Allied Vision

MIPI CSI-2, GigE Vision, and USB3 Vision Cameras

Alvium

Features Reference

V2.7.2

Alvium CSI-2, G5, USB: V00.10.6c9062b1

Alvium G1: V00.10.00.2cf3b22e

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2022-Jul-20

This document at a glance

Read this document carefully

Learn to avoid damage to your Alvium camera and use it in the most safe and efficient way.

The Alvium Features Reference describes Alvium features, based on GenICam features as seen from the **Vimba Viewer**.

Differences in features and values

Features described in this document may not be supported by every Alvium model. Value ranges may differ between models as well.

GenICam for CSI-2 Access is supported for selected camera models, please see the Alvium CSI-2 Cameras User Guide for details.

`ActionControl` features are currently supported only by Alvium G5 cameras. The features are not working properly for Alvium G1 yet. This will be fixed in the next firmware release. Support for the other Alvium series is intended for a future firmware release.

`ChunkDataControl` features are currently supported only by Alvium 1800 U cameras. Support for the other Alvium series is intended for a future firmware release.

`SequencerControl` features are currently supported only by Alvium 1800 U cameras with Sony IMX global shutter sensors. The features in this category are still in the testing phase and not fully validated, support for the other Alvium series is intended for a future firmware release.

`SoftwareSignalControl` features are supported by all Alvium series cameras. The features in this category are still in the testing phase and not fully validated.

Further information and feedback

- For more information on Alvium cameras, see www.alliedvision.com/en/support/technical-documentation.html.
- For feedback or technical questions, please visit www.alliedvision.com/en/support.

Vimba and third party software

Vimba is the Allied Vision Software Development Kit (SDK) for camera control and image acquisition, including drivers and other useful data.

Because Vimba SDK is based on the GenICam standard, GenICam-based third-party software automatically connects with **Vimba**'s transport layers. Additionally, Vimba includes the **Cognex Adapter** for **VisionPro**.

Download **Vimba** from:

www.alliedvision.com/en/support/software-downloads

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Contents

Document history and conventions

This chapter includes:

Document history

Version	Date	Document updates
V2.7.2	2022-Jul-20	Added notes that `ActionControl` features are not working properly on Alvium G1 cameras yet.
V2.7.1	2022-Jul-15	**Firmware versions** • Alvium CSI-2, G5, USB: V00.10.6c9062b1 • Alvium G1: V00.10.00.2cf3b22e **Applied changes** • Added options for `TriggerSource` in AcquisitionControl on page 26. • Added feature support for Alvium G5 in: - ActionControl on page 41 - GVCP (subcategory) on page 125 - PtpControl on page 166. • Added feature support for Alvium USB cameras in ChunkDataControl on page 64. • Added options for `TimerTriggerSource` in CounterAndTimerControl on page 82. • Added support for all Alvium cameras and reorganized features in SerialHub (subcategory) on page 109. • Added options to `FileSelector` in FileAccessControl on page 114. • Added TestPattern in ImageFormatControl on page 131. • Added features in SequencerControl on page 156. • Added features in SoftwareSignalControl on page 173. • Removed `ColorTransformationSelector` from ColorTransformationControl on page 73. • Applied editorial changes.

Table 1: Document history (Sheet 1 of 4)

Version	Date	Document updates
V2.7.0	2022-Jun-09	**Firmware versions** • Alvium CSI-2, G5,USB: V00.08.00.6727174b • Alvium 1500 C-050, C-120, C-210, C-500, and 1800 C-500: V00.08.01.13f227a4 • Alvium G1: V00.09.00.45ce470f **Applied changes** • Added support for Alvium G1 and G5 models. • Added features in ActionControl on page 41. (Currently available for **Alvium G1 only**) • Added features in SerialHub (subcategory) on page 109. (Currently available for **Alvium G1 only**) • Added features in GVCP (subcategory) on page 125. (Currently available for **Alvium G1 only**) • Added features in PtpControl on page 166. (Currently available for **Alvium G1 only**) • Updated diagrams in Features processing order on page 22 for GigE cameras. • Applied editorial changes.
V2.6.1	2022-Mar-28	Added ***`Timer0Active`*** and ***`Timer1Active`*** options for `LineSource`.
V2.6.0	2022-Mar-21	**Firmware version**: V00.08.00.6727174b • Added support for selected Alvium 1800 C models. • Updated diagrams in Features processing order on page 22 for convolution filters. • Added the `CounterAndTimerControl` category. • Added `AcquitisitonFrameRateMode`, `ExposureActiveMode` and `SensorBitDepth`. • Added features to control convolution filters in the `ImageProcessingControl` category. • Added individual options ***`UserSet1`*** to ***`UserSet4`*** and descriptions to the `UserSetControl` category. • Added features that are specific to MPI CSI-2, including the subcategories `StreamInformation/Statistics` and `TransportLayerControl/Info`. • Applied editorial changes.

