SONY

C-283-100-**14** (1)

Digital Video Camera Module

Technical Manual

XCG-CG40
XCG-CG160/CG160C
XCG-CG240/CG240C
XCG-CG510/CG510C
XCG-CP510

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Overview

Before operating the unit, please read this manual thoroughly and retain for future reference.

This unit is a digital video camera module that adopts the 1000BASE-T/100BASE-TX interface.

This operating instruction of the digital video camera module covers:
- XCG-CG40/CG160/CG240/CG510/CP510 (monochrome cameras)
- XCG-CG160C/CG240C/CG510C (color cameras)

In this document, we refer to “Digital Video Camera Module” as “the unit”, “XCG-CG40/CG160/CG240/CG510/CP510” as “Monochrome camera”, and “XCG-CG160C/CG240C/CG510C” as “Color camera”.

Features

GigE Vision compliant

This unit supports GigE Vision Ver.2.0/Ver.1.2, and the versions are switchable by changing the settings.

PTP(IEEE1588) compliant

PTP: An abbreviation for Precision Time Protocol.
This unit supports the IEEE1588 standard, which defines precise time synchronization via network. This unit can synchronize the exposures of multiple cameras via an Ethernet cable.

Polarization camera (XCG-CP510)

This unit is equipped with a CMOS polarization image sensor with a global shutter (Monochrome).
Polarization image can be processed using a polarization camera SDK.
For purchasing the SDK, consult the dealer.

External trigger shutter function

By synchronizing with an external trigger signal, any shutter timing can be used.

Partial scan (ROI)

ROI: An abbreviation for Region Of Interest.
This unit can limit the number of video output lines to achieve high frame rates, enabling high-speed image processing.

Body fixing

The screw holes to install the camera module are located under the front panel (the image sensor reference plane). Installing the camera module on the front panel minimizes deviation of the optical axis.

LUT (Look Up Table)

You can switch to OFF or ON. When set to ON, you can select from preset values, such as inversion, binarization, settable five-point approximations, etc.
This feature is not available in XCG-CP510.

Switching an Output Bit Length

You can select 8-bit output, 10-bit output, or 12-bit output.
For color cameras, you can also select an output of RGB 24-bit, YUV 24-bit (YUV444), or YUV 16-bit (YUV422).

White balance control (color camera)

You can adjust the R and B level against G level to adjust the white balance. This unit is also equipped with the one-push white balance function, by which the camera can automatically adjust the white balance.

Area gain function

You can set the individual digital gain to 16 optional rectangular areas.

Equipped with temperature sensor

This unit can readout the temperature inside of the camera from the temperature sensor installed on the module board. If the update interval of the temperature sensor value is set to other than 0, the temperature information can be sent to a PC application as event data.

Defect correction function

This unit is equipped with the function that reduces the sensor defect, and it can be switched On/Off.

Shading correction function

This unit is equipped with the function that corrects the shadings caused by a light source and lens, and it can be switched On/Off.
This feature is not available in XCG-CG40.

Binning function (monochrome camera)

By combining two pixels aligned vertically and horizontally in the camera, features including sensitivity can be improved.
This feature is not available in XCG-CG40/CP510.

Camera CMOS image sensor phenomena

Note

The following phenomena that may occur in images are specific to image sensors.
They do not indicate a malfunction.

White flecks

Although the image sensors are produced with high-precision technologies, fine white flecks may be generated on the screen in rare cases, caused by cosmic rays, etc.
This is related to the principle of image sensors and is not a malfunction.
The white flecks especially tend to be seen in the following cases:

- when operating at a high environmental temperature
- when you have raised the gain (sensitivity)
- when using the long exposure time

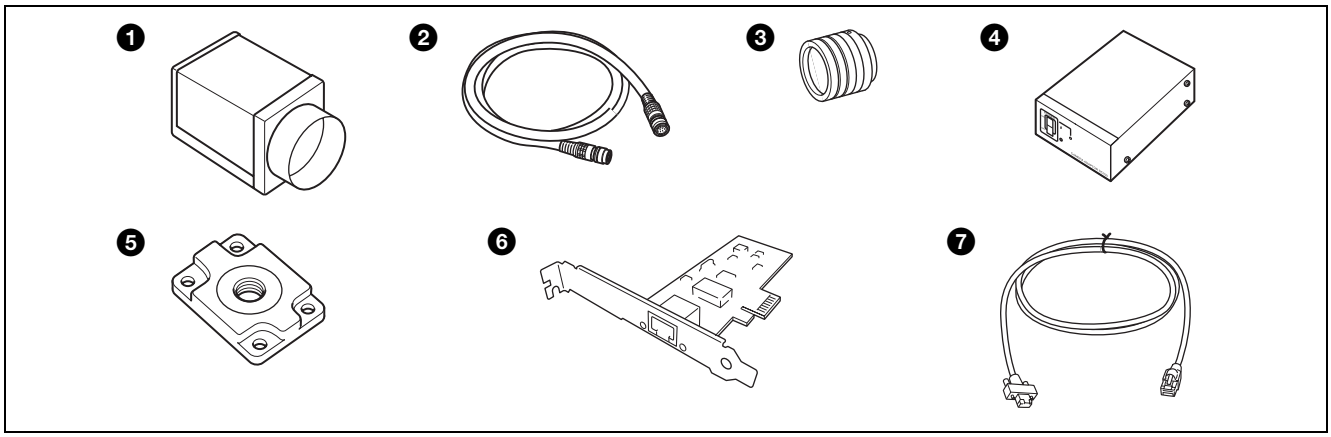
Flicker

If shooting under lighting produced by fluorescent lights, sodium lamps, mercury-vapor lamps, or LEDs, the screen may flicker or colors may vary.

Aliasing

When fine patterns, stripes, or lines are shot, they may appear jagged or flicker.

System Components



This unit comprises the following optional products.

❶ Video Camera Module (this unit)
This is a small-size, high image-quality video camera module that uses CMOS image sensors with a global shutter function.

❷ Camera cable
This is attached to the DC power input connector on the back of the camera module and is used for power supply, and sends and receives GPIO signals.
For purchasing the cable, consult the dealer.

❸ C-mount lens (sold separately)
Use a lens appropriate for the pixel count of the camera.

❹ Camera adaptor DC-700/700CE (sold separately)
This is connected to the camera module to enable power supply from ordinary AC power source.

❺ Tripod adaptor VCT-333I (Insulated type) (sold separately)
This attaches to the bottom of the camera module to fix the camera module to a tripod.

❻ Frame grabber board (Network Interface Card)
Install the board in the expansion slot of the host device (ex: computer). Use a board that is appropriate for your system and that supports 1000BASE-T and jumbo packets.
It is also possible to connect to the connectors built into the PC, but we recommend using the board. This document will explain the case of using the board.

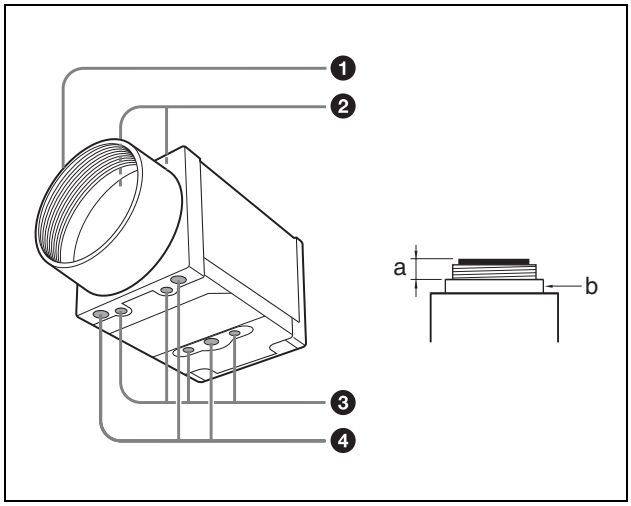
❼ LAN cable
This cable connects to the RJ45 connector on the rear panel of the camera module.
Image/control signals are transmitted via this cable. Use a LAN cable (CAT5e or higher standard) that supports 1000BASE-T.
Depending on the characteristics of the LAN cable, images may become less clear and the camera module may become unstable. Be sure to use a LAN cable that has sufficient noise reduction.

Note

When you connect the LAN cable of the unit to peripheral device, use a shielded-type cable to prevent malfunction due to radiation noise.

Location and Function of Parts and Operation

Front/Top/Bottom



❶ Lens mount (C-mount)
Attach any C-mount lens or other optical equipment.

Note

Use a C-mount lens with a protrusion (a) extending from the lens mount face (b) of 10 mm (13/32 inch) or less. The performance of a lens may change according to the aperture level.
If the resolution is not enough, adjust the aperture level.

❷ Guide screw holes (Top)

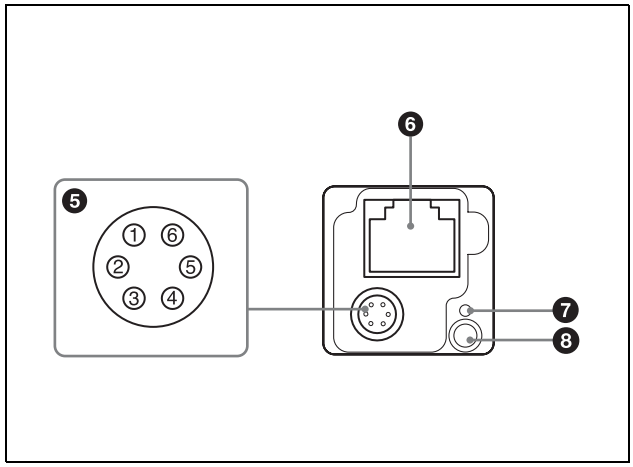
❸ Guide screw holes/Tripod screw holes (bottom)
When using a tripod, use these four screw holes to attach a VCT-333I tripod adaptor.

❹ Reference screw holes (bottom)
These precision screw holes are for locking the camera module. Locking the camera module into these holes secures the optical axis alignment.

Note

Refer to Demensions in page 80 for about the position/ size of the Guide hole and the Reference hole.

Rear



❺ ⎓ DC power input connector (6-pin)
You can connect a camera cable to input the +12 V DC power supply. The pin configuration of this connector is as follows.
(Refer to Fig. ❻ above for the pin assignment of the connector.)

Pin No.	Signal	Pin No.	Signal
1	DC input (10.5 V to 15 V)	4	GPI3/GPO3 (GPO3 (ISO +)*)
2	GPI1 (ISO +)	5	ISO –
3	GPI2/GPO2	6	GND

*XCG-CG40/CG160/CG160C

❻ RJ45 connector
You can connect a LAN cable to this connector to control the camera module from a host device to output image to a host device. By using a PoE-compatible LAN cable and Frame grabber board (Network Interface Card) or hub, you can supply power using the LAN cable.

Note

For safety, do not connect the connector for peripheral device wiring that might have excessive voltage to this port. Refer to “Connecting the cables” on page 8 for details on how to connect.

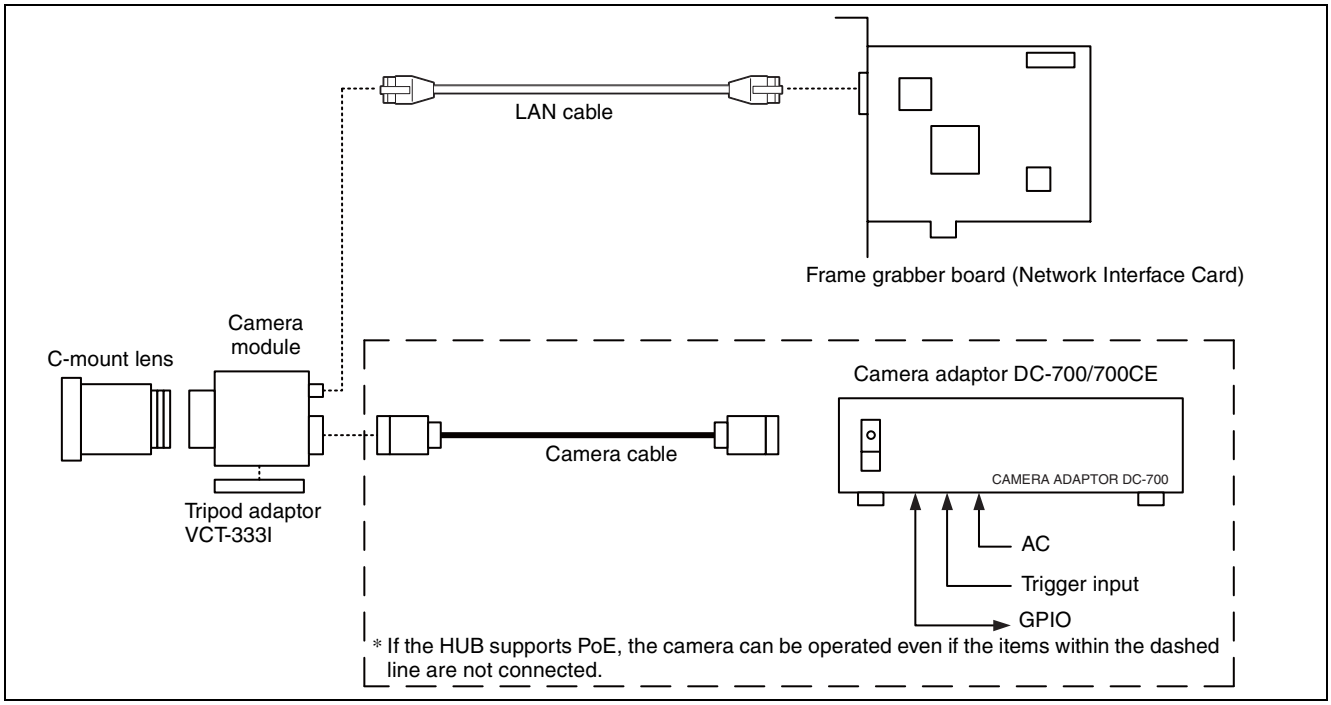
❼ Reset switch
The camera can be reset to the factory setting by pressing the reset switch for more than 3 seconds while the power is turned on.

Notes

- All the setting items will be deleted.
- Initializing is performed after operation.
  Do not turn off the power for 1 minute after the LED lights again.

❽ Status LED (Green)
Displays the unit status.
For details, see “Status LED” (page 42).

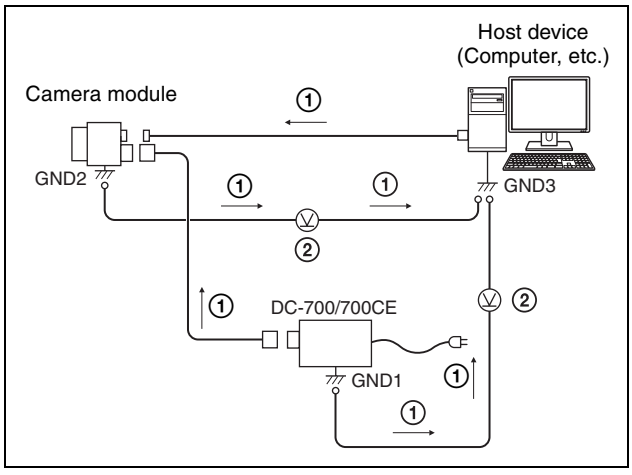
Connections



When installing the camera

When you install the camera with various peripheral devices and if the devices have different ground electric potential, ground only one device. In case there is a ground electric potential difference, the camera may be damaged.

① Abnormal electricity
② Ground electric potential difference



Power supply

You can supply power to the camera module using the following methods.

Using the RJ45 connector

Since this unit adopts PoE (IEEE802.3af standards), both the supplying power and camera control/image output are supported with a single LAN cable by using a PoE standard compatible LAN cable and Frame grabber board (Network Interface Card) or a HUB.

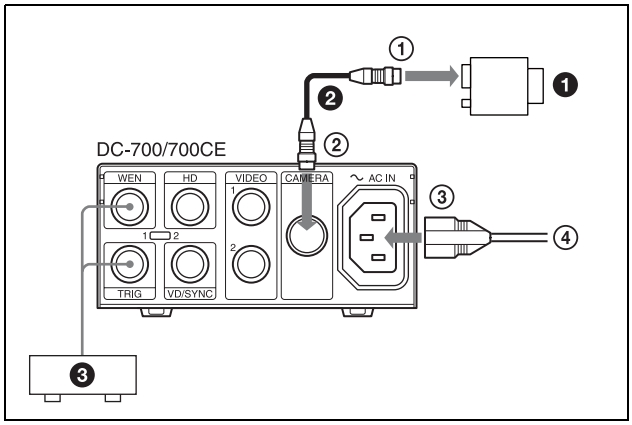
Using the DC power input connector

You can supply power via the DC power input connector using the power adapter.
Use DC-700/700CE which is the stable power source free from ripple or noise.

Heat dissipation

Heat dissipation is required depending on the usage environment.
For heat dissipation, refer to “When mounting the camera” (see page 9).

Connecting DC-700/700CE (sold seperately)



Connect the camera module to the power via the camera adaptor DC-700/700CE. For details on the camera adaptor DC-700/700CE, see the DC-700/700CE Instruction Manual.

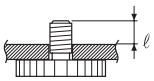
❶ C-mount lens
❷ Camera cable
❸ TRIG generator

① To DC power input connector
② To CAMERA connector
③ To AC IN connector
④ To AC power source

Using a tripod

To use the tripod, install the tripod adaptor VCT-333I (sold seperately) on the camera module.
Use a tripod screw with a protrusion (ℓ) extending from the installation surface, as follows, and tighten it, using a screwdriver. Be sure that the protrusion (ℓ) does not exceed 5.5 mm (0.22 in.) in length.

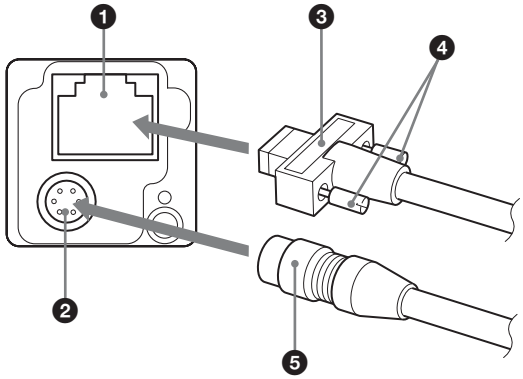
Length 4.5 to 5.5 mm
Length 0.18 to 0.22 inches



Note

If you install a tripod adapter (sold seperately), use the screws provided.

Connecting the cables



Connect the camera cable (❺) to the DC power input connector (❷) and connect the LAN cable (❸) to the RJ45 connector (❶) respectively. If you use a Frame grabber board (Network Interface Card) or a hub that supports PoE, you can operate the camera even if you do not connect the camera cable to the DC power input connector. When you connect the LAN cable with fastening screws, turn the two screws (❹) on the connector to secure the cable tightly.

Connect the other end of the camera cable to the DC-700/700CE and the other end of the LAN cable to the Frame grabber board (Network Interface Card) or a hub.

Note

Do not supply power to the camera cable and LAN cable at the same time.

When mounting the camera

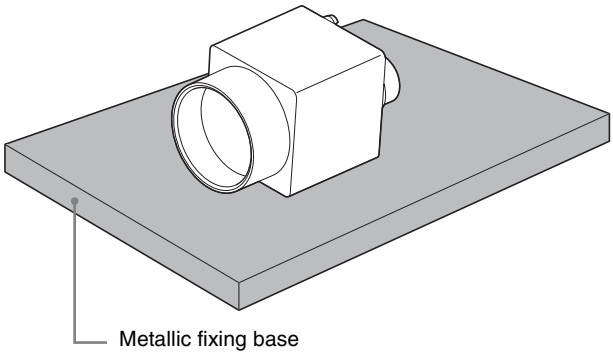
When the value read from temperature sensor is above 75 °C (167 °F), heat dissipation is required.
For more information about reading from the temperature sensor, see “Temperature Readout Function” (page 42).

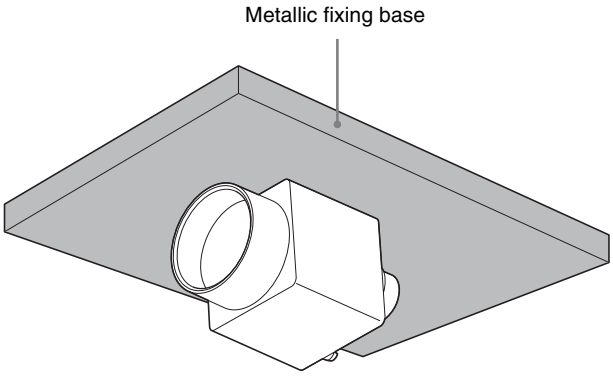
* For XCG-CG40/CG160/CG160C, in addition to the above condition, use in environments where the difference with the ambient temperature is 34 °C (61.2 °F) or less.

To promote heat dissipation from the unit and maintain performance, mount the camera to a metallic fixing base.

Notes

- When mounting the camera to the fixing base, secure the camera tightly by using the reference screw holes (see page 6) and screws.
- Do not mount the camera to a plate made of a material such as wood or resin that prevents heat dissipation.





Network Settings

For the camera to be connected to a network, the following address data must be properly specified:

- IP address
- Subnet mask
- Default gateway

The camera provides the following three methods for the address data setting:

- Using Persistent IP
- Using DHCP
- Using Link Local Address (LLA)

Using Persistent IP

Use this method when the IP address to be assigned to the camera has been specified in advance. When you use a persistent IP, setting of subnet mask is necessary. To use beyond the router, you need to set the default gateway as well.

Using DHCP

The camera is equipped with a function to automatically obtain an IP address by communicating with a DHCP server on a network. When using the DHCP method for IP address setting, the subnet mask and default gateway values automatically obtained from the DHCP server are also used.

Using LLA

If neither Persistent IP nor DHCP is used, or if an IP address cannot be obtained from the DHCP server, the IP address is determined by LLA. The IP address determined by LLA will be 169.254.XXX.YYY, with XXX and YYY automatically specified.

Packet Size

The amount of image data per packet can be set in bytes. To permit the camera to operate properly, set the packet size to a value less than the MTU of the network device connected to the camera. Set the largest value in the networks including the hub.

Packet Delay

The delay amount to be inserted between packets can be set when sending them to a network. By increasing the packet delay, you can reduce the network bandwidth that the camera uses for sending packets. However, as the amount of data sent in a certain time is decreased with increased delay, the frame rate of output images of the camera may be consequently decreased.

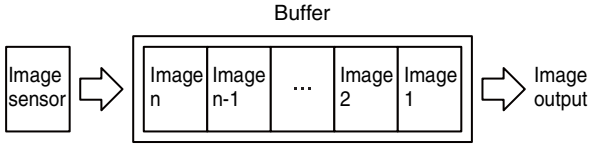
Network connection speed

This unit supports the connection with 1000Base-T (1 Gbps) or 100Base-TX (100 Mbps).
When you connect the unit to the network, negotiate the communication speed with the connected equipment and start communication at a higher speed of that both equipment are compatible with.
When using the unit with 100Base-TX connection, the frame rate to be output is limited, because the output data band width from the camera becomes narrow compared to the 1000Base-T connection.
The camera has a buffer to store multiple images and all of the shot images are stored once in the buffer.
The stored images are output from the camera in order starting from the oldest image in the buffer.
Therefore, if the frame rate during shooting is faster than the frame rate that can be output from the camera, the image data will always be stored in the buffer, and the time interval from shooting to image output becomes large.
To avoid this situation, it is required to set the shooting frame rate to the proper value when using 100Base-TX connection.
The data rate of images is obtained by the following formula:

Data rate = Width × Height × BPP × FPS
Width: Width of image
Height: Height of image
BPP: The number of bits per pixel depends on the PixelFormat setting

Mono8/BayerRG8	8-bit
Mono10Packed/BayerRG10Packed	12-bit
Mono12Packed/BayerRG12Packed	12-bit
RGB8Packed/BRG8Packed/YUV8_UYV	24-bit
YUV422_8/YUV422_8_UYVY	16-bit

FPS: Frame rate [frame/sec]
It is possible to minimize delay by using the camera at a frame rate where the data rate becomes low with a margin against 100 Mbps.



Notes

- Any persistent IP address can be entered, but the camera may become unable to be detected, depending on the IP address setting. If this occurs, use a tool for issuing ForceIP and set a persistent IP address again.
- When setting the parameters (Width, Height, and PixelFormat) for calculating the payload size, stop camera image output beforehand.

Trigger Signal Input

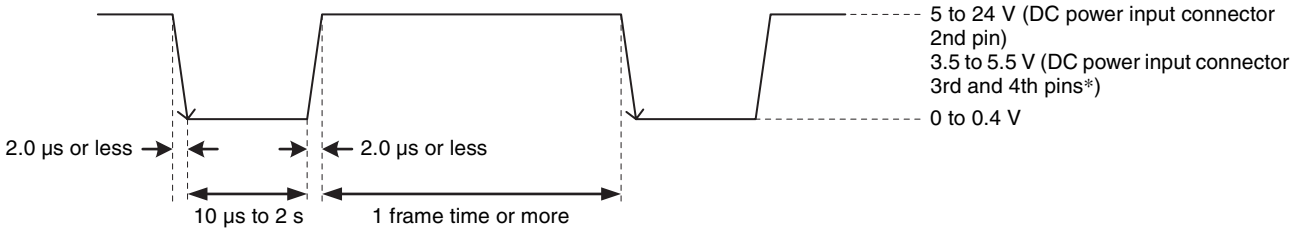
Trigger signals can be input via the 2nd, 3rd, 4th pins of the DC power input connector, or the software command. Input switchover of the trigger signal can be changed via the TriggerSource.

