See the possibilities

User Manual

GO-2400M-PMCL
GO-2400C-PMCL

2.35M Digital Progressive Scan Monochrome and Color Camera

Document Version: 1.1

GO-2400-PMCL_Ver.1.1_Aug.2016

Thank you for purchasing this product.

Be sure to read this manual before use.

This manual includes important safety precautions and instructions on how to operate the unit. Be sure to read this manual to ensure proper operation, and store it safely for future use.

Contents

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.

Company and product names mentioned in this manual are trademarks or registered trademarks of their respective owners.

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 GO-2400M-PGE and GO-2400C-PGE comply with the following provisions applying to its standards.
EN 61000-6-3 (Generic emission standard part 1)
EN 61000-6-2 (Generic immunity standard part 1)

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.

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.

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SJ/T11363-2006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SJ/T11363-2006规定的限量要求。
（企业可在此处、根据实际情况对上表中打 " × " 的技术原因进行进一步说明。）

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基人身、财产造成严重损害的期限。
数字「15」为期限15年。

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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SJ/T11363-2006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SJ/T11363-2006规定的限量要求。
（企业可在此处、根据实际情况对上表中打 " × " 的技术原因进行进一步说明。）

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数字「15」为期限15年。

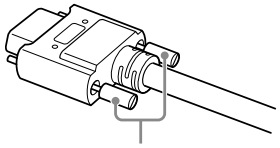
Usage Precautions

Notes on cable configurations

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

Notes on Camera Link cable connections

Secure the locking screws on the connector manually, and do not use a driver. Do not secure the screws too tightly. Doing so may wear down the screw threads on the camera. (Tightening torque: 0.291±0.049 N·m or less)



Secure manually.
Do not secure too tightly.

Notes on attaching the lens

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, more than the allowable amount of charge of the sensor element in the COMS image sensor (pixel) and the charge is overflowing, enters into the surrounding pixels, and blooming may occur. However, this does not affect actual operation.
- 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

The GO-2400M-PMCL/GO-2400C-PMCL is an industrial progressive scan camera equipped with a 1/1.2-inch global shutter CMOS image sensor with 2.35 effective megapixels (1936 × 1216). The unit is compact and lightweight in design and is equipped with Camera Link Ver. 2.0 compatible interface.

❖ The GO-2400M-PMCL produces monochrome output while the GO-2400C-PMCL produces color output.

Compact and lightweight

The unit's compact (approx. 29 × 29 × 41.5 mm (excluding the lens)) and lightweight (approx. 46 g) design allows for easy assembly and installation.

Camera Link Ver. 2.0 compatible interface

- High-speed transfer at up to 850 MByte/s of uncompressed data, the ideal format for image processing.
- Maximum cable length of 10 m.
- Support for PoCL (Power over Camera Link) allowing you to supply power to the camera via the Camera Link cable.

Note

To power the camera via Camera Link, the frame grabber board you are using must support PoCL. You can also supply power via the 4-pin connector. A separate power supply and/or conversion cable (not supplied) is required.

Output formats

You can choose from 8-bit, 10-bit, and 12-bit for both monochrome and color outputs.

* As the color camera cannot perform white balance when using 12-bit output, perform white balance on the application.

High frame rate

Both the GO-2400M-PMCL and GO-2400C-PMCL are capable of frame rates of up to 165.5 fps (for the 8-bit format) and 2.35 megapixel outputs. Even faster frame rates can be achieved by using binning (GO-2400M-PMCL only) or by specifying smaller scanning areas for the ROI (region of interest).

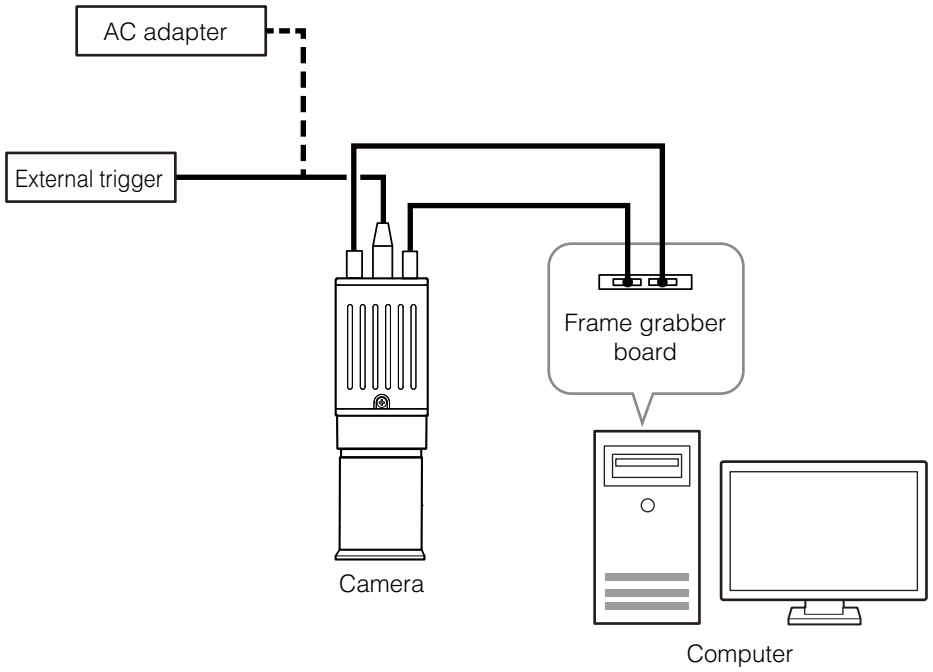
ALC (automatic lighting control) function

Combine the automatic gain control and automatic exposure control functions to allow handling of changes in various brightnesses.

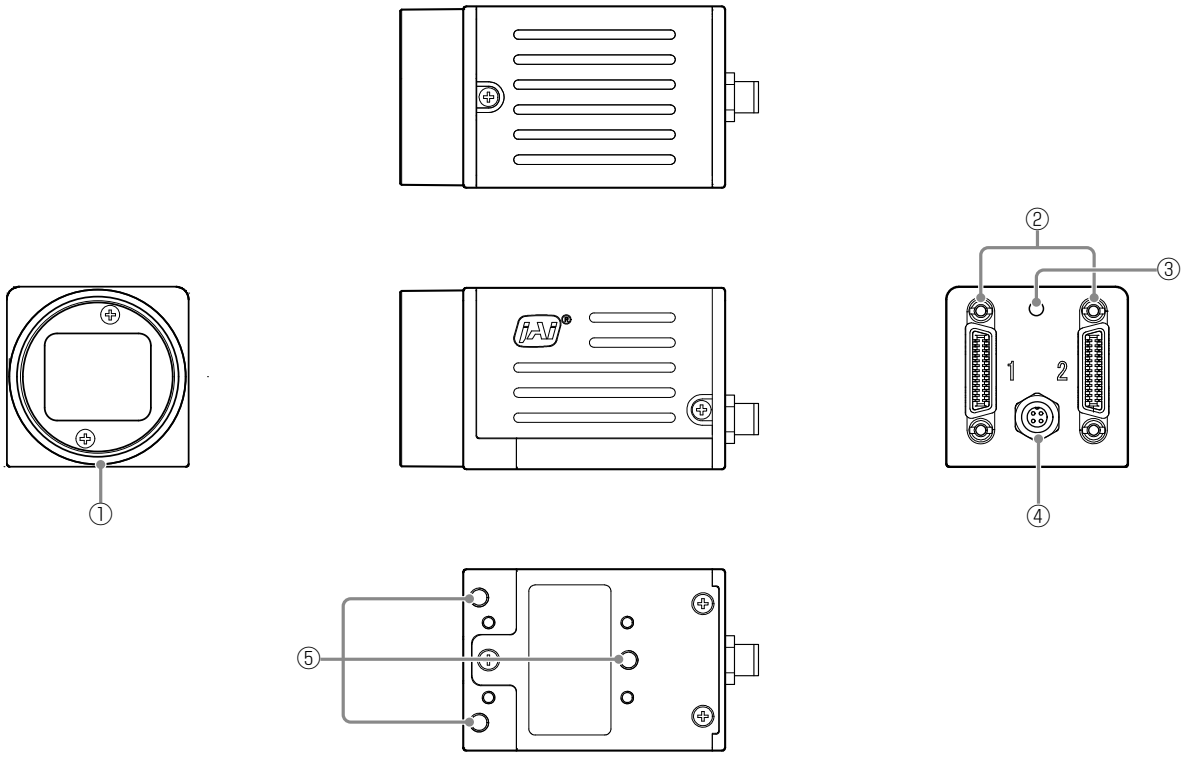
Variety of pre-process functions

- LUT (Lookup Table)
  Programmable control over gamma and contrast is possible.
- Gamma correction
  Gamma can be set to 0.45, 0.60, or 1.0 (off).
- Shading correction (flat field and color shading)
  Non-uniformity (i.e., shading) in the amount of light generated by the lens and lighting equipment can be corrected.
- Bayer white balance (GO-2400C-PMCL only)
  Automatically adjust white balance continuously. It can also be adjusted manually using R, and B gain.

Connection example:



Parts Identification



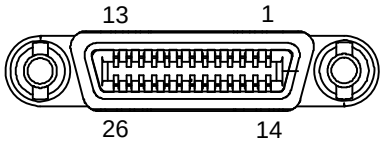
① Lens mount (C-mount)

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

❖ Before mounting a lens, be sure to refer to “Step 2: Connecting Devices” (page 13) and confirm the precautions for attaching a lens and the supported lens types.

② Mini Camera Link connector

Connect a cable that is compatible with Mini Camera Link (SDR) connectors here.



Camera side: HONDA HDR-EC26FYTG2-SL+

Port 1

Pin No.	Input/output	Signal	Description
1, 26		Power	Power
2(–), 15(+)	Out	X_OUT0	Data out
3(–), 16(+)	Out	X_OUT1	
4(–), 17(+)	Out	X_OUT2	
5(–), 18(+)	Out	X_Clk	CL Clock
6(–), 19(+)	Out	X_OUT3	Data out
7(+), 20(–)	In	SerTC (RxD)	LVDS Serial Control
8(–), 21(+)	Out	SerTFG (TxD)	
9(–), 22(+)	In	CC1 (Trigger)	JAI standard trigger
10(+), 23(–)	In	CC2 (Reserved)	
11, 24		N.C	
12, 25		N.C	
13, 14		Shield	Power Return

Port 2

Pin No.	Input/output	Signal	Description
1, 26		Power	Power
2(–), 15(+)	Out	Y_OUT0	Data out
3(–), 16(+)	Out	Y_OUT1	
4(–), 17(+)	Out	Y_OUT2	
5(–), 18(+)	Out	Y_Clk	CL Clock
6(–), 19(+)	Out	Y_OUT3	Data out
7(+), 20(–)		N.C	
8(–), 21(+)	Out	Z_OUT0	Data out
9(–), 22(+)	Out	Z_OUT1	
10(+), 23(–)	Out	Z_OUT2	
11(–), 24(+)	Out	Z_Clk	CL Clock
12(–), 25(+)	Out	Z_OUT3	Data out
13, 14		Shield	Power Return

③ Power/trigger LED

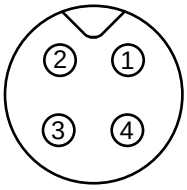
Indicates the power and trigger input status.

LED status and camera status

LED	Light	Status
Power / trigger LED	Lit amber	Camera initializing.
	Lit green	Operational and no triggers being input.
	Blinking green	Operational and triggers being input. ❖ The blinking interval is not related to the actual input interval of the external trigger.

④ DC IN / trigger IN connector (4-pin round)

Connect the cable for a VA-044G Power Supply (optional) or for DC IN /trigger IN here.



Compatible connectors

Camera side: 09-3111-81-04 (Binder)

Cable side: 79-3108-52-04 (Binder) AWG 26

or

79-3108-32-04 (Binder) AWG 24

Pin No.	Input/output	Signal	Description
1	Power In	DC (+12 V) In	DC 12 V to 24 V +/– 10%
2	In	TTL In	Line 4
3	Out	TTL Out	Line 1
4	Out	Power GND	COMMON GND

Preparation

Preparation Flow

Step 1	Installing the Software (first time only) Install the software for configuring and controlling the camera (JAI SDK) on the computer.
⬇	
Step 2	Connecting Devices Connect the lens, Camera Link cable, AC adapter, computer, and other devices.
⬇	
Step 3	Verifying the Camera's Network Connection Status Verify whether the camera is ready for use via the LEDs at the rear of the camera.
⬇	
Step 4	Configuring Initial Settings for the Camera • Configure the output format. • Configure the exposure and external trigger settings.
⬇	
Step 5	Adjusting the Image Quality • Adjust the gain and white balance. • Adjust the exposure (shutter).
⬇	
Step 6	Configuring Various Other Settings Configure various other settings as necessary.
⬇	
Step 7	Saving the Settings Save the current setting configurations as user memory.

Step 1: Installing the Software (first time only)

When using the camera for the first time, install the software for configuring and controlling the camera (JAI SDK) on the computer.

❖ When you install JAI SDK, JAI Camera Control Tool will also be installed.

1 Download the "JAI - Getting Started Guide" and JAI SDK from the JAI website.

URL http://www.jai.com/en/support/jai_sdk_and_control_tool

2 Refer to the "JAI - Getting Started Guide," and install JAI SDK on the computer.

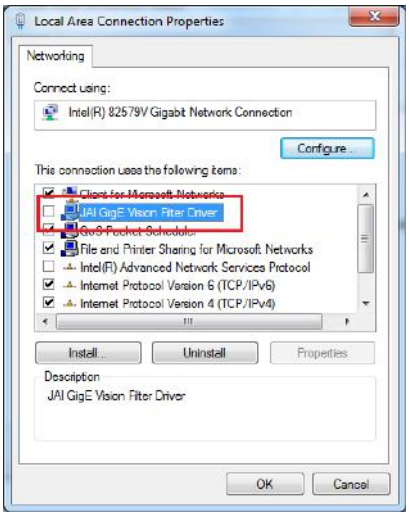
The computer will restart when installation is complete.

Note

When the JAI SDK is installed, a camera driver for the interface is also part of the default installation. This Vision Filter Driver is added to every NIC/port on the host computer. As the driver is also added to the NIC/port for Internet connection, it may affect Internet access speed on some systems. If you think your Internet speed is affected, configure the following settings to disable the filter driver on that port.

❶ Open [Control Panel] → [Network and Internet] → [Connect to a network], and right-click the port used for Internet connection to open the properties dialog box.

❷ Clear the [JAI GigE Vision Filter Driver] checkbox, and save.



3 Verify the settings for using Camera Link.

The GO-2400-PMCL supports GenICam and Gen-CP. Check the following settings when controlling the camera via JAI SDK.

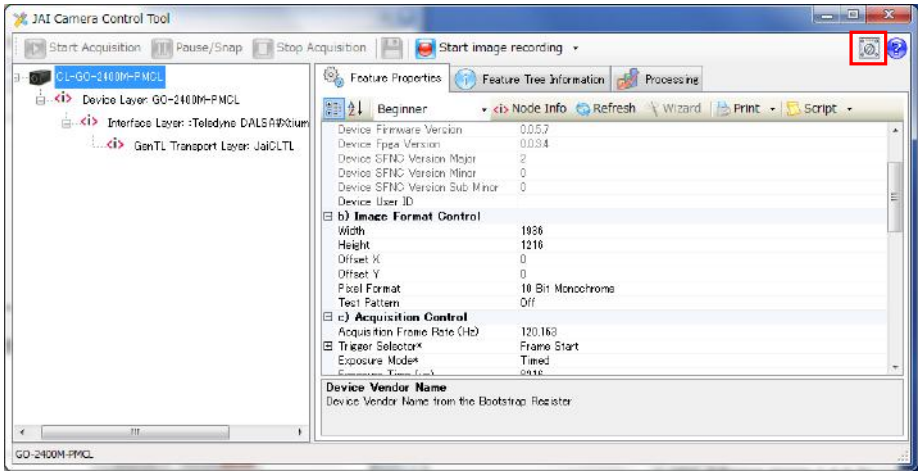
Checking the frame grabber board's settings

Settings must be configured on the frame grabber board to enable Gen-CP support.

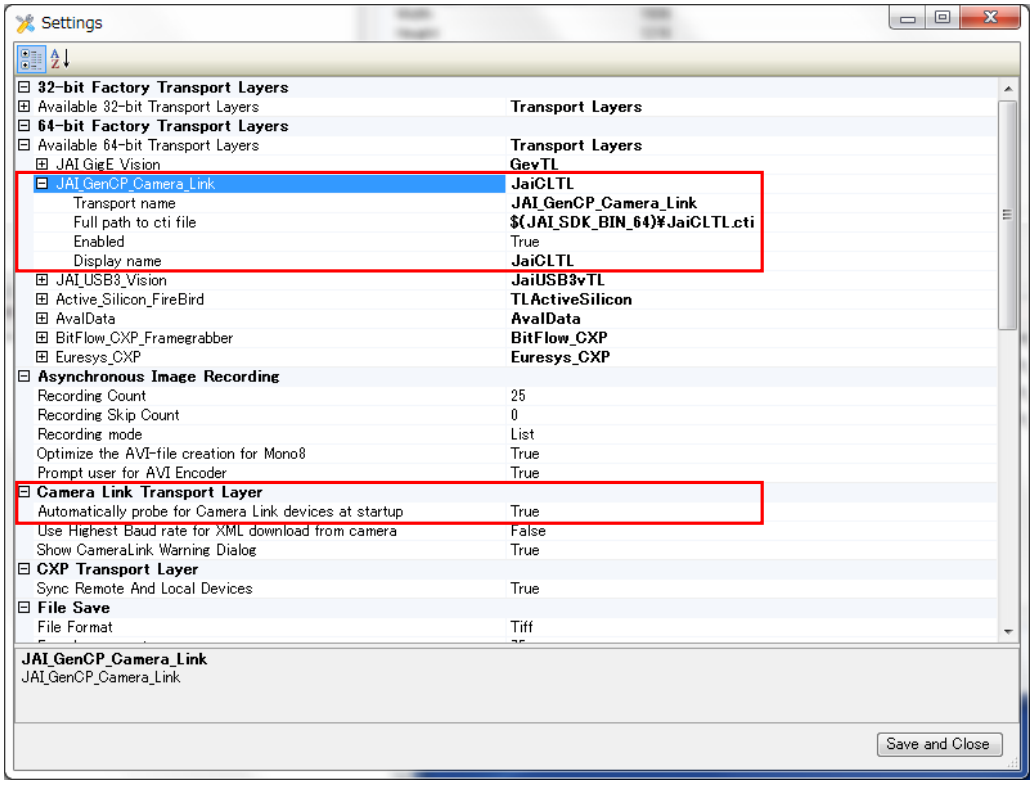
For details, refer to the operating instructions for each board.

Checking JAI SDK's settings

❶ Start JAI Control Tool, and click the  (Settings) icon at the top right.

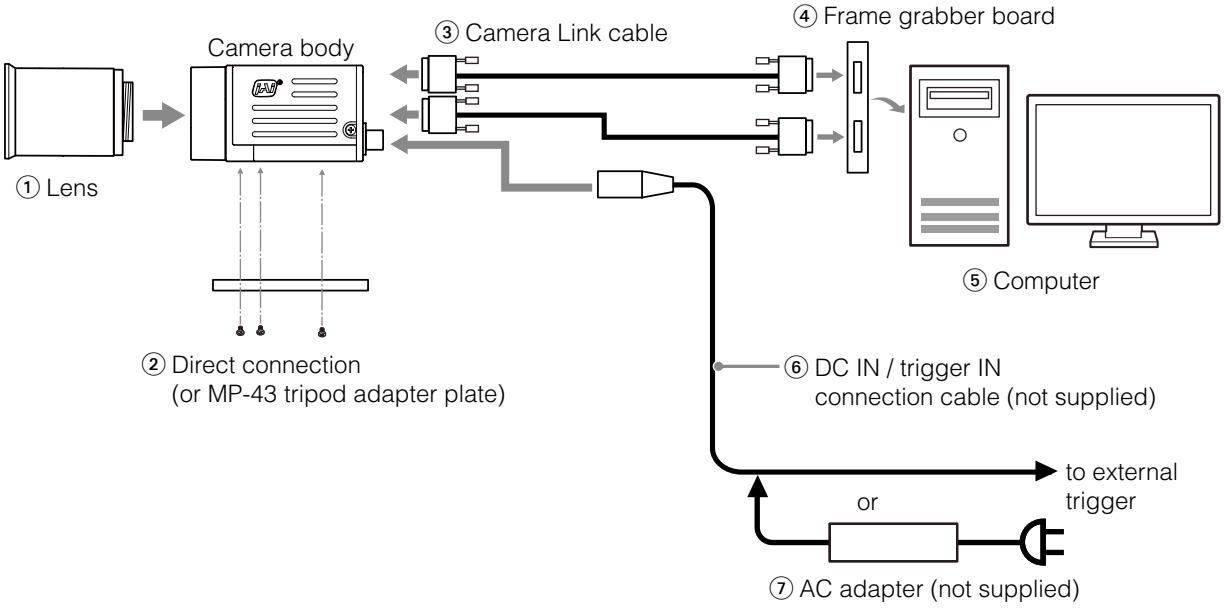


❷ Check that the [JAI_GenCP_Camera_Link] and [Camera Link Transport Layer] settings are configured as follows.



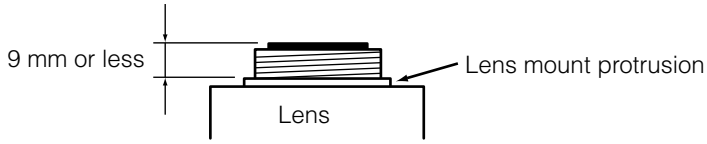
Step 2: Connecting Devices

Connect the lens, Camera Link cable, AC adapter, and other necessary devices.
Attach the lens in a clean environment to prevent dust from adhering to the unit.



① Lens

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



- The diagonal of the camera's CMOS image sensor is smaller at 13.4 mm than the 16 mm of 1-inch models. To prevent vignetting and to obtain the optimal resolution, use a 1-inch lens.

Caution

- The maximum performance of the camera may not be realized depending on the lens.
- Attaching a lens with a mount protrusion longer than 9.1 mm may damage the lens or camera.

Note

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 (11.3 mm on this camera)

② Direct connection (or MP-43 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. (Large: M3, small: M2, depth: 3 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.

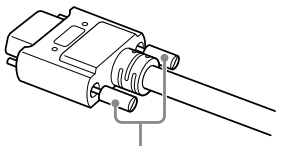
③ Camera Link cable

Connect the Camera Link cable to the Mini Camera Link connector.

- Use a cable that supports the Camera Link standard and is compatible with Mini Camera Link (SDR) connectors.
- Refer to the specifications of the cable for details on its bend radius.
- For details on the cable, see “2 Mini Camera Link connector” (page 9).

Caution

Secure the locking screws on the connector manually, and do not use a driver. Do not secure the screws too tightly. Doing so may wear down the screw threads on the camera. (Tightening torque: 0.291±0.049 N·m or less)



Secure manually.
Do not secure too tightly.

④ Frame grabber board

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

⑤ Computer

Use a computer that meets the following requirements.

Operating system (OS):

Microsoft Windows Vista 7/8 32-bit/64-bit edition

CPU: Intel Core i3 or higher

Memory:

Windows 7/8 32-bit edition: DDR3, 4 GB or higher

Windows 7/8 64-bit edition: DDR3, 8 GB or higher

Graphics card: PCI-Express 3.0 or higher

⑥ DC IN / trigger IN connection cable

⑦ AC adapter (if desired)

Connect an AC adapter to the DC IN / trigger IN connector on the camera. For details on the connector, see "④ DC IN / trigger IN connector (4-pin round)" (page 10).

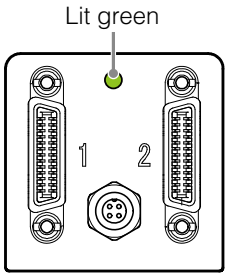
❖ The AC adapter is not required when using PoCL.

Step3: Verifying the Camera Connection Status

When the necessary devices are connected and power is supplied to the camera, the power / trigger LED at the rear of the camera lights amber, and initialization of the camera starts.
When initialization is complete, the power / trigger LED lights green.

Verify whether power is being supplied to the camera and whether the camera is operational by checking the rear LED.

During normal status



❖ For details on how to read the LED, see "LED status and camera status" (page 10) in the "Parts Identification" section.

Note

Initialization of the camera will not complete unless connection with the host is established. If the power / trigger LED does not switch to green within minutes of supplying power, check the Camera Link cable and other connections. After initialization is completed once, the power / trigger LED will remain green, even if the connection with the host is severed.

Step 4: Configuring Initial Settings for the Camera

Start Control Tool, connect the camera to the frame grabber board, and configure initial settings for the output format, exposure, external trigger, etc.

Connecting to the Camera to Control Tool

1 Start JAI Control Tool.

Cameras connected to the frame grabber board are detected, and a window appears. If they do not appear, right-click inside the window and select [Search for Cameras].

2 Select the camera you want to configure.

3 Check that the settings of the selected camera are displayed.

Configuring the Output Format

Configure the size, position, and pixel format of the images to be captured.
The factory default settings are as follows. Change the settings as necessary.

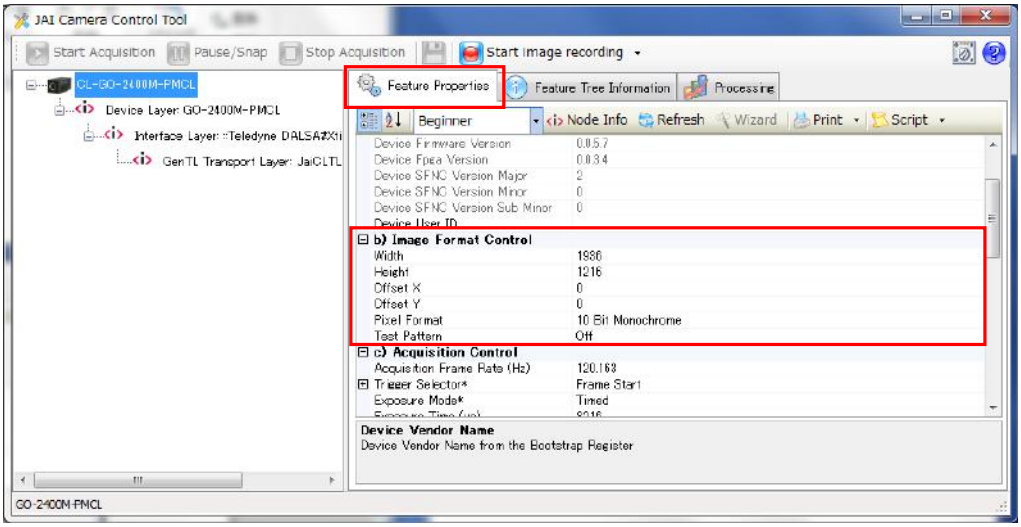
Factory default values

Item		Default value
Image Format Control	Width	1936 (pixels)
	Height	1216 (pixels)
	Offset X (horizontal position)	0 (pixels)
	Offset Y (vertical position)	0 (pixels)
	Pixel Format	GO-2400M-PGE: 8 Bit Monochrome GO-2400C-PMCL: 8 Bit Bayer RG

❖ You can specify the image capture area. For details, see “ROI (Regional Scanning Function)” (page 44).

1 Select the [Feature Properties] tab, and select the item you want to configure under [Image Format Control].

 when a configurable item is selected.

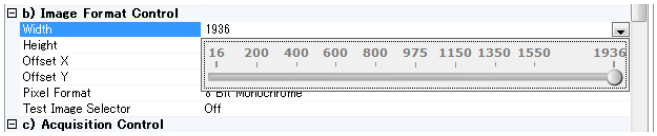


Note

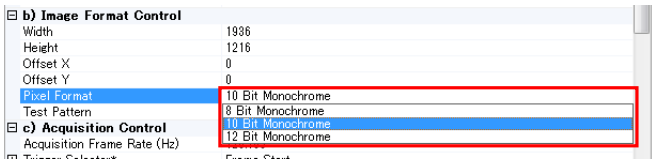
Settings can only be changed when image capture on the camera is stopped. If an item is grayed out and  does not appear even when you select it, click  (Stop Acquisition) to stop image capture.

2 Click  and change the setting value.

Example: When changing [Width]



Example: When changing [Pixel Format]



Note

Direct entry of numerical and text values is possible for some setting items.

Configuring Exposure and External Trigger Settings

Configure settings related to exposure control methods and trigger control.
The factory default settings are as follows. Change settings as necessary, according to the intended purpose or application.

Factory default values

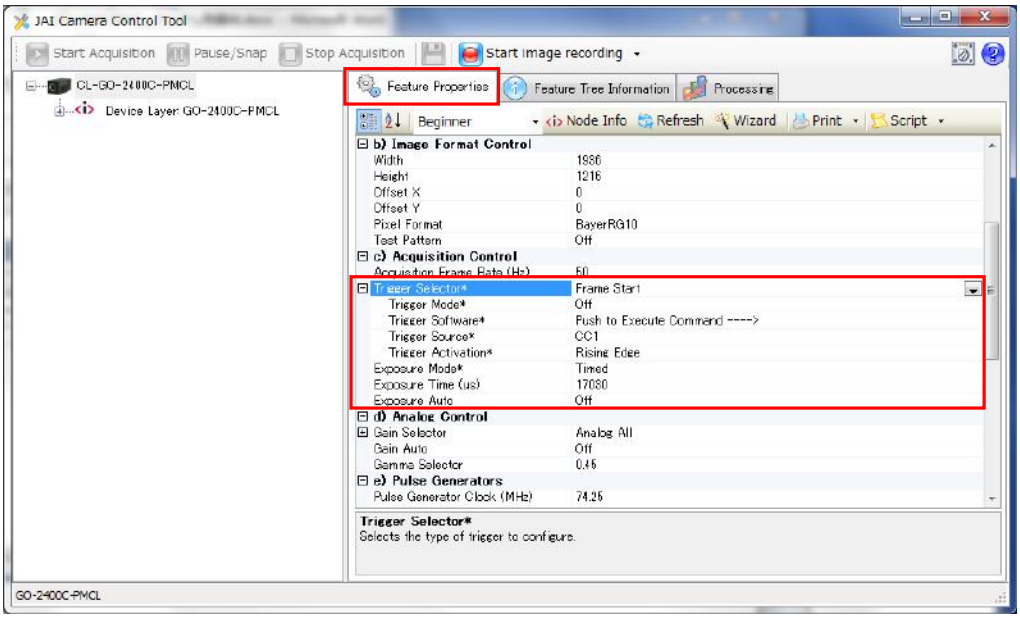
Item		Default value
Trigger Selector (trigger operation)		Frame Start
	Trigger Mode	Off
	Trigger Source (trigger signal source)	Line7 CC1
	Trigger Activation (trigger polarity)	Rising Edge (rising edge of input signal)
Exposure Mode		Timed (control via exposure time)
Exposure Time		20363 (µs)
Exposure Auto *		Off

* This item is only enabled when [Exposure Mode] is set to [Timed].

Caution

When [Exposure Mode] is set to [Off], [Trigger Mode] cannot be set to [On]. Other settings may also be restricted depending on the [Exposure Mode] setting, so be sure to set the [Exposure Mode] setting before configuring the trigger settings.

Expand [Acquisition Control] and configure the following items.



Caution

Settings can only be configured when image capture on the camera is stopped. If an item is grayed out and the setting cannot be changed, stop image capture beforehand.

■ Exposure times

Exposure times vary depending on the Tap Geometry and CL Pixel Clock settings. Refer to the following table.

Tap Geometry	CL Pixel Clock (MHz)	Max. exposure time value A	Longest exposure time [msec]	Shortest exposure time [usec]
1X2-1Y	37.125	Frame Period -342 [usec]	7999.658	79
1X2-1Y	74.25	Frame Period -171 [usec]	7999.829	40
1X2-1Y	84.85	Frame Period -162 [usec]	7999.838	38
1X3-1Y	37.125	Frame Period -252 [usec]	7999.748	59
1X3-1Y	74.25	Frame Period -114 [usec]	7999.886	27
1X3-1Y	84.85	Frame Period -100 [usec]	7999.900	24
1X4-1Y	37.125	Frame Period -172 [usec]	7999.828	40
1X4-1Y	74.25	Frame Period -86 [usec]	7999.914	20
1X4-1Y	84.85	Frame Period -81 [usec]	7999.919	19
1X8-1Y	37.125	Frame Period -88 [usec]	7999.912	21
1X8-1Y	74.25	Frame Period -63 [usec]	7999.937	15
1X8-1Y	74.25	Frame Period -81 [usec]	7999.919	19
1X8-1Y	84.85	Frame Period -63 [usec]	7999.937	15
1X8-1Y	84.85	Frame Period -81 [usec]	7999.919	19

Control via External Triggers

When Controlling the Exposure Time Using Specified Exposure Times

Configure the settings as follows.