Table 1: Document history (Sheet 2 of 4)

Version	Date	Document updates
V2.5.0	2021-Dec-07	**Firmware version**: V00.07.00.81db3896 • Updated diagrams in Features processing order on page 22 for new LUT and Sharpness features. • Added descriptions for `Sharpness`, `TriggerDelay`, and LUT features. • Removed descriptions for `ContrastConfigurationMode`. • Added information on using `ExposureMode`.
V2.4.1	2021-Sep-22	• Removed ***`FitRange`*** option from `IntensityControllerAlgorithm`.
V2.4.0	2021-Aug-04	**Firmware version**: V00.06.00.35992 • Updated Figure 1: Image data flow for Alvium cameras on page 22. • Added feature descriptions for `BinningHorizontal`, `BinningHorizontalMode`, `BinningSelector`, `BinningVertical`, `BinningVerticalMode`, and `DevicePowerSavingMode`. • Applied editorial changes.
V2.3.0.	2021-Apr-07	**Firmware version**: V00.04.00.34658 • Added feature descriptions for `DeviceLinkCommandTimeout`, `DeviceTLVersionMajor`, `DeviceTLVersionMinor`, `TimestampLatch`, `TimestampLatchValue`, `TimestampReset`. • Applied editorial changes.
V2.2.0	2020-Nov-13	**Firmware version**: V00.03.00.31919 • Added descriptions in Features processing order on page 22. • Added ***`User`*** option to `CorrectionSet` and `CorrectionSetDefault` for defect pixel correction. • Applied editorial changes.
V2.1.2	2020-Jun-05	Corrected naming for the `IntensityAutoPrecedence` feature.
V2.1.1	2020-Mar-12	Removed notes for features previously enabled.
V2.1.0	2020-Feb-13	• Added contents for maximum values for contrast features. • Added `ShutterMode` to the feature descriptions.

Table 1: Document history (Sheet 3 of 4)

Version	Date	Document updates
V2.0.0	2020-Jan-07	**Firmware version**: V00.01.02.28100 • Added descriptions for `Contrast`, `Gamma`, `Hue`, `Saturation` features, and *`ExposureActive`* option for `TriggerSelector`. • Reorganized feature categories. • Added information on related selectors. • Reorganized introduction chapters. • Corrected typographical errors.
V1.0.3	2019-Sep-05	Applied editorial changes.
V1.0.2	2019-Jul-08	Applied editorial changes.
V1.0.1	2019-Jul-05	Applied editorial changes.
V1.0.0	2019-Jul-01	Associated firmware version: V00.01.00.26405 Release version

Table 1: Document history (Sheet 4 of 4)

Conventions used in this document

To give this document an easily understandable layout and to emphasize important information, the following typographical styles and symbols are used:

Styles

Style (example)	Function
Emphasis	Some important parts or items of the text are emphasized to make them more visible.
`Features names`	Features names are displayed as monospaced text.
`Features options`	Features options and values that are selectable by the user are displayed as monospaced italicized text.
`Non-standard features options`	Marked with superscript ([1]) are features that complement the features defined in the SFNC.
`InputCommand`	Text or command to type in by the user, selected menu options, or other selectable options.
`SourceCode`	Code words, such as for programs, used in running text. Mainly designated for use in software documentation.
UIElement	Text that is displayed, or output, by the system for the user, like parts of the GUI, dialog boxes, buttons, menus, important information, or windows titles.
WebReference	References to other documents or webpages, like weblinks, hypertext links, or emails.