Trigger signal polarity

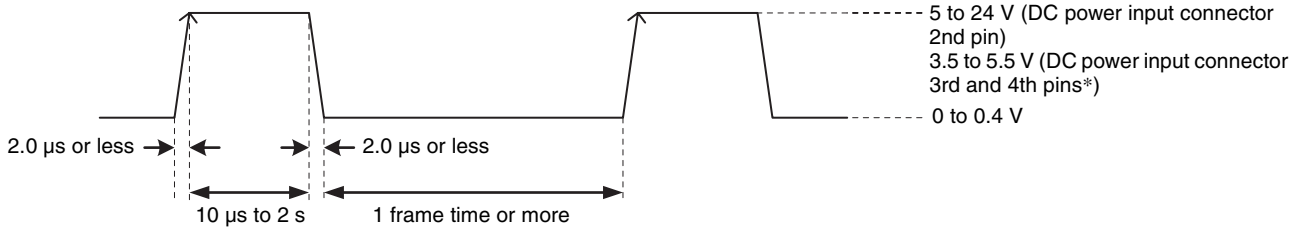
Positive refers to a trigger signal polarity activated while rising from Low to High, or during the High interval. Negative refers to a trigger signal polarity activated while falling from High to Low, or during the Low interval.

Function name	Parameter	Setting
TriggerActivation	0: FallingEdge	Negative
	1: RisingEdge	Positive

DC power input connector specifications



Trigger input polarity = Negative



Trigger input polarity = Positive

* XCG-CG40/CG160/CG160C: Unavailable. Dedicated to output.

Note

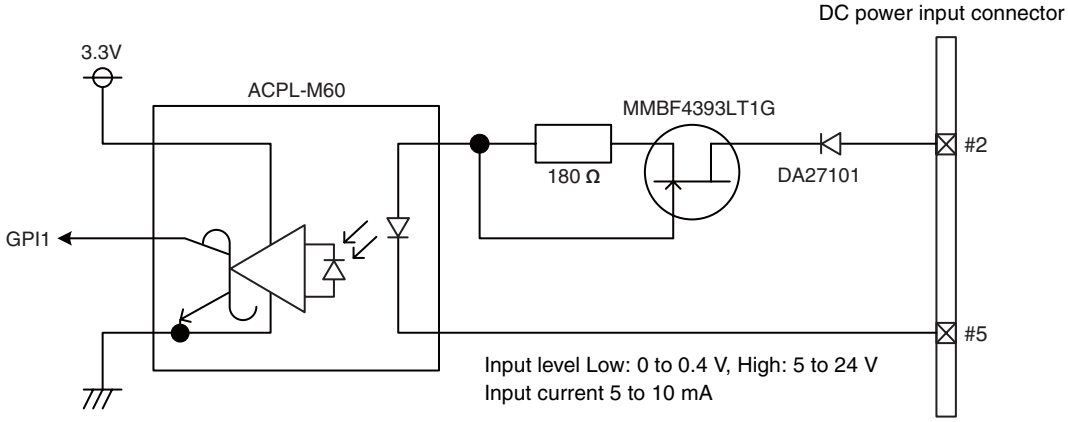
- When inputting a trigger signal to the camera using the DC-700/700CE, use DC 5 V or less at the logical high level.
- Make sure to supply power to the unit and confirm that the unit is operating before inputting a trigger signal. If you input trigger signal to a unit without the power supplied, this may cause a malfunction of the unit.

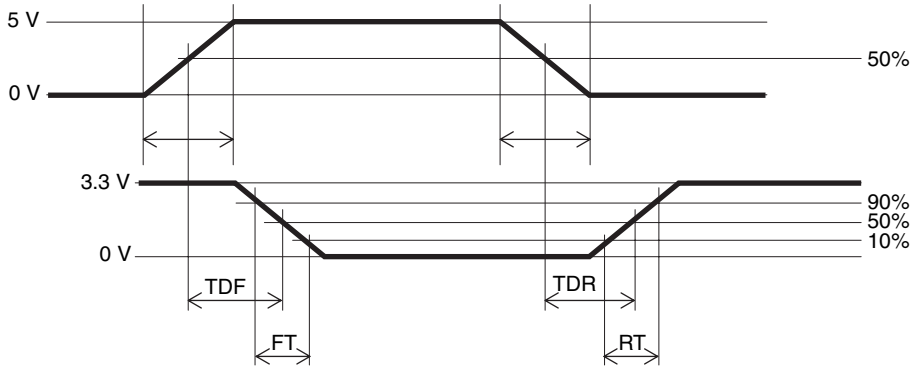
GPIO Connector

The DC power input connector 2nd pin is the GPI connector. The 3rd pin and 4th pin connectors can be set as GPI/GPO.* The trigger reset pin is the DC power input connector 2nd pin (GPI1). If you are connecting an external device to the GPI or GPO connector, refer to the circuit specifications below.

* The 4th pin is GPO connector for XCG-CG40/CG160/CG160C.

GPI circuit specifications



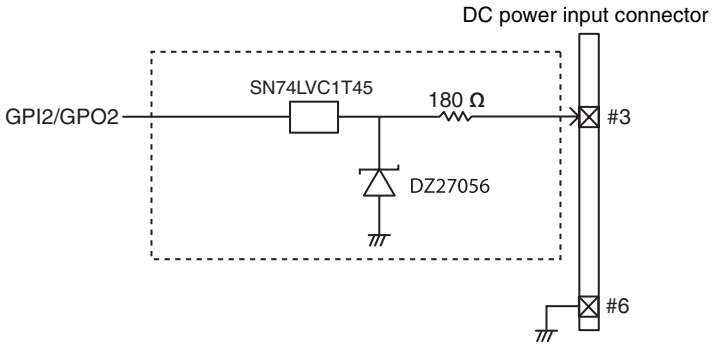


Example

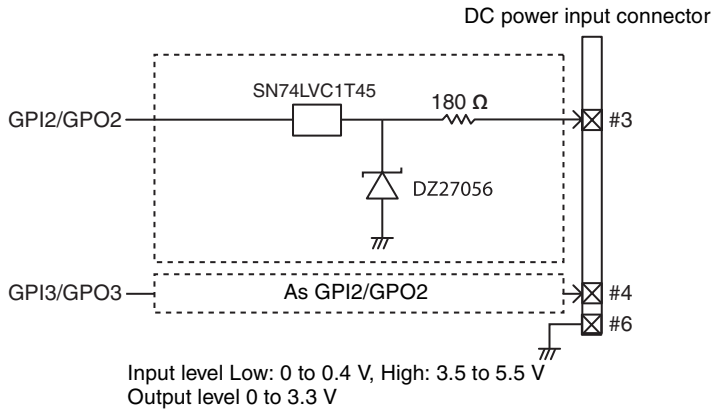
Input voltage [V]	TDF [ns]	FT [ns]	TDR [ns]	RT [ns]
5.0	167	297	192	358

GPIO circuit specifications

XCG-CG40/CG160/CG160C

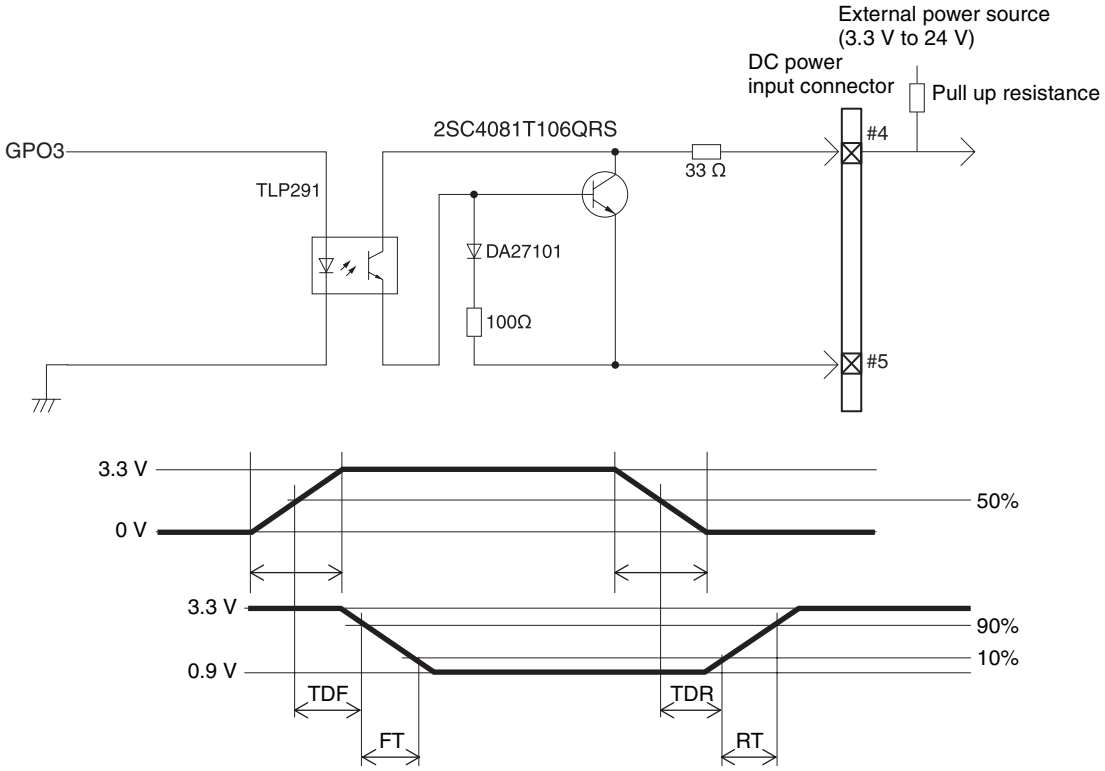


XCG-CG240/CG240C
XCG-CG510/CG510C/CP510



GPO circuit specifications

XCG-CG40/CG160/CG160C



Example

When connecting to an external power supply, be sure to use a pull-up resistor for a current limit of less than 50 mA.

	Supply voltage of the output [V]	Pull-up resistor (Use 1/16 W)	Current [mA]	TDF [µs]	FT [µs]	TDR [µs]	RT [µs]	Output voltage [V]
Normal temperature	3.3	470 Ω	5.07	0.75	0.49	24	35	0.916
	5.0	820 Ω	4.98	0.73	0.63	28	46	0.909
	12.0	Two 2200 Ω resistors in parallel	9.87	0.71	1.05	36	64	1.112
	24.0	Eight 8200 Ω resistors in parallel	21.85	0.73	1.45	45	76	1.571

Partial scan (ROI)

Only the area selected from the effective pixel area can be read out. The area size is selected by the Height and Width, and the read beginning point is selected by the OffsetX and OffsetY. Reducing Height increases the frame rate, but changing the Width does not change the frame rate. Partial scan can be set with or without a trigger.
OffsetX and OffsetY relate to Width and Height as follows:
OffsetX + Width ≤ Width (maximum value)
OffsetY + Height ≤ Height (maximum value)

Note

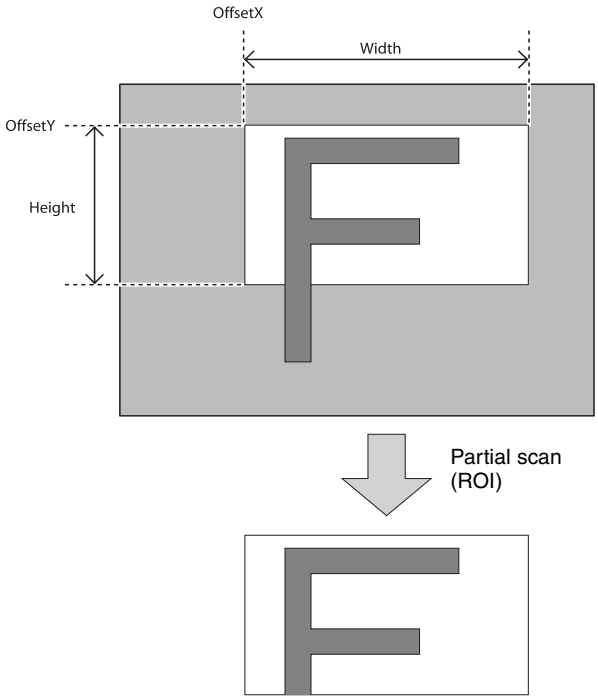
To fasten the frame rate on the partial scan, use an exposure time shorter than the frame period.

Configurable range

	Width	Height
XCG-CG40	8 to 720 to 728	8 to 540 to 544
XCG-CG160/ CG160C	16 to 1440 to 1456	16 to 1080 to 1088
XCG-CG240/ CG240C	16 to 1920 to 1936	16 to 1200 to 1216
XCG-CG510/ CG510C/CP510	16 to 2448 to 2464	16 to 2048 to 2056

Configurable values

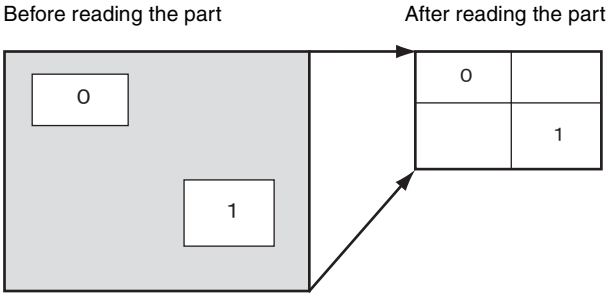
The values of OffsetX, OffsetY, Width and Height increase or decrease in steps of 4.



Multi ROI (XCG-CG160/ CG160C)

You can set and read two arbitrary rectangular areas from the effective pixel area.
By reading only necessary parts, you can shorten the time it takes to read.

Function name	Parameter	Setting
MultiROIMode	0: Off	All areas Off
	1: On	All areas On
	2: Highlight	Highlights the set ROI areas.
MultiROISelect	0 to 1	Designates the number of the area the parameter is to be changed.
MultiROIEnable	0: False	The area designated in MultiROISelect is Off.
	1: True	The area designated in MultiROISelect is On.
MultiROIWidth	4 to 128 to 1456	Horizontal size of the area
MultiROIHeight	4 to 128 to 1088	Vertical size of the area
MultiROIOffsetX	0 to 128 to 1452	Horizontal position of the area
MultiROIOffsetY	0 to 128 to 1084	Vertical position of the area



Binning (Monochrome camera)

Adding 2 pixels in the vertical and horizontal directions achieves higher sensitivity and frame rate.
XCG-CG240/CG510 does not change the frame rate.

Function name	Parameter	Setting
BinningVertical	1	Vertical binning is disabled
	2	Vertical binning is enabled
BinningHorizontal	1	Horizontal binning is disabled
	2	Horizontal binning is enabled

Notes

- To fasten the frame rate on binning, use an exposure time shorter than the frame period.
- When applying binning, the settable values of OffsetX, OffsetY, Width and Height are halved.
- This feature is not available in XCG-CG40/CP510.

Quarter Mode (Color camera)

Using this function outputs an image by reducing the output size to the 1/4 area without changing the angle of view.
Before using the Quarter mode function, check the drive mode (page 15).

Set PixelFormat.
> PixelFormat = RGB8Packed/RGB8

Note

The sensitivity and frame rate are not changed.

Drive mode

"Mode0" which prioritizes the frame rate is set by default.
The frame rate upper limit of "Mode0" is higher than"Mode1," but the usable functions are limited.
When correcting the defects/shadings in "Mode0." After detecting and saving the defects/shadings in "Mode1," return to "Mode0" and use them.
Reboot the unit to reflect the changes of the drive mode.

Function name	parameter	Setting
DriveMode	0: Mode0	Mode0
	1: Mode1	Mode1

DriveMode	Mode0	Mode1
Maximum frame rate	300 fps (XCG-CG40) 75 fps (XCG-CG160/CG160C) 41 fps (XCG-CG240/CG240C) 23 fps (XCG-CG510/CG510C/CP510)	200 fps (XCG-CG40) 50 fps (XCG-CG160/CG160C) 32 fps (XCG-CG240/CG240C) 15 fps (XCG-CG510/CG510C/CP510)
Defect detection function (page 42)	–	●
Defect correction function	●	●
Shading detection function (page 44)	–	○
Shading correction function	○	○
Free set sequence (page 28)	○	–
Quarter mode function (page 15)	○ (color camera)	–

●: Usable function
○: Not a usable function for XCG-CG40
– : Not a usable function

Output format

The settable pixel formats are as follows:

Function name	Model	Drive mode	ReverseX	ReverseY	Parameter	Setting
PixelFormat	XCG-CG240	Mode0	*	*	0x01080001	Mono8
			*	*	0x010C0004	Mono10Packed
		Mode1	*	*	0x01080001	Mono8
			*	*	0x010C0004	Mono10Packed
			*	*	0x010C0006	Mono12Packed
	XCG-CG240C	Mode0	False	False	0x0108000B	BayerBG8
			False	False	0x010C0029	BayerBG10Packed
		Mode1	False	False	0x0108000B	BayerBG8
			False	False	0x010C0029	BayerBG10Packed
			False	False	0x010C002D	BayerBG12Packed
		Mode0	False	True	0x01080008	BayerGR8
			False	True	0x010C0026	BayerGR10Packed
		Mode1	False	True	0x01080008	BayerGR8
			False	True	0x010C0026	BayerGR10Packed
			False	True	0x010C002A	BayerGR12Packed
		Mode0	True	False	0x0108000A	BayerGB8
			True	False	0x010C0028	BayerGB10Packed
		Mode1	True	False	0x0108000A	BayerGB8
			True	False	0x010C0028	BayerGB10Packed
			True	False	0x010C002C	BayerGB12Packed
		Mode0	True	True	0x01080009	BayerRG8
			True	True	0x010C0027	BayerRG10Packed
		Mode1	True	True	0x01080009	BayerRG8
			True	True	0x010C0027	BayerRG10Packed
			True	True	0x010C002B	BayerRG12Packed
			*	*	0x02180014	RGB8/RGB8Packed
			*	*	0x02180015	BGR8/BGR8Packed
			*	*	0x02180020	YUV8_UYV(YUV444)
			*	*	0x0210001F	YUV422_8_UYVY
			*	*	0x02100032	YUV422_8
		Mode0	*	*	0x02180014	RGB8/RGB8Packed
	XCG-CG40/ CG160/CG510/ CP510	Mode0	*	*	0x01080001	Mono8
		Mode1	*	*	0x01080001	Mono8
			*	*	0x010C0004	Mono10Packed
			*	*	0x010C0006	Mono12Packed

*: optional

* Selectable setting format varies between drive modes.

* Modes for ReverseX and ReverseY are limited for the color camera, as some setting formats fix the pixel array.

Function name	Model	Drive mode	ReverseX	ReverseY	Parameter	Setting
PixelFormat	XCG-CG160C/ CG510C	Mode0	False	False	0x01080009	BayerRG8
		Mode1	False	False	0x01080009	BayerRG8
			False	False	0x010C0027	BayerRG10Packed
			False	False	0x010C002B	BayerRG12Packed
		Mode0	False	True	0x0108000A	BayerGB8
		Mode1	False	True	0x0108000A	BayerGB8
			False	True	0x010C0028	BayerGB10Packed
			False	True	0x010C002C	BayerGB12Packed
		Mode0	True	False	0x01080008	BayerGR8
		Mode1	True	False	0x01080008	BayerGR8
			True	False	0x010C0026	BayerGR10Packed
			True	False	0x010C002A	BayerGR12Packed
		Mode0	True	True	0x0108000B	BayerBG8
		Mode1	True	True	0x0108000B	BayerBG8
			True	True	0x010C0029	BayerBG10Packed
			True	True	0x010C002D	BayerBG12Packed
			*	*	0x02180014	RGB8/RGB8Packed
			*	*	0x02180015	BGR8/BGR8Packed
			*	*	0x02180020	YUV8_UYV(YUV444)
			*	*	0x0210001F	YUV422_8_UYVY
			*	*	0x02100032	YUV422_8
		Mode0	*	*	0x02180014	RGB8/RGB8Packed

*: optional

Image flip

Flips an image vertically and horizontally.
Reboot the unit to reflect the changes of the setting.

Function name	Parameter	Setting
ReverseX	False	Off (no flip)
	True	Flip horizontally
ReverseY	False	Off (no flip)
	True	Flip vertically

Gain

Manual gain

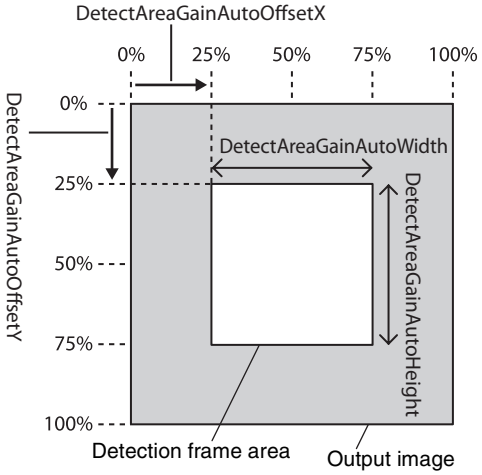
The manual gain can be finely set in 0.1 dB.
Although the settable lower/upper limit values of the gain are slightly different in each camera, the gain parameter value can be set from –1 dB or less to 27 dB or more. Same as the gain, the parameter value of the GainAnalogRaw can be set from –10 or less to 270 or more. The setting rage of the gain that guarantees image quality is from 0 dB to 18 dB.

Function name	Parameter	Setting
Gain	–1 or less ~ 0 ~ 27 or more	dB unit
GainAnalogRaw	–10 or less ~ 0 ~ 270 or more	0.1 dB unit

Auto gain (AGC)

By setting Auto gain, the gain is automatically adjusted according to the image pickup environment. AGC works so that the average level in a detection frame may reach GainAutoLevel. The AGC detection frame is set to the central region by default. The detection frame can be displayed or the detection area changed.

Function name	Parameter	Setting
GainAuto	0: Off	Manual gain
	1: Once	One-push AGC
	2: Continuous	Continuous AGC
GainAutoLevel	0 to 11264 to 16383	AGC target level (14 bits)
GainAutoSpeed	1 to 192 to 256	AGC convergence speed
GainAuto-UpperLimit	–10 or less ~ 180 ~ 270 or more	AGC upper limit
GainAuto-LowerLimit	–10 or less ~ 0 ~ 270 or more	AGC lower limit
DetectArea-GainAutoMode	0: Off	AGC detection frame is hidden
	1: On	AGC detection frame is displayed
DetectArea-GainAutoWidth	1 to 50 to 100	Width size of AGC detection frame
DetectAreaGain-AutoHeight	1 to 50 to 100	Height size of AGC detection frame
DetectAreaGain-AutoOffsetX	0 to 25 to 99	Horizontal position of AGC detection frame
DetectAreaGain-AutoOffsetY	0 to 25 to 99	Vertical position of AGC detection frame



Area gain

A separate digital gain can be set for a rectangular area of preference 16 positions.
If multiple rectangular areas are duplicated, the gain value of the low-numbered area takes priority.

Function name	Parameter	Setting
AreaGainEnableAll	0: False	Gains in all areas are set to Off
	1: True	Gains in all areas are set to On
AreaGainSelect	0 to 15	Specify the area number of the parameter to be changed.
AreaGainEnable	0: False	Gains specified area in AreaGainSelect are set to Off
	1: True	Gains specified area in AreaGainSelect are set to On
AreaGainWidth	0 to Width	Horizontal size of area*
AreaGainHeight	0 to Height	Vertical size of area*
AreaGainOffsetX	OffsetX to Width	Horizontal position of area*
AreaGainOffsetY	OffsetY to Height	Vertical position of area*
AreaGainValue	0 to 256 (equal) to 8191	Gain value of area

* Specify the area size and position of the area gain on the absolute coordinate value for an effective pixel. Therefore, the range of the area size and position needs to be set within the partial scan (ROI) range.

Exposure time

Manual settings

The setting is configured in μs unit. If you do not prioritize the image quality, you can set it up to 60 sec during operation. If the exposure time is long, it will be easier to see the pixel defects.

Note

Exposure time to be set varies depending on modes. Check the actual value with read out after completing settings.

Function name	Parameter
ExposureTime	10*1 to 60000000

*1 The minimum value varies upon models or settings.

	Exposure Time [us]	Rate [fps]
XCG-CG40	9757	100
XCG-CG160/ CG160C	12002	75
XCG-CG240/ CG240C	23299	41
XCG-CG510/ CG510C/CP510	41997	23

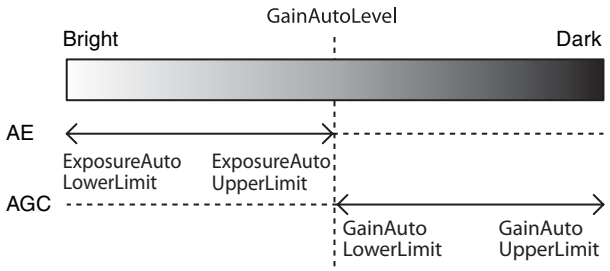
Auto exposure (AE)

The exposure time is set automatically by detecting the output level. The target level is the same as the value of GainAutoLevel. This can be performed along with auto gain.

Function name	Parameter	Setting
ExposureAuto	0: Off	Manual setting
	1: Once	One-push AE
	2: Continuous	Continuous AE
ExposureAuto-Speed	1 to 192 to 256	AE convergence speed
ExposureAuto-UpperLimit	1 to 60000000	AE upper limit
ExposureAuto-LowerLimit	1 to 60000000	AE lower limit

Combination of Continuous AGC and Continuous AE

AGC and AE coordinate with each other to adjust the level automatically with GainAutoLevel as the target level. When the environment starts getting dark and AE reaches the upper limit, AGC starts to work.



Trigger Control

Free run/trigger mode / PTP (IEEE1588)

Free run

The camera operates without a trigger signal and performs the video output operation continuously after the exposure is finished. The horizontal and vertical timing signals are generated within the camera. During the free-run operation, image pickup timing cannot be controlled. In the free-run operation, the adjustment is made automatically to achieve the maximum frame rate according to the exposure time setting.

Trigger mode

Exposure is started by detecting the externally input trigger signal. The cycle of trigger signal to input must not be greater than the maximum value of the frame rate. When the ExposureMode is Timed, the exposure is started by detecting the rising edge or falling edge of the trigger signal, and the exposure time is determined by the register setting. When the ExposureMode is TriggerWidth, the exposure time is determined by the trigger signal width.