Item		Setting value / selectable range
Trigger Selector (trigger operation)		Frame Start
	Trigger Mode	On
	Trigger Source (trigger signal source)	Any
	Trigger Activation (trigger polarity)	Rising Edge (rising edge of input signal), Falling Edge (falling edge of input signal)
Exposure Mode		Timed (control via exposure time)
Exposure Time		Varies depending on the Tap Geometry and CL Pixel Clock settings. * 1
Exposure Auto		Off, Continuous

* 1 Max. value = [Acquisition Frame Rate] - Max. exposure time value A (“Exposure times” (page 19))

1 Set [Exposure Mode] to [Timed].

([Timed] is the default setting.)

2 Specify the exposure time in [Exposure Time].

The setting value for the exposure time can only be changed when [Exposure Auto] is set to [Off]. If [Exposure Auto] is set to [Continuous], temporarily set it to [Off] before changing the [Exposure Time].

3 Set [Trigger Selector] to [Frame Start].

([Frame Start] is the default setting.)

4 Set [Trigger Mode] to [On].

5 If necessary, change the [Trigger Source], [Trigger Activation], and [Exposure Auto] settings.

When controlling the exposure time using the pulse width of the trigger input signal

Configure the settings as follows.

Item		Setting value / selectable range
Trigger Selector (trigger operation)		Frame Start
	Trigger Mode	On
	Trigger Source (trigger signal source)	Any
	Trigger Activation (trigger polarity)	Level High (high-level duration), Level Low (low-level duration)
Exposure Mode		Trigger Width (control via trigger width)

1 Set [Exposure Mode] to [Trigger Width] .

When you select [Trigger Width], [Trigger Mode] will automatically be set to [On].

2 Set [Trigger Selector] to [Frame Start].

([Frame Start] is the default setting.)

3 If necessary, change the [Trigger Source] and [Trigger Activation] settings.

Control without external triggers

When controlling the exposure time using specified exposure times

Configure the settings as follows.

Item	Setting value / selectable range
Trigger Selector (trigger operation)	Frame Start
Trigger Mode	Off
Exposure Mode	Timed (control via exposure time)
Exposure Time	Varies depending on the Tap Geometry and CL Pixel Clock settings. * 1
Exposure Auto	Off, Continuous

* 1 Max. value = [Acquisition Frame Rate] - Max. exposure time value A (“Exposure times” (page 19))

1 Set [Exposure Mode] to [Timed].

([Timed] is the default setting.)

2 Specify the exposure time in [Exposure Time].

The setting value for the exposure time can only be changed when [Exposure Auto] is set to [Off]. If [Exposure Auto] is set to [Continuous], temporarily set it to [Off] before changing the [Exposure Time].

3 Set [Trigger Mode] to [On].

4 If necessary, change the [Exposure Auto] setting.

When not controlling the exposure time

Configure the settings as follows.

Item	Setting value / selectable range
Exposure Mode	Off

The exposure will be performed with an exposure time equal to 1 / frame rate.

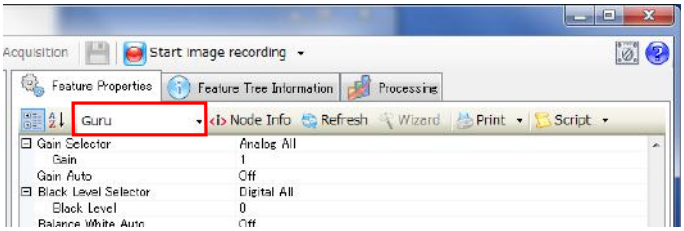
* The [Exposure Time] setting will be disabled, and the [Exposure Auto] function cannot be used.

Step 5: Adjusting the Image Quality

Adjust the image quality using the gain and white balance (GO-2400C-PMCL only) functions.

To adjust the image quality

The display level must be changed from [Beginner] to [Guru].



Adjusting the Gain

Adjust the sensitivity via the analog gain (i.e., master gain).

❖ For details on gain control, see “Gain Control” (page 39) in the "Main Functions" section.

■ Manual adjustment

1 Expand [Analog Control], and set [Gain Auto] to [Off].

([Off] is the default setting.)

2 Configure the gain.

❶ Expand [Analog Control], and select the gain you want to configure in [Gain Selector].

- For the GO-2400M-PMCL, only [Analog All] (master gain) can be configured.
- For the GO-2400C-PMCL, [Analog All] (master gain), [Digital Red] (digital R gain), and [Digital Blue] (digital B gain) can be configured individually.

❷ Configure the gain value in [Gain].

- The [Digital All] (master gain) can be set to a value from x1 to x16 (0 dB to +24 dB) the analog base gain value. The resolution is set in x0.01 steps (0.05 dB to 0.08 dB depending on the setting value). Values are configured by multipliers. For example, the values set for x1 and x16 are 100 and 1600 respectively.
- For the GO-2400C-PMCL, the [Digital Red] (digital R gain) and [Digital Blue] (digital B gain) can be set to a value from x0.45 to x5.62 (–7 dB to +15 dB) the [Digital All] (master gain) value. The resolution is set in 0.1 dB steps. Specify 0 for 0 dB, negative values for settings below 0, and positive values for settings above 0.

Adjusting the White Balance (GO-2400C-PMCL only)

Adjust the white balance using R, and B gain. The white balance can also be adjusted automatically.

■ Manual white balance adjustment

1 Expand [Analog Control], and set [Balance White Auto] to [Off].

([Off] is the default setting.)

2 Select the gain to configure in [Gain Selector], and set the gain value in [Gain].

■ 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 spot lights from entering the screen.

2 Select the [Balance White Auto] tab, and click [Continuous] or [Once] depending on your intended application.

The white balance is automatically adjusted.

Adjusting the Black Level

1 Expand [Analog Control] and select the black level you want to configure in [Black Level Selector].

For the GO-2400M-PMCL, only [Digital All] (master black) can be configured.

For the GO-2400C-PMCL, [Digital All] (master black), [Digital Red] (digital R), and [Digital Blue] (digital B) can be configured individually.

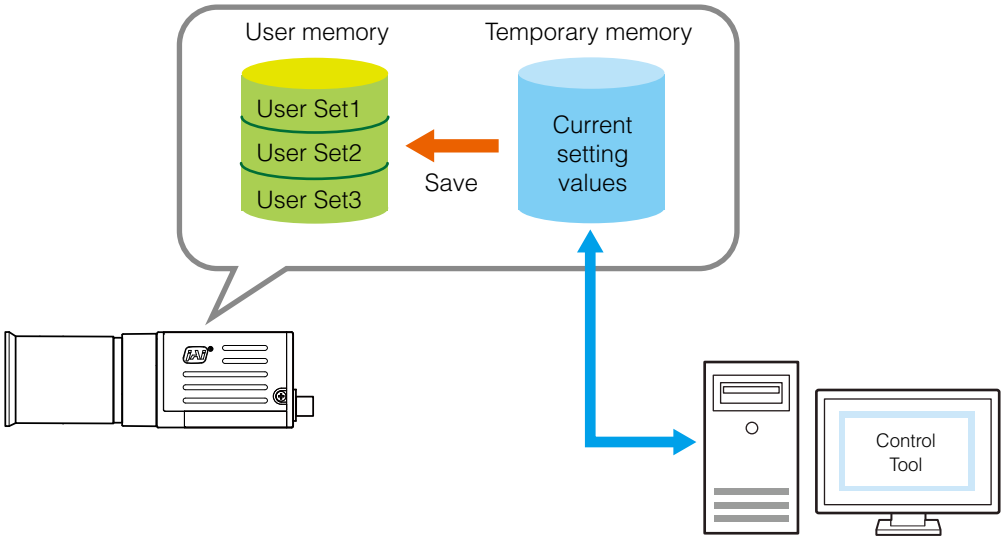
2 Specify the adjustment value in [Black Level].

Step 6: Configuring Various Other Settings

See “Settings List” (page 57), and configure settings as necessary.

Step 7: Saving the Settings

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



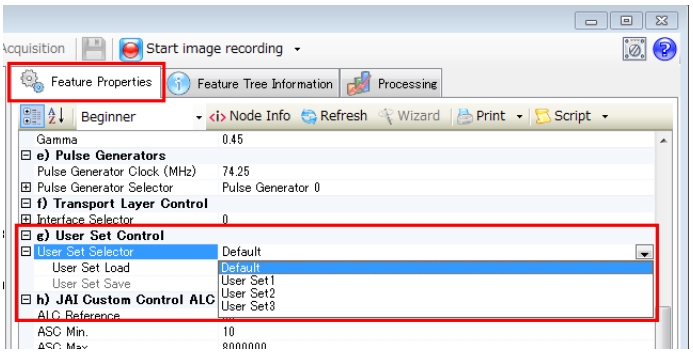
Note

The setting values are not saved to the computer (Control Tool).

■ To save user settings

1 Stop image capture.

2 Expand [User Set Control] and select the save destination ([User Set1] to [User Set3]) in [User Set Selector].



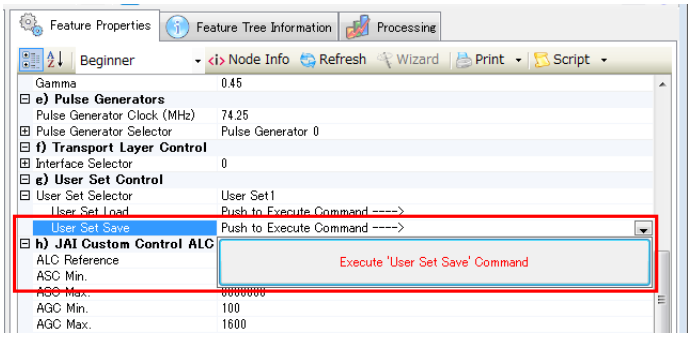
Note

The factory default setting values are stored in [Default] and cannot be overwritten.

Caution

Settings can only be saved when image capture on the camera is stopped.

3 Select [User Set Save], and click [Execute 'User Set Save' Command].



The current setting values are saved as user settings.

■ To load user settings

1 Stop image capture.

User settings can only be loaded when image capture on the camera is stopped.

2 Select the settings to load (Default, and User Set1 to User Set3) in [User Set Selector].

3 Select [User Set Load], and click [Execute 'User Set Load' Command].

The selected user settings are loaded.

❖ The next time the unit is started up, the settings selected in [User Set Selector] will be loaded automatically.

Basic Function Matrix

The combinations of settings for the basic functions that can be used together are as follows.

Exposure Mode	Frame Start Trigger	Exposure Time	ROI	Balance White Auto*1	Gain Auto	Exposure Auto	Video Send Mode		
							Sensor Multi ROI	Trigger Sequence Mode	Command Sequence Mode
Off	Off	×	○	○	○	×	○	×	×
Timed	Off	○	○	○	○	○	○	×	○
Timed (EPS)	On	○	○	×	×	×	○	○	○
Trigger Width	On	×	○	×	×	×	○	×	×

* 1 Operates only on the GO-2400C-PMCL

Main Functions

GPIO (Digital Input/Output Settings)

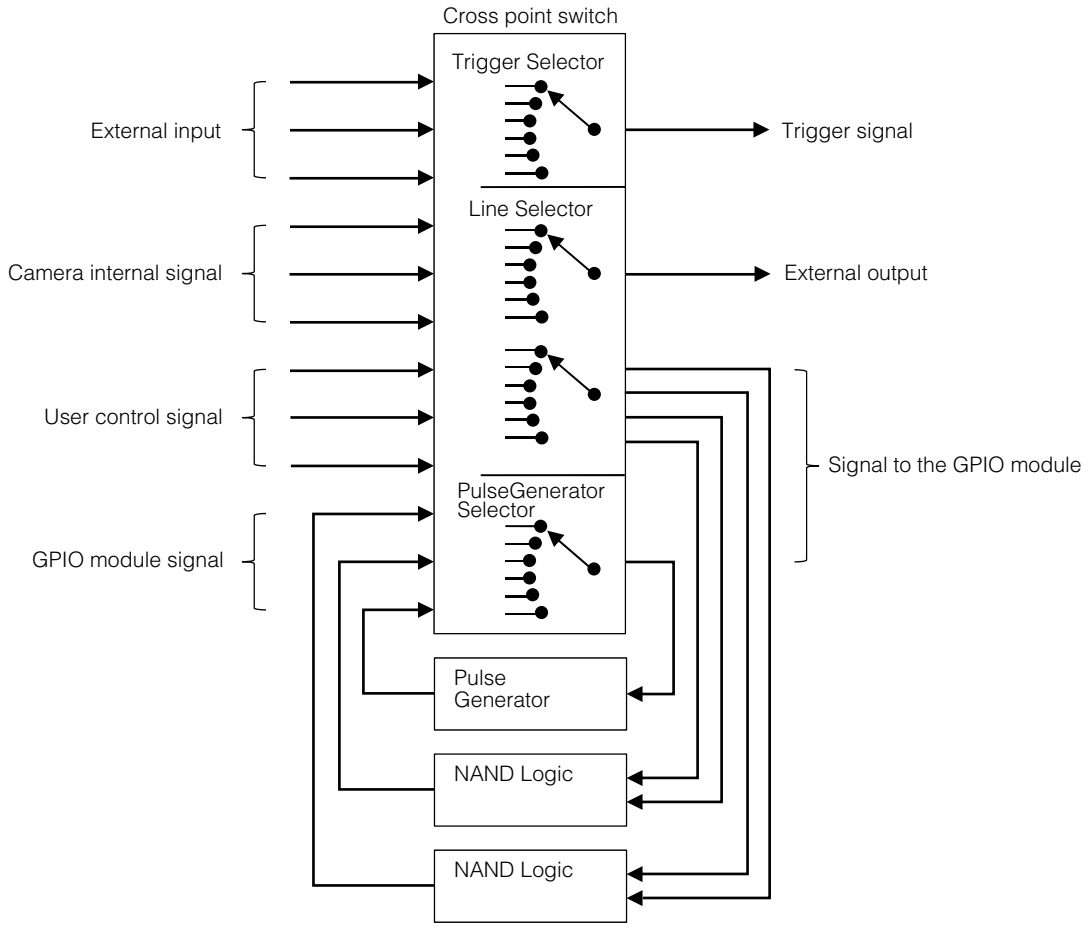
The unit can input/output the following signals to and from external input/output connectors.

External output	TTL Out (Line1)	DC IN / trigger IN connector (4-pin round)
External input	TTL IN (Line4)	DC IN / trigger IN connector (4-pin round)
	CC1 (Line7)	Camera Link cable

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.
In addition, a pulse generator for generating custom pulses and a NAND module for performing logic operations are built into the camera. The two can be used together for a variety of purposes, such as noise removal for trigger signals and phase adjustment for pulse outputs.
Such functions are generally referred to as GPIO functions.

Signals are selected as follows.
- When using external signals or the signals of each GPIO module as trigger signals:
  Select in [Trigger Selector] > [Trigger Source].
- When selecting the signals to use for external outputs:
  Select in [Line Selector] > [Line Source].
- When selecting the input signal for the NAND logic line:
  Select in [Line Selector] > [Line Source].
- When selecting the clear signal for [Pulse Generator]:
  Select in [Pulse Generator Selector] > [Pulse Generator Clear source].

GPIO block diagram



Valid Input/Output Combinations

The following signals can be used as sources for each output destination (Trigger Selector, Line Selector, Pulse Generator Selector).
You can also connect two different sources to NAND paths in the GPIO and reuse the signal generated there as a source for a different selector.

The combinations of source signals and output destinations are indicated in the following.

Source signal (Cross point switch input) \ Selector (Cross point switch output)		Output destination											
		Trigger Selector				Line Selector							Pulse Generator Selector
		Acquisition Start	Acquisition Stop	Frame Start	Transfer Start	Line2 OPT Out 1 (GPIO 1)	Line2 OPT Out 2 (GPIO 2)	Time Stamp Reset	NAND 0 In 1	NAND 0 In 2	NAND 1 In 1	NAND 1 In 2	Pulse Generator 0
Signals to use as output	LOW	○	○	○	○	○	○	○	○	○	○	○	○
	HIGH	○	○	○	○	○	○	○	○	○	○	○	○
	Line4 TTL In	○	○	○	○	○	○	○	○	○	○	○	○
	Line7 CC1	○	○	○	○	○	○	○	○	○	○	○	○
	NAND 0 Out	○	○	○	○	○	○	○	×	×	○	○	○
	NAND 1 Out	○	○	○	○	○	○	○	○	○	×	×	○
	Pulse Generator 0	○	○	○	○	○	○	○	○	○	○	○	×
	User Output 0	○	○	○	○	○	○	○	○	○	○	○	○
	User Output 1	○	○	○	○	○	○	○	○	○	○	○	○
	Software Trigger	○	○	○	○	×	×	○	×	×	×	×	×
	Action 1	○	○	○	○	×	×	×	×	×	×	×	○
	Action 2	○	○	○	○	×	×	×	×	×	×	×	○
	FVAL	×	×	×	×	○	○	○	○	○	○	○	○
	LVAL	×	×	×	×	○	×	○	○	○	○	○	○
	Exposure Active	×	×	×	×	○	○	○	○	○	○	○	○
	Frame Trigger Wait	×	×	×	×	○	○	○	○	○	○	○	○
	Frame Active	×	×	×	×	○	○	○	○	○	○	○	○
	Acquisition Trigger Wait	×	×	×	×	○	○	○	○	○	○	○	○
		Trigger Source				Line Source							Pulse Generator Clear Source
		Use											

: Indicates default values for each selector. “Factory default values” (page 18) shows the default values for [Frame Start].

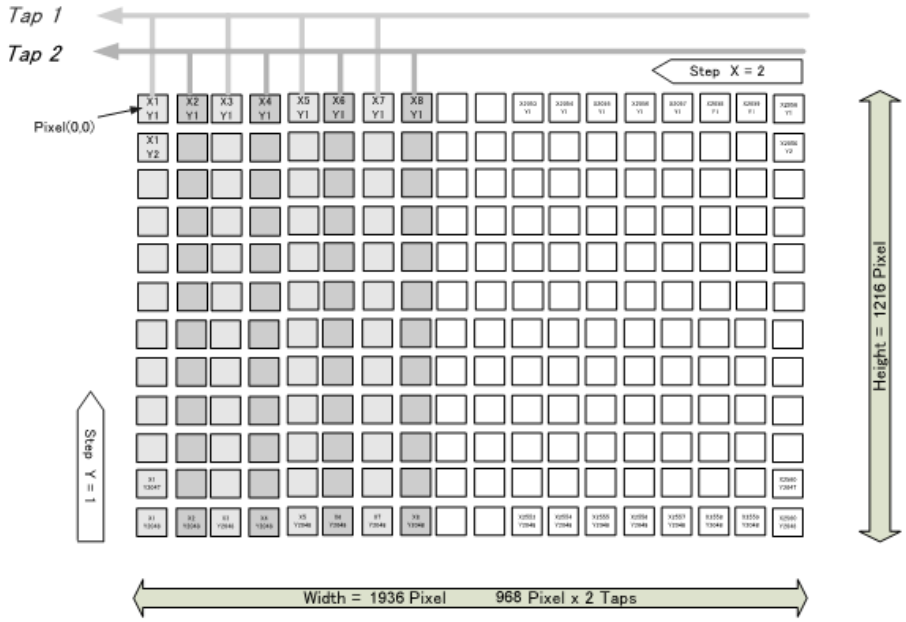
Camera Output Formats

The GO-2400-PMCL supports a variety of output formats.
The following tap geometries are supported.
The settings on the frame grabber board must be configured to match the tap geometry setting on the camera. For details configuring frame grabber board settings, refer to the operating instructions for each board.

Tap Geometry	CL Configuration	IP Bypass Off	IP Bypass On
1X2-1Y	Base	bit: 8/10	bit: 8/10/12
1X3-1Y	Base	bit: 8	bit: 8
1X3-1Y	Medium	bit: 10	bit: 10/12
1X4-1Y	Medium	bit: 8/10	bit: 8/10/12
1X8-1Y	Full	bit: 8	bit: 8
1X8-1Y	80-bit	bit: 10	bit: 10

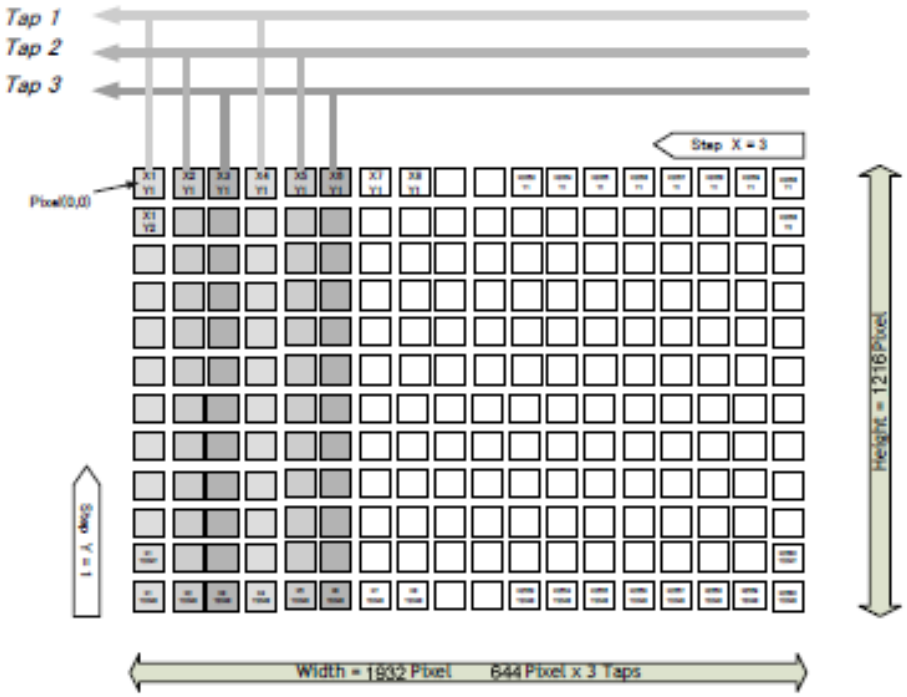
■ 1X2-1Y

1X2-1Y is a 2-tap output format as defined in GenICam tap geometry.



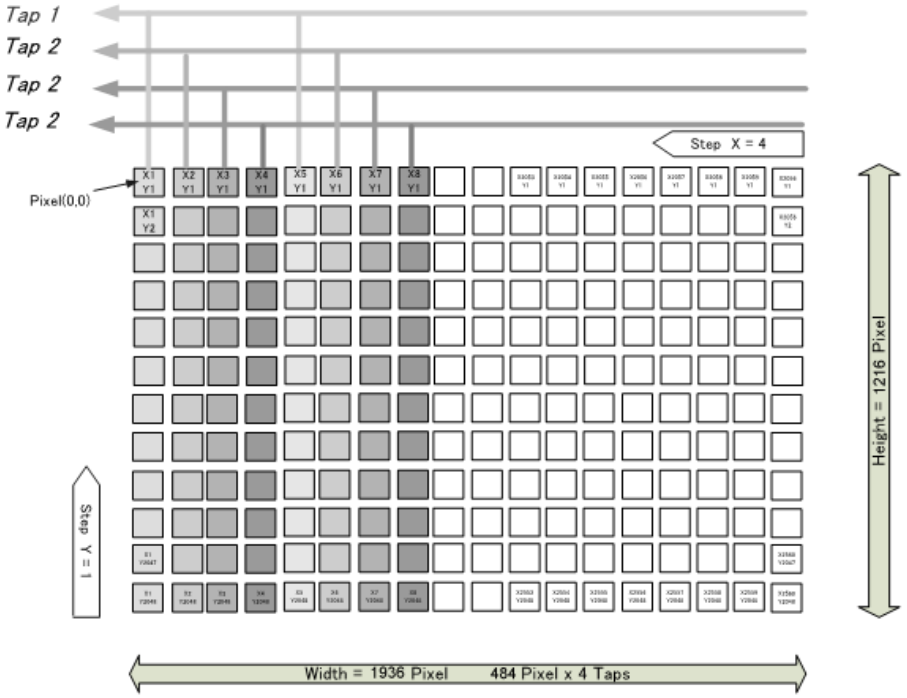
■ 1X3-1Y

1X3-1Y is a 3-tap output format as defined in GenICam tap geometry.



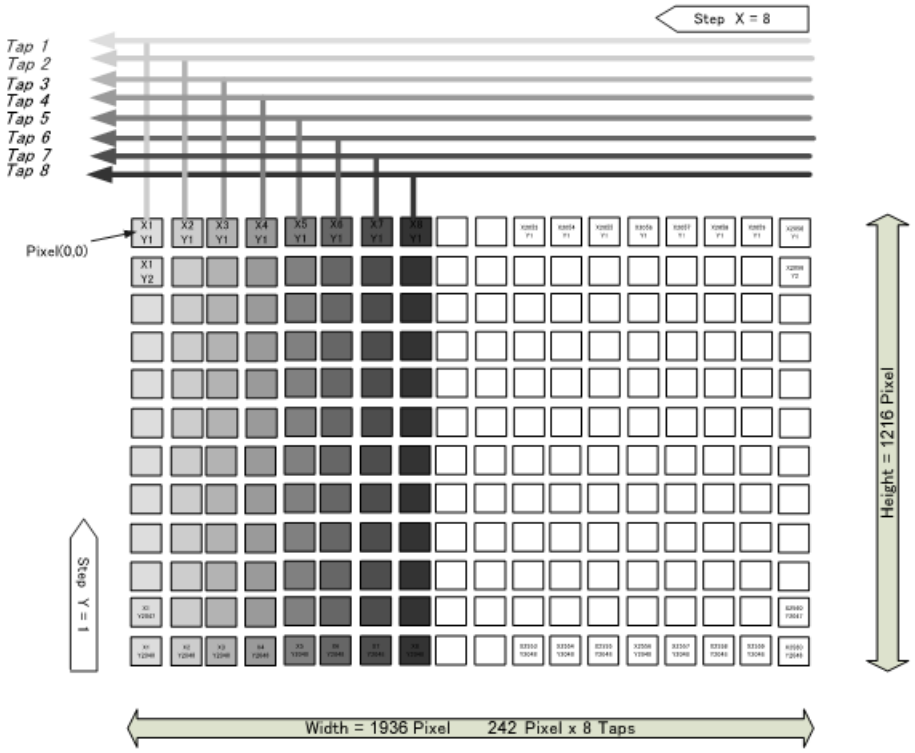
■ 1X4-1Y

1X4-1Y is a 4-tap output format as defined in GenICam tap geometry.



■ 1X8-1Y (CL)

1X8-1Y (CL) is a 8-tap output format as defined in GenICam tap geometry.



■ Cable length reference

The following is a reference for the length of cable you can use based on the Camera Link clock*1.

CL Pixel Clock [MHz]	CL cable length
37.125	10 m
74.25	7 m
84.85	3 m

*1 The length of cable you can use will also vary depending on type and maker.

Acquisition Control (Image Acquisition Controls)

Perform operations and configure settings related to image capture in [Acquisition Control].

On the GO-2400-PMCL, acquisition control always operates in [Continuous] mode.

Changing the Frame Rate

When [Trigger Mode] is disabled, you can change the frame rate in [Acquisition Frame Rate].

Note

- The shortest frame period varies depending on the ROI, pixel format, and binning mode selected. The longest frame period is 0.125 Hz (8 sec.).
- When [Trigger Mode] is enabled, the [Acquisition Frame Rate] setting is disabled.

■ Maximum frame rate period formula

- <Maximum output frame rate>
  During [Continuous] mode: 1 / ((Height_s + 40) × Hperiod)
  During [Trigger Mode]: 1 / (Exposure Time [sec] + (Height_s + 40) × Hperiod)

Full size (regardless of Binning Vertical and Binning Horizontal settings)

Tap Geometry	CL Pixel Clock (MHz)	H Period [sec]	Frame Rate [Hz]
1X2-1Y	37.125	26.290×10^{-6}	30.28
1X2-1Y	74.25	13.145×10^{-6}	60.57
1X2-1Y	84.85	12.444×10^{-6}	63.98
1X3-1Y	37.125	19.421×10^{-6}	41.00
1X3-1Y	74.25	8.795×10^{-6}	90.53
1X3-1Y	84.85	7.731×10^{-6}	102.99
1X4-1Y	37.125	13.253×10^{-6}	60.08
1X4-1Y	74.25	6.626×10^{-6}	120.15
1X4-1Y	84.85	6.222×10^{-6}	127.96
1X8-1Y	37.125	6.734×10^{-6}	118.23
1X8-1Y	74.25	4.848×10^{-6}	164.21
1X8-1Y	74.25	6.222×10^{-6}	127.96
1X8-1Y	84.85	4.808×10^{-6}	165.59
1X8-1Y	84.85	6.222×10^{-6}	127.96

Exposure Mode

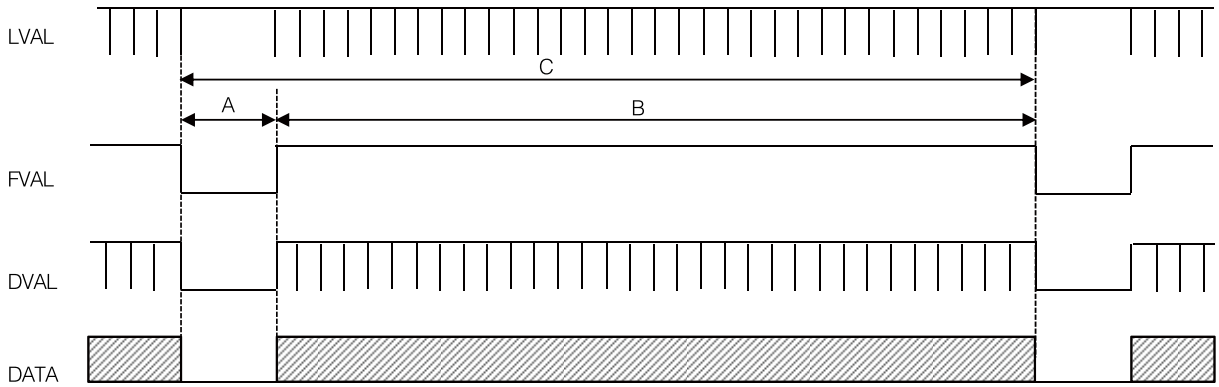
The following exposure modes are available on the camera.

Exposure Mode	Description
Off	Exposure control is not performed (free-running operation).
Timed	Mode in which exposure time is pre-set by the user. Images can be captured with the trigger off (free-running) or with trigger on (EPS).
Trigger Width	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. This allows long exposure.

❖ The settings for exposure control and triggers are related to each other. Be sure to configure the settings described in “Configuring Exposure and External Trigger Settings” (page 18).