Table 2: Markup conventions used in this reference

Symbols and notes

Practical tip

Additional information helps to understand or ease handling the camera.

Additional information

Web address or reference to an external source with more information is shown.

Avoiding malfunctions

Precautions are described.

Access

Acronym	Meaning
R/W	Feature is read/write.
R/(W)	Feature is readable, and it may be read/write, depending upon the user privilege level.
R/C	Feature is read-only and constant.
R	Feature is read-only and may change.
ROI	Region of interest
W	Feature is write-only.

Table 3: Abbreviations used in this reference

Standards referred to in this document

The document describes in alphabetical order the basic and advanced camera controls for Allied Vision Alvium cameras as seen from Vimba Viewer.

These features comply with the following standards:

- GigE Vision Standard Version 1.2
- USB3 Vision Standard V1.1
- GenICam Standard Features Naming Convention (SFNC) V2.4
- GenICam Transport Layer Standard Features Naming Convention (GenTL SFNC) V1.0
- AIA Pixel Format Naming Convention (PFNC) V2.2
- GenICam Generic Control Protocol (GenCP) V1.3.

Downloads of applied common standards

For SFNC, GenTL SFNC, and GenCP, see www.genicam.org
For USB3 Vision and PFNC, see www.visiononline.org

Allied Vision custom features

Some features in this document are adapted SFNC features. Some features are custom features adding new functions to the features range defined by the SFNC.

Acronyms and terms

Abbreviation/term	Meaning
Custom	Non-SFNC features that are adding to new functions to the existing SFNC feature definitions
GenTL SFNC	GenICam Transport Layer Standard Features Naming Convention
GenTL SFNC adapted	Features that deviate from the GenTL SFNC definition
GEV	GigE Vision Standard
SFNC	GenICam Standard Features Naming Convention
SFNC adapted	Features that deviate from the SFNC definition
U3V	USB3 Vision Standard

Table 4: Standards used in this reference

Features description scheme

This document describes categories and features as seen from Vimba Viewer and features in alphabetical order for Allied Vision Alvium cameras.

The features in this reference are described according to the formatting scheme described below.

Category name

First-level item, always starting a new page. Short description of category, including individual characteristics, and showing the Feature type as *(Category)*.

Subcategory

Second-level item. Short description of subcategory, including individual characteristics, and showing the Feature type as *(Category)*.

Feature

[Selector]

Second-level or third-level item. Short description of feature, including individual characteristics and possible values, and showing the full Category path.

Features availability

Some features are available for one camera interface only. Other features differ between camera interfaces. `AcquisitionFrameCount` is supported for all interfaces. If a feature is supported for some interfaces only, the Interface support is stated.

AcquisitionFrameCount

Controls the number of frames to acquire in *`MultiFrame`* acquisition mode.

Interface support	All
Display name	Acquisition Frame Count
Standard	SFNC
Origin of feature	Camera
Feature type	Integer
Access	R/W
Unit	(number)
Affected features	Not applicable
Category	/AcquisitionControl

Selectors

Some features have multiple instances. For these features, Selector features define which instance of the feature is accessed.

Example: the `LineInverter` feature, used to invert internal signal polarity, can be applied to all input and output lines of the camera. The line is selected by the `LineSelector` feature.

The headline for the feature description is `LineInverter[LineSelector]`, according to the C programming language convention for arrays: a pair of brackets follows the feature name, like in `SelectedFeature[Selector]`.

Invalidators

Some features have opposing functions. For example, `Sharpness` enhances edge contrast while `Blur` reduces edge contrast. Therefore, when `Sharpness` is enabled, `Blur` is automatically disabled. Feature descriptions provide an additional row for opposing features, called **Affected features**.

