

## APPLICATION NOTE

# Multiple Regions of Interest for Goldeye G/CL

**V1.2.0**  
**2023-Jan-26**

## 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
All G/CL-008 models	Maximum 32	V04.04.x or higher
G/CL-030 TEC1, G/CL-130 TEC1	Maximum 8	V02.26.x or higher
All G/CL-034 models	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**:

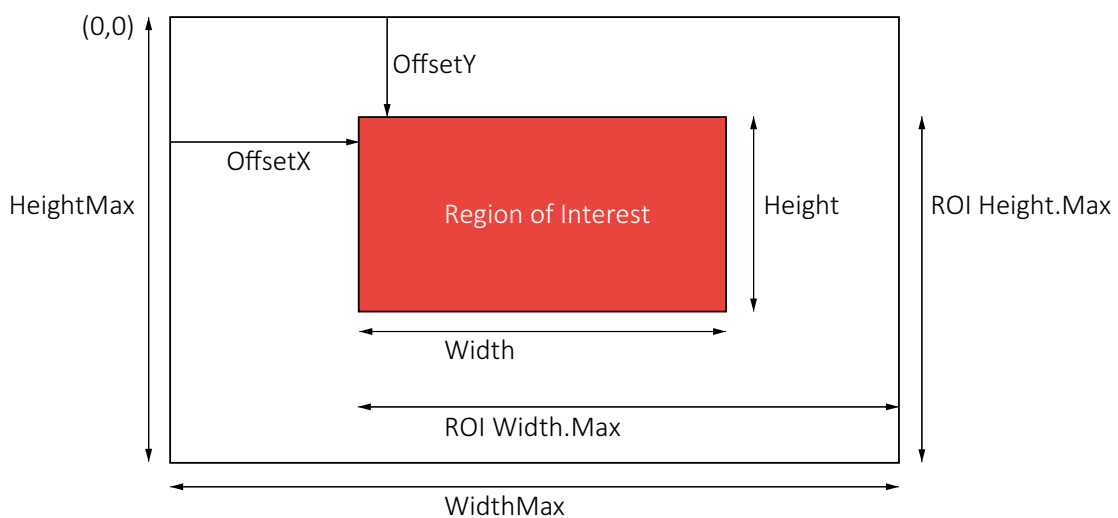


Figure 1: Features to configure a single ROI

## 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.

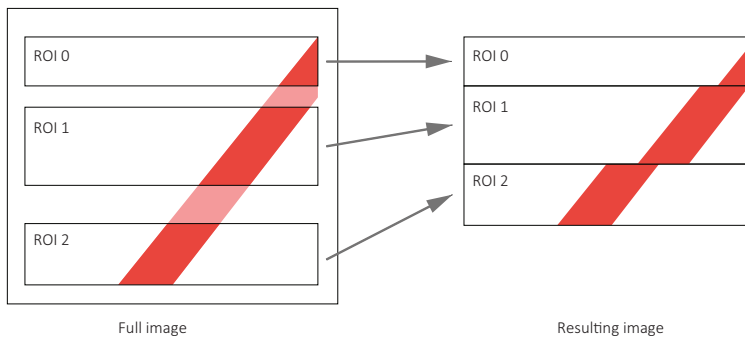


Figure 2: Multiple ROIs merged to a common image

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](#).