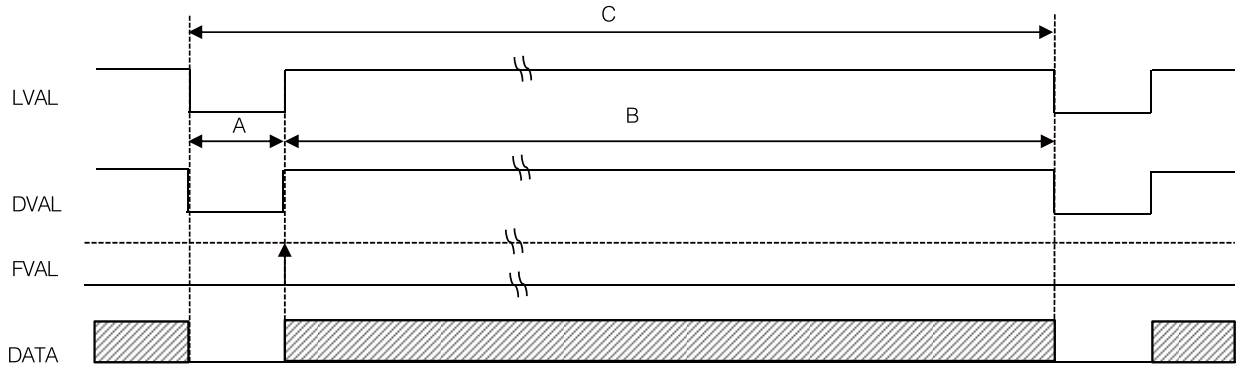
Image Output Timing

■ Vertical timing



Tap Geometry	CL PixelClock [MHz]	H Frequency (KHz)	FVAL BlankingLine [A]	FVALValid Line [B]	Total FrameLine [C]	Total Frame Period (msec)	Frame Rate (Hz)
Vertical ROI	ALL	↓	40	Height	Height + 40	(Height + 40) / H Freq	H Freq*1000 / Height + 40
1X2-1Y (Full)	37.125	38.038	40	1216	1256	33.020	30.28
	74.25	76.076	40	1216	1256	16.510	60.57
	84.85	80.357	40	1216	1256	15.630	63.98
1X3-1Y (Full)	37.125	51.491	40	1216	1256	24.393	41.00
	74.25	113.706	40	1216	1256	11.046	90.53
	84.85	129.355	40	1216	1256	9.710	102.99
1X4-1Y (Full)	37.125	75.457	40	1216	1256	16.645	60.08
	74.25	150.915	40	1216	1256	8.323	120.15
	84.85	160.714	40	1216	1256	7.815	127.96
1X8-1Y (Full)	37.125	148.500	40	1216	1256	8.458	118.23
	74.25_8	206.250	40	1216	1256	6.090	164.21
	74.25_10	160.714	40	1216	1256	7.815	127.96
	84.85_8	207.983	40	1216	1256	6.039	165.59
	84.85_10	160.714	40	1216	1256	7.815	127.96

■ Horizontal timing



Tap Geometry	CL Pixel Clock (MHz)	Line BlankingClock [A]	LineValid clock [B]	Total Line clock [C]	Total Line Period (usec) [C]	Line Rate (KHz) [C]
Horizontal ROI	ALL	(1936/Tap) - Width + 8	Width	↓	↓	↓
1X2-1Y (Full)	37.125	8	968	976	26.290	38.038
	74.25	8	968	976	13.145	76.076
	84.85	8	968	1056	12.444	80.357
1X3-1Y (Full)	37.125	76	645	721	19.421	51.491
	74.25	8	645	653	8.795	113.706
	84.85	11	645	656	7.731	129.355
1X4-1Y (Full)	37.125	8	484	492	13.253	75.457
	74.25	8	484	492	6.626	150.915
	84.85	44	484	528	6.222	160.714
1X8-1Y (Full)	37.125	8	242	250	6.734	148.500
	74.25_8	118	242	360	4.848	206.250
	74.25_10	220	242	462	6.222	160.714
	84.85_8	166	242	408	4.808	207.983
	84.85_10	286	242	528	6.222	160.714

Trigger Control

The camera allows Frame Start trigger controls to be performed via external trigger signals.
The Frame Start trigger allows exposure control via the trigger signal inputs.

❖ The settings for exposure control and triggers are related to each other. Be sure to configure the settings described in “Configuring Exposure and External Trigger Settings” (page 18).

Shortest Repetition Period for Triggers

The reciprocal of the maximum frame rate is the time required to output one frame. The shortest repetition periods for triggers cannot be lower than that value.

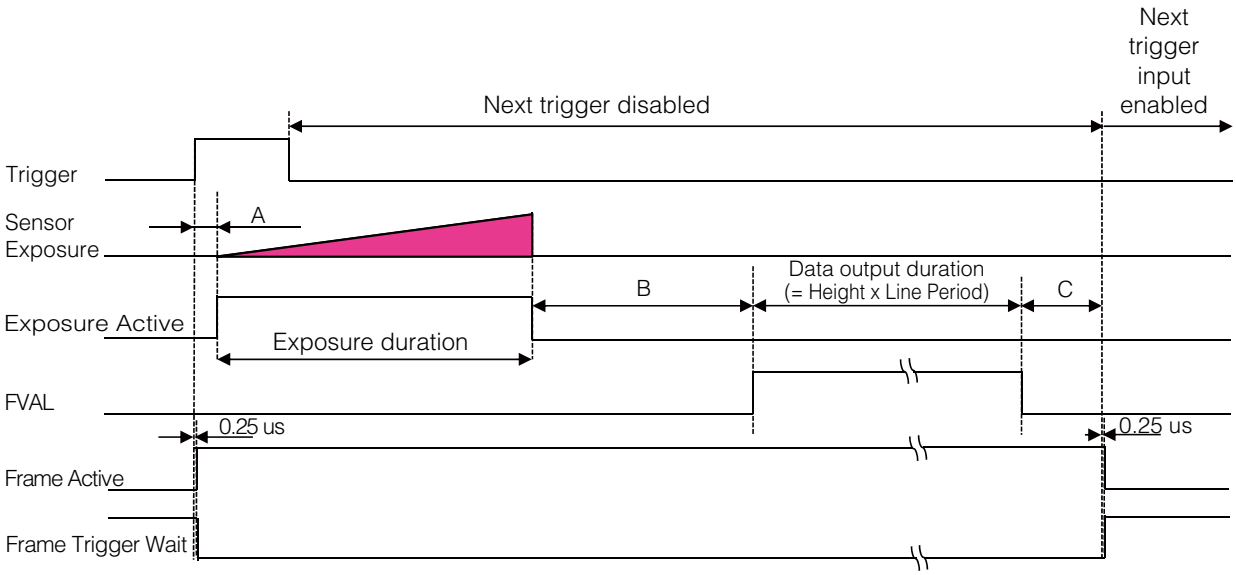
■ When [Exposure Mode] is [Timed]

Example: When [Trigger Source] is set to [Line7 CC1]

Scanning range	Shortest period of trigger [ms], exposure condition: minimum exposure time			
	1X2-1Y	1X3-1Y	1X4-1Y	1X8-1Y
	84.85 MHz 8 bit	84.85 MHz 8-bit	84.85 MHz 8-bit	84.85 MHz 8-bit
Full	15670	9736	7836	6046
ROI 2/3 (Height = 810)	10618	6597	5310	4094
ROI 1/2 (Height = 608)	8104	5035	4053	3122
ROI 1/4 (Height = 304)	4321	2685	2161	1661
ROI 1/8 (Height = 152)	2429	1510	1216	930
Binning Vertical (968 × 608)*	15670	9736	7836	6046

* GO-2400M-PMCL only

Exposure and readout cannot overlap on the GO-2400-PMCL. The above table indicates the shortest trigger periods for the shortest exposure times. By adding the value of the exposure time you are using to the values in the table, you can determine the shortest trigger periods under your own usage environment.



Tap Geometry	CL Pixel Clock (MHz)	Period From Trigger start edge to Exposure start [A] (usec)	Period from Exposure endTo FVAL start [B] (usec)	Period FVAL end to next trigger start [C] (usec)	Max Exposure [msec]	Min Exposure [usec]
Horizontal ROI	ALL	↓	↓	↓	Framerate − 13/H Freq	3/H Freq + 22×0.013
1X2-1Y (Full)	37.125	80	884	≥ 89	7999.658	79
	74.25	40	452	≥ 37	7999.829	40
	84.85	38	428	≥ 34	7999.838	38
1X3-1Y (Full)	37.125	60	654	≥ 65	7999.748	59
	74.25	27	300	≥ 11	7999.886	27
	84.85	24	263	≥ 24	7999.900	24
1X4-1Y (Full)	37.125	41	454	≥ 37	7999.828	40
	74.25	21	228	≥ 18	7999.914	20
	84.85	20	214	≥ 17	7999.919	19
1X8-1Y (Full)	37.125	22	232	≥ 17	7999.912	21
	74.25_8	16	168	≥ 13	7999.937	15
	74.25_10	20	214	≥ 19	7999.919	19
	84.85_8	15	167	≥ 2.1	7999.937	15
	84.85_10	20	214	≥ 19	7999.919	19

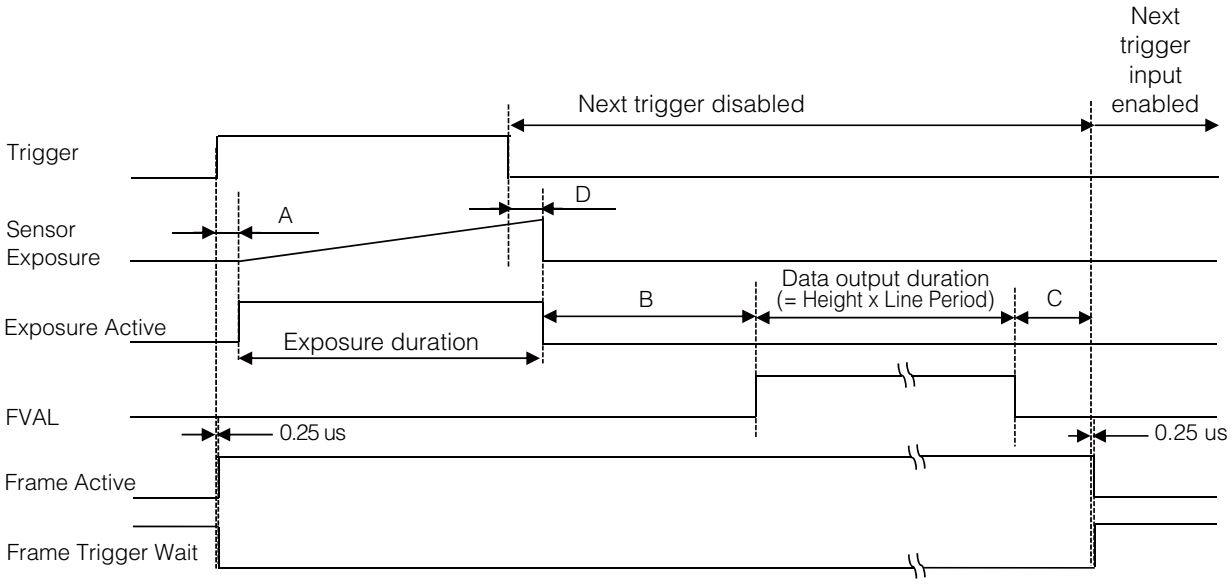
Smallest input pulse width of trigger signal: 10 µS or more

■ When [Exposure Mode] is [Trigger Width]

Scanning range	Shortest period of trigger [ms], exposure condition: minimum exposure time			
	1X2-1Y	1X3-1Y	1X4-1Y	1X8-1Y
	84.85 MHz 8-bit	84.85 MHz 8-bit	84.85 MHz 8-bit	84.85 MHz 8-bit
Full	15670	9736	7836	6046
ROI 2/3 (Height = 810)	10618	6597	5310	4094
ROI 1/2 (Height = 608)	8104	5035	4053	3122
ROI 1/4 (Height = 304)	4321	2685	2161	1661
ROI 1/8 (Height = 152)	2429	1510	1216	930
Binning Full (968 × 608)*	15670	9736	7836	6046

* GO-2400M-PMCL only

Exposure and readout cannot overlap on the GO-2400-PMCL. The above table indicates the shortest trigger periods for the shortest exposure times. By adding the value of the exposure time you are using to the values in the table, you can determine the shortest trigger periods under your own usage environment.



Tap Geometry	CL Pixel Clock (MHz)	Period From Trigger start edge to Exposure start [A] (usec)	Period from Exposure endTo FVAL start [B] (usec)	Period FVAL end to next trigger start [C] (usec)	Period From Trigger end edge to Exposure end [D] (usec)	Min Exposure [usec]
Horizontal ROI	ALL	↓	↓	↓	↓	3/H Freq + 22×0.013
1X2-1Y (Full)	37.125	80	885	≥ 88	80	79
	74.25	41	452	≥ 36	41	40
	84.85	39	428	≥ 33	39	38
1X3-1Y (Full)	37.125	60	654	≥ 64	60	59
	74.25	27	300	≥ 9.3	27.4	27
	84.85	24	264	≥ 23	25	24
1X4-1Y (Full)	37.125	41	452	≥ 36	41	40
	74.25	20	227	≥ 17	20.8	20
	84.85	19	214	≥ 16	19.6	19
1X8-1Y (Full)	37.125	21	231	≥ 17	21.2	21
	74.25_8	16	169	≥ 12	16	15
	74.25_10	20	215	≥ 18	20	19
	84.85_8	16	168	≥ 1.2	16	15
	84.85_10	20	214	≥ 19	20	19

Smallest input pulse width of trigger signal: minimum exposure time of each mode

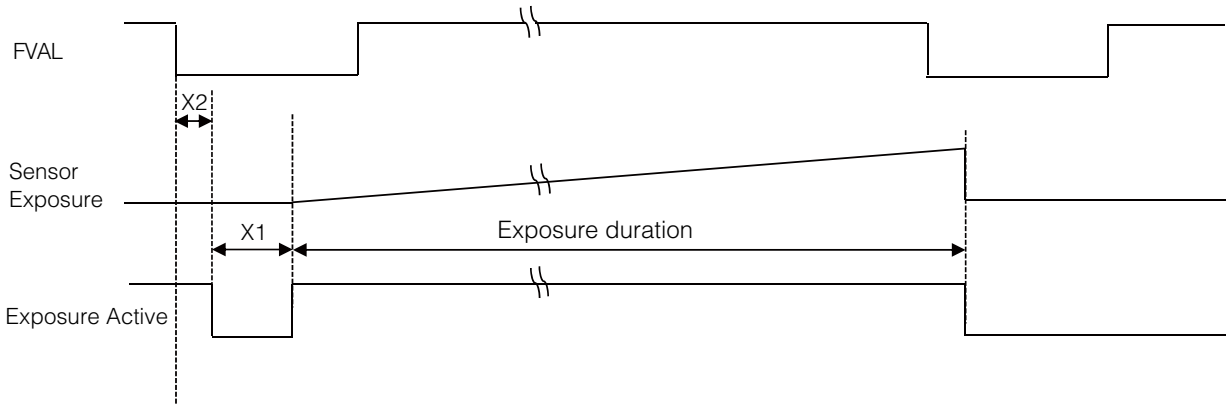
■ During normal continuous operation

When using an application that does not require external triggers, the following applies.

Scanning range	Shortest period [ms]			
	1X2-1Y	1X3-1Y	1X4-1Y	1X8-1Y
	84.85 MHz 8-bit	84.85 MHz 8-bit	84.85 MHz 8-bit	84.85 MHz 8-bit
Full	15.630	9.710	7.815	6.039
ROI 2/3 (Height = 810)	10.578	6.571	5.289	4.087
ROI 1/2 (Height = 608)	8.064	5.009	4.032	3.116
ROI 1/4 (Height = 304)	4.281	2.659	2.140	1.654
ROI 1/8 (Height = 152)	2.389	1.484	1.195	0.923
Binning Full (968 × 608)*	15.630	9.710	7.815	6.039

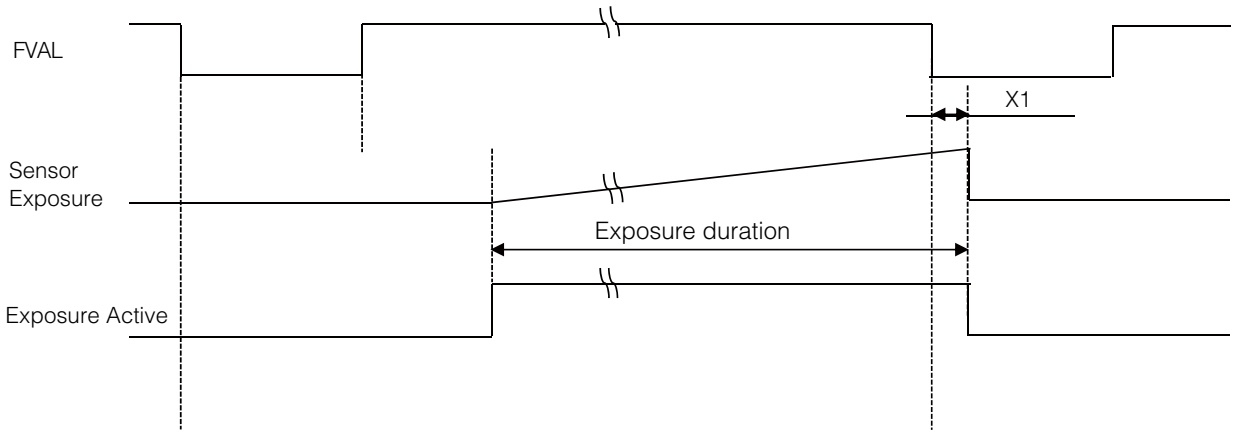
* GO-2400M-PMCL only

When [Exposure Mode] is [Off]



Tap Geometry	CL Pixel Clock (MHz)	Exposure stop period [X1] (usec)	Period From FVAL end to Exposure end [min] [X2] (usec)
Horizontal ROI	ALL	13/H Freq	↓
1X2-1Y (Full)	37.125	342	≥ 167
	74.25	171	≥ 75
	84.85	162	≥ 69
1X3-1Y (Full)	37.125	252	≥ 121
	74.25	114	≥ 35
	84.85	100	≥ 45
1X4-1Y (Full)	37.125	172	≥ 80
	74.25	86	≥ 36
	84.85	80	≥ 37
1X8-1Y (Full)	37.125	88	≥ 37
	74.25_8	63	≥ 26
	74.25_10	81	≥ 36
	84.85_8	63	≥ 8.9
	84.85_10	81	≥ 36

When [Exposure Mode] is [Timed]



Tap Geometry	CL Pixel Clock (MHz)	Period From FVAL end to Exposure end [X1] (usec)	Max Exposure [msec]	Min Exposure [usec]
Horizontal ROI	ALL	↓	Framerate-13/H Freq	3H + 22 x 0.013
1X2-1Y (Full)	37.125	143 to 169	7999.658	79
	74.25	64 to 77	7999.829	40
	84.85	59 to 72	7999.838	38
1X3-1Y (Full)	37.125	104 to 124	7999.748	59
	74.25	29 to 39	7999.886	27
	84.85	40 to 48	7999.900	24
1X4-1Y (Full)	37.125	64 to 78	7999.828	40
	74.25	32 to 40	7999.914	20
	84.85	30 to 37	7999.919	19
1X8-1Y (Full)	37.125	32 to 40	7999.912	21
	74.25_8	24 to 29	7999.937	15
	74.25_10	32 to 39	7999.919	19
	84.85_8	7.3 to 12	7999.937	15
	84.85_10	33 to 39	7999.919	19

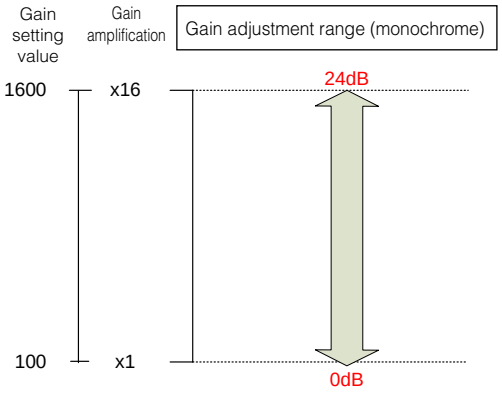
Gain Control

[Analog All] can be used for gain control for both the monochrome and color camera. [Analog All] (master gain) uses the sensor's internal gain function and consists of analog gain + digital gain. Analog gain is used for lower gain, and analog gain + digital gain is used when the gain becomes high. R and B can be configured individually as digital gain on the GO-2400C-PMCL.

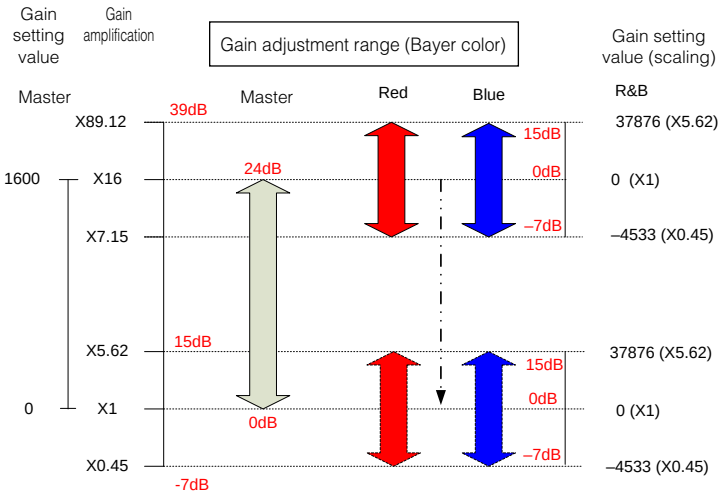
❖ For details on how to configure the settings, see “Adjusting the Gain” (page 22).

The relationship between the gain setting value, gain amplification, and dB value is as follows. For example, a gain amplification of x5.62 will be 15 dB.

For monochrome



For color



LUT (Lookup Table)

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 256 setting points (indexes) on the GO-2400M/C-PMCL.

■ To use the LUT function

Configure the settings as follows.

Item	Setting value / selectable range	Description
JAI LUT Mode	LUT	Use LUT.
LUT Selector*	R, G, B	Select the LUT channel to control.
LUT Index	GO-2400M-PMCL: 0 to 255 GO-2400C-PMCL: 0 to 255	Select the LUT index to configure. Indexes represent the setting points, and values from the lowest point (Index 0) to the highest point (Index 15) are represented. On the 2400M-PMCL, for example, Index 0 is full black and Index 255 is full white.
LUT Value	0 to 4095	Set the LUT output value for the selected index.

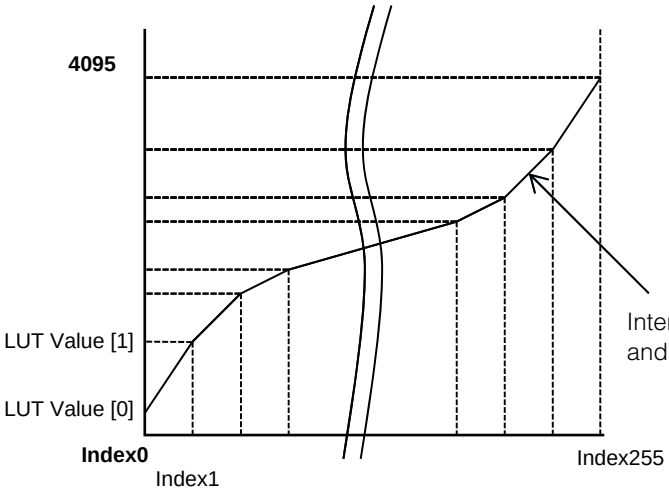
* GO-2400C-PMCL only

Note

For the GO-2400C-PMCL, the same characteristic curve is configured for R, G, and B.

■ LUT values

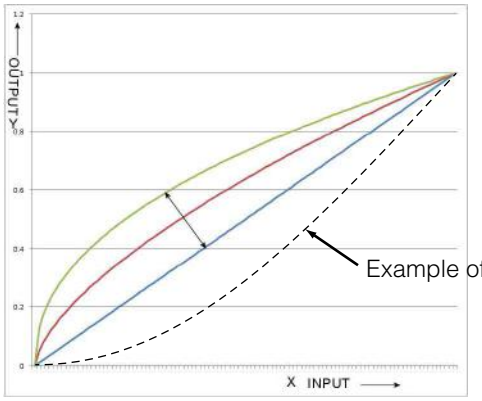
LUT values range from 0 at the lowest to 4095 at the highest. Linear interpolation is used to calculate LUT values between the index points.



Interpolation using the average values of data to the left and right is used to determine values between points.

Gamma Function

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.



Example of the light-emitting properties of the monitor display

■ To use the gamma function

Configure the settings as follows.

Item	Setting value / selectable range	Description
Gamma	0.45, 0.60, 1.0 (Off)	Select the gamma correction value.
JAI LUT Mode	Gamma	Use Gamma.

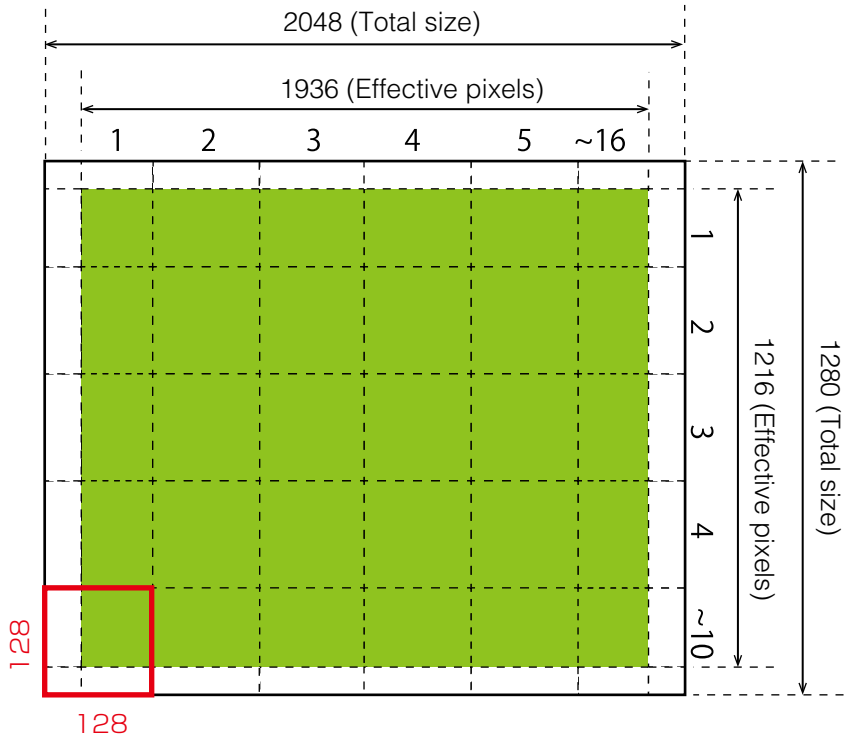
Note

You can use the LUT function to configure a curve with more detailed points. For details, see “LUT (Lookup Table)” (page 40).

Shading Correction

The shading correction is a function that 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).

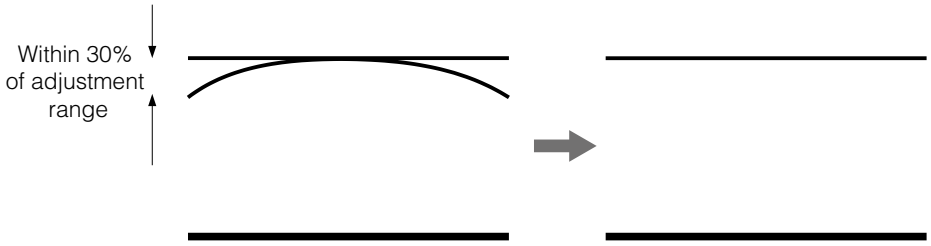
The size of the correction block is 16 (H) × 10 (V) blocks and calculation errors in the correction data are minimized due to the small interpolation block. Each block is 128 × 128 pixels.
The total size of the blocks is 2048 (H) × 1280 (V), but the actual number of effective pixels for the camera is 1936 (H) × 1216 (V). The ineffective peripheral areas will be deleted internally on the camera automatically.



The following shading correction modes are available on the camera.

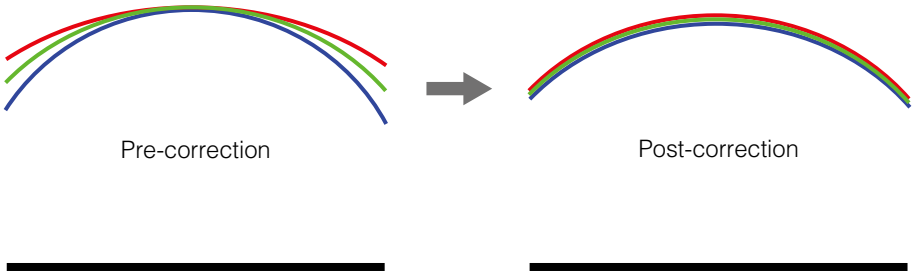
■ Flat Shading

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.



■ Color Shading (GO-2400C-PMCL only)

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



Caution

Proper correction is not possible under the following conditions.

- If an area with a brightness level that is more than 30% less than the reference level exists within the screen
- If the brightness level is saturated in parts or all of the screen
- If the area in the screen with the highest brightness level is 300 LSB or less (during 10-bit video output)

■ To use the shading correction function

Configure the settings as follows.

Item	Setting value	Description
Shading Correction Mode	GO-2400M-PMCL: Flat Shading (fixed) GO-2400C-PMCL: Flat Shading, Color Shading	Select the shading correction mode.
Shading Mode	User 1, User 2, User 3	Select the user area to which to save the shading correction value.

Display a white chart under a uniform light, and execute [Perform Shading Calibration].

Note

After shading correction is executed, the shading correction value is automatically saved to the user area selected in [Shading Mode].

Binning Function

The binning function allows you to combine the signal values of clusters of adjacent pixels on the sensor to create improved virtual pixels. Using the function results in images with lower pixel resolution and higher sensitivity.
Common methods of binning include "horizontal binning" where two horizontally adjacent pixels are combined, and "vertical binning" where two vertically adjacent pixels are combined. By combining the horizontal and vertical methods to create a group of four pixels (2×2 binning), you can create images with x4 sensitivity.

* GO-2400M-PMCL only

ROI (Regional Scanning Function)

The ROI (region of interest) function allows you to output images by specifying the areas to scan.

ROI Settings

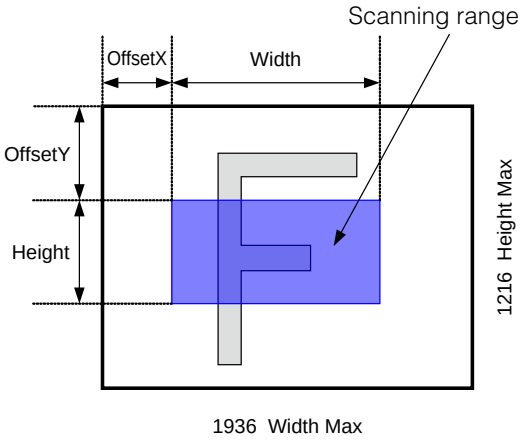
Specify the area to scan by specifying width, height, and horizontal/vertical offset values under [Image Format Control].

❖ For details on how to configure the settings, see “Configuring the Output Format” (page 16).

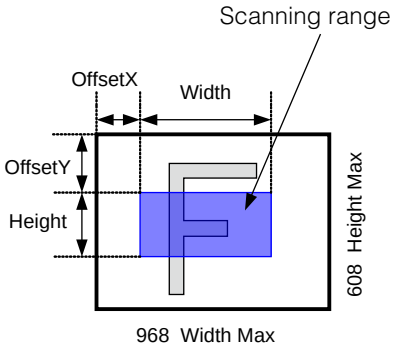
You can increase the frame rate by specifying a lower height, as the number of lines scanned decreases.
The minimum area is as follows.

	Minimum width value (pixels)	Minimum height value (pixels)
GO-2400M-PMCL	Binning Off: 96 Binning On: 48 ❖ The minimum value for Monochrome varies depending on the [Binning] setting.	2
GO-2400C-PMCL	16	2

Example 1: Without binning
[Binning Horizontal] *: 1
[Binning Vertical] *: 1



Example 2: With binning
[Binning Horizontal] *: 2
[Binning Vertical] *: 2



* GO-2400M-PMCL only

❖ For details on the frame rates for common ROI sizes, see “Frame Rate Reference” (page 97) (page 43).

Video Send Mode

Switch the video send mode to configure and operate Sequence Trigger and other JAI Custom Control functions.

Video Send Mode

■ To switch the video send mode

Select the video send mode in [Video Send Mode Selector].

[Video Send Mode Selector] option	Description
Normal Mode	Normal camera operation.
Trigger Sequence Mode	Sequence Trigger mode. Sequence Trigger mode that executes presets in a predefined order based on [Sequence Roi Frame Count] and [Sequence Roi Next Index]. Starts at Index #1.
Command Sequence Mode	Sequence Command mode. Sequence Trigger mode that executes the preset listed in [Command Sequence Index] each time a trigger is received. Can jump to new preset by sending a new index value to [Command Sequence Index].

■ Trigger Sequence mode

The Sequence Trigger function lets you define up to 128 preset 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. The order of execution and the repetition of particular presets are based on user-defined parameters stored in the sequence, as well as the sequence mode selected in the [Video Send Mode Selector].

Two operation modes (Trigger Sequence and Command Sequence) are available for the Sequence Trigger function.

