

Multiple Regions of Interest for Goldeye G/CL

Scope

A regions of interest (ROI) is used to reduce the image resolution when only a section of the sensor image is needed and to increase maximum frame rates.

Goldeye G/CL cameras support **MultipleRegions** features for multiple ROIs that are non-overlapping. This document explains how to use the these features.

Supported camera models	Supported number of ROIs	Required firmware version
G/CL-030, G/CL-130	Maximum 8	V02.26.x or higher
G/CL-034, G/CL-034 XSWIR	Maximum 32	V03.06.x or higher

Table 1: Supported camera models, number of ROIs and required firmware version

Single ROI

With ROI features, you can configure a single ROI by **Height**, **Width**, **OffsetX**, and **OffsetY**:

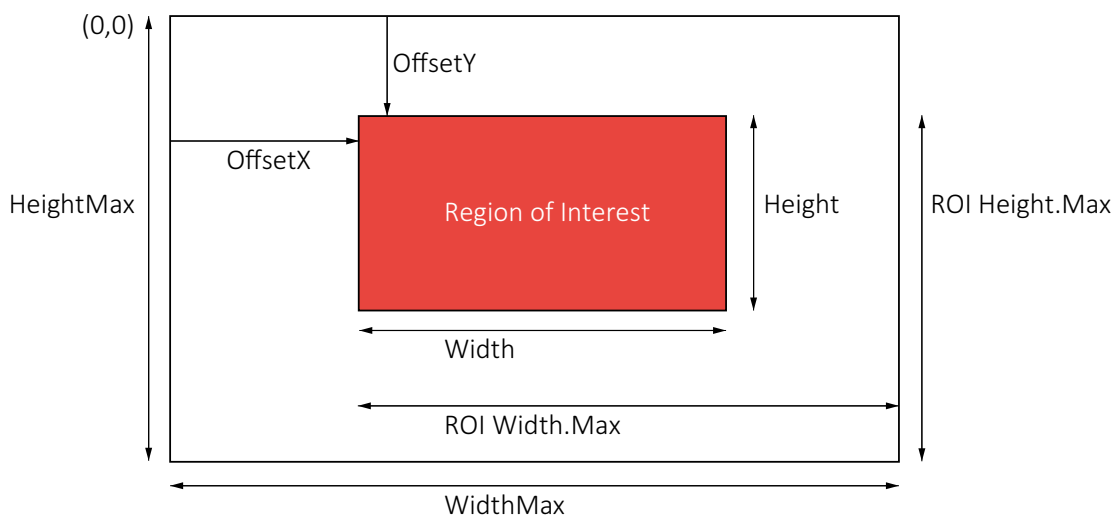


Figure 1: Features to configure a single ROI

Multiple ROIs

Multiple ROIs merged to a common image

With Multiple ROI, you can configure several ROIs, named subregions. The maximum number of supported subregions depends on the camera model. [Figure 2](#) shows an example with 3 ROIs.

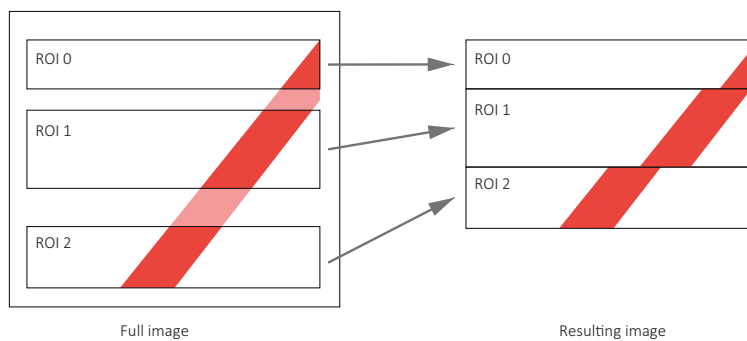


Figure 2: Multiple ROIs merged to a common image

All active ROIs are transmitted in a single frame. For each ROI, you can configure **Height** and **OffsetY**. In contrast, **Width** and the **OffsetX** are common for all regions, as shown in [Figure 3](#).