Function name	Parameter	Setting
TriggerMode	0: Off	Free run
	1: On	Trigger mode

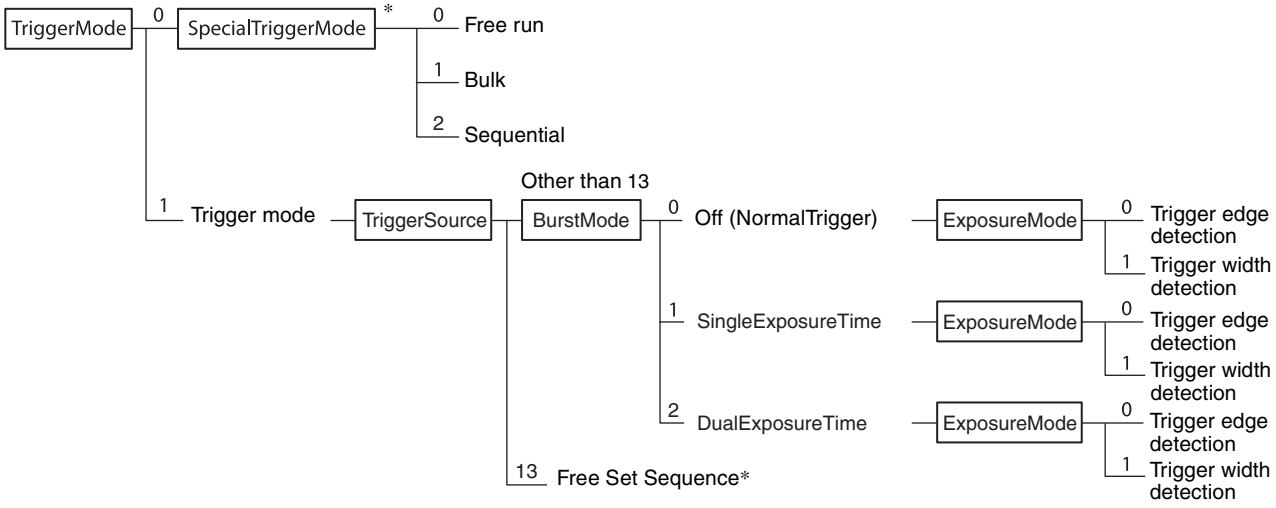
For trigger mode (TriggerMode=On)

Function name	Parameter	Setting
ExposureMode	0: Timed	Trigger edge detection
	1: TriggerWidth	Trigger width detection

Note

You cannot set Software in TriggerSource and also TriggerWidth in ExposureMode.

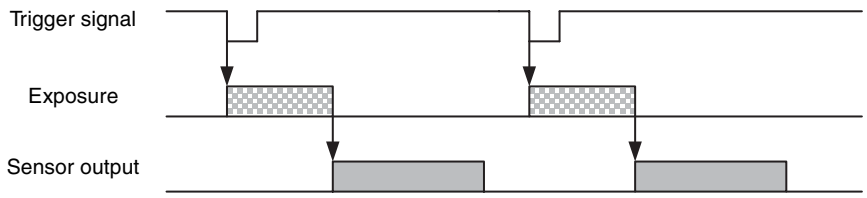
Trigger states



* This feature is not available in XCG-CG40.

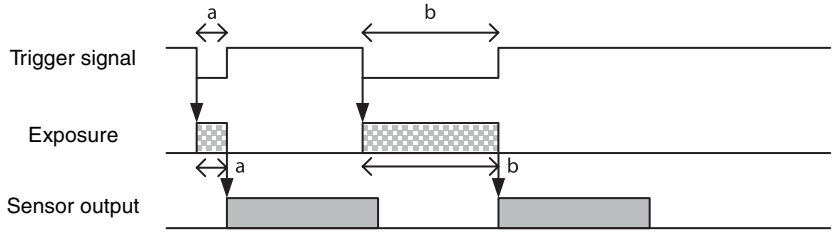
Trigger edge detection

The figure shows the trigger signal negative polarity (detecting the drop edge).



Trigger width detection

The figure shows the trigger signal negative polarity (detecting Low level width).



PTP (IEEE1588)

When running the unit in GigE Vision 2.0 mode, the unit can expose by synchronizing with a PTP (IEEE1588) server. This can work as a master or slave of PTP (Precision Time Protocol). Operate as a slave when you have a grand master device. When you don't have a grand master device, you can make a single camera as a master and synchronize between cameras. You can set the current time on the camera which is treated as a master. If you don't set the time, the time the power was turned on would be 1/1/1970 0:00.
To use IEEE1588, you have to launch the camera in GigE Vision Version2.0 mode.

Function name	Parameter	Setting
GevVersionForStartUp	GigE_Version_1_2	GigE Vision Version1.2
	GigE_Version_2_0	GigE Vision Version2.0

Restart the camera after you complete the settings.

Function name	Parameter	Setting
PtpEnable/GevIEEE1588	0: False	IEEE1588 OFF
	1: True	IEEE1588 ON
PtpSlaveOnly/GevIEEE1588SlaveOnly	0: False	Becomes the master depending on the condition
	1: True	Works always as slave
PtpPriority1/GevIEEE1588Priority1	0 to 128 to 255	Priority 1
PtpPriority2/GevIEEE1588Priority2	0 to 128 to 255	Priority 2
PtpDomainNumber/ GevIEEE1588DomainNumber	0 to 255	PTP domain designation
PtpLogAnnounceInterval/ GevIEEE1588LogAnnounceInterval	0: Interval1s 1: Interval2s 2: Interval4s 3: Interval8s 4: Interval16s	Sending announce interval
PtpLogSyncInterval/ GevIEEE1588LogSyncInterval	-1: Interval0_5s 0: Interval1s 1: Interval2s	Sending Sync frame interval
PtpLogMinDelayReqInterval/ GevIEEE1588LogMinDelayReqInterval	0: Interval1s 1: Interval2s 2: Interval4s 3: Interval8s 4: Interval16s 5: Interval32s	Minimum delay request interval
PtpAnnounceReceiptTimeout/ GevIEEE1588AnnounceReceiptTimeout	2 (x2) to 3 (x3) to 10 (x10)	Announce receiving timeout

You don't have to set these parameters in normal conditions.
The device to become the master will be determined automatically by the best master clock algorism.

Function name	Parameter	Conditions
PtpStatus/GevIEEE1588Status	4: Listening	Listening
	6: Master	Master
	9: Slave	Slave

This function is valid for use when the status is either master or slave.
It takes around 10 sec. to start synchronizing from when the function is enabled.

Sync exposure using PTP(IEEE1588)

When the timestamp on the camera is synchronized with the IEEE1588 master, the camera can start exposure by synchronizing with it.
If you set the trigger source to PTP, the camera starts synchronization only by setting the trigger interval. To synchronize with the camera of version 1.0.0, the synchronization start time should be set as well. The trigger interval can be set in 1 μs units.

Function name	Parameter	Setting
PTPTriggerInterval*	0 to 1000 to 50000	Trigger interval (ms)
PTPTriggerIntervalMicroSeconds	1000 to 1000000 to 50000000	Trigger interval (μs)
PTPTriggerStartTime	0x0 to 0xFFFFFFFF	Sync start time (s)

Sync start time is set by 32 bit values of seconds when time is represented by epoch time.

* Use PTPTriggervalMicroSeconds for Firmware Version 1.1.5 or later.

Time settings on Master

As the camera itself doesn't have a real-time clock, its internal watch starts working at the time the power is turned on as 1/1/1970 0:00. However, the current time can be set on the camera which works as the master for IEEE1588. The current time is 64 bit values of the epoch time represented by seconds multiplied by 1,000,000,000. Write this value on 2 registers in 32 bits each then perform settings with the time set command on the camera. This time setting is a simplified setting and there is no way to set the complete time on the camera. You can synchronize between cameras without setting the time of the master.
As the time is important when you use schedule action commands, we recommend setting the time on the master.

Function name	Parameter	Setting
PTPMasterTimeInitialValueHigh	0x0 to 0xFFFFFFFF	Upper 32 bits
PTPMasterTimeInitialValueLow	0x0 to 0xFFFFFFFF	Lower 32 bits
PTPMasterTimeSet		Time set command

Starting exposure with the set time synched with PTP(IEEE1588)

You can start exposure by setting the absolute time.
Only 1 time can be registered. The next exposure can be reserved when the exposure starts.
As with the setting of the IEEE1588 master time, the time is reserved by writing the epoch time expressed in seconds and multiplying it by 1,000,000,000 (64 bits) into two 32 bit registers and sending the time set command. If the past time has been passed, the exposure starts immediately.

Function name	Parameter	Setting
PTPSoftwareTriggerTimeHigh	0x0 to 0xFFFFFFFF	Upper 32 bits
PTPSoftwareTriggerTimeLow	0x0 to 0xFFFFFFFF	Lower 32 bits
PTPSoftwareTriggerTimeSet		Time set command

GPO output with setting time synched with PTP(IEEE1588)

You can output the signal to the GPO connector by setting the absolute time.
1 time can be registered. The next output can be reserved when the signal is output.
As with the setting of the IEEE1588 master time, the time is reserved by writing the epoch time expressed in seconds and multiplying it by 1,000,000,000 (64 bits) into two 32 bit registers and sending the time set command. If the past time has been passed, the exposure starts immediately.

Function name	Parameter	Setting
PTPLineTimeHigh	0x0 to 0xFFFFFFFF	Upper 32 bits
PTPLineTimeLow	0x0 to 0xFFFFFFFF	Lower 32 bits
PTPLineTimeSet		Time set command

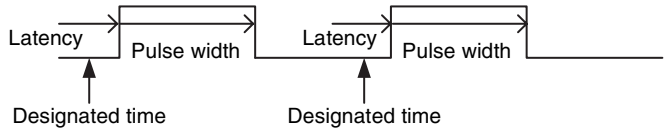
The signal flips the current condition.

Latency and pulse width from the specified time can be set. Specifying the pulse width to 0 maintains the condition. When the pulse width is set to 0, the signal flips over each time you execute the command. Please keep in mind that if the next command time comes earlier than the set pulse width, the signal flips over.

Function name	Parameter	Setting
ActionCommandPulseDelayLine2*	0 to 50000000	Line2 latency time
ActionCommandPulseWidthLine2*	0 to 50000000	Line2 pulse width
ActionCommandPulseDelayLine3*	0 to 50000000	Line3 latency time
ActionCommandPulseWidthLine3*	0 to 50000000	Line3 pulse time

* This feature is not available in XCG-CG40.

When the pulse width is a value other than 0



When the pulse width is a value 0

Trigger source

This can be input via the DC power input connector or software command (TriggerSoftware).

Function name	Parameter	Setting
TriggerSource	0: Line1	DC power input connector 2nd pin
	1: Line2	DC power input connector 3rd pin
	2: Line3	DC power input connector 4th pin*1
	4: Software	Software (TriggerSoftware)
	13: FreeSetSequence mode	FreeSetSequence mode*2
	15: PTP	IEEE1588 sync mode

*1 XCG-CG40/CG160/CG160C: Unavailable. Dedicated to output.
*2 Not configurable for XCG-CG40.

Special trigger

When operating in trigger mode and performing image pickup in different conditions (such as the exposure time, gain, and image pickup area), the setting has to be changed in advance for each trigger input. However, if the special trigger operation is enabled, the setting does not have to be changed and continuous image pick up in different conditions is facilitated. Up to 16 settings can be configured. There are the bulk operations in which images are taken consecutively by inputting the trigger signal once and the sequential operation in which images are taken each time the trigger signal is detected. The next exposure is started after the end of video output. In the sequential operation, the second and subsequent trigger signals should be input 5 ms or more after the end of video output. During the special trigger operation, the device cannot be set to the trigger mode. The source and polarity of the special trigger signal should be defined separately from the trigger mode. Each setting should be saved in the user set. For the items reflected, refer to “Command List” (page 50).
This feature is not available in XCG-CG40.

Function name	Parameter	Setting
SpecialTriggerMode	0: Off	Special trigger off
	1: Bulk	Bulk trigger
	2: Sequential	Sequential trigger
SpecialTriggerSource	0: Line1	DC power input connector 2nd pin
	1: Line2	DC power input connector 3rd pin*
	2: Line3	DC power input connector 4th pin*
	4: Software	Software command
	15: PTP	IEEE1588 sync mode
SpecialTriggerActivation	0: FallingEdge	Negative
	1: RisingEdge	Positive
NumberOfMemoryForSpecialTriggerMode	1 to 2 to 16	Number of shot images during the bulk operation

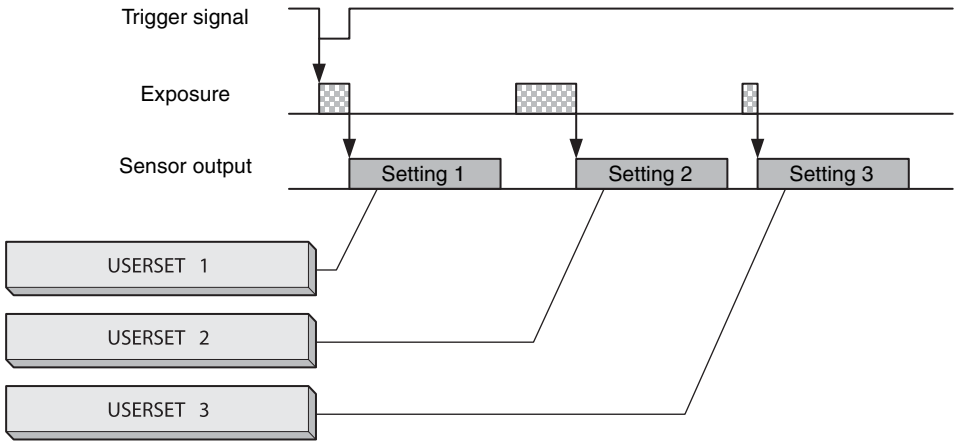
* XCG-CG160/CG160C: Unavailable. Dedicated to output.

Note

During the special trigger operation, defect detection cannot be used.

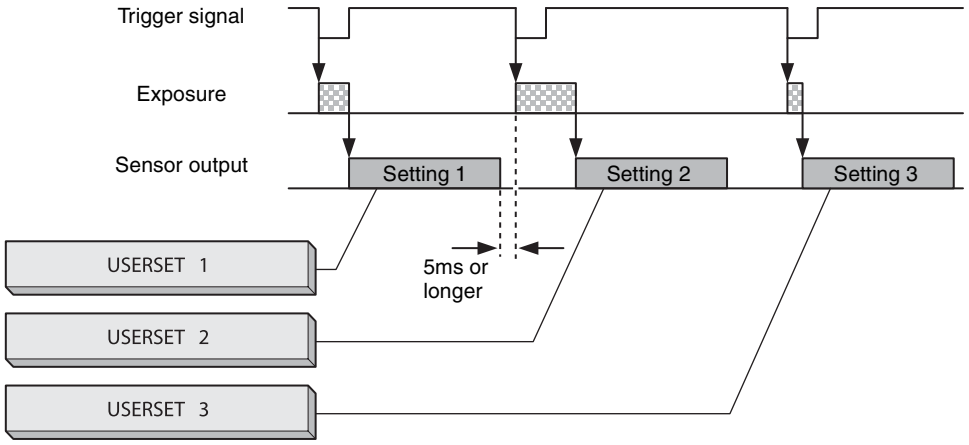
Bulk

SpecialTriggerMode=Bulk, SpecialTriggerActivation=FallingEdge, NumberOfMemoryForSpecialTriggerMode=3 in the figure.



Sequential

SpecialTriggerMode=Sequential, SpecialTriggerActivation=FallingEdge, NumberOfMemoryForSpecialTriggerMode=3 in the figure.



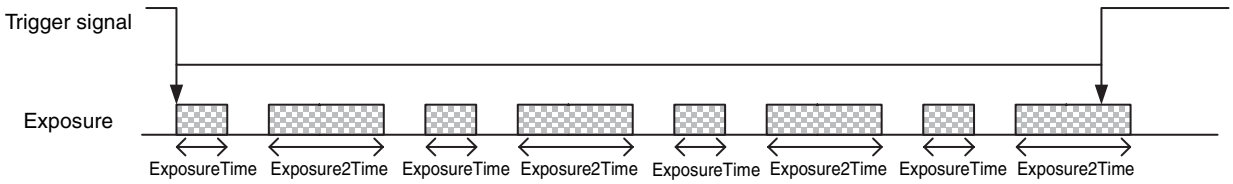
Burst trigger

Exposure can be repeated continuously with one trigger signal.
Two modes are available; a mode that repeats a single exposure time and a mode that alternately repeats two exposure times. There are also other modes that specify the number of exposures or repeat only while the trigger signal is on.

Function name	Parameter	Setting	
BurstMode	0: Off		
	1: SingleExposureTime	Upon trigger edge detection	Exposes for the period set in ExposureTime.
		Upon trigger width detection	Exposes for the range of trigger width.
	2: DualExposureTime	Upon trigger edge detection	Exposes for periods set in ExposureTime and Exposure2Time alternatively.
		Upon trigger width detection	Exposes for periods in trigger width and trigger width x Exposure2Ratio alternately.
BurstPeriod	0: FrameCount	Exposes only the times set in BurstFrameCount.	
	1: TriggerDuration	Performs burst exposure while the input trigger is on. However, burst exposure would be terminated when it reaches BurstFrameCount. Enabled when ExposureMode is in edge detection mode. Disabled in width detection mode.	
BurstFrameCount	0 to 1 to 65533	0: repeated unlimitedly	
		1 or more: exposure for designated times	
BurstForceStop		Forced termination of repeated exposure	
Exposure2Time	1 to 60000000	Second exposure time during trigger edge detection	
Exposure2Ratio	1: x1 2: x2 4: x4 8: x8 16: x16	Value to determine the second exposure time of trigger width detection. The first exposure time (trigger width) multiplied by this value is the second exposure time.	

Trigger edge detection (ExposureMode = Timed(0))

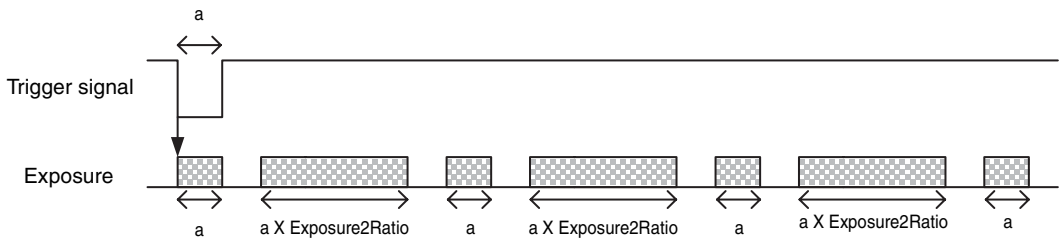
BurstPeriod = TriggerDuration
BurstMode = DualExposureTime



The continuous exposure will end when either one of below conditions occurred.
- Trigger signal Off is detected
- The times of exposure reaches the number specified in BurstFrameCount

Trigger width detection (ExposureMode = TriggerWidth(1))

BurstFrameCount = 7
BurstMode = DualExposureTime

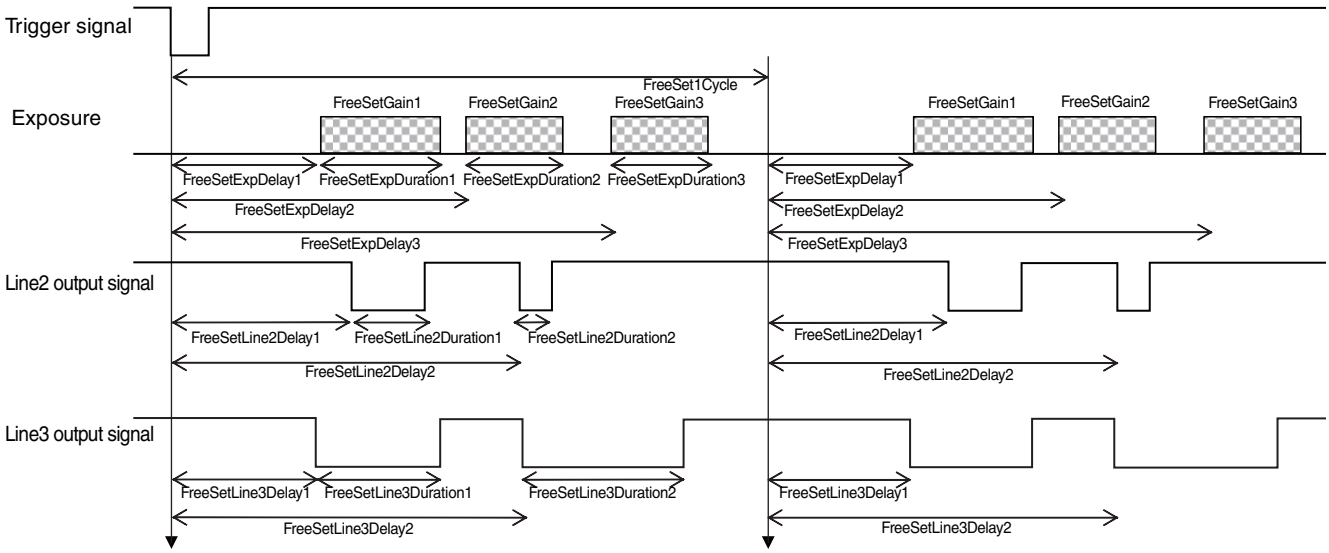


FreeSetSequence

Multiple exposure and GPO output can be performed with a single trigger signal. The start time, length and gain of exposure, and GPO output can be set arbitrarily. However, do not set the start time and length so that there is inversion/overlap of the order. It is also possible to repeat the cycle with a set of exposure and GPO output set as one cycle.
When using the Free set sequence function, check the drive mode (page 15).
This function is not available for XCG-CG40.

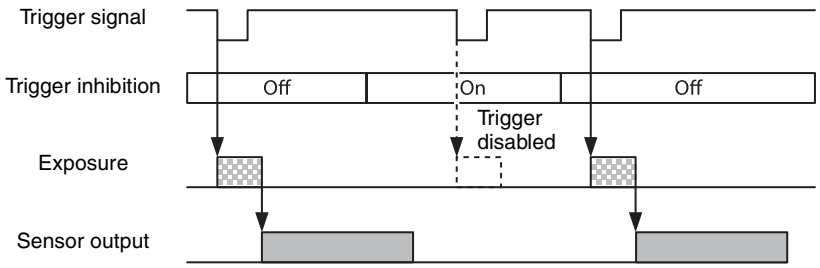
Function name	Parameter	Setting
FreeSetTriggerSource	0: Line1	DC power input connector #2 pin
	1: Line2	DC power input connector #3 pin
	2: Line3	DC power input connector #4 pin*
	4: Software	Software (TriggerSoftware)
	15: PTP	IEEE1588 sync mode
FreeSetStop		Forced end of FreeSetSequence
FreeSet1Cycle	0 to 1 to 10000000	Designate the length of 1 cycle of FreeSetSequence in µSec.
FreeSet1CycleNum	0 to 1 to 65535	Designate how many cycles to run FreeSetSequence. No repetition when this is 0.
FreeSetSelect	1 to 10	Designate the number of the action parameter to set.
FreeSetLine2Delay	-1 to 10000000	Designate the Line2 GPO exposure start time (µSec). No output is performed in -1.
FreeSetLine2Duration	0 to 10000000	Designate the Line2 GPO output length (µSec).
FreeSetLine3Delay	-1 to 10000000	Designate the Line3 GPO exposure start time (µSec). No output is performed in -1.
FreeSetLine3Duration	0 to 10000000	Designate the Line3 GPO output length (µSec).
FreeSetExpDelay	-1 to 10000000	Designate the exposure start time (µSec). No output is performed in -1.
FreeSetExpDuration	0 to 10000000	Designate the exposure start time (µSec).
FreeSetGain	Same as GainAnalogRaw	Designate the advanced gain settings of exposure (GainAnalogRaw relevance).
FreeSetSave		Save the settings of FreeSetSequence.
FreeSetLoad		Readout the settings of FreeSetSequence.

* XCG-CG160/CG160C: Unavailable. Dedicated to output.



Trigger inhibition

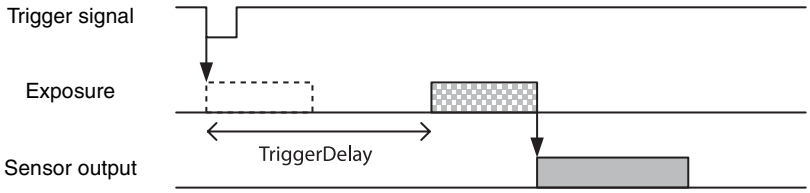
Trigger input can be disabled. This function is effective when disabling the trigger signal to a specific camera in the environment where multiple cameras are connected by the same trigger signal and when preventing false operations caused by noise contamination to the trigger signal line (due to the installed environment).



Function name	Parameter	Setting
TriggerInhibit	0: Off	Trigger is accepted
	1: On	Trigger is not accepted

Trigger delay

The camera can delay the trigger signal.



Function name	Parameter	Setting
TriggerDelay	0 to 4000000	Trigger delay [μs]

Trigger counter

Accepted triggers by which video output is performed are counted. Triggers that have been removed by trigger range limit are not counted. The trigger counter returns to 0 when the upper limit (4294967295) is reached. The trigger counter can be returned to 0 by issuing the TriggerCounterReset.

Function name
TriggerCounter
TriggerCounterReset

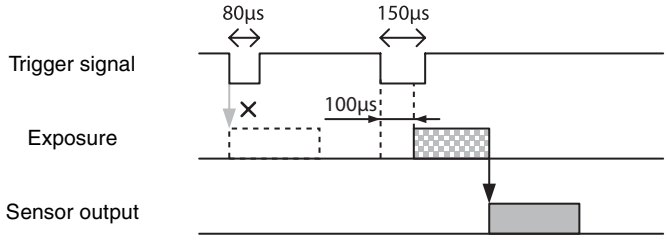
Trigger range limit

Only signals in the set trigger width can be accepted as the trigger signal. This functions as a noise filter, which removes chattering or disturbance noise in the trigger signal line. When the trigger signal is input, exposure is started with the time lag of the trigger range setting values. Image will not be output, when trigger signal width is out of set range.

Function name	Parameter	Setting
TriggerAcceptanceRangeEnable	0: False	Trigger range off
	1: True	Trigger range on
TriggerAcceptanceRangeLowerLimit	1 to 2000000	Trigger range lower limit [µs]

Trigger range operation example

ExposureTime=300, TriggerAcceptanceRangeLowerLimit=100 in the figure.