Trigger Sequence mode

With this mode, the Sequence Trigger “pattern” is predetermined by the user. The user defines up to 128 different “indexes.” Each index represents a combination of the following parameters:

- ROI (width, height, offset X, and offset Y)
- Exposure Time
- Gain Level (R/B Gain can also be configured on the color model)
- Black Level
- Binning Mode (monochrome only)
- LUT Enable (whether or not to enable the use of LUT for this index)
- Frame Count (the number of times to repeat this index before moving to the next)
- Next Index to execute in the predetermined pattern

In addition to these individual index parameters, two other parameters are applied to the entire sequence:

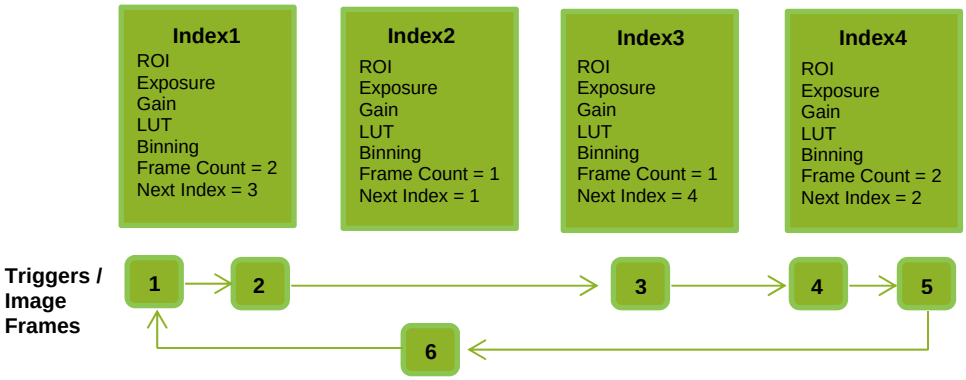
[Sequence LUT Mode] defines whether Gamma or LUT is to be applied to the sequence. If Gamma is selected, the Gamma setting defined in the camera’s Analog Control section will be applied to all exposures in the sequence. If LUT is selected, the LUT characteristics defined in Analog Control will be applied to any index where [Sequence LUT enable] has been set to ON.

[Reset Sequence Index] causes the index selector to be reset to Index 1. Thus, the sequence pattern will start over at the next trigger.

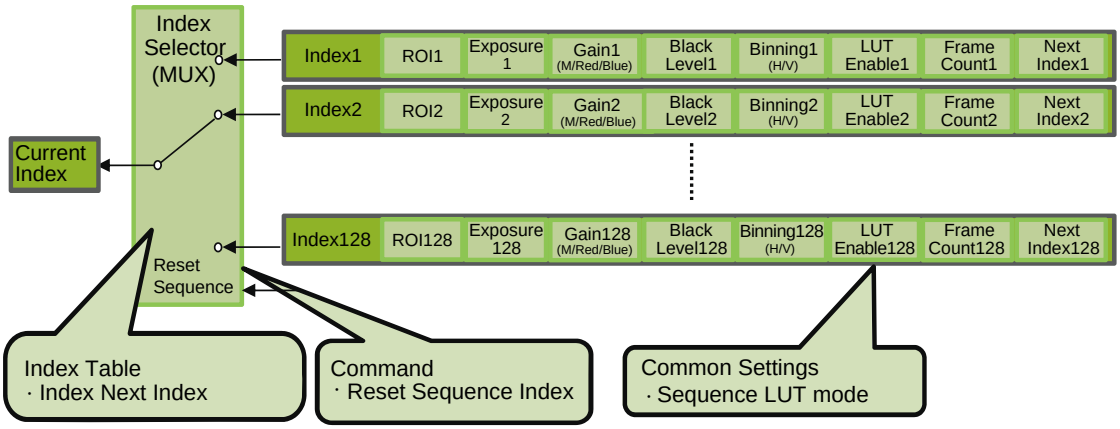
In Trigger Sequence mode, patterns always begin with Index1. Subsequent triggers follow the user-defined values in [Sequence Index Frame Count] and [Sequence ROI Next Index].
Assigning a Next Index value of “1” to an index creates a loop back to the start of the sequence pattern.

Trigger Sequence example

User-defined Indexes (up to 128)



Index structure for Trigger Sequence



Command Sequence mode

This mode allows the user to vary the “pattern” of the sequence in response to external factors. Changes in the sequence can be initiated manually or in a programmatic fashion as the result of data from sensors/controllers or from the analysis of previous images.

In this mode, the user can define up to 128 different “indexes” each incorporating a combination of:

- ROI (width, height, offset X, and offset Y)
- Exposure Time
- Gain Level (R/B Gain can also be configured on the color model)
- Black Level
- Binning Mode (monochrome only)
- LUT Enable (whether or not to enable the use of LUT for this index)

The user must also enter a value from 1 to 128 in [Command Sequence Index]. This indicates which index to execute each time a trigger is received. The same index will continue to be executed for all subsequent triggers as long as the value of [Command Sequence Index] remains unchanged.

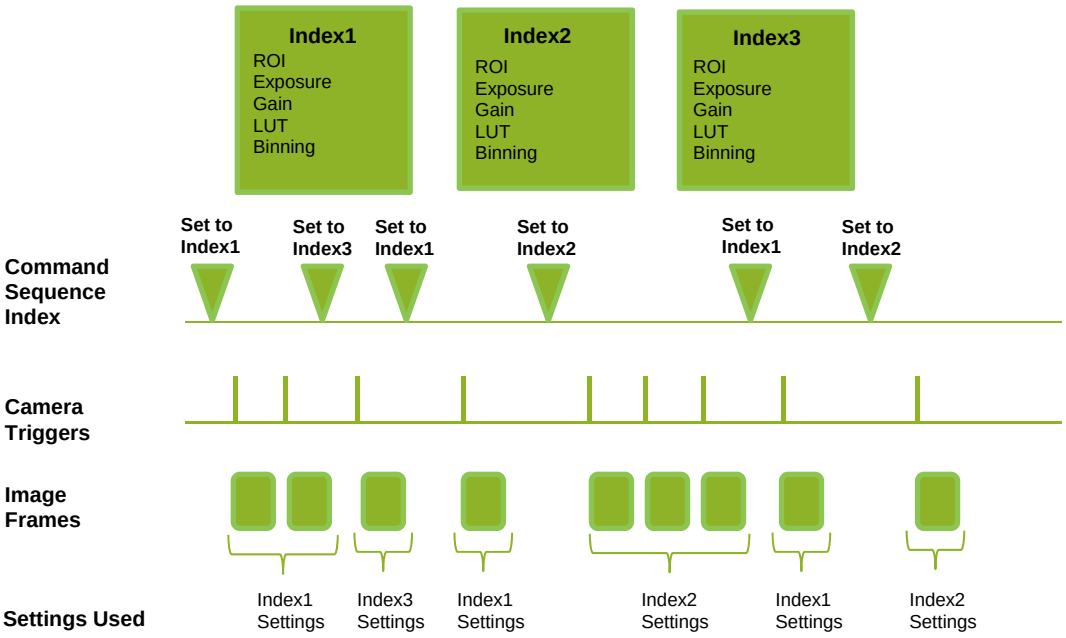
Changing the value of [Command Sequence Index] to one of the other predefined indexes causes that index to be executed in response to subsequent triggers. This mode of operation enables users to develop applications that continually send new values to [Command Sequence Index] in response to external factors such as changing light conditions, different types or sizes of objects being inspected, or other factors. This allows applications to change ROI, exposure, gain, etc., without being restricted to a predefined pattern.

[Sequence LUT Mode] defines whether Gamma or LUT is to be applied to the sequence. If Gamma is selected, the Gamma setting defined in the camera's Analog Control section will be applied to all exposures in the sequence. If LUT is selected, the LUT characteristics defined in Analog Control will be applied to any index where [Sequence LUT enable] has been set to ON.

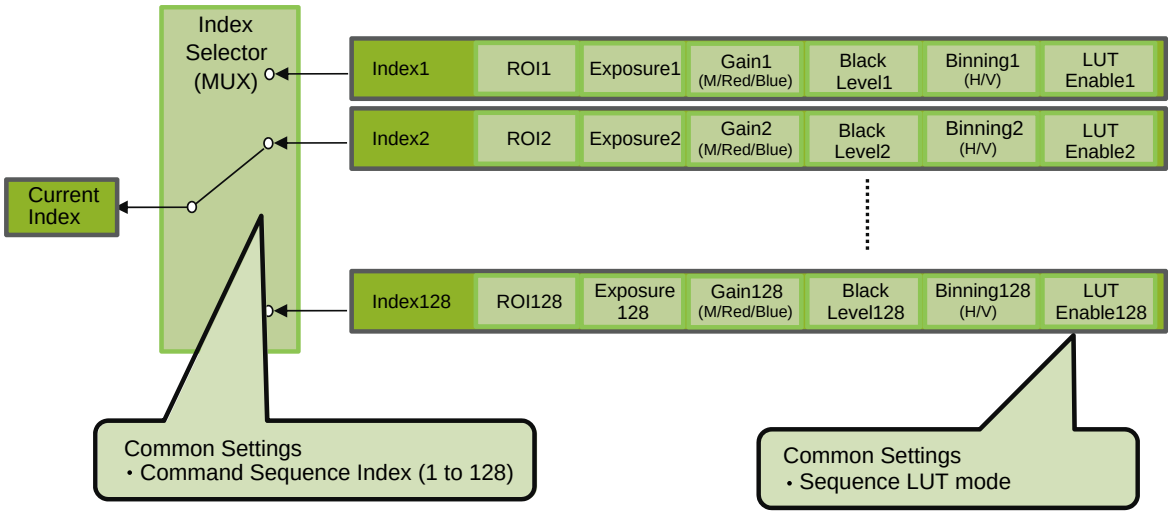
[Sequence Index Frame Count], [Sequence ROI Next Index], and [Reset Sequence Index] are not used in Command Sequence mode and entered values are ignored.

Command Sequence example

User-defined Indexes (up to 128)

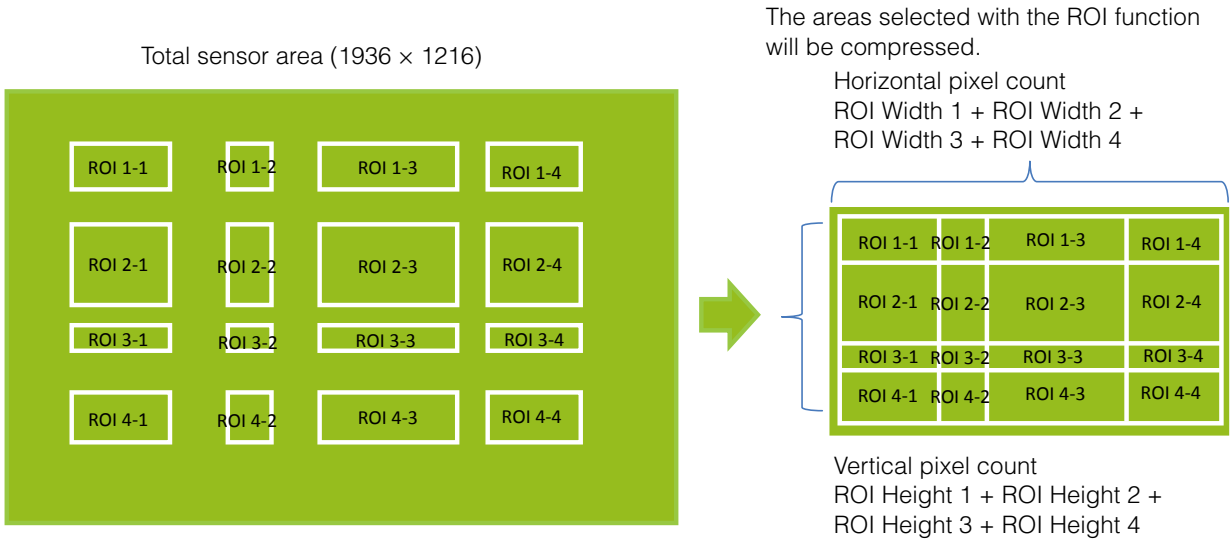


Index structure for Command Sequence



Sensor Multi ROI Function

Sensor Multi ROI is an ROI function that is configured and functions inside the sensor.
You can configure up to 16 scanning regions (4 horizontal and 4 vertical).
By skipping areas that are not specified as regions of interest when scanning a frame, the sensor's ROI function outputs the specified regions in a compressed state. You can increase the frame rate due to the reduced scanning time for the compressed areas. However, you cannot make the line frequency faster by compressing in the horizontal direction.



Restrictions

- The specified areas cannot overlap.
- The frame rate can be increased in relation to size of the area specified in the vertical direction, but not in relation to the horizontal direction.
- In the horizontal direction, the configuration for the second and subsequent row will be identical. In the vertical direction, the configuration for the second and subsequent column will be identical.

Configuration

Configure each area so that they do not overlap.
Both the horizontal and vertical settings must be configured as even values.

Horizontal ROI conditions

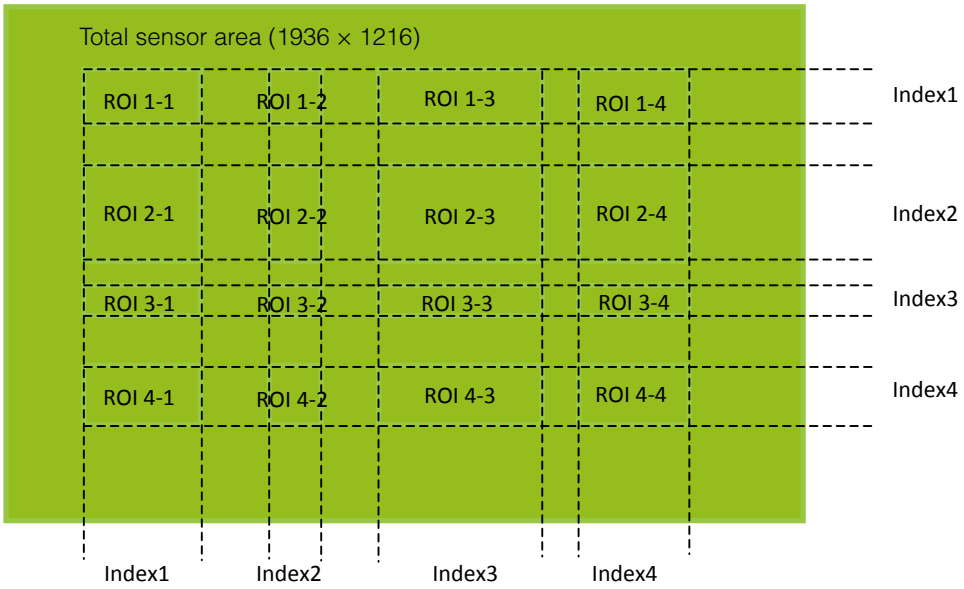
ROI Offset H1 + ROI Width 1 < ROI Offset H2
ROI Offset H2 + ROI Width 2 < ROI Offset H3
ROI Offset H3 + ROI Width 3 < ROI Offset H4
ROI Offset H4 + ROI Width4 < 1936

Vertical ROI conditions

ROI Offset V1 + ROI Height 1 < ROI Offset V2
ROI Offset V2 + ROI Height 2 < ROI Offset V3
ROI Offset V3 + ROI Height 3 < ROI Offset V4
ROI Offset V4 + ROI Height 4 < 1216

Configure the four index settings (Index 1 to 4). The [OffsetH], [Width], [OffsetV], [Height], [Horizontal Enable], and [Vertical Enable] settings can be configured for each index.

When you configure the [OffsetH], [Width], [OffsetV], and [Height] settings for an index and set [Horizontal Enable] or [Vertical Enable] to [True] for that index, the corresponding area is configured. When [False] is specified, the settings within the index are disabled.
OffsetH, Width: 16 pixels/step
OffsetV, Height: 2 lines/step



Reference: Areas corresponding to the [Horizontal Enable] and [Vertical Enable] settings of each setting

Index 1		Index 2		Index 3		Index 4		Enabled ROI	Enabled area
Hori	Vert	Hori	Vert	Hori	Vert	Hori	Vert		
True	True	False	False	False	False	False	False	1	ROI 1-1
True	True	True	True	False	False	False	False	4	ROI 1-1, ROI 1-2, ROI 2-1, ROI 2-2
True	True	True	False	False	False	False	False	2	ROI 1-1, ROI 1-2
True	True	True	True	True	True	False	False	9	ROI 1-1, ROI 1-2, ROI 1-3 ROI 2-1, ROI 2-2, ROI 2-3 ROI 3-1, ROI 3-2, ROI 3-3
True	True	True	True	True	True	True	False	12	ROI 1-1, ROI 1-2, ROI 1-3, ROI 1-4 ROI 2-1, ROI 2-2, ROI 2-3, ROI 2-4 ROI 3-1, ROI 3-2, ROI 3-3, ROI 3-4

Index 1		Index 2		Index 3		Index 4		Enabled ROI	Enabled area
Hori	Vert	Hori	Vert	Hori	Vert	Hori	Vert		
True	True	True	True	True	True	True	True	16	ROI 1-1, ROI 1-2, ROI 1-3, ROI 1-4 ROI 2-1, ROI 2-2, ROI 2-3, ROI 2-4 ROI 3-1, ROI 3-2, ROI 3-3, ROI 3-4 ROI 4-1, ROI 4-2, ROI 4-3, ROI 4-4

Frame rate calculation formula

FR = line rate ÷ (ROI Height 1 + ROI Height 2 + ROI Height 3 + ROI Height 4 + vertical invalid lines)

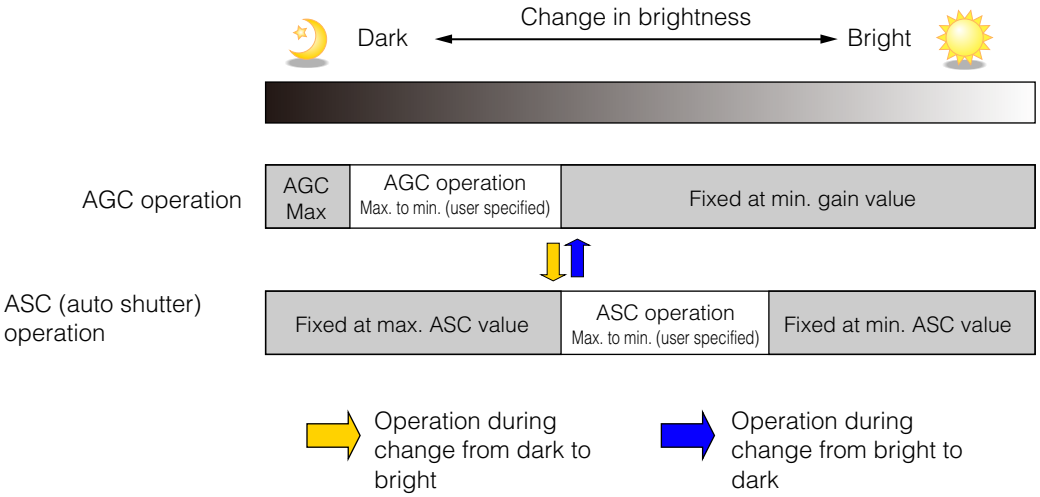
- ❖ Invalid vertical lines = 40 (constant)
- ❖ The value of [Line Rate] depends on tap geometry and Camera Link pixel clock frequency as shown in the following table.

Tap Geometry	CL Pixel Clock (MHz)	Line Rate (KHz)
1X2-1Y(Full)	37.125	38.038
	74.25	76.076
	84.85	80.357
1X3-1Y(Full)	37.125	51.491
	74.25	113.706
	84.85	129.355
1X4-1Y(Full)	37.125	75.457
	74.25	150.915
	84.85	160.714
1X8-1Y(Full)	37.125	148.500
	74.25_8	206.250
	74.25_10	160.714
	84.85_8	207.983
	84.85_10	160.714

ALC (Automatic Level Control) Function

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.

Change from bright to dark: ASC → AGC
Change from dark to bright: AGC → ASC



■ To use the ALC function

Set [Gain Auto] or [Exposure Auto] or both to [Continuous] mode. Configure the minimum value, maximum value, etc. for AGC and ASC under [JAI Custom Control ALC].
The target video levels for AGC and ASC are configured in [ALC Reference]. For example, when [ALC Reference] is set to 100%, video levels will be maintained at 100% for AGC and ASC.

■ Automatic gain level control

Set [Gain Auto] to [Continuous].

Detailed Settings for Automatic Gain Level Control (Gain Auto)

When [Gain Auto] is set to [Continuous], you can configure the conditions for automatic adjustment in detail.

Item	Description
ALC Reference	Specify the target level for automatic gain control. (This setting is also used for automatic exposure control.)
ALC Area Enable All	Select whether to specify all areas as auto gain metering areas or whether to specify the areas individually. [0]: Specify areas as auto gain metering areas (16 areas) individually. [1]: Specify all areas as auto gain metering areas.
ALC Area Selector	Individually select any of 16 areas for automatic gain metering. (This setting is also used for automatic exposure control.)
ALC Area Enable	Select [True] to enable the metering area selected in [ALC Area Selector], or select [False] to disable it.
AGC Max.	Specify the maximum value for the automatic gain control range.
AGC Min.	Specify the minimum value for the automatic gain control range.
AGC/ASC Control Speed	Specify the speed for automatic gain control. (This setting is also used for automatic exposure control.)

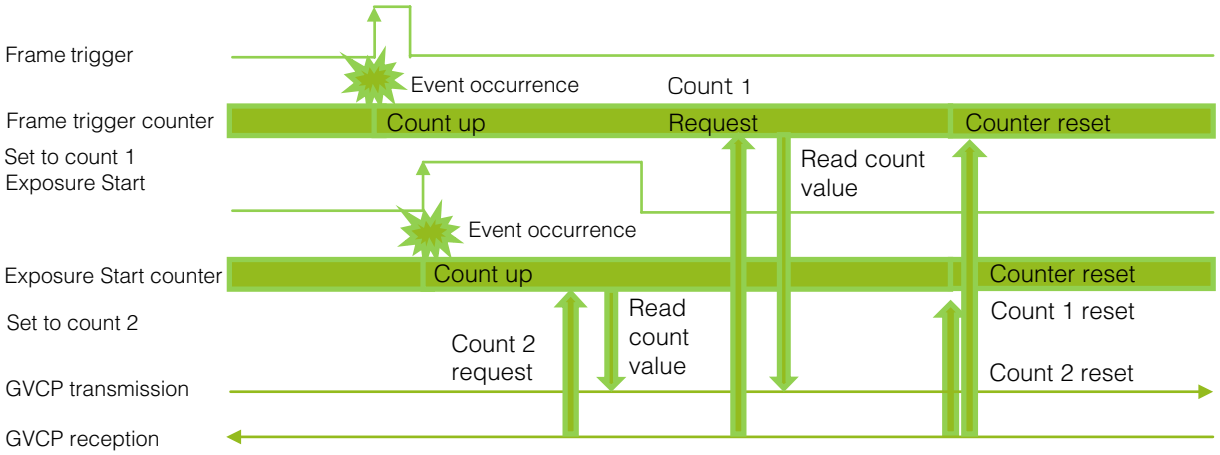
Auto gain metering areas (16 areas)

High Left	High Mid-left	High Mid-right	High Right
Mid-High Left	Mid-High Mid-left	Mid-High Mid-right	Mid-High Right
Mid-Low Left	Mid-Low Mid-left	Mid-Low Mid-right	Mid-Low Right
Low Left	Low Mid-left	Low Mid-right	Low Right

Counter and Timer Control Function (only “Counter” is implemented)

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.
Counting is performed at frame trigger, frame start, exposure start, and exposure transfer end, and by comparing these values, you can determine which internal camera state at which missed triggers will occur.

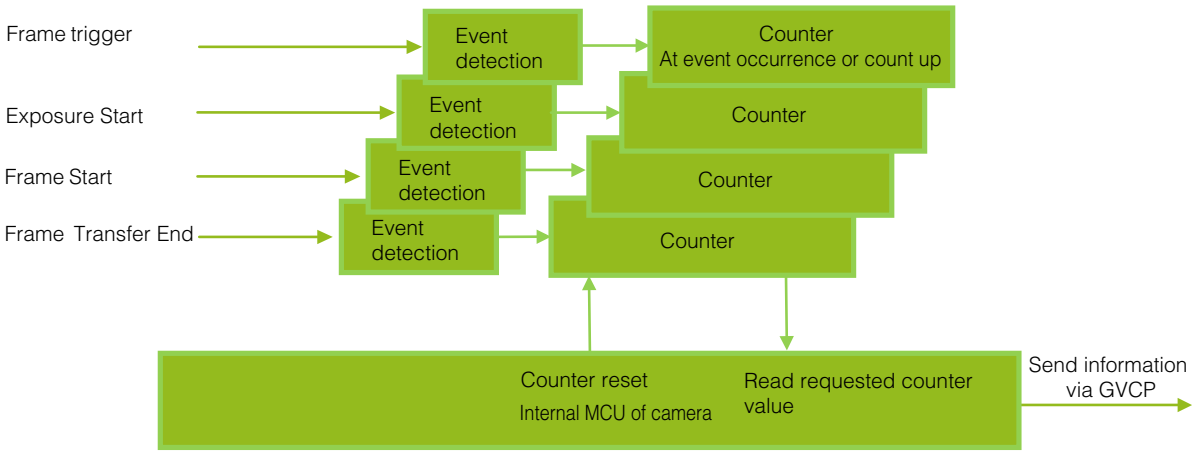
■ Counter occurrence diagram



Note

To reset the counter itself, execute [Counter Reset] or enter "1" in [Counter Reset].

■ Internal camera blocks



■ To use the counter function

Configure the settings as follows.
Three counters can be configured (Counter 0 to 2).

Item	Setting value / selectable range	Description
Counter 0 to 2	Counter 0 to 2	Select the counter.
Counter 0 to 2 Event Source	Off, Frame Trigger, Frame Start, Exposure Start, Exposure Transfer End	Select the counter event signal for which to read the count value.
Counter 0 to 2 Event Activation	Rising Edge (fixed) or Falling Edge	Specify the timing at which to count.

Note

The four counter event signals are always counted up internally on the camera.

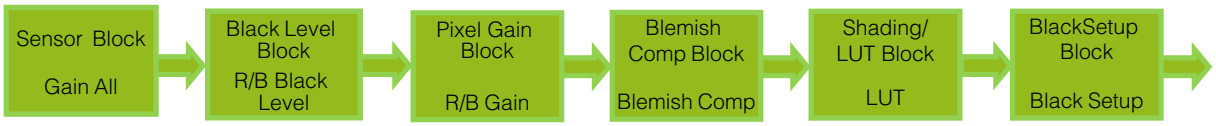
Video Process Bypass Mode

The video process bypass mode is a function that bypasses internal video processing on the camera. When bypass is enabled, the sensor output and camera output data can be set to the same bit width. Operation using 12-bit outputs must be performed in bypass mode.

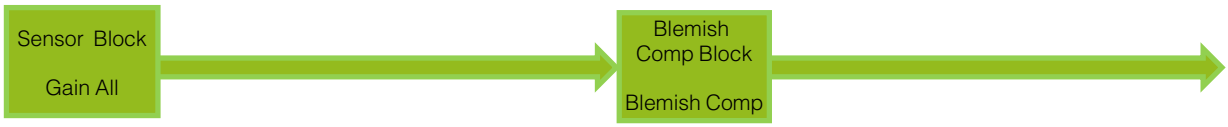
Video process bypass mode	On	Off
Camera operation	All video processes except Gain all (excluding R/B Gain) and Blemish Compensation are disabled.	All video processes are enabled.
Camera output	8-/10-/12-bit	8-/10-bit

■ Differences in camera operation

When video process bypass mode is disabled
All video processes are enabled.



When video process bypass mode is enabled
All video processes except Gain all (excluding R/B Gain) and Blemish Compensation are disabled.



■ To enable video process bypass mode

Item	Setting value / selectable range	Description
Video Process Bypass Mode	On	Enable video process bypass mode.

P-Iris Lens Control Model

In addition to the standard model, a model that supports P-Iris lens control is available.
Currently, only a monochrome model, the GO-2400M-PMCL-AUX1, is available.

The DC IN / trigger connector (4-pin round) signal on this model differs from that of the standard model.

Caution

The pin specifications differ despite being the same connector. Beware that connecting the standard model's cable to the P-Iris model may damage the unit.

Standard model

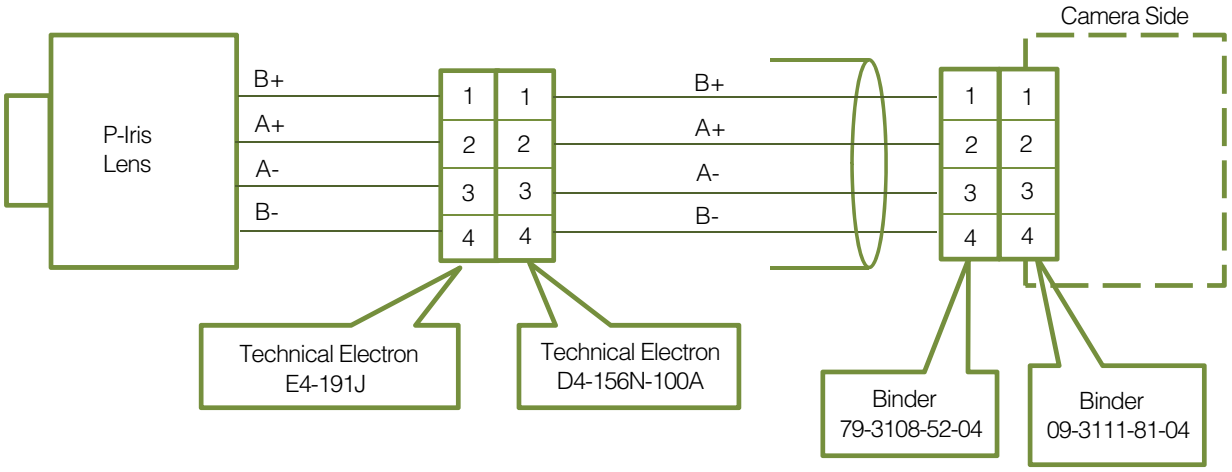
Pin No.	Input/output	Signal	Description
1	Power In	DC(+12 V)In	DC 12 to 24 V +/–10%
2	In	TTL In	Line4
3	Out	TTL Out	Line1
4	Out	Power GND	COMMON GND

P-Iris

Pin No.	Input/output	Signal	Description
1	Out	OUT B+	P-Iris control signal
2	Out	OUT A+	P-Iris control signal
3	Out	OUT A–	P-Iris control signal
4	Out	OUT B–	P-Iris control signal

■ Example of camera and P-Iris lens connection

Use the following camera and P-Iris lens connection as a reference.



Close			→			
Open			←			
Pin name	Lens Pin No.	Camera Pin No.	Step1	Step2	Step3	Step4
B+	1	1	L	L	H	H
A+	2	2	L	H	H	L
A–	3	3	H	L	L	H
B–	4	4	H	H	L	L

■ Supported lenses

The GO-2400-PMCL-AUX1 supports the following lenses.

LM16JC5MM	Kowa 16 mm 2/3"
LM35JC5MM	Kowa 35 mm 2/3"
CINEGON 1.9/10	Schneider 16 mm 1"
CINEGON 1.8/4.8	Schneider 11 mm 2/3"
SCHNEIDER COMPACTIRIS	Schneider P-IRIS unit
MG3518KC	CBC 35 mm
VV1618HF_DN_P	Myutron zoom lens
OTHERS	Select this when using a lens not found in the presets.

You can use an unsupported lens by setting the lens setting to [OTHERS] and configuring other necessary information.
The necessary settings are as follows.

Item	Description
P-IRIS Position Limit	Set the maximum position value. (manual operation, auto operation)
P-IRIS Auto Minimum Step No	Set the smallest value configurable for the iris value. (Auto operation only)
P-IRIS Auto Maximum Step No	Set the largest value configurable for the iris value. (Auto operation only)

■ Configuration procedure

Configure the following settings when using a P-Iris lens.

1 Start the camera.

Do not connect the P-Iris lens' connector to the camera yet.

2 Set the P-IRIS Lens Control setting to [Off].

3 Select your lens in the P-IRIS Lens Select setting, or select [OTHERS].

- If you are using a supported lens, proceed to step 7.
- If you selected [OTHERS] and are using manual operation, proceed to step 7 after performing step 4.
- If you selected [OTHERS] and are using auto operation, proceed to step 4.