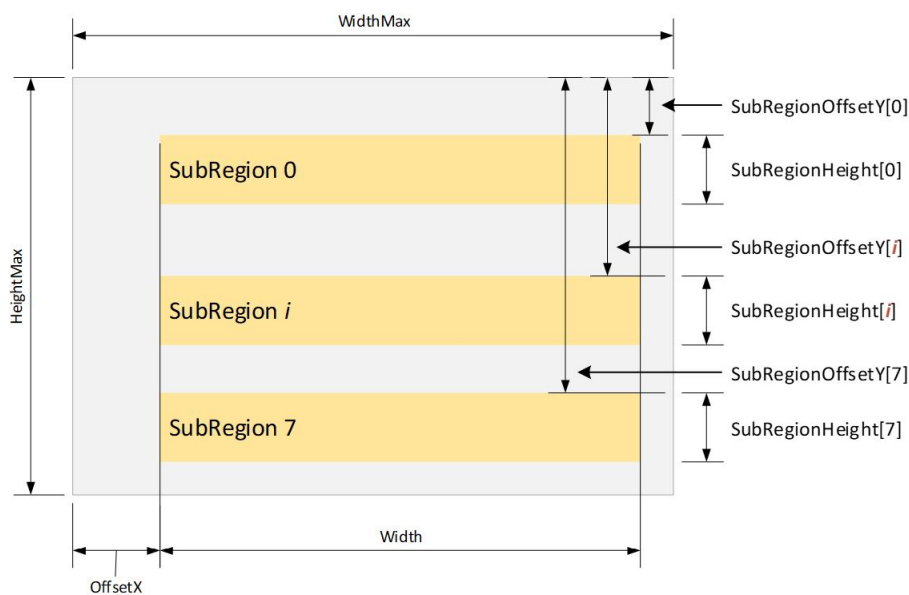


Figure 3: Subregion parameters and ROI order

Rules for configuring subregions

- ROIs must not overlap.
- Keep the order for ROIs as defined in [Equation 1](#) on page 3 and [Equation 2](#) on page 3.
- NUC (non uniformity correction) and DPC (defect pixel correction) are disabled for multiple ROIs.

The `SubRegionHeight` and `SubRegionOffsetY` parameters must meet the conditions shown in [Equation 1](#) and [Equation 2](#) (see [Figure 3](#) on page 2 for reference).)

$$\text{SubRegionOffsetY}[i + 1] \geq \text{SubRegionOffsetY}[i] + \text{SubRegionHeight}[i]$$

with i as `SubRegionSelector`

Equation 1: Rule 1 for the start position of the next SubRegion

$$\text{SubRegionOffsetY}[i] + \text{SubRegionOffsetHeight}[i] \leq \text{HeightMax}$$

with i as `SubRegionSelector`

Equation 2: Rule 2 for the maximum height of the next SubRegion

Therefore, **SubRegion 1** must start after **SubRegion 0**, **SubRegion 2** must start after **SubRegion 1**, and so on. [Table 2](#) gives examples of valid and invalid settings for subregions.

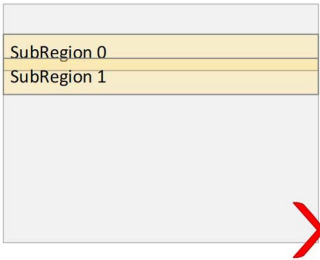
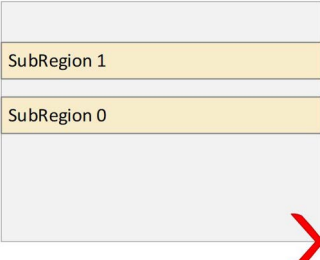
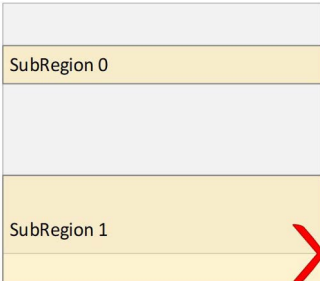
Example	Description
	Subregions are overlapping.
	Wrong order of subregions. Subregion indices must be increasing.
	Subregion 1 exceeds the maximum height. See Equation 2 .

Table 2: Valid and invalid conditions for subregions (sheet 1 of 2)

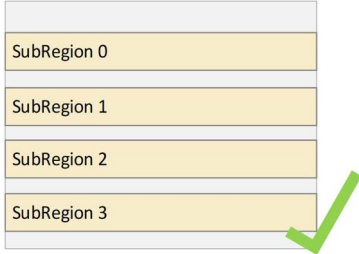
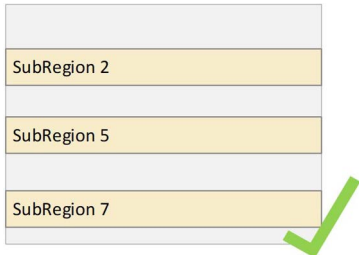
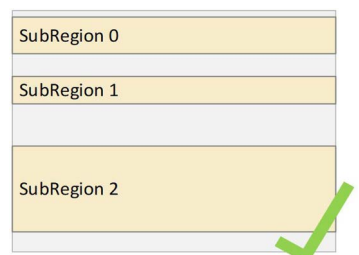
Example	Description
	Correct order of subregions
	Subregions may be omitted as long as the indices are increasing.
	Subregions may have different height values.

Table 2: Valid and invalid conditions for subregions (sheet 2 of 2)

Application workflow

We recommend you to configure the [MultipleRegions features](#) as follows:

1. Stop the acquisition.
2. Set `MultipleRegionsEnable` to `True` to enable multiple regions. (If this feature is set to `False`, only a single region is active that can be configured as usual by `Width`, `Height`, `OffsetX`, and `OffsetY`.)
3. Select a subregion through `SubRegionSelector`.
4. Set `SubRegionMode` to `On` to activate the selected subregion.
5. Set the subregion's height by `SubRegionHeight`.
6. Set the subregions's vertical offset by `SubRegionOffsetY`.
7. Check the subregion's status by `SubRegionStatus`. The feature must be shown as `Valid`. Otherwise continue the configuration from [Step 5](#) again.
8. Continue with [Step 3](#) to set up further subregions.
9. Adjust width and horizontal offset for all subregions by `Width` and `OffsetX` features if desired.
10. Start the acquisition.