Overlap trigger

Trigger signal can be accepted during read out from the image sensor.
Set FastTriggerMode to off.
The setting of FastTriggerMode will change the error of trigger latency exposure time.
For more information, see Trigger latency/Exposure time (page 34).

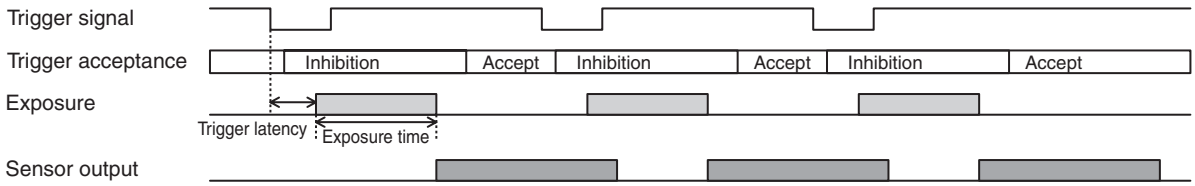
Function name	Parameter	Setting
FastTriggerMode	0: Off	Overlap trigger acceptable
	1: On	Overlap trigger not acceptable (Image sensor Fast trigger mode)

* It is not required to set the “TriggerOverlapInhibit” command when you use Firmware Version1.1.5 or later.

FastTriggerMode: Off (Overlap trigger acceptable)

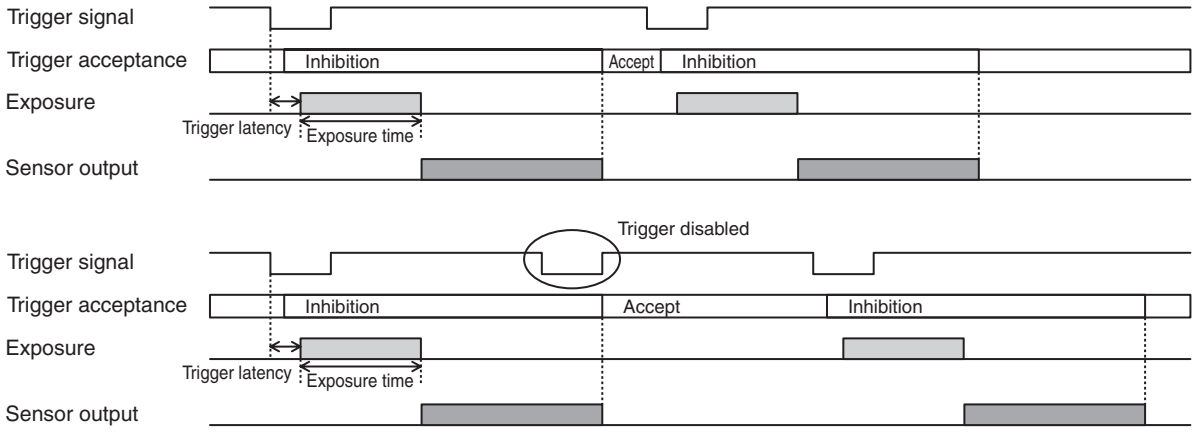
Trigger signal is accepted while reading sensor output.
Trigger signal can be accepted in shorter cycle.

Trigger input prohibited period: frame rate maximum value + 1 line time



FastTriggerMode: On (Overlap trigger not acceptable)
Trigger signal will be disabled, even they are input while reading sensor output.

Trigger input prohibited period: exposure time + sensor read out time



Frame Rate

Auto frame rate

The reading cycle is set to allow the frame rate to be the maximum value automatically according to the current exposure time setting, the partial scan (ROI) setting, etc. in the free-run operation (Shutter has priority). The next exposure is performed while outputting a video and the next video output is started immediately after finishing all video outputs. The frame rate is lowered when setting the exposure time longer than the video output time.

Function name	Parameter	Setting
AcquisitionFrameRateAuto	0: Off	Auto frame rate off
	1: On	Auto frame rate on

Specifying frame rate

The frame rate of the video output can be specified in the free-run operation or on trigger edge detection in burst trigger mode. The value of the frame rate [fps] should be entered. The frame rate faster than the fastest frame rate cannot be set.

Function name	Parameter	Setting
AcquisitionFrameRate	0.0625 to 2000	Frame rate [fps]

* The upper limit varies depending on the partial scan (ROI) setting.

Reading frame rate

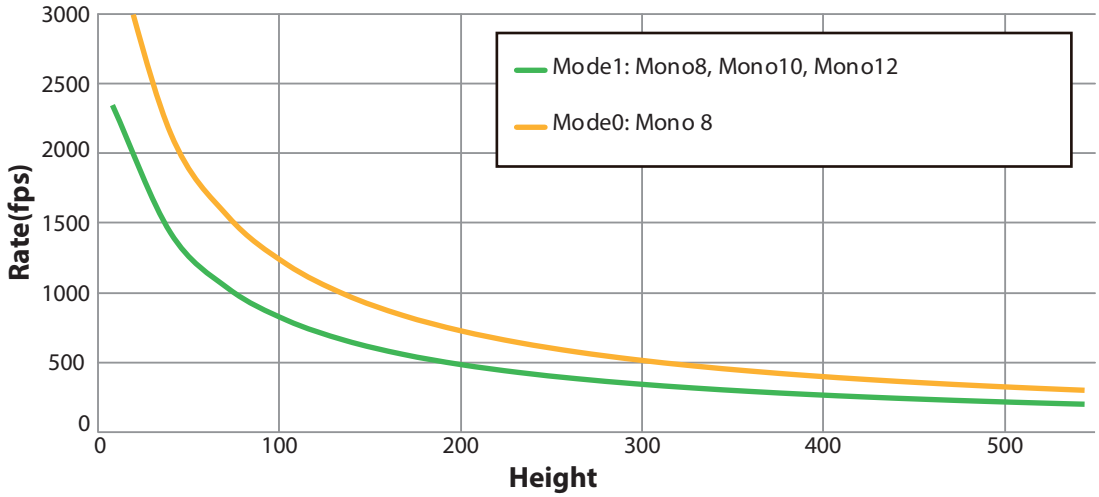
The current frame rate during the auto frame rate operation is read.

Function name
AcquisitionFrameRateActual

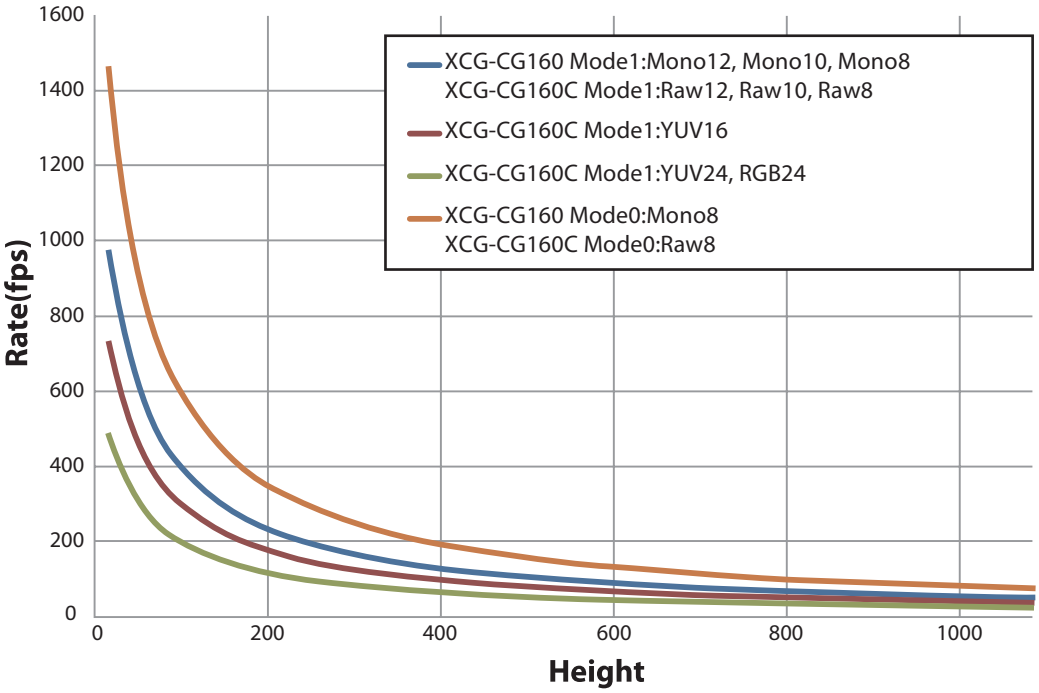
Fastest frame rate for partial scanning (ROI)

The fastest frame rate varies depending on Height for partial scanning.

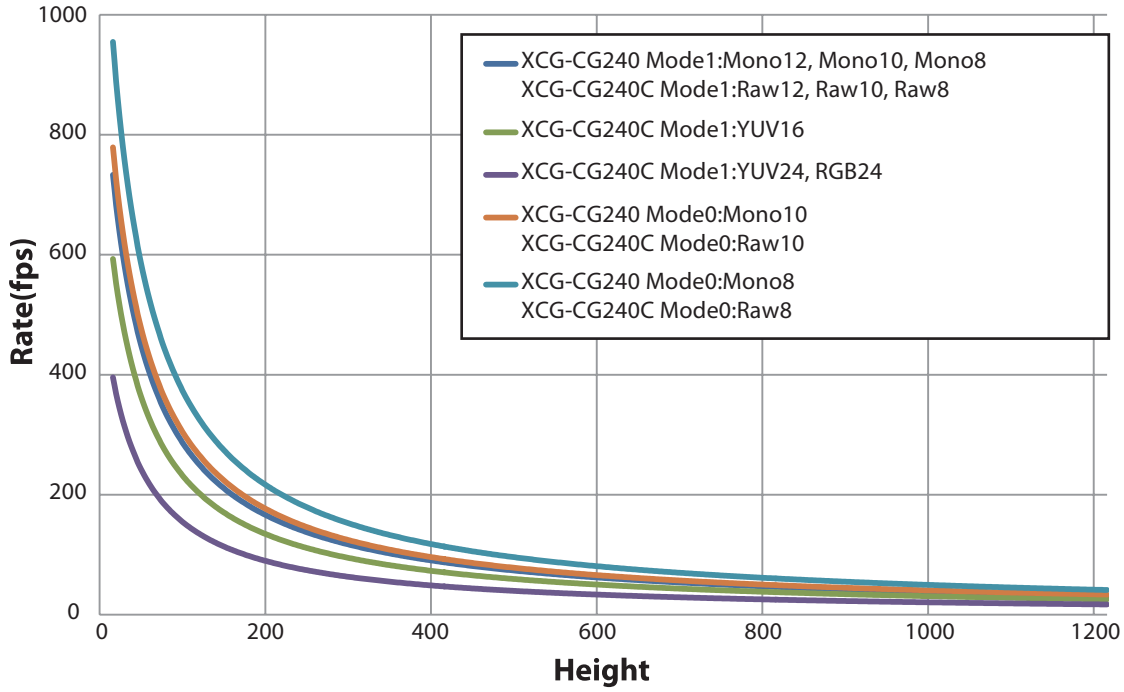
XCG-CG40



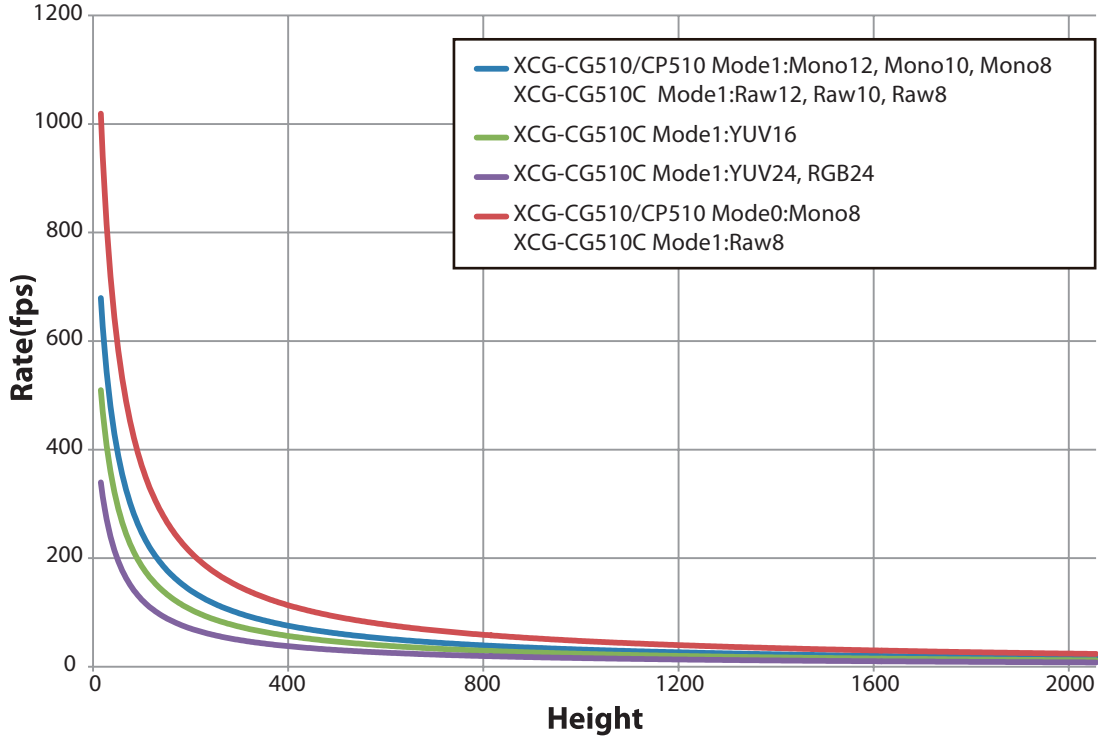
XCG-CG160/CG160C



XCG-CG240/CG240C



XCG-CG510/CG510C/CP510



Frame counter

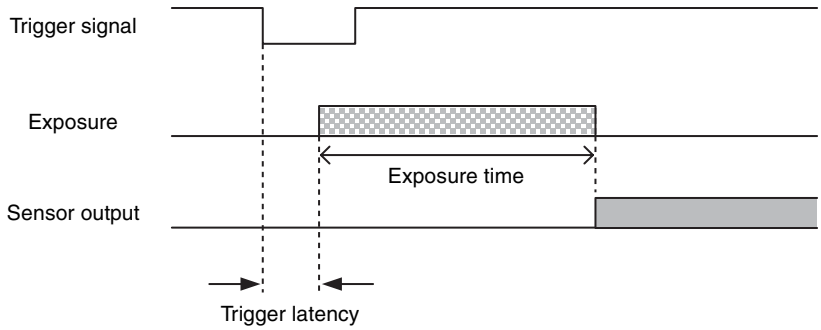
Reads out the number of frames output.
The counter can be reset.

Function name
FrameCounter
FrameCounterReset

Timing Chart

Trigger latency/Exposure time

The values of trigger latency (time from the trigger acceptance to the exposure start) are as follows.



XCG-CG40/CG160/CG160C/CG510/CG510C/CP510

FastTriggerMode	Trigger latency	Error in the exposure time	Overlap trigger
0: Off	2H to 3H	Approx. -1H to approx. +2H	Enabled
1: On	approx. 0.2 µs	0 to 13 µs	Disabled

XCG-CG240/CG240C

FastTriggerMode	Trigger latency	Error in the exposure time	Overlap trigger
-	2H to 3H	Approx. 0H to approx. 2H	Enabled

- H refers to the horizontal read out time.
- This may differ upon the setting of the output mode (DriveMode/PxielFormat) of the camera.
- This can be checked by HorizontalReadoutTime. (unit: µsec)

Memory shot

Memory shot is a function that controls the exposure timing and image output to the network individually. This is effective when multiple cameras are connected to the same network and it is necessary to expose them at the same time in a configuration that exceeds 1 Gbps band when operated simultaneously.
Memory shot is available in multi-frame mode or single-frame mode.
Number of images that can be saved is determined by image size and pixel format.

How to use:

Set the image size and pixel format. Turn on the memory shot mode in AcquisitionStop status.
Designate the number of images to record in AcquisitionFrameCount. The maximum number that can be stored can be obtained as the max value of AcquisitionFrameCount in GenICam API.
When you execute AcquisitionStart, the exposure starts immediately and the image data is stored in the internal memory when the trigger is in the OFF state. Recording will be finished when the number of images meets the designated number. At this time, the recording completion notification is sent to the application with Event(ID=0xB000).

The image is output when the output start command is sent.

Function name	Parameter	Setting
MemoryShotMode	0: Off	Memory shot mode OFF
	1: On	Memory shot mode ON
MemoryShotImageOutputStart		Image output starts

Sequence when exposing three shots in free run

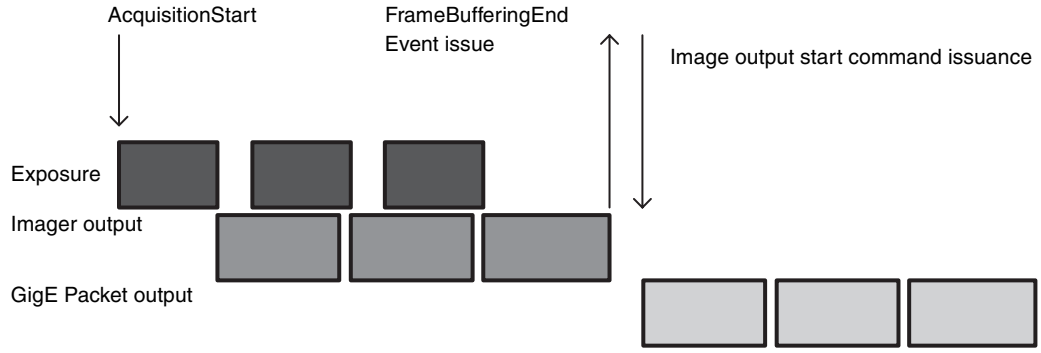
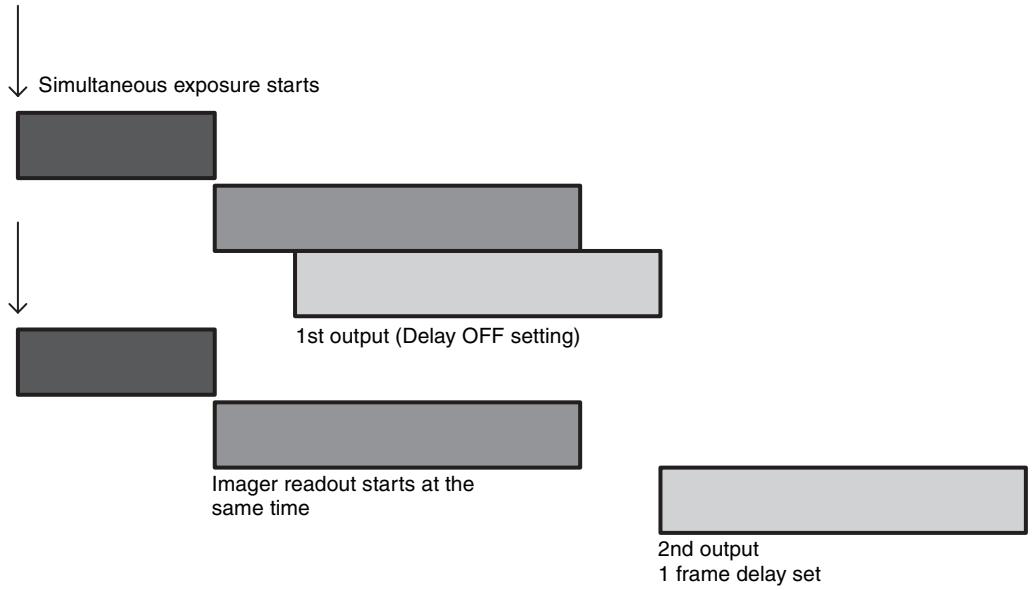


Image delay output

Normally, images are sequentially output when the exposure is completed. However, the timing of output start can be delayed. This is effective when multiple cameras are connected to the same network and it is necessary to expose at the same time in a configuration that exceeds 1 Gbps band when operated simultaneously.
Use in normal trigger mode when you use delay output. When you perform exposure for 2 cameras at the same time, set no delay on the first camera and set the time of completion of image output on the first camera to the second camera.

Function name	Parameter	Setting
ImageTransferDelayMode	0: Off	Delay mode OFF
	1: On	Delay mode ON
ImageTransferDelayValue	0 to 10000	Up to 10 seconds (ms)



Broadcast support of command

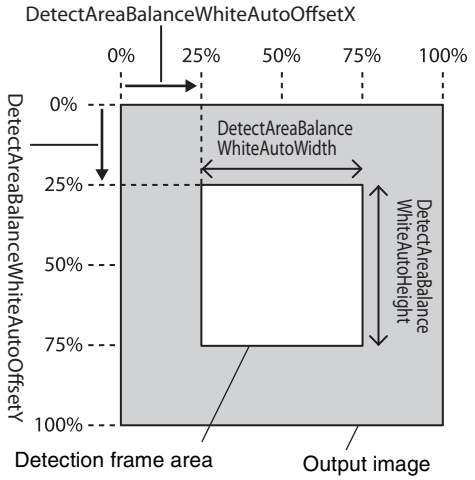
As normal commands are executed by unicast communication, you cannot perform the same command at the same time on multiple cameras. This camera is equipped with the function that receives the command sent to the broadcast. As the GigE Vision standard does not recommend sending commands destined for broadcasts, broadcast reception is disabled by default.

Function name	Parameter	Setting
BroadcastWriteRegEnable	0: Disable	Ignore the commands sent to the broadcast
	1: Enable	Execute the commands sent to the broadcast

White Balance (Color camera)

The white balance can be automatically adjusted when the BalanceWhiteAuto command is executed. The detection area is set to the screen center by default. The detection area can also be displayed on the screen. The detection frame can be changed arbitrarily (DetectAreaWBAuto). For manual correction, the GainDigital should be changed.

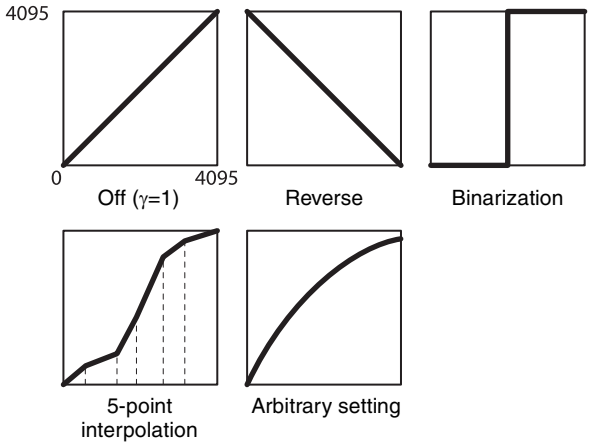
Function name	Parameter	Setting
BalanceWhiteAuto	0: Off	Manual correction
	1: Once	One-push AWB
GainDigitalRedRaw	256 (x1) to 4095	Red gain
GainDigitalGreenRaw	256 (x1) to 4095	Green gain
GainDigitalBlueRaw	256 (x1) to 4095	Blue gain
DetectAreaBalanceWhiteAutoMode	0: Off	AWB detection frame is hidden
	1: On	AWB detection frame is displayed
DetectAreaBalanceWhiteAutoWidth	1 to 50 to 100	Horizontal size of AWB detection frame
DetectAreaBalanceWhiteAutoHeight	1 to 50 to 100	Vertical size of AWB detection frame
DetectAreaBalanceWhiteAutoOffsetX	0 to 25 to 99	Horizontal position of AWB detection frame
DetectAreaBalanceWhiteAutoOffsetY	0 to 25 to 99	Vertical position of AWB detection frame



LUT

The LUT (Look Up Table) provides five types of presets. Specify using a 12 bit value. Binarization, 5-point interpolation, and arbitrary setting can be changed. This feature is not available in XCG-CP510.

Function name	Parameter	Setting
LUTEnable	0: False	LUT off (γ=1)
	1: True	LUT on
LUTFormat	0: Linear	Linear (γ=1)
	1: Reverse	Reverse
	2: Binarization	Binarization
	3: LinearInterpolation	5-point interpolation
	4: UserSet	Arbitrary setting



Binarization

The binarization threshold can be changed.

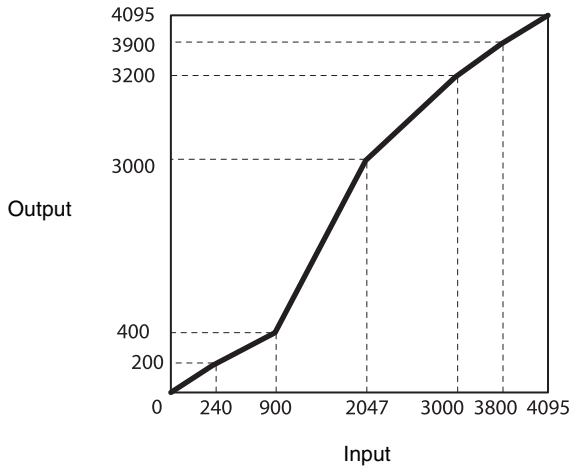
Function name	Parameter
BinarizationThreshold	0 to 2047 to 4095

5-point interpolation

The values of output points 1 through 5 that correspond to input points 1 through 5 can be changed. Linear interpolation is performed between interpolation points.

Function name	Parameter	Setting
LinearInterpolation-Index	Index1 to Index5	Select the interpolation points
LinearInterpolation-InValue	0 to 256 to 4095	Input
LinearInterpolation-OutValue	0 to 256 to 4095	Output
LinearInterpolation-Build		Build LUT

Setting example:



LinearInterpolationIndex = Index1
LinearInterpolationInValue = 240
LinearInterpolationOutValue = 200
LinearInterpolationIndex = Index2
LinearInterpolationInValue = 900
LinearInterpolationOutValue = 400
LinearInterpolationIndex = Index3
LinearInterpolationInValue = 2047
LinearInterpolationOutValue = 3000
LinearInterpolationIndex = Index4
LinearInterpolationInValue = 3000
LinearInterpolationOutValue = 3200
LinearInterpolationIndex = Index5
LinearInterpolationInValue = 3800
LinearInterpolationOutValue = 3900
LinearInterpolationBuild

Arbitrary setting

The output values 0 through 4095 that correspond to input values 0 through 4095 can be changed.