Copyright and trademarks

Feature description

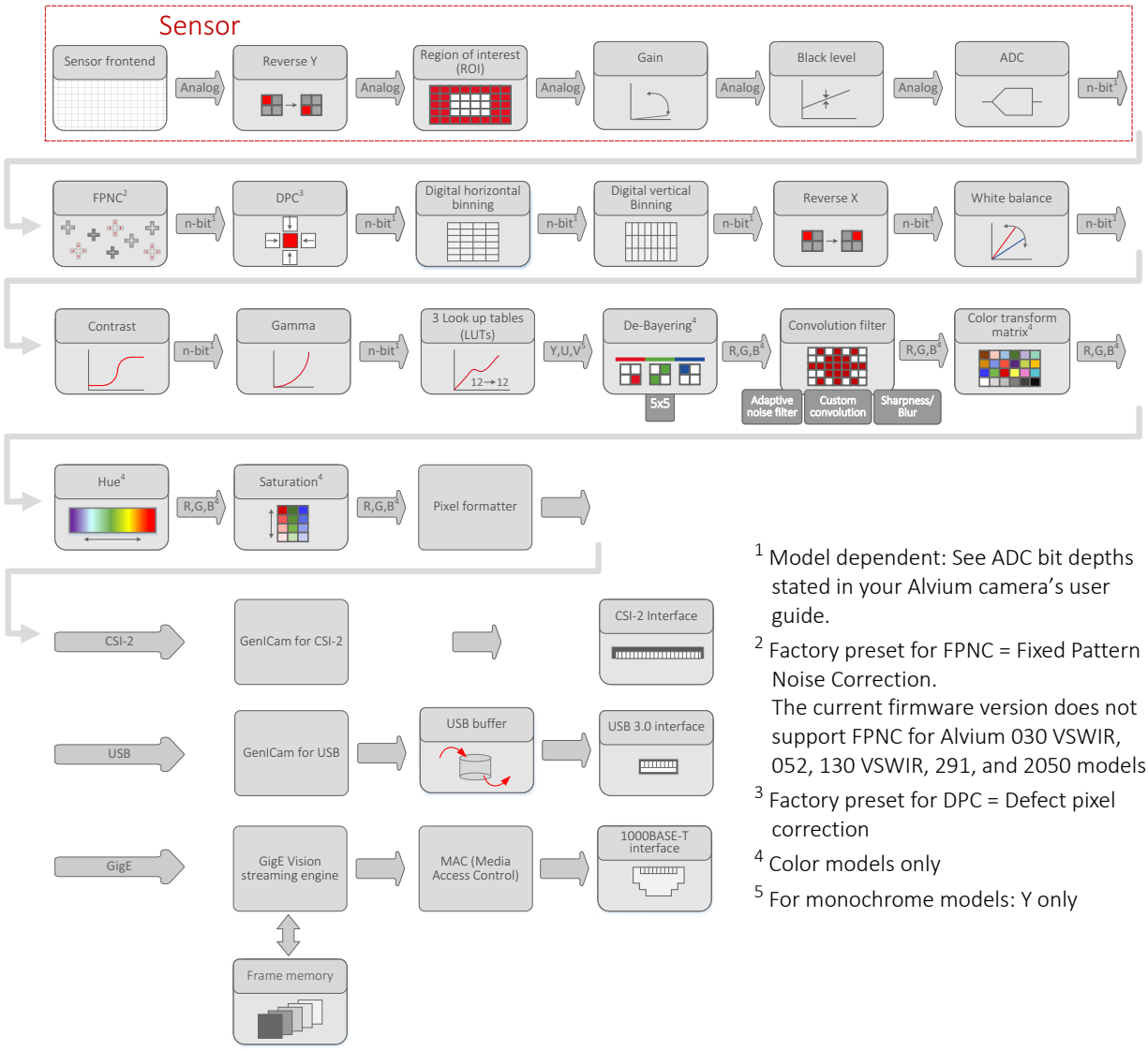
This chapter includes:

Features processing order

To develop your application effectively, note the order in which the features are processed in Alvium cameras.

Image data flow

In the Alvium user guides, the image data flow describes the sequence of image processing steps inside the camera. The shown functionalities represent features or feature groups.



[1] Model dependent: See ADC bit depths stated in your Alvium camera's user guide.

[2] Factory preset for FPNC = Fixed Pattern Noise Correction.
The current firmware version does not support FPNC for Alvium 030 VSWIR, 052, 130 VSWIR, 291, and 2050 models.

[3] Factory preset for DPC = Defect pixel correction

[4] Color models only

[5] For monochrome models: Y only

Figure 1: Image data flow for Alvium cameras

Feature interdependencies

The conversion between time and clock cycles affects control values. Features for pixel format, bandwidth, ROI, exposure time, and triggering are related to each other. Changing values for one feature can change values for another feature. For example, frame rates can be reduced when `PixelFormat` is changed subsequently. Figure 2 shows the interdependencies.

