOX-5105C-CXP, GOX-8105C-CXP, GOX-12405C-CXP, GOX-16205C-CXP, GOX-20405C-CXP, GOX-24505C-CXP

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	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr (VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
电路板	×	○	○	○	○	○
螺丝	×	○	○	○	○	○
插座	×	○	○	○	○	○
光学滤镜	×	○	×	○	○	○
.....	.....	.....	.....	.....	.....	.....

○:表示该有毒有害物质在该部件所有均质材料中的含量均在GB/T 26572-2011规定的限量要求以下。

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环保使用期限

电子信息产品中含有的有毒有害物质或元素在正常使用的条件下不会发生外 泄或突变、电子信息产品用户使用该电子信息产品不会对环境造成严重污染 或对其人身、财产造成严重损害的期限。

数字「15」为期限15年。

Usage Precautions

Notes on Cable Configurations

The presence of lighting equipment and television receivers nearby may result in video noise. In such cases, change the cable configurations or placement.

Notes on Attaching The Lens

Technical Notes How to Clean a Sensor

Avoiding Dust Particles

When attaching the lens to the camera, stray dust and other particles may adhere to the sensor surface and rear surface of the lens. Be careful of the following when attaching the lens.

- Work in a clean environment.
- Do not remove the caps from the camera and lens until immediately before you attach the lens.
- To prevent dust from adhering to surfaces, point the camera and lens downward and do not allow the lens surface to come into contact with your hands or other objects.
- Always use a blower brush to remove any dust that adheres.
- Never use your hands or cloth, blow with your mouth, or use other methods to remove dust.

Phenomena Specific to CMOS Image Sensors

The following phenomena are known to occur on cameras equipped with CMOS image sensors. These do not indicate malfunctions.

- **Aliasing**: When shooting straight lines, stripes, and similar patterns, vertical aliasing (zigzag distortion) may appear on the monitor.
- **Blooming**: When strong light enters the camera, some pixels on the CMOS image sensor may receive much more light than they are designed to hold, causing the accumulated signal charge to overflow into surrounding pixels. This “blooming” phenomenon can be seen in the image but does not affect the operation of the camera.
- **Fixed pattern noise**: When shooting dark objects in high-temperature conditions, fixed pattern noise may occur throughout the entire video monitor screen.
- **Defective pixels**: Defective pixels (white and black pixels) of the CMOS image sensor are minimized at the factory according to shipping standards. However, as this phenomenon can be

affected by the ambient temperature, camera settings (e.g., high sensitivity and long exposure), and other factors, be sure to operate within the camera's specified operating environment.

Notes on Exportation

When exporting this product, please follow the export regulations of your country or region.

Features

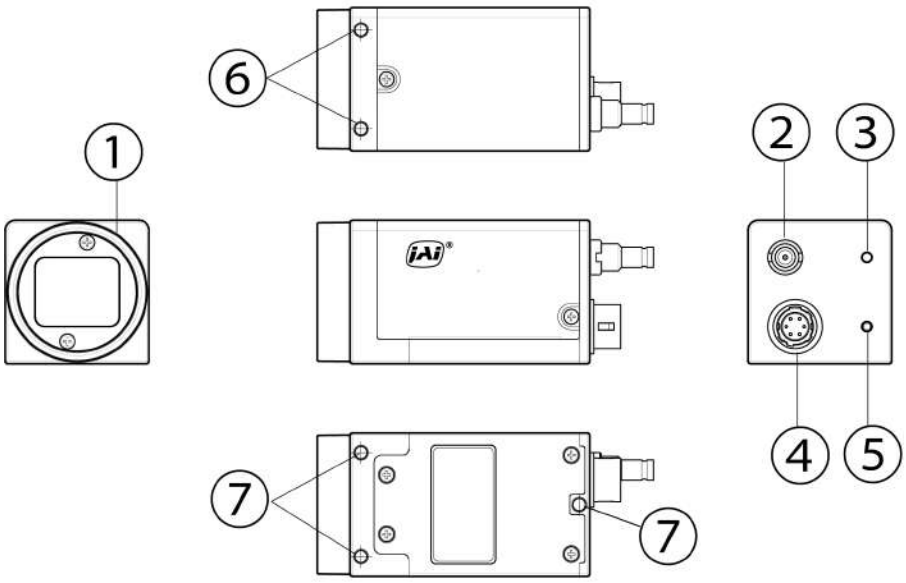
Go-X Series Global Shutter CoaXPress I/F cameras are industrial progressive scan cameras equipped with a global shutter CMOS image sensor. These small-size cameras (approx. 29mm x 29mm x 55mm) are also lightweight (60g), which makes them easy to install and mount. In addition, they use the CoaxPress user interface, which enables high-speed scanning.

Model Name	Image Sensor		Active Pixels	Pixel Size	Max Frame Rate*
GOX-5105M-CXP	Mono	1/1.8 inch	2472 x 2064	2.74 µm x 2.74 µm	112 fps
GOX-5105C-CXP	Color				
GOX-8105M-CXP	Mono	2/3 inch	2856 x 2848	2.74 µm x 2.74 µm	71 fps
GOX-8105C-CXP	Color				
GOX-12405M-CXP	Mono	1/1.1 inch	4128 x 3008	2.74 µm x 2.74 µm	47 fps
GOX-12405C-CXP	Color				
GOX-16205M-CXP	Mono	1.1 inch	5328 x 3040	2.74 µm x 2.74 µm	36 fps
GOX-16205C-CXP	Color				
GOX-20405M-CXP	Mono	1.1 inch	4512 x 4512	2.74 µm x 2.74 µm	29 fps
GOX-20405C-CXP	Color				
GOX-24505M-CXP	Mono	1.2 inch	5328 x 4608	2.74 µm x 2.74 µm	24 fps
GOX-24505C-CXP	Color				
*When Pixel Format = **Mono8/BayerRG8**, SensorDigitizationBits = **10 Bits** and CxpLinkConfiguration = **CXP6_X1**.					

Feature Overview

- Global shutter CMOS image sensor with backside illuminated pixel technology.
- 8/10/12-bit output in choice of monochrome or raw Bayer color models.
- Flexible ROI; rescaling function (monochrome and color); traditional 1x2, 2x1, 2x2 binning (monochrome models); horizontal/vertical image flip function; blemish correction; shading compensation; sequencer function; and Automatic Level Control (ALC) for dynamic lighting conditions. (See the Main Functions chapter for details).
- Compact size with excellent shock and vibration resistance.
- Accepts power over CoaXPress interface or via separate 6-pin connector.
- Lens mount: C-mount

Parts Identification



① Lens Mount (C-Mount)
② CXP (CoaXPress) Connector
③ LINK LED
④ DC IN/TRIG Connector (6-Pin Round)
⑤ POWER/TRIG LED
⑥ ⑦ Camera Locking Screw Holes

① Lens Mount (C-Mount)

Mount a C-mount lens, microscope adapter, etc. here.

> **Note:** Before mounting a lens, be sure to refer to ① Lens and confirm the precautions for attaching a lens and the supported lens types.

② CXP (CoaXPress) Connector

Coaxial cable for digital video output Connect.

	• DIN type • Single Channel output, CXP 2.0 • Requires cable with 75Ω, 1.0/2.3 DIN-type connector • Supports up to 6.25 Gbps output speed (CXP-6) • Supports PoCXP

Note: You can check the current CXP version in CxpVersion Used of TransportLayerControl. Even if you are using a CoaXPress frame grabber board that supports CXP 2.0, if [CxpVersionUsed] is CXP 1.1, you may need to make settings on the frame grabber board side. For the specific setting method, refer to the instruction manual of the frame grabber board to be used.

Caution: If you supply the power via the DC IN cable before the PoCXP power supply, the camera may restart. In this case, after the restart, the camera will operate normally with the PoCXP power supply.

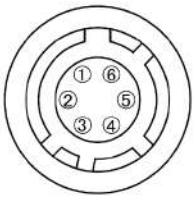
③ LINK LED

Indicates the connection status of the CoaXPress.

LED		Status
	Off	Power is off.
	Lit amber	System is powering up.
	Red pulse - slow	No connection. **Note:** Not applicable when using PoCXP.
	Alternating between green and amber - rapid	**When using PoCXP** - Detecting link. **Note:** Blinks for 1 second even when detected immediately.
	Blinking amber - rapid	**When not using PoCXP** - Detecting link. **Note:** Blinks for 1 second even when detected immediately.
	Lit green	Connection between device and host is established, but there is no data being transmitted.
	Blinking amber - slow	Established connection between camera and frame grabber. Waiting for an event (trigger, exposure pulse, etc.)
	Blinking green - rapid	Established connection between camera and frame grabber. Data is being transmitted.
	Alternating between green and amber - slow	Sending connection test packet.

④ DC IN/TRIG Connector (6-Pin Round)

Connect the cable for a power supply (optional) or for DC IN / trigger IN here.



Camera Side: HR10A-7R-6PB (Hirose Electric or equivalent)

Cable Side: : HR10A-7P-6S (Plug) (Hirose Electric or equivalent)

Pin No.	Input/Output	Signal	Description
1	Power In	DC In	DC in +10V ～ +25V
2	In	Opto In+	
3	In	Opto In-	
4	Out	Opto Out+	
5	Out	Opto Out-	
6	GND	GND	

Caution: If you supply the power via the DC IN cable before the PoCXP power supply, the camera may restart. In this case, after the restart, the camera will operate normally with the PoCXP power supply.

Note: See Recommended Circuit Diagram (Reference Examples) for the recommended Input/Output circuit diagrams.

⑤ POWER/TRIG LED

Indicates the power or trigger input status.

LED		Status
	Lit amber	Camera initializing.
	Lit green	Camera in operation
	Blinking green	During operation in trigger mode, trigger signals are being input. **Note:** The blinking interval is not related to the actual input interval of the external trigger.

⑥ ⑦ Camera Locking Screw Holes

Use these holes when mounting the camera directly to a wall or other structural system.

⑥ Upper part of camera: M3, 3mm depth, 20mm pitch

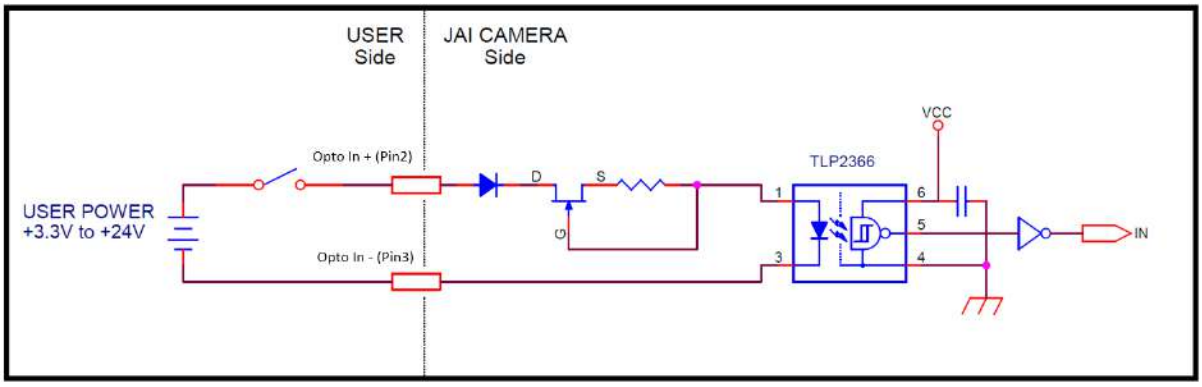
⑦ Lower part of camera: M3, 4mm depth, 21mm pitch (lens side)

Recommended Circuit Diagram (Reference Examples)

Related Setting Items: DigitalIOControl

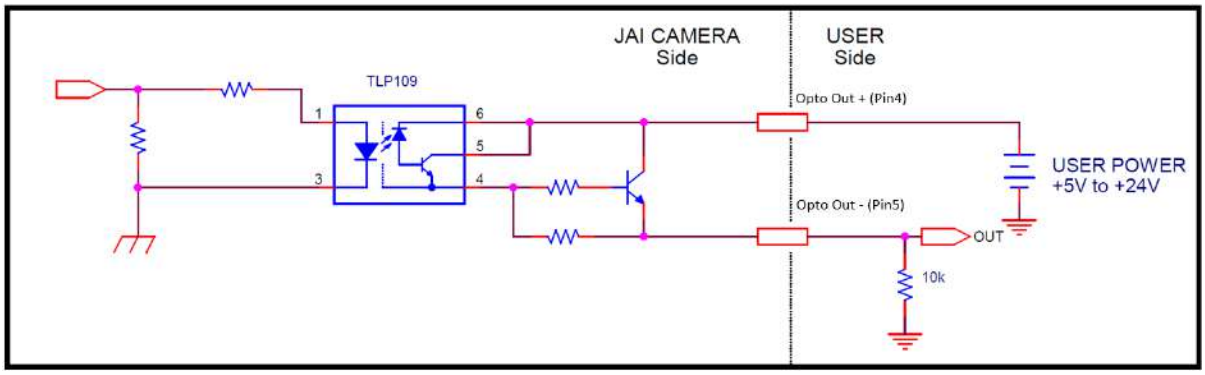
Technical Notes OPTO-In Circuit Characteristics

Recommended External Input Circuit Diagram



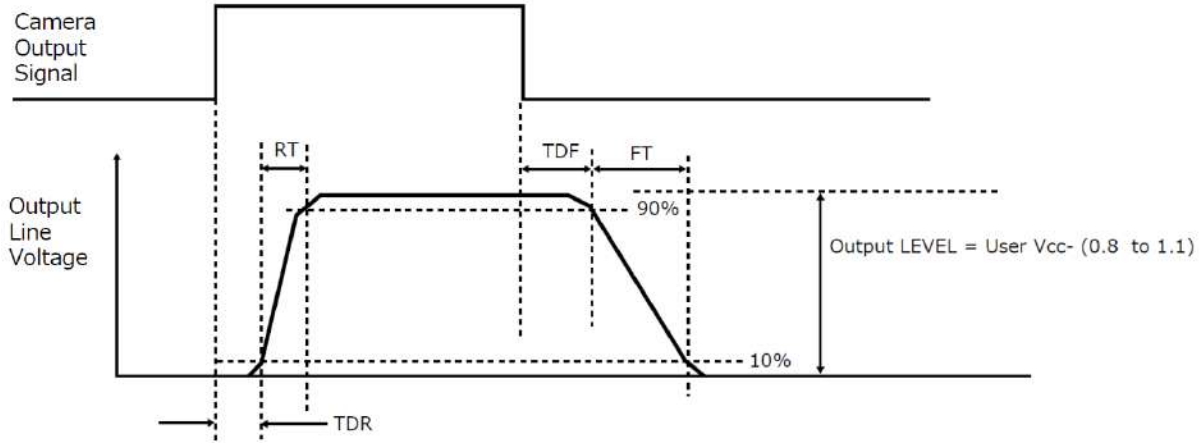
Recommended External Output Circuit Diagram

Reference Example



Characteristics of the Recommended Circuits for Opto OUT

OUTPUT LINE RESPONSE TIME



For the operating conditions of applied voltage (User Power) +12V, load resistance 10kΩ, and cable length 1m, the timing is shown in the table below.

Item	Result (Typ)
TDR (Time Delay Rise) (μs)	0.48
RT (Rise Time) (μs)	3.08
TDF (Time Delay Fall) (μs)	3.16
FT (Fall Time) (μs)	52.4

Note: Since it varies depending on the applied voltage, load resistance, cable length, etc., check the actual environment before use.

Cautions:
Please note that the recommended load resistance of Opto output is 10 kΩ (rated 1/10 W) or more. The 270 Ω resistor shown in the circuit diagram is the MINIMUM resistance that should be used. The response speed from On (High) to Off (Low) depends on the voltage applied to Opto output and the value of the load resistance. Higher load resistance results in a slower response. If the response at 10 kΩ is slower than desired, you can try reducing the load resistance in order to increase the response speed but DO NOT go below the minimum 270 Ω value.

The load resistance loss can be calculated as follows.

load resistance loss ≒ (voltage applied to Opto output)^2 / (load resistance)

Preparation

Read this section to learn how the camera connects to devices and accessories. The preparation process is described below.

> **Note:** This camera does not support eBUS Player for JAI.

Step 1: Connecting Devices

- Connect the lens, CoaXPress cable, computer, and other devices.

Step 2: Verifying Camera Operation

- Verify whether the camera is turned on and ready for use.

Step 3: Verifying the Connection between the Camera and PC

- Set settings and display image using suitable tool for CXP frame grabber board.

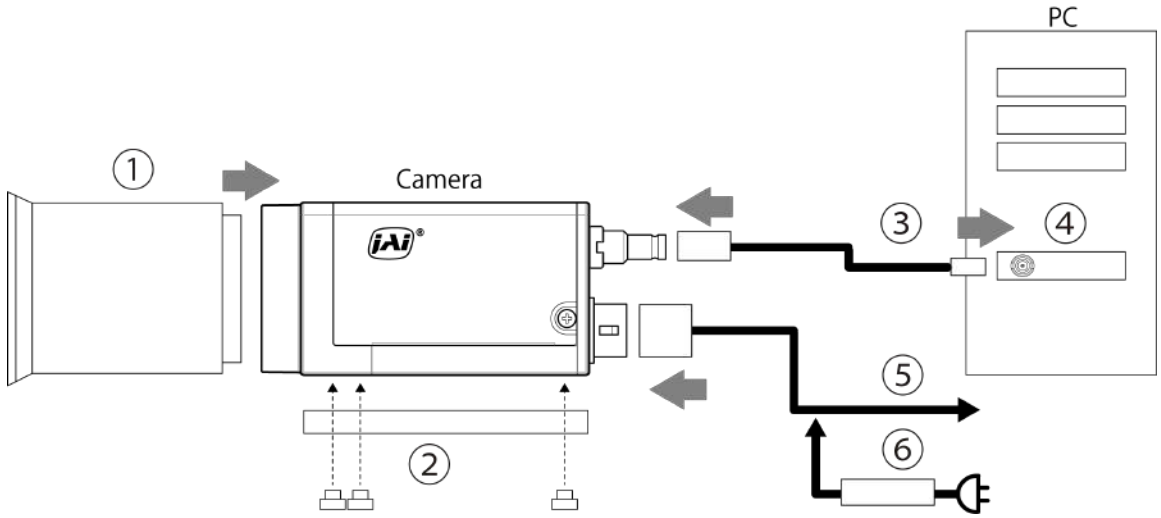
Step 4: Adjusting the Image Quality

- Refer to the procedures for adjusting the gain, white balance, and black level as examples, and adjust the image quality.

Step 5: Saving the Settings

- Save the current setting configurations in user memory.

Step 1: Connecting Devices



① Lens

② Direct Mounting (or Use MP-46 Tripod Adapter Plate)

③ CoaXPress Cable

④ CXP Frame Grabber Board

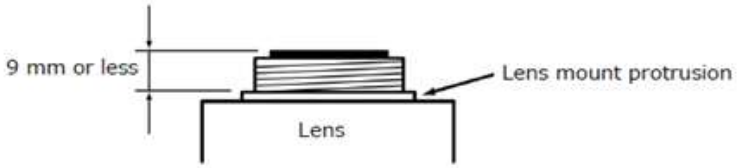
⑤ DC IN / Trigger IN Connection Cable

⑥ AC Adapter (Power Supply) - Optional

① Lens

Technical Notes Lens Selection Guide

C-mount lenses with lens mount protrusions of 9 mm or less can be attached.



To prevent vignetting and to obtain the optimal resolution, use a lens that will cover the image sensor size.

Model Name	Image Sensor		
GOX-5105M-CXP	Mono	1/1.8 inch	6.8 mm x 5.7 mm (8.82mm diagonal)
GOX-5105C-CXP	Color		
GOX-8105M-CXP	Mono	2/3 inch	7.8 mm x 7.8 mm (11.05mm diagonal)
GOX-8105C-CXP	Color		
GOX-12405M-CXP	Mono	1/1.1 inch	11.3 mm x 8.2 mm (14.00mm diagonal)
GOX-12405C-CXP	Color		
GOX-16205M-CXP	Mono	1.1 inch	14.6 mm x 8.3 mm (16.81mm diagonal)
GOX-16205C-CXP	Color		
GOX-20405M-CXP	Mono	1.1 inch	12.4 mm x 12.4 mm (17.48mm diagonal)
GOX-20405C-CXP	Color		
GOX-24505M-CXP	Mono	1.2 inch	14.6 mm x 12.6 mm (19.30mm diagonal)
GOX-24505C-CXP	Color		

Notes:
The following formula can be used to estimate the focal length.

Focal length ＝ WD / (1 ＋ W/w)

WD: Working distance (distance between lens and object)

W: Width of object

w: Width of sensor

Cautions:

- The maximum performance of the camera may not be realized depending on the lens.
- Attaching a lens with a mount protrusion of 9 mm or longer may damage the lens or camera.

② Direct Mounting (or Use MP-46 Tripod Adapter Plate)

When mounting the camera directly to a wall or other device, use screws that match the camera locking screw holes on the camera (M3, depth: 4 mm).

Use the supplied screws to attach the tripod adapter plate.

Caution: For heavy lenses, be sure to support the lens itself. Do not use configurations in which its weight is supported by the camera.

③ CoaXPress Cable

Connect the CXP cable to the CXP connector on the camera and frame grabber board. Refer to the specifications of the cable for details on its bend radius.

④ CXP Frame Grabber Board

Refer to the operating instructions of the frame grabber board, and configure settings on the computer as necessary.

⑤ DC IN / Trigger IN Connection Cable

Performs external I/O such as power supply and trigger input.

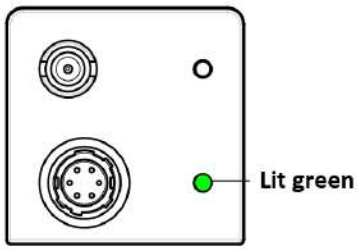
⑥ AC Adapter (Power Supply) - Optional

Connect the AC adapter and the round connector of the connection cable to the DC IN / trigger IN connector on the camera.

Step 2: Verifying Camera Operation

When power is supplied to the camera while the necessary equipment is connected, the POWER/TRIG LED at the rear of the camera lights amber, and initialization of the camera starts. When initialization is complete, the POWER/TRIG LED lights green.

Verify whether power is being supplied to the camera by checking the rear LED. When properly turned on, the power LED is lit green.



For details on how to read the LEDs, see the ⑤ POWER/TRIG LED section.

Step 3: Verifying the Connection between the Camera and PC

Use an appropriate software tool associated with your CoaXPress frame grabber to set up the camera and display captured images. Refer to the operation manual of the selected software tool for specific instructions.

> **Note:** This camera does not support eBUS Player for JAI.

Step 4: Adjusting the Image Quality

> **Related Setting Items:** AnalogControl

Display the camera image and adjust the image quality.

Adjust the Gain

Adjust the image quality using the gain and white balance functions. The Visibility must be changed from Beginner to **Guru**.

> **Note:** For details on the Gain control, see Gain Control in the Main Functions chapter.

Manual Adjustment

Expand **AnalogControl**, and set GainAuto to **Off** (Default = Off).

1. Expand AnalogControl, and select the gain you want to configure in GainSelector. AnalogAll (master gain), DigitalRed* (digital R gain), and DigitalBlue* (digital B gain) can be configured.
2. Configure the Gain.
   - DigitalAll (master gain) can be set to a value from x1 to x126 the analog gain value. The resolution is set in about 0.1dB steps. Values are configured by multipliers.
   - The DigitalRed* (digital R gain) and DigitalBlue* (digital B gain) can be set to a value from x0.447 to x5.624. Values are configured by multipliers.

> **Note:** *Color models only.

Adjusting the White Balance

Adjust the white balance using the automatic adjustment function.

> **Note:** The white balance is only supported on color models.

Automatic White Balance Adjustment

1. Place a white sheet of paper or similar object under the same lighting conditions as the intended subject, and zoom in to capture the white.

   White objects near the subject, such as a white cloth or wall, can also be used. Be sure to prevent the high-intensity spotlights from entering the screen.
2. Select the **BalanceWhiteAuto** tab, and select **Continuous** or **Once** for the adjustment method.

   The white balance is automatically adjusted.

> **Note:** For Continuous and Once, white balance is adjusted using R/B Gain.

Adjusting the Black Level

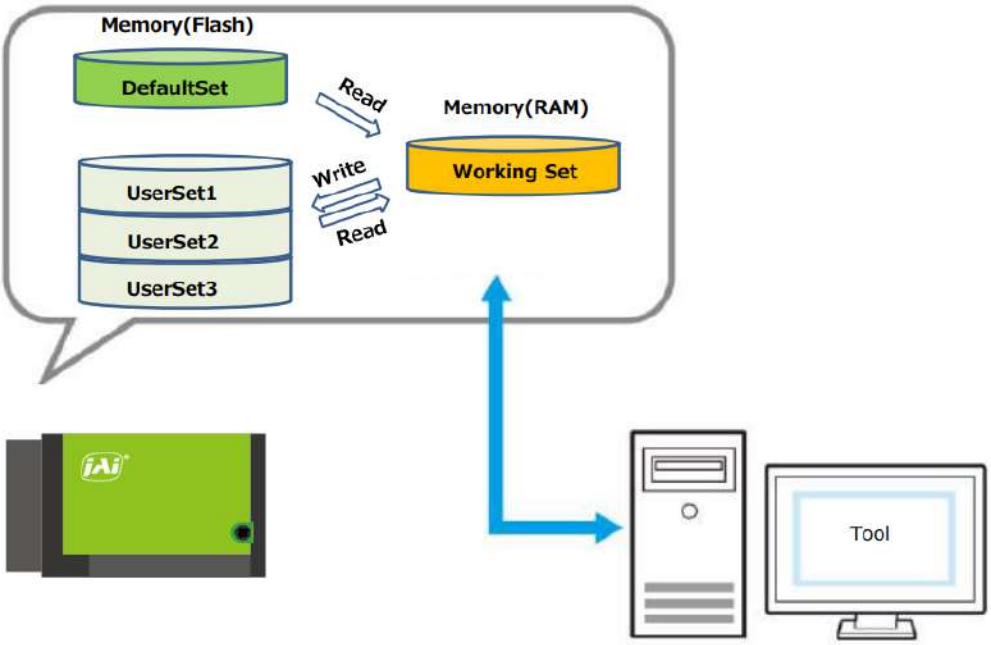
1. Expand **AnalogControl**, and select the black level you want to configure in BlackLevelSelector. All (master black), Red* (digital R), and Blue* (digital B) can be configured.
2. Specify the adjustment value in BlackLevel.

> **Note:** *Color models only.

Step 5: Saving the Settings

> **Related Setting Items:** UserSetControl

The setting values configured in the tool will be deleted when the camera is turned off. By saving current setting values to user memory, you can load and recall them whenever necessary. You can save up to three sets of user settings in the camera. (User Set1 to 3)



To Save User Settings

1. Stop image acquisition.
2. Expand **UserSetControl**, and select the save destination (UserSet1 to UserSet3) in UserSetSelector.

   > **Note:** The factory default setting values are stored in Default and cannot be overwritten.

   > **Caution:** Settings can only be saved when image acquisition on the camera is stopped.

3. The current setting values are saved as user settings.

To Load User Settings

1. Stop image acquisition. User settings can only be loaded when image capture on the camera is stopped.
2. Select the settings to load (UserSet1 to UserSet3) in UserSetSelector.
3. Select **UserSetLoad**, and click **Execute 'UserSetLoad' Command**.
4. The selected user settings are loaded.

> **Note:** When selecting **Default** for UserSetSelector, the factory settings are loaded.

Main Functions

This chapter describes the camera's main functions.

Acquisition Control

> **Related Setting Items:** AcquisitionControl

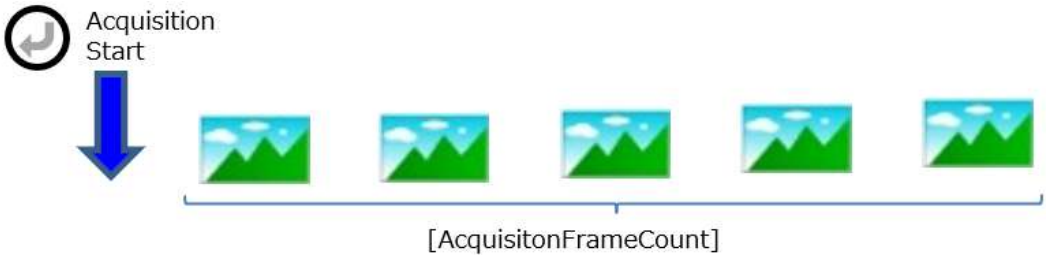
This camera has three Acquisition modes (SingleFrame, MultFrame, Continuous). Use the AcquisitionControl settings to perform operations and settings for image capture.

SingleFrame

When the AcquisitionStart command is executed, one frame of image is captured.

MultiFrame

When the AcquisitionStart command is executed, the number of frames set in AcquisitonFrameCount are acquired as images.



Continuous

When the AcquisitionStart command is executed, images will continue to be acquired until the AcquisitionStop command is executed.

> **Note:** After changing various settings, the black level may not be stable for several frames immediately after AcquisitionStart.

Changing the Frame Rate

When TriggerMode is disabled, you can change the frame rate in AcquisitionFrameRate.

The shortest frame period varies depending on the Width, Height, PixelFormat, SensorDigitizationBits, Binning (Horizontal/Vertical), FD2x2BinningMode, ImageScalingMode, Decimation (Horizontal/Vertical), CxpLinkConfiguration(LinkSpeed), StreamPacketSize settings.

The longest frame period is 0.125 Hz (8 sec.).

> **Note:** When TriggerMode[FrameStart] is enabled, the AcquisitionFrameRate setting is disabled.

Exposure Mode

> **Related Setting Items:** AcquisitionControl

This camera has three Exposure modes (Off, Timed, TriggerWidth).

Use the AcquisitionControl settings to perform operations and settings for exposure.

ExposureMode = Off

Exposure control is not performed (free-running operation).

The exposure time is the longest possible time within the operating conditions such as the frame rate.

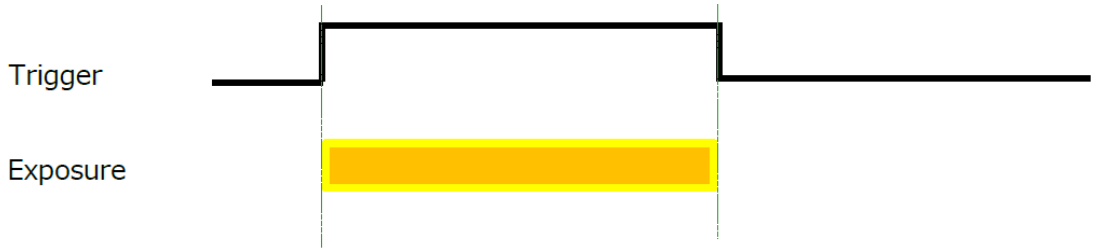
ExposureMode = Timed

Mode in which control is performed using ExposureTime. Acquire images using an exposure time configured beforehand on an external trigger.

In this mode, the exposure time can be adjusted automatically by setting ExposureAuto. For details, refer to ALC (Automatic Level Control) Function.

ExposureMode = TriggerWidth

Mode in which control of the exposure time is performed using the pulse width of the trigger input signal. The exposure time will be the same as the pulse width of the trigger input signal.



> **Notes:**
> - The settings for exposure control and triggers are related to each other. Be sure to configure the settings described in Trigger Control.
> - When exposed to strong light, the accumulation time may appear to shift due to PLS (Parasitic Light Sensitivity) and other effects.

Actual Exposure Time

> **Related Setting Items:** AcquisitionControl

When ExposureMode is set to **Timed**, the actual exposure time will consist of the image sensor's offset duration (2.45us) added to the ExposureTime setting configured on the camera.

Actual Exposure Time: *ExposureTime* value (us) + 2.45us

> **Note:** On this camera, the ExposureActive signal's pulse width includes the Exposure offset duration (2.45us). Therefore, "ExposureActive signal's pulse width = *ExposureTime* value (us) + 2.45(us)."

RCT Mode

> **Related Setting Items:** AcquisitionControl

RCT mode can be used when Exposure Mode is Timed and Frame Start Trigger is enabled.

In RCT mode, the image is not output from the camera until FrameStartTrigger is input, but internally the imaging operation is continued and the automatic gain control (AGC) function, the automatic shutter control (ASC) function and the automatic white balance (AWB) function can be continued.

Trigger Control

> **Related Setting Items:** AcquisitionControl

The camera allows the following controls to be performed via external trigger signals.

TriggerSelector	Description
AcquisitionStart	Start image acquisition in response to the external trigger signal input.
AcquisitionEnd	Stop image acquisition in response to the external trigger signal input.
FrameStart	Start capturing a one-frame image in response to the external trigger signal input. **Note:** The FrameStart Trigger can only be used when the Exposure Mode setting is set to **Timed**.

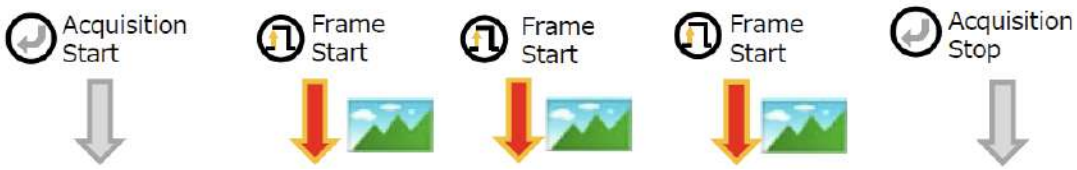
> **Notes:**
> - The settings for exposure control and triggers are related to each other. Be sure to configure the settings described in Exposure Mode.
> - You can delay when exposure actually starts after a trigger is received for a specific amount of time by configuring **TriggerDelay**.

Select the trigger type with TriggerSelector, and set the following items for each trigger.

TriggerMode	Switch enable or disable.
TriggerSource	Select the source signal (PulseGenerator0-3, UserOutput0-3, Software, Line5 Opt In, Line7 Cxp In, Nand0 Out, Nand1 Out). **Note:** Trigger can be executed by TriggerSoftware[TriggerSelector] command only when Software is set.
TriggerActivation	Sets the polarity of the trigger signal.
TriggerDelay	You can specify a delay after receiving the trigger signal until the trigger is enabled.