Result: The frames are merged from the subregions.

MultipleRegions features



Goldeye G/CL Features Reference

This is an excerpt of the Goldeye G/CL Features Reference, see www.alliedvision.com/en/support/technical-documentation/goldeye-gcl-documentation.

MultipleRegions (subcategory)

This subcategory holds the features to configure and control the multiple regions of the camera.

Notes

- Multiple regions are **available only on** Goldeye G/CL-030 TEC1, G/CL-034 XSWIR 1.9 TEC2, G/CL-034 XSWIR 2.2 TEC2, and G/CL-130 TEC1..
- Features in the **NonUniformityCorrection** and **DefectPixelCorrection** subcategories are not supported when **MultipleRegionsEnable** is set *True*.
- Enabling **NonUniformityCorrection** and **DefectPixelCorrection** features disables **MultipleRegions** features and vice versa.

Display name	MultipleRegions
Origin of feature	Camera
Feature type	(Subcategory)
Category	/ImageFormatControl

MultipleRegionsEnable

Selects between single region and multiple regions mode. Multiple regions mode allows to configure up to 8 subregions.

Note: The height and Y-offset for each active subregion can be configured individually, but the horizontal dimensions are commonly set by **Width** and **OffsetX** for all subregions.

Display name	MultipleRegionsEnable
Origin of feature	Camera
Feature type	Boolean
Access	R/W
Affected features	Height, OffsetY
Category	/ImageFormatControl/MultipleRegions

Possible Values	Description
<i>False</i>	Single region mode is enabled, subregions mode is disabled (default). Height and OffsetY can be used as usual.
<i>True</i>	Subregions mode is enabled. Height and OffsetY features are locked and are automatically aligned with the values set for subregions.

SubRegionMode

[SubRegionSelector]

Enables or disables the selected subregion.

Display name	SubRegionMode
Origin of feature	Camera
Feature type	Boolean
Access	R/W
Affected features	Height, OffsetY, SubRegionStatus
Category	/ImageFormatControl/MultipleRegions

Possible Values	Description
<i>On</i>	The selected subregion is enabled.
<i>Off</i>	The selected subregion is disabled.

SubRegionHeight

[SubRegionSelector]

Height of the selected subregion.

Goldeye G/CL-030 and G/CL-130: If values are entered that are not dividable by 8, SubRegionHeight is increased automatically to the next higher available value. For example, if 9 is entered, the value is increased to 16.

Goldeye G/CL-034 and G/CL-034 XSWIR: The total sum of all active SubRegionsHeights must be >= 4.

Display name	SubRegionHeight
Origin of feature	Camera
Feature type	Integer
Access	R/W
Unit	Pixels
Affected features	Height, SubRegionStatus
Category	/ImageFormatControl/MultipleRegions

Values ¹	Description
8 ; 1	Minimum
(Height max)	Maximum, depending on the height of other subregions
8 ; 1	Increment
¹ G/CL-030, G/CL-130 ; G/CL-034, G/CL-034 XSWIR	

SubRegionOffsetY

[SubRegionSelector]

Y-offset of the selected subregion.

Notes for Goldeye G/CL-030 and G/CL-130: If values are entered that are not dividable by 8, **SubRegionOffsetY** is increased automatically to the next higher available value. For example, if **9** is entered, the value is increased to **16**.

Display name	SubRegionOffsetY
Origin of feature	Camera
Feature type	Integer
Access	R/W
Unit	Pixels
Affected features	OffsetY, SubRegionStatus
Category	/ImageFormatControl/MultipleRegions

Values ¹	Description
8 ; 1	Minimum
(Height max)	Maximum, depending on the height of other subregions
8 ; 1	Increment
¹ G/CL-030, G/CL-130 ; G/CL-034, G/CL-034 XSWIR	

SubRegionSelector

Selects the subregion in a range from θ to n , where θ is the index of the first subregion and n is the index of the last one..

Display name	SubRegionSelector
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	SubRegionHeight, SubRegionMode, SubRegionOffsetY, SubRegionStatus
Category	/ImageFormatControl/MultipleRegions

Values ¹	Description
θ ; θ	Minimum
7 ; 31	Maximum
¹ G/CL-030, G/CL-130 ; G/CL-034, G/CL-034 XSWIR	

SubRegionStatus

[SubRegionSelector]

Displays the status of the selected subregion.

Note: The `SubRegionStatus` is updated only if `MultipleRegionsEnable` is `True` and the corresponding `SubRegionMode` is set to `On`.

Display name	SubRegionStatus
Origin of feature	Camera
Feature type	Enumeration
Access	R
Affected features	(None)
Category	/ImageFormatControl/MultipleRegions

Possible values	Description
<i>Disabled</i>	The selected subregion is disabled.
<i>Valid</i>	The selected subregion is enabled and has a valid configuration.
<i>OverlapError¹</i>	The selected subregion is enabled but has an invalid configuration.

¹**Note:** Invalid subregions are excluded automatically from the resulting frame.

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