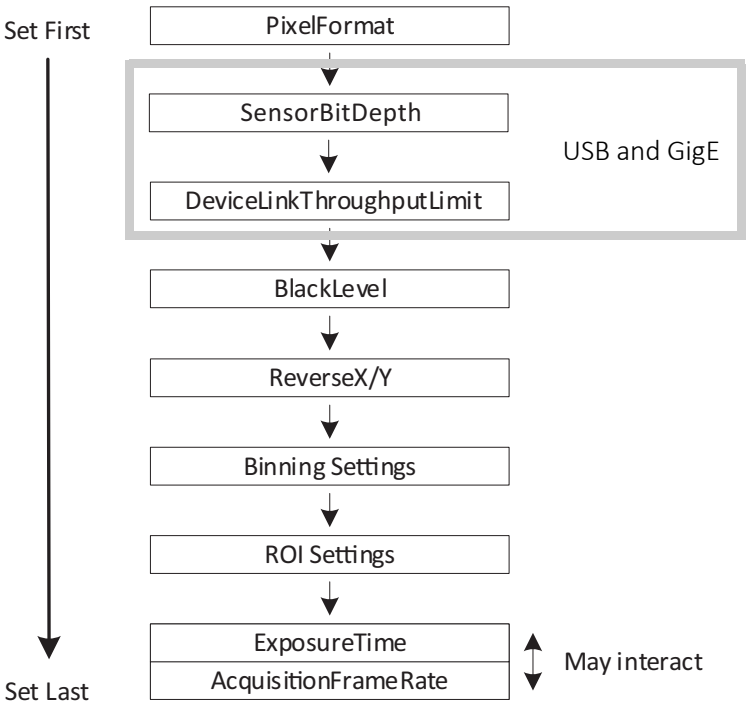


Figure 2: Interdependencies between features

Config mode for IP settings

GigE cameras: Use the Config mode in **Vimba Viewer** to write values for features in the `GigE/Configuration` and `GigE/Persistent` categories:

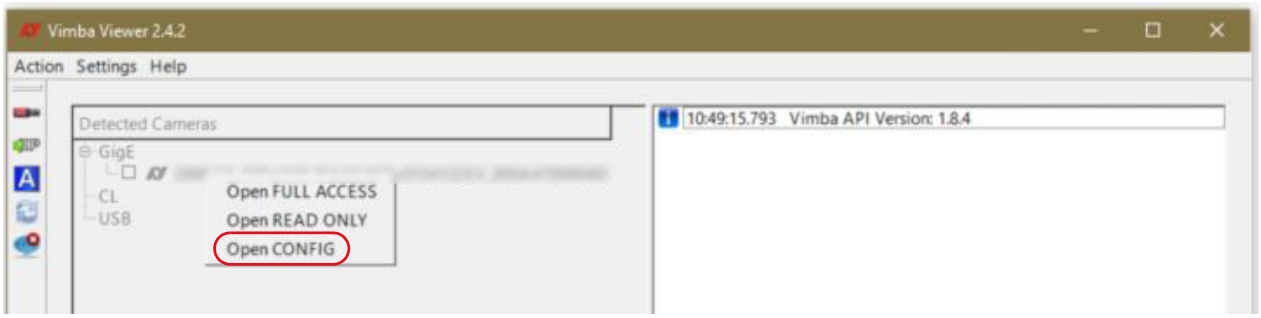


Figure 3: Opening a camera in Vimba Viewer's Config mode

Regions of interest and auto mode regions

Generally, auto mode regions are areas or regions on the image, where measurements are done to be used by various auto-features, for example measurement of the intensity for auto-exposure control.

The features used to define area of regions of interest (ROIs) and auto mode regions are displayed in Figure 4.