Function name	Parameter	Setting
LUTIndex	0 to 4095	Input
LUTValue	0 to 4095	Output

Setting example:

LUTIndex = 0
LUTValue = 3
LUTIndex = 1
LUTValue = 10
…
LUTIndex = 4094
LUTValue = 4000
LUTIndex = 4095
LUTValue = 4010

Save LUT

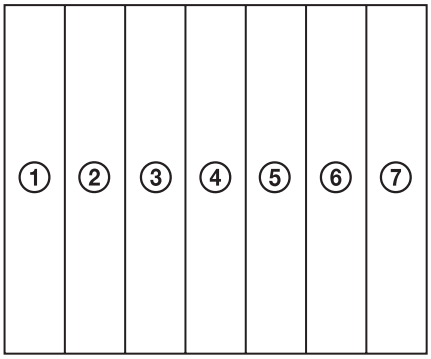
When you change the settings, save them using the LUTSAVE command.

Function name	Parameter	Setting
LUTValueSave		Save LUT

Test Chart Output

For monochrome camera, monochrome chart can be set. For color camera, monochrome chart or color chart can be set.
This feature is not available in XCG-CG40.

Function name	Parameter	Setting
TestImageSelector	0: Off	Off
	1: GreyBar	Monochrome chart
	2: ColorBar	Color chart



	Monochrome	Color		
	Raw/Mono	R	G	B
(1)	0xF30	0xFFF	0xFFF	0xFFF
(2)	0xDC0	0xFFF	0xFFF	0
(3)	0xC80	0	0xFFF	0xFFF
(4)	0xA00	0	0xFFF	0
(5)	0x7A0	0xFFF	0	0xFFF
(6)	0x550	0xFFF	0	0
(7)	0x340	0	0	0xFFF

* 12 bit notation

Color Matrix Conversion (Color camera)

During RGB 24-bit, YUV 24-bit, and YUV 16-bit output, the following color matrix conversion can be applied to the color camera. Specify using values between –8191 and +8191. 256 is ×1.

Function name	Parameter	Setting
ColorMatrixEnable	0: False	Conversion off
	1: True	Conversion on
ColorMatrixSelector-Row	0 to 2	Matrix row position
ColorMatrixSelector-Column	0 to 2	Matrix column position
ColorMatrixValue	–8191 to 8191	Gain value

$$\begin{bmatrix} R \\ G \\ B \end{bmatrix} = \begin{bmatrix} Gain00 & Gain01 & Gain02 \\ Gain10 & Gain11 & Gain12 \\ Gain20 & Gain21 & Gain22 \end{bmatrix} \begin{bmatrix} R \\ G \\ B \end{bmatrix}$$

3 × 3 filter

Monochrome camera and color camera apply a 3 × 3 area filter for RAW output. The brightness of the central pixel and the eight pixels around it, and the parameter of each pixel are multiplied and added together, The result is the brightness of the central pixels. Specify using values between -8191 and 8191. The parameter 256 is ×1.
Depending on the patterns of parameters, you can reduce noise, apply edge enhancement and extract the contour.
This feature is not available in XCG-CP510.

Function name	Parameter	Setting
SpatialFilterEnable	0: False	Filter off
	1: True	Filter on
SpatialFilterSelector-Row	0: Top 1: Center 2: Bottom	Matrix row position
SpatialFilterSelector-Column	0: Left 1: Center 2: Right	Matrix column position
SpatialFilterValue	-8191 to 0 to 8191	Filter parameters

GPIO

GPI

The signal level which is input in the 2nd, 3rd, and 4th pins* DC power input connector can be detected. After selecting a connector by LineSelector, the signal level is acquired from LineStatus.

* Only output is available for XCG-CG40/CG160/CG160C

GPO

Various signals can be output from the 3rd and 4th pins DC power input connector. After selecting a connector by LineSelector and setting LineMode to Output, LineSource is set. The output polarity is set by LineInverter.

Function name	Parameter	Setting
LineSelector	0: Line1	DC power input connector 2nd pin
	1: Line2	DC power input connector 3rd pin
	2: Line3	DC power input connector 4th pin
LineMode	0: Input	Set to input
	1: Output	Set to output
LineInverter	0: False	Without output inversion
	1: True	With output inversion
LineStatus	0: False	Without Input level signal
	1: True	With Input level signal
LineSource	0: TriggerThrough	Trigger through signal
	1: ExposureActive	Exposure signal
	2: StrobeActive	Strobe control signal
	3: SensorReadout	Sensor readout signal
	4: UserOutput1	User definition 1
	5: UserOutput2	User definition 2
	6: UserOutput3	User definition 3
	7: SignalTrue	Level H
	8: SignalFalse	Level L
	9: PWM	Pulse generation signal
	10: ActionCommandPulse	Action command signal
	11: FreeSetSequence	Free set sequence signal

Notes

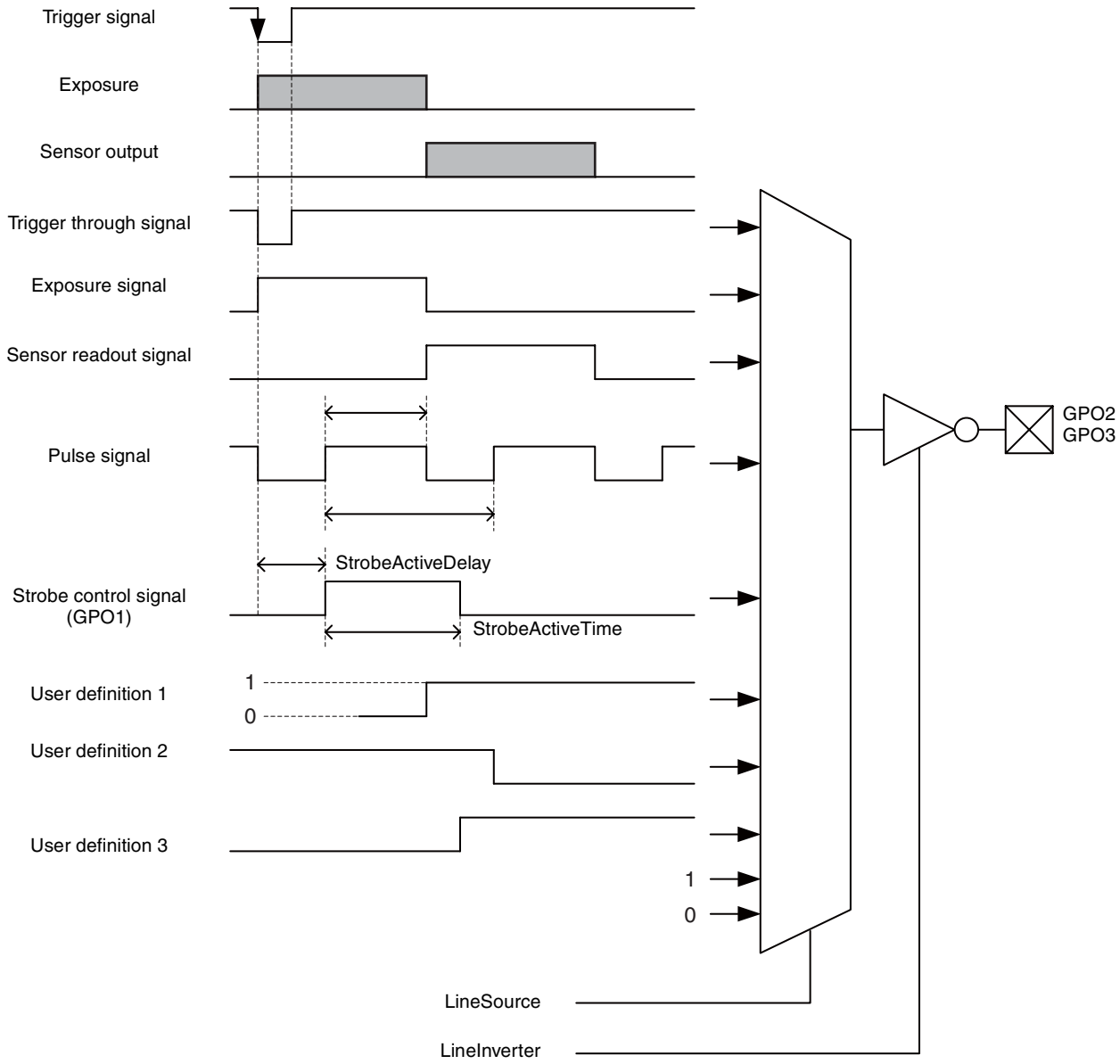
- LineInverter and LineSource are valid when the pin selected by LineSelector is Output.
- LineStatus is valid when the pin selected by LineSelector is Input.

- LineSource cannot be set to 10: ActionCommandPulse or 11: FreeSetSequence for XCG-CG40.

Setting example:

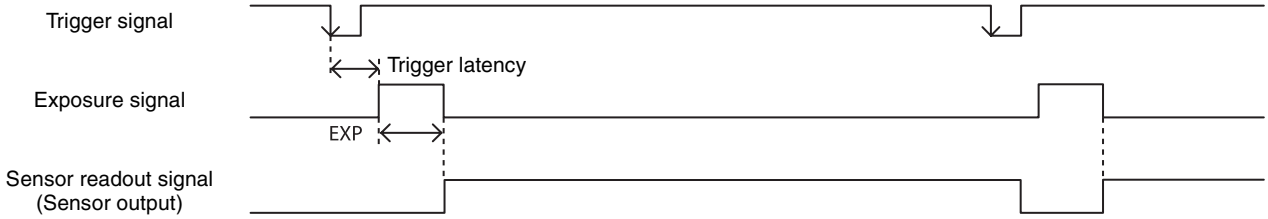
The strobe control signal is output to GPO2 (DC power input connector 3rd pin) by High active setting.
LineSelector = Line2
LineMode = Output
LineInverter = False
LineSource = StrobeActive

GPO output system diagram (example of GPO1)



Sensor Readout (Sensor Output)

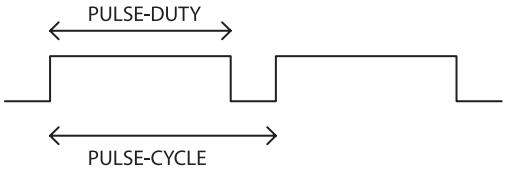
This signal indicates that exposure has completed and the image sensor has entered the video output sequence (enabled only when operating the trigger mode). This signal can be output from the GPO connector. The sensor readout signal is asserted before optical black (OB) and the effective pixel area is output. Image might not be output properly, if trigger signal is input while this signal is asserted.



Pulse Train Generator

Pulse waveforms can be output from the GPO connector. Valid range is 0.5Hz to 100kHz.

Function name	Parameter
PulseDuty	1 to 500000 to 1999999 [μs]
PulseCycle	10 to 1000000 to 2000000 [μs]



Status LED

The LED-on, blinking, or LED-off condition of the LED on the rear panel is as follows:

LED-on	Power is turned on and an IP address is set.
Blinking (low speed)	Power is turned on and an IP address is not set.
Blinking (high speed)	Power is turned on and the reset button is pressed down.
LED-off	Power is turned off or during startup. Or LED-off by a user command.

Function name	Parameter	Setting
LEDMode	0: Off	Off
	1: On	Lit

Temperature Readout Function

The camera's internal temperature can be read from the temperature sensor installed in the circuit board. Its accuracy is ±2°C. Use this value as a general guide.
If the interval of the temperature sensor value is set to a value other than 0, the temperature information can be transmitted to a PC application as an event data.

Function name	Parameter	Setting
CameraTemperature DeviceTemperature		Temperature sensor value
CameraTemperature-MeasurementInterval	32-bit integers	Update interval of the temperature sensor value [second]

Defect Correction

This function corrects clear defect points and opaque defect points. From the peripheral pixels, correction is performed on coordinate pixels in which defects are detected. The factory setting and user setting can be selected.

Function name	Parameter	Setting
DefectCorrection	0: Off	Correction off
	1: On	Correction on

Defect correction setup procedure

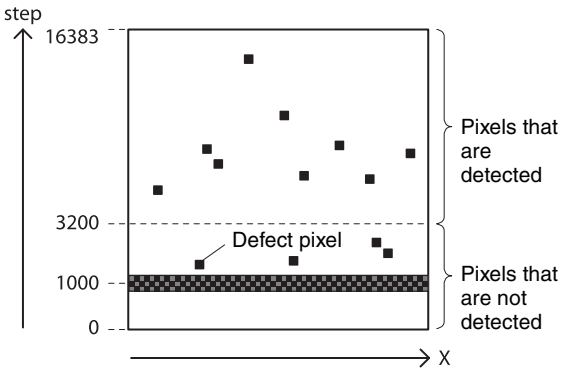
Before performing defect detection, check the drive mode (page 15).

1 Turn off defect detection correction.
> DefectCorrection = Off

2 Set conditions in which clear defect points are prone to occur.
Below is an example in which gain is 18 dB and the exposure time is 1 second. Prevent light from entering by blocking light completely.
>Gain = 18
>ExposureTime = 1000000

3 Set the threshold in units of 14 bits.
Points are detected as clear defect points when this level is exceeded. Below is an example for 3200 step/14bit. Pixels that indicate 3200 to 16383 are detected.
>DefectThreshold = 3200

4 Execute clear defect point detection.
Detection takes four times the EXP time setting. The output levels on the same x coordinate axis are shown below. The levels uniformly indicate around 1000 steps when an all-black image is taken, but defect pixels (at high levels) are present in some locations. All pixels whose levels exceed 3200 steps, which was set in step 2, are detected.
Execute the detection after the image transfer is set to off.
>AcquisitionStop
>DefectDetectionMode = DetectModeWhite



5 Determine the completion of detection.
If DetectModeOff is returned when you read DefectDetectionMode, detection is finished.

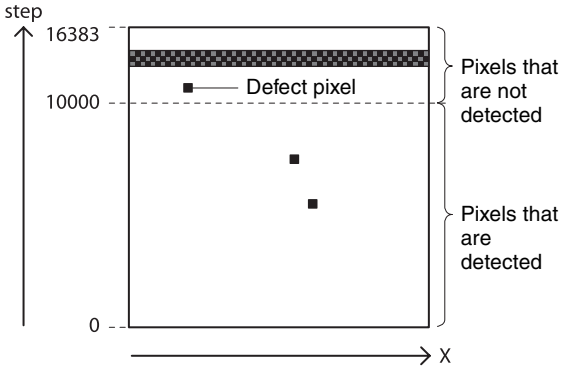
6 Set conditions in which opaque defect points are prone to occur.
If you are not setting opaque defect points, you can skip steps 6 to 9.
Release the blocking light that was set in step 2. Set the imaging condition so that the whole image is about 15040 steps.
Start the image transfer.
>AcquisitionStart

7 Set the threshold in units of 14 bits.

Below is an example for 10000 steps/14 bits. Pixels that indicate 0 to 10000 steps are detected.
>DefectThreshold = 10000

8 Execute opaque defect point detection.

Execute the detection after the image transfer is set to off.
>AcquisitionStop
>DefectDetectionMode = DetectModeBlack



9 Determine the completion of detection.

If DetectModeOff is returned when you read DefectDetectionMode, detection is finished.

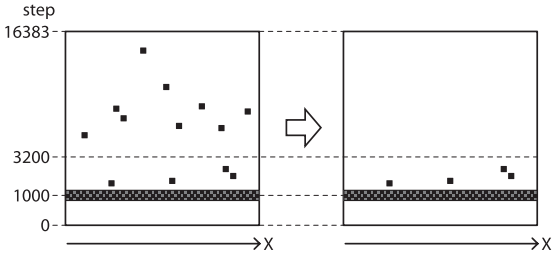
10 Select the data for applying defect correction.

To apply the pixels detected in steps 4 and 8, select 2. To apply factory settings, select 0. To apply values that have been saved, select 1.
> DefectPatternLoad = DefectPatternDetected

Function name	Parameter	Setting
DefectPattern-Load	0: DefectPatternFactory	Factory setting
	1: DefectPatternUser	User setting
	2: DefectPatternDetected	Data detected using DEFECT-DETECTION

11 Turn on defect detection correction.

>AcquisitionStart
>DefectCorrection = On



12 Save the settings.

>DefectPatternSave
To repeat defect detection without saving, repeat steps 1 to 11.

Note

The upper limit of defect detection points is 2047 for clear and opaque defect points combined. Correction cannot be performed over the upper limit. The detected defect points can be confirmed using the DefectDetectionResult. If the upper limit is exceeded, defect detection will fail or abnormal defect detection will occur, and the DefectDetectionResult value will be -1. Perform the defect detection after the image transfer is set to off.
During the special trigger operation, defect detection cannot be used.

Shading Correction

Depending on the characteristics of the lens, shadings caused by a drop in the amount of light around the lens, or light source variation, are corrected. 31 patterns in XCG-CG160/CG160C, 20 patterns in XCG-CG240/CG240C, and 9 patterns in XCG-CG510/CG510C/CP510 can be stored as user settings.
Shading Correction has two modes. In peak detection mode, you can adjust the screen to brightest level. In average detection mode, you can adjust the whole screen to its average brightness.
This feature is not available in XCG-CG40.

Function name	Parameter	Setting
ShadingDetection-Mode	0: ShadingDetectionOff	Check that the detection is completed
	1: ShadingDetectionBy PeakValue	Start detection (peak detection)
	2: ShadingDetectionBy AverageValue	Start detection (average detection)
ShadingCorrection	0: Off	Correction off
	1: On	Correction on
ShadingPatternSelect	XCG-CG160/ CG160C: 0 ~ 30	Shading patterns storage area
	XCG-CG240/ CG240C: 0 ~ 19	
	XCG-CG510/ CG510C/CP510: 0 ~ 8	
ShadingPatternSave	0: ShadingPatternSaveOff	Save shading patterns
	1: ShadingPatternSaveOn	
ShadingPatternLoad		Read shading patterns

Specify the color to detect shading (Color camera)

You can select the color of pixel to detect shading.

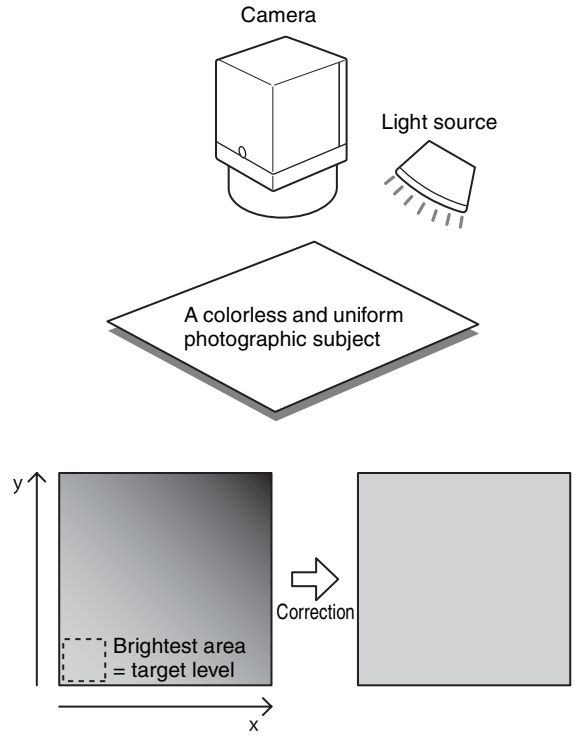
Function name	Parameter	Setting
ShadingDetectColor	82: Red	RED
	71: Green	GREEN
	66: Blue	BLUE
	89: Luminance (Brightness)	Brightness

Shading detection setup procedure

Before performing the shading detection, check the drive mode (page 15).

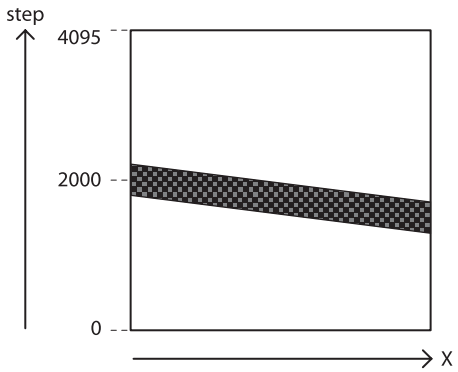
1 Fix the lens and lighting conditions.

Make an adjustment by assuming the brightest level as the target level in the peak detection mode, where the condition of the brightness is not uniform due to an uneven light source, as shown in the figure below.



2 Adjust the exposure time and other parameters so that the target level is about 50%.

On color cameras, adjust the white balance.



3 Perform the shading detection after the image transfer is stopped.

>AcquisitionStop
>ShadingDetectionMode = ShadingDetectionByPeakValue or ShadingDetectionByAverageValue

4 Determine the completion of detection.
Read the Status to determine whether the calculation is finished.
>Readout ShadingDetectionMode
Return to ShadingDetectionOff when finished.

5 Determine the effect of shading correction.
>AcquisitionStart
>ShadingCorrection

6 Save the shading pattern.
>ShadingPatternSelect = 0
>ShadingPatternSave = ShadingPatternSaveOn

7 Determine the completion of saving.
Read the status to determine that saving is finished.
>Read ShadingPatternSave
ShadingPatternSaveOn (running)
ShadingPatternSaveOff (finished)
ShadingPatternSaveOff is returned if saving is finished.

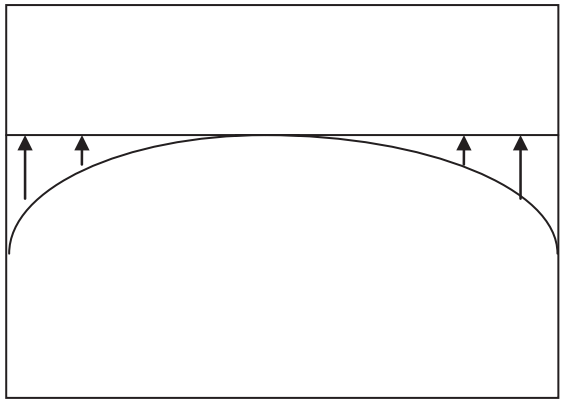
8 Readout the saved pattern.
>ShadingPatternSelect = 0
>ShadingPatternLoad

Note

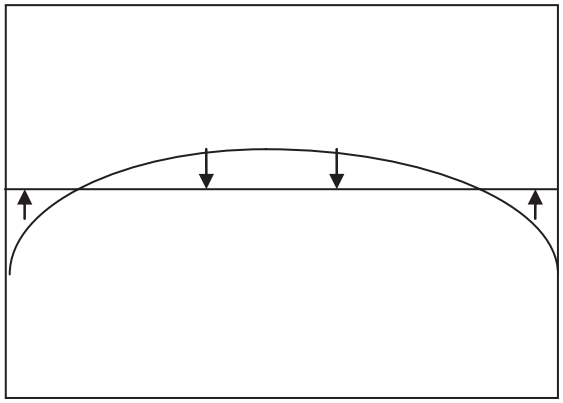
Perform the shading detection after the trigger mode and the image transfer are set to off. Reset the camera once if the shading detection cannot be finished.

Upon launching, it takes 3 minutes max after turning on the power and connecting to the network to read out the shading patterns.
If you turn ON the shading correction before completion of the reading, the correction might not start immediately.
To make sure the correction is performed properly, use the function after confirming the pattern formatting completion flag turns to 1.
>Read out ShadingInitialLoadFinished
False Reading out
True Readout completed

Peak detection mode
ShadingDetectionMode = ShadingDetectionByPeakValue
All parts tend to become brighter.



Average value detection mode
ShadingDetectionMode = ShadingDetectionByAverageValue
Brighter part of the object might be darker.



User Set

Main set values can be saved to the channels 1 to 16 of USERSET. Refer to “Command List” (page 50) for items to be saved. The factory setting is saved to channel 0, which cannot be overwritten.

Setting example (1):

Exposure time is 3 ms, Gain is 3 dB, Pulse signal is output to GPO3 connector (this setting is saved to the channel 1).
ExposureTime = 3000
Gain = 3
LineSelector = Line3
LineMode = Output
LineSource = PWM
UserSetSelector = UserSet1
UserSetSave

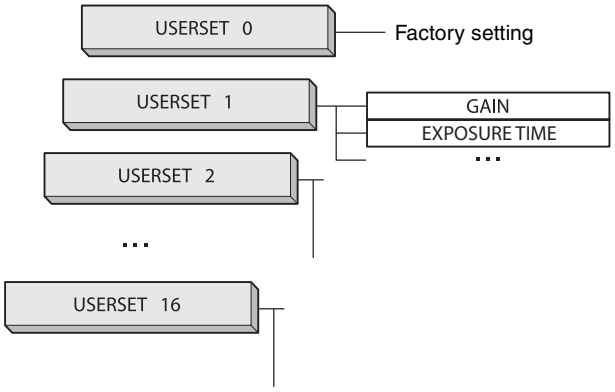
Setting example (2):

The user set saved in the channel 2 is loaded.
UserSetSelector = UserSet2
UserSetLoad

User set memory

This is one of the items to be saved in the user set channel. Signed 32-bit numbers are assigned to slots 0 to 15.

Configuration diagram of user set



User ID

User IDs are unique names that can be assigned to cameras. A string that is 15 characters long can be assigned.

Function name	Parameter
DeviceUserID	15 characters of your choice

Saving and Startup

The startup setting can be determined by UserSetDefaultSelector. This is also used to check which user set settings are currently being used.

Usage example:

Startup with the setting saved in the user set channel 3.
UserSetDefaultSelector = UserSet3
(Restart or CameraReboot command)

Check which user set settings are the current settings.
Read UserSetDefaultSelector

Camera Information

The model name of a camera or its firmware information can be read out.

Function name	Parameter
DeviceVendorName	Manufacture name (SONY)
DeviceModelName	Model name
DeviceVersion	Firmware version
DeviceSerialNumber	Serial number
DeviceManufacturerInfo	Data for service

Restart

The camera is rebooted.
A time after receiving a command until rebooting can be set in milliseconds (ms).

Function name
CameraReboot
DeviceReset
CameraRebootDelayTime

Switching of GigE Vision Version

You can set the GigE Vision version for the camera startup.
Reboot the unit to reflect the changes of the GigE Vision version.