4 Configure the P-IRIS Position Limit setting according to the specifications of your P-Iris lens.

5 Set the OPEN-end value for auto iris control by configuring the P-IRIS Auto Minimum Step No setting.

(Example: OPEN end = 0)

6 Set the CLOSE-end value for auto iris control by configuring the P-IRIS Auto Maximum Step No setting.

The recommended value is about 80% of the value configured for P-IRIS Position Limit.

(Example: If the P-IRIS Position Limit is 50, set the value to about 40.)

7 Connect the P-Iris lens connector to the camera.

8 Set the P-IRIS Lens Control setting to [On].

The iris position of the P-Iris lens is initialized.

- Manual operation: Proceed to step 9, and adjust the aperture of the iris.
- Auto operation: Proceed to step 10, and start auto operation.

9 When operating the P-Iris manually, adjust the P-Iris position to obtain the appropriate brightness.

10 When operating the P-Iris automatically, set the Auto Iris Lens Control Signal Output to [On], and adjust the brightness with the ALC Reference setting.

Settings List

Feature Properties

: Settings that can only be configured when image capture on the camera is stopped.

Function name	Access type	Setting range	Min. value	Max. value	Default value	Description
a) Device Control	—	—			—	Display/configure information related to the device.
Device Vendor Name	R/O	—	—	—	JAI Ltd, Japan	Display the manufacturer name.
Device Model Name	R/O	—	—	—	GO-2400M-PMCL GO-2400C-PMCL	Display the model name.
Device Manufacturer Info	R/O	—	—	—	Digital 2.4Mega Pexel Progresshive Scan	Display manufacturer information.
Device Version	R/O	—	—	—	Software Version	Display the software version.
Device Firmware Version	R/O	—	—	—	Firm Ver. No.	Display the firmware version.
Device Fpga Version	R/O	—	—	—	FPGA Ver. No.	Display the FPGA version.
Device SFNC Version Major	R/O	—	—	—	SFNCMajorVersion	Display the SFNC version.
Device SFNC Version Minor	R/O	—	—	—	SFNCMinorVersion	Display the SFNC version.
Device SFNC Version SubMinor	R/O	—	—	—	SFNCSubMinorVersion	Display the SFNC version.
XML Major Version	R/O	—	—	—	XMLMajorVersion	Display the XML version.
XML Minor Version	R/O	—	—	—	XMLMinorVersion	Display the XML version.
XML Sub Minor Version	R/O	—	—	—	XMLSubMinorVersion	Display the XML version.
Device Serial Number	R/O	—	—	—	Varies by camera.	Display the device ID.
Device User ID	R/W	—	—	—	blank	Set the user ID for the camera.
Device Temperature Selector	R/O	Mainboard	—	—	Mainboard	Select the area of the camera's interior for which to display the temperature sensor's reading.
Device Temperature (C)	R/O	value ˚C	—	—	value ˚C	Display the internal temperature (˚C) of the camera.
Device Reset	W/O	—	—	—	—	Reset the device.
b) Image Format Control	—		—	—		Configure image format settings.
Sensor Width	R/O	1936	—	—	1936	Display the maximum image width.
Sensor Height	R/O	1216	—	—	1216	Display the maximum image height.
Sensor Digitization Taps	R/W	Ten [10 Bit] Twelve [12 Bit]	—	—	12 Bit	Displays the digital tones output from the sensor.
Width Max	R/O	1936	—	—	1936	Display the maximum image width.
Height Max	R/O	1216	—	—	1216	Display the maximum image height.
Width	R/W	Min to (Max-OffsetX)	96	1936	1936	Set the image width.
Height	R/W	Min to (Max-OffsetX)	2	1216	1216	Set the image height.

Function name	Access type	Setting range	Min. value	Max. value	Default value	Description
Offset X	R/W	Min to Max	0	1840	0	Set the horizontal offset.
Offset Y	R/W	Min to Max	0	1214	0	Set the vertical offset.
Binning Horizontal	R/W	1: Off 2: x2	1	2	1: Off	Set the number of pixels in the horizontal direction for which to perform binning. (Mono only)
Binning Vertical	R/W	1: Off 2: x2	1	2	1: Off	Set the number of pixels in the vertical direction for which to perform binning. GO-400M-PMCL only
Pixel Format	R/W	GO-2400M-PMCL: Mono8 Mono10 Mono12 GO-2400C-PMCL: BayerRG8 BayerRG10 BayerRG12	—	—	GO-2400M-PMCL: Mono8 GO-2400C-PMCL: BayerRG8	Set the pixel format. Mono12 and BayerRG12 are available when Video Process Bypass Mode is set to On.
PixelColorFilter	R/O	GO-2400M-PMCL: None GO-2400C-PMCL: BayerRG	—	—	GO-2400M-PMCL: None GO-2400C-PMCL: BayerRG	Display the color filter type that will be applied to the image.
Test Pattern	R/W	Off [Off] GreyHorizontalRamp [Grey Horizontal Ramp] GreyVerticalRamp [Grey Vertical Ramp] GreyHorizontalRampMoving [Grey Horizontal Ramp Moving] HorizontalColorBar [Horizontal Color Bar] VerticalColorBar [Vertical Color Bar] MovingColorBar [Moving Color Bar]	—	—	0: Off	Select the test image. ColorBar is only available on the GO-2400C-PMCL.
c) Acquisition Control						Configure image capture settings.
Acquisition Frame Rate Raw	R/W	0.125 to 127.975	0.125	127.975	120.163	Set the frame rate as a frequency. (unit: Hz) The maximum value varies depending on the TapGeometory and ROI settings.
Trigger Selector	R/O	FrameStart [Frame Start]*	—	—	FrameStart	Select the trigger operation.
Trigger Mode	R/W	Off On	—	—	Off	Display the Trigger mode.
Trigger Software	W/O	—	—	—	—	Execute a software trigger.
Trigger Source	R/W	Low [Low] High [High] Software [Software] PulseGenerator0 [Pulse Generator 0] UserOutput0 [User Output 0] UserOutput1 [User Output 1] Line4 [Line4 - TTL In] Line 7[Line7 - CC1] Nand0 [Nand0 Out] Nand1 [Nand1 Out]	—	—	Line 7 [Line7- CC1]	Select the trigger signal source. Line4 TTL In is available on Standard Model.
Trigger Activation	R/W	RisingEdge [Rising Edge] FallingEdge [Falling Edge] LevelHigh [Level High] LevelLow [Level Low]	—	—	Rising Edge	Select the polarity of the trigger signal (i.e., location of signal at which trigger is applied).

Function name	Access type	Setting range	Min. value	Max. value	Default value	Description
Trigger OverLap	R/O	Off	—	—	Off	Select the trigger overlap operation.
Trigger Option	R/W	Off	—	—	Off	Select the alternate trigger modes when [Exposure Mode] is set to [Timed]. This is fixed at OFF on this camera.
Exposure Mode	R/W	Off [Off] Timed [Timed] TriggerWidth [Trigger Width]	0	2	Timed (control via exposure time)	Select the exposure mode.
Exposure Time (us)	R/W	10bit: 15 to 8000000 12bit: 20 to 8000000	15 *	8000000 *	8216	Set the exposure time. The maximum value when Trigger Mode is OFF varies depending on the [Acquisition Frame Rate Raw] value. The minimum value varies depending on the TapGeometry.
Exposure Auto	R/W	Off Continuous	—	—	Off	Set whether to enable auto exposure.
d) Digital IO Control						Configure settings for digital input/output.
Line Selector	R/W	Line1 [Line1 - TTL Out] Line4 [Line4 - TTL In] Line7 [Line7 - CC1] Nand0_In_1 [NAND Gate 0 In 1] Nand0_In_2 [NAND Gate 0 In 2] Nand1_In_1 [NAND Gate 1 In 1] Nand1_In_2 [NAND Gate 1 In 2]	—	—	6: CC1	Select the input/output to configure. Line1 TTL Out and Line4 TTL In are available on Standard Model.
Line Mode	R/O	Input Output	—	—	Input	Display the input/output status (whether it is input or output).
Line Inverter	R/W	True, False	—	—	FALSE	Enable/disable polarity inversion for the selected input signal or output signal.
Line Status	R/O	True, False	—	—	—	Display the status of the input signal or output signal (True: High, False: Low).
LineSource	R/W	Low [Low] High [High] FrameTriggerWait [Frame Trigger Wait] FrameActive [Frame Active] ExposureActive [Exposure Active] FVAL [FVAL] LVAL [LVAL] PulseGenerator0 [PulseGenerator0] UserOutput0 [User Output 0] UserOutput1 [User Output 1] Line4 [Line4 - TTL In] Line7 [Line7 - CC1] Nand0 [Nand0 Out] Nand1 [Nand1 Out]	—	—	Low	Select the line source signal for the item selected in [Line Selector]. Line4 TTL In is available on Standard Model.
Line Format	R/O	NoConnect [No Connect] InternalSignal [Internal Signal] TTL [TTL] LVDS [LVDS] OptoCoupled [Opto Coupled]	—	—	TTL	Display the current I/F type.
User Output Selector	R/W	UserOutput0 [User Output 0] UserOutput1 [User Output 1]	—	—	0: UserOutput0	Set the user output signal.

Function name	Access type	Setting range	Min. value	Max. value	Default value	Description
User Output Value	R/W	True, False	—	—	FALSE	Set the User Output value selected in [User Output Selector].
e) Analog Control						Configure analog control settings.
Gain Selector	R/W	GO-2400M-PMCL: AnalogAll [Analog All] GO-2400C-PMCL: AnalogAll [Analog All] DigitalRedAll [Digital Red All] DigitalBlueAll [Digital Blue All]	—	—	Analog All (master gain)	Select the gain to configure. Digital Red All and Digital Blue All are only available on the GO-2400C-PMCL.
Gain	R/W	AnalogAll: 1 to 16 DigitalRedAll, DigitalBlueAll:0.4467 to 5.6235	AnalogAll: 1 to 16 DigitalRedAll: 0.4467 DigitalBlueAll: 0.4467	AnalogAll: 16 to 16 DigitalRedAll: 5.6235 DigitalBlueAll: 5.6235	1	Set the gain value for the gain item selected with the GainSelector setting.
Gain Auto	R/W	Off Continuous			Off	
Black Level Selector	R/W	GO-2400M-PMCL: Digita All [Digital All] GO-2400C-PMCL: DigitalAll [Digital All] DigitalRed [Digital Red] DigitalBlue [Digital Blue]	—	—	Digital All (master black)	Select the black level to configure. Digital Red All and Digital Blue All are only available on the GO-2400C-PMCL.
Black Level	R/W	–133 to 255	–133	255	0	Set the black level value.
Balance White Auto	R/W	Off [Off] Once [Once] Continuous [Continuous] Preset_4600K [Preset 4600K] Preset_5600K [Preset 5600K] Preset_6500K [Preset 6500K]	—	—	Off	Enable/disable auto white balance.
LUT Mode	R/W	Off Gamma LUT	—	—	0: 0.45	Select the JAI LUT mode.
Gamma Selector	R/W	Gamma_0_45 [0.45] Gamma_0_6 [0.6] Gamma_1_0 [1.0]	—	—	0: Off	Set the gamma value.
f) Pulse Generators						Configure pulse generator settings.
Clock Pre-scaler	R/W	1 to 4096	1	4096	1	Set the division value for the prescaler (12-bit) using the pixel clock as the base clock.
Pulse Generator Clock (MHz)	R/W	0.018127 to 74.25	0.018127	74.25	74.25	Set the clock used for the pulse generator. This value is calculated based on the Clock Pre-Scaler value.
Pulse Generator Selector	R/O	PulseGenerator0 [Pulse Generator 0]	—	—	Pulse Generator 0	Select the pulse generator.
Pulse Generator Length	R/W	1 to 1048575	1	1048575	1	Set the maximum count up value using clock value.
Pulse Generator Length (ms)	R/W	0.000013468 to 14.1222	1.35E-05	14.1222	1.35E-05	Set the maximum count up value using ms. This value is calculated based on the Pulse Generator Length value. The setting range varies depending on the Clock Pre-Scaler value.

Function name	Access type	Setting range	Min. value	Max. value	Default value	Description
Pulse Generator Frequency (Hz)	R/W	70.810386 to 74250000	70.810386	74250000	4.8E+07	Set the maximum count up value using frequency. This value is calculated based on the Pulse Generator Length value.
Pulse Generator Start Point	R/W	0 to 1048574	0	1048574	0	Set the start point for the High interval using clock value. When the counter reaches this value, the output becomes 1.
Pulse Generator Start Point (ms)	R/W	0 to 14.1222	0	14.1222	0	Set the start point for the High interval using ms. When the counter reaches this value, the output becomes 1. The setting range varies depending on the Clock Pre-Scaler value.
Pulse Generator End Point	R/W	1 to 1048575	1	1048575	1	Set the start point for the Low interval using clock value. When the counter reaches this value, the output becomes 0.
Pulse Generator End Point (ms)	R/W	0.000013468 to 14.1222	0.000013468	14.1222	1.35E-05	Set the start point for the Low interval using ms. When the counter reaches this value, the output becomes 0. The setting range varies depending on the Clock Pre-Scaler value.
Pulse Generator pulse-width (ms)	R/O	0 to 14.1222	—	—	1.35E-05	Display High interval width for the pulse in ms. This is a calculation of the time between the Start Point and End Point. The setting range varies depending on the Clock Pre-Scaler value.
Pulse Generator Repeat Count	R/W	0 to 255	0	255	0	Set the repeat count for the counter. When this is set to 0, the counter will be free-running with limitless repeating.
Pulse Generator Clear Activation	R/W	Off [Off] HighLevel [High Level] LowLevel [Low Level] RisingEdge [Rising Edge] FallingEdge [Falling Edge]	—	—	0: Off	Set the clear signal condition for the count clear input of the pulse generator.

Function name	Access type	Setting range	Min. value	Max. value	Default value	Description
Pulse Generator Clear Source	R/W	Low [Low] High [High] FrameTriggerWait [Frame Trigger Wait] FrameActive [Frame Active] ExposureActive [Exposure Active] FVAL [FVAL] LVAL [LVAL] UserOutput0 [User Output 0] UserOutput1 [User Output 1] Line4 [Line4 - TTL In] Line7 [Line7 - CC1] Nand0 [Nand0 Out] Nand1 [Nand1 Out]	—	—	0: Low	Select the count clear input signal source. Line4 TTL In is available on Standard Model.
Pulse Generator Clear Inverter	R/W	True, False	—	—	FALSE	Select whether to invert the polarity of the count clear input signal.
Pulse Generator Clear Sync Mode	R/W	AsyncMode [Async Mode] SyncMode [Sync Mode]	—	—	Async Mode	Select the sync mode for the count clear input signal.
g) LUTControl						Configure LUT settings.
LUT Selector	R/W	Red Green Blue	—	—	GO-2400M-PMCL: 1: Mono GO-2400C-PMCL: 1: Green	Select the LUT channel to control. This item is not displayed for the GO-2400M-PMCL.
LUT Index	R/W	0 to 255	0	255	0	Set the LUT index table number.
LUT Value	R/W	0 to 4095	0	4095	0	Set the LUT value.
h) TransportLayerControl						Configure Camera Link Transport Layer settings.
Device Tap Geometry	R/W	Geometry_1X2_1Y Geometry_1X3_1Y Geometry_1X4_1Y Geometry_1X8_1Y	—	—	3: 1X4_1Y	Set the transmission method for each time images are transmitted from the device (TAP structure).
Camera Link Clock Frequency	R/W	CameraLinkClock37_1MHz [37.1MHz] CameraLinkClock74_3MHz [74.3MHz] CameraLinkClock84_9MHz [84.9MHz]	—	—	1: 74.3MHz	Set the Camera Link clock.
h) UserSetControl						Load factory default settings or save/load user settings for camera settings.
UserSet Selector	R/W	Default [Default] User1 [User1] User2 [User2] User3 [User3]	0	3	0: Default (factory default values)	Select the user settings.
UserSet Load	W/O	—	—	—	—	Load user settings.
UserSet Save	W/O	—	—	—	—	Save the current setting values as user settings.
i) JAICustomControl						Configure settings for functions that are unique to JAI cameras and not specified by SFNC.
Video Process Bypass Mode	R/W	Off On	—	—	Off	Enable/ disable video process bypass mode.

Function name	Access type	Setting range	Min. value	Max. value	Default value	Description
Binning Gain Enable	R/W	Off On	—	—	Off	Set whether to apply gain to the image during binning mode. GO-2400M-PMCL only
Blemish Reduction Enable	R/W	True, False	—	—	TRUE	Enable/disable blemish correction.
Perform White Blemish Reduction Calibration	W/O	—	—	—	—	Execute blemish detection.
Blemish Detect Threshold	R/W	0 to 100	0	100	10	Set the blemish detection threshold.
Blemish Data Index	R/W	0 to 255	0	255	0	Select the correction blemish coordinate (Blemish Data Position X/Y) index.
Blemish Data Position X Value	R/W	–1 to +1935	–1	1935	Varies by camera.	Display the x coordinate (horizontal pixel position) of the correction blemish selected in [Blemish Data Index]. You can also manually enter the x coordinate of the blemish you want to correct.
Blemish Data Position Y Value	R/W	–1 to +1215	–1	1215	Varies by camera.	Display the y coordinate (vertical pixel position) of the correction blemish selected in [Blemish Data Index]. You can also manually enter the y coordinate of the blemish you want to correct.
Blemish Compensation Number	R/O	—	—	—	Varies by camera.	Display the number of correction blemishes.
Shading Correction Mode	R/W	FlatShading [Flat Shading] ColorShading [Color Shading]	—	—	Flat Shading	Select the shading correction mode. This is fixed at [Flat Shading] on the GO-2400M-PMCL. You can select from [Flat Shading] and [Color Shading] on the GO-2400C-PMCL.
Shading Mode	R/W	Off [Off] User1 [User 1] User2 [User 2] User3 [User 3]	—	—	Off	Set the storage area for the shading correction data. When this is set to [Off], the shading correction data is not saved.
Perform Shading Calibration	W/O	—	—	—	—	Execute shading correction.
Shading Detect Result	R/O	—	—	—	0	Display the shading correction results.
ALC Reference	R/W	10 to 95	10	95	50	Set the target level for ALC. (unit: %)

Function name	Access type	Setting range	Min. value	Max. value	Default value	Description
ALC Area Selector	R/W	LowRight [Low Right] LowMidRight [Low Mid-Right] LowMidLeft [Low Mid-Left] LowLeft [Low Left] MidLowRight [Mid-Low Right] MidLowMidRight [Mid-Low Mid-Right] MidLowMidLeft [Mid-Low Mid-Left] MidLowLeft [Mid-Low Left] MidHighRight [Mid-High Right] MidHighMidRight [Mid-High Mid-Right] MidHighMidLeft [Mid-High Mid-Left] MidHighLeft [Mid-High Left] HighRight [High Right] HighMidRight [High Mid-Right] HighMidLeft [High Mid-Left] HighLeft [High Left]	—	—	Low Right	Select the area for which to configure [ALC Area Enable].
ALC Area Enable	R/W	Off On	—	—	FALSE	Enable/disable the photometry area selected in [ALC Area Selector].
ALC Area Enable All	R/W	Off On	—	—	On	On: Specify all photometry areas for ALC, regardless of the enabled/disabled statuses configured individually for each photometry area with [ALC Area Selector]. Off: Specify areas for ALC based on the enabled/disabled statuses configured individually for each photometry area with [ALC Area Selector].
ASC Min.	R/W	100 to 7999999	100	7999999	100	Set the minimum value for the Exposure Auto (ASC) control range.
ASC Max.	R/W	101 to 8000000	101	8000000	8216	Set the maximum value for the Exposure Auto (ASC) control range.
AGC Min.	R/W	100 to 1599	100	1599	100	Set the minimum value for the Gain Auto (AGC) control range.
AGC Max.	R/W	101 to 1600	101	1600	1600	Set the maximum value for the Gain Auto (AGC) control range.
AGC/ASC Control Speed	R/W	1(slow) to 8(fast)	1	8	4	Set the control speed for AGC and ASC (8 is the fastest).
ALC Status	R/W	Off AIC ASC AGC	—	—	—	Display whether ASC or AGC is being controlled during ALC.

Function name	Access type	Setting range	Min. value	Max. value	Default value	Description
AWB Area Selector	R/W	LowRight [Low Right] LowMidRight [Low Mid-Right] LowMidLeft [Low Mid-Left] LowLeft [Low Left] MidLowRight [Mid-Low Right] MidLowMidRight [Mid-Low Mid-Right] MidLowMidLeft [Mid-Low Mid-Left] MidLowLeft [Mid-Low Left] MidHighRight [Mid-High Right] MidHighMidRight [Mid-High Mid-Right] MidHighMidLeft [Mid-High Mid-Left] MidHighLeft [Mid-High Left] HighRight [High Right] HighMidRight [High Mid-Right] HighMidLeft [High Mid-Left] HighLeft [High Left]	—	—	Low Right	Select the area for which to configure [AWB Area Enable].
AWB Area Enable	R/W	Off On	—	—	Off	Enable/disable the photometry area selected in [AWB Area Selector].
AWB Area Enable All	R/W	Off On	—	—	On	On: Specify all photometry areas for AWB, regardless of the enabled/disabled statuses configured individually for each photometry area with [AWB Area Selector]. Off: Specify areas for AWB based on the enabled/disabled statuses configured individually for each photometry area with [AWB Area Selector].
AWB Control Speed	R/W	1(slow) to 8(fast)	1	8	4	Set the control speed for Balance White Auto (AWB) (8 is the fastest).
Video Send Mode Selector	R/W	NormalMode [Normal Mode] TriggerSequenceMode [Trigger Sequence Mode] CommandSequenceMode [Command Sequence Mode]	—	—	Normal Mode	Set the video send mode.
Sequence Roi Index	R/W	1 to 128	1	128	1	Select the index for Trigger Sequence Mode and Command Sequence Mode.
Sequence Roi Frame Count	R/W	1 to 255	1	255	1	Set the display frame count of the selected Sequence Roi Index. (Only enabled during 4Trigger Sequence Mode.)
Sequence Roi Next Index	R/W	1 to 128	1	128	1	Set the index to be displayed after the selected Sequence Roi Index. (Only enabled during Trigger Sequence Mode.)
Sequence Roi Width	R/W	96 to 1936	96	1936	1936	Set the width of the selected Sequence Roi Index.
Sequence Roi Height	R/W	2 to 1216	2	1216	1216	Set the height of the selected Sequence Roi Index.

Function name	Access type	Setting range	Min. value	Max. value	Default value	Description
Sequence Roi Offset X	R/W	0 to 1840	0	1840	0	Set the Offset X of the selected Sequence Roi Index.
Sequence Roi Offset Y	R/W	0 to 1214	0	1214	0	Set the Offset Y of the selected Sequence Roi Index.
Sequence Roi V Binning	R/W	1 to 2	1	2	1	Set the Horizontal Binning of the selected Sequence Roi Index. (Mono only)
Sequence Roi Black Level	R/W	1 to 2	1	2	1	Set the Vertical Binning of the selected Sequence Roi Index. (Mono only)
Sequence Roi Exposure Time	R/W	15 to 8000000*	15 *	8000000 *	8000	Set the exposure time of the selected Sequence Roi Index.
Sequence Roi Gain	R/W	100 to 1600	100	1600	100	Set the gain of the selected Sequence Roi Index.
Sequence Roi Gain Red	R/W	–4533 to +37876	–4533	37876	0	Set the red gain of the selected Sequence Roi Index.
Sequence Roi Gain Blue	R/W	–4533 to +37876	–4533	37876	0	Set the blue gain of the selected Sequence Roi Index.
Sequence Roi H Binning	R/W	–133 to +255	–133	255	0	Set the black level of the selected Sequence Roi Index.
Sequence Lut enable	R/W	True, False	—	—	FALSE	Enable/disable the LUT setting for the selected Sequence Roi Index.
Sequence LUT Mode	R/W	Gamma LUT	—	—	Gamma	Select the LUT mode to use during Trigger Sequence Mode and Command Sequence Mode. (This setting is applied when Sequence Roi Lut Enable is set to "True.")
Command Sequence Index	R/O	—	1	128	0	Set the index displayed during Command Sequence Mode.
Current Sequence Index	R/W		—	—		Display the index number of the currently displayed image.
Reset Sequence Index	W/O	—	—	—	—	Reset the current index number for Trigger Sequence Mode and Command Sequence Mode to "Index 1."
Sensor Multi Roi Index	R/W	Index1 [Index 1] Index2 [Index 2] Index3 [Index 3] Index4 [Index 4]	—	—	Index1	Select the index for Sensor Multi Roi Mode.
Sensor Multi Roi Width	R/W	96 to 1936	96	1936	1936	Set the width of the selected Sensor Multi Roi Index.
Sensor Multi Roi Height	R/W	2 to 1216	2	1216	1216	Set the height of the selected Sensor Multi Roi Index.

Function name	Access type	Setting range	Min. value	Max. value	Default value	Description
Sensor Multi Roi Offset X	R/W	0 to 1840	0	1840	0	Set the Offset X of the selected Sensor Multi Roi Index.
Sensor Multi Roi Offset Y	R/W	0 to 1214	0	1214	0	Set the Offset Y of the selected Sensor Multi Roi Index.
Horizontal Enable	R/W	Off On	—	—	Off	Enable/disable the Width/Offset X for the selected Sequence Multi Roi Index.
Vertical Enable	R/W	Off On	—	—	Off	Enable/disable the Height/Offset Y for the selected Sequence Multi Roi Index.
P-IRIS Lens Select	R/W	OTHERS [OTHERS] LM16JC5MM [LM16JC5MM] LM35JC5MM [LM35JC5MM] CNG1P9M10 [CINEGON1.9/10] CNG1P8M48 [CINEGON1.8/4.8] CNGCOMPACTIRIS [SCHNEIDER COMPACT IRIS] MG3518KC [MG3518KC] VV1618HF_DN_P [VV1618HF DN P]	—	—	OTHERS	Select the P-Iris lens to be used. (P-Iris models only)
P-IRIS Lens Control	R/W	Off On	—	—	Off	Set this to [On] when using a P-Iris lens. (P-Iris models only)
P-IRIS Step Max	R/O	0 to 255	0	255	74	Display the maximum step number for the P-Iris lens selected in [P-IRIS Lens Select]. This is only enabled when [P-IRIS Lens Select] is set to a setting other than [OTHERS]. (P-Iris models only)
P-IRIS Position	R/W	0 to	0	Varies depending on lens	0	Set the iris position of the P-Iris lens as a step number. (P-Iris models only)
P-IRIS Auto Minimum F_No	R/W	F_OPEN [Open] F_14 [F 1.4] F_20 [F 2.0] F_28 [F 2.8] F_40 [F 4.0] F_56 [F 5.6] F_80 [F 8.0] F_110 [F 11.0] F_160 [F 16.0] F_220 [F 22.0] F_320 [F 32.0] F_CLOSE [Close]	—	—	F 5.6	Set the minimum value for the control range as an F number when controlling the P-Iris lens using auto iris. This is only enabled when [P-IRIS Lens Select] is set to a setting other than [OTHERS]. (P-Iris models only)
P-IRIS Auto Maximum F_No	R/W	F_OPEN [Open] F_14 [F 1.4] F_20 [F 2.0] F_28 [F 2.8] F_40 [F 4.0] F_56 [F 5.6] F_80 [F 8.0] F_110 [F 11.0] F_160 [F 16.0] F_220 [F 22.0] F_320 [F 32.0] F_CLOSE [Close]	—	—	F 1.4	Set the maximum value for the control range as an F number when controlling the P-Iris lens using auto iris. This is only enabled when [P-IRIS Lens Select] is set to a setting other than [OTHERS]. (P-Iris models only)

Function name	Access type	Setting range	Min. value	Max. value	Default value	Description
P-IRIS Current F Value	R/O	F_OPEN [Open] F_14 [F 1.4] F_20 [F 2.0] F_28 [F 2.8] F_40 [F 4.0] F_56 [F 5.6] F_80 [F 8.0] F_110 [F 11.0] F_160 [F 16.0] F_220 [F 22.0] F_320 [F 32.0] F_CLOSE [Close] F_UNKNOWN [Unknown]	—	—	Unknown	Display the iris position of the P-Iris lens as an F number. (P-Iris models only)
P-IRIS Auto Minimum Step No	R/W		0	200	0	Set the minimum value for the control range as a step number when controlling the P-Iris lens using auto iris. This is only enabled when [P-IRIS Lens Select] is set to [OTHERS]. (P-Iris models only)
P-IRIS Auto Maximum Step No	R/W		0	200	60	Set the maximum value for the control range as a step number when controlling the P-Iris lens using auto iris. This is only enabled when [P-IRIS Lens Select] is set to [OTHERS]. (P-Iris models only)
P-IRIS Position Limit	R/W		0	200	74	Set the maximum step number for when [P-IRIS Lens Select] is set to [OTHERS]. This is only enabled when [P-IRIS Lens Select] is set to [OTHERS]. (P-Iris models only)
P-IRIS Phase Control	R/W	Phase_AB [A-AM_B-BM] Phase_BA [B-BM_A-AM]	—	—	Off	Set the iris control direction for the P-Iris lens. This is only enabled when [P-IRIS Lens Select] is set to [OTHERS]. (P-Iris models only)
Auto Iris Lens Control Signal Output	R/W	A-AM_B-BM B-BM_A-AM	—	—	A-AM, B-	Set this to [On] to control the P-Iris lens using auto iris control. (P-Iris models only)
j) CounterAndTimer Control						Configure counter settings. (This camera only supports counter functions.)
Counter 0	R/O	Counter [Counter 0]	—	—	—	Select the counter.
Counter0 Event Source	R/W	Off [Off] FrameTrigger [Frame Trigger] FrameStart [Frame Start] ExposureStart [Exposure Start] FrameTransferEnd [Frame Transfer End]	—	—	Off	Select the counter event signal for which to read the count value.
Counter0 Event Activation	R/O	RisingEdge [Rising Edge] FallingEdge [Falling Edge]	—	—	—	Display the timing at which to count.
Counter0 Reset	W/O	—	—	—	—	Reset the counter.

Function name	Access type	Setting range	Min. value	Max. value	Default value	Description
Counter0 Refresh	W/O	—	—	—	—	Update the count value.
Counter0 Value	R/O	—	—	—	0	Display the count value.
Counter0 Status	R/O	CounterActive [Counter Active]	—	—	Counter Active	Display the counter status.
Counter 1	R/O	Counter [Counter 1]	—	—	—	Select the counter.
Counter1 Event Source	R/W	Off [Off] FrameTrigger [Frame Trigger] FrameStart [Frame Start] ExposureStart [Exposure Start] FrameTransferEnd [Frame Transfer End]	—	—	Off	Select the counter event signal for which to read the count value.
Counter1 Event Activation	R/O	RisingEdge [Rising Edge] FallingEdge [Falling Edge]	—	—	—	Display the timing at which to count.
Counter1 Reset	W/O	—	—	—	—	Reset the counter.
Counter1 Refresh	W/O	—	—	—	—	Update the count value.
Counter1 Value	R/O	—	—	—	0	Display the count value.
Counter1 Status	R/O	CounterActive [Counter Active]	—	—	Counter Active	Display the counter status.
Counter 2	R/O	Counter [Counter 2]	—	—	—	Select the counter.
Counter2 Event Source	R/W	Off [Off] FrameTrigger [Frame Trigger] FrameStart [Frame Start] ExposureStart [Exposure Start] FrameTransferEnd [Frame Transfer End]	—	—	Off	Select the counter event signal for which to read the count value.
Counter2 Event Activation	R/O	RisingEdge [Rising Edge] FallingEdge [Falling Edge]	—	—	—	Display the timing at which to count.
Counter2 Reset	W/O	—	—	—	—	Reset the counter.
Counter2 Refresh	W/O	—	—	—	—	Update the count value.
Counter2 Value	R/O	—	—	—	0	Display the count value.
Counter2 Status	R/O	CounterActive [Counter Active]	—	—	Counter Active	Display the counter status.