When Using the FrameStart Trigger

When AcquisitionStart is executed and a FrameStart trigger is received before the AcquisitionStop command is executed, one frame is acquired.



The source signals that can be set for the trigger are as follows.

	Off	AcquisitionActive	FrameActive	ExposureActive	FVAL	LVAL	Software	PulseGenerator0	PulseGenerator1	PulseGenerator2	PulseGenerator3	UserOutput0	UserOutput1	UserOutput2	UserOutput3	Line5 Opt In1	Line7 Cxp In	NAND0 Out	NAND1 Out	Low	High	AcquisitionTriggerWait	FrameTriggerWait
AcquisitionStart							✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
AcquisitionEnd							✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
FrameStart							✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		

Pixel Format

> **Related Setting Items:** ImageFormatControl

Selectable PixelFormat is as follows.

Color models	BayerRG8, BayerRG10, BayerRG12, (BayerGR8*, BayerGR10*, BayerGR12*, BayerGB8*, BayerGB10*, BayerGB12*, BayerBG8*, BayerBG10*, BayerBG12*), RGB8, RGB10, RGB12 **Note:** *When using ReverseX, ReverseY.
Mono models	Mono8, Mono10, Mono12

Notes:
On color models, the Bayer array is changed by the Image Flip Function.

- ReverseX : 0 (False), ReverseY : 0 (False) -> BayerRG
- ReverseX : 0 (False), ReverseY : 1 (True) -> BayerGB
- ReverseX : 1 (True), ReverseY : 0 (False) -> BayerGR
- ReverseX : 1 (True), ReverseY : 1 (True) -> BayerBG

SensorDigitizationBits

> **Related Setting Items:** ImageFormatControl

You can use SensorDigitizationBits to select the sensor output bits for this camera (8bits, 10bits, and 12bits: default = 10bits).

Notes:

- When SensorDigitizationBits is set to "8Bits", the sensitivity is 4 times higher than when set to 10Bits/12Bits.
- If SensorDigitizationBits is set to smaller than the pixel format bits configured in the Pixel Format, the image may have gaps in histogram.
- When Gradation Compression Mode is set to On, SensorDigitizationBits is not configurable (maintains 10bits or 12bits).

Image Flip Function

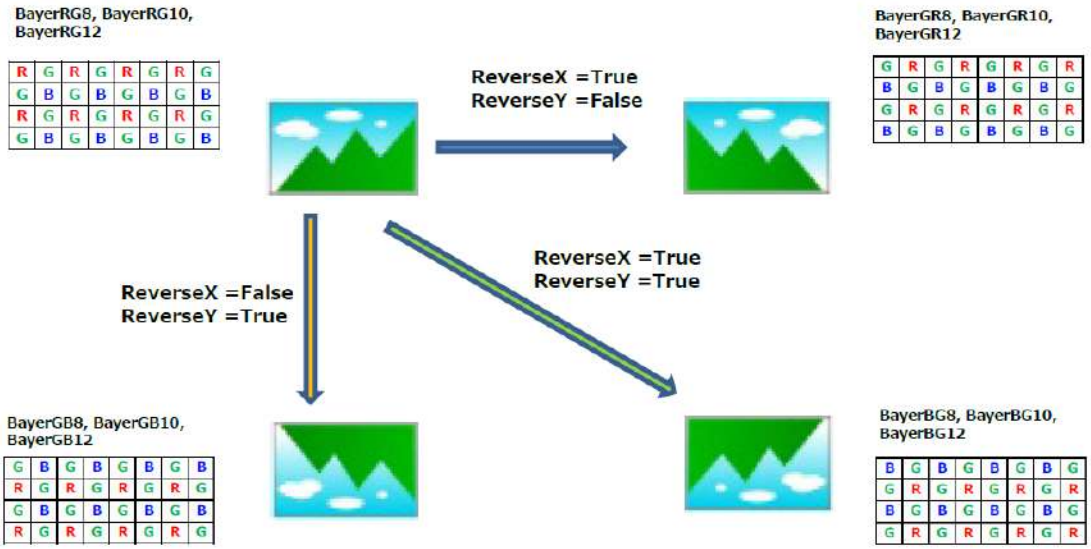
> **Related Setting Items:** ImageFormatControl

Using this function, you can output the image by inverting it horizontally and/or vertically.

In the ImageFormatControl settings,

- To reverse the image horizontally, set ReverseX to True.
- To reverse the image vertically, set ReverseY to True.

On color models, the Bayer array is changed by the Image Flip function.



GPIO (Digital Input/Output Settings)

> **Related Setting Items:** DigitalIOControl

The camera can input/output the following signals to and from external input/output connectors.

External Output	Line2 : Opt Out	DC IN / TRIG IN Connector (6-pin round)
Internal Output	Line5 : Opt In	DC IN / TRIG IN Connector (6-pin round)

These signals can be used as triggers and other necessary signals within the camera or as signals output from the camera to the system, such as those used for lighting equipment control.

Use the DigitalIOControl to set the digital input/output. Select input or output in LineSelector, you can check LineMode, LineFormat, and set LineInverter. You can also check the status of each digital I/O as shown in the table below with LineStatusAll.

LineSelector	LineMode	LineFormat	LineInverter	LineStatusAll	
Line2 (Opt Output1)	Output	OptCoupled	True/False	bit1	DC IN / TRG IN connector
Line5 (Opt In 2)	Input	OptCoupled	False (fixed)	bit4	DC IN / TRG IN connector
Line7 (Cxp In)	Input	InternalSignal	False (fixed)	bit6	
Nand0In1	Input	InternalSignal	True/False		
Nand0In2	Input	InternalSignal	True/False		
Nand1In1	Input	InternalSignal	True/False		
Nand1In2	Input	InternalSignal	True/False		
TimestampReset	Internal Connection	InternalSignal	False (fixed)		

For digital output, set the output source signal using LineSource. Set the source signal in the same way for NAND Logic (Nand0In1, Nand0In2, Nand1In1, NandIn2) and TimestampReset.

The table below shows the source signals that can be set.

LineSelector	Off	AcquisitionActive	FrameActive	ExposureActive	FVAL	LVAL	PulseGenerator0	PulseGenerator1	PulseGenerator2	PulseGenerator3	UserOutput0	UserOutput1	UserOutput2	UserOutput3	Line5 Opt In1	Line7 Cxp In	NAND0 Out	NAND1 Out	Low	High	AcquisitionTriggerWait	FrameTriggerWait
Line2		✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Line5																						
Line7																						
Nand0In1		✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Nand0In2		✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Nand1In1		✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
Nand1In2		✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
TimestampReset	✓						✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		

VideoProcessBypassMode

> **Related Setting Items:** ImagingControl

The video process bypass mode is a function that bypasses internal video processing on the camera. To use this function, VideoProcessBypassMode must be set to On.

Functions Unavailable in VideoProcessBypassMode

Gain[DigitalRed][DigitalBlue], BlackLevel, LUTMode, ColorTransformationControl, EdgeEnhancer, ColorEnhancer, ShadingControl, SequencerGainDigitalRed/Blue, SequencerLutEnable

Calculate the Maximum Frame or Trigger Rate (Approximate)

> **Related Setting Items:** AcquisitionControl

This section describes how to calculate the maximum frame rate or the maximum trigger rate (approximate). First, calculate the H Period, then calculate the minimum frame period based on the H Period value, and finally calculate the maximum frame rate (when in Continuos mode) or maximum trigger rate (when in Trigger mode).

> **Notes:**
> - The formulas described in this section are simplified versions and may have a certain margin of error.
> - The following conditions are applied:
>   1. PacketSize = 8192 (the max value)
>   2. DeviceLinkThroughputLimitMode = Off (No bandwidth limitations)
> - On this camera, the maximum frame rate or the maximum trigger rate will not be affected by the BinningHorizontal, BinningVertical, or ImageScalingMode settings.

1. Calculate the H Period

First, Calculate the IF_LINETIME, SENSOR_LINETIME, and VIDEO_LINETIME values, then calculate the LineTime[clk] value and finally calculate the H Period value.

IF_LINETIME, SENSOR_LINETIME, VIDEO_LINETIME

A. IF_LINETIME

IF_LINETIME[clk] = Roundup((Width(*1) x a + b) / 10000, 0)

1. For the Width(*1), enter the following value when using the Binning Function or in Decimation Mode.
   - When **BinningHorizontal** is set to **2**, enter the Width value "**before**" configuring the Binning settings.
   - When **FD2x2BinningMode** is turned **On**, or **DecimationHorizontal** is set to **2**, enter the Width value "**after**" configuring the FD2x2Binning or DecimationMode settings.

2. For the "a" and "b" values, select the values from the table below based on the CxpLinkConfiguration, and Pixel Format settings.

	CxpLinkConfiguration	PixelFormat		
		8bit	10bit	12bit
a	CXP6_X1	1205	1504	1807
	CXP3_X1	2410	3013	3613
b	CXP6_X1	-3333	7857	-714
	CXP3_X1	6608	6422	14021

B. SENSOR_LINETIME[clk]

SENSOR_LINETIME[clk] = HMAX

Select the **HMAX** value from the table below based on the Sensor Operation, the SensorDigitizationBits setting and your camera model.

Sensor Operation	Sensor Digitization Bits	GOX-5105		GOX-8105		GO-X12405		GOX-16205		GOX-20405		GOX-24505	
		Mono	Color	Mono	Color	Mono	Color	Mono	Color	Mono	Color	Mono	Color
Normal Mode	8Bit	270		270		344		447		375		447	
	10Bit	274		302		429		549		469		549	
	12Bit	408		408		511		655		557		655	
FD2x2BinningMode DecimationMode	8Bit	135	270	135	270	183	270	230	290	199	290	230	290
	10Bit	142	284	158	284	222	284	285	302	245	302	285	302
	12Bit	204	408	204	408	264	408	339	418	287	418	339	418

C. VIDEO_LINETIME[clk]

VIDEO_LINETIME[clk] = Roundup(((Width(*1) / 4) + 4) / 156.25 x 74.25, 0)

For the Width(*1), enter the following value when using the Binning Function or in Decimation Mode.

- When **BinningHorizontal** is set to **2**, enter the Width value "**before**" configuring the Binning settings.
- When **FD2x2BinningMode** is turned **On**, or **DecimationHorizontal** is set to **2**, enter the Width value "**after**" configuring the FD2x2Binning or DecimationMode settings.

LineTime[clk]

Next, calculate the LineTime[clk] value using the IF_LINETIME, SENSOR_LINETIME, and VIDEO_LINETIME values. The formula for calculating the LineTime[clk] value depends on the Pixel Format setting.

A. When PixelFormat = Mono, Bayer****

LineTime[clk] = MAX(IF_LINETIME, SENSOR_LINETIME, VIDEO_LINETIME)

B. When PixelFormat = RGB**

LineTime[clk] = MAX(IF_LINETIME, SENSOR_LINETIME, VIDEO_LINETIME) x 3

H Period

Calculate the H Period based on the above LineTime[clk] value.

H Period[us] = LineTime[clk] / 74.25[MHz]

2. Calculate the Minimum Frame Period

Next, calculate the Minimum Frame Period.

Minimum Frame Period[us] = H Period[us] x (Height(*2) + VBlanking + 2)

1. For the Height(*2), enter the following value when using the Binning Function or in Decimation Mode.
   - When **BinningVertical** is set to **2**, enter the Height value "**before**" configuring the Binning settings.
   - When **FD2x2BinningMode** is turned **On**, or **DecimationVertical** is set to **2**, enter the Height value "**after**" configuring the FD2x2Binning or DecimationMode settings.
2. Select the **VBlanking** value from the table below based on the Sensor Operation, the SensorDigitizationBits setting, and your camera model.

Sensor Operation	SensorDigitization Bits	GOX-5105		GOX-8105		GO-X12405		GOX-16205		GOX-20405		GOX-24505	
		Mono	Color	Mono	Color	Mono	Color	Mono	Color	Mono	Color	Mono	Color
Normal Mode	8Bit	172		172		152		118		124		118	
	10Bit	152		164		142		112		116		112	
	12Bit	144		144		130		110		112		110	
FD2x2BinningMode DecimationMode	8Bit	258	172	258	172	214	172	144	132	152	132	144	132
	10Bit	246	166	234	166	190	166	136	130	144	130	136	130
	12Bit	202	144	202	144	174	144	128	120	136	120	128	120

3. Calculate the Maximum Frame Rate or Maximum Trigger Rate

Finally, calculate the maximum acquisition frame rate (Continuous Mode) or maximum trigger rate (Trigger Mode).

Maximum Acquisition Frame Rate (When in Continuous Mode: Frame Start Trigger = Off)

Maximum Acquisition Frame Rate[Hz] = 1000000 / Minimum Frame Period[us]

Maximum Trigger Rate (When in Trigger Mode: Frame Start Trigger = On)

First, calculate the Maximum Overlap Time value for the shortest trigger period.

MaxOverlapTime_TrOlrd[us] = Minimum Frame Period[us] - (Non-ExposurePeriod[H] x H Period[us])

Select the **Non-ExposurePeriod[H]** value from the table below based on the Sensor Operation, the SensorDigitizationBits setting, and your camera model.

Sensor Operation	Sensor DigitizatioBits	GOX-5105		GOX-8105		GO-X12405		GOX-16205		GOX-20405		GOX-24505	
		Mono	Color	Mono	Color	Mono	Color	Mono	Color	Mono	Color	Mono	Color
Normal Mode	8Bit	70		70		56		24		26		24	
	10Bit	66		64		48		20		22		20	
	12Bit	50		50		40		20		20		20	
FD2x2BinningMode DecimationMode	8Bit	132	70	132	70	100	70	36	30	40	30	36	30
	10Bit	124	66	116	66	84	66	32	28	36	28	32	28
	12Bit	92	50	92	50	72	50	28	24	32	24	28	24

Next, calculate the Maximum Trigger Rate. The formula depends on whether the Exposure Time value is longer or shorter than the MaxOverlapTime_TrOlrd value.

A. When ExposureTime ≦ MaxOverlapTime_TrOlrd[us]

Maximum Trigger Rate[Hz] = Maximum Acquisition Frame Rate[Hz]

B. When ExposureTime > MaxOverlapTime_TrOlrd[us]

First, calculate the Non-OverlapExposureTime_TrOlrd[us] value.

Non-OverlapExposureTime_TrOlrd[us] = ExposureTime - MaxOverlapTime_TrOlrd[us]

Finally, calculate the Maximum Trigger Rate.

Maximum Trigger Rate[Hz] = 1000000 / (Minimum Frame Period[us] + Non-OverlapExposureTime_TrOlrd[us])

Timing Chart

> **Related Setting Items:** AcquisitionControl

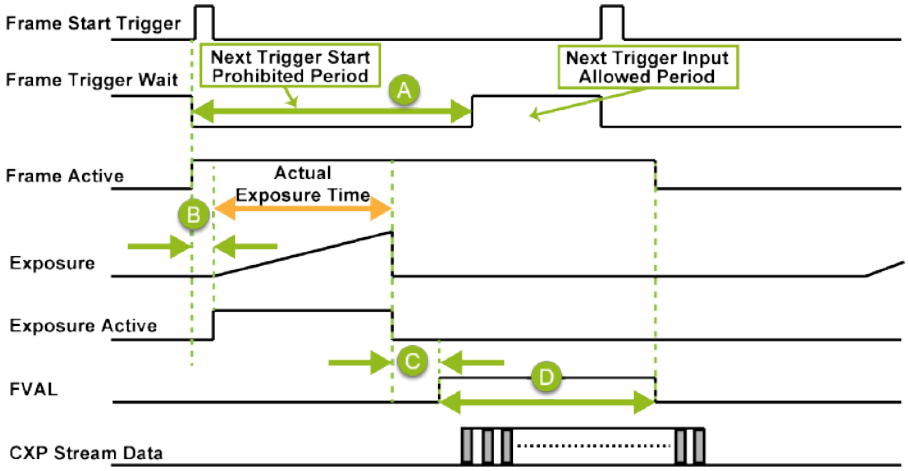
This section shows the timing charts under the following conditions on each model when FrameStartTriger is set to **On**.

- Exposure Mode = Timed (Overlap Readout)
- Exposure Mode = TriggerWidth (Overlap Readout)
- Exposure Mode = Timed (RCT Mode)

> **Notes:**
> - The values on the timing charts were measured with SensorDigitizationBits set to 10Bits.
> - On this camera, the ExposureActive signal's pulse width includes the Exposure offset duration (2.45us). Therefore, "ExposureActive signal's pulse width = ExposureTime value (us) + 2.45(us)," or in the case of TriggerWidth operation “ExposureActive signal's pulse width = Trigger Signal’s Effective Pulse Width (us) + 2.45(us)."

Exposure Mode = Timed (Overlap Readout)

This section shows the timing charts when FrameStartTrigger is set to **On**, and ExposureMode is set to **Timed** (Overlap Readout).



A	Frame Period (usec)
B	Period From Trigger Start Edge to Exposure Start (usec)
C	Period From Exposure End to FVAL Start (usec)
D	Data Valid Period (usec)

GOX-5105MC-CXP, CXP6-1

Exposure Mode = Timed (Frame Start Trigger On, Overlap Readout)

Pixel Format	Frame Period [A] usec	Period From Trigger Start Edge to Exposure Start [B] (usec)	Period From Exposure End to FVAL Start [C](usec)	Data Valid Period [D] (usec)
Full (Max Frame Rate)				
Mono8	9268	52.7	525.0	8256
Mono10	11614	65.8	655.3	10340
Mono12	13928	78.8	783.9	12396
BayerRG8	9268	52.7	525.0	8256
BayerRG10	11614	65.8	655.3	10340
BayerRG12	13928	78.8	783.9	12396
RGB8	27855	156.7	1597.0	24764
RGB10	34844	196.1	1997.0	31015
RGB12	41841	234.9	2391.7	37183
Binning Horizontal (Max Frame Rate)				
Mono8	9268	52.7	533.0	8254
Mono10	11615	65.8	663.3	10338
Mono12	13928	78.8	791.8	12394
Binning Vertical (Max Frame Rate)				
Mono8	9268	52.7	533.0	8252
Mono10	11614	65.8	664.3	10335
Mono12	13928	78.8	793.9	12390
Binning Horizontal & Binning Vertical (Max Frame Rate)				
Mono8	9268	52.7	541.0	8250
Mono10	11614	65.8	672.3	10333
Mono12	13928	78.8	801.8	12388

GOX-5105MC-CXP, CXP3-1

Exposure Mode = Timed (Frame Start Trigger On, Overlap Readout)

Pixel Format	Frame Period [A] usec	Period From Trigger Start Edge to Exposure Start [B] (usec)	Period From Exposure End to FVAL Start [C](usec)	Data Valid Period [D] (usec)
Full (Max Frame Rate)				
Mono8	18588	104.8	1042.7	16536
Mono10	23256	130.9	1301.6	20676
Mono12	27855	156.9	1558.7	24788
BayerRG8	18588	104.8	1042.7	16536
BayerRG10	23256	130.9	1301.6	20676
BayerRG12	27855	156.9	1558.7	24788
RGB8	55866	313.2	3186.3	49603
RGB10	69931	391.4	3981.0	62023
RGB12	84034	469.2	4770.3	74359
Binning Horizontal (Max Frame Rate)				
Mono8	18588	104.8	1050.7	16534
Mono10	23256	130.9	1309.6	20674
Mono12	27855	156.9	1566.7	24786
Binning Vertical (Max Frame Rate)				
Mono8	18588	104.8	1054.7	16528
Mono10	23256	131.0	1315.6	20666
Mono12	27855	156.9	1574.7	24776
Binning Horizontal & Binning Vertical (Max Frame Rate)				
Mono8	18588	104.8	1062.7	16526
Mono10	23256	130.9	1323.6	20664
Mono12	27855	156.9	1582.7	24774

GOX-8105MC-CXP, CXP6-1

Exposure Mode = Timed (Frame Start Trigger On, Overlap Readout)

Pixel Format	Frame Period [A] usec	Period From Trigger Start Edge to Exposure Start [B] (usec)	Period From Exposure End to FVAL Start [C](usec)	Data Valid Period [D] (usec)
Full (Max Frame Rate)				
Mono8	14327	60.7	606.5	13156
Mono10	17986	76.0	757.7	16492
Mono12	21506	90.9	905.4	19751
BayerRG8	14327	60.7	606.5	13156
BayerRG10	17986	76.0	757.7	16492
BayerRG12	21506	90.9	905.4	19751
RGB8	43104	180.8	1844.6	39464
RGB10	54055	226.5	2308.6	49472
RGB12	64517	271.2	2761.9	59249
Binning Horizontal (Max Frame Rate)				
Mono8	14327	60.7	615.8	13154
Mono10	17986	76.0	766.9	16490
Mono12	21506	90.9	914.6	19749
Binning Vertical (Max Frame Rate)				
Mono8	14327	60.7	615.8	13152
Mono10	17986	76.0	768.1	16486
Mono12	21506	90.9	916.9	19744
Binning Horizontal & Binning Vertical (Max Frame Rate)				
Mono8	14327	60.7	625.0	13149
Mono10	17986	76.0	777.3	16484
Mono12	21506	90.8	926.1	19742

GOX-8105MC-CXP, CXP3-1

Exposure Mode = Timed (Frame Start Trigger On, Overlap Readout)

Pixel Format	Frame Period [A] usec	Period From Trigger Start Edge to Exposure Start [B] (usec)	Period From Exposure End to FVAL Start [C](usec)	Data Valid Period [D] (usec)
Full (Max Frame Rate)				
Mono8	28736	121.1	1205.9	26385
Mono10	35972	151.1	1503.0	32941
Mono12	43104	181.2	1801.8	39537
BayerRG8	28736	121.1	1205.9	26385
BayerRG10	35972	151.1	1503.0	32941
BayerRG12	43104	181.2	1801.8	39537
RGB8	86208	362.0	3684.6	79150
RGB10	108697	451.8	4596.5	98820
RGB12	129872	542.2	5513.9	118605
Binning Horizontal (Max Frame Rate)				
Mono8	28736	121.1	1215.1	26383
Mono10	35972	151.1	1512.2	32939
Mono12	43104	181.2	1811.0	39534
Binning Vertical (Max Frame Rate)				
Mono8	28736	121.1	1219.8	26376
Mono10	35972	151.1	1519.2	32930
Mono12	43104	181.2	1820.3	39523
Binning Horizontal & Binning Vertical (Max Frame Rate)				
Mono8	28736	121.1	1229.0	26373
Mono10	35972	151.1	1528.4	32928
Mono12	43104	181.2	1829.5	39520

GOX-12405MC-CXP, CXP6-1

Exposure Mode = Timed (Frame Start Trigger On, Overlap Readout)

Pixel Format	Frame Period [A] usec	Period From Trigger Start Edge to Exposure Start [B] (usec)	Period From Exposure End to FVAL Start [C](usec)	Data Valid Period [D] (usec)
Full (Max Frame Rate)				
Mono8	21645	74.5	800.8	20175
Mono10	27100	92.8	996.2	25196
Mono12	32468	111.2	1191.6	30218
BayerRG8	21645	74.5	800.8	20175
BayerRG10	27100	92.8	996.2	25196
BayerRG12	32468	111.2	1191.6	30218
RGB8	64935	222.0	2437.3	60517
RGB10	81301	277.1	3038.5	75582
RGB12	98040	332.2	3639.7	90648
Binning Horizontal (Max Frame Rate)				
Mono8	21645	74.5	814.1	20171
Mono10	27101	92.8	1009.5	25193
Mono12	32468	111.2	1204.9	30215
Binning Vertical (Max Frame Rate)				
Mono8	21645	74.5	814.2	20168
Mono10	27101	92.8	1011.2	25188
Mono12	32468	111.2	1208.3	30208
Binning Horizontal & Binning Vertical (Max Frame Rate)				
Mono8	21645	74.5	827.5	20165
Mono10	27100	92.8	1024.5	25185
Mono12	32468	111.2	1221.6	30205

GOX-12405MC-CXP, CXP3-1

Exposure Mode = Timed (Frame Start Trigger On, Overlap Readout)

Pixel Format	Frame Period [A] usec	Period From Trigger Start Edge to Exposure Start [B] (usec)	Period From Exposure End to FVAL Start [C](usec)	Data Valid Period [D] (usec)
Full (Max Frame Rate)				
Mono8	43290	148.2	1585.5	40343
Mono10	54348	185.1	1977.9	50427
Mono12	64936	221.9	2368.6	60470
BayerRG8	43290	148.2	1585.5	40343
BayerRG10	54348	185.1	1977.9	50427
BayerRG12	64936	221.9	2368.6	60470
RGB8	67568	222.0	2437.3	60517
RGB10	80001	277.1	3038.5	75582
RGB12	98040	332.2	3639.7	90648
Binning Horizontal (Max Frame Rate)				
Mono8	43290	148.2	1598.8	40339
Mono10	54348	185.1	1991.2	50423
Mono12	64936	221.9	2381.9	60467
Binning Vertical (Max Frame Rate)				
Mono8	43290	148.2	1605.6	40329
Mono10	54348	185.1	2001.3	50410
Mono12	64936	221.9	2395.4	60450
Binning Horizontal & Binning Vertical (Max Frame Rate)				
Mono8	43290	148.2	1618.9	40326
Mono10	54348	185.1	2014.6	50407
Mono12	64936	221.9	2408.7	60447

GOX-16205MC-CXP, CXP6-1

Exposure Mode = Timed (Frame Start Trigger On, Overlap Readout)

Pixel Format	Frame Period [A] usec	Period From Trigger Start Edge to Exposure Start [B] (usec)	Period From Exposure End to FVAL Start [C](usec)	Data Valid Period [D] (usec)
Full (Max Frame Rate)				
Mono8	27625	95.8	758.6	26285
Mono10	34602	119.7	942.9	32875
Mono12	41494	143.4	1126.0	39423
BayerRG8	27625	95.8	758.6	26285
BayerRG10	34602	119.7	942.9	32875
BayerRG12	41494	143.4	1126.0	39423
RGB8	83334	286.1	2312.4	78846
RGB10	104168	357.6	2884.8	98616
RGB12	125001	428.7	3453.7	118262
Binning Horizontal (Max Frame Rate)				
Mono8	27549	95.6	773.3	26199
Mono10	34483	119.3	956.5	32748
Mono12	41323	143.0	1139.6	39296
Binning Vertical (Max Frame Rate)				
Mono8	27625	95.9	775.8	26276
Mono10	34603	119.7	962.3	32864
Mono12	41494	143.4	1147.6	39410
Binning Horizontal & Binning Vertical (Max Frame Rate)				
Mono8	27549	95.6	790.5	26190
Mono10	34483	119.2	975.8	32737
Mono12	41323	143.0	1161.1	39283

GOX-16205MC-CXP, CXP3-1

Exposure Mode = Timed (Frame Start Trigger On, Overlap Readout)

Pixel Format	Frame Period [A] usec	Period From Trigger Start Edge to Exposure Start [B] (usec)	Period From Exposure End to FVAL Start [C](usec)	Data Valid Period [D] (usec)
Full (Max Frame Rate)				
Mono8	55249	191.1	1494.7	52603
Mono10	69445	238.7	1862.1	65741
Mono12	83334	286.2	2229.6	78879
BayerRG8	55249	191.1	1494.7	52603
BayerRG10	69445	238.7	1862.1	65741
BayerRG12	83334	286.2	2229.6	78879
RGB8	166668	571.8	4598.6	157799
RGB10	208336	714.5	5739.9	197214
RGB12	250003	857.1	6881.2	236471
Binning Horizontal (Max Frame Rate)				
Mono8	55249	190.5	1507.1	52435
Mono10	68966	238.1	1874.6	65573
Mono12	82645	285.3	2239.8	78629
Binning Vertical (Max Frame Rate)				
Mono8	55249	191.1	1520.6	52585
Mono10	69445	238.7	1892.4	65719
Mono12	83334	286.2	2264.1	78853
Binning Horizontal & Binning Vertical (Max Frame Rate)				
Mono8	55249	190.5	1532.9	52417
Mono10	68966	238.1	1904.7	65551
Mono12	82646	285.3	2274.2	78603

GOX-20405MC-CXP, CXP6-1

Exposure Mode = Timed (Frame Start Trigger On, Overlap Readout)

Pixel Format	Frame Period [A] usec	Period From Trigger Start Edge to Exposure Start [B] (usec)	Period From Exposure End to FVAL Start [C](usec)	Data Valid Period [D] (usec)
Full (Max Frame Rate)				
Mono8	34247	81.3	655.1	33057
Mono10	42919	101.5	814.4	41320
Mono12	51547	121.6	973.8	49582
BayerRG8	34247	81.3	655.1	33057
BayerRG10	42919	101.5	814.4	41320
BayerRG12	51547	121.6	973.8	49582
RGB8	103094	242.5	2003.1	99165
RGB10	129872	302.9	2497.7	123952
RGB12	156252	363.4	2992.2	148740
Binning Horizontal (Max Frame Rate)				
Mono8	34247	81.3	669.6	33054
Mono10	42919	101.5	829	41316
Mono12	51547	121.6	988.3	49579
Binning Vertical (Max Frame Rate)				
Mono8	34247	81.3	669.7	33050
Mono10	42919	101.5	830.9	41311
Mono12	51547	121.6	992.1	49571
Binning Horizontal & Binning Vertical (Max Frame Rate)				
Mono8	34247	81.3	684.2	33046
Mono10	42919	101.5	845.4	41307
Mono12	51547	121.6	1006.6	49568

GOX-20405MC-CXP, CXP3-1

Exposure Mode = Timed (Frame Start Trigger On, Overlap Readout)

Pixel Format	Frame Period [A] usec	Period From Trigger Start Edge to Exposure Start [B] (usec)	Period From Exposure End to FVAL Start [C](usec)	Data Valid Period [D] (usec)
Full (Max Frame Rate)				
Mono8	68966	162.1	1293.7	66168
Mono10	86208	202.4	1612.4	82693
Mono12	103094	242.5	1929.9	99157
BayerRG8	68966	162.1	1293.7	66168
BayerRG10	86208	202.4	1612.4	82693
BayerRG12	103094	242.5	1929.9	99157
RGB8	208336	484.7	3984.9	198498
RGB10	263161	605.6	4974.0	248072
RGB12	312504	726.0	5959.4	297465
Binning Horizontal (Max Frame Rate)				
Mono8	68966	162.1	1308.2	66164
Mono10	86208	202.4	1626.9	82689
Mono12	103094	242.5	1944.4	99154
Binning Vertical (Max Frame Rate)				
Mono8	68966	162.1	1315.6	66153
Mono10	86208	202.4	1638	82675
Mono12	103094	242.5	1959.2	99136
Binning Horizontal & Binning Vertical (Max Frame Rate)				
Mono8	68966	162.1	1330.1	66150
Mono10	86208	202.4	1652.5	82671
Mono12	103094	242.5	1973.7	99132

GOX-24505MC-CXP, CXP6-1

Exposure Mode = Timed (Frame Start Trigger On, Overlap Readout)

Pixel Format	Frame Period [A] usec	Period From Trigger Start Edge to Exposure Start [B] (usec)	Period From Exposure End to FVAL Start [C](usec)	Data Valid Period [D] (usec)
Full (Max Frame Rate)				
Mono8	41323	95.8	756.1	39843
Mono10	51547	119.7	940.4	49832
Mono12	62112	143.4	1123.6	59760
BayerRG8	41323	95.8	756.1	39843
BayerRG10	51547	119.7	940.4	49832
BayerRG12	62112	143.4	1123.6	59760
RGB8	125001	286	2312.4	119520
RGB10	156251	357.6	2884.8	149488
RGB12	188681	428.7	3453.7	179270
Binning Horizontal (Max Frame Rate)				
Mono8	41153	95.6	770.8	39714
Mono10	51547	119.3	954	49642
Mono12	61729	143	1137.2	59569
Binning Vertical (Max Frame Rate)				
Mono8	41323	95.8	773.3	39834
Mono10	51547	119.7	959.8	49821
Mono12	62112	143.4	1145.1	59747
Binning Horizontal & Binning Vertical (Max Frame Rate)				
Mono8	41153	95.5	788	39706
Mono10	51547	119.2	973.3	49631
Mono12	61729	143	1158.6	59556

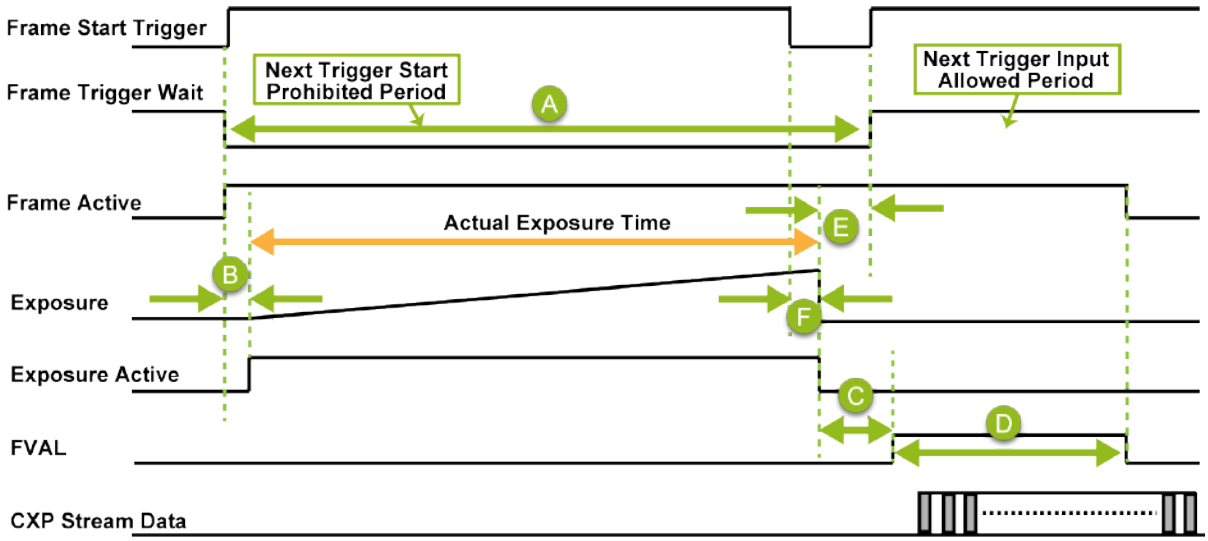
GOX-24505MC-CXP, CXP3-1

Exposure Mode = Timed (Frame Start Trigger On, Overlap Readout)

Pixel Format	Frame Period [A] usec	Period From Trigger Start Edge to Exposure Start [B] (usec)	Period From Exposure End to FVAL Start [C](usec)	Data Valid Period [D] (usec)
Full (Max Frame Rate)				
Mono8	82645	191.1	1492.2	79739
Mono10	103094	238.7	1859.6	99656
Mono12	125001	286.2	2227.1	119573
BayerRG8	82645	191.1	1492.2	79739
BayerRG10	103094	238.7	1859.6	99656
BayerRG12	125001	286.2	2227.1	119573
RGB8	250002	571.8	4598.6	239209
RGB10	312502	714.4	5739.9	298959
RGB12	384618	857.0	6881.2	358553
Binning Horizontal (Max Frame Rate)				
Mono8	82645	190.5	1504.6	79486
Mono10	103094	238.1	1872.1	99404
Mono12	123458	285.3	2237.3	119196
Binning Vertical (Max Frame Rate)				
Mono8	82645	191.1	1518.1	79721
Mono10	103094	238.6	1889.9	99634
Mono12	125001	286.2	2261.6	119547
Binning Horizontal & Binning Vertical (Max Frame Rate)				
Mono8	82645	190.5	1530.4	79469
Mono10	103094	238.1	1902.2	99382
Mono12	123458	285.3	2271.7	119171

Exposure Mode = TriggerWidth (Overlap Readout)

This section shows the timing charts when FrameStartTrigger is set to **On**, and ExposureMode is set to **TriggerWidth** (Overlap Readout).