Function name	Parameter	Setting
GevVersionForStartUp	GigE_Version_1_2	GigE Vision Version1.2
	GigE_Version_2_0	GigE Vision Version2.0

Selection of XML Device Description-File

You can set the XML Device Description-file for the camera startup. The XML Device Description is the file in which the camera function is written.
Reboot the unit to reflect the changes of the XML Device Description-file.

XCG-CG40/CG160/CG160C/CG240/CG240C/ CG510/CG510C

Function name	Parameter	Setting
XMLVersionSelector	1	SFNC 2.0 compatible
	2	SFNC 1.1 compatible
	3	SFNC 2.4 compatible

XCG-CP510

Function name	Parameter	Setting
XMLVersionSelector	1	SFNC 2.4 compatible
	2	SFNC 1.1 compatible

Exclusion function

XCG-CG40

	Simultaneously usable function				
Setting function	**Area Gain**	**AE**	**AGC**	**Burst Trigger**	**Defect Detection**
Area Gain		○	○	○	○
AE	○		○	○*1	○
AGC	○	○		○*1	○
Burst Trigger	○	○*1	○*1		○

○ Simultaneously usable function, –Not a simultaneously usable function

*1 Only when Burst Trigger is set to SingleExposureTime (when set to DualExposureTime, the functions cannot be used simultaneously.)

XCG-CG160

	Simultaneously usable function								
Setting function	**Area Gain**	**Binning**	**Multi ROI**	**Shading Correction**	**AE**	**AGC**	**Burst Trigger**	**Free Set Sequence**	**Shading Detection / Defect Detection**
Area Gain		○	○	○	○	○	○	○	○
Binning	○		–	–	–	–	○	○	–
Multi ROI	○	–		–	–	–	○	○	–
Shading Correction	○	–	–		○	○	○*1	○	–
AE	○	–	–	○		○	○*1	–	○
AGC	○	–	–	○	○		–	–	○
Burst Trigger	○	○	○	○*1	○*1	–		–	○
Free Set Sequence	○	○	○	–	–	–	–		○

○ Simultaneously usable function, –Not a simultaneously usable function

*1 Only when Burst Trigger is set to SingleExposureTime (when set to DualExposureTime, the functions cannot be used simultaneously.)

XCG-CG160C/CG240/CG240C/CG510/CG510C/CP510

	Simultaneously usable function							
Setting function	**Area Gain**	**Multi ROI*1**	**Shading Correction**	**AE**	**AGC**	**Burst Trigger**	**Free Set Sequence**	**Shading Detection / Defect Detection**
Area Gain		○	○	○	○	○	○	○
Multi ROI*1	○		–	–	–	○	○	–
Shading Correction	○	–		○	○	○	○	–
AE	○	–	○		○	○*2	–	○
AGC	○	–	○	○		○*2	–	○
Burst Trigger	○	○	○	○*2	○*2		–	○
Free Set Sequence	○	○	○	–	–	–		○

○ Simultaneously usable function, –Not a simultaneously usable function

*1 For XCG-CG160C only

*2 Only when Burst Trigger is set to SingleExposureTime (when set to DualExposureTime, the functions cannot be used simultaneously.)

Command List

*1 This feature is supported by Firmware Ver.1.1.2 or before.
*2 This feature is supported by Firmware Ver.1.1.3 or later.
*3 This feature is supported by Firmware Ver.1.1.5 or later.

DeviceControl

Contains the features related to the control and information of the device.

Feature Name	Type	Access	Description	Default Value	Save to	Referenced page
DeviceVendorName	String	RO	Name of the manufacturer of the device.			46
DeviceModelName	String	RO	Model of the device.			46
DeviceVersion	String	RO	Version of the device.			46
DeviceManufacturerInfo	String	RO	Manufacturer information about the device.			46
DeviceSerialNumber	String	RO	Device's serial number. This string is a unique identifier of the device.			46
DeviceUserID	String	RW	User-programmable device identifier.		Device	46
DeviceSFNCVersionMajor*2	Integer	RO	Major version of the Standard Features Naming Convention that was used to create the device's GenICam XML.			–
DeviceSFNCVersionMinor*2	Integer	RO	Minor version of the Standard Features Naming Convention that was used to create the device's GenICam XML.			–
DeviceSFNCVersionSubMinor*2	Integer	RO	Sub minor version of Standard Features Naming Convention that was used to create the device's GenICam XML.			–
DeviceTLVersionMajor*2	Integer	RO	Major version of the Transport Layer of the device.			–
DeviceTLVersionMinor*2	Integer	RO	Minor version of the Transport Layer of the device.			–
DeviceGenCPVersionMajor*2	Integer	RO	Major version of the GenCP protocol supported by the device.			–
DeviceGenCPVersionMinor*2	Integer	RO	Minor version of the GenCP protocol supported by the device.			–
DeviceRegistersEndianness*2	Enumeration	RO	Endianness of the registers of the device.			–
DeviceType*2	Enumeration	RO	Returns the device type.			–
DeviceCharacterSet*2	Enumeration	RO	Character set used by the strings of the device's bootstrap registers.			–
DeviceEventChannelCount*2	Integer	RO	Indicates the number of event channels supported by the device.			–
DeviceStreamChannelCount*2	Integer	RO	Indicates the number of streaming channels supported by the device.			–
DeviceLinkHeartbeatTimeout*2	Integer	RW	Controls the current heartbeat timeout of the specific Link in microseconds. This can be a value in the following range: Min: 3000000 Max: 4294967295	5000000		–
DeviceLinkHeartbeatMode*2	Boolean	RO	Activate or deactivate the Link's heartbeat.			–

Feature Name	Type	Access	Description	Default Value	Save to	Referenced page
TimestampLatch*2	Command	WO	Latches the current timestamp counter into TimestampLatchValue.			–
TimestampReset*2	Command	WO	Resets the current value of the device timestamp counter.			–
TimestampLatchValue*2	Integer	RO	Returns the latched value of the timestamp counter (in ns).			–
DeviceStreamChannelType*2	Enumeration	RO	Reports the type of the stream channel.			–
DeviceStreamChannelEndianness*2	Enumeration	RO	Endianess of multi-byte pixel data for this stream.			–
DeviceTemperatureSelector*2	Enumeration	RO	Selects the location within the device, where the temperature will be measured.			–
DeviceTemperature*2	Float	RO	Device temperature in degrees Celsius (C). It is measured at the location selected by DeviceTemperatureSelector.			–
DeviceReset*2	Command	WO	Resets the device to its power up state. After reset, the device must be rediscovered.			–

ImageFormatControl

Contains the features related to the format of the transmitted image.

Feature Name	Type	Access	Description	Default Value	Save to	Referenced page
Width	Integer	RW	Width of the image provided by the device (in pixels). This can be a value in the following range: [XCG-CG40] min:8, max:728, step:4 [XCG-CG160/CG160C] min:16, max:1456, step:4 [XCG-CG240/CG240C] min:16, max:1936, step:4 [XCG-CG510/CG510C/CP510] min:16, max:2464, step:4	[XCG-CG40] 720 [XCG-CG160/CG160C] 1440 [XCG-CG240/CG240C] 1920 [XCG-CG510/CG510C/CP510] 2448	UserSet	–
Height	Integer	RW	Height of the image provided by the device (in pixels). This can be a value in the following range: [XCG-CG40] min:8, max:544, step:4 [XCG-CG160/CG160C] min:16, max:1088, step:4 [XCG-CG240/CG240C] min:16, max:1216, step:4 [XCG-CG510/CG510C/CP510] min:16, max:2056, step:4	[XCG-CG40] 540 [XCG-CG160/CG160C] 1080 [XCG-CG240/CG240C] 1200 [XCG-CG510/CG510C/CP510] 2048	UserSet	–
OffsetX	Integer	RW	Horizontal offset from the origin to the region of interest (in pixels). This can be a value in the following range: [XCG-CG40] min:0, max:720, step:4 [XCG-CG160/CG160C] min:0, max:1440, step:4 [XCG-CG240/CG240C] min:0, max:1920, step:4 [XCG-CG510/CG510C/CP510] min:0, max:2448, step:4	0	UserSet	–

Feature Name	Type	Access	Description	Default Value	Save to	Referenced page
OffsetY	Integer	RW	Vertical offset from the origin to the region of interest (in pixels). This can be a value in the following range: [XCG-CG40] min:0, max:536, step:4 [XCG-CG160/CG160C] min:0, max:1072, step:4 [XCG-CG240/CG240C] min:0, max:1200, step:4 [XCG-CG510/CG510C/CP510] min:0, max:2040, step:4	0	UserSet	–
PixelFormat	Enumeration	RW	Format of the pixels provided by the device. It represents all the information provided by PixelCoding, PixelSize, PixelColorFilter combined in a single feature. This can be any of the following values: [XCG-CG40/CG160/CG240/CG510/CP510] Mono8 Mono10Packed Mono12Packed [XCG-CG160C/CG240C/CG510C] BayerGR8 BayerRG8 BayerGB8 BayerBG8 BayerGR10Packed BayerRG10Packed BayerGB10Packed BayerBG10Packed BayerGR12Packed BayerRG12Packed BayerGB12Packed BayerBG12Packed RGB8/RGB8Packed BGR8/BGR8Packed YUV8_UYV YUV422_8_UYVY YUV422_8	[XCG-CG40/CG160/CG240/CG510/CP510] Mono8 [XCG-CG240C] BayerBG8 [XCG-CG160C/CG510C] BayerRG8	UserSet	16
ReverseX	Boolean	RW	Flip horizontally the image sent by the device. The Region of interest is applied after the flipping. This feature performs at the next start-up.	FALSE	Device	18
ReverseY	Boolean	RW	Flip vertically the image sent by the device. The Region of interest is applied after the flipping. This feature performs at the next start-up.	FALSE	Device	18
SensorWidth	Integer	RO	Effective width of the sensor in pixels.			–
SensorHeight	Integer	RO	Effective height of the sensor in pixels.			–
BinningHorizontal	Integer	RW	Number of horizontal photo-sensitive cells to combine together. This can be any of the following values: [XCG-CG160/CG240/CG510 only] 1 (Horizontal binning is disabled.) 2 (Horizontal binning is enabled.)	1		15
BinningVertical	Integer	RW	Number of vertical photo-sensitive cells to combine together. This can be any of the following values: [XCG-CG160/CG240/CG510 only] 1 (Vertical binning is disabled.) 2 (Verticall binning is enabled.)	1		15

Feature Name	Type	Access	Description	Default Value	Save to	Referenced page
TestImageSelector	Enumeration	RW	This feature selects the type of test image that is sent by the camera. This can be any of the following values: Off GreyBar ColorBar	Off		38

AcquisitionControl

Contains the features related to image acquisition, including trigger and exposure control.

Feature Name	Type	Access	Description	Default Value	Save to	Referenced page
AcquisitionMode	Enumeration	RW	Sets the acquisition mode of the device. It defines mainly the number of frames to capture during an acquisition and the way the acquisition stops. This can be any of the following values: SingleFrame MultiFrame Continuous	Continuous		–
AcquisitionFrameCount	Integer	RW	Number of frames to acquire in MultiFrame Acquisition mode. The Max value of AcquisitionFrameCount is affected by Width, Height, and PixelFormat when the MemoryShotMode is On. This can be a value in the following range: Min: 1 Max: 4294967295	1		–
AcquisitionFrameRateAuto	Enumeration	RW	This feature automatically controls the frame rate when the TriggerMode is Off. It is implicitly controlled by the ROI setting and the exposure time, etc. This can be any of the following values: Off On	On	UserSet	31
AcquisitionFrameRate	Float	RW	Controls the acquisition rate (in Hertz) at which the frames are captured. TriggerMode must be Off for the Frame trigger. This can be a value in the following range: [XCG-CG40] Min: 0.0625 Max: 4000.0 [XCG-CG160/CG160C/CG240/ CG240C/CG510/CG510C/CP510] Min: 0.0625 Max: 2000.0	[XCG-CG40] 100 [XCG-CG160/CG160C] 50 [XCG-CG240/CG240C] 41 [XCG-CG510/CG510C/ CP510] 23	UserSet	31
AcquisitionFrameRateActual	Float	RO	This feature indicates the actual frame rate (in fps).			31
ExposureMode	Enumeration	RW	Sets the operation mode of the Exposure. This can be any of the following values: Timed TriggerWidth	Timed	UserSet	21
ExposureTime	Float	RW	Sets the Exposure time when ExposureMode is Timed and ExposureAuto is Off. This controls the duration where the photosensitive cells are exposed to light. This can be a value in the following range: Min: 1.0 Max: 60000000	[CG40] 9757 [CG160/CG160C] 12002 [CG240/CG240C] 23299 [CG510/CG510C/ CP510] 41997	UserSet	19

Feature Name	Type	Access	Description	Default Value	Save to	Referenced page
Exposure2Time	Float	RW	Set the 2nd Exposure time when TriggerMode is BurstTrigger and ExposureMode is Timed. This can be a value in the following range: Min: 1.0 Max: 60000000	[CG40] 19514 [CG160/CG160C] 84000 [CG240/CG240C] 46597 [CG510/CG510C/CP510] 83995	UserSet	27
Exposure2Ratio	Enumeration	RW	Sets the 2nd Exposure time as a multiple of TriggerWidth when TriggerMode is BurstTrigger and ExposureMode is TriggerWidth. This can be any of the following values: x1 x2 x4 x8 x16	x2	UserSet	27
TriggerMode	Enumeration	RW	Controls if the selected trigger is active. This can be any of the following values: Off On	Off	UserSet	21
TriggerSource	Enumeration	RW	Specifies the internal signal or physical input Line to use as the trigger source. The selected trigger must have its TriggerMode set to On. This can be any of the following values: Line1 Line2 Line3 Software FreeSetSequence PTP	Line1	UserSet	25
TriggerInhibit	Enumeration	RW	Disables the trigger input. This can be any of the following values: Off On	Off	UserSet	29
TriggerActivation	Enumeration	RW	Specifies the activation mode of the trigger. This can be any of the following values: RisingEdge FallingEdge	FallingEdge	UserSet	11
TriggerDelay	Float	RW	Specifies the delay in microseconds (us) to apply after the trigger reception before activating it. This can be a value in the following range: Min: 0.0 Max: 4000000.0	0	UserSet	29
TriggerCounter	Integer	RO	Gets the count of trigger.			29
TriggerCounterReset	Command	WO	Resets the trigger counter.			29
FrameCounter	Integer	RO	Gets the count of frame.			34
FrameCounterReset	Command	WO	Resets the trigger counter.			34
TriggerAcceptanceRangeEnable	Boolean	RW	Controls if the trigger acceptance range is enabled.	FALSE	UserSet	30
TriggerAcceptanceRangeLowerLimit	Integer	RW	Sets the lower limit of trigger acceptance range. This can be a value in the following range: Min: 1 Max: 2000000	1	UserSet	30

Feature Name	Type	Access	Description	Default Value	Save to	Referenced page
TriggerSoftware	Command	WO	Generates an internal trigger. TriggerSource must be set to Software.			–
SpecialTriggerMode	Enumeration	RW	Activates the special trigger mode. This can be any of the following values: Off Bulk Sequential	Off		26
NumberOfMemoryForSpecialTriggerMode	Integer	RW	Number of User Sets used for the special trigger mode. This can be a value in the following range: Min: 1 Max: 16	2	Device	26
SpecialTriggerSource	Enumeration	RW	Specifies the internal signal or physical input Line to use as the special trigger source for the selected special trigger when SpecialTriggerMode is On. This can be any of the following values: Line1 Line2 Line3 Software PTP	Line1	Device	26
SpecialTriggerActivation	Enumeration	RW	Specifies the activation mode of the special trigger. This can be any of the following values: RisingEdge FallingEdge	FallingEdge	Device	26
FastTriggerMode	Enumeration	RW	Sets the trigger mode of the image sensor. This can be any of the following values: Off On This feature is not supported by XCG-CG240/CG240C.	On	UserSet	30
TriggerOverlapInhibit	Enumeration	RW	Specifies the activation of the trigger overlap. This can be any of the following values: Off On	On	UserSet	30

AnalogControl

Contains the features related to the video signal conditioning in the analog domain

Feature Name	Type	Access	Description	Default Value	Save to	Referenced page
GainSelector	Enumeration	RW	Selects which Gain is controlled by the various Gain features. This can be any of the following values: AnalogAll DigitalRed DigitalGreen DigitalBlue	AnalogAll		–
Gain	Float	RW	Controls the selected gain as an absolute physical value. This is an amplification factor applied to the video signal. This can be a value in the following range: -1 or less to 27 or more	0		18

Feature Name	Type	Access	Description	Default Value	Save to	Referenced page
GainRawControl						
GainAnalogRaw	Integer	RW	Controls the analog gain as an absolute physical value. This is an amplification factor applied to the video signal. This can be a value in the following range: Min: -194 Max: 286	0	UserSet	18
GainDigitalRedRaw	Integer	RW	This feature controls the gain of the red pixels. This can be a value in the following range: [XCG-CG160C/CG240C/CG510C] Min: 256 Max: 4095	256		37
GainDigitalGreenRaw	Integer	RW	This feature controls the gain of the green pixels. This can be a value in the following range: [XCG-CG160C/CG240C/CG510C] Min: 256 Max: 4095	256		37
GainDigitalBlueRaw	Integer	RW	This feature controls the gain of the blue pixels. This can be a value in the following range: [XCG-CG160C/CG240C/CG510C] Min: 256 Max: 4095	256		37
GainAuto	Enumeration	RW	Sets the automatic gain control (AGC) mode. This can be any of the following values: Off Once Continuous	Off	UserSet	18
GainAutoLevel	Integer	RW	Sets the target level for the automatic gain control. This can be a value in the following range: Min: 0 Max: 16383	11264	UserSet	18
GainAutoSpeed	Integer	RW	Sets the tracking speed for the automatic gain control. This can be a value in the following range: Min: 1 Max: 256	192	UserSet	18
GainAutoLowerLimit	Integer	RW	Sets the lower limit for the automatic gain control. This can be a value in the following range: -10 or less to 270 or more	0	UserSet	18
GainAutoUpperLimit	Integer	RW	Sets the upper limit for the automatic gain control. This can be a value in the following range: -10 or less to 270 or more	180	UserSet	18
BlackLevel	Float	RW	Controls the analog black level as an absolute physical value. This represents a DC offset applied to the video signal. This can be a value in the following range: Min: 0.0 Max: 2047.0	960	UserSet	–

Feature Name	Type	Access	Description	Default Value	Save to	Referenced page
BalanceWhiteAuto	Enumeration	RW	This feature performs automatic white balance control (AWB). This can be any of the following values: [XCG-CG160C/CG240C/CG510C] Off Once Continuous	Off	UserSet	37
ExposureAuto	Enumeration	RW	Sets the automatic exposure mode when ExposureMode is Timed. This can be any of the following values: Off Once Continuous	Off	UserSet	19
ExposureAutoSpeed	Integer	RW	Sets the tracking speed for the automatic exposure control. This can be a value in the following range: Min: 1 Max: 256	192	UserSet	19
ExposureAutoLowerLimit	Integer	RW	Sets the lower limit for the automatic exposure control. This can be a value in the following range: Min: 1 Max: 60000000	10	UserSet	19
ExposureAutoUpperLimit	Integer	RW	Sets the upper limit for the automatic exposure control. This can be a value in the following range: Min: 1 Max: 60000000	[XCG-CG40] 9757 [XCG-CG160/CG160C] 42000 [XCG-CG240/CG240C] 23300 [XCG-CG510/CG510C/CP510] 42000	UserSet	19
SpatialFilterEnable	Boolean	RW	This feature activates the 3x3 spatial filter.	FALSE		39
SpatialFilterSelectorRow	Enumeration	RW	This feature selects which parameter of the 3x3 spatial filter to control. This can be any of the following values: Top Center Bottom	Top		39
SpatialFilterSelectorColumn	Enumeration	RW	This feature selects which parameter of the 3x3 spatial filter to control. This can be any of the following values: Left Center Right	Left		39
SpatialFilterValue	Integer	RW	This feature controls the selected parameter for 3x3 spatial filter. 256 means x1.0. This can be a value in the following range: Min: -8191 Max: 8191	0		39
ColorMatrixEnable	Boolean	RW	This feature activates the Color Matrix function. [XCG-CG160C/CG240C/CG510C]	FALSE		39
ColorMatrixSelectorRow	Integer	RW	This feature selects which parameter of the Color Matrix parameter to control. This can be a value in the following range: [XCG-CG160C/CG240C/CG510C] Min: 0 Max: 2	0		39

Feature Name	Type	Access	Description	Default Value	Save to	Referenced page
ColorMatrixSelectorColumn	Integer	RW	This feature selects which parameter of the Color Matrix parameter to control. This can be a value in the following range: [XCG-CG160C/CG240C/CG510C] Min: 0 Max: 2	0		39
ColorMatrixValue	Integer	RW	This feature controls the parameter of the Color Matrix function. This can be a value in the following range: [XCG-CG160C/CG240C/CG510C] Min: -8191 Max: 8191	256		39

DigitalIOControl

Contains the features related to the control of the input and output pins of the device.

Feature Name	Type	Access	Description	Default Value	Save to	Referenced page
LineSelector	Enumeration	RW	Selects the physical line (or pin) of the external device connector to configure. This can be any of the following values: Line1 Line2 Line3	Line1		39
LineMode	Enumeration	RW	Controls if the physical Line is used to Input or Output a signal. This can be any of the following values: Input Output	Input	UserSet	39
LineInverter	Boolean	RW	Controls the inversion of the signal of the selected output Line.		UserSet	39
LineStatus	Boolean	RO	Returns the current status of the selected input Line.			39
LineSource	Enumeration	RW	Selects which internal acquisition or I/O source signal to output on the selected Line. LineMode must be Output. This can be any of the following values: TriggerThrough ExposureActive StrobeActive SensorReadout UserOutput1 UserOutput2 UserOutput3 SignalTrue SignalFalse PWM ActionCommandPulse FreeSetSequence	StrobeActive	UserSet	39
LineFormat	Enumeration	RO	Returns the current electrical format of the selected physical input or output Line.			–
StrobeControl						
StrobeActiveTimeLine2	Integer	RW	Sets the Strobe active time (in us) for line2. This can be a value in the following range: Min: 1 Max: 40000	256	UserSet	–

Feature Name	Type	Access	Description	Default Value	Save to	Referenced page
StrobeActiveDelayLine2	Integer	RW	Sets the delay (in us) to apply after the StrobeActive before effectively activating it. This can be a value in the following range: Min: 0 Max: 40000	100	UserSet	–
StrobeActiveTimeLine3	Integer	RW	Sets the Strobe active time (in us) for line3. This can be a value in the following range: Min: 1 Max: 40000	256	UserSet	–
StrobeActiveDelayLine3	Integer	RW	Sets the delay (in us) to apply after the StrobeActive before effectively activating it. This can be a value in the following range: Min: 0 Max: 40000	100	UserSet	–
UserOutputValue						
UserOutput1Value	Boolean	RW	Sets the value of the bit of the UserOutput1.	FALSE	UserSet	–
UserOutput2Value	Boolean	RW	Sets the value of the bit of the UserOutput2.	FALSE	UserSet	–
UserOutput3Value	Boolean	RW	Sets the value of the bit of the UserOutput3.	FALSE	UserSet	–
PulseWidthControl						
PulseCycle	Integer	RW	Sets the cycle of the output pulse (in us). This can be a value in the following range: Min: 10 Max: 2000000	1000000	UserSet	41
PulseDuty	Integer	RW	Sets the duty of the output pulse (in us). This can be a value in the following range: Min: 1 Max: 1999999	500000	UserSet	41
ActionCommandPulse						
ActionCommandPulseWidthLine2	Integer	RW	Sets the Pulse Width (in us) by Action Command for line2. The value 0 means infinity. This can be a value in the following range: Min: 0 Max: 50000000	0		25
ActionCommandPulseDelayLine2	Integer	RW	Sets the Pulse Delay (in us) by Action Command for line2. This can be a value in the following range: Min: 0 Max: 50000000	0		25
ActionCommandPulseWidthLine3	Integer	RW	Sets the Pulse Width (in us) by Action Command for line3. The value 0 means infinity. This can be a value in the following range: Min: 0 Max: 50000000	0		25
ActionCommandPulseDelayLine3	Integer	RW	Sets the Pulse Delay (in us) by Action Command for line3. This can be a value in the following range: Min: 0 Max: 50000000	0		25

LUTControl

Contains the features related to the look-up table (LUT) control.

Feature Name	Type	Access	Description	Default Value	Save to	Referenced page
LUTSelector	Enumeration	RO	Selects which LUT to control.			–
LUTEnable	Boolean	RW	Activates the selected LUT.	FALSE	UserSet	37
LUTFormat	Enumeration	RW	Selects the LUT format. This can be any of the following values: Linear Reverse Binarization LinearInterpolation UserSet	Linear	UserSet	37
BinarizationThreshold	Integer	RW	Controls the binarization threshold (in 12 bits). This can be a value in the following range: Min: 0 Max: 4095	2047	UserSet	37
LinearInterpolationIndex	Enumeration	RW	Selects the index point to build linear interpolation LUT. This can be any of the following values: Index1 Index2 Index3 Index4 Index5	Index1		37
LinearInterpolationInValue	Integer	RW	Specifies the In value of the point selected by LinearInterpolationIndex. This can be a value in the following range: Min: 0 Max: 4095	256	Device	37
LinearInterpolationOutValue	Integer	RW	Specifies the Out value of the point selected by LinearInterpolationIndex. This can be a value in the following range: Min: 0 Max: 4095	256	Device	37
LinearInterpolationBuild	Command	WO	Builds linear interpolation LUT.			37
LUTIndex	Integer	RW	Control the index (offset) of the coefficient to access in the selected LUT. This can be a value in the following range: Min: 0 Max: 4095	0		38
LUTValue	Integer	RW	Sets the Value at entry LUTIndex of the LUT selected by LUTSelector. This can be a value in the following range: Min: 0 Max: 4095	0		38
LUTValueSave	Command	WO	Saves the values of LUT to flash memory.			38
LUTValueAll	Refister	RW	Accesses all the LUT coefficients in a single access without using individual LUTIndex.			–

UserSetControl

Contains the features related to the User Set Control to save and load the user device settings.