ASCII Command List

1. GenCP Bootstrap Register

Name	Access	ShortASCII	Values	MIN	MAX	DEFAULT	Description	Description
DeviceVendorName	R/O	DVN	JAI Ltd, Japan	—	—	—	DVN?<CR><LF>	Display the manufacturer name.
DeviceModelName	R/O	MD	“GO-2400M-PMCL”(Mono) “GO-2400C-PMCL”(Color) “GO-2400M-PMCL-AUX1”(Mono) “GO-2400C-PMCL-AUX1”(Color)	—	—	—	MD?<CR><LF>	Display the model name.
DeviceVersion	R/O	DV	Indicate device version (e.g. “0.1.0.0”)	—	—	—	DV?<CR><LF>	Display the camera version.
DeviceID	R/O	ID	Serial Number	—	—	—	ID?<CR><LF>	Display the device ID.

DeviceUserID	R/W	UD	User can save and load free text. (12 or less characters)				UD=[Param.]<CR><LF> UD?<CR><LF>	Set the user ID for the camera.
2. Technology Specific Bootstrap Register								
SupportedBaudrates	R/O	SBDRT	Indicate Support/ Non-support status for each baud rate bit0: 9600bps bit1: 19200bps bit2: 38400bps bit3: 57600bps bit4: 115200bps	0x01	0xFF	0x1F	SBDRT?<CR><LF> This camera supports 9600bps, 19200bps, 38400bps, 57600bps, and 115200bps.	Display the supported transmission baud rates as bit fields.
CurrentBaudrate	R/W	CBDRT	READ: Indicate current baud rate WRITE: Set any bit of baud rate bit0: 9600bps bit1: 19200bps bit2: 38400bps bit3: 57600bps bit4: 115200bps	0x01	0x80	1 (9600bps)	CBDRT=[Param.]<CR><LF> CBDRT?<CR><LF> In case of WRITE execution (change baud rate), it needs to control in the proper sequence between Host and Camera. (Refer to the section 3.3)	Display the currently configured transmission baud rate. To change the transmission baud rate, use this command (configuration steps).
3. Device Control								
DeviceFirmware Version	R/O	VN	Firm Ver. No.	—	—	—	VN?<CR><LF>	Display the firmware version.
DeviceReset	W/O	CRS00	1	—	—	—	CRS00=1<CR><LF>	Reset the device.
4. Image Format Control								
Height	R/W	HTL	Min to (Max - OffsetY)	2	1216	1216	HTL=[Param.]<CR><LF> HTL?<CR><LF> (2 line/ Step)	Set the image height.
Width	R/W	WTC	Min to (Max - OffsetX)	96	1936 (*) Varies depending on Tap Geometry setting.	1936	"WTC=[Param.]<CR><LF> WTC?<CR><LF> 1X2-1Y:96~1936,Step:2Pix/Step 1X3-1Y:96~1932.Step:6Pix/Step 1X4-1Y:96~1936,Step:4Pix/Step 1X8-1Y:96~1936,Step:8Pix/Step	Set the image width.
Offset Y	R/W	OFL	Min to (Max - Height)	0	1214	0	OFL=[Param.]<CR><LF> OFL?<CR><LF> (2 line/ Step)	Set the vertical offset.
Offset X	R/W	OFC	Min to (Max - Width)	0	1840 (*) Varies depending on Tap Geometry setting.	0	OFC=[Param.]<CR><LF> OFC?<CR><LF> * 1X2-1Y:Offset X:2Pix/Step 1X3-1Y:Offset X:6Pix/Step Max 1836 1X4-1Y:Offset X:4Pix/Step 1X8-1Y:Offset X:8Pix/Step	Set the horizontal offset.
BinningHorizontal	R/W	HB	1: Binning Off 2: Binning 2 mode"	1	2	1	HB=[Param.]<CR><LF> HB?<CR><LF> (Mono model only)	Set the number of pixels in the horizontal direction for which to perform binning. (Mono only)
BinningVertical	R/W	VB	1: Binning Off 2: Binning 2 mode	1	2	1	VB=[Param.]<CR><LF> VB?<CR><LF> (Mono model only)	Set the number of pixels in the vertical direction for which to perform binning. GO-2400M-PMCL only

PixelFormat	R/(W)	BA	Mono model: 0: Mono8 1: Mono10 2: Mono12* Color model: 0: ColorRG8 1: ColorRG10 2: ColorRG12* (*VP bypass On only)	0	2	0	BA=[Param.]<CR><LF> BA?<CR><LF>	Set the pixel format.
TestImageSelector	R/W	TPN	0: Off 1: GreyHorizontalRamp 2: GreyVerticalRamp 3: GreyHorizontalRampMoving 4: Horizontal Colorbar* 5: Vertical Colorbar* 6: Moving Colorbar* (* Color model only)	0	Mono:3 Color:6	0	TPN=[Param.]<CR><LF> TPN?<CR><LF>	Select the test image.
SensorDigitizationTaps	R/W	SDT	1: 10-bit 2: 12-bit	1	2	2	SDT=[Param.]<CR><LF> SDT?<CR><LF>	Displays the digital tones output from the sensor.
5. Acquisition Control								
FrameStartTrigMode	R/W	TM	Off/On	0	1	0	TM=[Param.]<CR><LF> TM?<CR><LF>	Display the Trigger mode.
TriggerSoftware	(R)/W	STRG	0 or 1	—	—	—	STRG=0<CR><LF>	Execute a software trigger.
FrameStartTrigSource	R/W	TI	0: Low 1: High 2: SoftTrigger 8: PulseGenerator0 10:UserOutput0 11:UserOutput1 12: TTL_In1(Std Only) 13: CL_CC1_In 14: Nand0 15: Nand1	0	15	0	TI=[Param.]<CR><LF> TM?<CR><LF>	Select the trigger signal source.
FrameStartTrig Activation	R/W	TA	0: RisingEdge 1: FallingEdge 2: LevelHigh 3: LevelLow	0	3	0	TA=[Param.]<CR><LF> TA?<CR><LF>	Select the polarity of the trigger signal (i.e., location of signal at which trigger is applied).
ExposureMode	R/W	EM	0: Off 1: Timed 2: TriggerWidth	0	2	0	EM=[Param.]<CR><LF> EM?<CR><LF>	Select the exposure mode.
ExposureTimeRaw	R/W	PE	Min to Max[us]	15 *1	8000000	18000	PE=[Param.]<CR><LF> PE?<CR><LF>	Set the exposure time. The maximum value varies depending on the [Acquisition Frame Rate Raw] value.
ExposureAuto	R/W	ASC	0: Off 1: Continuous	0	1	0	ASC=[Param.]<CR><LF> ASC?<CR><LF>	Set whether to enable auto exposure.
6. Digital I/O Control								
LineInverter_Nand0In1	R/W	ND0INV1	False/True	0	1	0	ND0INV1=[Param.]<CR><LF> ND0INV1?<CR><LF>	Enable/disable polarity inversion for the NAND0 In1 input.
LineInverter_Nand0In2	R/W	ND0INV2	False/True	0	1	0	ND0INV2=[Param.]<CR><LF> ND0INV2?<CR><LF>	Enable/disable polarity inversion for the NAND0 In2 input.
LineInverter_Nand1In1	R/W	ND1INV1	False/True	0	1	0	ND1INV1=[Param.]<CR><LF> ND0INV1?<CR><LF>	Enable/disable polarity inversion for the NAND1 In1 input.

LineInverter_Nand1In2	R/W	ND1INV2	False/True	0	1	0	ND1INV2=[Param.]<CR><LF> ND0INV2?<CR><LF>	Enable/disable polarity inversion for the NAND1 In2 input.
LineSource_Line1	R/W	LS0	0: Low 1: High 3: FrameTriggerWait 4: FrameActive 5: ExposureActive 6: Fval 7: Lval 8: PulseGenerator0 10:UserOutput0 11:UserOutput1 12: TTL_In1(Std Only) 13: CL_CC1_In 14: Nand0 15: Nand1	0	15	0	LS0=[Param.]<CR><LF> LS0?<CR><LF> For 12pin TTL out	Select the line source signal for Line1 (12-pin TTL output).
UserOutput0	R/W	USC0	False/True	0	1	0	USC0=[Param.]<CR><LF> USC0?<CR><LF>	Set the User Output0 value.
UserOutput1	R/W	USC1	False/True	0	1	0	USC1=[Param.]<CR><LF> USC1?<CR><LF>	Set the User Output1 value.
7. Analog Control								
GainRawAnalogAll	R/W	FGA	min to 0 to max	100	1600	100	FGA=[Param.]<CR><LF> FGA?<CR><LF>	Set the gain value.
GainRawDigitalRedAll	R/W	PGR	min to 0 to max	–4533	28400	0	PGR=[Param.]<CR><LF> PGR?<CR><LF> (Color model only)	Set the red gain value for white balance control.
GainRawDigitalBlueAll	R/W	PGB	min to 0 to max	–4533	28400	0	PGB=[Param.]<CR><LF> PGB?<CR><LF> (Color model only)	Set the blue gain value for white balance control.
GainAuto	R/W	AGC	0: Off 1: Continuous	0	1	0	AGC=[Param.]<CR><LF> AGC?<CR><LF>	Enable/disable gain auto adjustment.
BlackLevelRawAll	R/W	BL	min to 0 to max	–133	255	0	BL=[Param.]<CR><LF> BL?<CR><LF>	Set the black level value.
BlackLevelRawRed	R/W	BLR1	min to 0 to max	–133	255	0	BLR1=[Param.]<CR><LF> BLR1?<CR><LF> (Color model only)	Set the red gain value for black balance control.
BlackLevelRawBlue	R/W	BLB1	min to 0 to max	–133	255	0	BLB1=[Param.]<CR><LF> BLB1?<CR><LF> (Color model only)	Set the blue gain value for black balance control.
BalanceWhiteAuto	R/W	AWB	0: Off 1: Once 2: Continuous 3: 4600K 4: 5600K 5: 6600K Else : Off	0	2	0	AWB=[Param.]<CR><LF> AWB?<CR><LF> (Color model only)	Set the auto white balance mode. (Color only)
8. LUT Control								
LUTValueRed	R/W	LUTR	Param 1: LUT index Param 2: LUTdata(Min to Max)	0 0	255 4095	γ=1 equivalent value	LUTR=[Param1],[Param2]<CR><LF> LUTR?[Param1]<CR><LF> (Color model only)	Set the LUT value for the red output signal. (Color only)
LUTValueGreen(Mono)	R/W	LUTG	Param 1: LUT index Param 2:LUTdata(Min to Max)	0 0	255 4095	γ=1 equivalent value	LUTG=[Param1],[Param2]<CR><LF> LUTG?[Param1]<CR><LF>	Set the LUT value for the green output signal. (for Color) Set the LUT value for the image output signal. (for Mono)
LUTValueBlue	R/W	LUTB	Param 1: LUT index Param 2: LUTdata(Min to Max)	0 0	255 4095	γ=1 equivalent value	LUTB=[Param1],[Param2]<CR><LF> LUTB?[Param1]<CR><LF> (Color model only)	Set the LUT value for the blue output signal. (Color only)

9. Transport Layer Control								
DeviceTapGeometry	R/W	TAGM	1: Geometry_1X2_1Y 3: Geometry_1X4_1Y 5: Geometry_1X8_1Y 7: Geometry_1X3_1Y	1	7	5	TAGM=[Param.]<CR><LF> TAGM?<CR><LF>	Set the transmission method for each time images are transmitted from the device (TAP structure).
10. User Set Control								
UserSetLoad	(R)/W	LD	0: Default 1: UserSet1 2: UserSet2 3: UserSet3	0	3	0	LD=[Param.]<CR><LF> LD?<CR><LF>	Load user settings.
UserSetSave	(R)/W	SA	1: UserSet1 2: UserSet2 3: UserSet3	1	3	1	SA=[Param.]<CR><LF> SA?<CR><LF>	Save the current setting values as user settings.
11. Counter and Timer Control								
Counter0EventSource	R/W	CE0	False/True	0	1	0	CE0=[Param.]<CR><LF> CE0?<CR><LF>	Select the counter event signal for which to read the count value (for Counter0).
Counter1EventSource	R/W	CE1	False/True	0	1	0	CE1=[Param.]<CR><LF> CE1?<CR><LF>	Select the counter event signal for which to read the count value (for Counter1).
Counter2EventSource	R/W	CE2	False/True	0	1	0	CE2=[Param.]<CR><LF> CE2?<CR><LF>	Select the counter event signal for which to read the count value (for Counter2).
Counter0Reset	(R)/W	CR0	1	1	1	—	CR0=0<CR><LF>	Reset Counter0.
Counter1Reset	(R)/W	CR1	1	1	1	—	CR1=0<CR><LF>	Reset Counter1.
Counter2Reset	(R)/W	CR2	1	1	1	—	CR2=0<CR><LF>	Reset Counter2.
Counter0Value	R/O	CV0	Min to Max	0	65535	0	CV0?<CR><LF>	Display the Counter0 value.
Counter1Value	R/O	CV1	Min to Max	0	65535	0	CV1?<CR><LF>	Display the Counter1 value.
Counter2Value	R/O	CV2	Min to Max	0	65535	0	CV2?<CR><LF>	Display the Counter2 value.
12. JAI-Custom								
AcquisitionFrame Period	R/W	AR	Min to Max[us]	32764 *2	8000000	11961	AR=[Param.]<CR><LF> AR?<CR><LF> Maximum value is calculated depending on Height and Offset Y settings	Set the frame rate as a frame interval [us].
BlemishWhiteEnable	R/W	BMW	0: False 1: True	0	1	1	BMW=[Param.]<CR><LF> BMW?<CR><LF>	Enable/disable blemish correction.
BlemishWhiteDetect	W/O	BMRCW	1	1	1	—	BMRCW=0<CR><LF>	Execute blemish detection.
BlemishWhiteDetect Threshold	R/W	BMTHW	Min to Max	0	100	10	BMTHW=[Param.]<CR><LF> BMTHW?<CR><LF>	Set the blemish detection threshold.

BlemishWhiteDetect PositionX	R/W	BMPXW	Param 1: Blemish index Param 2: X position(Min to Max)	0 –1	255 1935	–1	BMPXW=[Param1],[Param2]<CR><LF> BMPXW?[Param1]<CR><LF>	Display the x coordinate (horizontal pixel position) of the correction blemish selected in [Blemish Data Index]. You can also manually enter the x coordinate of the blemish you want to correct.
BlemishWhiteDetect PositionY	R/W	BMPYW	Param 1: Blemish index Param 2: Y position(Min to Max)	0 –1	255 1935	–1	BMPYW=[Param1],[Param2]<CR><LF> BMPYW?[Param1]<CR><LF>	Display the y coordinate (vertical pixel position) of the correction blemish selected in [Blemish Data Index]. You can also manually enter the y coordinate of the blemish you want to correct.
VideoSendMode	R/W	VSM	0: Normal 1: Trigger Sequence 2: Command Sequence	0	2	0	VSM=[Param.]<CR><LF> VSM?<CR><LF>	Set the video send mode.
ShadingCorrection Mode	R/W	SDCM	0: Flat Shading 1: Color Shading* (*Color model only)	0	1	0	SDCM=[Param.]<CR><LF> SDCM?<CR><LF>	Select the shading correction mode. (Color only / fixed at Flat Shading for Mono)
ShadingCorrect	W/O	RS		0	0	0	BMRCW=0<CR><LF>	Execute shading correction.
RequestShadingDetectResult	R/O	SDRS	0=Complete. 1=Too Bright. 2=Too dark. 3=Timeout Error. 4=Busy. 5=Limit. 6= Trig is not set as Normal.	0	6	0	SDRS?<CR><LF>	Display the shading correction results.
ShadingMode	R/W	SDM	0: OFF 1: User 1 2: User 2 3: User 3	0	3	0	SDM=[Param.]<CR><LF> SDM?<CR><LF>	Set the storage area for the shading correction data. When this is set to [Off], the shading correction data is not saved.
SequenceModeFrame Count1	R/W	SQF1	Min to Max	1	255	1	SQF1=[Param.]<CR><LF> SQI1?<CR><LF>	Set the frame count of Sequence Roi Index1. (Only enabled during Trigger Sequence Mode.)
SequenceModeFrame Count2	R/W	SQF2	Min to Max	1	255	1	SQF2=[Param.]<CR><LF> SQI2?<CR><LF>	Set the frame count of Sequence Roi Index2. (Only enabled during Trigger Sequence Mode.)
SequenceModeFrame Count3	R/W	SQF3	Min to Max	1	255	1	SQF3=[Param.]<CR><LF> SQI3?<CR><LF>	Set the frame count of Sequence Roi Index3. (Only enabled during Trigger Sequence Mode.)

SequenceModeFrame Count4	R/W	SQF4	Min to Max	1	255	1	SQF4=[Param.]<CR><LF> SQI4?<CR><LF>	Set the frame count of Sequence Roi Index4. (Only enabled during Trigger Sequence Mode.)
SequenceModeFrame Count5	R/W	SQF5	Min to Max	1	255	1	SQF5=[Param.]<CR><LF> SQI5?<CR><LF>	Set the frame count of Sequence Roi Index5. (Only enabled during Trigger Sequence Mode.)
SequenceModeFrame Count6	R/W	SQF6	Min to Max	1	255	1	SQF6=[Param.]<CR><LF> SQI6?<CR><LF>	Set the frame count of Sequence Roi Index6. (Only enabled during Trigger Sequence Mode.)
SequenceModeFrame Count7	R/W	SQF7	Min to Max	1	255	1	SQF7=[Param.]<CR><LF> SQI7?<CR><LF>	Set the frame count of Sequence Roi Index7. (Only enabled during Trigger Sequence Mode.)
SequenceModeFrame Count8	R/W	SQF8	Min to Max	1	255	1	SQF8=[Param.]<CR><LF> SQI8?<CR><LF>	Set the frame count of Sequence Roi Index8. (Only enabled during Trigger Sequence Mode.)
SequenceModeFrame Count9	R/W	SQF9	Min to Max	1	255	1	SQF9=[Param.]<CR><LF> SQI9?<CR><LF>	Set the frame count of Sequence Roi Index9. (Only enabled during Trigger Sequence Mode.)
SequenceModeFrame Count10	R/W	SQF10	Min to Max	1	255	1	SQF10=[Param.]<CR><LF> SQI10?<CR><LF>	Set the frame count of Sequence Roi Index10. (Only enabled during Trigger Sequence Mode.)
:		:						
SequenceModeFrame Count128	R/W	SQF128	Min to Max	1	255	1	SQF128=[Param.]<CR><LF> SQI128?<CR><LF>	Set the frame count of Sequence Roi Index128. (Only enabled during Trigger Sequence Mode.)
SequenceModeNext Index1	R/W	SQNI1	Same as SequenceRoiIndex	1	128	1	SQNI1=[Param.]<CR><LF> SQNI1?<CR><LF>	Set the index to be executed after Sequence Roi Index1. (Only enabled during Trigger Sequence Mode.)
SequenceModeNext Index2	R/W	SQNI2	Same as SequenceRoiIndex	1	128	1	SQNI2=[Param.]<CR><LF> SQNI2?<CR><LF>	Set the index to be executed after Sequence Roi Index2. (Only enabled during Trigger Sequence Mode.)
SequenceModeNext Index3	R/W	SQNI3	Same as SequenceRoiIndex	1	128	1	SQNI3=[Param.]<CR><LF> SQNI3?<CR><LF>	Set the index to be executed after Sequence Roi Index3. (Only enabled during Trigger Sequence Mode.)

SequenceModeNext Index4	R/W	SQNI4	Same as SequenceRoiIndex	1	128	1	SQNI4=[Param.]<CR><LF> SQNI4?<CR><LF>	Set the index to be displayed after executed Roi Index4. (Only enabled during Trigger Sequence Mode.)
SequenceModeNext Index5	R/W	SQNI5	Same as SequenceRoiIndex	1	128	1	SQNI5=[Param.]<CR><LF> SQNI5?<CR><LF>	Set the index to be executed after Sequence Roi Index5. (Only enabled during Trigger Sequence Mode.)
SequenceModeNext Index6	R/W	SQNI6	Same as SequenceRoiIndex	1	128	1	SQNI6=[Param.]<CR><LF> SQNI6?<CR><LF>	Set the index to be executed after Sequence Roi Index6. (Only enabled during Trigger Sequence Mode.)
SequenceModeNext Index7	R/W	SQNI7	Same as SequenceRoiIndex	1	128	1	SQNI7=[Param.]<CR><LF> SQNI7?<CR><LF>	Set the index to be executed after Sequence Roi Index7. (Only enabled during Trigger Sequence Mode.)
SequenceModeNext Index8	R/W	SQNI8	Same as SequenceRoiIndex	1	128	1	SQNI8=[Param.]<CR><LF> SQNI8?<CR><LF>	Set the index to be executed after Sequence Roi Index8. (Only enabled during Trigger Sequence Mode.)
SequenceModeNext Index9	R/W	SQNI9	Same as SequenceRoiIndex	1	128	1	SQNI9=[Param.]<CR><LF> SQNI9?<CR><LF>	Set the index to be executed after Sequence Roi Index9. (Only enabled during Trigger Sequence Mode.)
SequenceModeNext Index10	R/W	SQNI10	Same as SequenceRoiIndex	1	128	1	SQNI10=[Param.]<CR><LF> SQNI10?<CR><LF>	Set the index to be executed after Sequence Roi Index10. (Only enabled during Trigger Sequence Mode.)
:								
SequenceModeNext Index128	R/W	SQNI128	Same as SequenceRoiIndex	1	128	1	SQNI128=[Param.]<CR><LF> SQNI128?<CR><LF>	Set the index to be executed after Sequence Roi Index128. (Only enabled during Trigger Sequence Mode.)
SequenceMode Width1	R/W	SQW1	Min to Max	96	1936	1936	SQW1=[Param.]<CR><LF> SQW1?<CR><LF>	Set the width of Sequence Roi Index1.
SequenceMode Width2	R/W	SQW2	Min to Max	96	1936	1936	SQW2=[Param.]<CR><LF> SQW2?<CR><LF>	Set the width of Sequence Roi Index2.
SequenceMode Width3	R/W	SQW3	Min to Max	96	1936	1936	SQW3=[Param.]<CR><LF> SQW3?<CR><LF>	Set the width of Sequence Roi Index3.
SequenceMode Width4	R/W	SQW4	Min to Max	96	1936	1936	SQW4=[Param.]<CR><LF> SQW4?<CR><LF>	Set the width of Sequence Roi Index4.
SequenceMode Width5	R/W	SQW5	Min to Max	96	1936	1936	SQW5=[Param.]<CR><LF> SQW5?<CR><LF>	Set the width of Sequence Roi Index5.

SequenceMode Width6	R/W	SQW6	Min to Max	96	1936	1936	SQW6=[Param.]<CR><LF> SQW6?<CR><LF>	Set the width of Sequence Roi Index6.
SequenceMode Width7	R/W	SQW7	Min to Max	96	1936	1936	SQW7=[Param.]<CR><LF> SQW7?<CR><LF>	Set the width of Sequence Roi Index7.
SequenceMode Width8	R/W	SQW8	Min to Max	96	1936	1936	SQW8=[Param.]<CR><LF> SQW8?<CR><LF>	Set the width of Sequence Roi Index8.
SequenceMode Width9	R/W	SQW9	Min to Max	96	1936	1936	SQW9=[Param.]<CR><LF> SQW9?<CR><LF>	Set the width of Sequence Roi Index9.
SequenceMode Width10	R/W	SQW10	Min to Max	96	1936	1936	SQW10=[Param.]<CR><LF> SQW10?<CR><LF>	Set the width of Sequence Roi Index10.
:								
SequenceMode Width128	R/W	SQW128	Min to Max	96	1936	1936	SQW128=[Param.]<CR><LF> SQW128?<CR><LF>	Set the width of Sequence Roi Index128.
SequenceMode OffsetX1	R/W	SQOX1	Min to Max	0	1840	0	SQOX1=[Param.]<CR><LF> SQOX1?<CR><LF>	Set the Offset X of Sequence Roi Index1.
SequenceMode OffsetX2	R/W	SQOX2	Min to Max	0	1840	0	SQOX2=[Param.]<CR><LF> SQOX2?<CR><LF>	Set the Offset X of Sequence Roi Index2.
SequenceMode OffsetX3	R/W	SQOX3	Min to Max	0	1840	0	SQOX3=[Param.]<CR><LF> SQOX3?<CR><LF>	Set the Offset X of Sequence Roi Index3.
SequenceMode OffsetX4	R/W	SQOX4	Min to Max	0	1840	0	SQOX4=[Param.]<CR><LF> SQOX4?<CR><LF>	Set the Offset X of Sequence Roi Index4.
SequenceMode OffsetX5	R/W	SQOX5	Min to Max	0	1840	0	SQOX5=[Param.]<CR><LF> SQOX5?<CR><LF>	Set the Offset X of Sequence Roi Index5.
SequenceMode OffsetX6	R/W	SQOX6	Min to Max	0	1840	0	SQOX6=[Param.]<CR><LF> SQOX6?<CR><LF>	Set the Offset X of Sequence Roi Index6.
SequenceMode OffsetX7	R/W	SQOX7	Min to Max	0	1840	0	SQOX7=[Param.]<CR><LF> SQOX7?<CR><LF>	Set the Offset X of Sequence Roi Index7.
SequenceMode OffsetX8	R/W	SQOX8	Min to Max	0	1840	0	SQOX8=[Param.]<CR><LF> SQOX8?<CR><LF>	Set the Offset X of Sequence Roi Index8.
SequenceMode OffsetX9	R/W	SQOX9	Min to Max	0	1840	0	SQOX9=[Param.]<CR><LF> SQOX9?<CR><LF>	Set the Offset X of Sequence Roi Index9.
SequenceMode OffsetX10	R/W	SQOX10	Min to Max	0	1840	0	SQOX10=[Param.]<CR><LF> SQOX10?<CR><LF>	Set the Offset X of Sequence Roi Index10.
:								
SequenceMode OffsetX128	R/W	SQOX128	Min to Max	0	1840	0	SQOX128=[Param.]<CR><LF> SQOX128?<CR><LF>	Set the Offset X of Sequence Roi Index128.
SequenceMode Height1	R/W	SQH1	Min to Max	2	1216	1216	SQH1=[Param.]<CR><LF> SQH1?<CR><LF>	Set the height of Sequence Roi Index1.
SequenceMode Height2	R/W	SQH2	Min to Max	2	1216	1216	SQH2=[Param.]<CR><LF> SQH2?<CR><LF>	Set the height of Sequence Roi Index2.
SequenceMode Height3	R/W	SQH3	Min to Max	2	1216	1216	SQH3=[Param.]<CR><LF> SQH3?<CR><LF>	Set the height of Sequence Roi Index3.
SequenceMode Height4	R/W	SQH4	Min to Max	2	1216	1216	SQH4=[Param.]<CR><LF> SQH4?<CR><LF>	Set the height of Sequence Roi Index4.
SequenceMode Height5	R/W	SQH5	Min to Max	2	1216	1216	SQH5=[Param.]<CR><LF> SQH5?<CR><LF>	Set the height of Sequence Roi Index5.

SequenceMode Height6	R/W	SQH6	Min to Max	2	1216	1216	SQH6=[Param.]<CR><LF> SQH6?<CR><LF>	Set the height of Sequence Roi Index6.
SequenceMode Height7	R/W	SQH7	Min to Max	2	1216	1216	SQH7=[Param.]<CR><LF> SQH7?<CR><LF>	Set the height of Sequence Roi Index7.
SequenceMode Height8	R/W	SQH8	Min to Max	2	1216	1216	SQH8=[Param.]<CR><LF> SQH8?<CR><LF>	Set the height of Sequence Roi Index8.
SequenceMode Height9	R/W	SQH9	Min to Max	2	1216	1216	SQH9=[Param.]<CR><LF> SQH9?<CR><LF>	Set the height of Sequence Roi Index9.
SequenceMode Height10	R/W	SQH10	Min to Max	2	1216	1216	SQH10=[Param.]<CR><LF> SQH10?<CR><LF>	Set the height of Sequence Roi Index10.
:								
SequenceMode Height128	R/W	SQH128	Min to Max	2	1216	1216	SQH128=[Param.]<CR><LF> SQH128?<CR><LF>	Set the height of Sequence Roi Index128.
SequenceMode OffsetY1	R/W	SQOY1	Min to Max	0	1214	0	SQOY1=[Param.]<CR><LF> SQOY1?<CR><LF>	Set the Offset Y of Sequence Roi Index1.
SequenceMode OffsetY2	R/W	SQOY2	Min to Max	0	1214	0	SQOY2=[Param.]<CR><LF> SQOY2?<CR><LF>	Set the Offset Y of Sequence Roi Index2.
SequenceMode OffsetY3	R/W	SQOY3	Min to Max	0	1214	0	SQOY3=[Param.]<CR><LF> SQOY3?<CR><LF>	Set the Offset Y of Sequence Roi Index3.
SequenceMode OffsetY4	R/W	SQOY4	Min to Max	0	1214	0	SQOY4=[Param.]<CR><LF> SQOY4?<CR><LF>	Set the Offset Y of Sequence Roi Index4.
SequenceMode OffsetY5	R/W	SQOY5	Min to Max	0	1214	0	SQOY5=[Param.]<CR><LF> SQOY5?<CR><LF>	Set the Offset Y of Sequence Roi Index5.
SequenceMode OffsetY6	R/W	SQOY6	Min to Max	0	1214	0	SQOY6=[Param.]<CR><LF> SQOY6?<CR><LF>	Set the Offset Y of Sequence Roi Index6.
SequenceMode OffsetY7	R/W	SQOY7	Min to Max	0	1214	0	SQOY7=[Param.]<CR><LF> SQOY7?<CR><LF>	Set the Offset Y of Sequence Roi Index7.
SequenceMode OffsetY8	R/W	SQOY8	Min to Max	0	1214	0	SQOY8=[Param.]<CR><LF> SQOY8?<CR><LF>	Set the Offset Y of Sequence Roi Index8.
SequenceMode OffsetY9	R/W	SQOY9	Min to Max	0	1214	0	SQOY9=[Param.]<CR><LF> SQOY9?<CR><LF>	Set the Offset Y of Sequence Roi Index9.
SequenceMode OffsetY10	R/W	SQOY10	Min to Max	0	1214	0	SQOY10=[Param.]<CR><LF> SQOY10?<CR><LF>	Set the Offset Y of Sequence Roi Index10.
:								
SequenceMode OffsetY128	R/W	SQOY128	Min to Max	0	1214	0	SQOY128=[Param.]<CR><LF> SQOY128?<CR><LF>	Set the Offset Y of Sequence Roi Index128.
SequenceModeGain1	R/W	SQGA1	Min to Max	100	1600	0	SQGA1=[Param.]<CR><LF> SQGA1?<CR><LF>	Set the gain of Sequence Roi Index1.
SequenceModeGain2	R/W	SQGA2	Min to Max	100	1600	0	SQGA2=[Param.]<CR><LF> SQGA2?<CR><LF>	Set the gain of Sequence Roi Index2.
SequenceModeGain3	R/W	SQGA3	Min to Max	100	1600	0	SQGA3=[Param.]<CR><LF> SQGA3?<CR><LF>	Set the gain of Sequence Roi Index3.
SequenceModeGain4	R/W	SQGA4	Min to Max	100	1600	0	SQGA4=[Param.]<CR><LF> SQGA4?<CR><LF>	Set the gain of Sequence Roi Index4.
SequenceModeGain5	R/W	SQGA5	Min to Max	100	1600	0	SQGA5=[Param.]<CR><LF> SQGA5?<CR><LF>	Set the gain of Sequence Roi Index5.