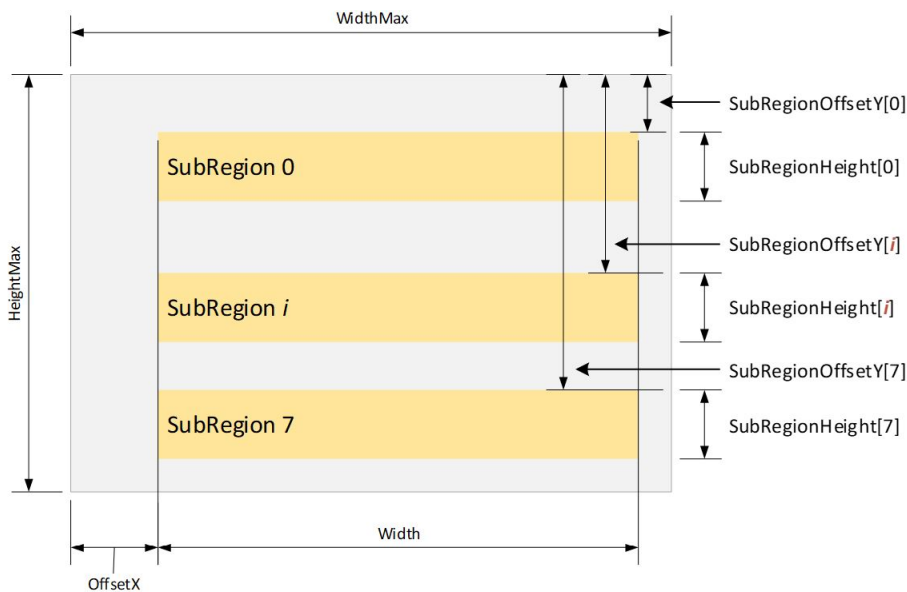


Figure 3: Subregion parameters and ROI order

### 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`

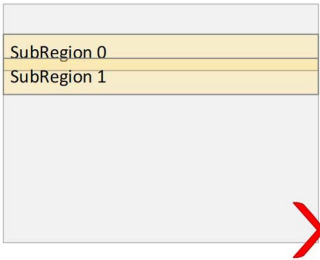
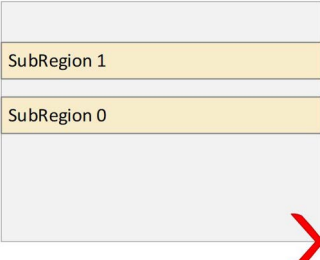
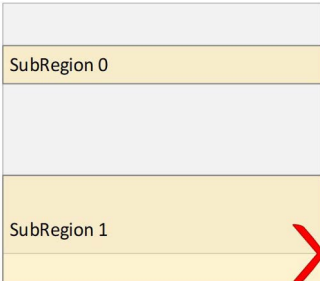
*Equation 1: Rule 1 for the start position of the next SubRegion*

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

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 <a href="#">Equation 2</a> .

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

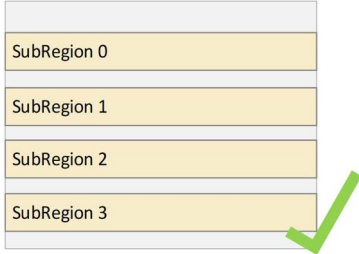
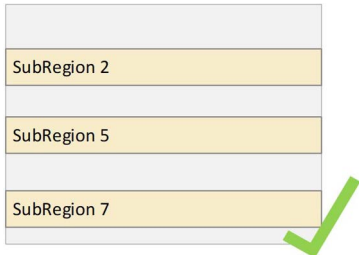
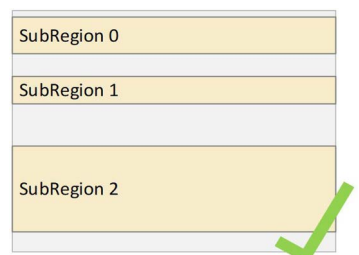
Example	Description
	Correct order of subregions
	Subregions may be omitted as long as the indices are increasing.
	Subregions may have different height values.

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](http://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 for** all Goldeye G/CL-008 models, on G/CL-030 TEC1, all G/CL-034 models, 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.

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

## MultipleRegionsEnable

Selects between single region and multiple regions mode. The number of subregions to be configured depends on the camera model.

**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.

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

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

## SubRegionMode

[SubRegionSelector]

Enables or disables the selected subregion.

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

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.

**All Goldeye G/CL-008 models, G/CL-034 and G/CL-034 XSWIR models:** The total sum of all active SubRegionsHeights must be >= 4.

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

Values <sup>1</sup>	Description
8 ; 1	Minimum
(Height max)	Maximum, depending on the height of other subregions
8 ; 1	Increment

<sup>1</sup> G/CL-030, G/CL-130 ; all G/CL-008 models, 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**.

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

Values <sup>1</sup>	Description
8 ; 1	Minimum
(Height max)	Maximum, depending on the height of other subregions
8 ; 1	Increment
<sup>1</sup> G/CL-030, G/CL-130 ; all G/CL-008 models, G/CL-034, G/CL-034 XSWIR	

## SubRegionSelector

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

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

Values <sup>1</sup>	Description
$\theta$ ; $\theta$	Minimum
7 ; 31	Maximum
<sup>1</sup> G/CL-030, G/CL-130 ; all G/CL-008 models, 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`.

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

Values	Description
<i>Disabled</i>	The selected subregion is disabled.
<i>Valid</i>	The selected subregion is enabled and has a valid configuration.
<i>OverlapError<sup>1</sup></i>	The selected subregion is enabled but has an invalid configuration.

<sup>1</sup>**Note:** Invalid subregions are excluded automatically from the resulting frame.



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