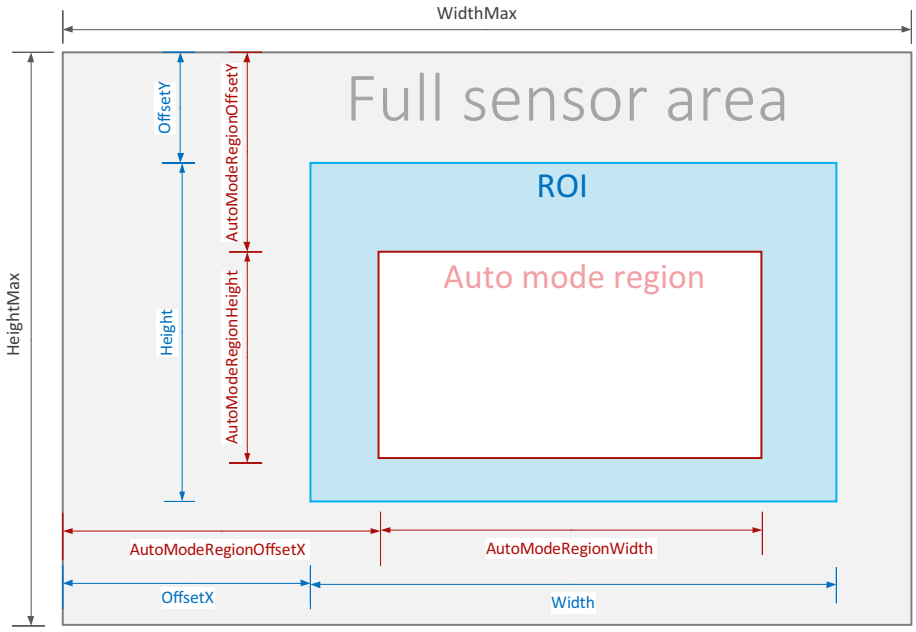


Figure 4: auto mode region and ROI measurement features

It is possible to have multiple auto mode regions. Also, multiple sensor-ROIs are supported that are called DisplayROI in this document. A DisplayROI covers the area that is being transmitted by the camera subsystem.

The interaction of auto mode regions and ROIs would allow for a huge variety of possibilities. However, the actual interaction is limited to a few useful possibilities that practically make sense.

Basic rules

- Auto mode regions must be explicitly enabled by a feature.
- One auto mode region inside a ROI is permitted. This provides a fixed correlation between ROI and auto mode region.
- Auto mode region and ROI coordinates are absolute to the sensor area. If the ROI position is changed, the position of the auto mode region is maintained. The auto mode region represents the content changed by shifting the ROI.

- The auto mode region must be inside the respective ROI.
- If auto mode regions are enabled, the position and size are set to the same position and size of the respective ROI. This means that disabling and re-enabling the auto mode regions resets their positions and sizes.
- If ROI is changed, auto mode region may need to be adjusted. To do so, **set the position before you set the size**.
  Therefore, as long as the origin of the auto mode region remains inside the ROI, the position and size of the auto mode region can be maintained.
  To ensure no part of the auto mode region is outside the ROI, the size of the auto mode region is adjusted until the minimum allowed size is reached.
  Only then the position may be altered.

ROI and auto mode region effects

Auto mode region is always treated as a subset of ROI. The following scenarios show the interaction between ROI and auto mode region and gives recommendations where auto mode region settings can be improved. Vice versa, you can adjust settings for ROI to match an existing auto mode region.