SequenceModeGain6	R/W	SQGA6	Min to Max	100	1600	0	SQGA6=[Param.]<CR><LF> SQGA6?<CR><LF>	Set the gain of Sequence Roi Index6.
SequenceModeGain7	R/W	SQGA7	Min to Max	100	1600	0	SQGA7=[Param.]<CR><LF> SQGA7?<CR><LF>	Set the gain of Sequence Roi Index7.
SequenceModeGain8	R/W	SQGA8	Min to Max	100	1600	0	SQGA8=[Param.]<CR><LF> SQGA8?<CR><LF>	Set the gain of Sequence Roi Index8.
SequenceModeGain9	R/W	SQGA9	Min to Max	100	1600	0	SQGA9=[Param.]<CR><LF> SQGA9?<CR><LF>	Set the gain of Sequence Roi Index9.
SequenceModeGain10	R/W	SQGA10	Min to Max	100	1600	0	SQGA10=[Param.]<CR><LF> SQGA10?<CR><LF>	Set the gain of Sequence Roi Index10.
:								
SequenceModeGain128	R/W	SQGA128	Min to Max	100	1600	0	SQGA128=[Param.]<CR><LF> SQGA128?<CR><LF>	Set the gain of Sequence Roi Index128.
SequenceMode ExposureTime1	R/W	SQPE1	Min to Max	15 *1	8000000	18000	SQPE1=[Param.]<CR><LF> SQPE1?<CR><LF>	Set the exposure time of Sequence Roi Index1.
SequenceMode ExposureTime2	R/W	SQPE2	Min to Max	15 *1	8000000	18000	SQPE2=[Param.]<CR><LF> SQPE2?<CR><LF>	Set the exposure time of Sequence Roi Index2.
SequenceMode ExposureTime3	R/W	SQPE3	Min to Max	15 *1	8000000	18000	SQPE3=[Param.]<CR><LF> SQPE3?<CR><LF>	Set the exposure time of Sequence Roi Index3.
SequenceMode ExposureTime4	R/W	SQPE4	Min to Max	15 *1	8000000	18000	SQPE4=[Param.]<CR><LF> SQPE4?<CR><LF>	Set the exposure time of Sequence Roi Index4.
SequenceMode ExposureTime5	R/W	SQPE5	Min to Max	15 *1	8000000	18000	SQPE5=[Param.]<CR><LF> SQPE5?<CR><LF>	Set the exposure time of Sequence Roi Index5.
SequenceMode ExposureTime6	R/W	SQPE6	Min to Max	15 *1	8000000	18000	SQPE6=[Param.]<CR><LF> SQPE6?<CR><LF>	Set the exposure time of Sequence Roi Index6.
SequenceMode ExposureTime7	R/W	SQPE7	Min to Max	15 *1	8000000	18000	SQPE7=[Param.]<CR><LF> SQPE7?<CR><LF>	Set the exposure time of Sequence Roi Index7.
SequenceMode ExposureTime8	R/W	SQPE8	Min to Max	15 *1	8000000	18000	SQPE8=[Param.]<CR><LF> SQPE8?<CR><LF>	Set the exposure time of Sequence Roi Index8.
SequenceMode ExposureTime9	R/W	SQPE9	Min to Max	15 *1	8000000	18000	SQPE9=[Param.]<CR><LF> SQPE9?<CR><LF>	Set the exposure time of Sequence Roi Index9.
SequenceMode ExposureTime10	R/W	SQPE10	Min to Max	15 *1	8000000	18000	SQPE10=[Param.]<CR><LF> SQPE10?<CR><LF>	Set the exposure time of Sequence Roi Index10.
:								
SequenceMode ExposureTime128	R/W	SQPE128	Min to Max	15 *1	8000000	18000	SQPE128=[Param.]<CR><LF> SQPE128?<CR><LF>	Set the exposure time of Sequence Roi Index128.
SequenceMode Hbinning1	R/W	SQHB1	1: Hbinning = OFF 2: Hbinning = x2	1	2	1	SQHB1=[Param.]<CR><LF> SQHB1?<CR><LF> (Mono model only)	Set the horizontal binning of Sequence Roi Index1. (Mono only)
SequenceMode Hbinning2	R/W	SQHB2	1: Hbinning = OFF 2: Hbinning = x2	1	2	1	SQHB2=[Param.]<CR><LF> SQHB2?<CR><LF> (Mono model only)	Set the horizontal binning of Sequence Roi Index2. (Mono only)
SequenceMode Hbinning3	R/W	SQHB3	"1: Hbinning = OFF 2: Hbinning = x2	1	2	1	SQHB3=[Param.]<CR><LF> SQHB3?<CR><LF> (Mono model only)	Set the horizontal binning of Sequence Roi Index3. (Mono only)

SequenceMode Hbinning4	R/W	SQHB4	1: Hbinning = OFF 2: Hbinning = x2	1	2	1	SQHB4=[Param.]<CR><LF> SQHB4?<CR><LF> (Mono model only)	Set the horizontal binning of Sequence Roi Index4. (Mono only)
SequenceMode Hbinning5	R/W	SQHB5	1: Hbinning = OFF 2: Hbinning = x2	1	2	1	SQHB5=[Param.]<CR><LF> SQHB5?<CR><LF> (Mono model only)	Set the horizontal binning of Sequence Roi Index5. (Mono only)
SequenceMode Hbinning6	R/W	SQHB6	1: Hbinning = OFF 2: Hbinning = x2	1	2	1	SQHB6=[Param.]<CR><LF> SQHB6?<CR><LF> (Mono model only)	Set the horizontal binning of Sequence Roi Index6. (Mono only)
SequenceMode Hbinning7	R/W	SQHB7	1: Hbinning = OFF 2: Hbinning = x2	1	2	1	SQHB7=[Param.]<CR><LF> SQHB7?<CR><LF> (Mono model only)	Set the horizontal binning of Sequence Roi Index7. (Mono only)
SequenceMode Hbinning8	R/W	SQHB8	1: Hbinning = OFF 2: Hbinning = x2	1	2	1	SQHB8=[Param.]<CR><LF> SQHB8?<CR><LF> (Mono model only)	Set the horizontal binning of Sequence Roi Index8. (Mono only)
SequenceMode Hbinning9	R/W	SQHB9	1: Hbinning = OFF 2: Hbinning = x2	1	2	1	SQHB9=[Param.]<CR><LF> SQHB9?<CR><LF> (Mono model only)	Set the horizontal binning of Sequence Roi Index9. (Mono only)
SequenceMode Hbinning10	R/W	SQHB10	1: Hbinning = OFF 2: Hbinning = x2	1	2	1	SQHB10=[Param.]<CR><LF> SQHB10?<CR><LF> (Mono model only)	Set the horizontal binning of Sequence Roi Index10. (Mono only)
:								
SequenceMode Hbinning128	R/W	SQHB128	1: Hbinning = OFF 2: Hbinning = x2	1	2	1	SQHB128=[Param.]<CR><LF> SQHB128?<CR><LF> (Mono model only)	Set the horizontal binning of Sequence Roi Index128. (Mono only)
SequenceMode Vbinning1	R/W	SQVB1	1: Vbinning = OFF 2: Vbinning = x2	1	2	1	SQVB1=[Param.]<CR><LF> SQVB1?<CR><LF> (Mono model only)	Set the vertical binning of Sequence Roi Index1. (Mono only)
SequenceMode Vbinning2	R/W	SQVB2	1: Vbinning = OFF 2: Vbinning = x2	1	2	1	SQVB2=[Param.]<CR><LF> SQVB2?<CR><LF> (Mono model only)	Set the vertical binning of Sequence Roi Index2. (Mono only)
SequenceMode Vbinning3	R/W	SQVB3	1: Vbinning = OFF 2: Vbinning = x2	1	2	1	SQVB31=[Param.]<CR><LF> SQVB3?<CR><LF> (Mono model only)	Set the vertical binning of Sequence Roi Index3. (Mono only)
SequenceMode Vbinning4	R/W	SQVB4	1: Vbinning = OFF 2: Vbinning = x2	1	2	1	SQVB4=[Param.]<CR><LF> SQVB4?<CR><LF> (Mono model only)	Set the vertical binning of Sequence Roi Index4. (Mono only)
SequenceMode Vbinning5	R/W	SQVB5	1: Vbinning = OFF 2: Vbinning = x2	1	2	1	SQVB5=[Param.]<CR><LF> SQVB5?<CR><LF> (Mono model only)	Set the vertical binning of Sequence Roi Index5. (Mono only)
SequenceMode Vbinning6	R/W	SQVB6	1: Vbinning = OFF 2: Vbinning = x2	1	2	1	SQVB6=[Param.]<CR><LF> SQVB6?<CR><LF> (Mono model only)	Set the vertical binning of Sequence Roi Index6. (Mono only)

SequenceMode Vbinning7	R/W	SQVB7	1: Vbinning = OFF 2: Vbinning = x2	1	2	1	SQVB7=[Param.]<CR><LF> SQVB7?<CR><LF> (Mono model only)	Set the vertical binning of Sequence Roi Index7. (Mono only)
SequenceMode Vbinning8	R/W	SQVB8	1: Vbinning = OFF 2: Vbinning = x2	1	2	1	SQVB8=[Param.]<CR><LF> SQVB8?<CR><LF> (Mono model only)	Set the vertical binning of Sequence Roi Index8. (Mono only)
SequenceMode Vbinning9	R/W	SQVB9	1: Vbinning = OFF 2: Vbinning = x2	1	2	1	SQVB9=[Param.]<CR><LF> SQVB9?<CR><LF> (Mono model only)	Set the vertical binning of Sequence Roi Index9. (Mono only)
SequenceMode Vbinning10	R/W	SQVB10	1: Vbinning = OFF 2: Vbinning = x2	1	2	1	SQVB10=[Param.]<CR><LF> SQVB10?<CR><LF> (Mono model only)	Set the vertical binning of Sequence Roi Index10. (Mono only)
:								
SequenceMode Vbinning128	R/W	SQVB128	1: Vbinning = OFF 2: Vbinning = x2	1	2	1	SQVB128=[Param.]<CR><LF> SQVB128?<CR><LF> (Mono model only)	Set the vertical binning of Sequence Roi Index128. (Mono only)
SequenceMode LutEnable1	R/W	SQLUT1	Off/On	0	1	0	SQLUT1=[Param.]<CR><LF> SQLUT1?<CR><LF>	Enable/disable the LUT setting for Sequence Roi Index1.
SequenceMode LutEnable2	R/W	SQLUT2	Off/On	0	1	0	SQLUT2=[Param.]<CR><LF> SQLUT2?<CR><LF>	Enable/disable the LUT setting for Sequence Roi Index2.
SequenceMode LutEnable3	R/W	SQLUT3	Off/On	0	1	0	SQLUT3=[Param.]<CR><LF> SQLUT3?<CR><LF>	Enable/disable the LUT setting for Sequence Roi Index3.
SequenceMode LutEnable4	R/W	SQLUT4	Off/On	0	1	0	SQLUT4=[Param.]<CR><LF> SQLUT4?<CR><LF>	Enable/disable the LUT setting for Sequence Roi Index4.
SequenceMode LutEnable5	R/W	SQLUT5	Off/On	0	1	0	SQLUT5=[Param.]<CR><LF> SQLUT5?<CR><LF>	Enable/disable the LUT setting for Sequence Roi Index5.
SequenceMode LutEnable6	R/W	SQLUT6	Off/On	0	1	0	SQLUT6=[Param.]<CR><LF> SQLUT6?<CR><LF>	Enable/disable the LUT setting for Sequence Roi Index6.
SequenceMode LutEnable7	R/W	SQLUT7	Off/On	0	1	0	SQLUT7=[Param.]<CR><LF> SQLUT7?<CR><LF>	Enable/disable the LUT setting for Sequence Roi Index7.
SequenceMode LutEnable8	R/W	SQLUT8	Off/On	0	1	0	SQLUT8=[Param.]<CR><LF> SQLUT8?<CR><LF>	Enable/disable the LUT setting for Sequence Roi Index8.
SequenceMode LutEnable9	R/W	SQLUT9	Off/On	0	1	0	SQLUT9=[Param.]<CR><LF> SQLUT9?<CR><LF>	Enable/disable the LUT setting for Sequence Roi Index9.
SequenceMode LutEnable10	R/W	SQLUT10	Off/On	0	1	0	SQLUT10=[Param.]<CR><LF> SQLUT10?<CR><LF>	Enable/disable the LUT setting for Sequence Roi Index10.
:								
SequenceMode LutEnable128	R/W	SQLUT128	Off/On	0	1	0	SQLUT128=[Param.]<CR><LF> SQLUT128?<CR><LF>	Enable/disable the LUT setting for Sequence Roi Index128.

SequenceMode BlackLevel1	R/W	SQBL1	Min to Max	–133	255	0	SQBL1=[Param.]<CR><LF> SQBL1?<CR><LF>	Set the black level of Sequence Roi Index1.
SequenceMode BlackLevel2	R/W	SQBL2	Min to Max	–133	255	0	SQBL2=[Param.]<CR><LF> SQBL2?<CR><LF>	Set the black level of Sequence Roi Index2.
SequenceMode BlackLevel3	R/W	SQBL3	Min to Max	–133	255	0	SQBL3=[Param.]<CR><LF> SQBL3?<CR><LF>	Set the black level of Sequence Roi Index3.
SequenceMode BlackLevel4	R/W	SQBL4	Min to Max	–133	255	0	SQBL4=[Param.]<CR><LF> SQBL4?<CR><LF>	Set the black level of Sequence Roi Index4.
SequenceMode BlackLevel5	R/W	SQBL5	Min to Max	–133	255	0	SQBL5=[Param.]<CR><LF> SQBL5?<CR><LF>	Set the black level of Sequence Roi Index5.
SequenceMode BlackLevel6	R/W	SQBL6	Min to Max	–133	255	0	SQBL6=[Param.]<CR><LF> SQBL6?<CR><LF>	Set the black level of Sequence Roi Index6.
SequenceMode BlackLevel7	R/W	SQBL7	Min to Max	–133	255	0	SQBL7=[Param.]<CR><LF> SQBL7?<CR><LF>	Set the black level of Sequence Roi Index7.
SequenceMode BlackLevel8	R/W	SQBL8	Min to Max	–133	255	0	SQBL8=[Param.]<CR><LF> SQBL8?<CR><LF>	Set the black level of Sequence Roi Index8.
SequenceMode BlackLevel9	R/W	SQBL9	Min to Max	–133	255	0	SQBL9=[Param.]<CR><LF> SQBL9?<CR><LF>	Set the black level of Sequence Roi Index9.
SequenceMode BlackLevel10	R/W	SQBL10	Min to Max	–133	255	0	SQBL10=[Param.]<CR><LF> SQBL10?<CR><LF>	Set the black level of Sequence Roi Index10.
:								
SequenceMode BlackLevel128	R/W	SQBL128	Min to Max	–133	255	0	SQBL128=[Param.]<CR><LF> SQBL128?<CR><LF>	Set the black level of Sequence Roi Index128.
SequenceMode GainRed1	R/W	SQPGR1	Min to Max	–4533	17713	0	SQPGR1=[Param.]<CR><LF> SQPGR1?<CR><LF> (Color model only)	Set the red gain of Sequence Roi Index1.
SequenceMode GainRed2	R/W	SQPGR2	Min to Max	–4533	17713	0	SQPGR2=[Param.]<CR><LF> SQPGR2?<CR><LF> (Color model only)	Set the red gain of Sequence Roi Index2.
SequenceMode GainRed3	R/W	SQPGR3	Min to Max	–4533	17713	0	SQPGR3=[Param.]<CR><LF> SQPGR3?<CR><LF> (Color model only)	Set the red gain of Sequence Roi Index3.
SequenceMode GainRed4	R/W	SQPGR4	Min to Max	–4533	17713	0	SQPGR4=[Param.]<CR><LF> SQPGR4?<CR><LF> (Color model only)	Set the red gain of Sequence Roi Index4.
SequenceMode GainRed5	R/W	SQPGR5	Min to Max	–4533	17713	0	SQPGR5=[Param.]<CR><LF> SQPGR5?<CR><LF> (Color model only)	Set the red gain of Sequence Roi Index5.
SequenceMode GainRed6	R/W	SQPGR6	Min to Max	–4533	17713	0	SQPGR6=[Param.]<CR><LF> SQPGR6?<CR><LF> (Color model only)	Set the red gain of Sequence Roi Index6.
SequenceMode GainRed7	R/W	SQPGR7	Min to Max	–4533	17713	0	SQPGR7=[Param.]<CR><LF> SQPGR7?<CR><LF> (Color model only)	Set the red gain of Sequence Roi Index7.
SequenceMode GainRed8	R/W	SQPGR8	Min to Max	–4533	17713	0	SQPGR8=[Param.]<CR><LF> SQPGR8?<CR><LF> (Color model only)	Set the red gain of Sequence Roi Index8.
SequenceMode GainRed9	R/W	SQPGR9	Min to Max	–4533	17713	0	SQPGR9=[Param.]<CR><LF> SQPGR9?<CR><LF> (Color model only)	Set the red gain of Sequence Roi Index9.
SequenceMode GainRed10	R/W	SQPGR10	Min to Max	–4533	17713	0	SQPGR10=[Param.]<CR><LF> SQPGR10?<CR><LF> (Color model only)	Set the red gain of Sequence Roi Index10.
:								
SequenceMode GainRed128	R/W	SQPGR128	Min to Max	–4533	17713	0	SQPGR128=[Param.]<CR><LF> SQPGR128?<CR><LF> (Color model only)	Set the red gain of Sequence Roi Index128.

SequenceMode GainBlue1	R/W	SQPGB1	Min to Max	–4533	17713	0	SQPGB1=[Param.]<CR><LF> SQPGB1?<CR><LF> (Color model only)	Set the blue gain of Sequence Roi Index1.
SequenceMode GainBlue2	R/W	SQPGB2	Min to Max	–4533	17713	0	SQPGB2=[Param.]<CR><LF> SQPGB2?<CR><LF> (Color model only)	Set the blue gain of Sequence Roi Index2.
SequenceMode GainBlue3	R/W	SQPGB3	Min to Max	–4533	17713	0	SQPGB3=[Param.]<CR><LF> SQPGB3?<CR><LF> (Color model only)	Set the blue gain of Sequence Roi Index3.
SequenceMode GainBlue4	R/W	SQPGB4	Min to Max	–4533	17713	0	SQPGB4=[Param.]<CR><LF> SQPGB4?<CR><LF> (Color model only)	Set the blue gain of Sequence Roi Index4.
SequenceMode GainBlue5	R/W	SQPGB5	Min to Max	–4533	17713	0	SQPGB5=[Param.]<CR><LF> SQPGB5?<CR><LF> (Color model only)	Set the blue gain of Sequence Roi Index5.
SequenceMode GainBlue6	R/W	SQPGB6	Min to Max	–4533	17713	0	SQPGB6=[Param.]<CR><LF> SQPGB6?<CR><LF> (Color model only)	Set the blue gain of Sequence Roi Index6.
SequenceMode GainBlue7	R/W	SQPGB7	Min to Max	–4533	17713	0	SQPGB7=[Param.]<CR><LF> SQPGB7?<CR><LF> (Color model only)	Set the blue gain of Sequence Roi Index7.
SequenceMode GainBlue8	R/W	SQPGB8	Min to Max	–4533	17713	0	SQPGB8=[Param.]<CR><LF> SQPGB8?<CR><LF> (Color model only)	Set the blue gain of Sequence Roi Index8.
SequenceMode GainBlue9	R/W	SQPGB9	Min to Max	–4533	17713	0	SQPGB9=[Param.]<CR><LF> SQPGB9?<CR><LF> (Color model only)	Set the blue gain of Sequence Roi Index9.
SequenceMode GainBlue10	R/W	SQPGB10	Min to Max	–4533	17713	0	SQPGB10=[Param.]<CR><LF> SQPGB10?<CR><LF> (Color model only)	Set the blue gain of Sequence Roi Index10.
:								
SequenceMode GainBlue128	R/W	SQPGB12	Min to Max	–4533	17713	0	SQPGB128=[Param.]<CR><LF> SQPGB128?<CR><LF> (Color model only)	Set the blue gain of Sequence Roi Index128.
CommnadSequence Index	R/W	CSQI	Same as SequenceModeIndex	1	128	0	CSQI=[Param.]<CR><LF> CSQI?<CR><LF>	Set the index to execute during Command Sequence Mode.
CurrentSequence Index	R/O	SQIDX	Same as SequenceModeIndex	1	128	0	SQIDX?<CR><LF>	Display the index number of the current Command Sequence Index.
SequenceReset	W/O	SQRST	0	0	0	0	SQRST=[Param.]<CR><LF>	Reset the current index number for Trigger Sequence Mode and Command Sequence Mode to “Index 1.”
SequenceLutMode	R/W	SQLUT	0: Gamma 1: LUT	0	1	0	SQLUT=[Param.]<CR><LF> SQLUT?<CR><LF>	Select the LUT mode to use during Trigger Sequence Mode and Command Sequence Mode. (This setting is applied when Sequence Roi Lut Enable is set to “True.”)
SensorMultiRoiWidth1	R/W	SMRW1	Min to Max	16	1936	1936	SMRW1=[Param.]<CR><LF> SMRW1?<CR><LF>	Set the width of Sensor Multi Roi Index1.
SensorMultiRoiWidth2	R/W	SMRW2	Min to Max	16	1936	1936	SMRW2=[Param.]<CR><LF> SMRW2?<CR><LF>	Set the width of Sensor Multi Roi Index2.
SensorMultiRoiWidth3	R/W	SMRW3	Min to Max	16	1936	1936	SMRW3=[Param.]<CR><LF> SMRW3?<CR><LF>	Set the width of Sensor Multi Roi Index3.

SensorMultiRoiWidth4	R/W	SMRW4	Min to Max	16	1936	1936	SMRW4=[Param.]<CR><LF> SMRW4?<CR><LF>	Set the width of Sensor Multi Roi Index4.
SensorMultiRoiHeight1	R/W	SMRH1	Min to Max	2	1216	1216	SMRH1=[Param.]<CR><LF> SMRH1?<CR><LF>	Set the height of Sensor Multi Roi Index1.
SensorMultiRoiHeight2	R/W	SMRH2	Min to Max	2	1216	1216	SMRH2=[Param.]<CR><LF> SMRH2?<CR><LF>	Set the height of Sensor Multi Roi Index2.
SensorMultiRoiHeight3	R/W	SMRH3	Min to Max	2	1216	1216	SMRH3=[Param.]<CR><LF> SMRH3?<CR><LF>	Set the height of Sensor Multi Roi Index3.
SensorMultiRoiHeight4	R/W	SMRH4	Min to Max	2	1216	1216	SMRH4=[Param.]<CR><LF> SMRH4?<CR><LF>	Set the height of Sensor Multi Roi Index4.
SensorMultiRoi OffsetX1	R/W	SMROX1	Min to Max	0	1920	0	SMROX1=[Param.]<CR><LF> SMROX1?<CR><LF>	Set the Offset X of Sensor Multi Roi Index1.
SensorMultiRoi OffsetX2	R/W	SMROX2	Min to Max	0	1920	0	SMROX2=[Param.]<CR><LF> SMROX2?<CR><LF>	Set the Offset X of Sensor Multi Roi Index2.
SensorMultiRoi OffsetX3	R/W	SMROX3	Min to Max	0	1920	0	SMROX3=[Param.]<CR><LF> SMROX3?<CR><LF>	Set the Offset X of Sensor Multi Roi Index3.
SensorMultiRoi OffsetX4	R/W	SMROX4	Min to Max	0	1920	0	SMROX4=[Param.]<CR><LF> SMROX4?<CR><LF>	Set the Offset X of Sensor Multi Roi Index4.
SensorMultiRoi OffsetY1	R/W	SMROY1	Min to Max	0	1214	0	SMROY1=[Param.]<CR><LF> SMROY1?<CR><LF>	Set the Offset Y of Sensor Multi Roi Index1.
SensorMultiRoi OffsetY2	R/W	SMROY2	Min to Max	0	1214	0	SMROY2=[Param.]<CR><LF> SMROY2?<CR><LF>	Set the Offset Y of Sensor Multi Roi Index2.
SensorMultiRoi OffsetY3	R/W	SMROY3	Min to Max	0	1214	0	SMROY3=[Param.]<CR><LF> SMROY3?<CR><LF>	Set the Offset Y of Sensor Multi Roi Index3.
SensorMultiRoi OffsetY4	R/W	SMROY4	Min to Max	0	1214	0	SMROY4=[Param.]<CR><LF> SMROY4?<CR><LF>	Set the Offset Y of Sensor Multi Roi Index4.
SensorMultiRoi HorizontalEnable1	R/W	SMROH1	Off/On	0	1	0	SMROH1=[Param.]<CR><LF> SMROH1?<CR><LF>	Enable/disable Sensor Multi Roi horizontal Index1 (Row 1).
SensorMultiRoi HorizontalEnable2	R/W	SMROH2	Off/On	0	1	0	SMROH2=[Param.]<CR><LF> SMROH2?<CR><LF>	Enable/disable Sensor Multi Roi horizontal Index2 (Row 2).
SensorMultiRoi HorizontalEnable3	R/W	SMROH3	Off/On	0	1	0	SMROH3=[Param.]<CR><LF> SMROH3?<CR><LF>	Enable/disable Sensor Multi Roi horizontal Index3 (Row 3).
SensorMultiRoi HorizontalEnable4	R/W	SMROH4	Off/On	0	1	0	SMROH4=[Param.]<CR><LF> SMROH4?<CR><LF>	Enable/disable Sensor Multi Roi horizontal Index4 (Row 4).
SensorMultiRoi VerticalEnable1	R/W	SMROV1	Off/On	0	1	0	SMROV1=[Param.]<CR><LF> SMROV1?<CR><LF>	Enable/disable Sensor Multi Roi vertical Index1 (Column 1).
SensorMultiRoi VerticalEnable2	R/W	SMROV2	Off/On	0	1	0	SMROV2=[Param.]<CR><LF> SMROV2?<CR><LF>	Enable/disable Sensor Multi Roi vertical Index2 (Column 2).
SensorMultiRoi VerticalEnable3	R/W	SMROV3	Off/On	0	1	0	SMROV3=[Param.]<CR><LF> SMROV3?<CR><LF>	Enable/disable Sensor Multi Roi vertical Index3 (Column 3).
SensorMultiRoi VerticalEnable4	R/W	SMROV4	Off/On	0	1	0	SMROV4=[Param.]<CR><LF> SMROV4?<CR><LF>	Enable/disable Sensor Multi Roi vertical Index4 (Column 4).

LUTMode	R/W	LUTC	0: Off 1: Gamma 2: LUT	0	2	0	LUTC=[Param.]<CR><LF> LUTC?<CR><LF>	Select the JAI LUT mode.
AlcSpeed	R/W	ALCS	Min to Max	1	8	4	ALCS=[Param.]<CR><LF> ALCS?<CR><LF> for AGC and ASC	Set the control speed for AGC and ASC (8 is the fastest).
AwbSpeed	R/W	AWBS	Min to Max	1	8	4	AWBS=[Param.]<CR><LF> AWBS?<CR><LF> for AWB	Set the control speed for Balance White Auto (AWB) (8 is the fastest).
ExposureAutoMax	R/W	ASCEA	Min to Max[us]	101	8000000	18000	ASCEA=[Param.]<CR><LF> ASCEA?<CR><LF> Maximum value is varied depending on frame rate.	Set the maximum value for the Exposure Auto (ASC) control range.
ExposureAutoMin	R/W	ASCEI	Min to Max	100	7999999	100	ASCEI=[Param.]<CR><LF> ASCEI?<CR><LF> Maximum value is varied depending on frame rate.	Set the minimum value for the Exposure Auto (ASC) control range.
AlcReference	R/W	AGCF	Min to Max[%]	1	100	50	AGCF=[Param.]<CR><LF> AGCF?<CR><LF>	Set the target level for ALC. (unit: %)
GainAutoMax	R/W	AGCGA	Min to Max	101	1600	1600	AGCGA=[Param.]<CR><LF> AGCGA?<CR><LF>	Set the maximum value for the Gain Auto (AGC) control range.
GainAutoMin	R/W	AGCGI	Min to Max	100	1599	100	AGCGI=[Param.]<CR><LF> AGCGI?<CR><LF>	Set the minimum value for the Gain Auto (AGC) control range.
ALCChannelAreaAll	R/W	ALCA	0: Off / 1: On	0	1	0	ALCA=[Param.]<CR><LF> ALCA?<CR><LF>	On: Specify all photometry areas for ALC, regardless of the enabled/disabled statuses configured individually for each photometry area with [ALC Area Selector]. Off: Specify areas for ALC based on the enabled/ disabled statuses configured individually for each photometry area with [ALC Area Selector].
ALCChannelArea LowRight	R/W	ALCLR	0: Off / 1: On	0	1	1	ALC**=[Param.]<CR><LF> ALC**?<CR><LF>	Enable/disable the Low Right photometry area.
ALCChannelArea LowMidRight	R/W	ALCLMR	0: Off / 1: On	0	1	1		Enable/disable the Low Mid Right photometry area.
ALCChannelArea LowMidLeft	R/W	ALCLML	0: Off / 1: On	0	1	1		Enable/disable the Low Mid Left photometry area.
ALCChannelArea LowLeft	R/W	ALCLL	0: Off / 1: On	0	1	1		Enable/disable the Low Left photometry area.
ALCChannelArea MidLowRight	R/W	ALCMLR	0: Off / 1: On	0	1	1		Enable/disable the Mid Low Left photometry area.
ALCChannelArea MidLowMidRight	R/W	ALCMLMR	0: Off / 1: On	0	1	1		Enable/disable the Mid Low Mid Right photometry area.

ALCChannelArea MidLowMidLeft	R/W	ALCMLML	0: Off / 1: On	0	1	1		Enable/disable the Mid Low Mid Left photometry area.
ALCChannelArea MidLowLeft	R/W	ALCMLL	0: Off / 1: On	0	1	1		Enable/disable the Mid Low Left photometry area.
ALCChannelArea MidHighRight	R/W	ALCMHR	0: Off / 1: On	0	1	1		Enable/disable the Mid High Right photometry area.
ALCChannelArea MidHighMidRight	R/W	ALCMHMR	0: Off / 1: On	0	1	1		Enable/disable the Mid High Mid Right photometry area.
ALCChannelArea MidHighMidLeft	R/W	ALCMHML	0: Off / 1: On	0	1	1		Enable/disable the Mid High Mid Left photometry area.
ALCChannelArea MidHighLeft	R/W	ALCMHL	0: Off / 1: On	0	1	1		Enable/disable the Mid High Left photometry area.
ALCChannelArea HighRight	R/W	ALCHR	0: Off / 1: On	0	1	1		Enable/disable the High Right photometry area.
ALCChannelArea HighMidRight	R/W	ALCHMR	0: Off / 1: On	0	1	1		Enable/disable the High Mid Right photometry area.
ALCChannelArea HighMidLeft	R/W	ALCHML	0: Off / 1: On	0	1	1		Enable/disable the Mid High Left photometry area.
ALCChannelArea HighLeft	R/W	ALCHL	0: Off / 1: On	0	1	1		Enable/disable the High Left photometry area.
RequestBalanceWhite AutoResult	R/O	AWRS	0= Complete. 1= Too Bright. 2= Too dark. 3= Timeout Error. 4= Busy. 5= Limit. 6= Trig is not set as Normal.	0	6	0	AWRS?<CR><LF> (Color model only)	Display the AWB Once results.
AWBChannelAreaAll	R/W	AWBA	0: Off / 1: On	0	1	0	AWBA=[Param.]<CR><LF> AWBA?<CR><LF> (Color model only)	On: Specify all photometry areas for AWB, regardless of the enabled/disabled statuses configured individually for each photometry area with [AWB Area Selector]. Off: Specify areas for AWB based on the enabled/ disabled statuses configured individually for each photometry area with [AWB Area Selector].
AWBChannelArea LowRight	R/W	AWBLR	0: Off / 1: On	0	1	1	AWB**=[Param.]<CR><LF> AWB**?<CR><LF> (Color model only)	Enable/disable the Low Right photometry area.
AWBChannelArea LowMidRight	R/W	AWBLMR	0: Off / 1: On	0	1	1		Enable/disable the Low Mid Right photometry area.
AWBChannelArea LowMidLeft	R/W	AWBLML	0: Off / 1: On	0	1	1		Enable/disable the Low Mid Left photometry area.