A	Frame Period (usec)
B	Period From Trigger Start Edge to Exposure Start (usec)
C	Period From Exposure End to FVAL Start (usec)
D	Data Valid Period (usec)
E	Period From Exposure End to Next Trigger Start (usec)
F	Period From Trigger End to Exposure End (usec) (= B + 2.45 usec)

GOX-5105MC-CXP, CXP6-1

Exposure Mode = TriggerWidth (Frame Start Trigger On, Overlap Readout)

Pixel Format	Frame Period [A] (usec)	Period From Trigger Start Edge to Exposure Start [B] (usec)	Period From Exposure End to FVAL Start [C] (usec)	Data Valid Period [D] (usec)	Period from Exposure End to Next Trigger Start [E] (usec)
Full (Max Frame Rate), Maximum Exposure Time in Max Frame Rate					
Mono8	9001	52.7	525.0	8256	198.8
Mono10	11642	65.8	655.3	10340	248.0
Mono12	13774	78.8	783.9	12396	298.0
BayerRG8	9001	52.7	525.0	8256	198.8
BayerRG10	11642	65.8	655.3	10340	248.0
BayerRG12	13774	78.8	783.9	12396	298.0
RGB8	27027	156.7	1597.0	24764	603.4
RGB10	33899	196.0	1997.0	31015	751.0
RGB12	40000	234.9	2391.7	37183	901.5
Binning Horizontal (Max Frame Rate), Maximum Exposure Time in Max Frame Rate					
Mono8	8889	52.7	532.9	8255	230.0
Mono10	11877	65.8	663.3	10338	230.0
Mono12	13718	78.8	791.8	12394	230.0
Binning Vertical (Max Frame Rate), Maximum Exposure Time in Max Frame Rate					
Mono8	9001	52.7	533.0	8252	198.8
Mono10	11696	65.8	664.3	10335	248.0
Mono12	14265	78.8	793.9	12390	298.6
Binning Horizontal & Binning Vertical (Max Frame Rate), Maximum Exposure Time in Max Frame Rate					
Mono8	9381	52.7	541.0	8250	230.0
Mono10	11696	65.8	672.3	10333	230.0
Mono12	13661	78.8	801.8	12388	230.0

GOX-5105MC-CXP, CXP3-1

Exposure Mode = TriggerWidth (Frame Start Trigger On, Overlap Readout)

Pixel Format	Frame Period [A] (usec)	Period From Trigger Start Edge to Exposure Start [B] (usec)	Period From Exposure End to FVAL Start [C] (usec)	Data Valid Period [D] (usec)	Period from Exposure End to Next Trigger Start [E] (usec)
Full (Max Frame Rate), Maximum Exposure Time in Max Frame Rate					
Mono8	17954	104.8	1042.7	16536	399.4
Mono10	22989	130.9	1301.6	20676	500.3
Mono12	26954	156.8	1558.7	24788	600.2
BayerRG8	17954	104.8	1042.7	16536	399.4
BayerRG10	22989	130.9	1301.6	20676	500.3
BayerRG12	26954	156.8	1558.7	24788	600.2
RGB8	59524	313.2	3186.3	49603	600
RGB10	69931	391.4	3981	62022	749.4
RGB12	80001	469.2	4770.3	74359	901.2
Binning Horizontal (Max Frame Rate), Maximum Exposure Time in Max Frame Rate					
Mono8	17954	104.8	1050.7	16534	198.7
Mono10	22989	130.9	1309.6	20674	247.8
Mono12	28011	156.8	1566.7	24786	298.6
Binning Vertical (Max Frame Rate), Maximum Exposure Time in Max Frame Rate					
Mono8	17986	104.8	1054.7	16528	399.4
Mono10	22831	130.9	1315.6	20666	500.3
Mono12	26882	156.8	1574.7	24776	600.2
Binning Horizontal & Binning Vertical (Max Frame Rate), Maximum Exposure Time in Max Frame Rate					
Mono8	17699	104.8	1062.6	16527	198.7
Mono10	22727	130.9	1323.6	20664	247.8
Mono12	27027	156.8	1582.7	24774	298.6

GOX-8105MC-CXP, CXP6-1

Exposure Mode = TriggerWidth (Frame Start Trigger On, Overlap Readout)

Pixel Format	Frame Period [A] (usec)	Period From Trigger Start Edge to Exposure Start [B] (usec)	Period From Exposure End to FVAL Start [C] (usec)	Data Valid Period [D] (usec)	Period from Exposure End to Next Trigger Start [E] (usec)
Full (Max Frame Rate), Maximum Exposure Time in Max Frame Rate					
Mono8	14006	60.7	606.5	13156	219.7
Mono10	18657	75.9	757.7	16492	274.5
Mono12	21009	90.8	905.4	19751	331.6
BayerRG8	14006	60.7	606.5	13156	219.7
BayerRG10	18657	75.9	757.7	16492	274.5
BayerRG12	21009	90.8	905.4	19751	331.6
RGB8	43669	180.8	1844.6	39464	665.5
RGB10	56180	226.5	2308.6	49472	833.6
RGB12	68966	271.1	2761.9	59250	1013.7
Binning Horizontal (Max Frame Rate), Maximum Exposure Time in Max Frame Rate					
Mono8	13889	60.7	615.7	13158	219.7
Mono10	18083	76.0	766.9	16490	274.5
Mono12	21009	90.8	914.6	19749	331.6
Binning Vertical (Max Frame Rate), Maximum Exposure Time in Max Frame Rate					
Mono8	14006	60.7	615.8	13152	219.7
Mono10	17889	76.0	768.1	16486	274.5
Mono12	21009	90.8	916.9	19744	331.6
Binning Horizontal & Binning Vertical (Max Frame Rate), Maximum Exposure Time in Max Frame Rate					
Mono8	14006	60.7	625.0	13149	219.7
Mono10	17954	76.0	777.3	16484	274.5
Mono12	21009	90.8	926.1	19742	331.6

GOX-8105MC-CXP, CXP3-1

Exposure Mode = TriggerWidth (Frame Start Trigger On, Overlap Readout)

Pixel Format	Frame Period [A] (usec)	Period From Trigger Start Edge to Exposure Start [B] (usec)	Period From Exposure End to FVAL Start [C] (usec)	Data Valid Period [D] (usec)	Period from Exposure End to Next Trigger Start [E] (usec)
Full (Max Frame Rate), Maximum Exposure Time in Max Frame Rate					
Mono8	28012	121.1	1205.9	26385	443.3
Mono10	35843	151.1	1503.0	32942	706.6
Mono12	42919	181.2	1801.8	39537	665.9
BayerRG8	28012	121.1	1205.9	26385	443.3
BayerRG10	35843	151.1	1503.0	32942	706.6
BayerRG12	42919	181.2	1801.8	39537	665.9
RGB8	86957	362.0	3684.6	79150	1334.0
RGB10	107528	451.9	4596.6	98820	1673.5
RGB12	149255	542.1	5513.8	118605	2003.0
Binning Horizontal (Max Frame Rate), Maximum Exposure Time in Max Frame Rate					
Mono8	27933	121.1	1215.1	26382	443.3
Mono10	35972	151.1	1512.2	32939	706.6
Mono12	43860	181.2	1811.0	39534	665.9
Binning Vertical (Max Frame Rate), Maximum Exposure Time in Max Frame Rate					
Mono8	28012	121.1	1219.8	26376	443.3
Mono10	35843	151.1	1519.2	32930	706.6
Mono12	44053	181.2	1820.3	39523	665.9
Binning Horizontal & Binning Vertical (Max Frame Rate), Maximum Exposure Time in Max Frame Rate					
Mono8	28012	121.1	1229	26373	443.3
Mono10	35588	151.1	1528.4	32928	706.6
Mono12	43669	181.2	1829.5	39520	665.9

GOX-12405MC-CXP, CXP6-1

Exposure Mode = TriggerWidth (Frame Start Trigger On, Overlap Readout)

Pixel Format	Frame Period [A] (usec)	Period From Trigger Start Edge to Exposure Start [B] (usec)	Period From Exposure End to FVAL Start [C] (usec)	Data Valid Period [D] (usec)	Period from Exposure End to Next Trigger Start [E] (usec)
Full (Max Frame Rate), Maximum Exposure Time in Max Frame Rate					
Mono8	21645	74.4	800.8	20175	226.0
Mono10	26954	92.8	996.2	25196	287.8
Mono12	32895	111.2	1191.6	30218	338.5
BayerRG8	21645	74.4	800.8	20175	226.0
BayerRG10	26954	92.8	996.2	25196	287.8
BayerRG12	32895	111.2	1191.6	30218	338.5
RGB8	67568	222.0	2437.3	60517	682.0
RGB10	80001	277.1	3038.5	75582	855.9
RGB12	98040	332.2	3639.7	90648	1022.2
Binning Horizontal (Max Frame Rate), Maximum Exposure Time in Max Frame Rate					
Mono8	21739	74.4	814.1	20171	226.0
Mono10	26882	92.8	1009.5	25193	287.8
Mono12	31949	111.2	1204.9	30215	338.5
Binning Vertical (Max Frame Rate), Maximum Exposure Time in Max Frame Rate					
Mono8	21645	74.5	814.2	20168	226.0
Mono10	26738	92.8	1011.2	25188	287.8
Mono12	31746	111.2	1208.3	30208	338.5
Binning Horizontal & Binning Vertical (Max Frame Rate), Maximum Exposure Time in Max Frame Rate					
Mono8	21882	74.4	827.5	20165	226.0
Mono10	27027	92.8	1024.5	25185	287.8
Mono12	31949	111.2	1221.6	30205	338.5

GOX-12405MC-CXP, CXP3-1

Exposure Mode = TriggerWidth (Frame Start Trigger On, Overlap Readout)

Pixel Format	Frame Period [A] (usec)	Period From Trigger Start Edge to Exposure Start [B] (usec)	Period From Exposure End to FVAL Start [C] (usec)	Data Valid Period [D] (usec)	Period from Exposure End to Next Trigger Start [E] (usec)
Full (Max Frame Rate), Maximum Exposure Time in Max Frame Rate					
Mono8	43860	148.2	1585.5	40343	475.0
Mono10	54645	185.1	1977.9	50426	566.3
Mono12	68028	221.8	2368.7	60470	783.9
BayerRG8	43860	148.2	1585.5	40343	475.0
BayerRG10	54645	185.1	1977.9	50426	566.3
BayerRG12	68028	221.8	2368.7	60470	783.9
RGB8	67568	222.0	2437.3	60517	1375.2
RGB10	80001	277.1	3038.5	75582	1740.0
RGB12	98040	332.2	3639.7	90648	2062.9
Binning Horizontal (Max Frame Rate), Maximum Exposure Time in Max Frame Rate					
Mono8	45045	148.2	1598.8	40339	475.0
Mono10	56819	185.1	1991.2	50423	566.3
Mono12	68028	221.8	2381.9	60467	783.9
Binning Vertical (Max Frame Rate), Maximum Exposure Time in Max Frame Rate					
Mono8	44843	148.2	1605.6	40329	475.0
Mono10	57143	185.1	2001.3	50410	566.3
Mono12	64103	221.8	2395.4	60450	783.9
Binning Horizontal & Binning Vertical (Max Frame Rate), Maximum Exposure Time in Max Frame Rate					
Mono8	45045	148.2	1618.9	40326	475.0
Mono10	57143	185.1	2014.6	50407	566.3
Mono12	63292	221.8	2408.7	60447	783.9

GOX-16205MC-CXP, CXP6-1

Exposure Mode = TriggerWidth (Frame Start Trigger On, Overlap Readout)

Pixel Format	Frame Period [A] (usec)	Period From Trigger Start Edge to Exposure Start [B] (usec)	Period From Exposure End to FVAL Start [C] (usec)	Data Valid Period [D] (usec)	Period from Exposure End to Next Trigger Start [E] (usec)
Full (Max Frame Rate), Maximum Exposure Time in Max Frame Rate					
Mono8	27701	95.8	758.6	26285	67.1
Mono10	35088	119.7	942.9	32875	84.4
Mono12	42554	143.4	1126.1	39423	101.2
BayerRG8	27701	95.8	758.6	26285	67.1
BayerRG10	35088	119.7	942.9	32875	84.4
BayerRG12	42554	143.4	1126.1	39423	101.2
RGB8	89287	286.0	2312.4	78847	205.3
RGB10	108697	357.6	2884.8	98616	256.9
RGB12	128206	428.7	3453.7	118261	308.7
Binning Horizontal (Max Frame Rate), Maximum Exposure Time in Max Frame Rate					
Mono8	28012	95.5	773.3	26199	67.1
Mono10	34723	119.2	956.5	32748	84.4
Mono12	43291	142.9	1139.6	39296	101.2
Binning Vertical (Max Frame Rate), Maximum Exposure Time in Max Frame Rate					
Mono8	28012	95.8	775.8	26276	67.1
Mono10	34844	119.7	962.3	32864	84.4
Mono12	42017	143.4	1147.6	39410	101.2
Binning Horizontal & Binning Vertical (Max Frame Rate), Maximum Exposure Time in Max Frame Rate					
Mono8	28572	95.5	790.5	26190	67.1
Mono10	34966	119.2	975.8	32737	84.4
Mono12	43479	142.9	1161.1	39283	101.2

GOX-16205MC-CXP, CXP3-1

Exposure Mode = TriggerWidth (Frame Start Trigger On, Overlap Readout)

Pixel Format	Frame Period [A] (usec)	Period From Trigger Start Edge to Exposure Start [B] (usec)	Period From Exposure End to FVAL Start [C] (usec)	Data Valid Period [D] (usec)	Period from Exposure End to Next Trigger Start [E] (usec)
Full (Max Frame Rate), Maximum Exposure Time in Max Frame Rate					
Mono8	57472	191.1	1494.7	52603	140.1
Mono10	69931	238.6	1862.1	65741	170.0
Mono12	90910	286.2	2229.6	78879	210.3
BayerRG8	57472	191.1	1494.7	52603	140.1
BayerRG10	69931	238.6	1862.1	65741	170.0
BayerRG12	90910	286.2	2229.6	78879	210.3
RGB8	169494	571.8	4598.6	157799	415.6
RGB10	243905	714.4	5739.8	197214	518.9
RGB12	294121	857.0	6881.0	236472	622.3
Binning Horizontal (Max Frame Rate), Maximum Exposure Time in Max Frame Rate					
Mono8	57804	190.5	1507.1	52435	140.1
Mono10	74628	238.0	1874.5	65573	170.0
Mono12	88497	285.3	2239.8	78629	210.3
Binning Vertical (Max Frame Rate), Maximum Exposure Time in Max Frame Rate					
Mono8	58480	191.1	1520.5	52585	140.1
Mono10	69931	238.7	1892.3	65719	170.0
Mono12	87720	286.2	2264.1	78853	210.3
Binning Horizontal & Binning Vertical (Max Frame Rate), Maximum Exposure Time in Max Frame Rate					
Mono8	57472	190.5	1532.9	52417	140.1
Mono10	69931	238.1	1904.7	65551	170.0
Mono12	86957	285.3	2274.2	78603	210.3

GOX-20405MC-CXP, CXP6-1

Exposure Mode = TriggerWidth (Frame Start Trigger On, Overlap Readout)

Pixel Format	Frame Period [A] (usec)	Period From Trigger Start Edge to Exposure Start [B] (usec)	Period From Exposure End to FVAL Start [C] (usec)	Data Valid Period [D] (usec)	Period from Exposure End to Next Trigger Start [E] (usec)
Full (Max Frame Rate), Maximum Exposure Time in Max Frame Rate					
Mono8	34965	81.3	655.1	33057	71.0
Mono10	43104	101.5	814.4	41320	90.1
Mono12	52084	121.6	973.8	49582	112.2
BayerRG8	34965	81.3	655.1	33057	71.0
BayerRG10	43104	101.5	814.4	41320	90.1
BayerRG12	52084	121.6	973.8	49582	112.2
RGB8	109892	242.5	2003.1	99164	220.0
RGB10	142859	302.9	2497.6	123952	272.0
RGB12	178574	363.3	2992.2	148740	335.2
Binning Horizontal (Max Frame Rate), Maximum Exposure Time in Max Frame Rate					
Mono8	34844	81.3	669.6	33054	71.0
Mono10	44843	101.5	829.0	41316	90.1
Mono12	54055	121.6	988.3	49579	112.2
Binning Vertical (Max Frame Rate), Maximum Exposure Time in Max Frame Rate					
Mono8	35212	81.3	669.7	33050	71.0
Mono10	44053	101.5	830.9	41311	90.1
Mono12	52632	121.6	992.1	49571	112.2
Binning Horizontal & Binning Vertical (Max Frame Rate), Maximum Exposure Time in Max Frame Rate					
Mono8	35088	81.3	684.2	33046	71.0
Mono10	45045	101.5	845.4	41307	90.1
Mono12	55556	121.6	1006.6	49568	112.2

GOX-20405MC-CXP, CXP3-1

Exposure Mode = TriggerWidth (Frame Start Trigger On, Overlap Readout)

Pixel Format	Frame Period [A] (usec)	Period From Trigger Start Edge to Exposure Start [B] (usec)	Period From Exposure End to FVAL Start [C] (usec)	Data Valid Period [D] (usec)	Period from Exposure End to Next Trigger Start [E] (usec)
Full (Max Frame Rate), Maximum Exposure Time in Max Frame Rate					
Mono8	69445	162.0	1293.7	66168	143.9
Mono10	87720	202.3	1612.4	82693	180.9
Mono12	105264	242.5	1929.9	99158	218.4
BayerRG8	69445	162.0	1293.7	66168	143.9
BayerRG10	87720	202.3	1612.4	82693	180.9
BayerRG12	105264	242.5	1929.9	99158	218.4
RGB8	270273	484.6	3984.6	198497	437.8
RGB10	294120	605.4	4973.8	248072	550.9
RGB12	384619	725.8	5959.2	297466	665.0
Binning Horizontal (Max Frame Rate), Maximum Exposure Time in Max Frame Rate					
Mono8	69445	162.0	1308.2	66165	143.9
Mono10	89287	202.3	1626.9	82689	180.9
Mono12	107528	242.5	1944.4	99154	218.4
Binning Vertical (Max Frame Rate), Maximum Exposure Time in Max Frame Rate					
Mono8	69931	162.1	1315.6	66153	143.9
Mono10	95239	202.3	1638.0	82675	180.9
Mono12	106384	242.5	1959.1	99136	218.4
Binning Horizontal & Binning Vertical (Max Frame Rate), Maximum Exposure Time in Max Frame Rate					
Mono8	69931	162.1	1330.1	66150	143.9
Mono10	95239	202.3	1652.5	82671	180.9
Mono12	114944	242.4	1973.7	99132	218.4

GOX-24505MC-CXP, CXP6-1

Exposure Mode = TriggerWidth (Frame Start Trigger On, Overlap Readout)

Pixel Format	Frame Period [A] (usec)	Period From Trigger Start Edge to Exposure Start [B] (usec)	Period From Exposure End to FVAL Start [C] (usec)	Data Valid Period [D] (usec)	Period from Exposure End to Next Trigger Start [E] (usec)
Full (Max Frame Rate), Maximum Exposure Time in Max Frame Rate					
Mono8	42919	95.8	756.1	39843	67.1
Mono10	55249	119.7	940.4	49832	84.6
Mono12	65790	143.4	1123.6	59760	103.2
BayerRG8	42919	95.8	756.1	39843	67.1
BayerRG10	55249	119.7	940.4	49832	84.6
BayerRG12	65790	143.4	1123.6	59760	103.2
RGB8	140846	285.9	2312.3	119520	205.5
RGB10	178573	357.5	2884.7	149488	256.9
RGB12	188681	428.6	3453.7	179270	308.8
Binning Horizontal (Max Frame Rate), Maximum Exposure Time in Max Frame Rate					
Mono8	42735	95.5	770.8	39714	67.1
Mono10	54054	119.2	954.0	49642	84.6
Mono12	65790	142.9	1137.1	59569	103.2
Binning Vertical (Max Frame Rate), Maximum Exposure Time in Max Frame Rate					
Mono8	41667	95.8	773.3	39834	67.1
Mono10	53192	119.7	959.8	49821	84.6
Mono12	65360	143.4	1145.1	59747	103.2
Binning Horizontal & Binning Vertical (Max Frame Rate), Maximum Exposure Time in Max Frame Rate					
Mono8	42017	95.5	788.0	39706	67.1
Mono10	54645	119.2	973.3	49631	84.6
Mono12	65360	142.9	1158.6	59556	103.2

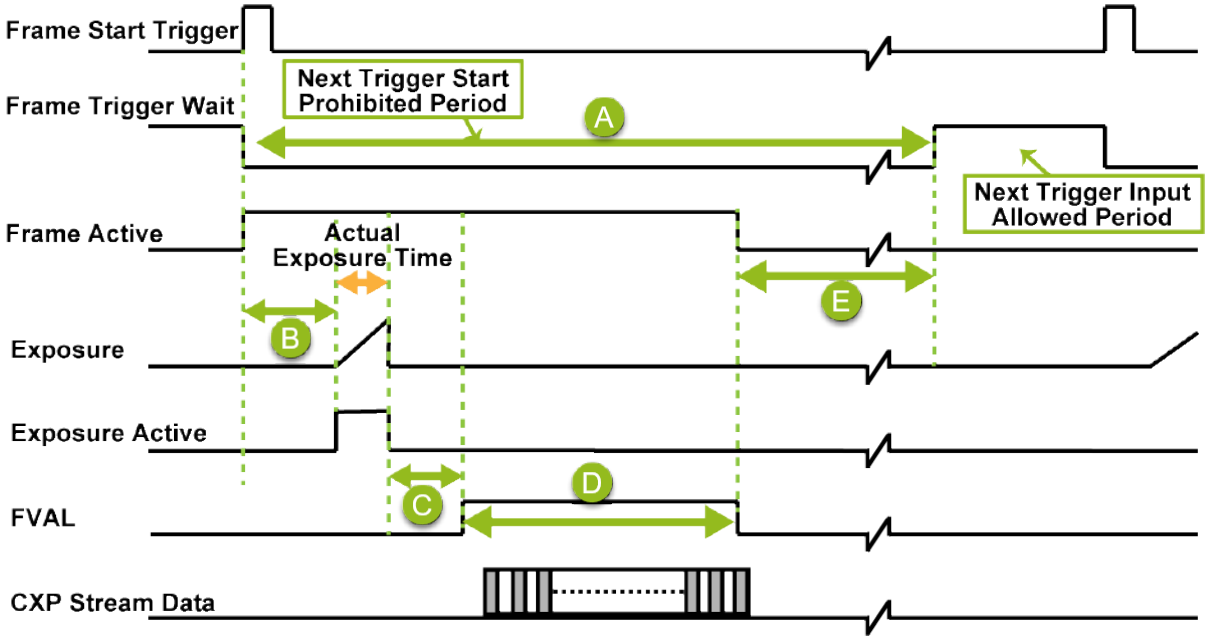
GOX-24505MC-CXP, CXP3-1

Exposure Mode = TriggerWidth (Frame Start Trigger On, Overlap Readout)

Pixel Format	Frame Period [A] (usec)	Period From Trigger Start Edge to Exposure Start [B] (usec)	Period From Exposure End to FVAL Start [C] (usec)	Data Valid Period [D] (usec)	Period from Exposure End to Next Trigger Start [E] (usec)
Full (Max Frame Rate), Maximum Exposure Time in Max Frame Rate					
Mono8	88496	191.1	1492.2	79739	137.2
Mono10	109891	238.6	1859.6	99656	170.3
Mono12	140846	286.1	2227.0	119573	206.0
BayerRG8	88496	191.1	1492.2	79739	137.2
BayerRG10	109891	238.6	1859.6	99656	170.3
BayerRG12	140846	286.1	2227.0	119573	206.0
RGB8	294119	571.6	4598.4	239208	414.0
RGB10	357145	714.2	5739.8	298959	530.0
RGB12	588240	856.0	6880.0	358553	622.0
Binning Horizontal (Max Frame Rate), Maximum Exposure Time in Max Frame Rate					
Mono8	87720	190.5	1504.6	79486	137.2
Mono10	109891	238.0	1872.1	99404	170.3
Mono12	129871	285.3	2237.2	119196	206.0
Binning Vertical (Max Frame Rate), Maximum Exposure Time in Max Frame Rate					
Mono8	87720	191.1	1518.1	79721	137.2
Mono10	109891	238.6	1889.8	99634	170.3
Mono12	129871	286.2	2261.6	119547	206.0
Binning Horizontal & Binning Vertical (Max Frame Rate), Maximum Exposure Time in Max Frame Rate					
Mono8	87720	190.5	1530.4	79469	137.2
Mono10	108696	238.0	1902.2	99382	170.3
Mono12	129871	285.3	2271.7	119170	206.0

Exposure Mode = Timed (RCT Mode)

This section shows the timing charts when FrameStartTrigger is set to **On**, and ExposureMode is set to**Timed** (RCT Mode).



A	Frame Period (usec)
B	Period From Trigger Start Edge to Exposure Start (usec)
C	Period From Exposure End to FVAL Start (usec)
D	Data Valid Period (usec)
E	Data Invalid Period (usec)

GOX-5105MC-CXP, CXP6-1

Exposure Mode = Timed (Frame Start Trigger On, RCT Mode)

Pixel Format	Frame Period [A] (usec)	Period From Trigger Start Edge to Exposure Start [B] (usec)	Period From Exposure End to FVAL Start [C] (usec)	Data Valid Period [D] (usec)	Data Invalid Period [E] (usec)
Full (Max Frame Rate), Exposure Time Minimum					
Mono8	103093	1817.9	525.0	8256	92491
Mono10	103094	1831.1	655.3	10340	90264
Mono12	103094	1844.0	783.8	12396	88067
BayerRG8	103093	1817.9	525.0	8256	92491
BayerRG10	103094	1831.1	655.3	10340	90264
BayerRG12	103094	1844.0	783.8	12396	88067
Binning Horizontal (Max Frame Rate), Exposure Time Minimum					
Mono8	103093	1817.9	533.0	8254	92485
Mono10	103094	1831.1	663.3	10338	90258
Mono12	103094	1844.0	791.8	12394	88061
Binning Vertical (Max Frame Rate), Exposure Time Minimum					
Mono8	103094	1817.9	533.0	8252	92487
Mono10	103094	1831.1	664.3	10335	90260
Mono12	103094	1844.0	793.8	12390	88063
Binning Horizontal & Binning Vertical (Max Frame Rate), Exposure Time Minimum					
Mono8	103093	1817.9	541.0	8250	92481
Mono10	103094	1831.1	672.3	10333	90254
Mono12	103094	1844.0	801.8	12388	88057

GOX-5105MC-CXP, CXP3-1

Exposure Mode = Timed (Frame Start Trigger On, RCT Mode)

Pixel Format	Frame Period [A] (usec)	Period From Trigger Start Edge to Exposure Start [B] (usec)	Period From Exposure End to FVAL Start [C] (usec)	Data Valid Period [D] (usec)	Data Invalid Period [E] (usec)
Full (Max Frame Rate), Exposure Time Minimum					
Mono8	103094	1870.1	1042.7	16536	83642
Mono10	103094	1896.2	1301.6	20675	79217
Mono12	103094	1922.1	1558.7	24788	74822
BayerRG8	103094	1870.1	1042.7	16536	83642
BayerRG10	103094	1896.2	1301.6	20675	79217
BayerRG12	103094	1922.1	1558.7	24788	74822
Binning Horizontal (Max Frame Rate), Exposure Time Minimum					
Mono8	103094	1870.1	1050.7	16534	83636
Mono10	103094	1896.2	1309.6	20674	79211
Mono12	103094	1922.1	1566.7	24786	74816
Binning Vertical (Max Frame Rate), Exposure Time Minimum					
Mono8	103094	1870.1	1054.7	16528	83638
Mono10	103094	1896.2	1315.6	20665	79213
Mono12	103094	1922.1	1574.7	24776	74818
Binning Horizontal & Binning Vertical (Max Frame Rate), Exposure Time Minimum					
Mono8	103094	1870.1	1062.7	16526	83632
Mono10	103094	1896.2	1323.6	20664	79207
Mono12	103094	1922.1	1582.7	24774	74812

GOX-8105MC-CXP, CXP6-1

Exposure Mode = Timed (Frame Start Trigger On, RCT Mode)

Pixel Format	Frame Period [A] (usec)	Period From Trigger Start Edge to Exposure Start [B] (usec)	Period From Exposure End to FVAL Start [C] (usec)	Data Valid Period [D] (usec)	Data Invalid Period [E] (usec)
Full (Max Frame Rate), Exposure Time Minimum					
Mono8	103094	1826.0	606.5	13156	87502
Mono10	103094	1841.2	757.7	16492	83999
Mono12	103094	1856.1	905.3	19751	80578
BayerRG8	103094	1826.0	606.5	13156	87502
BayerRG10	103094	1841.2	757.7	16492	83999
BayerRG12	103094	1856.1	905.3	19751	80578
Binning Horizontal (Max Frame Rate), Exposure Time Minimum					
Mono8	103094	1826.0	615.7	13154	87494
Mono10	103094	1841.2	766.9	16490	83993
Mono12	103094	1856.1	914.6	19749	80571
Binning Vertical (Max Frame Rate), Exposure Time Minimum					
Mono8	103094	1826.0	615.7	13152	87497
Mono10	103094	1841.2	768.0	16486	83995
Mono12	103094	1856.1	916.9	19744	80573
Binning Horizontal & Binning Vertical (Max Frame Rate), Exposure Time Minimum					
Mono8	103094	1826.0	624.9	13149	87490
Mono10	103094	1841.2	777.2	16484	83988
Mono12	103094	1856.1	926.1	19742	80566

GOX-8105MC-CXP, CXP3-1

Exposure Mode = Timed (Frame Start Trigger On, RCT Mode)

Pixel Format	Frame Period [A] (usec)	Period From Trigger Start Edge to Exposure Start [B] (usec)	Period From Exposure End to FVAL Start [C] (usec)	Data Valid Period [D] (usec)	Data Invalid Period [E] (usec)
Full (Max Frame Rate), Exposure Time Minimum					
Mono8	103094	1886.4	1205.9	26385	73614
Mono10	103094	1916.3	1503.0	32941	66730
Mono12	103094	1886.4	1207.4	26421	73576
BayerRG8	103094	1886.4	1205.9	26385	73614
BayerRG10	103094	1916.3	1503.0	32941	66730
BayerRG12	103094	1886.4	1207.4	26421	73576
Binning Horizontal (Max Frame Rate), Exposure Time Minimum					
Mono8	103094	1886.4	1215.1	26382	73606
Mono10	103094	1916.3	1512.2	32939	66723
Mono12	103094	1886.4	1216.8	26421	73566
Binning Vertical (Max Frame Rate), Exposure Time Minimum					
Mono8	103094	1886.4	1219.8	26375	73609
Mono10	103094	1916.3	1519.2	32930	66725
Mono12	103094	1886.4	1221.4	26414	73569
Binning Horizontal & Binning Vertical (Max Frame Rate), Exposure Time Minimum					
Mono8	103094	1886.4	1229.0	26373	73602
Mono10	103094	1916.3	1528.4	32928	66718
Mono12	103094	1886.4	1230.6	26411	73563

GOX-12405MC-CXP, CXP6-1

Exposure Mode = Timed (Frame Start Trigger On, RCT Mode)

Pixel Format	Frame Period [A] (usec)	Period From Trigger Start Edge to Exposure Start [B] (usec)	Period From Exposure End to FVAL Start [C] (usec)	Data Valid Period [D] (usec)	Data Invalid Period [E] (usec)
Full (Max Frame Rate), Exposure Time Minimum					
Mono8	103094	1839.7	800.8	20175	80275
Mono10	103094	1858.1	996.2	25196	75040
Mono12	103094	1876.5	1191.6	30218	69804
BayerRG8	103094	1839.7	800.8	20175	80275
BayerRG10	103094	1858.1	996.2	25196	75040
BayerRG12	103094	1876.5	1191.6	30218	69804
Binning Horizontal (Max Frame Rate), Exposure Time Minimum					
Mono8	103094	1839.7	814.1	20171	80265
Mono10	103093	1858.1	1009.5	25193	75029
Mono12	103094	1876.5	1204.9	30215	69794
Binning Vertical (Max Frame Rate), Exposure Time Minimum					
Mono8	103094	1839.7	814.1	20168	80268
Mono10	103094	1858.1	1011.2	25188	75033
Mono12	103094	1876.5	1208.3	30208	69797
Binning Horizontal & Binning Vertical (Max Frame Rate), Exposure Time Minimum					
Mono8	103093	1839.7	827.5	20165	80258
Mono10	103094	1858.1	1024.5	25185	75023
Mono12	103094	1876.5	1221.6	30205	69787