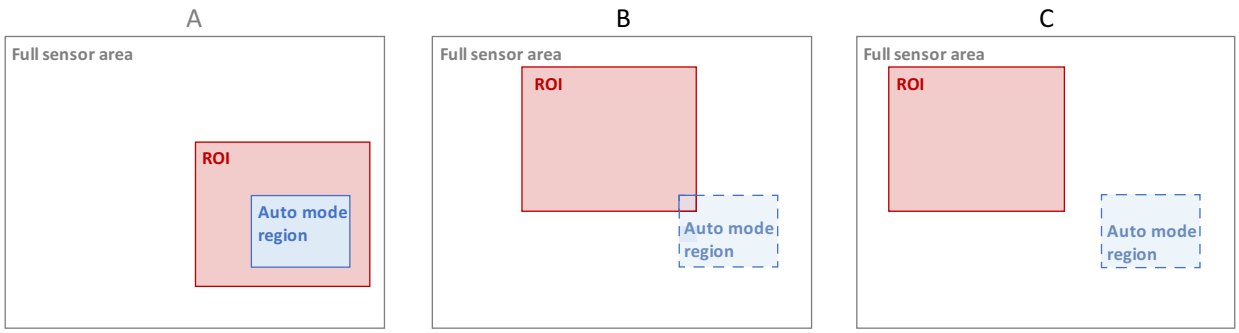


Figure 5: ROI and auto mode region effects

A. **Scenario**: User input creates an auto mode region included by a larger ROI.
   Result: Camera logic applies no changes to the selected auto mode region. The complete auto mode region is effective.
B. **Scenario**: User input creates a common area between ROI and auto mode region is only small.
   Result: Camera logic reduces the effective auto mode region to the common area between auto mode region and ROI.
   Recommendation: Relocate and resize auto mode region to become a subset of or to match ROI.
C. **Scenario**: User input creates ROI and auto mode region that have no common area.
   Result: Camera logic reduces the effective auto mode region to $\emptyset$.
   Recommendation: Relocate and resize auto mode region to become a subset or to match ROI.

Feature descriptions

AcquisitionControl

The features in this category can be used to control acquisition, frame rate, and exposure time, and to enable triggering the camera and connected devices, such as strobe lights.

Interface support	All
Display name	Acquisition Control
Standard	SFNC
Origin of feature	Camera
Feature type	(Category)

AcquisitionFrameCount

Controls the number of frames to acquire in ***`MultiFrame`*** acquisition mode.

Interface support	All
Display name	Acquisition Frame Count
Standard	SFNC
Origin of feature	Camera
Feature type	Integer
Access	R/W
Unit	(number)
Affected features	Not applicable
Category	/AcquisitionControl

AcquisitionFrameRate

Controls the acquisition rate at which the frames are captured.

Notes

- If `AcquisitionFrameRateEnable` is false, `AcquisitionFrameRate` is read-only.
- If values for exposure time or ROI are changed **after** `AcquisitionFrameRate` has been set, the value may be adjusted. See Feature interdependencies on page 23. In this case the value for `AcquisitionFrameRate` must be re-adjusted by the user.

Interface support	All
Display name	Acquisition Frame Rate
Standard	SFNC
Origin of feature	Camera
Feature type	Float
Access	R/W
Unit	Hertz
Affected features	`ExposureTime`
Category	/AcquisitionControl

AcquisitionFrameRateEnable

Enables or disables `AcquisitionFrameRate`.

Note: Otherwise, the frame rate is implicitly controlled by the combination of other features like `ExposureTime`.

Interface support	All
Display name	Acquisition Frame Rate Enable
Standard	SFNC
Origin of feature	Camera
Feature type	Boolean
Access	R/W
Affected features	`AcquisitionFrameRate`
Category	/AcquisitionControl

Values	Description
True	`AcquisitionFrameRate` feature is writable and used to control the acquisition rate.
False	`AcquisitionFrameRate` is implicitly controlled by the combination of other features like `ExposureTime`. Automatically, the maximum available frame rate is used.

AcquisitionFrameRateMode

Selects the priority between `AcquisitionFrameRate` and `ExposureTime`.

Interface support	All
Display name	Acquisition Frame Rate Mode
Standard	Custom
Origin of feature	Camera
Feature type	Enumeration
Access	R
Affected features	Not affected
Category	/AcquisitionControl

Values	Description
Basic	`ExposureTime` has the priority over `AcquisitionFrameRate`. If `ExposureTime` gets longer than the inverse of `AcquisitionFrameRate`, the resulting acquisition frame rate is reduced accordingly.

AcquisitionMode

Selects the acquisition mode of the camera. The feature defines mainly the number of frames to capture during an acquisition and the way the acquisition stops.

Interface support	All
Display name	Acquisition Mode
Standard	SFNC
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	`LineMode`, `TriggerSource`, `LineInverter`, `LineSource`
Category	/AcquisitionControl

Values	Description
`SingleFrame`	Single images are acquired. Further trigger events will be ignored until acquisition is stopped and restarted.
`MultiFrame`	A number of images is acquired that is specified by `AcquisitionFrameCount`. Further trigger events will be ignored until acquisition is stopped and restarted. In case of *`MultiFrame`*, acquisition can be stopped using `AcquisitionStop` command before it reaches the number of frames specified in `AcquisitionFrameCount`. So, the `AcquisitionStop` trigger event will not be ignored.
`Continuous`	After an `AcquisitionStart` event: Selects continuous image acquisition until acquisition stop is triggered.