Feature Name	Type	Access	Description	Default Value	Save to	Referenced page
UserSetDefaultSelector	Enumeration	RW	Selects the feature User Set as default User Set. This can be any of the following values: Default, UserSet1 to UserSet16	Default	Device	46
UserSetSelector	Enumeration	RW	Selects the feature User Set to load, save or configure. This can be any of the following values: Default, UserSet1 to UserSet16	Default		–
UserSetLoad	Command	WO	Loads the User Set specified by UserSetSelector to the device and makes it active.			–
UserSetSave	Command	WO	Save the User Set specified by UserSetSelector to the non-volatile memory of the device.			–
UserMemoryIndex	Integer	RW	Sets the index (offset) of the user-programmable identifier to access in the UserMemory. Min: 0 Max: 15	0		–
UserMemoryValue	Integer	RW	Represents the Value found at entry UserMemoryIndex. Min: 0 Max: 4294967295	0	UserSet	–

ActionControl

Contains the features related to the control of the Action command mechanism. This feature is not available in XCG-CG40.

Feature Name	Type	Access	Description	Default Value	Save to	Referenced page
ActionDeviceKey	Integer	WO	Provides the device key that allows the device to check the validity of action commands. The device internal assertion of an action signal is only authorized if the ActionDeviceKey and the action device key value in the protocol message are equal. Min: 0 Max: 4294967295			–
ActionUnconditionalMode	Enumeration	RO	Enables the unconditional action command mode where action commands are processed even when the primary control channel is closed.			–
ActionSelector	Enumeration	RW	Selects to which Action Signal further Action settings apply. This can be any of the following values: SoftwareTrigger StartPTPSynchronization UsersetLoad LineControl	SoftwareTrigger		–
ActionGroupMask	Integer	RW	Provides the mask that the device will use to validate the action on reception of the action protocol message. Min: 0 Max: 4294967295	0		–
ActionGroupKey	Integer	RW	Provides the key that the device will use to validate the action on reception of the action protocol message. Min: 0 Max: 4294967295	0		–

SonyOriginal

Contains the features related to the original command of the Sony camera.

Feature Name	Type	Access	Description	Default Value	Save to	Referenced page
XMLVersionSelector*3	Integer	RW	Sets the XML Device Description-file for the camera startup. This can be any of the following values: [XCG-CG40/CG160/CG160C/CG240/CG240C/CG510/CG510C] Min: 1 Max: 3 [XCG-CP510] Min: 1 Max: 2	1	Device	47
SelectedXMLVersion*3	String	RO	Represents the XML Device Description-file selected when the camera starts up.			–
GevVersionForStartUp	Enumeration	RW	Sets the GigE Version of the device for startup. Read for getting the current time start-up version. Write for setting the start-up version for next time. This can be any of the following values: GigE_Version_1_2 GigE_Version_2_0	GigE_Version_1_2	Device	23
GevXmlUrlSetting	Enumeration	RW	Exchanges the first URL and the second URL of the XML file. This can be any of the following values: Default Exchanged	Default	Device	–
GevPacketSizeInitialValue	Integer	RW	Initial value for the GevSCPS packet size. Min: 576 Max: 8228	8228	Device	–
GevPacketDelayInitialValue	Integer	RW	Initial value for the GevSCPD packet delay. Min: 0 Max: 262144	0	Device	–
UnitCellSizeH	Float	RO	Indicates the physical pixel size(Horizontal) of the image sensor (in um).			–
UnitCellSizeV	Float	RO	Indicates the physical pixel size(Vertical) of the image sensor (in um).			–
DiagonalLength	Float	RO	Indicates the diagonal length of the image (in mm).			–
ShutterType	String	RO	Indicates the shutter mechanism of the image sensor.			–
AspectRatio	Float	RO	Indicates the image aspect ratio (width divided by height).			–
CameraReboot	Command	WO	Reboot the camera. The time delay of rebooting is specified by CameraRebootDelayTime.			46
CameraRebootDelayTime	Integer	RW	Specify delay-time (in ms) for rebooting camera. Min: 0 Max: 10000			46
DriveMode	Enumeration	RW	Configuration of drive mode. This can be any of the following values: Mode0 Mode1	Mode0	Device	15
DriveModeCurrent	Enumeration	RO	Indicates the current drive mode.			–
LEDMode	Enumeration	RW	This feature controls the LED light. This can be any of the following values: Off On	On	Device	42

Feature Name	Type	Access	Description	Default Value	Save to	Referenced page
CameraTemperature	Integer	RO	Temperature of camera (in degrees).			42
DetectAreaGainAuto						
DetectAreaGainAutoMode	Enumeration	RW	This feature performs highlight area for auto gain control and auto exposure feature. This can be any of the following values: Off On	Off		18
DetectAreaGainAutoWidth	Integer	RW	Sets the percentage of the width for automatic gain's detection area. This can be a value in the following range: Min: 0 Max: 100	50	UserSet	18
DetectAreaGainAutoHeight	Integer	RW	Sets the percentage of the height for automatic gain's detection area. This can be a value in the following range: Min: 0 Max: 100	50	UserSet	18
DetectAreaGainAutoOffsetX	Integer	RW	Sets the percentage of the offset-X for automatic gain's detection area. This can be a value in the following range: Min: 0 Max: 99	25	UserSet	18
DetectAreaGainAutoOffsetY	Integer	RW	Sets the percentage of the offset-Y for automatic gain's detection area. This can be a value in the following range: Min: 0 Max: 99	25	UserSet	18
DetectAreaBalanceWhiteAuto						
DetectAreaBalanceWhiteAuto-Mode	Enumeration	RW	This feature performs highlight area for automatic white balance control (AWB). This can be any of the following values: [XCG-CG160C/CG240C/CG510C] Off On	Off		37
DetectAreaBalanceWhiteAuto-Width	Integer	RW	Sets the percentage of the width for automatic balance white's detection area. This can be a value in the following range: [XCG-CG160C/CG240C/CG510C] Min: 0 Max: 100	50	UserSet	37
DetectAreaBalanceWhiteAuto-Height	Integer	RW	Sets the percentage of the height for automatic balance white's detection area. This can be a value in the following range: [XCG-CG160C/CG240C/CG510C] Min: 0 Max: 100	50	UserSet	37
DetectAreaBalanceWhiteAuto-OffsetX	Integer	RW	Sets the percentage of the offset-X for automatic balance white's detection area. This can be a value in the following range: [XCG-CG160C/CG240C/CG510C] Min: 0 Max: 99	25	UserSet	37
DetectAreaBalanceWhiteAuto-OffsetY	Integer	RW	Sets the percentage of the offset-Y for automatic balance white's detection area. This can be a value in the following range: [XCG-CG160C/CG240C/CG510C] Min: 0 Max: 99	25	UserSet	37

Feature Name	Type	Access	Description	Default Value	Save to	Referenced page
Defect						
DefectThreshold	Integer	RW	This feature controls the threshold of the defct level for the defect detection. Enabled when DriveMode is mode1. This can be a value in the following range: Min: 0 Max: 16383	8192		–
DefectDetectionMode	Enumeration	RW	This feature performs defect detection by selected mode. Enabled when DriveMode is mode1. This can be any of the following values: DetectModeOff DetectModeWhite DetectModeBlack	DetectModeOff		–
DefectDetectionResult	Integer	RO	Indicates the result of defect detection. Enabled when DriveMode is mode1.			–
DefectPatternSave	Command	WO	Save the user detected pattern to the non-volatile memory of the device.			–
DefectPatternLoad	Enumeration	RW	Loads the selected defect pattern to the device. Enabled when DriveMode is mode1. This can be any of the following values: DefectPatternFactory DefectPatternUser DefectPatternDetected	DefectPatternFactory		43
DefectCorrection	Enumeration	RW	This feature activates the defect correction by the selected pattern. Enabled when DriveMode is mode1. This can be any of the following values: Off On	On	Device	42
Shading						
ShadingDetectColor	Enumeration	RW	This feature specifies which color is used for shading detection. This can be any of the following values: [XCG-CG160C/CG240C/CG510C] Red Green Blue Luminance	Green	Device	44
ShadingDetectionMode	Enumeration	RW	This feature performs shading detection by selected mode. Enabled when DriveMode is mode1. This can be any of the following values: ShadingDetectionOff ShadingDetectionByPeakValue ShadingDetectionByAverageValue	ShadingDetectionOff		44
ShadingPatternCheck	Command	WO	This feature performs the current detected pattern. Enabled when DriveMode is mode1.			–
ShadingPatternSelect	Integer	RW	Selects a shading pattern to load or save. This can be a value in the following range: [XCG-CG160/CG160C] Min: 0 Max: 30 [XCG-CG240/CG240C] Min: 0 Max: 19 [XCG-CG510/CG510C/CP510] Min: 0 Max: 8	0	UserSet	44

Feature Name	Type	Access	Description	Default Value	Save to	Referenced page
ShadingPatternSave	Enumeration	RW	Save the detected pattern specified by ShadingPatternSelect to the non-volatile memory of the device. Enabled when DriveMode is mode1. This can be any of the following values: ShadingPatternSaveOff ShadingPatternSaveOn	ShadingPatternSaveOff		44
ShadingPatternLoad	Command	WO	Loads the shading pattern specified by ShadingPatternSelect to the device.			44
ShadingCorrection	Enumeration	RW	This feature activates the shading correction by the selected pattern. This can be any of the following values: Off On	Off	UserSet	44
ShadingInitialLoadFinished	Boolean	RO	Indicates the ShadingPattern initial load status.			–
ShadingBlockSize	Integer	RO	Indicates the ShadingBlockSize.			–
ShadingValueOffset	Integer	RW	This feature provides the offset of the coefficient to access in the Shading Value. This can be a value in the following range: Min: 0 Max: 8388607	0		–
ShadingValue	Integer	RW	This feature represents the Value found at entry ShadingValueOffset. This can be a value in the following range: Min: 0 Max: 4294967295	16777472		–
ShadingMemoryPageOffset	Integer	RO	This feature represents the page offset of the Shading Working Memroy in bytes.			–
ShadingMemoryPageSize	Integer	RO	This feature represents the page size of the Shading Working Memroy in bytes.			–
ShadingMemoryPageWidth	Integer	RO	This feature represents the page width of the Shading Working Memroy in bytes.			–
ShadingMemoryPageHeight	Integer	RO	This feature represents the page height of the Shading Working Memroy in bytes.			–
ShadingMemoryValueAllEnable*3	Boolean	RW	Sets the availability of access-to the Shading data.	FALSE		–
ShadingMemoryValueAll*3	Register		Represents the Shading data.			–
ShadingMemoryCopyToWork-RAM	Command	WO	Copy shading pattern to the working RAM.			–
FreeMemory						
FreeMemoryEnable*3	Boolean	RW	This feature controls if the Free memory function is enabled.	FALSE	Device	–
FreeMemoryIndex*3	Integer	RW	Sets the Free memory index (offset). Min: 0 Max: 16383	0		–
FreeMemoryValue*3	Integer	RW	Sets the Free memory value in the index range set in FreeMemoryIndex. This can be any of the following values: Min: 0 Max: 4294967295	0		–
FreeMemorySave*3	Enumeration		Saves the Free memory. This can be any of the following values: FreeMemorySaveOff FreeMemorySaveOn			–
FreeMemoryLock*3	Integer	WO	Sets the write protection-lock for the Free memory with arbitrary values as a key.	0		–

Feature Name	Type	Access	Description	Default Value	Save to	Referenced page
FreeMemoryUnlock*3	Integer	WO	Releases the write protection-lock for the Free memory by using the value set in FreeMemoryLock.	0		–
FreeMemoryClear*3	Command		Clears the Free memory data. Enabled only when the write protection-lock for the Free memory is released.			–
FreeMemoryValueAll*3	Register		Represents the Free memory data.			–
AreaGain						
AreaGainEnableAll	Boolean	RW	This feature controls if all gain areas are enabled.	FALSE	UserSet	19
AreaGainSelect	Integer	RW	Selects a gain area of interest. This can be a value in the following range: Min: 0 Max: 15	0		19
AreaGainEnable	Boolean	RW	This feature controls if the selected area is enabled.	FALSE	UserSet	19
AreaGainWidth	Integer	RW	Width of the selected area (in pixels). This can be a value in the following range: Min: 0 Max: (Width)	[XCG-CG40] 64 [XCG-CG160/CG160C/ CG240/CG240C/ CG510/CG510C/ CP510] 128	UserSet	19
AreaGainHeight	Integer	RW	Height of the selected area (in pixels). This can be a value in the following range: Min: 0 Max: (Height)	[XCG-CG40] 64 [XCG-CG160/CG160C/ CG240/CG240C/ CG510/CG510C/ CP510] 128	UserSet	19
AreaGainOffsetX	Integer	RW	Horizontal offset from the origin to the region of interest (in pixels). This can be a value in the following range: Min: (OffsetX) Max: (Width - 2)	[XCG-CG40] 64 [XCG-CG160/CG160C/ CG240/CG240C/ CG510/CG510C/ CP510] 128	UserSet	19
AreaGainOffsetY	Integer	RW	Vertical offset from the origin to the region of interest (in pixels). This can be a value in the following range: Min: (OffsetY) Max: (Height - 2)	[XCG-CG40] 64 [XCG-CG160/CG160C/ CG240/CG240C/ CG510/CG510C/ CP510] 128	UserSet	19
AreaGainValue	Integer	RW	This feature controls the gain of the selected area. This can be a value in the following range: Min: 0 Max: 8191	256	UserSet	19
MultiROI						
MultiROIMode	Enumeration	RW	This feature controls if all MultiROI areas are enabled. This can be any of the following values: Off On Highlight	Off		14
MultiROISelect	Integer	RW	Selects a MultiROI area of interest. This can be a value in the following range: Min: 0 Max: 1	0		14

Feature Name	Type	Access	Description	Default Value	Save to	Referenced page
MultiROIEnable	Boolean	RW	This feature controls if the selected area is enabled.	TRUE		14
MultiROIWidth	Integer	RW	Width of the selected area (in pixels). This can be a value in the following range: Min: 4 Max: 1456	128		14
MultiROIHeight	Integer	RW	Height of the selected area (in pixels). This can be a value in the following range: Min: 4 Max: 1088	128		14
MultiROIOffsetX	Integer	RW	Horizontal offset from the origin to the region of interest (in pixels). This can be a value in the following range: Min: 0 Max: 1452	128		14
MultiROIOffsetY	Integer	RW	Vertical offset from the origin to the region of interest (in pixels). This can be a value in the following range: Min: 0 Max: 1084	128		14
BurstTrigger						
BurstMode	Enumeration	RW	This feature used to set exposure type for BurstTrigger mode. This can be any of the following values: Off SingleExposureTime DualExposureTime	Off	UserSet	27
BurstPeriod	Enumeration	RW	This feature is used to set the burst period type. This can be any of the following values: FrameCount TriggerDuration	FrameCount	UserSet	27
BurstFrameCount	Integer	RW	Number of frames to acquire in BurstTrigger mode. The value 0 means infinity. This can be a value in the following range: Min: 0 Max: 65533	1	UserSet	27
BurstForceStop	Command	WO	Stops the Acquisition of the device at the end of the current Frame.			27
FreeSetSequence						
FreeSetTriggerSource	Enumeration	RW	FreeSetTriggerSource specifies the internal signal or physical input Line to use as the free set trigger source for the selected trigger when Free-Set Sequence Mode is On. Enabled when DriveMode is mode0. This can be any of the following values: Line1 Line2 Line3 Software PTP	Line1	Device	28
FreeSetStop	Command	WO	Stops the Acquisition of the device at the end of the current cycle. Enabled when DriveMode is mode0.			28

Feature Name	Type	Access	Description	Default Value	Save to	Referenced page
FreeSet1Cycle	Integer	RW	Specify 1 cycle time (in us) for Free-Set Sequence mode. Enabled when DriveMode is mode0. This can be a value in the following range: Min: 0 Max: 10000000	0	Device	28
FreeSet1CycleNum	Integer	RW	Number of cycles for Free-Set Sequence mode. The value 0 means infinity. Enabled when DriveMode is mode0. This can be a value in the following range: Min: 0 Max: 65535	1	Device	28
FreeSetSelect	Integer	RW	Selects a sequence number of interest. Enabled when DriveMode is mode0. This can be a value in the following range: Min: 1 Max: 10	1		28
FreeSetLine2Delay	Integer	RW	This feature set the GPO output delay (in us) by FreeSetTrigger for Line2. The value -1 means inactive. Enabled when DriveMode is mode0. This can be a value in the following range: Min: -1 Max: 10000000	-1	Device	28
FreeSetLine2Duration	Integer	RW	This feature set the GPO output duration (in us) by FreeSetTrigger for Line2. Enabled when DriveMode is mode0. This can be a value in the following range: Min: 0 Max: 10000000	0	Device	28
FreeSetLine3Delay	Integer	RW	This feature set the GPO output delay (in us) by FreeSetTrigger for Line3. The value -1 means inactive. Enabled when DriveMode is mode0. This can be a value in the following range: Min: -1 Max: 10000000	-1	Device	28
FreeSetLine3Duration	Integer	RW	This feature set the GPO output duration (in us) by FreeSetTrigger for Line3. Enabled when DriveMode is mode0. This can be a value in the following range: Min: 0 Max: 10000000	0	Device	28
FreeSetExpDelay	Integer	RW	This feature set the exposure delay (in us) by FreeSetTrigger. The value -1 means inactive. Enabled when DriveMode is mode0. This can be a value in the following range: Min: -1 Max: 10000000	-1	Device	28
FreeSetExpDuration	Integer	RW	This feature set the exposure time (in us) by FreeSetTrigger. Enabled when DriveMode is mode0. This can be a value in the following range: Min: 0 Max: 10000000	0	Device	28
FreeSetGain	Integer	RW	This feature controls the analog gain at the FreeSetExp as a raw value. Enabled when DriveMode is mode0. This can be a value in the following range: Min: -37 Max: 443	0	Device	28

Feature Name	Type	Access	Description	Default Value	Save to	Referenced page
FreeSetSave	Command	WO	Save the all parameters for Freeset sequence mode. Enabled when DriveMode is mode0.			28
FreeSetLoad	Command	WO	Load the all parameters for Freeset sequence mode. Enabled when DriveMode is mode0.			28
HorizontalReadoutTime	Integer	RO	Indicates horizontal readout time of the image sensor (in ns).			–
VerticalReadoutTime	Integer	RO	Indicates vertical readout time of the image sensor (in ns).			–
ResendWaitFinal	Integer	RW	Configuration of the waiting time from final frame. This can be a value in the following range: Min: 0 Max: 4294967295	0		–
ResendFrame	Integer	RO	Indicate the number of the resend count.			–
PTP						
PTPTriggerInterval	Integer	RW	This feature used to set the PTP Trigger Interval in milliseconds. This can be a value in the following range: Min: 1 Max: 50000	1000	UserSet	24
PTPTriggerIntervalMicroSeconds*3	Integer	RW	Sets the PTP Trigger Interval in microseconds. This can be any of the following values: Min: 1000 Max: 50000000	1000000	UserSet	24
PTPTriggerStartTime	Integer	RW	This feature used to set the PTP Trigger Start Time in seconds. This can be a value in the following range: Min: 0 Max: 4294967295	0		24
PTPMasterTimeSet	Command	WO	Set the PTP master time initial value to the camera.			–
PTPMasterTimeInitialValueHigh	Integer	WO	Sets the 64-bit value of the PTP master time. This can be a value in the following range: Min: 0 Max: 4294967295	0		24
PTPMasterTimeInitialValueLow	Integer	WO	Sets the 64-bit value of the PTP master time. This can be a value in the following range: Min: 0 Max: 4294967295	0		24
PTPSoftwareTriggerTimeSet	Command	WO	Set the activation time for Software Trigger synchronized with the PTP clock.			24
PTPSoftwareTriggerTimeHigh	Integer	RW	Sets the 64-bit value of the activation time for Software Trigger synchronized with the PTP clock.(High part) This can be a value in the following range: Min: 0 Max: 4294967295	0		24
PTPSoftwareTriggerTimeLow	Integer	RW	Sets the 64-bit value of the activation time for Software Trigger synchronized with the PTP clock.(Low part) This can be a value in the following range: Min: 0 Max: 4294967295	1000000000		24
PTPLineTimeSet	Command	WO	Set the activation time for GPO output synchronized with the PTP clock.			–

Feature Name	Type	Access	Description	Default Value	Save to	Referenced page
PTPLineTimeHigh	Integer	RW	Sets the 64-bit value of the activation time for GPO output synchronized with the PTP clock.(High part) This can be a value in the following range: Min: 0 Max: 4294967295	4294967295		–
PTPLineTimeLow	Integer	RW	Sets the 64-bit value of the activation time for GPO output synchronized with the PTP clock.(Low part) This can be a value in the following range: Min: 0 Max: 4294967295	4294967295		–
ImageTransferDelayMode	Enumeration	RW	Enables the Image Transfer Delay mode. It is a kind of bandwidth control. This can be any of the following values: Off On	Off		35
ImageTransferDelayValue	Float	RW	Sets the delay when ImageTransferDelayMode is enabled. The units is milliseconds. This can be a value in the following range: Min: 0.0 Max: 10000.0	0		35
MemoryShotMode	Enumeration	RW	Enables the Image Buffer to store images in the device. This can be any of the following values: Off On	Off		35
MemoryShotImageOutputStart	Command	WO	Starts the Image Transfer stored in the device.			35
AutoNegotiationEnable	Enumeration	RW	Sets auto negotiation for the Gigabit Ethernet PHY. This can be any of the following values: Disable Enable	Enable	Device	–
BroadcastWriteRegEnable	Enumeration	RW	Accept WRITEREG command sent to the broadcast address. This can be any of the following values: Disable Enable	Disable	Device	36

EventControl

Contains the features related to the generation of Event notifications by the device.

Feature Name	Type	Access	Description	Default Value	Save to	Referenced page
EventDataTemperature						
CameraTemperatureMeasurement-Interval	Integer	RW	Interval for measuring temperature of camera (in seconds). This can be a value in the following range: Min: 0 Max: 4294967295	0	Device	42
EventDataTemperatureTimestamp	Integer	RO	Indicates the time stamp for an temperature measured end event.			–
EventDataTemperatureMsg	Integer	RO	Indicates the message for an temperature measured end event.			–
EventExposureEnd						
EventExposureEndEnable	Boolean	RW	Sends the message that indicates the exposure end timing.	FALSE		–

Feature Name	Type	Access	Description	Default Value	Save to	Referenced page
EventTriggerAcception						
EventTriggerAcceptionEnable	Boolean	RW	Sends the message that indicates the exposure end timing.	FALSE		–

TransportLayerControl

Contains the features related to the Transport Layer Control.