GOX-12405MC-CXP, CXP3-1

Exposure Mode = Timed (Frame Start Trigger On, RCT Mode)

Pixel Format	Frame Period [A] (usec)	Period From Trigger Start Edge to Exposure Start [B] (usec)	Period From Exposure End to FVAL Start [C] (usec)	Data Valid Period [D] (usec)	Data Invalid Period [E] (usec)
Full (Max Frame Rate), Exposure Time Minimum					
Mono8	103094	1913.5	1585.5	40343	59249
Mono10	102524	1913.5	1479.2	40343	58785
Mono12	102430	1886.6	1399.8	40343	58797
BayerRG8	103094	1913.5	1585.5	40343	59249
BayerRG10	102524	1913.5	1479.2	40343	58785
BayerRG12	102430	1886.6	1399.8	40343	58797
Binning Horizontal (Max Frame Rate), Exposure Time Minimum					
Mono8	103094	1913.5	1598.8	40339	59239
Mono10	102522	1913.5	1492.6	40339	58774
Mono12	102417	1886.6	1413.1	40339	58775
Binning Vertical (Max Frame Rate), Exposure Time Minimum					
Mono8	103094	1913.5	1605.6	40329	59242
Mono10	102522	1913.5	1499.3	40329	58777
Mono12	102416	1886.6	1419.9	40329	58777
Binning Horizontal & Binning Vertical (Max Frame Rate), Exposure Time Minimum					
Mono8	103094	1913.5	1618.9	40326	59232
Mono10	102522	1913.5	1512.6	40326	58766
Mono12	102416	1886.7	1433.2	40326	58767

GOX-16205MC-CXP, CXP6-1

Exposure Mode = Timed (Frame Start Trigger On, RCT Mode)

Pixel Format	Frame Period [A] (usec)	Period From Trigger Start Edge to Exposure Start [B] (usec)	Period From Exposure End to FVAL Start [C] (usec)	Data Valid Period [D] (usec)	Data Invalid Period [E] (usec)
Full (Max Frame Rate), Exposure Time Minimum					
Mono8	103094	1861.1	758.6	26285	74188
Mono10	103094	1885.0	942.8	32875	67391
Mono12	103094	1908.6	1126.0	39423	60635
BayerRG8	103094	1861.1	758.6	26285	74188
BayerRG10	103094	1885.0	942.8	32875	67391
BayerRG12	103094	1908.6	1126.0	39423	60635
Binning Horizontal (Max Frame Rate), Exposure Time Minimum					
Mono8	103094	1860.8	773.3	26199	74260
Mono10	103094	1884.5	956.4	32748	67504
Mono12	103094	1908.2	1139.6	39296	60749
Binning Vertical (Max Frame Rate), Exposure Time Minimum					
Mono8	103094	1861.1	775.8	26276	74179
Mono10	103094	1884.9	962.3	32864	67382
Mono12	103094	1908.6	1147.6	39410	60627
Binning Horizontal & Binning Vertical (Max Frame Rate), Exposure Time Minimum					
Mono8	103094	1860.8	790.5	26190	74252
Mono10	103094	1884.5	975.8	32737	67496
Mono12	103094	1908.2	1161.1	39283	60741

GOX-16205MC-CXP, CXP3-1

Exposure Mode = Timed (Frame Start Trigger On, RCT Mode)

Pixel Format	Frame Period [A] (usec)	Period From Trigger Start Edge to Exposure Start [B] (usec)	Period From Exposure End to FVAL Start [C] (usec)	Data Valid Period [D] (usec)	Data Invalid Period [E] (usec)
Full (Max Frame Rate), Exposure Time Minimum					
Mono8	103094	1956.3	1494.6	52603	47040
Mono10	103094	1921.7	1461.4	52602	37109
Mono12	103094	1921.8	1462.8	52602	47106
BayerRG8	103094	1956.3	1494.6	52603	47040
BayerRG10	103094	1921.7	1461.4	52602	37109
BayerRG12	103094	1921.8	1462.8	52602	47106
Binning Horizontal (Max Frame Rate), Exposure Time Minimum					
Mono8	103094	1955.8	1507.1	52435	47196
Mono10	103094	1921.8	1478.6	52598	37096
Mono12	103094	1921.7	1480.0	52598	47093
Binning Vertical (Max Frame Rate), Exposure Time Minimum					
Mono8	103094	1956.4	1520.5	52585	47031
Mono10	103094	1921.8	1487.3	52585	47099
Mono12	103094	1921.8	1488.7	52585	47098
Binning Horizontal & Binning Vertical (Max Frame Rate), Exposure Time Minimum					
Mono8	103094	1955.8	1532.9	52417	47187
Mono10	103094	1921.7	1504.4	52581	47086
Mono12	103094	1921.8	1505.9	52581	47084

GOX-20405MC-CXP, CXP6-1

Exposure Mode = Timed (Frame Start Trigger On, RCT Mode)

Pixel Format	Frame Period [A] (usec)	Period From Trigger Start Edge to Exposure Start [B] (usec)	Period From Exposure End to FVAL Start [C] (usec)	Data Valid Period [D] (usec)	Data Invalid Period [E] (usec)
Full (Max Frame Rate), Exposure Time Minimum					
Mono8	102042	1846.6	655.0	33057	66480
Mono10	103094	1866.7	814.4	41320	59090
Mono12	103094	1886.9	973.8	49582	50647
BayerRG8	102042	1846.6	655.0	33057	66480
BayerRG10	103094	1866.7	814.4	41320	59090
BayerRG12	103094	1886.9	973.8	49582	50647
Binning Horizontal (Max Frame Rate), Exposure Time Minimum					
Mono8	102042	1846.6	669.6	33054	66468
Mono10	103094	1866.7	828.9	41316	59079
Mono12	103094	1886.9	988.3	49579	50637
Binning Vertical (Max Frame Rate), Exposure Time Minimum					
Mono8	102042	1846.6	669.6	33050	66472
Mono10	103094	1866.7	830.8	41311	59082
Mono12	103094	1886.9	992.0	49571	50640
Binning Horizontal & Binning Vertical (Max Frame Rate), Exposure Time Minimum					
Mono8	102042	1846.6	684.2	33046	66461
Mono10	103094	1866.7	845.4	41307	59071
Mono12	103094	1886.9	1006.6	49568	50629

GOX-20405MC-CXP, CXP3-1

Exposure Mode = Timed (Frame Start Trigger On, RCT Mode)

Pixel Format	Frame Period [A] (usec)	Period From Trigger Start Edge to Exposure Start [B] (usec)	Period From Exposure End to FVAL Start [C] (usec)	Data Valid Period [D] (usec)	Data Invalid Period [E] (usec)
Full (Max Frame Rate), Exposure Time Minimum					
Mono8	103094	1927.3	1293.6	66168	33701
Mono10	103094	1967.5	1612.3	82693	16818
Mono12	105264	2007.8	1929.9	99158	2165
BayerRG8	103094	1927.3	1293.6	66168	33701
BayerRG10	103094	1967.5	1612.3	82693	16818
BayerRG12	105264	2007.8	1929.9	99158	2165
Binning Horizontal (Max Frame Rate), Exposure Time Minimum					
Mono8	103094	1927.3	1308.2	66165	33690
Mono10	103094	1967.6	1626.8	82689	16807
Mono12	105264	2007.8	1944.4	99154	2154
Binning Vertical (Max Frame Rate), Exposure Time Minimum					
Mono8	103094	1927.3	1315.6	66153	33694
Mono10	103094	1967.5	1637.9	82675	16810
Mono12	105264	2007.8	1959.2	99136	2158
Binning Horizontal & Binning Vertical (Max Frame Rate), Exposure Time Minimum					
Mono8	103094	1927.3	1330.1	66150	33683
Mono10	103094	1967.6	1652.5	82671	16800
Mono12	105264	2007.8	1973.7	99132	2147

GOX-24505MC-CXP, CXP6-1

Exposure Mode = Timed (Frame Start Trigger On, RCT Mode)

Pixel Format	Frame Period [A] (usec)	Period From Trigger Start Edge to Exposure Start [B] (usec)	Period From Exposure End to FVAL Start [C] (usec)	Data Valid Period [D] (usec)	Data Invalid Period [E] (usec)
Full (Max Frame Rate), Exposure Time Minimum					
Mono8	103094	1861.1	756.1	39843	60630
Mono10	103094	1885.0	940.4	49832	50433
Mono12	103094	1908.6	1123.5	59760	40298
BayerRG8	103094	1861.1	756.1	39843	60630
BayerRG10	103094	1885.0	940.4	49832	50433
BayerRG12	103094	1908.6	1123.5	59760	40298
Binning Horizontal (Max Frame Rate), Exposure Time Minimum					
Mono8	103094	1860.8	770.8	39714	60744
Mono10	103094	1884.5	954.0	49642	50610
Mono12	103094	1908.2	1137.1	59569	40476
Binning Vertical (Max Frame Rate), Exposure Time Minimum					
Mono8	103094	1861.1	773.3	39834	60622
Mono10	103094	1885.0	959.8	49821	50424
Mono12	103094	1908.6	1145.1	59747	40290
Binning Horizontal & Binning Vertical (Max Frame Rate), Exposure Time Minimum					
Mono8	103094	1860.8	788.0	39706	60736
Mono10	103094	1884.5	973.3	49631	50601
Mono12	103094	1908.2	1158.6	59556	40467

GOX-24505MC-CXP, CXP3-1

Exposure Mode = Timed (Frame Start Trigger On, RCT Mode)

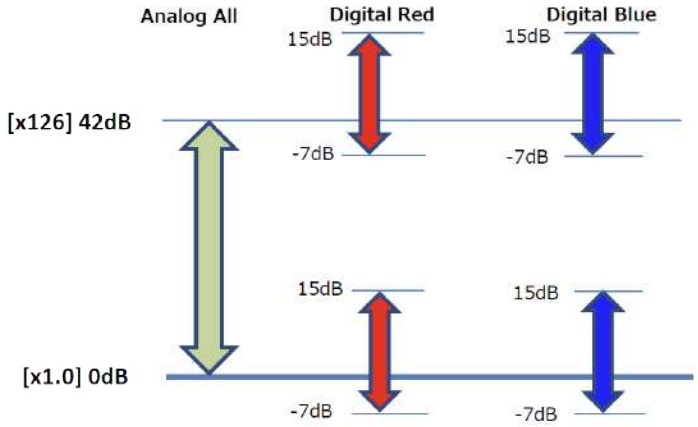
Pixel Format	Frame Period [A] (usec)	Period From Trigger Start Edge to Exposure Start [B] (usec)	Period From Exposure End to FVAL Start [C] (usec)	Data Valid Period [D] (usec)	Data Invalid Period [E] (usec)
Full (Max Frame Rate), Exposure Time Minimum					
Mono8	103094	1956.4	1492.2	79739	19903
Mono10	105264	2003.9	1859.6	99656	1741
Mono12	126583	2051.5	2227.1	119573	2728
BayerRG8	103094	1956.4	1492.2	79739	19903
BayerRG10	105264	2003.9	1859.6	99656	1741
BayerRG12	126583	2051.5	2227.1	119573	2728
Binning Horizontal (Max Frame Rate), Exposure Time Minimum					
Mono8	103094	1955.7	1504.6	79486	20144
Mono10	105264	2003.9	1876.8	99652	1728
Mono12	126583	2051.5	2244.3	119568	2716
Binning Vertical (Max Frame Rate), Exposure Time Minimum					
Mono8	103093	1956.4	1518.0	79721	19894
Mono10	105264	2003.9	1876.8	99652	1728
Mono12	126584	2051.5	2261.6	119547	2720
Binning Horizontal & Binning Vertical (Max Frame Rate), Exposure Time Minimum					
Mono8	103093	1955.7	1530.4	79469	20135
Mono10	105264	2003.9	1907	99630	1720
Mono12	126583	2051.5	2278.8	119542	2707

Gain Control

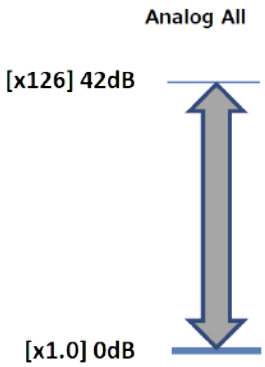
Related Setting Items: AnalogControl

Adjust the overall gain with AnalogAll (master gain), and adjust the white balance by changing DigitalRed and DigitalBlue.

Color Model



Monochrome Model



Automatic Gain Level Control

Set GainAuto to **Continuous** to control the gain level automatically.

When GainAuto is set to **Continuous**, you can configure the conditions for automatic adjustment in detail.

- When GainAuto is set to **Continuous**, the automatic adjustment will be performed continuously.
- When GainAuto is set to **Once**, the automatic adjustment will be performed only once.

White Balance

> **Related Setting Items:** AnalogControl

To adjust the white balance automatically, set BalanceWhiteAuto to **Once** (automatic adjustment only once) or **Continuous** (automatic adjustment always).

The metering area can be limited for automatic adjustment. To limit the metering area, specify each of the 16 areas with AWBAreaSelector and set AWBAreaEnable to True or False.

16 Areas

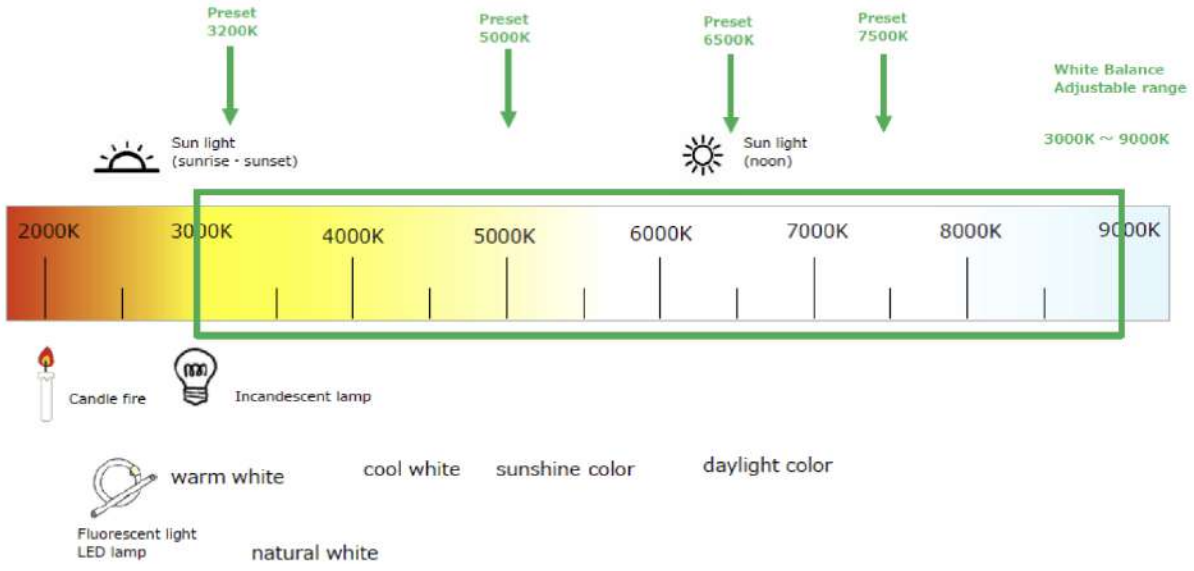
HighLeft	HighMidLeft	HighMidRight	HighRight
MidHighLeft	MidHighMidLeft	MidHighMidRight	MidHighRight
MidLowLeft	MidLowMidLeft	MidLowMidRight	MidLowRight
LowLeft	LowMidLeft	LowMidRight	LowRight

In addition, the white balance has been adjusted in advance for specific color temperature lighting. It is possible to select from the following four presets. (Color temperature for preset : 3200K, 5000K, 6500K, 7500K)

Color Temperature

The adjustable range of white balance for this camera is 3000K to 9000K.

Please refer to the figure below for an overview of the relationship between various lighting types and color temperature.



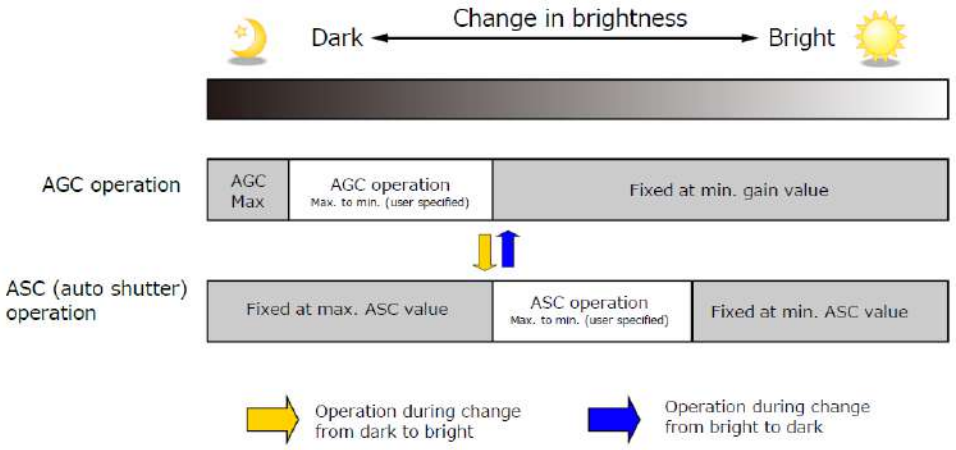
ALC (Automatic Level Control) Function

> **Related Setting Items:** AutoLevelControl

The ALC (automatic level control) function combines the automatic gain control (AGC/Auto Gain Control) and automatic exposure control (ASC/Auto Shutter Control) functions and is capable of handling various changes in brightness. The function operates as follows in response to changes in brightness.

Change from bright to dark: ASC → AGC

Change from dark to bright: AGC → ASC



To Use the ALC Function

Set GainAuto or ExposureAuto or both to **Continuous** mode. Configure the minimum value, maximum value, etc. for AGC and ASC in AutoLevelControl.

The target video levels for AGC and ASC are configured in ALCReference. For example, when ALCReference is set to 95%, video levels will be maintained at 95% using AGC and ASC.

In color models, the channel to be used as the reference for ALC control can be set.

- **ALCControlReference**: Set whether to specify the SelectedChannel refer to channel (R, G, B) or PeakChannel refer to the channel with the highest average image level.
- If ALCControlReference= SelectedChannel, set ALCControlChannel to **Red**, **Green** or **Blue**.

The speed of ALC control can be set from 1 to 100 (fastest) in ALCControlRatio.

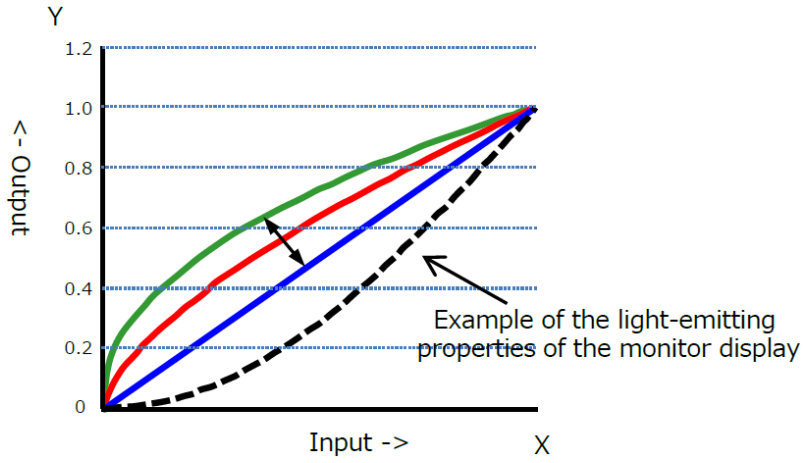
> **Note:** If the ALCControlRatio setting is large, the ALC operation may cause hunting depending on the AcquisitionFrameRate setting. In this case, lower the value of AcquisitionFrameRate or ALCControlRatio.

Gamma Function

Related Setting Items: AnalogControl

The Gamma function corrects the output signals from the camera beforehand (reverse correction), taking into consideration the light-emitting properties of the monitor display. As the light-emitting properties of the monitor are not linear, the entire image may be darker or the gradation in the dark areas may be less noticeable when camera outputs are displayed without processing.

The Gamma function can be used to correct the camera signals with an opposite-direction curve and produce a display that is close to linear.



To Use the Gamma Function

Configure the settings as follows.

Item	Setting Value / Selectable Range	Description
Gamma	0.45, 0.5, 0.55, 0.6, 0.65, 0.75, 0.8, 0.9, 1.0	Select the Gamma correction value.
LUTMode	Gamma	Use Gamma.

Note: You can use the LUT function to configure a curve with more detailed points. For details, see LUT (Lookup Table).

LUT (Lookup Table)

> **Related Setting Items:** LUTControl

The LUT function is used to generate a non-linear mapping between signal values captured on the sensor and those that are output from the camera. You can specify the output curve using 257 setting points (indexes).

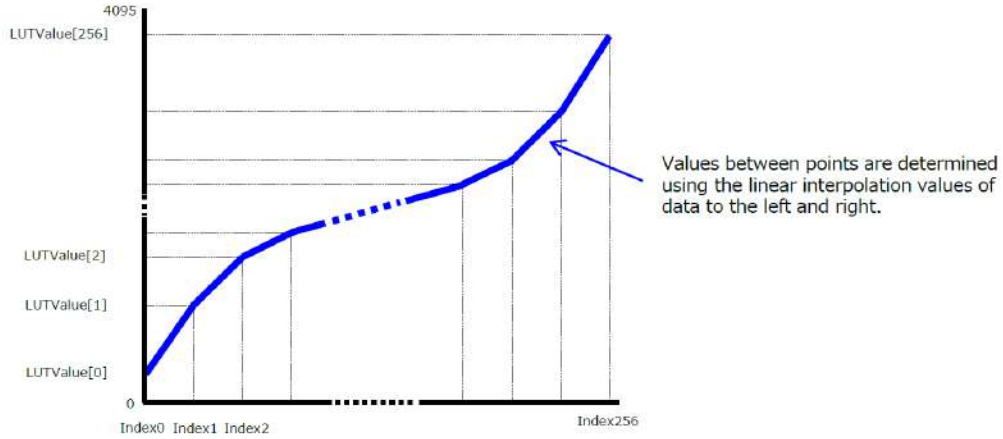
To Use the LUT Function

Configure the settings as follows.

Item	Setting Value / Selectable Range	Description
LUTMode	LUT	Use LUT.
LUTSelector	Red, Green, Blue	Select the LUT channel to control (Color models only).
LUTIndex	0 ～ 256	Select the LUT index to configure. Indexes represent the possible pixel values captured on the sensor, from the lowest value (Index 0) to the highest (Index 256). For example, Index 0 represents a full black pixel and Index 256 represents a full white pixel.
LUTValue	0 ～ 4095	Set the LUT output value for the selected index.

LUT Value

LUT values range from 0 at the lowest to 4095 at the highest. Linear interpolation is used to calculate LUT values between the index points.



BlemishCompensation

Related Setting Items: BlemishControl

Multiple defective pixels that are not adjacent to each other can occur on CMOS sensor cameras.

This camera features a function that interpolates defective pixels using the surrounding pixels. Up to 2000 pixels can be corrected. Pixel interpolation can be performed via automatic detection or point-by-point manual settings.

Automatic Detection

Automatic detection can only detect lit defective pixels (i.e., white blemishes).

1. Shield the camera sensor. If a lens is attached, use the lens cap as a shield, for example.
2. Configure the threshold level for defective pixel detection.
    - Up to 2000 pixels can be corrected.
    - The threshold value is specified as a percentage.
    - The default setting is "10" with 10% of the full scale (100%) specified as the threshold value.
3. Execute **BlemishDetect** to start automatic detection. After detection, the interpolation data is saved to the camera's internal memory.

To check the number of interpolated pixels after automatic detection

You can check the number of pixels interpolated via automatic detection by loading the BlemishNum data.

Notes:
Automatic detection will not be executed when:

- No image is being output.
- TestPattern is being output
- In Sequencer Mode (Sequencer Function)
- In MultiRoi mode (ROI Function (Multi ROI))
- The image is not full ROI size (ROI Function (Single ROI))
- In Reverse mode (Image Flip Function)
- GradationCompressionMode is not Off (Gradation Compression Mode)
- AcqusitionModeis not Continuous (Acquisition Control)
- Not in lens cap state

Manual Configuration

1. Select the **index** in BlemishCompensationIndex. You can select from 1 to 2000. However, configure the indexes in order starting with the smallest index. If you skip indexes while configuring settings, interpolation may not be performed.
2. Specify the pixel points for interpolation using the **BlemishCompensationPositionX** and **BlemishCompensationPositionY** settings.

   > **Notes:**
   > - You can configure values that are within the total effective pixel area. Specify pixels for which interpolation is not necessary as -1. If 0 is specified, the first line or first pixel will be interpolated.
   > - To delete the configured pixel points, execute **BlemishCompensationDataClear** with the corresponding index selected.

3. Execute **BlemishStore**. Blemish compensation data will be stored.
4. Set BlemishEnable to **Enable**, and execute interpolation. If it is set to **Disable all**, all interpolation for defective pixels will be disabled (including the factory-set interpolation data).

Shading Correction

Related Setting Items: ShadingControl

The ShadingCorrection function corrects non-uniformity (i.e., shading) in the amount of light generated by the lens and lighting equipment. Using this function allows correction even if top, bottom, left, and right shading is not symmetrical in relation to the center of the screen (H, V).

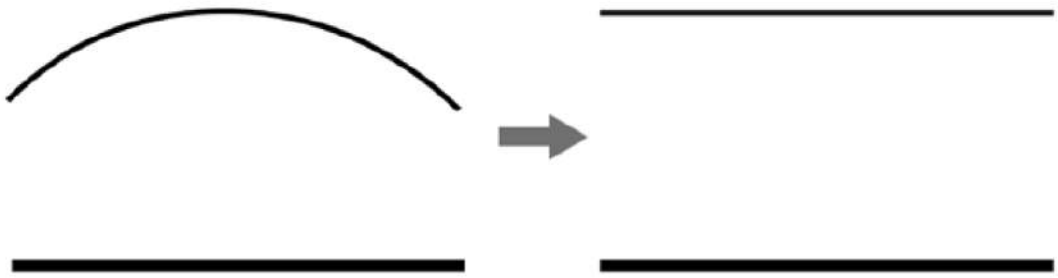
This function can be used even when the effective image area is limited (an area with both Width and Height set to more than 512 must be configured) by the ROI Function (Single ROI). In such cases, the correction area is included in the image area configured by the ROI.

Block size is 128 × 128 pixels.

The following shading correction modes are available on the camera.

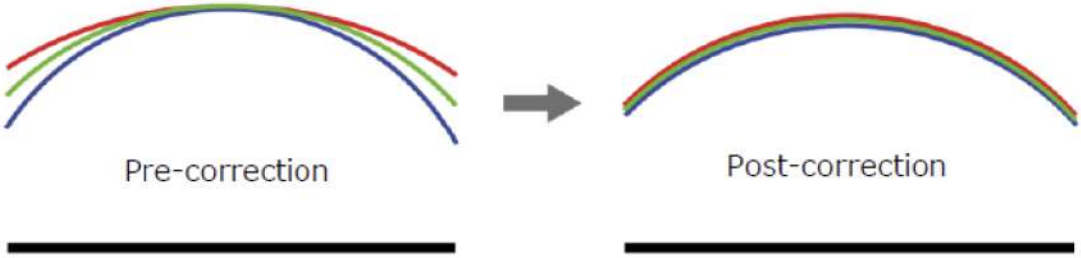
FlatShading (Monochrome model, Color model)

Correction is performed using the area of the screen with the highest brightness level as the reference, and adjusting the brightness levels of the other areas to match this level.



ColorShading (Color models only)

R-channel and B-channel properties are adjusted to using the G-channel shading properties as a reference.



Cautions:

- For FlatShading and ColorShading, the maximum amount of correction gain for all pixels is limited to 8 times the amount of gain before correction. (The amount of gain cannot be increased to more than 8 times the amount of gain from before correction.)
- If the area in the screen with the highest brightness level is 175 LSB or less (during 10-bit video output), proper correction is not possible.

To Use the Shading Correction Function

Configure the settings as follows.

Item	Setting Value	Description
ShadingCorrectionMode	FlatShading, ColorShading	Select the shading correction mode.
ShadingMode	User1, User2, User3, Off	Select the user area to which to save the shading correction value.

Display a white chart under a uniform light, and execute **PerformShadingCalibration**.

Notes:

- After shading correction is executed, the shading correction value is automatically saved to the user area selected in ShadingMode.
- The PerformShadingCalibration command cannot be executed under the following conditions. (An error also occurs when ShadingMode is set to Off).

  - When outputting no image.
  - When outputting TestPattern.
  - Width and/or Height are less than 512 (ROI Function (Single ROI))
  - In FD2x2Binning mode (Binning Function)
  - In ImageScaling mode (Image Scaling Mode (Xscale))
  - In Decimation mode (Decimation Mode)
  - In Sequencer mode (Sequencer Function)
  - In MultiRoi mode (ROI Function (Multi ROI))
  - In Reverse mode (Image Flip Function)
  - In GradationCompression mode (Gradation Compression Mode)
  - In ALC mode (ALC (Automatic Level Control) Function)

Binning Function

> **Related Setting Items:** ImageFormatControl

The Binning function allows you to combine the signal values of clusters of adjacent pixels to create improved virtual pixels. Using the function results in images with a lower pixel resolution and higher sensitivity in summing mode or reduced noise in averaging mode.

This camera model supports the following binning modes:

FD2x2BinningMode

Performs Horizontal x2 and Vertical x2 analog binning (Sum)

> **Notes:**
> - Monochrome models only.
> - Refer to Functions That Cannot Be Used Together for usage restrictions.

Horizontal/Vertical Binning

Performs Horizontal x2 and/or Vertical x2 digital binning (Sum or Average)

> **Notes:**
> - Monochrome models only.
> - Refer to Functions That Cannot Be Used Together for usage restrictions.

Image Scaling Mode (Xscale)

Related Setting Items: ImageFormatControl

JAI's Xscale algorithm digitally reduces the sensor image by specifying the vertical and horizontal scaling ratio. This function can also be used for color models and allows finer adjustment of resolution than the conventional Binning Function.

The output image types are Average or Sum.

Notes:

- When using this function with the ROI Function (Single ROI), first, set the Width, Height, OffsetX, and OffsetY settings, and then configure the Image Scaling Mode settings.
- Refer to Functions That Cannot Be Used Together for usage restrictions.

How To Configure

1. If necessary, configure the ROI Function (Single ROI) settings.
2. Set ImageScalingMode (ImageFormatControl) to **On**.
3. Use **ImageScalingSumMode** to specify the output image mode. The options are "**Average** (Off)" or "**Sum** (On)." Depending on the mode, the output image's brightness will be different.

   Average Mode: The average brightness of the sensor image is equal to the average brightness of the reduced output image.

   Sum Mode: The sum of the brightness of all pixels in the sensor image and the sum of the brightness of all pixels in the reduced output image is equal, thus increasing the brightness of the output image.

4. Use **ImageScalingHorizontal** and **ImageScalingVertical** to specify the horizontal and vertical scaling ratio. For more information on how to specify the scaling ratio, see Specifying the Scaling Ratio.

Specifying the Scaling Ratio

Specify the scaling ratio in decimal point (maximum six decimal places) for ImageScalingHorizontal and ImageScalingVertical. The setting range is 0.0625 to 1. If "1" is specified, the image will not be scaled.

Example 1

If you want to output an image with 50% scaling both horizontally and vertically, set ImageScalingHorizontal and ImageScalingVertical to "0.5". (This is equivalent to the traditional 2 x 2 binning.)

Example 2

If you are using a GOX-20405C-CXP with SensorWidth/SensorHeight of 4512, and you want to scale the output image to 3000 x 3000, set ImageScalingHorizontal and ImageScalingVertical to"0.6649" (3000 ÷ 4512 = 0.6649).

Example 3

When you are replacing your camera with a new one but the new camera has a different pixel size and resolution, you can reproduce the current camera's pixel size and output image size on the replacement camera, using the ROI Function (Single ROI) and ImageScalingMode functions.

This example shows how to configure the ROI and ImageScalingMode settings when replacing the GOX-2402C camera with the GOX-5105C camera.

	Pixel Size	Full Resolution (Width x Height)
Current Camera: GOX-2402C	3.45 µm x 3.45 µm	1920 x 1200
New Camera: GOX-5105C	2.74 µm x 2.74 µm	2472 x 2064

1. First, find the scaling ratio for the ROI. To make the virtual pixel size of the new camera (GOX-5105C) the same size as the current camera (GOX-2402C), the scaling ratio is "0.79" (2.74 ÷ 3.45 = 0.79).
2. Next, configure the ROI settings for the new camera (GOX-5105C). Set the new camera's **Width** and **Height** (ImageFormatControl) as follows:
    a. Width: 1920 ÷ 0.79 = 2430. However, since the ROI Width Step is 8, set Width to "2432".
    b. Height: 1200 ÷ 0.79= 1519. However, since the ROI Height Step is 2, set Height to "1520".
3. Turn the new camera's **ImageScalingMode On**.
4. Set **ImageScalingHorizontal** and **ImageScalingVertical** to "0.789474" (1920 ÷ 2432 = 0.789474 and 1200 ÷ 1520 = 0.789474).
5. Now the new camera's virtual pixel size is 3.45 µm x 3.45 µm, and the output image size is 1920 x 1200.

Decimation Mode

Related Setting Items: ImageFormatControl

Decimation mode performs 2X downsampling of the image horizontally, vertically, or both. This reduces the file size for processing or storage while maintaining the full field of view of the image. Please set DecimationHorizontal, DecimationVertical in ImageFormatControl.

Notes:

- Refer to Functions That Cannot Be Used Together for usage restrictions.
- When using Decimation Mode, the ROI Function (Single ROI) function can be configurable but may not operate as expected.