AWBChannelArea LowLeft	R/W	AWBLL	0: Off / 1: On	0	1	1		Enable/disable the Low Left photometry area.
AWBChannelArea MidLowRight	R/W	AWBMLR	0: Off / 1: On	0	1	1		Enable/disable the Mid Low Left photometry area.
AWBChannelArea MidLowMidRight	R/W	AWBMLMR	0: Off / 1: On	0	1	1		Enable/disable the Mid Low Mid Right photometry area.
AWBChannelArea MidLowMidLeft	R/W	AWBMLML	0: Off / 1: On	0	1	1		Enable/disable the Mid Low Mid Left photometry area.
AWBChannelArea MidLowLeft	R/W	AWBMLL	0: Off / 1: On	0	1	1		Enable/disable the Mid Low Left photometry area.
AWBChannelArea MidHighRight	R/W	AWBMHR	0: Off / 1: On	0	1	1		Enable/disable the Mid High Right photometry area.
AWBChannelArea MidHighMidRight	R/W	AWBMHMR	0: Off / 1: On	0	1	1		Enable/disable the Mid High Mid Right photometry area.
AWBChannelArea MidHighMidLeft	R/W	AWBMHML	0: Off / 1: On	0	1	1		Enable/disable the Mid High Mid Left photometry area.
AWBChannelArea MidHighLeft	R/W	AWBMHL	0: Off / 1: On	0	1	1		Enable/disable the Mid High Left photometry area.
AWBChannelArea HighRight	R/W	AWBHR	0: Off / 1: On	0	1	1		Enable/disable the High Right photometry area.
AWBChannelArea HighMidRight	R/W	AWBHMR	0: Off / 1: On	0	1	1		Enable/disable the High Mid Right photometry area.
AWBChannelArea HighMidLeft	R/W	AWBHML	0: Off / 1: On	0	1	1		Enable/disable the Mid High Left photometry area.
AWBChannelArea HighLeft	R/W	AWBHL	0: Off / 1: On	0	1	1		Enable/disable the High Left photometry area.
CurrentAreaNoRequest	R/O	EA	0: Factory area 1: User 1 area 2: User 2 area 3: User 3 area	0	3	0	EA?<CR><LF> The camera return the latest used DATA AREA.	Display the currently configured User Set Selector status. (Start up with the state saved to this area.)
AcquisitionFrameLine	R/W	AR	Min to Max	1	325786	774	AR=[Param.]<CR><LF> AR?<CR><LF> Maximum value is calcurated depending on Height and Offset Y settings	Not required. Acquisition Frame Period exists on 73rd line.
GammaSelector	R/W	GMA	0(γ=0.45)/1(γ=0.60)/ 2(γ=1.0)	0	2	0	GMA=[Param.]<CR><LF> GMA?<CR><LF>	Set the gamma value.
Temperature	R/O	TMP0	value	—	—	—	TMP0?<CR><LF> (Value÷128) = Temperature[˚C]	Display the internal temperature (˚C) of the camera as a x128 value.
GpioPulseGenDivide Value	R/W	PGDEV	Min to Max	1	4096	1	PGDEV=[Param.]<CR><LF> PGDEV?<CR><LF>	Set the division value for the prescaler (12-bit) using the pixel clock as the base clock.

GpioPulseGenLength0	R/W	PGL0	Min to Max	1	1048575	1	PGL0=[Param.]<CR><LF> PGL0?<CR><LF>	Set the maximum count up value using clock value.
GpioPulseGenStart Point0	R/W	PGST0	Min to Max	0	1048574	0	PGST0=[Param.]<CR><LF> PGST0?<CR><LF>	Set the start point for the High interval using clock value. When the counter reaches this value, the output becomes 1.
GpioPulseGenEnd Point0	R/W	PGEN0	Min to Max	1	1048575	1	PGEN0=[Param.]<CR><LF> PGEN0?<CR><LF>	Set the start point for the Low interval using clock value. When the counter reaches this value, the output becomes 0.
GpioPulseGenRepeat Count0	R/W	PGRPT0	Min to Max	0	255	0	PGRPT0=[Param.]<CR><LF> PGRPT0?<CR><LF>	Set the repeat count for the counter. When this is set to 0, the counter will be free-running with limitless repeating.
GpioPulseGenClear Mode0	R/W	PGCM0	0: Free Run 1: Level High 2: Level Low 3: Rising Edge 4: Falling Edge	0	4	0	PGCM0=[Param.]<CR><LF> PGCM0?<CR><LF>	Set the clear signal condition for the count clear input of the pulse generator.
GpioPulseGenSync Mode0	R/W	PGSM0	0: Async Mode 1: Sync Mode	0	1	0	PGSM0=[Param.]<CR><LF> PGSM0?<CR><LF>	Select the sync mode for the count clear input signal.
GpioPulseGenInput0	R/W	PGIN0	0: Low 1: High 4: FrameTriggerWait 5: FrameActive 6: ExposureActive 7: FVAL 8: LVAL 10: UserOutput0 11: UserOutput1 12: TTL_In1(Std Only) 13: CL_CC1_In 15: nand0 16: nand1	0	16	0	PGIN0=[Param.]<CR><LF> PGIN0?<CR><LF>	Select the count clear input signal source.
GpioPulseGen Invert0	R/W	PGINV0	0:Non-Inv 1:Inv	0	1	0	PGINV0=[Param.]<CR><LF> PGINV0?<CR><LF>	Select whether to invert the polarity of the count clear input signal.
GpioNand0 InputSource1	R/W	ND0IN1	0: Low 1: High 3: FrameTriggerWait 4: FrameActive 5: ExposureActive 6: Fval 7: Lval 8: PulseGenerator0 10: UserOutput0 11: UserOutput1 12: TTL_In1(Std Only) 13: CL_CC1_In 14: Nand0	0	6	0	ND0IN1=[Param.]<CR><LF> ND0IN1?<CR><LF>	Select the input source signal for NAND0 In1.
GpioNand0 InputSource2	R/W	ND0IN2	Same as above.	0	6	0	ND0IN2=[Param.]<CR><LF> ND0IN2?<CR><LF>	Select the input source signal for NAND0 In2.

GpioNand1 InputSource1	R/W	ND1IN1	0: Low 1: High 3: FrameTriggerWait 4: FrameActive 5: ExposureActive 6: Fval 7: Lval 8: PulseGenerator0 10: UserOutput0 11: UserOutput1 12: TTL_In1(Std Only) 13: CL_CC1_In 15: Nand1	0	6	0	ND1IN1=[Param.]<CR><LF> ND1IN1?<CR><LF>	Select the input source signal for NAND1 In1.
GpioNand1 InputSource2	R/W	ND1IN2	Same as above.	0	6	0	ND1IN2=[Param.]<CR><LF> ND1IN2?<CR><LF>	Select the input source signal for NAND1 In2.
GpioNand0 InputInvert1	R/W	ND0INV1	0: Non-Inv 1: Inv	0	1	0	ND0INV1=[Param.]<CR><LF> ND0INV1?<CR><LF>	Not required. LineInverter_ Nand0In1 exists on 37th line.
GpioNand1 InputInvert1	R/W	ND1INV1	Same as above.	0	1	0	ND1INV1=[Param.]<CR><LF> ND1INV1?<CR><LF>	Not required. LineInverter_ Nand1In1 exists on 39th line.
GpioNand0 InputInvert2	R/W	ND0INV2	0: Non-Inv 1: Inv	0	1	0	ND0INV2=[Param.]<CR><LF> ND0INV2?<CR><LF>	Not required. LineInverter_ Nand0In2 exists on 38th line.
GpioNand1 InputInvert2	R/W	ND1INV2	Same as above.	0	1	0	ND1INV2=[Param.]<CR><LF> ND1INV2?<CR><LF>	Not required. LineInverter_ Nand1In2 exists on 40th line.
LUTSequenceR	R/W	LUTSR	Min to Max	0	4095	0	LUTSR=[Param.]<CR><LF> LUTSR?<CR><LF> (Color model only)	When 256 commands are sent in succession, the LUT curve is updated (during WRITE) or the LUT curve is loaded sequentially (during READ). (Red signal)
LUTSequenceG	R/W	LUTSG	Min to Max	0	4095	0	LUTSG=[Param.]<CR><LF> LUTSG?<CR><LF> (Color model only)	When 256 commands are sent in succession, the LUT curve is updated (during WRITE) or the LUT curve is loaded sequentially (during READ). (Green signal)
LUTSequenceB	R/W	LUTSB	Min to Max	0	4095	0	LUTSB=[Param.]<CR><LF> LUTSB?<CR><LF> (Color model only)	When 256 commands are sent in succession, the LUT curve is updated (during WRITE) or the LUT curve is loaded sequentially (during READ). (Blue signal)
BlemishNum	R/O	BNUM	Min to Max	0	255	0	BNUM?<CR><LF>	Display the number of correction blemishes.
CameraLinkClock Frequency	R/O	CLCF	0= 84.85MHz 1= 74.25MHz 2= 37.12MHz	0	2	0	CLCF =[Param.]<CR><LF> CLCF?<CR><LF>	Set the Camera Link clock.

BINNING_GAIN_EN	R/W	BGOE	0: Off / 1: On	0	1	0	BGOE =[Param.]<CR><LF> BGOE?<CR><LF>	Set whether to apply gain to the image during binning mode.
PIrisLensControl	R/W	PLC	0: Off / 1: On	0	1	0	PLC =[Param.]<CR><LF> PLC?<CR><LF> (GO-2400-AUX1(P-Iris) only)	Set this to [On] when using a P-Iris lens.
PirisLensSelect	R/W	PLS	0: Others 1: LM16JC5MM 2: LM35JC5MM 3: CINEGON1.9/10 4: CINEGON1.8/4.8 5: SCHNEIDER COMPACTIRIS 6: MG3518KC 7: VV1618HF_DN_P	0	8	1	PLS=[Param.]<CR><LF> PLS?<CR><LF> (GO-2400-AUX1(P-Iris) only)	Select the P-Iris lens to be used.
PIrisStepMax	R/O	PIS	Indicate P-IRIS control step maximum value	0	200	128	PIS?<CR><LF> Different depending on PirisLensSelect value (P-Iris Model only)	Display the maximum step number for the P-Iris lens selected in [P-IRIS Lens Select]. (This is only enabled when [P-IRIS Lens Select] is set to a setting other than [OTHERS].)
PIrisPosition	R/W	PIP	Min to Max	0	200	128	PIP=[Param.]<CR><LF> PIP?<CR><LF> Maximum value is PIrisStepMax (GO-2400-AUX1(P-Iris) only)	Set the iris position of the P-Iris lens as a step number.
PirisAutoMin	R/W	PLI	0: FULL OPEN 1: F1.4 2: F2 3: F2.8 4: F4 5: F5.6 6: F8 7: F11 8: F16 9: F22 10: F32 11: CLOSE	0	11	1	PLI=[Param.]<CR><LF> PLI?<CR><LF> Minimum value and Maximum value are different depending on PirisLensSelect value (GO-2400-AUX1(P-Iris) only)	Set the minimum value for the control range as an F number when controlling the P-Iris lens using auto iris. (This is only enabled when [P-IRIS Lens Select] is set to a setting other than [OTHERS].)
PirisAutoMax	R/W	PLA	Same as above.	0	11	5	PLI=[Param.]<CR><LF> PLI?<CR><LF> Minimum value and Maximum value are different depending on PirisLensSelect value(GO-2400-AUX1(P-Iris) only)	Set the maximum value for the control range as an F number when controlling the P-Iris lens using auto iris. (This is only enabled when [P-IRIS Lens Select] is set to a setting other than [OTHERS].)
PirisCurrentFvalue	R/O	PCV	Same as above.	0	11	0	PCV?<CR><LF> (GO-2400-AUX1(P-Iris) only)	Display the iris position of the P-Iris lens as an F number.
PirisAutoStepMin	R/W	PLSI	Min to Max	0	200	0	PLSI=[Param.]<CR><LF> PLSI?<CR><LF> (GO-2400-AUX1(P-Iris) only)	Set the minimum value for the control range as a step number when controlling the P-Iris lens using auto iris. (This is only enabled when [P-IRIS Lens Select] is set to [OTHERS].)

PirisAutoStepMax	R/W	PLSA	Min to Max	0	200	60	PLSA=[Param.]<CR><LF> PLSA?<CR><LF> (GO-2400-AUX1(P-Iris) only)	Set the maximum value for the control range as a step number when controlling the P-Iris lens using auto iris. (This is only enabled when [P-IRIS Lens Select] is set to [OTHERS].)
PirisPositionLimit	R/W	PLSL	Min to Max	0	200	74	PLSL=[Param.]<CR><LF> PLSL?<CR><LF> (GO-2400-AUX1(P-Iris) only)	Set the maximum step number for when [P-IRIS Lens Select] is set to [OTHERS]. (This is only enabled when [P-IRIS Lens Select] is set to [OTHERS].)
AlcStatus	R/O	ALCST	0=Off 1=AIC(P-Iris Model only) 2=ASC 3=AGC	0	3	0	ALCST?<CR><LF>	Display whether ASC or AGC is currently being used for control when using ALC.
VideoProcessBypass	R/W	VPB	0: Off / 1: On	0	1	0	VPB=[Param.]<CR><LF> VPB?<CR><LF>	Enable/ disable video process bypass mode.
Framerate min limit	R/O	ARMIN	Min to Max *2	6029	32764	6080	ARMIN?<CR><LF>	Display the fastest value for the frame rate under the current configurations as a frame interval [us].
Exposure min limit	R/O	PEMIN	Min to Max *3	15	79	20	PEMIN?<CR><LF>	Display the minimum value [us] for exposure time under the current configurations.
Exposure max limit	R/O	PEMAX	Min to Max *3	5976	8000000	8236	PEMAX?<CR><LF>	Display the maximum value [us] for exposure time under the current configurations.
PirisPhaseControl	R/W	PIPC	0: A-AM B-BM 1: B-BM A-AM	0	1	0	PIPC=[Param.]<CR><LF> PIPC?<CR><LF> (GO-2400-AUX1(P-Iris) only)	Set the iris control direction for the P-Iris lens. (This is only enabled when [P-IRIS Lens Select] is set to [OTHERS].)

Settings

❖ For details on the setting items, refer to the JAI Control Tool User's Guide

Item	Setting range	Default value
32-bit Factory Transport Layers		
Available 32-bit Transport Layers	—	
JAI_GigE_Vision	—	
Transport name	—	JAI_GigE_Vision
Full path to cti file	—	$(JAI_SDK_BIN)¥ JaiGevTL.cti
Enabled	True, False	True
Display name	—	GevTL
64-bit Factory Transport Layers	—	
Available 64-bit Transport Layers	—	
JAI_GigE_Vision	—	
Transport name		JAI_GigE_Vision
Full path to cti file	—	$(JAI_SDK_BIN_64)¥ JaiGenTL.cti
Enabled	True, False	True
Display name	—	GenTL
Asynchronous Image Recording		
Recording Count	—	25
Recording Skip Count	—	0
Recording mode	List, CyclicBuffer	List
Optimize the AVI-file creation for Mono8	True, False	True
Prompt user for AVI Encoder	True, False	True
Camera Link Transport Layer		
Automatically probe for CameraLink devices at startup	True, False	True
Use Highest Baud rate for XML download from camera	True, False	False
Show CameraLink Warning Dialog	True, False	True
CXP Transport Layer		
Sync Remote And Local Devices	True, False	True
File Save		
File Format	Tiff, Jpeg, Bmp, Jai, RAW	Tiff
Encoder parameter	—	75
GigE Transport Layer		
Preferred Drive Type	FilterDriver, SocketDriver	FilterDriver
Preferred Device Access Mode	None, ReadOnly, Control	Control
Enable Automatic Force IP	True, False	True
Enable Subnet Conflict Warning?	True, False	True
Look-and-feel		
Visibility Level	Beginner, Expert, Guru	Beginner
HEX display	True, False	False
Display ToolTips	True, False	True
Floating-Point Display Notation	Automatic, Fixed, Scientific	Automatic
Floating-Point Display Precision	—	5
Display the Remote device layer at the top of the tree (transport at the bottom)	True, False	True
Refresh Property Grid After Editing	True, False	False
Override TrackBar Floating-point display precision settings	True, False	False
Make the control tool appear on top of images	True, False	False
Timestamp display format	Ticks, MSec, PTP	Ticks
Plugins		
Search path for plugin DLLs	—	.\plugins
Enable the plug-in button on the menu tab	True, False	False
Support		
Open settings file after save	True, False	True

Item	Setting range	Default value
Support EMail Address	—	camerasupport@jai.com
Logging Properties		
Enable logging	True, False	False
Use custom properties file	True, False	False
Custom logging properties file path		
Output log file path		
Enable GenApi logging	True, False	False
Enable GenTL logging	True, False	False
Enable CIProtocol logging	True, False	False
Enable USB logging	True, False	False
Log Level	FATAL, ALERT, CRIT, ERROR, WARN, NOTICE, INFO, DEBUG, NOTEST	INFO
Format string	—	LOG %d %x: %c : %m%n
Append To Log file	True, False	False
Video Display		
Stretch Live Video	True, False	True
Restore Live Video Window	True, False	True
Skip image display when busy	True, False	True
Enable Color Interpolation	True, False	True
Color Interpolation	BayerStandard, BayerStandardMultiprocessor, BayerExtended, BayerExtendedMultiprocessor, BayerSimple, BayerSimpleMultiprocessor, BayerFast, BayerFastMultiprocessor	BayerStandard
Show Zoom Navigation window	True, False	True
Show Cursor Information window	True, False	False
Enable Mouse Zoom	True, False	True
Enable Mouse Cursor Display	True, False	False

Miscellaneous

Troubleshooting

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

■ Power supply and connections

Problem	Cause and solution
The power / trigger LED remains lit amber and does not turn green, even after power is supplied to the camera.	Camera initialization may not be complete. Check the Camera Link cable conection.

■ Image display

Problem	Cause and solution
Gradation in dark areas is not noticeable.	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” (page 41).

■ Settings and operations

Problem	Cause and solution
Settings cannot be saved to user memory.	You cannot save to user memory while images are being captured by the camera. Stop image capture before performing the save operation.
I want to restore the factory default settings.	Load [Default] under [User Set Selector] in the [Feature Properties] tab to restore the factory default settings.

Specifications

Item				GO-2400M-PMCL	GO-2400C-PMCL
Scanning system				Progressive scan	
Synchronization				Internal	
Interface				CameraLink (Version 2.0)	
Image sensor				1/1.2-inch monochrome CMOS	1/1.2-inch Bayer color CMOS
Image size (effective image)				11.3 (H) × 7.13 (V), 13.4 mm diagonal	
Pixel size				5.86 (H) × 5.86 (V) µm	
Effective image pixel output				1936 (H) × 1216 (V)	1936 (H) × 1216 (V)
Acquisition Frame Rate (max) ❖ The minimum value is 0.125 fps for all.	8-bit	H1, V1		165.5 fps	165.5 fps
		Binning	H1, V2	165.5 fps	—
			H2, V1	165.5 fps	—
			H2, V2	165.5 fps	—
	10-bit	H1, V1		127.9 fps	127.9 fps
		Binning	H1, V2	127.9 fps	—
			H2, V1	127.9 fps	—
			H2, V2	127.9 fps	—
EMVA 1288 parameters Absolute sensitivity Maximum SNR				during 10-bit output 6.82p (λ = 525 nm) 45.29 dB	during 10-bit output 6.94p (λ = 525 nm) 45.15 dB
SNR (traditional method)				60 dB or more (standard) (0 dB gain, Black)	60 dB or more (standard) (0 dB gain, Green Black)
Image output format Digital	Full pixel			1936 (H) × 1216 (V)	Bayer 1936 (H) × 1216 (V)
	ROI	Width		96 to 1936, 12 or 16 pixels/step	96 to 1936, 12 or 16 pixels/step
		Offset X		0 to 1920, 2 to 8 pixels/step	0 to 1920, 2 to 8 pixels/step
		Height		2 to 1216, 1 line/step	2 to 1216, 2 lines/step
		Offset Y		0 to 1214, 2 lines/step	0 to 1214, 2 lines/step
	Binning	H	1	1936 (H)	1936 (H)
			2	968 (H)	—
		V	1	1216 (V)	1216 (V)
			2	608 (V)	—
	Pixel Format			Mono8, Mono10, Mono12	BayerRG8, BayerRG10, BayerRG12
Acquisition Mode				Continuous, Single Frame, Multi Frame (1 to 255)	
Trigger Selector	Exposure			Frame Start	
Exposure Mode				Off, Timed (EPS), Trigger Width (PWC)	
Trigger overlap				Off	
Trigger input signals				Line4 (TTL In), Software, PG0, NAND Out 0/1	
Exposure Mode	Timed			15 µs ~ (8-bit), 19 µs ~ (10-bit) (min) to 8 s (max), variable unit: 1 µs ❖ Performance verified for up to 1 second. Min. value varies depending on Tap Geometry setting.	
	Trigger Width			15 µs ~ (8-bit), 19 µs ~ (10-bit) (min) to ∞ (max) ❖ Performance verified for up to 1 second. Min. value varies depending on Tap Geometry setting.	
Auto exposure (Exposure Auto)				Off, Continuous	
Auto exposure response speed (AGC/ASC Control Speed)				1 to 8	
Video Send Mode Selector				Normal ROI, Trigger Sequence, Command Sequence, Delayed Readout	
Digital I/O				Std.: Line Selector(4P): GPIO IN / GPIO OUT	
Black level adjustment	Default level			33LSB (during 10-bit output)	
	Video level adjustment range			0 to 100 (during 10-bit output)	
	Adjustment range			–33LSB to +64LSB against reference level 10-bit	
	Resolution adjustment			1 STEP = 0.25LSB	

Item			GO-2400M-PMCL	GO-2400C-PMCL
Gain adjustment	Manual adjustment range		0 dB to +24 dB 1 step = x0.01 (0.005 dB to 0.08 dB) (varies by setting value)	0 dB to +24 dB 1 step = x0.01 (0.005 dB to 0.08 dB) (varies by setting value)
	Auto gain		Off, Continuous	Off, Continuous
	WB gain		—	R / B: –7 dB to +15 dB, 1 step = 0.1 dB
	WB area		—	16 (4 × 4) Area
	WB range		—	3000 K to 9000 K
	White balance		—	Off, Continuous, Once
Blemish correction	Detection		Detect white blemishes using threshold values (black blemish correction performed only at factory)	
	Correction		Interpolation using adjacent pixels (continuous blemishes not corrected)	
	Correctable pixels		256 pixels	
ALC			Can be adjusted automatically together with AGC and auto exposure	
Gamma			0.45, 0.6 an, 1.0 (OFF) (3 steps available)	
LUT			OFF: γ = 1.0, ON = 256 points can be set	
Power supply	4-pin connector	Input range	DC +12 V to +24 V ±10% (via input terminal)	
		Current	230 mA ±20 mA (at 12 V input, full pixel) (Typical)	
		Power	2.76 W (at 12 V input, full pixel) (Typical)	
	PoCL	Input range	DC +12 V	
		Current	230 mA ±20 mA (at 12 V input, full pixel) (Typical)	
		Power	2.76 W (at 12 V input, full pixel) (Typical)	
Lens mount			C-mount Lens mount protrusion length of 9 mm or less is supported	
Flange back			17.526, tolerance: 0 mm to –0.05 m	
Optical filter			Protective glass: Not provided	IR cut filter (half value of 670 nm)
Verified performance temperature / humidity			–5 ˚C to +45 ˚C / 20% to 80% (non-condensing)	
Storage temperature / humidity			–25 ˚C to +60 ˚C/ 20% to 80% (non-condensing)	
Regulations			CE (EN61000-6-2 and EN61000-6-3), FCC part 15 class B, RoHS, WEEE	
Dimensions (housing)			29 × 29 × 41.5 mm (WHD) (excluding mount and protrusions)	
Weight			46 g	

Approximately 5 minutes of warm-up are required to achieve these specifications.

Package contents

Camera body (1)
Sensor protection cap (1)
Dear Customer (sheet) (1)

Optional accessories (not supplied)

MP-43 tripod mount

Design and specifications are subject to change without notice.

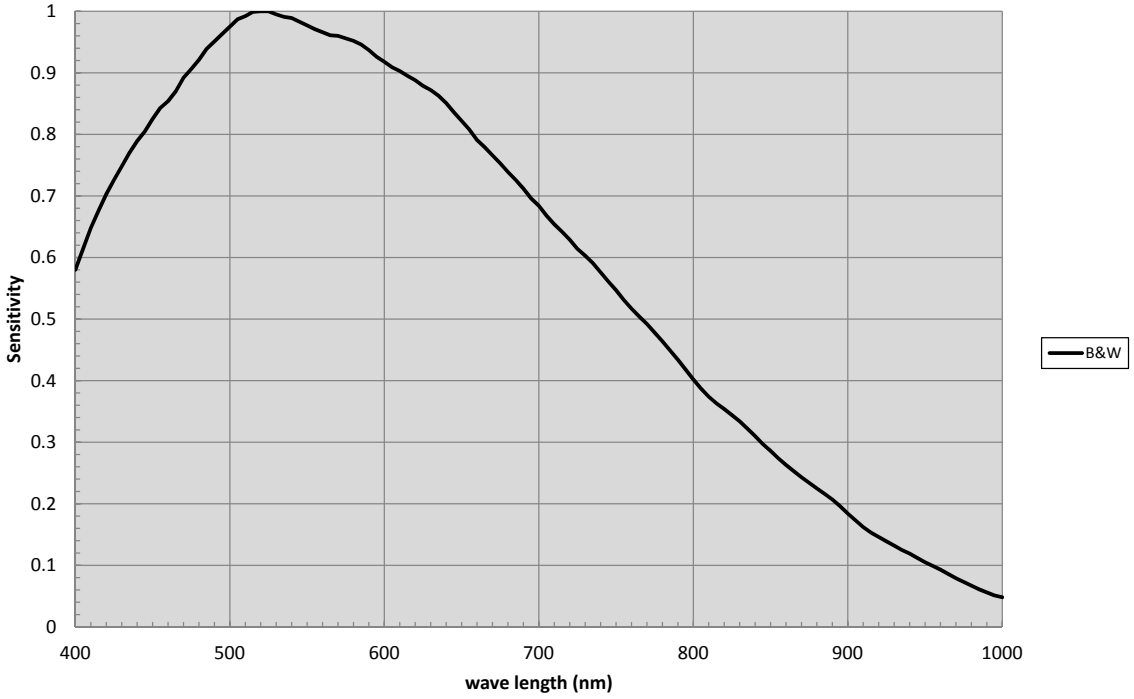
Frame Rate Reference

(Theoretical value: decimal values are dropped, during Unpacked)

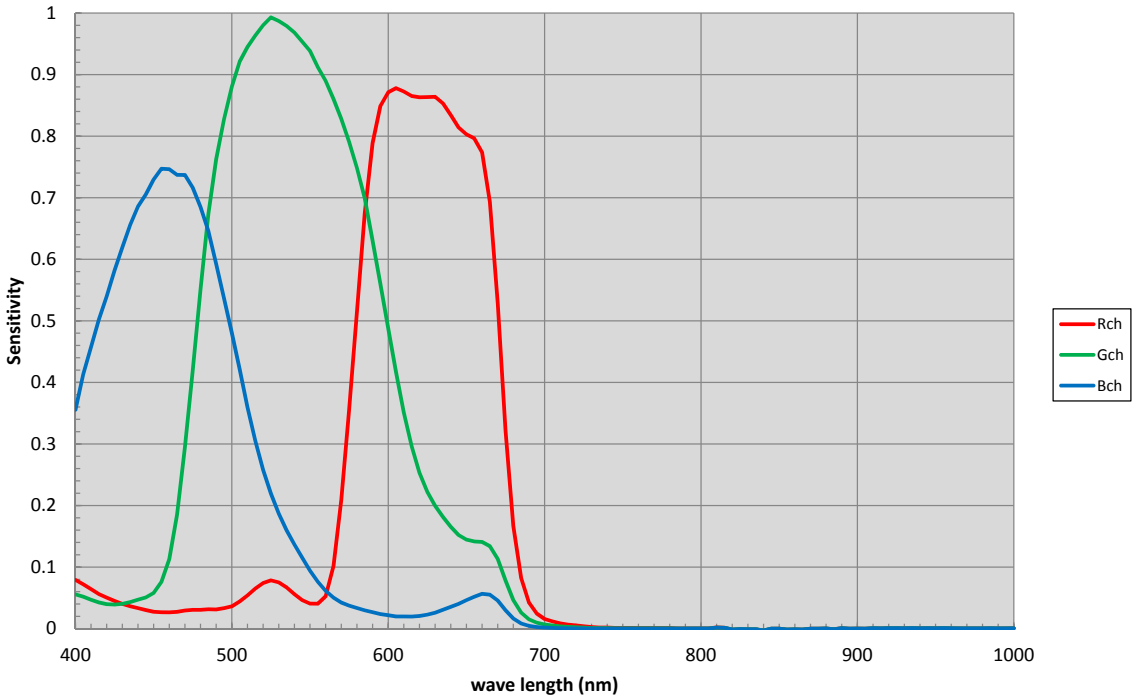
Pixel count	Resolution (screen size)	ROI/Binning	Pixel size (µm)	Image size	Frame rate 1x8-1Y (84.85 MHz)
2.35 MP	1936 × 1216	Full pixel	5.86 × 5.86	1/1.2" (13.40 mm)	165 fps (@ 8 bit)
2 MP	1920 × 1080	ROI	5.86 × 5.86	1/1.2" (12.91 mm)	185 fps (@ 8 bit)
1.4 MP	1400 × 1050	ROI	5.86 × 5.86	1/1.6" (10.26 mm)	190 fps (@ 8 bit)
1.3 MP	1280 × 1024	ROI	5.86 × 5.86	1/1.7" (9.61 mm)	195 fps (@ 8 bit)
0.5 MP	800 × 600	ROI	5.86 × 5.86	1/2.7" (5.86 mm)	324 fps (@ 8 bit)
0.3 MP	640 × 480	ROI	5.86 × 5.86	1/3.4" (4.69 mm)	400 fps (@ 8 bit)

Spectral Response

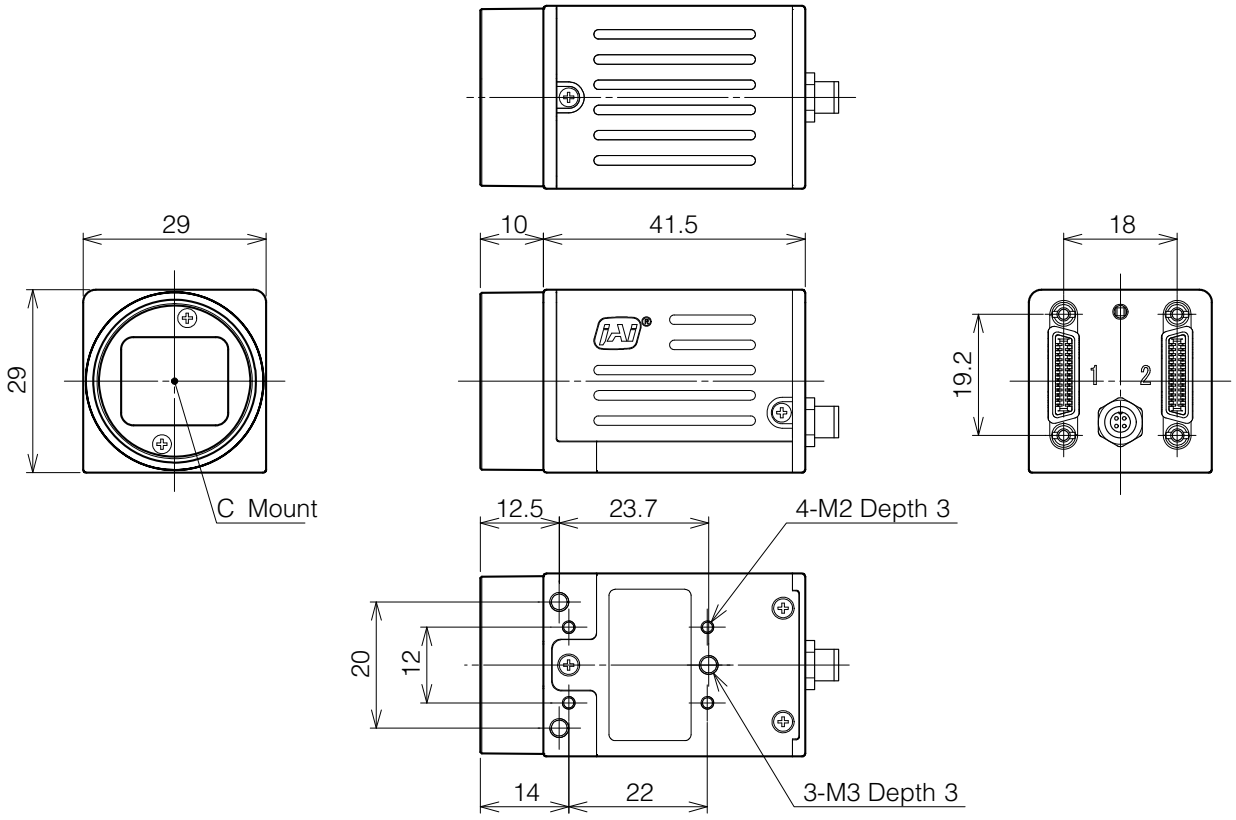
GO-2400M-PMCL



GO-2400C-PMCL



Dimensions



Dimensional tolerance: ±0.3 mm
Unit: mm

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