Feature Name	Type	Access	Description	Default Value	Save to	Referenced page
PayloadSize	Integer	RO	Provides the number of bytes transferred for each image or chunk on the stream channel. This includes any end-of-line, end-of-frame statistics or other stamp data. This is the total size of data payload for a data block.			–
GigEVision						
GevVersionMajor*1	Integer	RO	Major version of the specification.			–
GevVersionMinor*1	Integer	RO	Minor version of the specification.			–
GevDeviceModeIsBigEndian*1	Boolean	RO	Endianess of the device registers.			–
GevDeviceClass*1	Enumeration	RO	Returns the class of the device.			–
GevDeviceModeCharacterSet*1	Enumeration	RO	Character set used by all the strings of the bootstrap registers.			–
GevInterfaceSelector	Integer	RO	Selects which logical link to control.			–
GevMACAddress	Integer	RO	MAC address of the logical link.			–
GevPAUSEFrameReception	Boolean	RO	Handles the incoming PAUSE Frames with any given logical link.			–
GevPAUSEFrameTransmission	Boolean	RO	Generates the PAUSE Frames with any given logical link.			–
GevCurrentIPConfigurationLLA	Boolean	RO	Enables the Link Local Address.			–
GevCurrentIPConfigurationDHCP	Boolean	RW	Enables the DHCP.	TRUE	Device	–
GevCurrentIPConfiguration-PersistentIP	Boolean	RW	Enables the persistent IP address.	FALSE	Device	–
GevCurrentIPAddress	Integer	RO	Indicates the IP address.			–
GevCurrentSubnetMask	Integer	RO	Indicates the subnet mask.			–
GevCurrentDefaultGateway	Integer	RO	Indicates the default gateway IP address.			–
GevFirstURL	String	RO	This is a read only element. It indicates the first URL to the XML device description file.			–
GevSecondURL	String	RO	This is a read only element. It indicates the second URL to the XML device description file.			–
GevNumberOfInterfaces*1	Integer	RO	Indicates the number of logical links supported by this device.			–
GevPersistentIPAddress	Integer	RW	Controls the Persistent IP address.		Device	–
GevPersistentSubnetMask	Integer	RW	Controls the subnet mask associated with the Persistent IP address.		Device	–
GevPersistentDefaultGateway	Integer	RW	Controls the default gateway.		Device	–
GevMessageChannelCount*1	Integer	RO	Indicates the number of message channels supported by this device.			–
GevStreamChannelCount*1	Integer	RO	Indicates the number of stream channels supported by this device.			–

Feature Name	Type	Access	Description	Default Value	Save to	Referenced page
GevSupportedOptionSelector	Enumeration	RW	Selects the GEV option to interrogate for existing support. This can be any of the following values: UserDefinedName SerialNumber HeartbeatDisable LinkSpeed CCPApplicationSocket ManifestTable TestData DiscoveryAckDelayWritable DiscoveryAckDelay ExtendedStatusCodes PrimaryApplicationSwitchover UnconditionalAction IEEE1588 ExtendedStatusCodesVersion2_0 ScheduledAction Action PendingAck EventData Event PacketResend WriteMem CommandsConcatenation StreamChannel0BigAndLittleEndian StreamChannel0IPReassembly StreamChannel0MultiZone StreamChannel0PacketResend-Destination StreamChannel0AllInTransmission StreamChannel0Unconditional-Streaming StreamChannel0ExtendedChunkData	UserDefinedName		–
GevHeartbeatTimeout*1	Integer	RW	Controls the current heartbeat timeout in milliseconds. This can be a value in the following range: Min: 3000 Max: 4294967295	10000		–
GevTimestampTickFrequency*1	Integer	RO	Indicates the number of timestamp ticks in 1 second (frequency in Hz). If IEEE1588 is used, this feature must return 1,000,000,000 (1 GHz).			–
GevTimestampControlLatch*1	Command	WO	Latches the current timestamp counter into GevTimestampValue.			–
GevTimestampControlReset*1	Command	WO	Resets the timestamp counter to 0. This feature is not available or as no effect when IEEE1588 is used.			–
GevTimestampValue*1	Integer	RO	Returns the latched 64-bit value of the timestamp counter.			–
GevGVCPExtendedStatusCodes-Selector	Enumeration	RW	Selects the GigE Vision version to control extended status codes for. This can be any of the following values: Version1_1 Version2_0	Version1_1		–
GevGVCPExtendedStatusCodes	Boolean	RO	Enables the generation of extended status codes.			–
GevGVCPExtendedStatusCode-Version2_0	Boolean	RW	Enables the generation of extended status codes for 2.0.	FALSE		–
GevGVCPExtendedStatusCode-Version1_1	Boolean	RW	Enables the generation of extended status codes for 1.1.	FALSE		–
GevGVCPPendingAck	Boolean	RW	Enables the generation of PENDING_ACK.	TRUE		–

Feature Name	Type	Access	Description	Default Value	Save to	Referenced page
GevGVCPHeartbeatDisable*1	Boolean	RO	Disables the GVCP heartbeat.			–
GevGVCPPendingTimeout*1	Integer	RO	Indicates the longest GVCP command execution time before a device returns a PENDING_ACK.			–
GevGVSPExtendedIDMode	Enumeration	RW	Enables the extended IDs mode. Enabled when in GigE Version2.0. This can be any of the following values: Off On	Off		–
GevCurrentPhysicalLink-Configuration	Enumeration	RO	Indicates the current physical link configuration of the device.			–
GevPAUSEFrameReceptionCap*1	Boolean	RO	Status whether incoming PAUSE Frames are handled on the given logical link.			–
GevPAUSEFrameTransmission-Cap*1	Boolean	RO	Status whether PAUSE Frames can be generated on the given logical link.			–
GevCurrentIPConfiguration-LLACap*1	Boolean	RO	Status whether the Link Local Address IP configuration scheme is activated on the given logical link.			–
GevCurrentIPConfiguration-DHCPCap*1	Boolean	RO	Status whether the DHCP IP configuration scheme is activated on the given logical link.			–
GevCurrentIPConfiguration-PersistentIPCap*1	Boolean	RO	Status whether the PersistentIP configuration scheme is activated on the given logical link.			–
GevNumberOfActionSignals	Integer	RO	Indicates the number of the action signals.			–
GevSCSPxSupported*1	Integer	RO	Indicates the stream channel source port is supported.			–
GevLegacy16bitBlockID-Supported*1	Boolean	RO	Indicates the Legacy 16bit Block ID is supported.			–
GevMCSPxSupported*1	Integer	RO	Indicates the message channel source port is supported.			–
PayloadType*1	Integer	RO	Configuration of the payload type of the device.			–
GevCCP	Enumeration	RW	Controls the device access privilege of an application. This can be any of the following values: OpenAccess ExclusiveAccess ControlAccess ControlAccessSwitchoverActive			–
GevPrimaryApplicationSocket	Integer	RO	Returns the UDP source port of the primary application.			–
GevPrimaryApplicationIPAddress	Integer	RO	Returns the address of the primary application.			–
GevMCPHostPort	Integer	RW	Controls the port to which the device must send messages. Setting this value to 0 closes the message channel. This can be a value in the following range: Min: 0 Max: 65535	0		–
GevMCDA	Integer	RW	Controls the destination IP address for the message channel.			–
GevMCTT	Integer	RW	Provides the transmission timeout value in milliseconds. This can be a value in the following range: Min: 0 Max: 10000			–

Feature Name	Type	Access	Description	Default Value	Save to	Referenced page
GevMCRC	Integer	RW	Controls the number of retransmissions allowed when a message channel message times out. This can be a value in the following range: Min: 0 Max: 10	3		–
GevMCSP	Integer	RO	This feature indicates the source port for the message channel.			–
GevStreamChannelSelector	Integer	RO	Selects the stream channel to control.			–
GevSCPDirection*1	Enumeration	RO	Reports the direction of the stream channel.			–
GevSCPInterfaceIndex	Integer	RO	Index of the logical link to use.			–
GevSCPHostPort	Integer	RW	Controls the port of the selected channel to which a GVSP transmitter must send data stream or the port from which a GVSP receiver may receive data stream. Setting this value to 0 closes the stream channel. This can be a value in the following range: Min: 0 Max: 65535	0		–
GevSCPSBigEndian*1	Boolean	RW	Endianess of multi-byte pixel data for this stream.	FALSE		–
GevSCPSPacketSize	Integer	RW	Specifies the stream packet size, in bytes, to send on the selected channel for a GVSP transmitter or specifies the maximum packet size supported by a GVSP receiver. This can be a value in the following range: Min: 576 Max: 8228	8228		–
GevSCPD	Integer	RW	Controls the delay (in timestamp counter unit) to insert between each packet for this stream channel. This can be used as a crude flow-control mechanism if the application or the network infrastructure cannot keep up with the packets coming from the device. This can be a value in the following range: Min: 0 Max: 65535	0		–
GevSCDA	Integer	RW	Controls the destination IP address of the selected stream channel to which a GVSP transmitter must send data stream or the destination IP address from which a GVSP receiver may receive data stream.			–
GevSCSP	Integer	RO	Indicates the source port of the stream channel.			–
GevSCCFGPacketResend-Destination	Boolean	RW	Enables the alternate IP destination for stream packets resent due to a packet resend request. When True, the source IP address provided in the packet resend command packet is used. When False, the value set in the GevSCDA[GevStreamChannelSelector] feature is used.	FALSE		–
GevSCCFGAllInTransmission	Boolean	RO	Enables the selected GVSP transmitter to use the single packet per data block All-in Transmission mode.			–

Feature Name	Type	Access	Description	Default Value	Save to	Referenced page
GevSCCFGUnconditional-Streaming	Boolean	RO	Enables the camera to continue to stream, for this stream channel, if its control channel is closed or regardless of the reception of any ICMP messages (such as destination unreachable messages).			–
GevSCCFGExtendedChunkData	Boolean	RW	Enables cameras to use the extended chunk data payload type for this stream channel.	FALSE		–
IEEE1588						
GevIEEE1588*[1]	Boolean	RW	Enables the IEEE1588 Precision Time Protocol to control the timestamp register.	FALSE		23
GevIEEE1588SlaveOnly*[1]	Boolean	RW	Select the Master/Slave mode for the IEEE1588 Precision Time Protocol.	FALSE		23
GevIEEE1588Status*[1]	Enumeration	RO	Provides the state of the IEEE1588 clock.			23
GevIEEE1588Priority1*[1]	Integer	RW	Sets the Priority1 for the PTP master. This can be a value in the following range: Min: 0 Max: 255	128		23
GevIEEE1588Priority2*[1]	Integer	RW	Sets the Priority2 for the PTP master. This can be a value in the following range: Min: 0 Max: 255	128		23
GevIEEE1588DomainNumber*[1]	Integer	RW	Sets the Domain Number for the PTP. This can be a value in the following range: Min: 0 Max: 255	0		23
GevIEEE1588LogAnnounce-Interval*[1]	Enumeration	RW	Sets the Log Announce Interval when this device is PTP master. This can be any of the following values: Interval1s, 2s, 4s, 8s, 16s	Interval2s		23
GevIEEE1588LogSyncInterval*[1]	Enumeration	RW	Sets the Log Sync Interval when this device is PTP master. This can be any of the following values: Interval0_5s, 1s, 2s	Interval1s		23
GevIEEE1588LogMinDelay-ReqInterval*[1]	Enumeration	RW	Sets the Log Announce Receipt Timeout when this device is PTP master. This can be any of the following values: Interval1s, 2s, 4s, 8s, 16s, 32s	Interval1s		23
GevIEEE1588AnnounceReceipt-Timeout*[1]	Enumeration	RW	Sets the Log Announce Receipt Timeout when this device is PTP master. This can be any of the following values: x2, x3, x4, x5, x6, x7, x8, x9, x10	x3		23
PtpControl						
PtpEnable*[2]	Boolean	RW	Enables the IEEE1588 Precision Time Protocol to control the timestamp register.	FALSE	Device	23
PtpSlaveOnly*[2]	Boolean	RW	Select the Master/Slave mode for the IEEE1588 Precision Time Protocol.	FALSE	Device	23
PtpStatus*[2]	Enumeration	RO	Provides the latched state of the PTP clock.			23
PtpPriority1*[2]	Integer	RW	Sets the Priority1 for the PTP master. This can be a value in the following range: Min: 0 Max: 255	128		23

Feature Name	Type	Access	Description	Default Value	Save to	Referenced page
PtpPriority2*2	Integer	RW	Sets the Priority2 for the PTP master. This can be a value in the following range: Min: 0 Max: 255	128		23
PtpDomainNumber*2	Integer	RW	Sets the Domain Number for the PTP. This can be a value in the following range: Min: 0 Max: 255	0		23
PtpLogAnnounceInterval*2	Enumeration	RW	Sets the Log Announce Interval when this device is PTP master. This can be any of the following values: Interval1s, 2s, 4s, 8s, 16s	Interval2s		23
PtpLogSyncInterval	Enumeration	RW	Sets the Log Sync Interval when this device is PTP master. This can be any of the following values: Interval0_5s, 1s, 2s	Interval1s		23
PtpLogMinDelayReqInterval*2	Enumeration	RW	Sets the Log Announce Receipt Timeout when this device is PTP master. This can be any of the following values: Interval1s, 2s, 4s, 8s, 16s, 32s	Interval1s		23
PtpAnnounceReceiptTimeout*2	Enumeration	RW	Sets the Log Announce Receipt Timeout when this device is PTP master. This can be any of the following values: x2, x3, x4, x5, x6, x7, x8, x9, x10	x3		23

ChunkDataControl

Contains the features related to the Chunk Data Control. This feature is not available in XCG-CG40.

Feature Name	Type	Access	Description	Default Value	Save to	Referenced page
ChunkModeActive	Boolean	RW	Activates the inclusion of Chunk data in the payload of the image.	FALSE		–
ChunkSelector	Enumeration	RW	Selects which Chunk to enable or control. This can be any of the following values: ChunkTemperature ChunkLineStatusAll ChunkExposureTime ChunkGainAnalog ChunkPixelGain ChunkUserMemory	ChunkTemperature		–
ChunkIDSet	Integer	RO	Get Chunk ID.			–
ChunkSizeSet	Integer	RO	Get Chunk Size.			–
ChunkEnable	Boolean	RW	Enables the inclusion of the selected Chunk data in the payload of the image.	FALSE		–

Specifications

Pickup device CMOS image sensors with a global shutter function
XCG-CG40/CG160/CG160C: 1/2.9 type
XCG-CG240/CG240C: 1/1.2 type
XCG-CG510/CG510C/CP510: 2/3 type

Standard video output size (horizontal/vertical)
XCG-CG40: 720 × 540
XCG-CG160/CG160C: 1,440 × 1,080
XCG-CG240/CG240C: 1,920 × 1,200
XCG-CG510/CG510C/CP510: 2,448 × 2,048

Frame rate (during 1000BASE-T operation)
XCG-CG40: 300 fps
XCG-CG160/CG160C: 75 fps
XCG-CG240/CG240C: 41 fps
XCG-CG510/CG510C/CP510: 23 fps

Lens mount C-mount

Flange focal length
17.526 mm

Video output signal
XCG-CG40/CG160/CG240/CG510/CP510:
Mono 8 bits (default setting)/10 bits/12 bits
XCG-CG160C/CG240C/CG510C:
Raw 8 bits (default setting)/10 bits/12 bits, RGB 24 bits, YUV 24 bits, YUV 16 bits

Reference video output level
235 steps (8 bits)/3,760 steps (12 bits)

Reference pedestal level
16 steps (8 bits)/256 steps (12 bits)

Range of color temperature for white balance (color camera)
XCG-CG160C/CG240C/CG510C:
2,400 K to 9,000 K

Minimum illumination
XCG-CG40:
0.5 lx (gain control at +18 dB, F1.4, shutter speed at 1/100 sec)
XCG-CG160:
0.5 lx (gain control at +18 dB, F1.4, shutter speed 1/30 sec)
XCG-CG160C:
12 lx (gain control at +18 dB, F1.4, shutter speed 1/30 sec)
XCG-CG240:
0.5 lx (gain control at +18 dB, F1.4, shutter speed at 1/30 sec)
XCG-CG240C:
10 lx (gain control at +18 dB, F1.4, shutter speed at 1/30 sec)
XCG-CG510:
0.5 lx (gain control at +18 dB, F1.4, shutter speed at 1/23 sec)
XCG-CG510C:
10 lx (gain control at +18 dB, F1.4, shutter speed at 1/23 sec)
XCG-CP510:
1.5 lx (gain control at +18 dB, F1.4, shutter speed at 1/23 sec)

Sensitivity
XCG-CG40:
F11 (gain control at 0 dB, 400 lx, shutter speed at 1/30 sec)
XCG-CG160:
F5.6 (gain control at 0 dB, 400 lx, shutter speed 1/30 sec)
XCG-CG160C:
F5.6 (gain control at 0 dB, 2,000 lx, shutter speed 1/30 sec)
XCG-CG240:
F5.6 (gain control at 0 dB, 400 lx, shutter speed at 1/30 sec)
XCG-CG240C:
F5.6 (gain control at 0 dB, 2,000 lx, shutter speed at 1/30 sec)
XCG-CG510:
F8 (gain control at 0 dB, 400 lx, shutter speed at 1/23 sec)
XCG-CG510C:
F8 (gain control at 0 dB, 2,000 lx, shutter speed at 1/23 sec)
XCG-CP510:
F4 (gain control at 0 dB, 400 lx, shutter speed at 1/23 sec)

Gain 0 dB to 18 dB, Auto gain

Shutter speed
XCG-CG240/CG240C:
1/40,000 sec to 60 sec, Auto Exposure (Quality is secured for 2 sec. at most)
XCG-CG40/CG160/CG160C, XCG-CG510/CG510C/CP510:
1/100,000 sec to 60 sec, Auto Exposure (Quality is secured for 2 sec. at most)

Gamma $\gamma = 1$ (Changeable by LUT)

External power DC 12 V (10.5 V to 15 V): DC power input connector/IEEE802.3af (37 V to 57 V): RJ45 connector

Power consumption
XCG-CG40/CG160/CG160C:
4.0 W (PoE)/3.3 W (DC 12 V)
XCG-CG240/CG240C:
3.6 W (PoE)/3.0 W (DC 12 V)
XCG-CG510/CG510C/CP510:
3.7 W (PoE)/3.3 W (DC 12 V)

Performance guarantee temperature
0 °C to 40 °C (32 °F to 104 °F)

Operating temperature
–5 °C to +45 °C (23 °F to 113 °F)

Storage temperature
: –30 °C to +60 °C (–22 °F to +140 °F)

Operating relative humidity
: 20% to 80% (no condensation)

Storage relative humidity
: 20% to 80% (no condensation)

MTBF
: XCG-CG40/CG160/CG160C:
approx. 6.7 years
XCG-CG240/CG240C:
approx. 7.2 years
XCG-CG510/CG510C/CP510:
approx. 7.1 years

Vibration resistance
: 10 G (20 Hz to 200 Hz)

Shock resistance
: 70 G

External dimension (w/h/d)
: 29 × 29 × 42 mm ($1\ ^{3}/_{16} \times 1\ ^{3}/_{16} \times 1\ ^{11}/_{16}$ inches) (excluding protrusions)

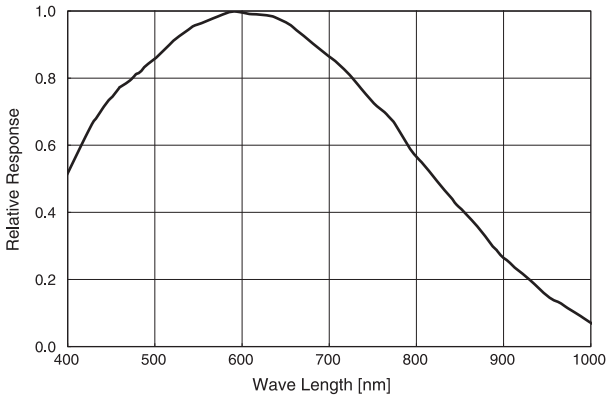
Mass About
: Approx. 65 g (2 oz)

Accessories
: Lens mount cap (1)
Safety Regulations (1)

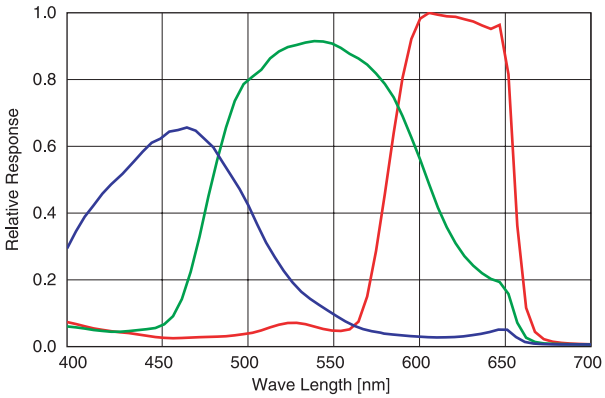
Design and specifications are subject to change without notice.

Spectral Sensitivity Characteristics (Typical Values)

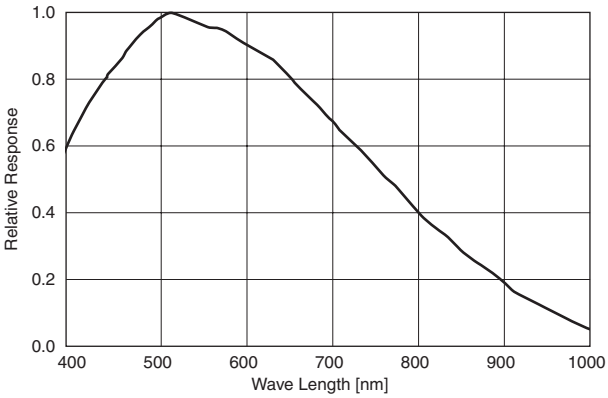
XCG-CG40/CG160



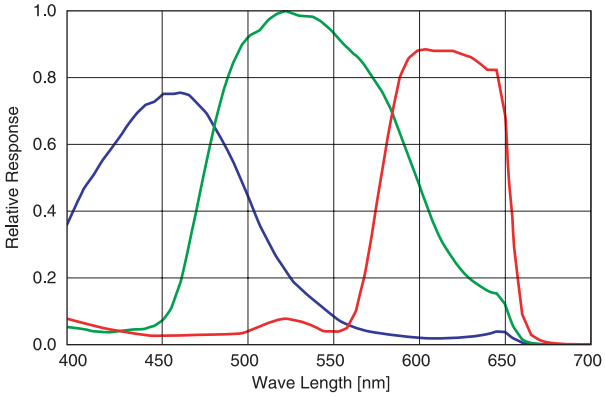
XCG-CG160C



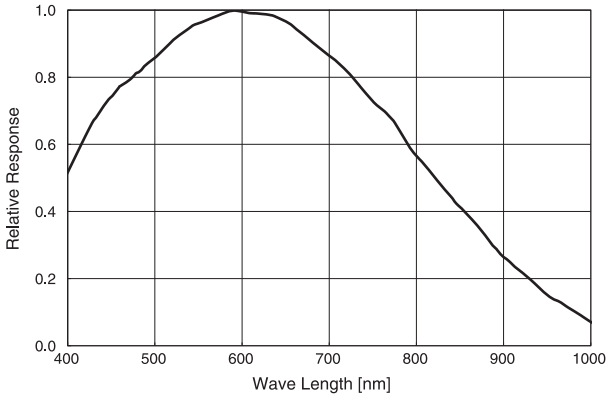
XCG-CG240



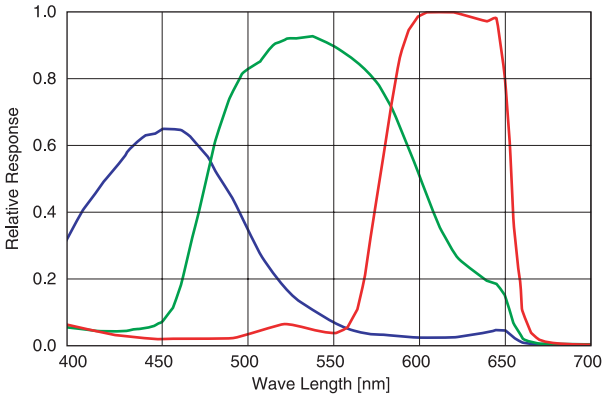
XCG-CG240C



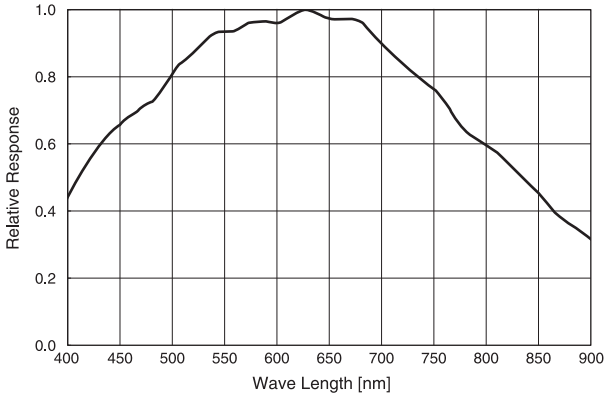
XCG-CG510



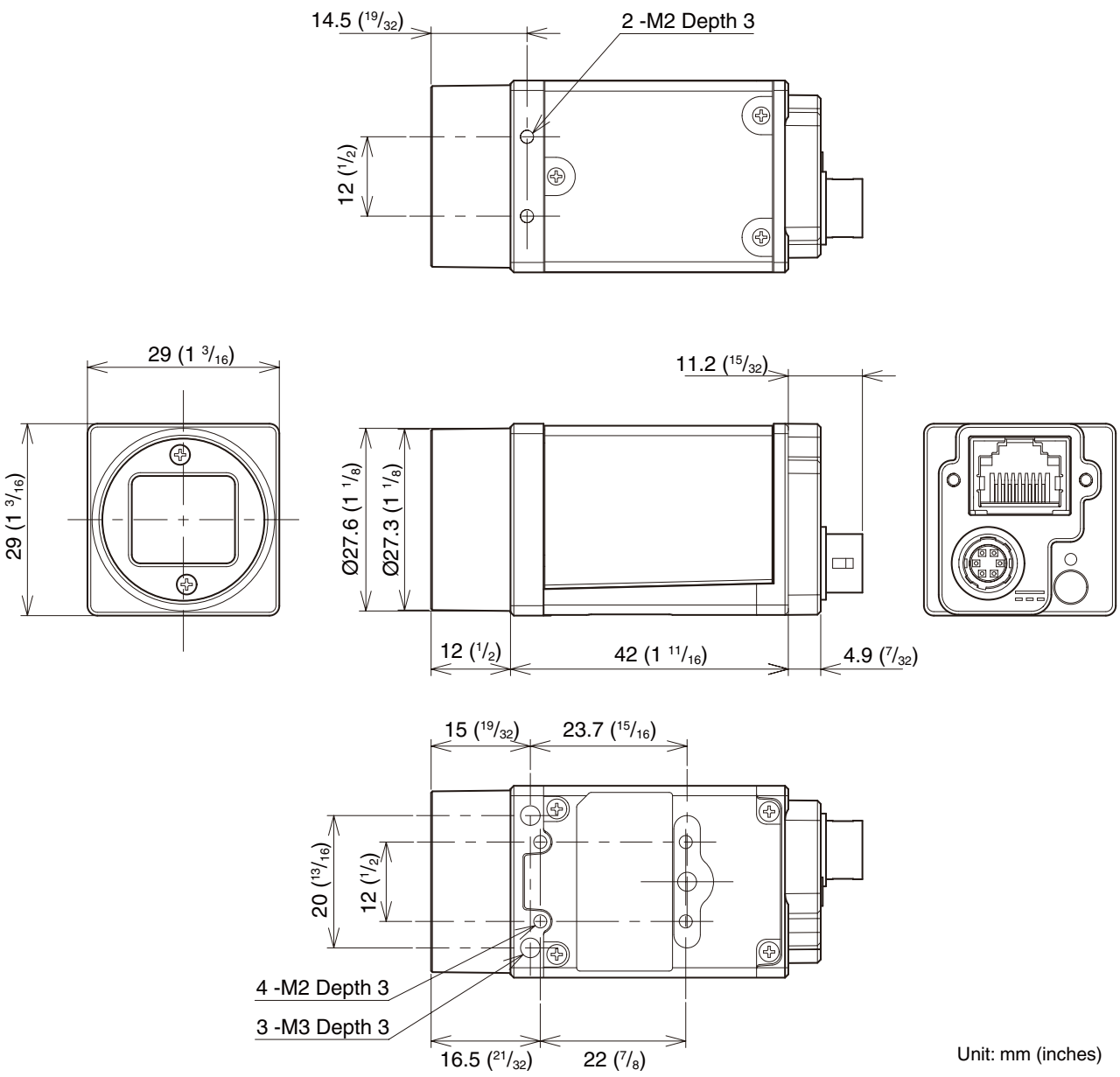
XCG-CG510C



XCG-CP510



Dimensions


14.5 (19/32)
2 -M2 Depth 3
12 (1/2)
29 (1 3/16)
29 (1 3/16)
11.2 (15/32)
Ø27.6 (1 1/8)
Ø27.3 (1 1/8)
12 (1/2)
42 (1 11/16)
4.9 (7/32)
15 (19/32)
23.7 (15/16)
20 (13/16)
12 (1/2)
4 -M2 Depth 3
3 -M3 Depth 3
16.5 (21/32)
22 (7/8)
Unit: mm (inches)

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