Gradation Compression Mode

> **Related Setting Items:** ImageFormatControl

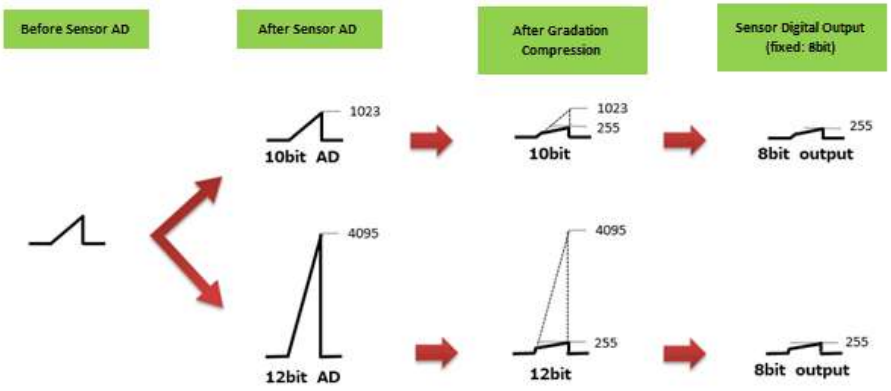
This function compresses the bit depth of captured images to enable images containing a wide range of pixel values to be output as a narrower set of intensity gradations.

> **Notes:**
> - This function cannot be used when SensorDigitizationBits is set to 8Bits.
> - When GradationCompressionMode is turned On, the Pixel Format is forced to be controlled as follows:
>
> Mono models: Mono8
> Color models - Bayer format: BayerRG8 (When ReverseX/Y is On, the flipped Bayer format is used).
> Color models - RGB format: RGB8

In Gradation Compression Mode, the sensor first converts the analog signal into 10bits or 12bits digital signal (= A/D conversion), and then the A/D-converted signal exceeding the compression knee point (s) is compressed and the entire image is output as 8bits data. (Whether A/D conversion is performed at 10 or 12 bits is based on the SensorDigitizationBits setting.)

The apparent sensitivity of the uncompressed area below the knee point is x4 at 10bits and x16 at 12bits.

The maximum value of each dynamic range is 400% at 10bits and 1600% at 12bits, comparing to the 8bits output.



How to Configure

1. Set **GradationCompressionMode** to **On** to enable the function.
2. Select a value for **GradationCompression1stKneePoint** to indicate where to start applying compression on the intensity values coming from the sensor. The knee point is specified as a percentage of the maximum digital value of the 8-bit compressed output (255).

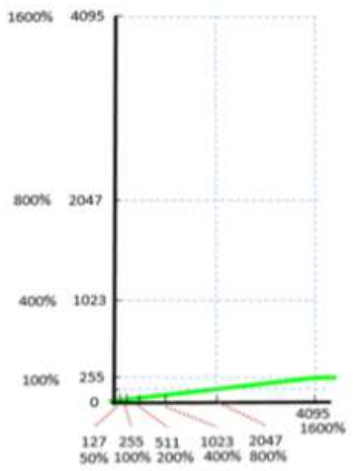
   > **Caution:** Selectable % values are 0, 6.25, 12.5, 25, 50, 100, 200, 400, and 800. However, if the first knee point is set at 100 or higher, there is no room for compression to occur. Therefore, first knee point should always be set to 50 or lower. See Examples.

3. Select a value for **GradationCompression1stGain** in order to set the slope angle at the first knee point. Available values range from 0 dB (no compression) to -66 dB.
4. Use **GradationCompression2ndKneePoint** and **GradationCompression2ndGain** to define an additional compression segment.

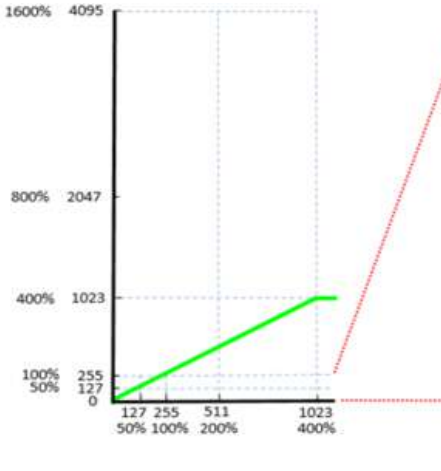
Examples

The following examples show how Gradation Compression knee points and gain can be calculated and applied.

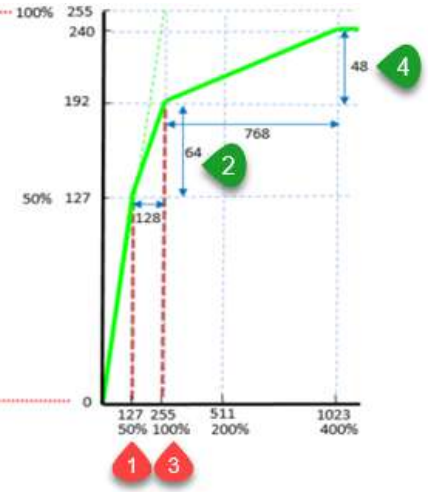
SensorDigitizationBits = 10Bits



GradationCompressioMode = Off

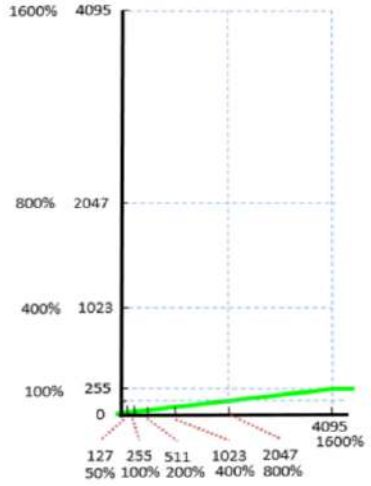


GradationCompressioMode = On
GradationCompression1stGain = 0dB
GradationCompression2ndGain = 0dB

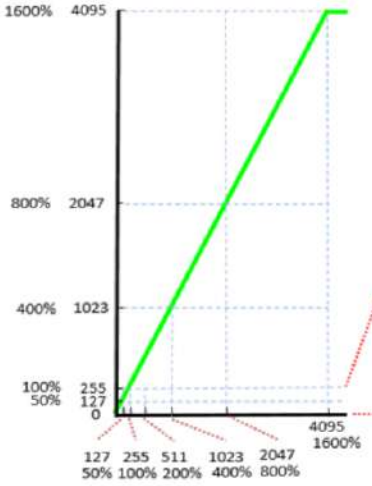


GradationCompressioMode = On
1 GradationCompression1stKneePoint = 50%
2 GradationCompression1stGain = - 6dB
(64/128 = 1/2 = -6dB)
3 GradationCompression2ndKneePoint = 100%
4 GradationCompression2ndGain = - 24dB
(48/768 = 1/16 = -24dB)

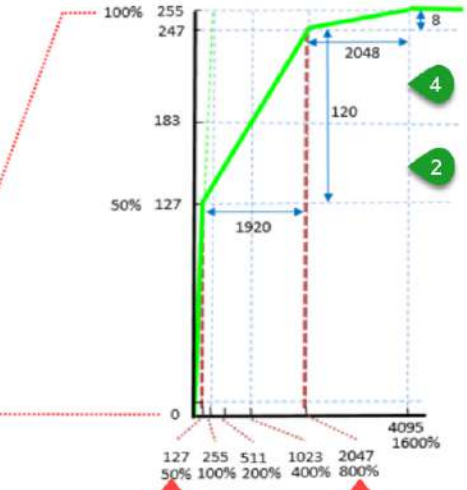
SensorDigitizationBits = 12Bits



GradationCompressionMode = On



GradationCompressionMode = On
GradationCompression1stGain = 0dB
GradationCompression2ndGain = 0dB



GradationCompressionMode = On
1 GradationCompression1stKneePoint = 50%
2 GradationCompression1stGain = - 24dB
(120/190 = 1/16 = -24dB)
3 GradationCompression2ndKneePoint = 800%
4 GradationCompression2ndGain = - 48dB
(8/2048 = 1/256 = -48dB)

Cautions:

- When VideoProcessBypassMode is set to **Off**, JAI cannot guarantee the configured knee point value because the GradationCompression1st(2nd)KneePoint value will not match the output signal's knee point level due to the effect of the digital gain value, which is performed during post-processing. In order to avoid this, set VideoProcessBypassMode = **On**.
- When VideoProcessBypassMode is set to **Off**, JAI cannot guarantee the white balance function's performance because the white balance function uses the digital gain during post-processing, and the output signal's knee point level between the RBG channels will not match. In order to avoid this, set VideoProcessBypassMode = **On**, and control the white balance on the Host side.

Overlay Mode

Related Setting Items: ImageFormatControl

Note: This function cannot be used with the Sequencer Function.

OverlayMode = MultiRoiAreaMode

In this mode, you can check the readout area when using the ROI Function (Multi ROI). The area that is not readout is displayed with the brightness reduced to half. This makes it possible to set and adjust the readout area while checking the target area on the screen.

Notes:

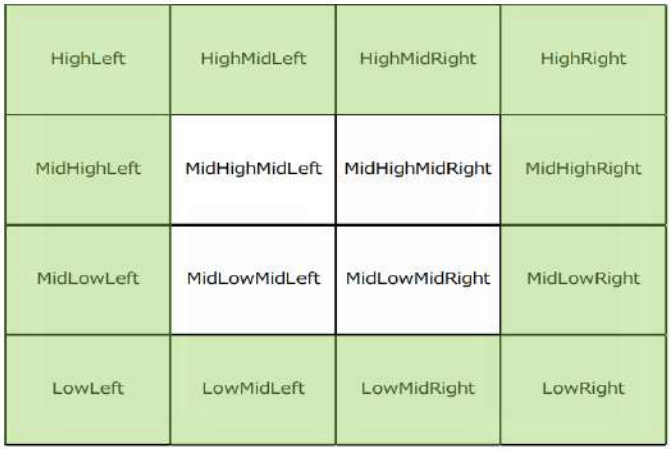
- To set Overlay Mode to **MultRoiAreaMode**, MultiRoiMode (MultiROIControl) must be set to **Off** in advance.
- In the following scenario, OverlayMode = MultiRoiMode will be disabled (you can still set to ALCAreaMode or AWBAreaMode): DecimationVertical/DecimationHorizontal = 2, ImageScalingMode = On, BinningHorizontal = 2, BinningVertical = 2, FD2x2BinningMode = On

OverlayMode = AWBAreaMode or ALCAreaMode

When Overlay Mode is set to **AWBAreaMode** or **ALCAreaMode**, you can check the photometry areas of WhiteBalance and ALC. In the non-target area as shown below, the brightness is reduced to half.

MultiRoiAreaMode

AWBAreaMode or ALCAreaMode



ROI Function (Single ROI)

Related Setting Items: ImageFormatControl

The ROI (region of interest) function allows you to output images by specifying the areas to scan. Specify the area to scan by specifying width, height, and horizontal/vertical offset values under ImageFormatControl.

You can increase the frame rate by specifying a lower height, as the number of lines scanned decreases. The setting ranges for the ROI function's readable area based on the Binning setting (BinningHorizontal, BinningVertical, FD2x2BinningMode) are as follows.

Notes:

- The Binning Function (Horizontal/Vertical Binning and FD2x2BinningMode) can only be used for monochrome camera models.
- When using this function with Image Scaling Mode (Xscale), first, set the Width, Height, OffsetX, and OffsetY settings, and then configure the Image Scaling Mode settings.
- When using Decimation Mode, the ROI Function (Single ROI) function can be configurable but may not operate as expected.
- Refer to Functions That Cannot Be Used Together for usage restrictions.

Width/OffsetX (Pixels)

<table>
<tr><th>Width
OffsetX</th><th>Binning Mode</th><th>Binning OFF</th><th>Binning ON</th><th>*A,B = WidthMax</th></tr>
<tr><td rowspan="2">Width (pixels)</td><td>Horizontal Binning</td><td rowspan="2">96 to [(*A) - OffsetX], step 8</td><td rowspan="2">48 to [(*B) - OffsetX], step 4</td><td rowspan="7"><table>
<tr><th></th><th>A</th><th>B</th></tr>
<tr><td>GOX-5105MC-CXP</td><td>2472</td><td>1236</td></tr>
<tr><td>GOX-8105MC-CXP</td><td>2856</td><td>1428</td></tr>
<tr><td>GOX-12405MC-CXP</td><td>4128</td><td>2064</td></tr>
<tr><td>GOX-16205MC-CXP</td><td>5328</td><td>2664</td></tr>
<tr><td>GOX-20405MC-CXP</td><td>4512</td><td>2256</td></tr>
<tr><td>GOX-24505MC-CXP</td><td>5328</td><td>2664</td></tr>
</table></td></tr>
<tr><td>FD2x2BinningMode</td></tr>
<tr><td rowspan="2">Offset X (pixels)</td><td>Horizontal Binning</td><td rowspan="2">0 to [(*A) - Width], step 8</td><td rowspan="2">0 to [(*B) - Width], step 4</td></tr>
<tr><td>FD2x2BinningMode</td></tr>
</table>

Height/OffsetY (Lines)

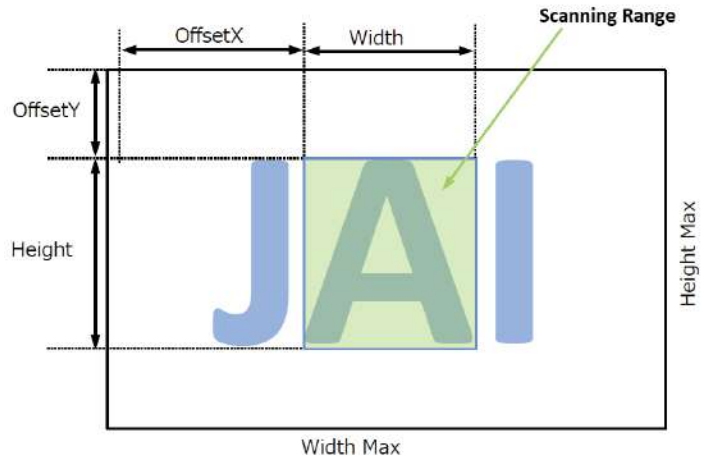
Height OffsetY	Binning Mode	Binning OFF	Binning ON	*C, D = HeightMax
Height (lines)	Vertical Binning	8 to [(*C) - OffsetY], step 2	4 to [(*D) - OffsetY], step 1	
	FD2x2BinningMode			
OffsetY (lines)	Vertical Binning	0 to [(*C) - Height], step 2	0 to [(*D) - Height], step 1	
	FD2x2BinningMode			

	C	D
GOX-5105MC-CXP	2064	1032
GOX-8105MC-CXP	2848	1424
GOX-12405MC-CXP	3008	1504
GOX-16205MC-CXP	3040	1520
GOX-20405MC-CXP	4512	2256
GOX-24505MC-CXP	4608	2304

Single ROI - Example

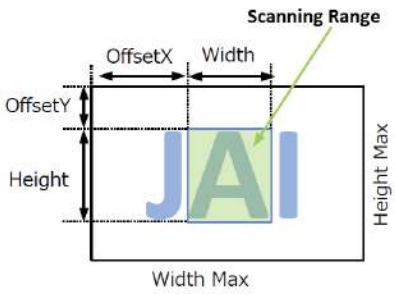
Binning Off

[BinningHorizontal]: 1, [BinningVertical] : 1



Binning On

[BinningHorizontal]: 2, [BinningVertical] : 2



ROI Function (Multi ROI)

> **Related Setting Items:** MultiROIControl

In the Multi ROI mode, you can specify up to 64 scanning areas for a single-frame image. The areas cannot overlap.

> **Notes:**
> - Refer to Functions That Cannot Be Used Together for usage restrictions.
> - If this function is turned on while Shading Correction is set to On, Shading Correction will be forced to Off.

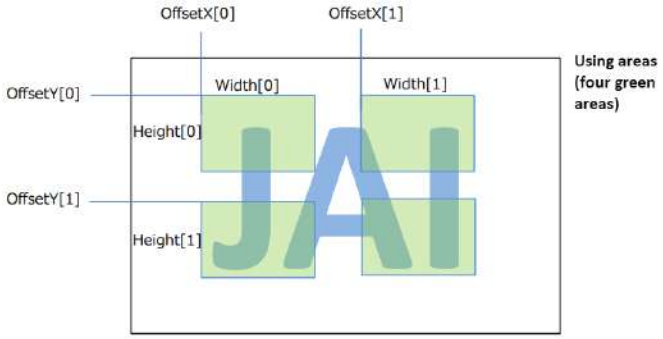
Set MultiROIControl->MultiRoiMode **On**. Select from the eight indexes in MultiRoiIndex then set **MultiRoiWidth**, **MultiRoiHeight, MultiRoiOffsetX**, and **MultiRoiOffsetY**.

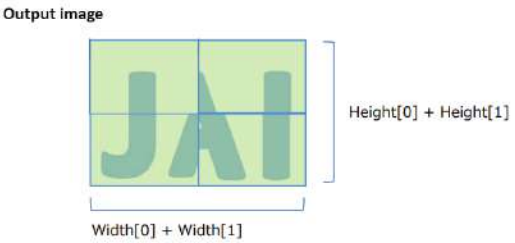
And set the maximum index number to be enabled to **MultiRoiVerticalEnableNumber** and **MultiRoiHorizontalEnableNumber**.

Example

To use four areas as shown below, refer to the following.

1. Set MultiROIControl->MultiRoiMode **On**.
2. Select “0” in MultiRoiIndex. Set MultiRoiWidth, MultiRoiHeight, MultiRoiOffsetX and MultiRoiOffsetY.
3. Select “1” in MultiRoiIndex. Set MultiRoiWidth, MultiRoiHeight, MultiRoiOffsetX and MultiRoiOffsetY.
4. Set 2 to MultiRoiVerticalEnableNumber.
5. Set 2 to MultiRoiHorizontalEnableNumber.





Color Space Conversion (ColorTransformationControl)

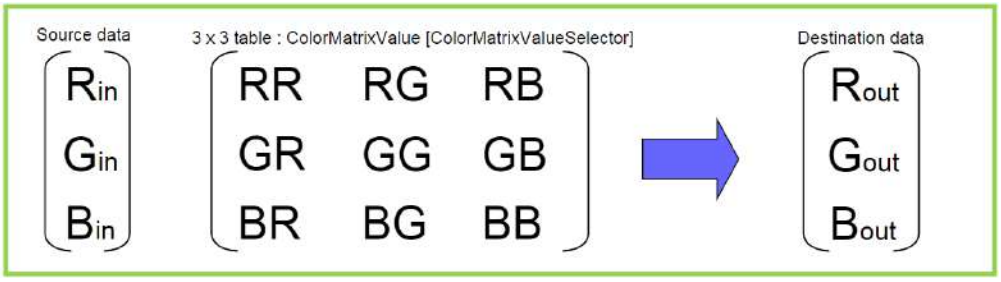
Related Setting Items: ColorTransformationControl

This camera allows you to convert the standard color space (RGB) that is used to produce colors into other color spaces, including XYZ and HSI. Five color spaces are available: RGB(sRGB), RGB (AdobeRGB), RGB(UserCustom), XYZ, and HSI. Specify the desired color space by configuring ColorTransformationMode and ColorTransformationRGBMode as follows.

ColorTransformation	ColorTransformationMode	ColorTransformationRGBMode
RGB (sRGB)	RGB	sRGB
RGB (AdobeRGB)	RGB	AdobeRGB
RGB (UserCustom)	RGB	UserCustom
XYZ	XYZ	Off
HSI	HSI	Off
Default	RGB	Off

Note on RGB (UserCustom)

This allows you to use user-configured 3x3 conversion tables to perform color space conversion.



Caution: If you set the color space to XYZ or HSI, JAI Control Tool will not display the images captured by the camera properly. To display them properly, XYZ- or HSI-compatible image processing must be performed on the computer side.

Configuration 3x3 table

1. Select the item you want to configure in ColorMatrixValueSelector.
2. Configure the value in ColorMatrixValue.
3. ColorMatrixValue can be set to a value from -2 to +2.

See ColorTransformationControl for detailed information on the setting items.

Notes:
About Color Space HSI

Hue Value : 0° to 360° can be specified for 8bit, 10bit and 12bit output as follows.

8bit output: Can be specified in 2° increments - 0°(00000000) ～ 360°(10110100)

10bit output: Can be specified in 0.5°increments- 0°(0000000000) ～ 360°(1011010000)

12bit output: Can be specified in 0.5°increments- 0°(000000000000) ～ 360°(101101000000)

Saturation value, Intensity value: 0～100% can be specified for 8bit, 10bit and 12bit output as follows.

8bit output: 0%(00000000) ～ 100%(11111111)

10bit output: 0%(00000000) ～ 100%(1111111111)

12bit output: 0%(00000000) ～ 100%(111111111111)

Edge Enhancer, Color Enhancer

Related Setting Items: ImagingControl

This camera is equipped with an Edge Enhancer function for enhancing the contrast of lines or edges within images and a Color Enhancer function for enhancing specified colors.

Edge Enhancer Function

The Edge Enhancer function is enabled when EdgeEnhancerEnable is set to On. Four enhancement levels are available: Low, Middle, High, and Strong.

Color Enhancer Function

The Color Enhancer function is enabled when ColorEnhancerEnable is set to On. Set a value from 0 to 1.0 (0.1 steps) for ColorEnhancerValue to configure the enhancement level: 0 = no enhancement, 1.0 = approx. x2 the color level of the original data.

Six colors can be specified in ColorEnhancerSelector: Red, Cyan, Green, Magenta, Blue, and Yellow.

Sequencer Function

> **Related Setting Items:** SequencerControl

The Sequencer function lets you define up to 32 index combinations of exposure time, gain, ROI, and other settings which can be stepped through each time a trigger is received. This is particularly useful for quickly capturing multiple exposures of objects under inspection to adjust for areas or components with significantly different levels of reflectance. You can specify the next index in the stepping sequence and the order in which indexes are executed. Multiple indexes can also be executed repeatedly.

Two operation modes (TriggerSequencer mode and CommandSequencer mode) are available for the Sequencer function.

> **Notes:**
> - Refer to Functions That Cannot Be Used Together for usage restrictions.
> - Up to 32 indexes can be configured. For details on the items that can be set for each index, see SequencerControl.

> **Cautions:**
> - If the values of ImageFormatControl's Width and Height are smaller than SequencerControl's SequencerWidth and SequencerHeight, the image may not be output correctly.
> - When using SequencerWidth / SequencerHeght, set the Width and Height to the default values in advance.

TriggerSequencer Mode

With this mode, the Sequencer Trigger “pattern” is predetermined by the user. The user defines up to 32 different “indexes.” Different camera settings can be configured for each index. The operation of this mode is controlled using the following five commands.

> **Caution:** In TriggerSequencer mode, the TriggerOverlap function of the FrameStart trigger is disabled and the operation is always Off.

SequencerSetActive: This allows you to confirm the index number displayed on the next trigger reception.

SequencerSetStart: This configures the index number to execute at the start of TriggerSequencer mode.

SequencerFrameCount: This configures the number of frame acquisitions for the selected SequencerIndex.

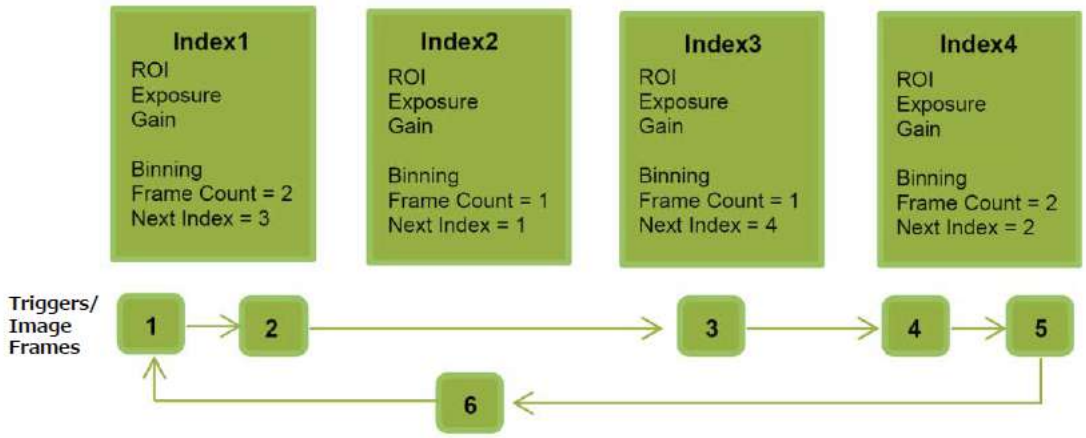
SequencerReset: During TriggerSequencer mode operation, this switches the index number to be executed to that specified in SequencerSetStart.

SequencerRepetition: This parameter applies to TriggerSequencer patterns which include an index whose SequencerROINextIndex is set to 0 (OFF).

When the index whose SequencerROINextIndex is set to 0 (OFF) is finished executing, the value of Sequencer Repetition (range = 1～255) is decremented internally. If the result of the decrement is not zero, the TriggerSequencer pattern starts over from the index specified in SequencerSetStart. If the result of the decrement is zero, the status changes to Acquisition Stop and external triggers are not accepted.

Sample TriggerSequencer Mode Operation

User-Defined Indexes (Up to 32)



1. Specify "1" in SequencerSetStart, and start TriggerSequencer mode with index 1.
2. Based on the SequencerFrameCount setting (= 2), capture a 2-frame image with the first and second triggers.
3. For the next index, configure index 3 specified in SequencerSetNext, and capture an image with the number of frames (the number of triggers) specified in SequencerFrameCount (=1).
4. Proceed to sequence from index 4 to index 2 to index 1.

> **Note:** In addition to repeating multiple conditions as in the above example, you can specify "0" (which indicates the end of TriggerSequencer mode) in SequencerSetNext of index 2, and specify the number of repetitions in SequencerRepetition.

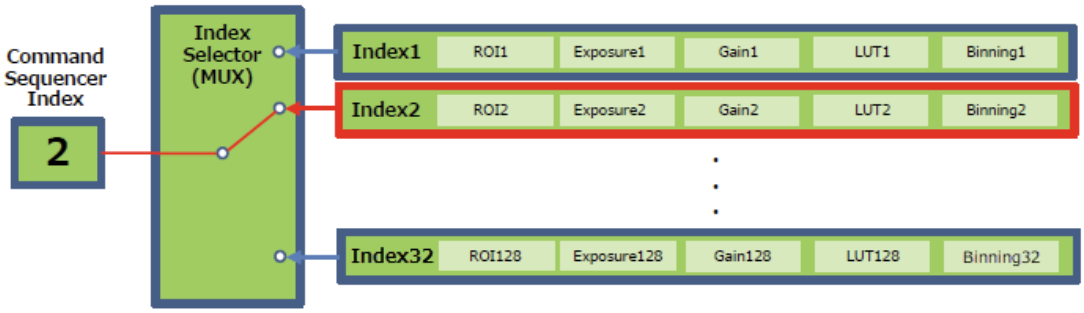
CommandSequencer Mode

As with TriggerSequencer mode, you can define up to 32 indexes beforehand in this mode. Set SequencerCommandIndex to point to one of your preconfigured indexes. This index will be executed on each trigger, until it is changed to point to a different index, typically by your vision application.

In this way, Command Sequencer mode allows you to programmatically adjust your sequence in response to image analysis or input from other sensors.

Notes:

- The same index table will be executed for subsequent triggers unless the CommandSequencerIndex value is changed.
- SequencerFrameCount, SequencerSetNext and SequencerRepetition cannot be used in CommandSequencer mode.



Non-Volatile Flash Memory

Technical Notes Storing Data in On-Camera Flash Memory

The camera has non-volatile memory for users to store data. Refer to the technical note “Storing Data in On-Camera Flash Memory” for more information.

Note: JAI strongly recommends saving images to the PC or other storage location because the non-volatile flash memory may not have enough memory size to store large data.

Pulse Generator

Related Setting Items: PulseGenerator

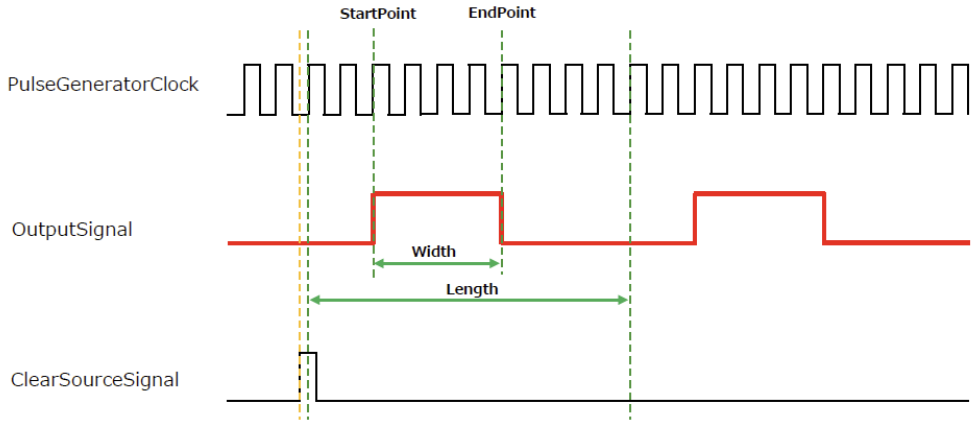
Technical Notes Tips for using the Pulse Generator

By using this function, any signal can be generated inside the camera.

The following is an example of signal generation.

Settings

PulseGeneratorStartPoint = 2
PulseGeneratorEndPoint = 6
PulseGeneratorLength = 10
PulseGeneratorPulseWidth = 4
PulseGeneratorClearSyncMode = AsyncMode



The table below shows the PulseGeneratorClearSource signals that can be set.

	Off	AcquisitionActive	FrameActive	ExposureActive	FVAL	LVAL	PulseGenerator0	PulseGenerator1	PulseGenerator2	PulseGenerator3	UserOutput0	UserOutput1	UserOutput2	UserOutput3	Line5 Opt In1	Line7 Cxp In	NAND0 Out	NAND1 Out	Low	High	AcquisitionTriggerWait	FrameTriggerWait
PulseGenerator0		✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
PulseGenerator1		✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
PulseGenerator2		✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
PulseGenerator3		✓	✓	✓	✓	✓		✓	✓		✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓

Counter and Timer Control Function

Related Setting Items: CounterAndTimerControl

Note: This camera supports only the counter function.

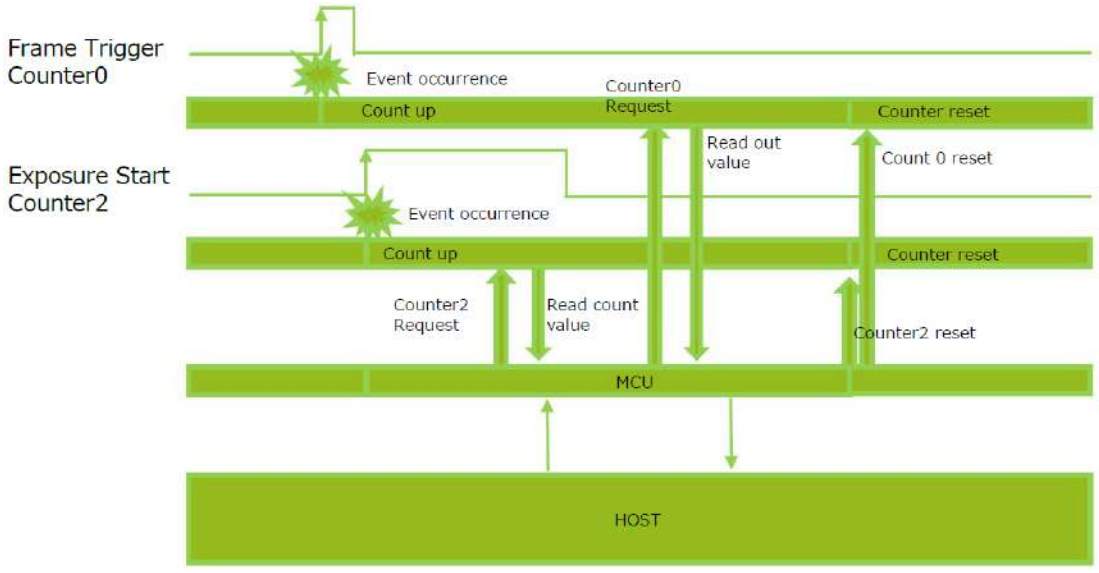
The counter function counts up change points in the camera's internal signals using the camera's internal counter and reads that information from the host side. This function is useful for verifying error conditions via the count value using internal camera operations.

Four counters are available on the camera; Counter0, Counter1, Counter2, and Counter3. The functions that can be counted are fixed for each counter.

- Counter0: Counts the number of FrameTrigger.
- Counter1: Counts the number of ExposureStart.
- Counter2: Counts the number of SensorReadOut.
- Counter3: Counts the number of FrameTransferEnd.

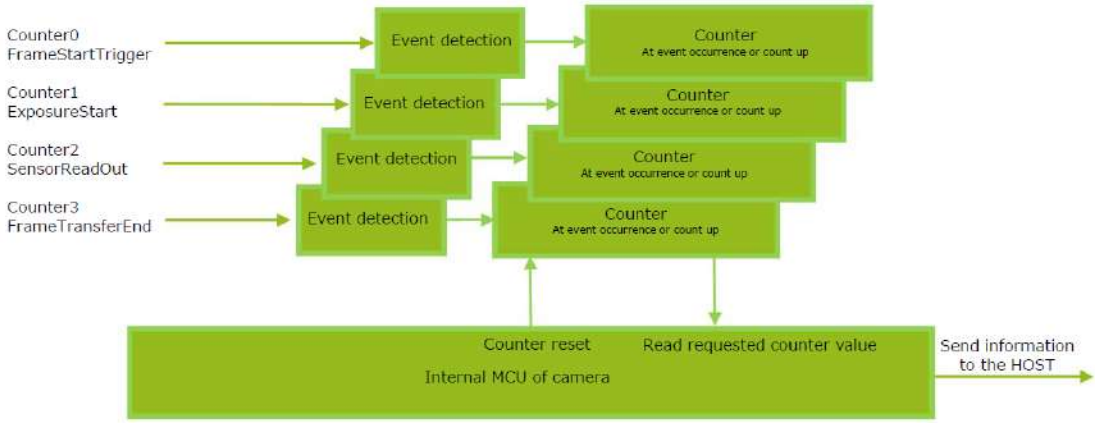
When a problem occurs in a system that includes this camera, comparing the values from multiple counters allows you to verify the extent of normal operability and can be useful when investigating the cause of the problem.

Counter Occurrence Diagram



> **Note:** You can reset a specific counter's count value by executing CounterReset[Counter0, Counter1, Counter2, Counter3].

Internal Camera Blocks



To Use the Counter Function

Configure the settings as follows.

Four counters are available. Specify a counter (Counter0 to Counter3), and configure the settings.

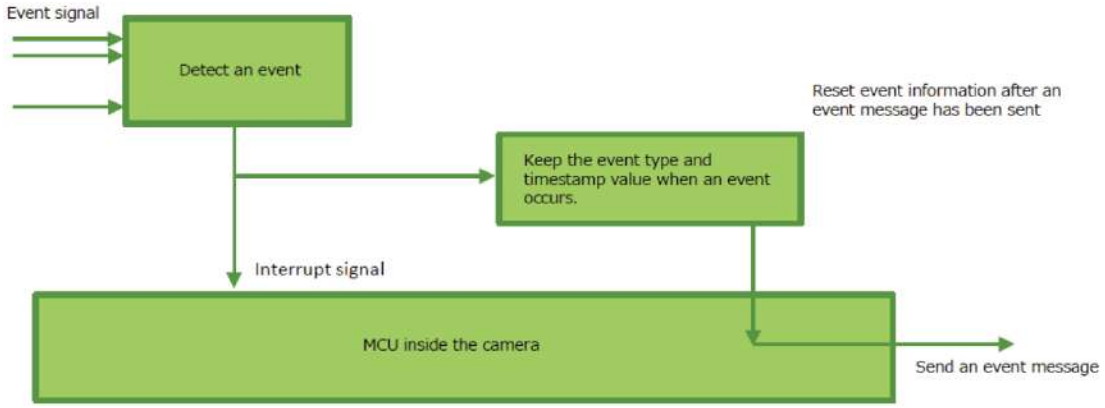
Item	Setting Value Selectable Range	Description
Counter 0 ～ 3	Counter 0 ～ 3	Select the counter.
CounterEventSource	Counter0: Off, Frame Trigger Counter1: Off, ExposureStart Counter2: Off, SensorReadOut Counter3: Off, FrameTransferEnd	Select the Counter Event signal for which to read the count value. When set to Off, the counter operation will stop (but will not be reset).
CounterEventActivation	When the Counter function is enabled: Counter0, Counter1, Counter2 = RisingEdge (Fixed) Counter3 = FallingEdge (Fixed)	Specify timing at which to count.

Event Control Function

Related Setting Items: EventControl

The Event Control function is a function that outputs a signal change point inside the camera as information indicative of an event occurrence (event message).

Flow from Detecting an Event to Sending an Event Message



Events That Can Use the Event Control Function

Events that can use the Event Control function are as follows. You can specify whether or not to send an event message when an event occurs at each event.

- AcquisitionStart
- AcquisitionEnd
- ExposureStart
- ExposureEnd

Cautions:

- This function can only be used with CXP 2.0 or later. The CoaXPress frame grabber board used must support CXP 2.0 and the Event Control function.
- You can check the current CXP version in CxpVersionUsed of TransportLayerControl. If CxpVersionUsed is CXP1.1, you cannot use this function.

Functions That Cannot Be Used Together

The table below shows functions that cannot be used with ImageFormatControl, MultiROIControl and SequencerControl setting items.

> **Note:** For functions that are not in this table, refer to the relevent function topic or setting item topic.

	Width,Height,OffsetX, OffsetY	FD2x2BinningMode	BinningHorizontal/Vertical	ImageScalingMode	DecimationHorizontal/Vertical	ReverseX/Y	GradationCompressionMode	OverlayMode = ALCAreaMode/AWBAreaMod	OverlayMode = MultiROiAreaMode	MultiRoiMode	SequencerMode
Width, Height, OffsetX, OffsetY (SingleROI)				1	⊘						
FD2x2BinningMode			⊘	⊘	⊘				⊘	⊘	⊘
BinningHorizontal/Vertical = 2		⊘		⊘	⊘				⊘	⊘	
ImageScalingMode	1	⊘	⊘		⊘				⊘	⊘	⊘
DecimationHorizontal/Vertical = 2	⊘	⊘	⊘	⊘					⊘	⊘	⊘
ReverseX/Y											⊘
GradationCompressionMode											⊘
OverlayMode = ALCAreaMode/AWBAreaMode											⊘
OverlayMode = MultiRoiAreaMode		⊘	⊘	⊘	⊘					2	⊘
MultiRoiMode		⊘	⊘	⊘	⊘				2		⊘
SequencerMode		⊘		⊘	⊘	⊘	⊘	⊘	⊘	⊘	

Empty	Can be used together
⊘	Cannot be used together
⊘	Configurable, but may not work as expected.
1	When using Image Scaling Mode (Xscale) together with the ROI Function (Single ROI), first, set the Width, Height, OffsetX, and OffsetY settings, and then configure the Image Scaling Mode settings.
2	To set Overlay Mode to **MultRoiAreaMode**, MultiRoiMode (MultiROIControl) must be set to **Off** in advance.

Setting List

This camera complies with GenICam. Each setting item name conforms to GenICam SFNC (Standard Features Naming Convention). (There are some JAI-specific setting items).

Each setting item is an integer type (IInteger), a real type (IFloat), an element enumeration type (IEnumeration), a character string (IString), a logical type (IBoolean), and a category type (ICategory) or a command type (ICommand) for executing the function.

Beginner: For beginner users.

Expert: For users with deep knowledge of camera functions.

Guru: For advanced users who make settings, including advanced features that can cause the camera to malfunction if not set correctly.

Selector

A Selector is used to index which instance of the feature is accessed in situations where multiple instances of a feature exist.

Instance Example:

Each Line-related item (LineSource, LineInverter, etc.) has LineSelector-LineX instances, which can be set or referenced as an index.

Selectors are a feature of element enumeration type (IEnumeration) or an integer type (IInteger). However, unlike normal configuration items, it is only used to select the instance in the following configuration item.

It does not change the behavior of the camera by changing the value of the selector. Also, the selector may have only one selectable value. In this case, use the selector function only for information purposes. In this document, it is described as SelectedFeature[Selector] according to the description method of GenICam.

In the case of Line Selector with a specific I/O line selected, the description could be as follows.

LineSource[LineSelector-LineX] = High

LineInverter[LineSelector-LineX] = False

LineMode[LineSelector-LineX] = Input

LineFormat[LineSelector-LineX] = TTL

Generally, selectors only apply to a single category of features. (Example: TriggerSelector only applies to trigger related functions.)

Feature Properties

> **Note:** Depending on the setting item, you may need to change visibility. Please switch visibility (Beginner / Expert / Guru) as necessary.

DeviceControl

Display/configure information related to the device.

DeviceControl Item	Setting Range	Default Value	Description
DeviceScanType	-	0:Areascan	Display the device scan type.
DeviceVendorName	-	"JAI Corporation"	Display the manufacturer name.
DeviceModelName	-	-	Display the model name.
DeviceManufacturerInfo	-	See the possibilities	Display the manufacturer information.
DeviceVersion	-	-	Display the device version.
DeviceFirmwareVersion	-	-	Display the firmware version.
DeviceFpgaVersion			Display the FPGA version.
DeviceSerialNumber	-	-	Display the device ID.
DeviceUserID	Any	-	Set the user ID (16bytes) for the camera.
DeviceSFNCVersionMajor	-	2	Display the SFNC Major version.
DeviceSFNCVersionMinor	-	5	Display the SFNC Minor version.
DeviceSFNCVersionSubMinor	-	0	Display the SFNC Sub-Minor version.
DeviceManifestEntrySelector	1	1	Display the valid XML file information.
DeviceManifestXML MajorVersion	0 ～9	-	Display XML file's major version number.
DeviceManifestXML MinorVersion	0 ～ 9	-	Display XML file's minor version number.
DeviceManifestXML SubMinorVersion	0 ～ 9	-	Display XML file's sub-minor version number.
DeviceManifestSchema MajorVersion	-	1	Display XML file's sub-major version number.
DeviceManifestSchema MinorVersion	-	1	Display schema file's minor version number.
DeviceManifestPrimaryURL	-	-	Display the PrimaryURL.
DeviceTLType	3:CoaXPress (Fixed)	-	Transport Layer type of the device.
DeviceTLVersionMajor	2 (Fixed)	-	Indicates the major version number of the GenICam XML file of the selected manifest entry

DeviceControl Item	Setting Range	Default Value	Description
DeviceTLVersionMinor	0 (Fixed)	-	Indicates the minor version number of the GenICam XML file of the selected manifest entry
DeviceTLVersionSubMinor	0 (Fixed)	-	Indicates the sub-minor version number of the GenICam XML file of the selected manifest entry
DeviceMaxThroughput	390625000～781250000	-	Takes the following values according to the setting of CxpLinkConfiguration. (Unit : Bytes / sec) Max: CXP6-1: 781250000 (Default); CXP3-1: 390625000
DeviceLinkThroughputLimitMode	0: Off 1: On	0: Off	**0: Off:** Stream packets are sent without gaps. **1: On**: Stream packets will be sent with the gap calculated by the CXP bandwidth value that was specified by DeviceLinkThroughputLimit.
DeviceLinkThroughputLimit	195312500 ～ 390625000	-	The setting range is DeviceMaxThroughput/2 to DeviceMaxThroughput.
DeviceStreamChannelCount	1 (fixed)	-	Indicates the number of streaming channels supported by the device.
DeviceStreamChannelPacketSize	256 ～ 8192	-	Indicates the packet size in bytes. (Read-only)
DeviceReset	-	-	Reset the device. (After the camera receives this command, it returns an ACK response. Then, execute reset.)
DeviceTemperatureSelector	0: Main board 1: Sensor 2: FPGA	0: Main board	Select the area of the camera's interior for which to display the temperature sensor's reading. (fixed 0: Mainboard)
DeviceTemperature	-55 ～ 125	0	Display the internal temperature (°C) of the device specified by DeviceTemperatureSelector.
Timestamp	0 ～ 64bit max	0	Display the timestamp value (ns). Resets to 0 when the signed maximum 64-bit value is exceeded.
TimestampReset	-	-	Forcibly sets the timestamp's count value to 0.
TimestampLatch	-	-	Sets the timestamp's count value to TimestampLatchValue.
TimestampLatchValue	0 ～ 64bit max	0	Maximum value Signed 64-bit max value.
UserDefinedValueSelector	0: Value1 1: Value2 2: Value3 3: Value4 4: Value5	0: Value1	Five 32bit data can be set and saved.
UserDefinedValue	-2147483648 ～ 2147483647	0	Selects one of the 32bit data (Value1 to Value5) set in UserDefinedValueSelector, and reads and sets the value in UserDefinedValue.

TransportLayerControl

Display information on transport layer control.

TransportLayerControl Item	Setting Range	Default Value	Description
PayloadSize	32 ～ 268369920	44728320	Display the payload size.
DeviceTapGeometry	-	0: Geometry_1X_1Y (fixed)	The method of transferring images from the device at one time (TAP configuration).
CoaXPress			
CxpLinkConfigurationPreferred	-	-	Displays the link structure that allows the camera to operate in default mode. This camera supports the following link configuration: CXP6_X1 and CXP3_X1.
CxpLinkConfiguration	-	-	Set the CoaXPress Link Configration. This camera supports the following link configuration: CXP6_X1 and CXP3_X1.
JAICxpLinkConfigurationPreferred	0x00010038: CXP3_X1 0x00010048: CXP6_X1	0x00010048: CXP6_X1	Custom command to change and save the CxpLinkConfigurationPreferred configuration value.
CxpConnectionSelector	-	-	Select the CoaXPress physical connection you want to control.
CxpConnectionTestMode	0:Off (fixed)	-	Enables test mode.
CxpConnectionTestErrorCount	-	-	Reports the current connection error count for the test packet.
CxpConnectionTestPacketCount	-	-	Reports the current count of test packets.
CxpVersionUsed	2: CXP1.1 3: CXP2.0	2: CXP1.1	Display the current CXP version.

ImageFormatControl

Configure image format settings.

> **Note:** Refer to Functions That Cannot Be Used Together for usage restrictions.

Image Format Control Item	Setting Range	Default Value	Description
SensorWidth	Display the maximum image width. GOX-5105MC-CXP: 2472 GOX-8105MC-CXP: 2856 GOX-12405MC-CXP: 4128 GOX-16205MC-CXP: 5328 GOX-20405MC-CXP: 4512 GOX-24505MC-CXP: 5328		
SensorHeight	Display the maximum image height. GOX-5105MC-CXP: 2064 GOX-8105MC-CXP: 2848 GOX-12405MC-CXP: 3008 GOX-16205MC-CXP: 3040 GOX-20405MC-CXP: 4512 GOX-24505MC-CXP: 4608		
WidthMax	Display the maximum image width. GOX-5105MC-CXP:2472 (1236) GOX-8105MC-CXP: 2856 (1428) GOX-12405MC-CXP: 4128 (2064) GOX-16205MC-CXP: 5328 (2664) GOX-20405MC-CXP: 4512 (2256) GOX-24505MC-CXP: 5328 (2664) **Note:** For monochrome models, when BinningHorizontal = 2 or FD2x2BinningMode = On, the value in parentheses is applicable.		
HeightMax	Display the maximum image height. GOX-5105MC-CXP: 2064 (1032) GOX-8105MC-CXP: 2848 (1424) GOX-12405MC-CXP: 3008 (1504) GOX-16205MC-CXP: 3040 (1520) GOX-20405MC-CXP: 4512 (2256) GOX-24505MC-CXP: 4608 (2304) **Note:** For monochrome models, when BinningVertical = 2 or FD2x2BinningMode = On, the value in parentheses is applicable.		

Image Format Control Item	Setting Range	Default Value	Description
Width **Related Topic:** ROI Function (Single ROI)	-	WidthMax value	Set the image width. **Note:** This setting is available only when ImageScalingMode=Off. Setting Range: 96 (48)*～ [WidthMax - OffsetX] , Step 8(4)* *For monochrome models, when BinningHorizontal = 2 or FD2x2BinningMode = On, the value in parentheses is applicable.
Height **Related Topic:** ROI Function (Single ROI)	-	HeightMax value	Set the image height. **Note:** This setting is available only when ImageScalingMode=Off. Setting Range: 8 (4)*～[HeightMax - OffsetY], Step 2(1)* *For monochrome models, when BinningVertical = 2 or FD2x2BinningMode = On, the value in parentheses is applicable.
OffsetX **Related Topic:** ROI Function (Single ROI)	-	0	Set the horizontal offset. **Note:** This setting is available only when ImageScalingMode=Off. Setting Range: 0～[WidthtMax - Width], Step 8(4)* *For monochrome models, when BinningHorizontal = 2 or FD2x2BinningMode = On, the value in parentheses is applicable.
OffsetY **Related Topic:** ROI Function (Single ROI)	-	0	Set the vertical offset. **Note:** This setting is available only when ImageScalingMode=Off. Setting Range: 0～[Height - Height], Step 2(1)* *For monochrome models, when BinningVertical = 2 or FD2x2BinningMode = On, the value in parentheses is applicable.
FD2x2BinningMode **Related Topic:** Binning Function	0:Off 1:On	0:Off	Performs 2x2 analog binning (Sum processing). Monochrome models only.
BinningHorizontalMode **Related Topic:** Binning Function	0:Sum 1:Average	0:Sum	Set the processing method for horizontal binning. Monochrome models only.
BinningHorizontal	1～ 2	1	Set the number of pixels in the horizontal direction for which to perform binning. Monochrome models only.

Image Format Control Item	Setting Range	Default Value	Description
BinningVerticalMode **Related Topic:** Binning Function	0:Sum 1:Average	0:Sum	Set the processing method for vertical binning. Monochrome models only.
BinningVertical	1～2	1	Set the number of pixels in the vertical direction for which to perform binning. Monochrome models only.
ImageScalingMode **Related Topic:** Image Scaling Mode (Xscale)	0:Off 1:On	0:Off	Enables Image Scaling Mode.
ImageScalingSumMode	0:Off (Ave) 1:On (Sum)	0:Off (Ave)	Selects whether to use Sum or Average mode when ImageScalingMode is On.
ImageScalingHorizontal	0.0625～ 1	1	Specifies the horizontal scaling ratio in decimal units. For example, if you want to scale the image by 50% in the horizontal direction, specify "0.5".
ImageScalingHorizontalAbs	256～4096	-	Indicates the horizontal scaling ratio as an integer value (rounded down to the nearest whole number). The formula is: ImageScalingHorizontal X 4096.
ImageScalingVertical	0.0625～ 1	1	Specifies the vertical scaling ratio in decimal units. For example, if you want to scale the image by 50% in the vertical direction, specify "0.5".
ImageScalingVerticalAbs	256～ 4096	-	Indicates the vertical scaling ratio as an integer value (rounded down to the nearest whole number). The formula is: ImageScalingVertical X 4096.
ImageScalingBaseAbs	-	4096 (Fixed)	
DecimationHorizontalMode	-	0: Discard (Fixed)	Set Decimation Horizontal mode.
DecimationHorizontal **Related Topic:** Decimation Mode	-	1: None	If set to 2, Pixels(50%) are thinned out horizontally. 1: None 2: Pixels are thinned out horizontally
DecimationVerticalMode	-	0: Discard (Fixed)	Set Decimation Vertical mode.
DecimationVertical **Related Topic:** Decimation Mode	-	1: None	If set to 2, Pixels(50%) are thinned out vertically. 1: None 2: Pixels are thinned out vertically.

Image Format Control Item	Setting Range	Default Value	Description
ReverseX **Related Topic:** Image Flip Function	0～1	0	Reverse pixels horizontally.
ReverseY **Related Topic:** Image Flip Function	0～1	0	Reverse pixels vertically.
SensorDigitizationBits **Related Topic:** SensorDigitizationBits	8: 8 Bits 10: 10 Bits 12: 12 Bits	10: 10 Bits	Select the sensor output bits.
PixelFormat **Related Topic:** Pixel Format	-	BayerRG8 Mono8	Set the pixel format. **Color models** 0x01080009: BayerRG8 (Default) 0x0110000D: BayerRG10 0x01100011: BayerRG12 0x01080008: BayerGR8* 0x0110000C: BayerGR10* 0x01100010: BayerGR12* 0x0108000A: BayerGB8* 0x0110000E: BayerGB10* 0x01100012: BayerGB12* 0x0108000B: BayerBG8* 0x0110000F: BayerBG10* 0x01100013: BayerBG12* 0x02180014: RGB8 0x02300018: RGB10 0x0230001A: RGB12 **Note:** *When using the Image Flip Function **Monochrome models** 0x01080001: Mono8 (Default) 0x01100003: Mono10 0x01100005: Mono12

Image Format Control Item	Setting Range	Default Value	Description
GradationCompression Mode **Related Topic:** Gradation Compression Mode	0: Off 1: On	0: Off	Enables the sensor's gradation compression function.
GradationCompression 1stKneePoint	-	50	Set the first knee point of the sensor's gradation compression function in percentage. Setting Range (%): 0, 6.25, 12.5, 25, 50, 100, 200, 400, 800 Max Value: GradationCompression2ndKneePoint
GradationCompression1stGain	-	0	Set the first knee compression rate for the sensor's gradation compression function in dB. Setting Range (dB): 0, -6, -12, -18, -24, -30, -36, -42, -48, -54, -60, -66
GradationCompression 2ndKneePoint	-	100	Set the second knee point of the sensor's gradation compression function in percentage. Setting Range (%): 6.25, 12.5, 25, 50, 100, 200, 400, 800 Min Value: GradationCompression1stKneePoint. However, when GradationCompression1stKneePoint is set to 0, Min = 6.25
GradationCompression2ndGain	-	0	Set the second knee compression rate for the sensor's gradation compression function in dB. Setting Range (dB): 0, -6, -12, -18, -24, -30, -36, -42, -48, -54, -60, -66
TestPattern	-	0: Off	Select the test image. 0: Off (Default) 1: GreyHorizontalRamp 4: HorizontalColorBar (Color models only)
OverlayMode **Related Topic:** Overlay Mode	-	0: Off	You can check the target area by reducing the brightness of the non-target area to 50%. 0: Off (Default) 1: MultiRoiAreaMode - Check the active area on MultiROI. 2: ALCAreaMode - Check the photometry area on ALC. 3: AWBAreaMode - Check the photometry area on AWB.

MultiROIControl

Configure settings for Multi ROI.

> **Related Topic:** ROI Function (Multi ROI)

> **Note:** Refer to Functions That Cannot Be Used Together for usage restrictions.

Multi ROI Control Item	Setting Range	Default Value	Description
MultiRoiMode	0:Off 1:On	0	Enable/disable Multi Roi.
MultiRoiIndex	0～7	0	Select the index for the Multi Roi mode.
MultiRoiWidth	-	-	Set the width for the selected Multi Roi index. Setting Range: 96～[WidthMax - MultiRoiOffsetX], Step 8 **Default** GOX-5105MC-CXP: 304 GOX-8105MC-CXP: 352 GOX-12405MC-CXP: 512 GOX-16205MC-CXP: 664 GOX-20405MC-CXP: 560 GOX-24505MC-CXP: 664
MultiRoiHeight	-	-	Set the height for the selected Multi Roi index. Setting Range: 8～[HeightMax - MultiRoiOffsetY], Step 2 **Default** GOX-5105MC-CXP: 258 GOX-8105MC-CXP: 356 GOX-12405MC-CXP: 376 GOX-16205MC-CXP: 380 GOX-20405MC-CXP: 564 GOX-24505MC-CXP: 576
MultiRoiOffsetX	-	-	Set the horizontal offset for the selected Multi Roi index. **Min**: The minimum value of the range where each Index does not overlap. **Max**: The maximum value of the range where each Index does not overlap. **Step**: 8 **Default**: (Index number - 1) x MultiRoiWidth

Multi ROI Control Item	Setting Range	Default Value	Description
MultiRoiOffsetY	-	-	Set the vertical offset for the selected Multi Roi index. **Min**: The minimum value of the range where each Index does not overlap. **Max**: The maximum value of the range where each Index does not overlap. **Step**: 2 **Default**: (Index number - 1) x MultiRoiHeight
MultiRoiHorizontal EnableNumber	1～8	1	Set the maximum number of valid horizontal index numbers.
MultiRoiVertical EnableNumber	1～8	1	Set the maximum number of valid vertical index numbers.

AcquisitionControl

Configure image capture settings.

Acquisition Control Item	Setting Range	Default Value	Description
AcquisitionMode **Related Topic:** Acquisition Control	0:SingleFrame 1:MultiFrame 2:Continuous	2:Continuous	Select the image capture mode.
AcquisitionStart	-	-	Start image capture.
AcquisitionStop	-	-	Stop image capture.
AcquisitionFrameCount	1～65535	1	In MultiFrame mode, set the number of frames to capture.
AcquisitionFrameRate **Related Topic:** Changing the Frame Rate	0.125～	-	Display the frame rate as a frequency (unit: Hz). The maximum value varies depending on the Width, Height, PixelFormat, SensorDigitizationBits, Binning (Horizontal/Vertical), FD2x2BinningMode, ImageScalingMode, Decimation (Horizontal/Vertical), CxpLinkConfiguration(LinkSpeed), StreamPacketSize settings. **Default** GOX-5105MC-CXP: 112 fps GOX-8105MC-CXP: 71 fps GOX-12405MC-CXP: 47 fps GOX-16205MC-CXP: 36 fps GOX-20405MC-CXP: 29 fps GOX-24505MC-CXP: 24 fps **Note:** When set to: CXP6_1, SensorDigitizationBits = 10bit, PixelFormat = 8bit.
TriggerSelector **Related Topic:** Trigger Control	0:AcquisitionStart 1:AcquisitionEnd 2:FrameStart	0:AcquisitionStart	Select the trigger operation.
TriggerMode	0:Off 1:On	0:Off	Select the trigger mode.
TriggerSoftware	-	-	Execute a software trigger.

Acquisition Control Item	Setting Range	Default Value	Description
TriggerSource	-	24: Line5 Opt In	Select the trigger signal source. 7: PulseGenerator0 8: PulseGenerator1 9: PulseGenerator2 10: PulseGenerator3 11: UserOutput0 12: UserOutput1 13: UserOutput2 14: UserOutput3 19: Software 24: Line5 Opt In 26: Line7 Cxp In 36: Nand0 Out 37: Nand1 Out
TriggerActivation	1:Rising Edge 2:Falling Edge 3:Level High 4:Level Low	1:Rising Edge	Select the polarity of the trigger signal (i.e., location of signal at which trigger is applied).
TriggerOverlap	0: Off (fixed) 1: ReadOut	-	Select the trigger overlap operation. TriggerSelector(AcquisitionStart) = 0:Off (fixed) TriggerSelector(AcquisitionEnd) = 0:Off (fixed) TriggerSelector(FrameStart) = 1: ReadOut
TriggerDelay	0 - 500000	0	Set the time of exposure start from trigger input. (unit: µs)
ExposureMode **Related Topic:** Exposure Mode	0: Off 1: Timed 2: TriggerWidth	1: Timed	Select the exposure mode.

Acquisition Control Item	Setting Range	Default Value	Description
ExposureTime (us) **Related Topic:** Actual Exposure Time	-	-	Set the exposure time (us). **Note:** The actual exposure time will consist of the image sensor's offset duration (2.45us) added to the ExposureTime setting. **Min**: 1 **Max**: (1/AcqusitionFrameRateMax) - Next trigger prohibited time. **Default**: GOX-5105MC-CXP: 8636 GOX-8105MC-CXP: 13667 GOX-12405MC-CXP: 20819 GOX-16205MC-CXP: 27097 GOX-20405MC-CXP: 33759 GOX-24505MC-CXP: 40659 **Note:** ExposureTime at the fastest FPS value when CXP6-1, SensorDigitizationBits=10bit, PixelFormat=8bit.
ExposureAuto	0: Off 1:Once 2:Continuous	0: Off	Set whether to enable auto exposure. When set to Once, the automatic adjustment will be performed only once, and then automatically switched to Off.
ExposureModeOption **Related Topic:** RCT Mode	0: Off 1: RCT	0: Off	Enables RCT Mode.

DigitalIOControl

Configure settings for digital input/output.

> **Related Topic:** GPIO (Digital Input/Output Settings)

Digital IO Control Item	Setting Range	Default Value	Description
LineSelector	-	21: Line2 Opt Out1	Select the input/output to configure. 21: Line2 Opt Out1 24: Line5 Opt In1 26: Line7 Cxp In 53: Nand0 In1 54: Nand0 In2 55: Nand1 In1 56: Nand1 In2 63: TimestampReset
LineMode	-	-	Display the input/output status (whether it is input or output). 0: Input (LineSelector=24,26,53,54,55,56) 1: Output (LineSelector=21) 2: InternalConnection (LineSelector=63)
LineInverter	0: False 1: True	0: False	Enable/disable polarity inversion for the selected input signal or output signal. **Note:** LineSelector=24, 26, 63 are fixed to "0".
LineStatus	0: False 1: True	0: False	Display the status of the input signal or output signal (True: High, False: Low).

Digital IO Control Item	Setting Range	Default Value	Description
LineSource	-	-	Select the line source signal for the item selected in LineSelector. 0: Off (Only when LineSelector is set to TimestampReset) 1: AcquisitionActive 2: FrameActive 4: ExposureActive 5: FVAL 7-10: PulseGenerator0-3 11-14: UserOutput0-3 24: Line5 Opt In1 26: Line7 Cxp In 36: Nand0 Out 37: Nand1 Out 40: - (Not selectable for Output and NAND In) 41: Low 42: High 43: AcquisitionTriggerWait 44: FrameTriggerWait ※LineSelector=24,26 are fixed to "-". **Default** LineSelector=TimestampReset: Off(0) LineSelector=Other than TimestampReset: Line5 Opt In1 (24)
LineFormat	-	-	Display the signal format. 0: NoConnect 1: TriState 2: TTL 3: LVDS 4: RS422 5: OptoCoupled 6: OpenDrain 7: Internal Signal **Default** LineSelector=21,24: OptoCoupled LineSelector=26,53,54,55,56,63: Internal Signal

Digital IO Control Item	Setting Range	Default Value	Description
LineStatusAll	-	-	Display the input/output signal status. The state is shown with 16 bits. Bit assignments are as follows. bit0: Unused (Fixed to 0) bit1: Line2 bit2 - 3: Unused (Fixed to 0) bit4: Line5 bit5: Unused (Fixed to 0) bit6: Line7 bit7 - 15: Unused (Fixed to 0)
OptInFilter (ns)	0～40000000	0	Remove noise from the OptIn input signal of Digital I/O. Step: 100 Setting Range: 0～40ms
UserOutput Selector	-	0: User Output 0	Set the UserOutput signal. 0: User Output 0 1: User Output 1 2: User Output 2 3: User Output 3
UserOutput Value	0: False 1: True	0: False	Set the value for the UserOutput selected in UserOutputSelector.

PulseGenerator

Configure pulse generator settings.

Related Topic: Pulse Generator

Pulse Generator Item	Setting Range	Default Value	Description
ClockPreScaler	1 ～ 4096	297	Set the division value for the prescaler (12 bit) using PixelClock as the base clock.
PulseGeneratorClock (MHz)	-	0.25	Set the clock used for the pulse generator. This value is calculated using the [ClockPreScaler] value as a base. PulseGeneratorClock = SrcFreq / ClockPreScaler SrcFreq:74.25
PulseGeneratorSelector	0:PulseGenerator0 1:PulseGenerator1 2:PulseGenerator2 3:PulseGenerator3	0:PulseGenerator0	Select the pulse generator.
PulseGeneratorLength	1～1048575	25000	Set the maximum count-up value as a clock count.
PulseGeneratorLengthMs (ms)	-	50	Set the maximum count-up value in milliseconds. This value is calculated using the PulseGeneratorLength value as a base. The setting range varies depending on the ClockPreScaler value. PulseGeneratorLengthMs = 1/PulseGeneratorClock * PulseGeneratorLength
PulseGeneratorFrequency (Hz)	-	20	Set the maximum count-up value as a frequency. This value is calculated using the PulseGeneratorLength value as a base. PulseGeneratorFrequency = 1sec / PulseGeneratorLengthMs
PulseGeneratorStartPoint	0～1048575	0	Set the start point of the High interval as a clock count. When the counter reaches this value, the output will be 1.
PulseGeneratorStartPointMs (ms)	-	0	Set the start point of the High interval in milliseconds. When the counter reaches this value, the output will be 1. The setting range varies depending on the ClockPreScaler value. PulseGeneratorStartPointMs = 1/PulseGeneratorClock * PulseGeneratorStartPoint
PulseGeneratorEndPoint	1～1048575	12500	Set the start point of the Low interval as a clock count. When the counter reaches this value, the output will be 0.

Pulse Generator Item	Setting Range	Default Value	Description
PulseGeneratorEndPointMs (ms)	-	25	Set the start point of the Low interval in milliseconds. When the counter reaches this value, the output will be 0. The setting range varies depending on the ClockPreScaler value. PulseGeneratorEndPointMs = 1/PulseGeneratorClock * PulseGeneratorEndPoint
PulseGeneratorPulseWidth (ms)	-	25	Display the High interval width of the pulse in milliseconds. The duration between the Start Point and End Point is calculated. The setting range varies depending on the ClockPreScaler value. PulseGeneratorPulseWidth = 1/PulseGeneratorClock * (PulseGeneratorEndPoint - PulseGeneratorStartPoint)
PulseGeneratorRepeat Count	0～255	0	Set the repeat count for the counter. When this is set to 0, a free counter is enabled with no repeat limit.
PulseGeneratorClear Activation	0: Off 1: Rising Edge 2: Falling Edge 3: Level High 4: Level Low	0: Off	Set the clear signal condition for the count clear input of the pulse generator.
PulseGeneratorClear Source	-	24: Line5 Opt In1	Select the count clear input signal source. 1: AcquisitionActive 2: FrameActive 4: ExposureActive 5: FVAL 7-10: PulseGenerator0-3(※) 11-14: UserOutput0-3 24: Line5 Opt In1 26: Line7 Cxp In 36: Nand0 Out 37: Nand1 Out 43: AcquisitionTriggerWait 44: FrameTriggerWait **Note:** (※)Disabled if the PulseGenerator is selected in PUlseGeneratorSelector.
PulseGeneratorClear SyncMode	0:Async Mode 1:Sync Mode	0:Async Mode	Select the sync mode for the count clear input signal.

AnalogControl

Configure analog control settings.

Analog Control Item	Setting Range	Default Value	Description
GainSelector **Related Topic:** Gain Control	0: Analog All 1: Digital Red 3: Digital Blue	0:Analog All	Select the gain to configure. **Note:** DigitalRed and DigitalBlue are avaliable only for color models.
Gain	-	1	Set the gain value for the gain setting selected in GainSelector. **Note:** DigitalRed and DigitalBlue are avaliable only for color models. Unit:Magnification **AnalogAll**: Min=1.0, Max=126.0 **DigitalRed/DigitalBlue**: Min=0.447, Max=5.624
GainAuto	0: Off 1: Once 2: Continuous	0: Off	Enable/disable gain auto adjustment. Once automatically changes to Off when the signal level converges once.
BlackLevelSelector	0: All 1: Red 3: Blue	0: All	Select the black level to configure. **Note:** DigitalRed andDigitalBlue are avaliable only for color models.
BlackLevel	-	0	Set the black level value. **All**: Min=-133, Max=25 **Red**: Min=-64, Max=64 **Blue**: Min=-64, Max=64 **Note:** Red and Blue are avaliable only for color models.
BalanceWhiteAuto **Related Topic:** White Balance	-	0: Off	Enable/disable auto white balance. When set to Once, the automatic adjustment will be performed only once, and then automatically switched to Off. **Note:** Color models only. 0: Off 1: Once 2: Continuous 3: Preset 3200K 4: Preset 5000K 5: Preset 6500K 6: Preset 7500K

Analog Control Item	Setting Range	Default Value	Description
AWBAreaSelector	-	0: Low Right	Select the area for which to configure AWBAreaEnable. **Note:** Color models only. 0: Low Right 1: Low Mid-Right 2: Low Mid-Left 3: Low Left 4: Mid-Low Right 5: Mid-Low Mid-Right 6: Mid-Low Mid-Left 7: Mid-Low Left 8: Mid-High Right 9: Mid-High Mid-Right 10: Mid-High Mid-Left 11: Mid-High Left 12: High Right 13: High Mid-Right 14: High Mid-Left 15: High Left
AWBAreaEnable	0: False 1: True	1: True	Enable/disable the photometry area selected in AWBAreaSelector.
AWBAreaEnableAll	0: False 1: True	1: True	True: Operate BalanceWhiteAuto with all areas designated as photometry areas, regardless of the individual enabled/disabled photometry area states configured in AWBAreaSelector. False: Operate BalanceWhiteAuto according to the individual enabled/disabled photometry area states configured in AWBAreaSelector.
AWBControlSpeed	1～8	4	Set the response speed for BalanceWhiteAuto. (8 is the fastest)
BalanceWhiteAutoResult	-	0: Idle	Display the results of BalanceWhiteAuto. 0: Idle 1: Processing 2: Converging 3: Succeeded 4: Error1 - G image was too bright 5: Error2 - G image was too dark 6: Error3 - Timeout 7: Error4 - could not processing 8: Error5 - R or B image was out of range

Analog Control Item	Setting Range	Default Value	Description
Gamma **Related Topic:** Gamma Function	0.45～1	0.45	Set the gamma value. Setting Range: 0.45, 0.50, 0.55, 0.60, 0.65, 0.75, 0.80, 0.90, 1.00
LUTMode	0: Off 1: Gamma 2: LUT	0:Off	Select the LUT mode.

LUTControl

Configure LUT settings.

Related Topic: LUT (Lookup Table)

LUT Control Item	Setting Range	Default Value	Description
LUTSelector	0: Red 1: Green 2: Blue	0: Red	Select the LUT channel to control. **Note:** Color models only.
LUTIndex	0～ 256	0	Set the LUT index table number.
LUTValue	0～4095	Gamma≒ 1.0	Set the LUT value.

AutoLevelControl

Configure AutoLevelControl.

> **Related Topic:** ALC (Automatic Level Control) Function

Auto Level Control Item	Setting Range	Default Value	Description
ALCControlReference	-	1: Selected Channel	Sets the channel to be used for ALC control reference. 0: Peak Channel 1: Selected Channel
ALCControlChannel	0: Red 1: Green 2: Blue	1: Green	When ALCControlReference is set to SelectedChannel, this setting determines which RGB channel signal is used for ALC control. When ALCControlReferenc is set to PeakChannel, this setting is disabled.
ALCReference	5 ～ 95	50	Set the target level for ALC. (unit: %)
ALCAreaSelector	-	0: Low Right	Select the area for which to configure ALCAreaEnable. 0: Low Right 1: Low Mid-Right 2: Low Mid-Left 3: Low Left 4: Mid-Low Right 5: Mid-Low Mid-Right 6: Mid-Low Mid-Left 7: Mid-Low Left 8: Mid-High Right 9: Mid-High Mid-Right 10: Mid-High Mid-Left 11: Mid-High Left 12: High Right 13: High Mid-Right 14: High Mid-Left 15: High Left
ALCAreaEnable	0: False 1: True	1: True	Enable/disable the photometry area selected in ALCAreaSelector.
ALCAreaEnableAll	0: False 1: True	1: True	True: Operate ALC with all areas designated as photometry areas, regardless of the individual enabled/disabled photometry area states configured in ALCAreaSelector. False: Operate ALC according to the individual enabled/disabled photometry area states configured in ALCAreaSelector.
ALCControlRatio	1～100	90	Set the response speed. (100 is the fastest.)

Auto Level Control Item	Setting Range	Default Value	Description
AutoControlStatus	-	0: Idle	Allows confirmation of the AGC, ASC, and AWB convergence status. 0: Idle 1: Processing - Exposure Time 2: Processing - Gain 3: Converging - Exposure Time 4: Converging - Gain 5: Error1 - could not processing 6: Error2 - timeout
ExposureAuto ControlMin	-	100	Set the minimum value for the ExposureTime control range. **Min**: 100 **Max**: ExposureTimeMax-1
ExposureAuto ControlMax	-	Exposure TimeMax	Set the maximum value for the ExposureTime control range. **Min**: ExposureAutoControlMin+1 **Max**: ExposureTimeMax
GainAutoControlMin	-	1	Set the minimum value for the GainAuto control range. **Min**: 1 **Max**: (GainAutoControlMax - 1)
GainAutoControlMax	-	126	Set the maximum value for the GainAuto control range. **Min**: GainAutoControlMin+1 **Max**: 126

ColorTransformationControl

Configure color transformation settings.

> **Related Topic:** Color Space Conversion (ColorTransformationControl)

Color Transformation Control Item	Setting Range	Default Value	Description
ColorTransformationMode	0:RGB 1: HSI 2: XYZ	0:RGB	Set the output image format.
ColorTransformationRGBMode	0: OFF 1: sRGB 2: AdobeRGB 3: UserCustom	0: OFF	Set the detailed mode when RGB is selected for the color space.
ColorMatrixValueSelector	0: R-R 1: R-G 2: R-B 3: G-R 4: G-G 5: G-B 6: B-R 7: B-G 8: B-B	0: R-R	Select the ColorMatrix setting component.
ColorMatrixValue	-2 ～ 2	-	Set the Color Matrix value. (Step = 0.1) **Default**: ColorMatrixValueSelector=0,4,8: 1.0 ColorMatrixValueSelector=1,2,3,5,6,7: 0

ImagingControl

Configure other JAI functions.

Imaging Control Item	Setting Range	Default Value	Description
VideoProcessBypassMode **Related Topic:** VideoProcessBypassMode	0: Off 1: On	0: Off	Enable/disable VideoProcessBypass mode.
EdgeEnhancerEnable **Related Topic:** Edge Enhancer, Color Enhancer	0: Off 1: On	0: Off	Enable/disable EdgeEnhancer.
EdgeEnhancerLevel	0: Low 1: Middle 2: High 3: Strong	1: Middle	Set the Level for EdgeEnhancer.
ColorEnhancerEnable **Related Topic:** Edge Enhancer, Color Enhancer	0: Off 1: On	0: Off	Enable/disable ColorEnhancer.
ColorEnhancerSelector	0: Red 1: Cyan 2: Green 3: Magenta 4: Blue 5: Yellow	0:Red	Index for configuring detailed settings of ColorEnhancer.
ColorEnhancerValue	0～1.0	0	Set the enhancement to one of ten levels for each color element. (Step = 0.1) 0: No enhancement

ShadingControl

Configure shading correction settings.

> **Related Topic:** Shading Correction

Shading Control Item	Setting Range	Default Value	Description
ShadingCorrectionMode	-	0: Flat Shading	Select the shading correction method. 0: Flat Shading 1: Color Shading (Color models only)
ShadingMode	0: Off 1: User1 2: User2 3: User3	0: Off	Set the area to which to save shading correction data. When this is set to Off, PerformShadingCalibration will not be executed.
PerformShadingCalibration	-	-	Execute shading correction. This command can not be executed under the following conditions. - When outputting no image. - When outputting TestPattern. - Width and/or Height are less than 512 (ROI Function (Single ROI)) - In FD2x2Binning mode (Binning Function) - In ImageScaling mode (Image Scaling Mode (Xscale)) - In Decimation mode (Decimation Mode) - In Sequencer mode (Sequencer Function) - In MultiRoi mode (ROI Function (Multi ROI)) - In Reverse mode (Image Flip Function) - In GradationCompression mode (Gradation Compression Mode) - In ALC mode (ALC (Automatic Level Control) Function)
ShadingDetectResult	-	0: Idle	Display the shading correction results. 0: Idle 1: Succeeded 2: Error1 - image was too bright 3: Error2 - image was too dark 4: Error3 - could not calibrated 5: Error4 - correction limit 6: Error5 - timeout

BlemishControl

Configure settings for JAI white blemish correction.

> **Related Topic:** BlemishCompensation

Blemish Control Item	Setting Range	Default Value	Description
BlemishEnable	-	1: Enable	Enable/disable blemish correction. 0: Disable all 1: Enable 2 :Disable user detection
BlemishDetect	-	-	Execute blemish detection. This command cannot be executed under the following conditions. - No image is being output. - TestPattern is being output - In Sequencer Mode (Sequencer Function) - In MultiRoi mode (ROI Function (Multi ROI)) - The image is not full ROI size (ROI Function (Single ROI)) - In Reverse mode (Image Flip Function) - GradationCompressionMode is not Off (Gradation Compression Mode) - AcqusitionModeis not Continuous (Acquisition Control) - Not in lens cap state
BlemishDetectionResult	-	0	Display the blemish detection results. 0: Idle 1: Succeeded 2: Error1 - image was too bright 3: Error2 - image was too dark (unused) 4: Error3 - signal level was unbalanced (unused) 5: Error4 - detect blemishes too many 6: Error5 - could not detected 7: Error6 - timeout
BlemishDetectThreshold	1～99	10	Set the blemish detection threshold.
BlemishStore	-	-	Save the location information of detected blemishes, manually specified by BlemishiCompensationPositionX and BlemishCompensasionPositionY.
BlemishCompensationIndex	1～ 2000	1	Select the index for the target blemish coordinates.
BlemishCompensation PositionX	-	-1	Display the X coordinate (horizontal pixel position) of the target blemish selected in BlemishCompensationIndex. You can also manually enter the X coordinate of the blemish you want to correct. **Min**: -1 **Max**: WidthMax - 1

Blemish Control Item	Setting Range	Default Value	Description
BlemishCompensation PositionY	-	-1	Display the Y coordinate (vertical pixel position) of the target blemish selected in BlemishCompensationIndex. You can also manually enter the Y coordinate of the blemish you want to correct. **Min**: -1 **Max**: HeightMax - 1
BlemishCompensation DataClear	-	-	Delete detected or specified blemish information selected in BlemishCompensationIndex.
BlemishCompensationNumber	0～2000	0	Display the number of target blemishes.

SequencerControl

Configure sequencer settings.

> **Related Topic:** Sequencer Function

> **Note:** Refer to Functions That Cannot Be Used Together for usage restrictions.

Sequencer Control Item	Setting Range	Default Value	Description
SequencerMode	0: Off 1: On	0: Off	Enable/disable SequencerMode.
SequencerModeSelect	-	0	Select the sequencer mode. 0: TriggerSequencerMode (Default) 1: CommandSequencerMode
SequencerSetSelector	1 ～ 32	1	Select the index number to configure.
SequencerWidth	-	WidthMax value	Set the width of the selected SequencerIndex. Setting Range: 96 (48)*～ [WidthMax - OffsetX] , Step 8(4)* *For monochrome models, when BinningHorizontal = 2, the value in parentheses is applicable.
SequencerHeight	-	HeightMax value	Set the height of the selected SequencerIndex. Setting Range: 8 (4)*～[HeightMax - OffsetY], Step 2(1)* *For monochrome models, when BinningVertical = 2 or FD2x2BinningMode = On, the value in parentheses is applicable.
SequencerOffsetX	-	0	Set the horizontal offset value for the selected SequencerIndex. Setting Range: 0～[WidthtMax - Width], Step 8(4)* *For monochrome models, when BinningHorizontal = 2, the value in parentheses is applicable.
SequencerOffsetY	-	0	Set the vertical offset value for the selected SequencerIndex. Setting Range: 0～[Height - Height], Step 2(1)* *For monochrome models, when BinningVertical = 2, the value in parentheses is applicable.
SequencerFrameCount	1～65535	1	Set the FrameCount value for the selected SequencerIndex. **Note:** The same value with AcquisitionFrameCount (AcquisitionControl)
SequencerExposureTime	1～8000000	-	Set the exposure time for the selected SequencerIndex. **Default**: ExposureTimeMax (AcquisitionControl)
SequencerGainAnalogAll	1.0～126.0	1	Set the Gain[AnalogAll] value for the selected SequencerIndex.

Sequencer Control Item	Setting Range	Default Value	Description
SequencerGainDigitalRed	0.447～5.624	1	Set the Gain[DigitalRed] value for the selected SequencerIndex.
SequencerGainDigitalBlue	0.447～5.624	1	Set the Gain[DigitalBlue] value for the selected SequencerIndex.
SequencerLUTEnable	0: False 1: True	0: False	Set the LutEnable value for the selected SequencerIndex.
SequencerSetNext	0～32	-	Set the next index to be displayed for the selected SequencerIndex. (Enabled only for TriggerSequencer.) If 0 is specified, the operation of the Sequencer is stopped. SequencerSetSelector = 1～31: (SequencerSetSelector+1) SequencerSetSelector = 32: 1
SequencerRepetition	1～255	1	Set the repeat count for the sequencer.
SequencerSetActive	1～32	1	Displays the active index number.
SequencerSetStart	1～32	1	Specify the first index number to switch to when starting TriggerSequencerMode.
SequencerCommandIndex	1～32	1	Set this to change the SequencerIndex. (Enabled only for CommandSequencer.)
SequencerReset	-	-	In TriggerSequencerMode, reset the current index number to the number configured in SequencerSetStart.

CounterAndTimerControl

Configure counter settings.

> **Note:** This camera only supports the counter functions.

> **Related Topic:** Counter and Timer Control Function

Counter and Timer Control Item	Setting Range	Default Value	Description
CounterSelector	0: Counter0 1: Counter1 2: Counter2 3: Counter3	0: Counter0	Select the counter.
CounterEventSource	-	0: Off	Assign the Counter Event signal for which you want to read the count value to a dedicated counter, and read the value. 0: Off 1: FrameTrigger (Counter0 only) 2: Exposure Start (Counter1 only) 3: Sensor Readout (Counter2 only) 4: FrameTransferEnd (Counter3 only)
CounterEventActivation	1:Rising Edge 2:Falling Edge	-	Set the count timing. The setting value is fixed with the following data. **Default**: CounterSelector=0, 1, 2: Rising Edge CounterSelector=3: Falling Edge
CounterReset	-	-	Reset the counter.
CounterValue	0～32bit max	0	Display the count value.
CounterStatus	-	0: CounterIdle	Display the counter status. 0: CounterIdle 1: CounterTriggerWait 2: CounterActive 3: CounterCompleted 4: CounterOverflow - Count value exceeded the maximum value

EventControl

Configure settings for event control.

> **Related Topic:** Event Control Function

Event Control Item	Setting Range	Default Value	Description
EventSelector	-	0: Acquisition Start	Select the event to send the event message. 0: AcquisitionStart 1: AcquisitionEnd 6: ExposureStart 7: ExposureEnd
EventNotification	0: Off 1: On	0: Off	Sets whether or not to send an event message when an event selected by EventSelector occurs.
EventAcquisitionStartData	-	-	When the event AcquisitionStart occurs, the following two data can be checked.
EventAcquisitionStart	-	0x0102	Displays the EventID (0x0102).
EventAcquisitionStartTimestamp	0～64bit max	0	Displays the Timestamp value when an event occurs.
EventAcquisitionEndData	-	-	When the event AcquisitionEnd occurs, the following two data can be checked.
EventAcquisitionEnd	-	0x0103	Displays the EventID (0x0103).
EventAcquisitionEndTimestamp	0～64bit max	0	Displays the Timestamp value when an event occurs.
EventExposureStartData	-	-	When the event ExposureStart occurs, the following two data can be checked.
EventExposureStart	-	0x0132	Displays the EventID (0x0132).
EventExposureStartTimestamp	0～64bit max	0	Displays the Timestamp value when an event occurs.
EventExposureEndData	-	-	When the event ExposureEnd occurs, the following two data can be checked.
EventExposureEnd	-	0x0133	Displays the EventID (0x0133).
EventExposureEndTimestamp	0～64bit max	0	Displays the Timestamp value when an event occurs.

UserSetControl

Configure user settings.

> **Related Topic:** Step 5: Saving the Settings

User Set Control Item	Setting Range	Default Value	Description
UserSetSelector	-	0: Default	Select the user settings. 0: Default - Invalid when executing UserSetSave 1: User1 2: User2 3: User3
UserSetLoad	-	-	Read the user settings. When selecting **Default** for UserSetSelector, the factory settings are loaded.
UserSetSave	-	-	Save the current setting values as user settings. Invalid when UserSetSelector is set to Default.

Miscellaneous

Troubleshooting

Check the following before requesting help. If the problem persists, contact your local JAI distributor.

Power Supply and Connections

Issue: The POWER/TRIG LED remains lit amber and does not turn green, even after power is supplied to the camera.

Cause and Solution: Camera initialization may not be complete due to lack of power. Check the CoaxPress cable or 6-pin power cable connection.

Image Display

Issue: Gradation in dark areas is not noticeable.

Cause and Solution: Use the gamma function to correct the display. As the light-emitting properties of the monitor are not linear, the entire image may be darker or the gradation in the dark areas may be less noticeable when camera outputs are displayed without processing. Using the gamma function performs correction to produce a display that is close to linear. For details, see Gamma Function.

Settings and Operations

Issue: Settings cannot be saved to user memory.

Cause and Solution: You cannot save to user memory while images are being acquired by the camera. Stop image acquisition before performing the save operation.

Issue: I want to restore the factory default settings.

Cause and Solution: Load Default under User Set Selector in the Feature Properties tab to restore the factory default settings.

Specifications

Item	Monochrome	Color
Scanning System	Progressive scan, 1 tap	
Synchronization	Internal	
Interface	CoaxPress v2.0/v1.1	
Image Sensor	Monochrome CMOS	Bayer color CMOS
Dark SN	**GOX-5105M-CXP** >60 dB@10bit AnalogGainAll:x1.0,Shutter:OFF, SensorDigitizationBits=12bit, Mono10, Frame Rate: 112.3fps	**GOX-5105C-CXP** >60 dB@10bit AnalogGainAll:x1.0,Shutter:OFF, SensorDigitizationBits=12bit, Bayer10, Frame Rate: 112.3fps
	GOX-8105M-CXP >60 dB@10bit AnalogGainAll:x1.0,Shutter:OFF, SensorDigitizationBits=12bit, Mono10, Frame Rate: 71.6fps	**GOX-8105C-CXP** >60 dB@10bit AnalogGainAll:x1.0,Shutter:OFF, SensorDigitizationBits=12bit, Bayer10, Frame Rate:71.6fps
	GOX-12405M-CXP >60 dB@10bit AnalogGainAll:x1.0,Shutter:OFF, SensorDigitizationBits=12bit, Mono10, Frame Rate: 47.3fps	**GOX-12405C-CXP** >60 dB@10bit AnalogGainAll:x1.0,Shutter:OFF, SensorDigitizationBits=12bit, Bayer10, Frame Rate:47.3fps
	GOX-16205M-CXP >60 dB@10bit AnalogGainAll:x1.0,Shutter:OFF, SensorDigitizationBits=12bit, Mono10, Frame Rate: 36.7fps	**GOX-16205C-CXP** >60 dB@10bit AnalogGainAll:x1.0,Shutter:OFF, SensorDigitizationBits=12bit, Bayer10, Frame Rate:36.7fps
	GOX-20405M-CXP >60 dB@10bit AnalogGainAll:x1.0,Shutter:OFF, SensorDigitizationBits=12bit, Mono10, Frame Rate: 29.5fps	**GOX-20405C-CXP** >60 dB@10bit AnalogGainAll:x1.0,Shutter:OFF, SensorDigitizationBits=12bit, Bayer10, Frame Rate:36.7fps
	GOX-24505M-CXP >60 dB@10bit AnalogGainAll:x1.0,Shutter:OFF, SensorDigitizationBits=12bit, Mono10, Frame Rate:24.5fps	**GOX-20405C-CXP** >60 dB@10bit AnalogGainAll:x1.0,Shutter:OFF, SensorDigitizationBits=12bit, Bayer10, Frame Rate:24.5fps
Bright SN	>38 dB	>36 dB(Gch)

<table>
<tr><th>Item</th><th colspan="3">Monochrome</th><th>Color</th></tr>
<tr><td rowspan="6">Image Size (Effective Image)</td><td>GOX-5105MC-CXP</td><td>1/1.8 inch</td><td colspan="2">6.8 mm x 5.7 mm (8.82mm diagonal)</td></tr>
<tr><td>GOX-8105MC-CXP</td><td>2/3 inch</td><td colspan="2">7.8 mm x 7.8 mm (11.05mm diagonal)</td></tr>
<tr><td>GOX-12405MC-CXP</td><td>1/1.1 inch</td><td colspan="2">11.3 mm x 8.2 mm (14.00mm diagonal)</td></tr>
<tr><td>GOX-16205MC-CXP</td><td>1.1 inch</td><td colspan="2">14.6 mm x 8.3 mm (16.81mm diagonal)</td></tr>
<tr><td>GOX-20405MC-CXP</td><td>1.1 inch</td><td colspan="2">12.4 mm x 12.4 mm (17.48mm diagonal)</td></tr>
<tr><td>GOX-24505MC-CXP</td><td>1.2 inch</td><td colspan="2">14.6 mm x 12.6 mm (19.30mm diagonal)</td></tr>
<tr><td>Pixel Size</td><td colspan="4">2.74 µm x 2.74 µm</td></tr>
<tr><td>Effective Image Pixel</td><td colspan="4">GOX-5105MC-CXP: 2472 x 2064
GOX-8105MC-CXP: 2856 x 2848
GOX-12405MC-CXP: 4128 x 3008
GOX-16205MC-CXP: 5328 x 3040
GOX-20405MC-CXP: 4512 x 4512
GOX-24505MC-CXP: 5328 x 4608</td></tr>
<tr><td>Acquisition Frame Rate (Max) - PixelFormat: 8Bits</td><td colspan="4">Mono8, BayerRG8, BayerGR8, BayerGB8, BayerBG8
GOX-5105MC-CXP: 112 fps
GOX-8105MC-CXP: 71 fps
GOX-12405MC-CXP: 47 fps
GOX-16205MC-CXP: 36 fps
GOX-20405MC-CXP: 29 fps
GOX-24505MC-CXP: 24 fps

RGB8
GOX-5105MC-CXP: 37 fps
GOX-8105MC-CXP: 23 fps
GOX-12405MC-CXP: 15 fps
GOX-16205MC-CXP: 12 fps
GOX-20405MC-CXP: 9.8 fps
GOX-24505MC-CXP: 8.1 fps

Note: When CxpLinkConfiguration is set to CXP6_X1 and SensorDigitizationBits is set to 10Bits.</td></tr>
</table>

<table>
<tr><th>Item</th><th>Monochrome</th><th>Color</th></tr>
<tr><td>Acquisition Frame Rate (Max) - PixelFormat: 10Bits</td><td colspan="2">Mono10, BayerRG10, BayerGR10, BayerGB10, BayerBG10
GOX-5105MC-CXP: 89 fps
GOX-8105MC-CXP: 57 fps
GOX-12405MC-CXP: 37 fps
GOX-16205MC-CXP: 29 fps
GOX-20405MC-CXP: 23 fps
GOX-24505MC-CXP: 19 fps

RGB10
GOX-5105MC-CXP: 29 fps
GOX-8105MC-CXP: 19 fps
GOX-12405MC-CXP: 12 fps
GOX-16205MC-CXP: 9.7 fps
GOX-20405MC-CXP: 7.8 fps
GOX-24505MC-CXP: 6.5 fps

Notes:
• When CxpLinkConfiguration is set to CXP6_X1 and SensorDigitizationBits is set to 10Bits.
• If SensorDigitizationBits is set to smaller than the pixel format bits configured in the Pixel Format, the image may have gaps in histogram.</td></tr>
<tr><td>Acquisition Frame Rate (Max) - PixelFormat: 12Bits</td><td colspan="2">Mono12, BayerRG12, BayerGR12, BayerGB12, BayerBG12
GOX-5105MC-CXP: 74 fps
GOX-8105MC-CXP: 47 fps
GOX-12405MC-CXP: 31 fps
GOX-16205MC-CXP: 24 fps
GOX-20405MC-CXP: 19 fps
GOX-24505MC-CXP: 16 fps

RGB12
GOX-5105MC-CXP: 24 fps
GOX-8105MC-CXP: 15 fps
GOX-12405MC-CXP: 10 fps
GOX-16205MC-CXP: 8.1 fps
GOX-20405MC-CXP: 6.5 fps
GOX-24505MC-CXP:5.4 fps

Notes:
• When CxpLinkConfiguration is set to CXP6_X1 and SensorDigitizationBits is set to 10Bits.
• If SensorDigitizationBits is set to smaller than the pixel format bits configured in the Pixel Format, the image may have gaps in histogram.</td></tr>
</table>

Item	Monochrome	Color
Digital Image Output Format - Full	GOX-5105MC-CXP: 2472 x 2064 GOX-8105MC-CXP: 2856 x 2848 GOX-12405MC-CXP: 4128 x 3008 GOX-16205MC-CXP: 5328 x 3040 GOX-20405MC-CXP: 4512 x 4512 GOX-24505MC-CXP: 5328 x 4608	
Digital Image Output Format - ROI (Width)	GOX-5105MC-CXP: 96(48) to 2472 (1236), step 8(4) GOX-8105MC-CXP: 96(48) to 2856(1428), step 8(4) GOX-12405MC-CXP: 96(48) to 4128 (2064), step 8(4) GOX-16205MC-CXP: 96(48) to 5328 (2664), step 8(4) GOX-20405MC-CXP: 96(48) to 4512 (2256), step 8(4) GOX-24505MC-CXP: 96(48) to 5328 (2664), step 8(4) **Note:** For monochrome models, when BinningHorizontal = 2 or FD2x2BinningMode = On, the value in parentheses is applicable.	
Digital Image Output Format - ROI (Offset X)	GOX-5105MC-CXP: 0 to [2472 (1236) - Width], step 8(4) GOX-8105MC-CXP: 0 to [2856(1428) - Width], step 8(4) GOX-12405MC-CXP: 0 to [4128 (2064) - Width], step 8(4) GOX-16205MC-CXP: 0 to [5328 (2664) - Width], step 8(4) GOX-20405MC-CXP: 0 to [4512 (2256) - Width], step 8(4) GOX-24505MC-CXP: 0 to [5328 (2664) - Width], step 8(4) **Note:** For monochrome models, when BinningHorizontal = 2 or FD2x2BinningMode = On, the value in parentheses is applicable.	
Digital Image Output Format - ROI (Height)	GOX-5105MC-CXP: 8(4) to 2064 (1032), step2(1) GOX-8105MC-CXP: 8(4) to 2848 (1424), step2(1) GOX-12405MC-CXP: 8(4) to 3008 (1504), step2(1) GOX-16205MC-CXP: 8(4) to 3040 (1520), step2(1) GOX-20405MC-CXP: 8(4) to 4512 (2256), step2(1) GOX-24505MC-CXP: 8(4) to 4608 (2304), step2(1) **Note:** For monochrome models, when BinningVertical = 2 or FD2x2BinningMode = On, the value in parentheses is applicable.	
Digital Image Output Format - ROI (Offset Y)	GOX-5105MC-CXP: 0 to [2064 (1032) - Height], step2(1) GOX-8105MC-CXP: 0 to [2848 (1424) - Height], step2(1) GOX-12405MC-CXP: 0 to [3008 (1504) - Height], step2(1) GOX-16205MC-CXP: 0 to [3040 (1520) - Height], step2(1) GOX-20405MC-CXP: 0 to [4512 (2256) - Height], step2(1) GOX-24505MC-CXP: 0 to [4608 (2304) - Height], step2(1) **Note:** For monochrome models, when BinningHorizontal = 2 or FD2x2BinningMode = On, the value in parentheses is applicable.	

Item	Monochrome	Color
Digital Image Output Format: Binning (H) = 1 and FD2x2BinningMode = Off	GOX-5105M-CXP: 2472 GOX-8105M-CXP: 2856 GOX-12405M-CXP: 4128 GOX-16205M-CXP: 5328 GOX-20405M-CXP: 4512 GOX-24505M-CXP: 5328	N/A
Digital Image Output Format: Binning (H) = 2 or FD2x2BinningMode = On	GOX-5105M-CXP: 1236 GOX-8105M-CXP: 1428 GOX-12405M-CXP: 2064 GOX-16205M-CXP: 2664 GOX-20405M-CXP: 2256 GOX-24505M-CXP: 2664	N/A
Digital Image Output Format: Binning (V) = 1 and FD2x2BinningMode = Off	GOX-5105M-CXP: 2064 GOX-8105M-CXP: 2848 GOX-12405M-CXP: 3008 GOX-16205M-CXP: 3040 GOX-20405M-CXP: 4512 GOX-24505M-CXP: 4608	N/A
Digital Image Output Format: Binning (V) = 2 or FD2x2BinningMode = On	GOX-5105M-CXP: 1032 GOX-8105M-CXP: 1424 GOX-12405M-CXP: 1504 GOX-16205M-CXP: 1520 GOX-20405M-CXP: 2256 GOX-24505M-CXP: 2304	N/A
Digital Image Output Format: Pixel Format	Mono8, Mono10, Mono12	BayerRG8, BayerRG10, BayerRG12, (BayerGR8*, BayerGR10*, BayerGR12*, BayerGB8*, BayerGB10*, BayerGB12*, BayerBG8*, BayerBG10*, BayerBG12*), RGB8, RGB10, RGB12 **Note:** * When ReverseX/ReverseY is On.
Acquisition Mode	Continuous / SingleFrame / MultiFrame (1 ~ 65535)	
Trigger Selector	**Acquisition**: AcquisitionStart / AcquisitionEnd **Exposure**: FrameStart	
Opto Filter	0~40ms, Step 100ns	
Trigger Overlap	Off / Read out	
Trigger Input Signals	PulseGenerator0-3, UserOutput0-3, Software, Line5 Opt In, Line7 Cxp In, Nand0 Out, Nand1 Out	
Exposure Mode	Timed (FrameStartTrigger Off): 3.45*μs~ ExposureTimeMax Timed (FrameStartTrigger On): 3.45*μs~ 8Sec TriggerWidth: 3.45*μs~ ∞ **Note:** *Including the exposure offset duration (2.45μs)	
Auto Exposure (Exposure Auto)	Off / Continuous / Once	
Auto Exposure Response Speed (ALCControlRatio)	1 ~ 100%	

Item	Monochrome	Color
Digital I/O	LineSelector (6P): GPIO IN / GPIO OUT	
Black Level Adjustment	Default Level: 8LSB@8bit All (Mono/Color): -133 ~ +255 LSB Red (Color): -64 ~ +64 LSB Blue (Color): -64 ~ +64 LSB Resolution Adjustment: 1LSB@12bit	
Gain Adjustment	Manual Adjustment Range: AnalogAll (Mono/Color): 0db～ 42dB DigitalRed (Color): -7dB ～ 15dB DigitalBlue (Color): -7dB ～ 15dB Adjustment Auto Gain: Off, Continuous, Once	
White Balance	WhiteBalanceGain: DigitalRed, DigitalBlue : -7dB ～ 15dB BalanceWhiteAuto: Off, Continuous, Once, Preset3200K, Preset5000K, Preset6500K, Preset7500K Photometry Area: 16 (4 x 4) Area Adjustment Range: 3000K ～ 9000K	
Blemish Correction	**Detection**: Detect white blemishes using threshold values (100 steps available) (black blemish correction performed only at the factory) **Correction**: Interpolation using adjacent pixels (continuous blemishes not corrected) **Correctable pixels**: 2000 pixels	
ALC	Video level adjusted automatically using AGC and ASC	
Gamma	0.45, 0.5, 0.55, 0.6 ,0.65, 0.75, 0.8, 0.9, 1.0 (9 steps available)	
LUT	OFF ：γ＝ 1.0, ON ＝ 257 points can be set	
Vibration Resistance	10G (20 Hz ～ 200 Hz X-Y-Z direction)	
Impact Resistance	80G	
Power Supply	PoCXP: Input Range: DC +24 V Consumption: 4.1 W typical @ +12 V, 4.8W (Max) 6-pin Connector: Input Range: DC +10V ～ +25V Consumption: 4.1 W typical @ +12 V, 500mA/4.8W (Max)	
Lens Mount	• C-Mount • Lens mount protrusion length of 9 mm or less is supported.	
Flange Back	17.526mm, tolerance: 0 mm ～ -0.05 mm	
Optical Filter	IR cut filter (color model only)	
Verified Performance Temperature/Humidity	- 5°C～＋ 45°C / 20%～ 80% (non-condensing) **Note:** It may change depending on the installation environment. Please refer to the Cautions in the Package Contents section.	
Storage Temperature/Humidity	- 25°C～＋ 60°C / 20%～ 80% (non-condensing)	
Regulations (Tentative)	CE [EN 55032:2015(CISPR32:2015), EN 55035:2017 (CISPR35:2016)], FCC Part 15 Class A, EU RoHS/WEEE, China RoHS, KC	
Housing	29mm x 29mm x 55mm (WHD, excluding connectors)	
Weight	60g	

Package Contents

- Camera (1)
- Sensor protection cap (1)
- Dear customer (sheet) (1)

Optional Accessories (Sold Separately)

- MP-46 Tripod Adapter Plate

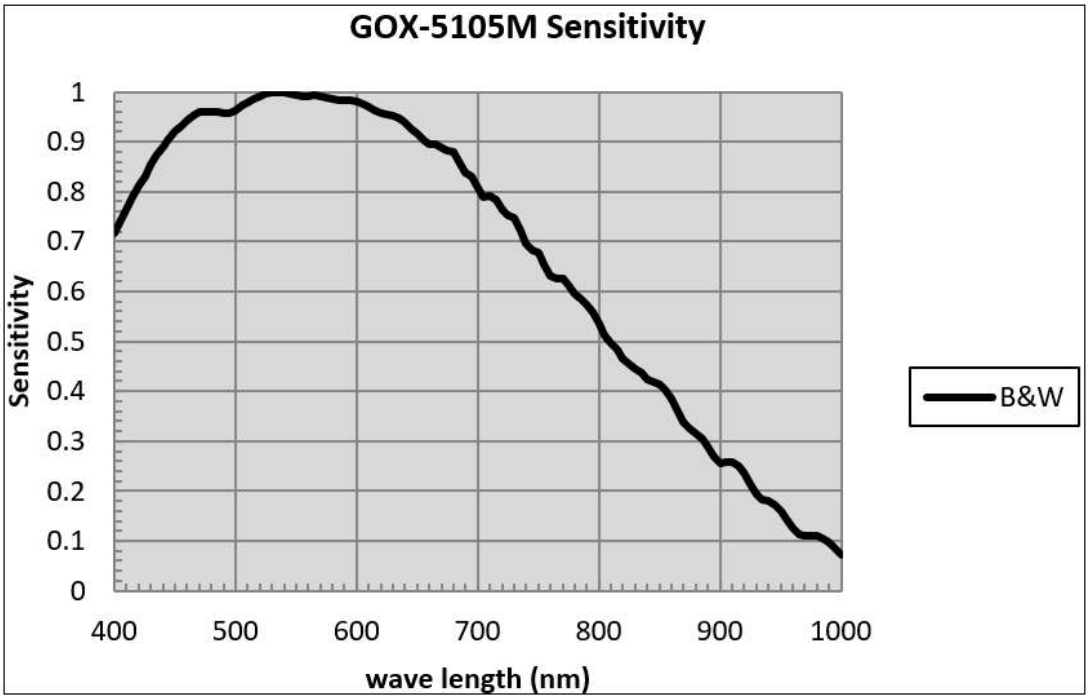
Notes:
- Design and specifications are subject to change without notice.
- Approximately 30 minutes of warm-up are required to achieve these specifications.

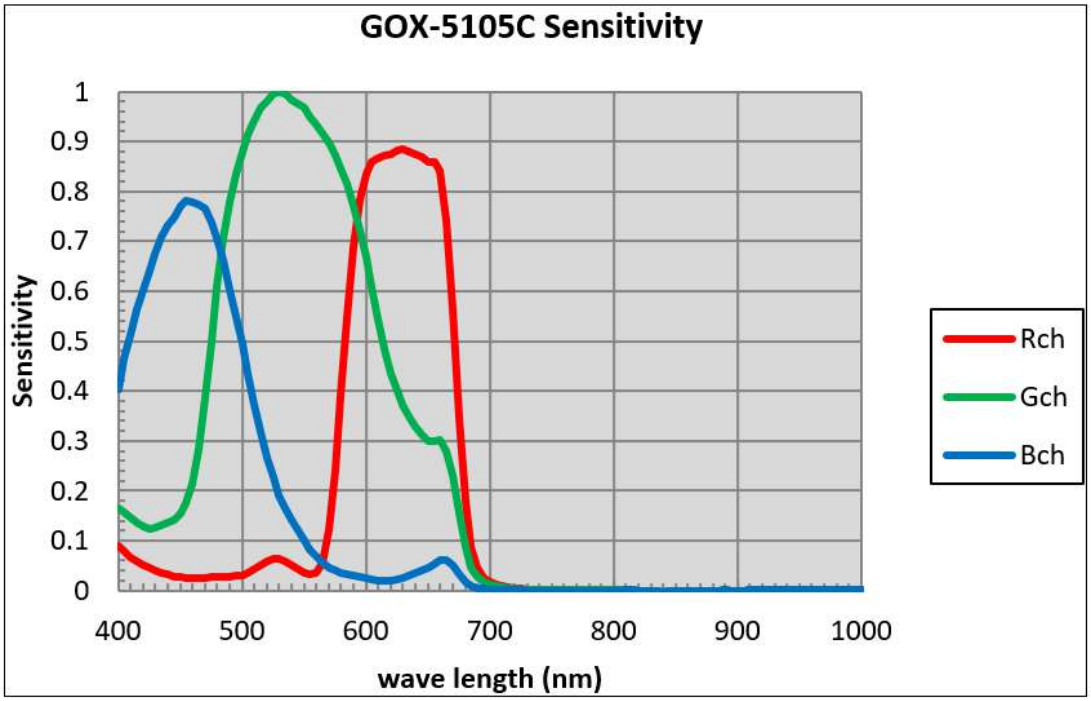
Cautions:
About the verified performance temperature, make sure the following temperature condition is met when operating the unit.

• The camera's internal temperature sensor detects temperatures of 82 °C or less during operation.

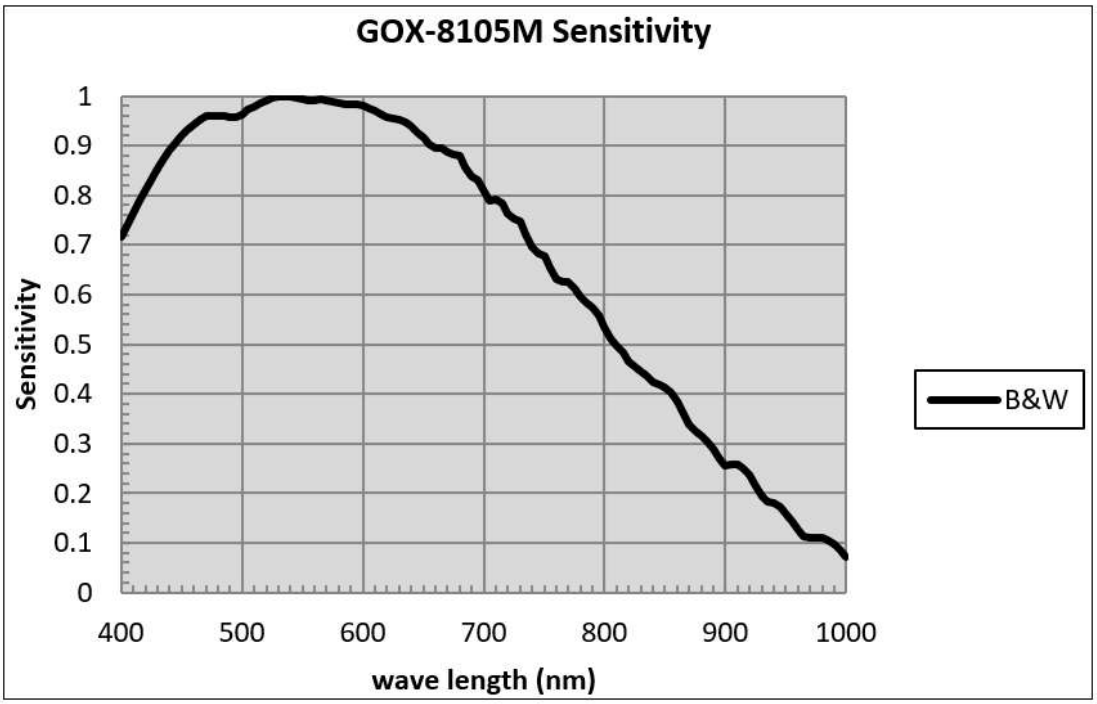
If the above temperature conditions are exceeded, take measures to dissipate heat according to your installation environment and conditions.

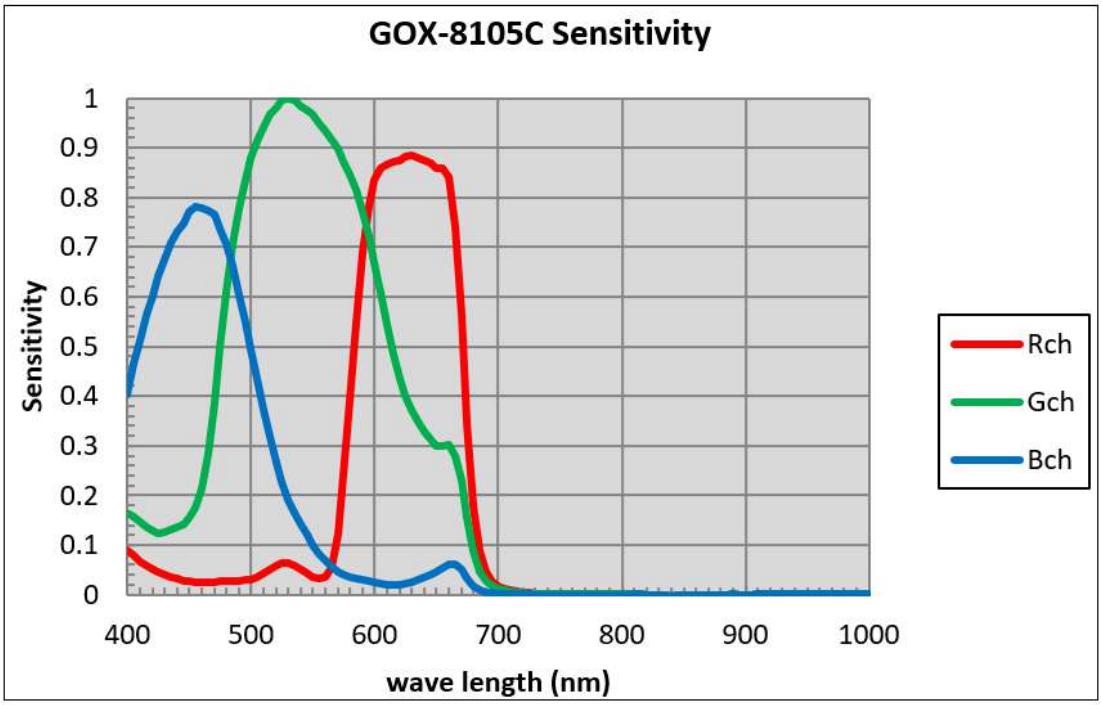
Spectral Response (GOX-5105M-CXP/GOX-5105C-CXP)



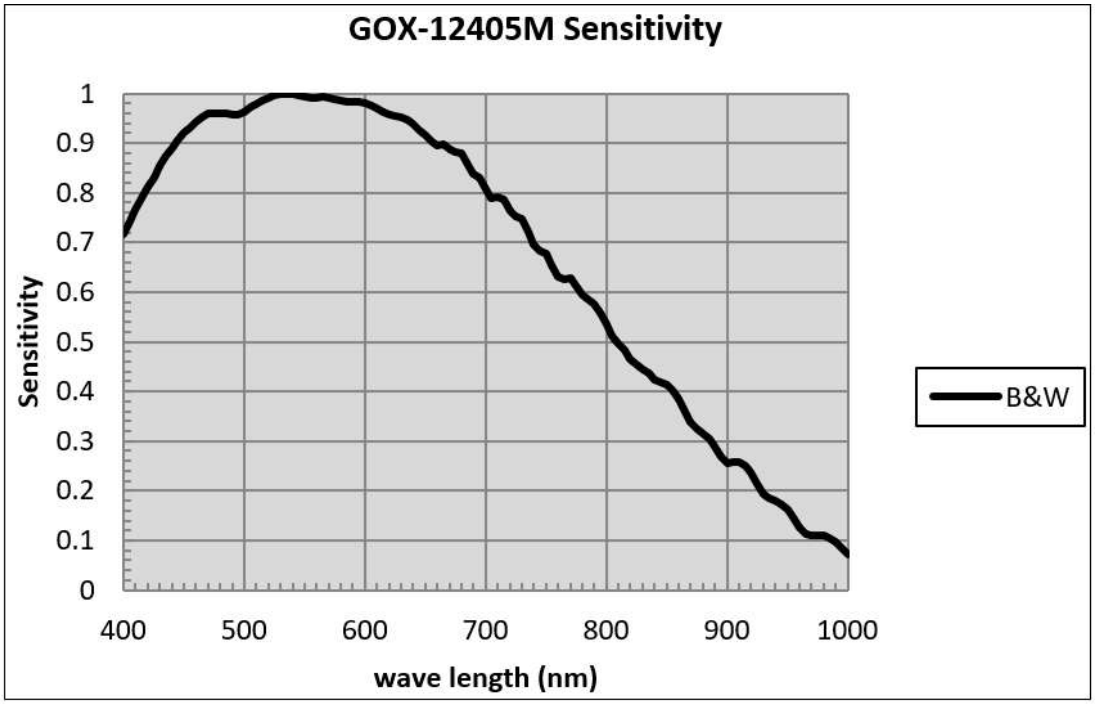


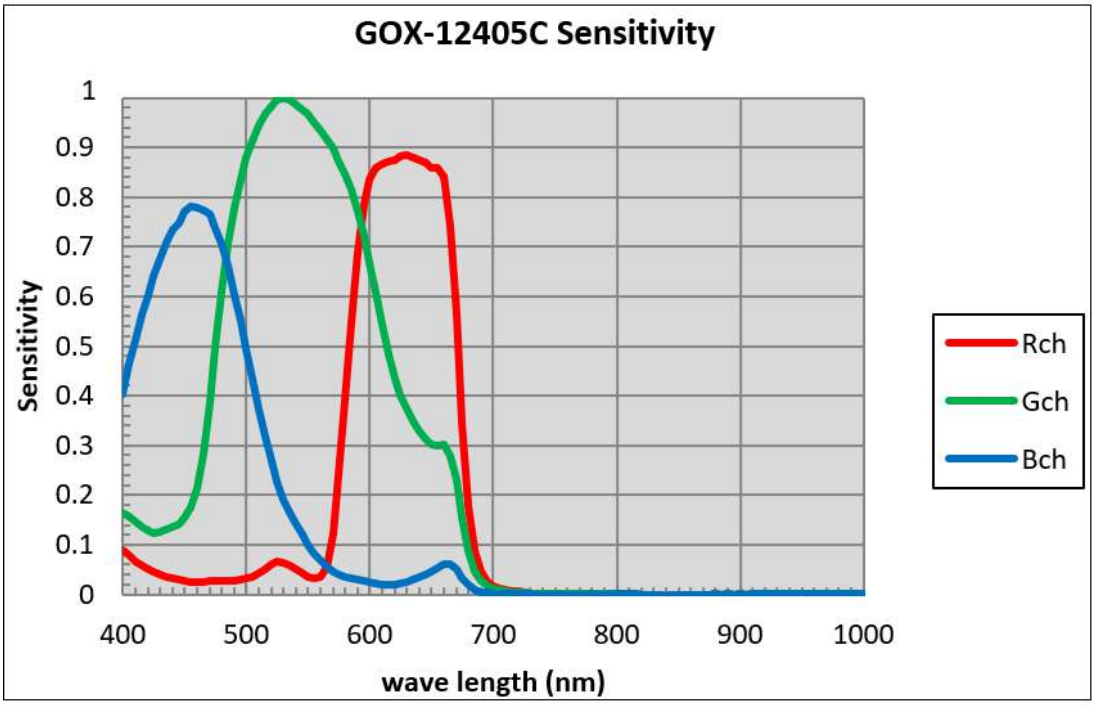
Spectral Response (GOX-8105M-CXP/GOX-8105C-CXP)



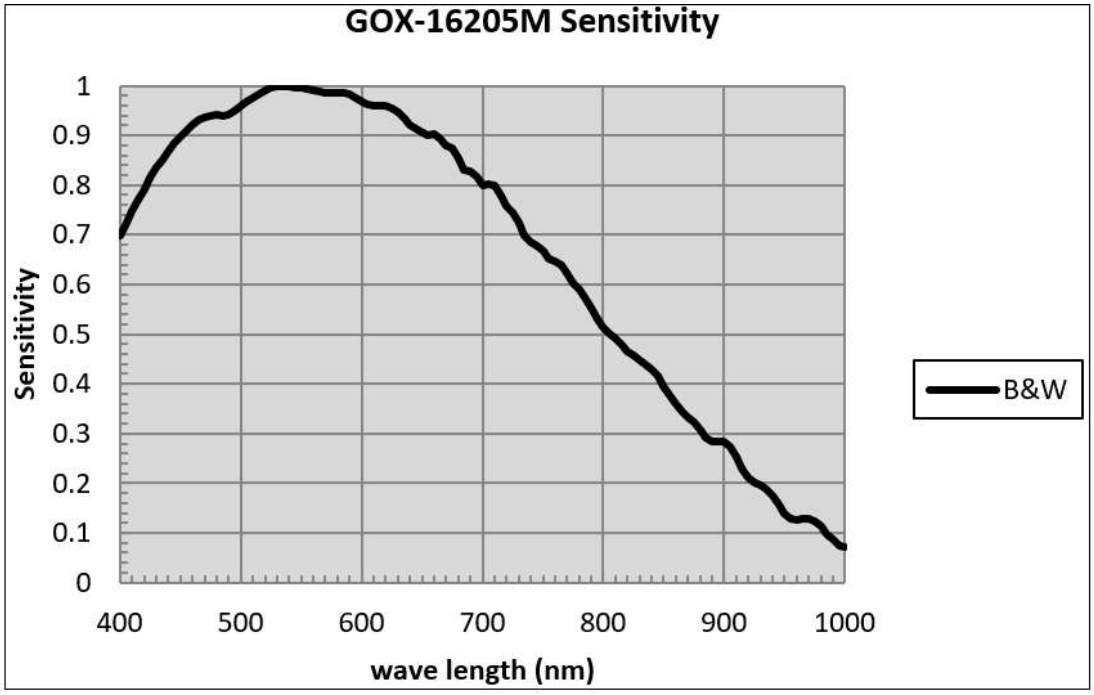


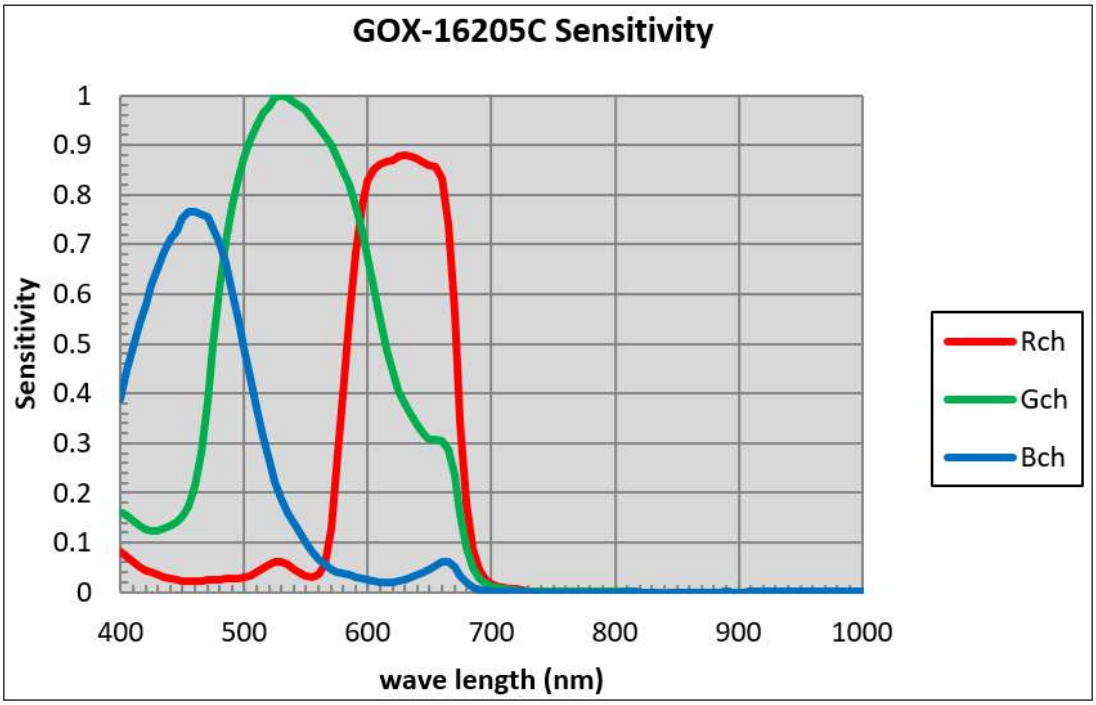
Spectral Response (GOX-12405M-CXP/GOX-12405C-CXP)



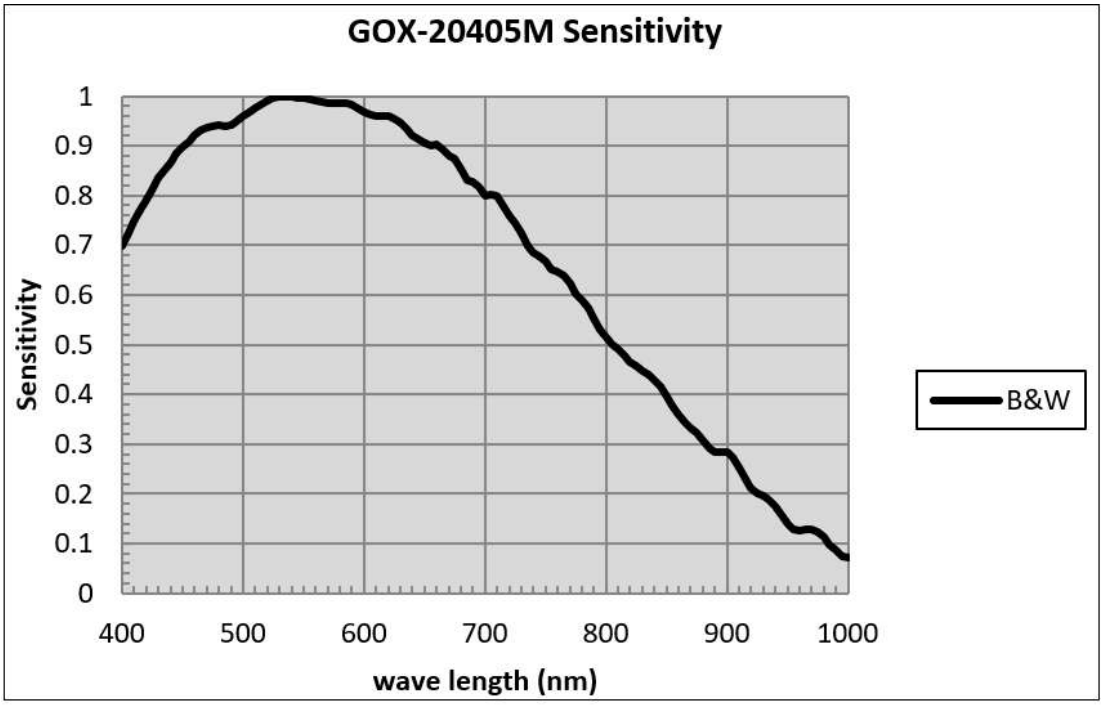


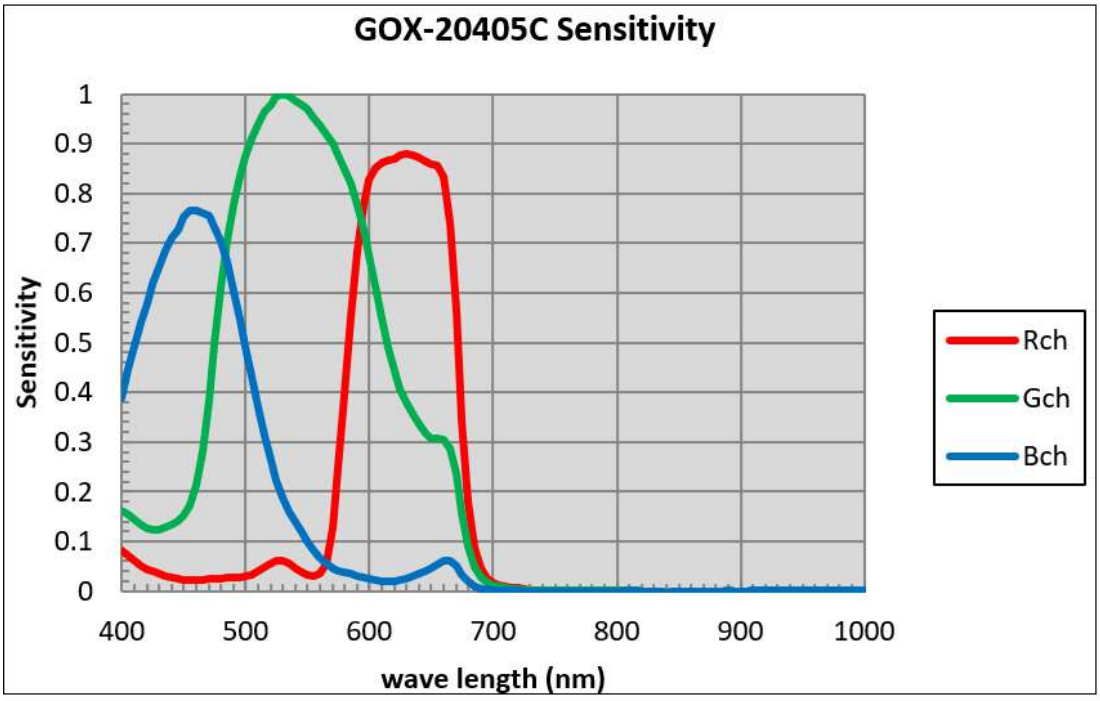
Spectral Response (GOX-16205M-CXP/GOX-16205C-CXP)



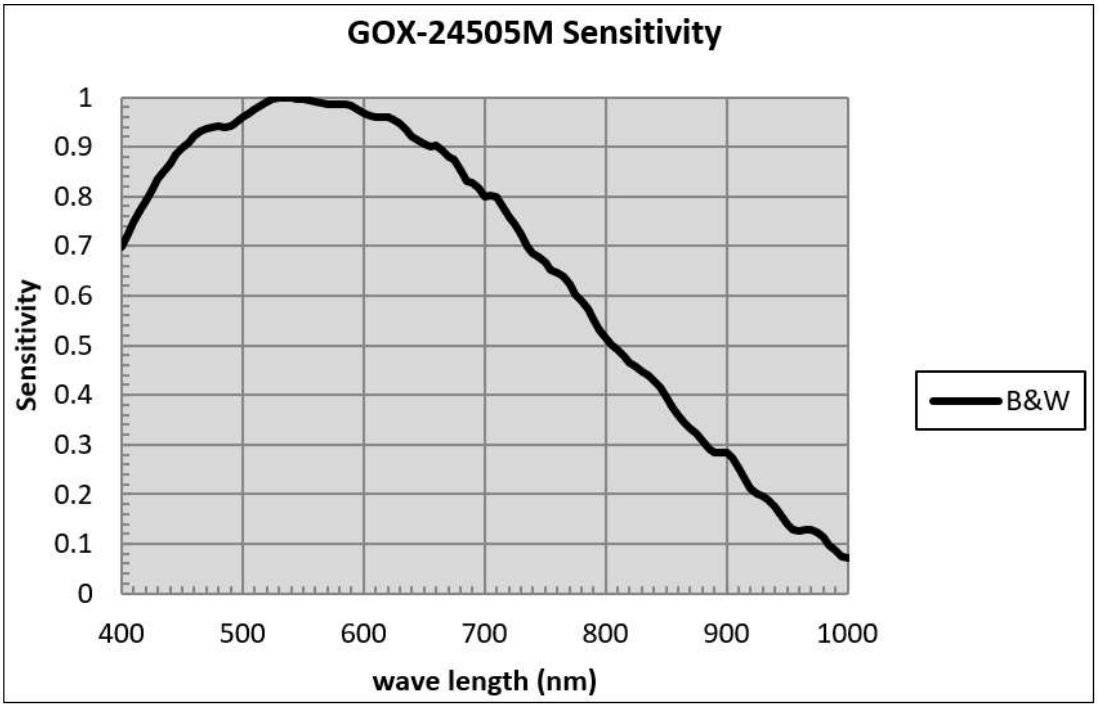


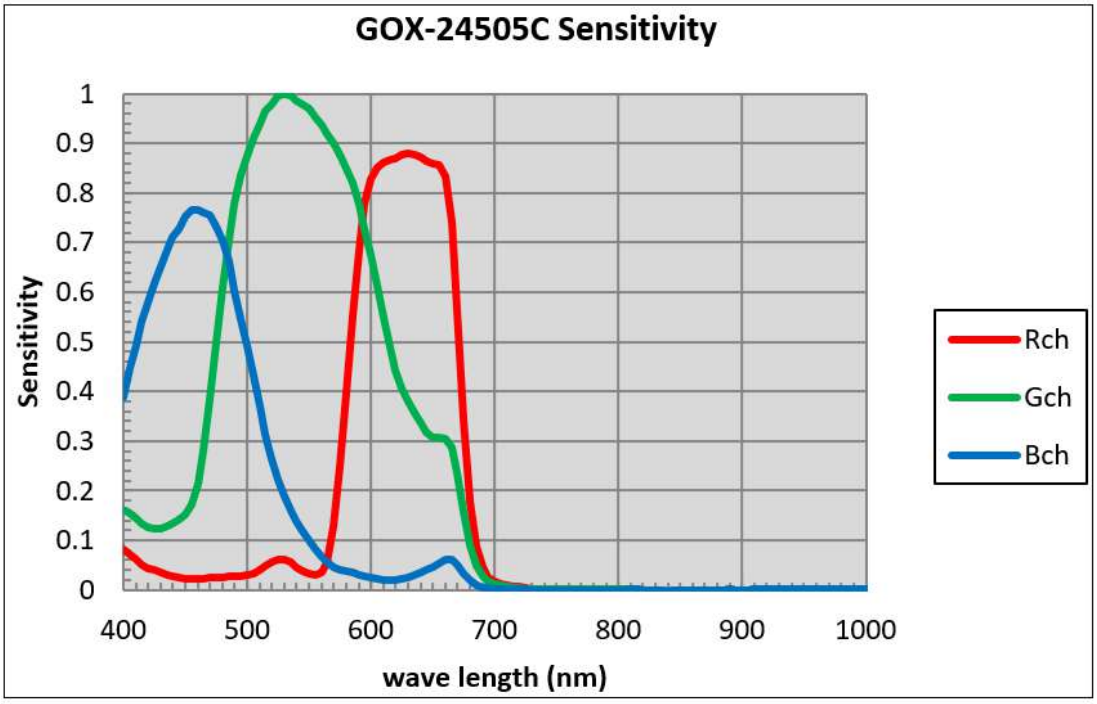
Spectral Response (GOX-20405M-CXP/GOX-20405C-CXP)



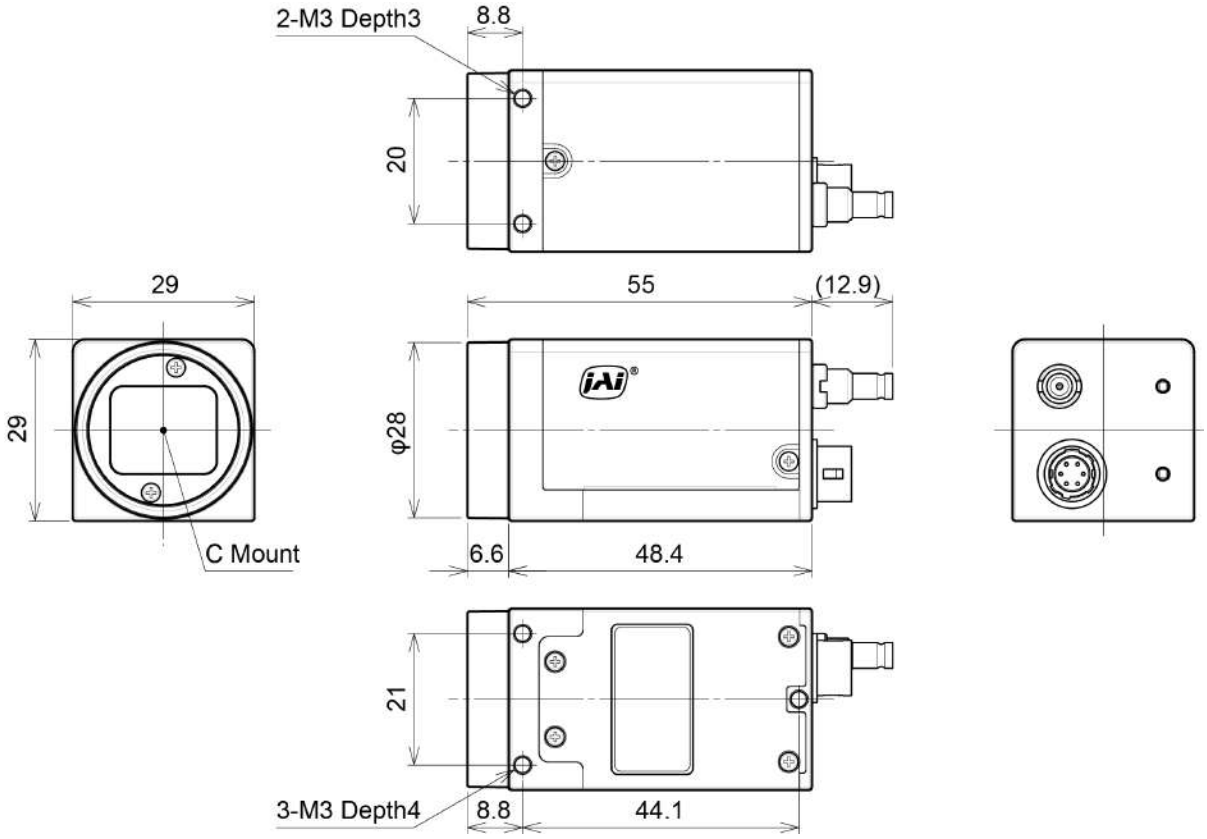


Spectral Response (GOX-24505M-CXP/GOX-24505C-CXP)





Dimensions



Notes:

- Dimensional tolerance: ± 0.3mm
- Unit: mm

Comparison of the Decibel Display and Multiplier Display

Decibels [dB]	Multipliers [X]	Remarks
-6	0.501	
-5	0.562	
-4	0.631	
-3	0.708	
-2	0.794	
-1	0.891	
0	1	
1	1.122	
2	1.259	
3	1.413	
4	1.585	
5	1.778	
6	1.995	
7	2.239	
8	2.512	
9	2.818	
10	3.162	
11	3.548	
12	3.981	
13	4.467	
14	5.012	
15	5.623	
16	6.31	
17	7.079	
18	7.943	
19	8.913	
20	10	
21	11.22	
22	12.589	
23	14.125	
24	15.849	
25	17.783	
26	19.953	
27	22.387	
28	25.119	
29	28.184	
30	31.623	
31	35.481	

Decibels [dB]	Multipliers [X]	Remarks
32	39.811	
33	44.668	
34	50.119	
35	56.234	
36	63.096	
37	70.795	
38	79.433	
39	89.125	
40	100	
41	112.202	
42	125.893	

User's Record

Camera type: Go-X Series Global Shutter CoaXPress interface

Model name: ……

Revision: ……

Serial No: ……

Firmware version: ……

For camera revision history, please contact your local JAI distributor.

Revision History

Revision	Date	Device Version	Changes
1.4	2022/06/22	DV0100	Updated the Exposure Mode section (Specifications).
1.3	2022/06/06	DV0100	Corrected the external input/output circuit diagrams (Recommended Circuit Diagram (Reference Examples)).
1.2	2022/05/13	DV0100	Corrected the default values for *PulseGeneratorLength* and *PulseGeneratorEndPoint* (PulseGenerator)
1.1	2022/05/09	DV0100	Added a note regarding the ExposureActive signal's pulse width (Timing Chart), and updated the timing chart diagrams accordingly. Corrected the 5105, 12405, and 20405 sensors' active area information (width, height, and diagonal).
1.0	2022/04/27	DV0100	First release.