AcquisitionStart

Starts the acquisition of the camera.

Note: The number of frames captured is specified by `AcquisitionMode`.

Interface support	All
Display name	Acquisition Start
Standard	SFNC
Origin of feature	Camera
Feature type	Command
Access	W
Affected features	Not applicable
Category	/AcquisitionControl

AcquisitionStatus

[AcquisitionStatusSelector]

Displays the state of the internal acquisition signal selected using `AcquisitionStatusSelector`.

Interface support	All
Display name	Acquisition Status
Standard	SFNC
Origin of feature	Camera
Feature type	Boolean
Access	R
Affected features	Not applicable
Category	/AcquisitionControl

Values	Description
`True`	The camera is performing the selected action.
`False`	The camera is performing the selected action.

AcquisitionStatusSelector

Selects the internal acquisition signal to read using ***`AcquisitionStatus`***.

Interface support	All
Display name	Acquisition Status Selector
Standard	SFNC
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	AcquisitionStatus
Category	/AcquisitionControl

Values	Description
`AcquisitionActive`	The camera acquires one or many frames.
`AcquisitionTransfer`	The camera transfers one or many frames to the host.

AcquisitionStop

Stops the acquisition of the camera at the end of the current frame.

Note: This feature is mainly used when `AcquisitionMode` is *`Continuous`*, but it can be used in any acquisition mode.

Interface support	All
Display name	Acquisition Stop
Standard	SFNC
Origin of feature	Camera
Feature type	Command
Access	W
Affected features	Not applicable
Category	/AcquisitionControl

ExposureActiveMode

Selects the mode for the `ExposureActive` signal. You can use this feature for synchronizing strobe lights to compensate for the rolling shutter effect.

Note: Global shutter cameras support only *`FlashWindow`*, other cameras support *`FirstLine`* and *`FlashWindow`*.

Interface support	All
Display name	Exposure Active Mode
Standard	Custom
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	`LineInverter, LineMode, LineSelector, LineSource, LineStatus, LineStatusAll, TimerDelay, TimerDuration, TimerReset, TimerSelector, TimerStatus, TimerTriggerActivation, TimerTriggerSource, TriggerSelector`
Category	/AcquisitionControl

Values	Description
`FirstLine`	Sets the `ExposureActive` signal to high when the first line is exposing.
`FlashWindow`	Sets the `ExposureActive` signal to high when all lines are exposing simultaneously.

ExposureAuto

Selects the auto exposure mode.

Note: The output of the auto exposure function affects the whole image.

Interface support	All
Display name	Exposure Auto
Standard	SFNC
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	Not applicable
Category	/AcquisitionControl

Values	Description
Off	Automatic mode is disabled.
Once	Automatic exposure is applied once until the target value of the selected auto control algorithm is achieved, then the value returns to *Off*.
Continuous	The exposure time varies continuously according to the scene illumination.

ExposureMode

Selects the operation mode of the exposure (or shutter).

Notes:

- A delay may occur between the trigger signal and the start of the exposure. For the delay with rolling shutter sensor cameras, see your Alvium camera's user guide.
- For *`TriggerWidth`* and *`TriggerControlled`*, the resulting exposure time is extended, because of an exposure offset after the trigger pulse.

Interface support	All
Display name	Exposure Mode
Standard	SFNC
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	Not applicable
Category	/AcquisitionControl

Value	Description
`Timed`	The exposure time is set by `ExposureTime` or `ExposureAuto`.
`TriggerWidth`[1,2]	The width of the current frame trigger signal(s) pulse controls the exposure time.
`TriggerControlled`[2]	One or more trigger signals control the exposure time independently from the current frame triggers.

[1]Controlling the exposure time using *`TriggerWidth`*: We recommend you to follow the workflow shown in ExposureMode- Using TriggerWidth on page 34.

[2]Global shutter sensor cameras only.

ExposureMode - Using TriggerWidth

Follow the workflow shown in Figure 6 to use ***TriggerWidth***.

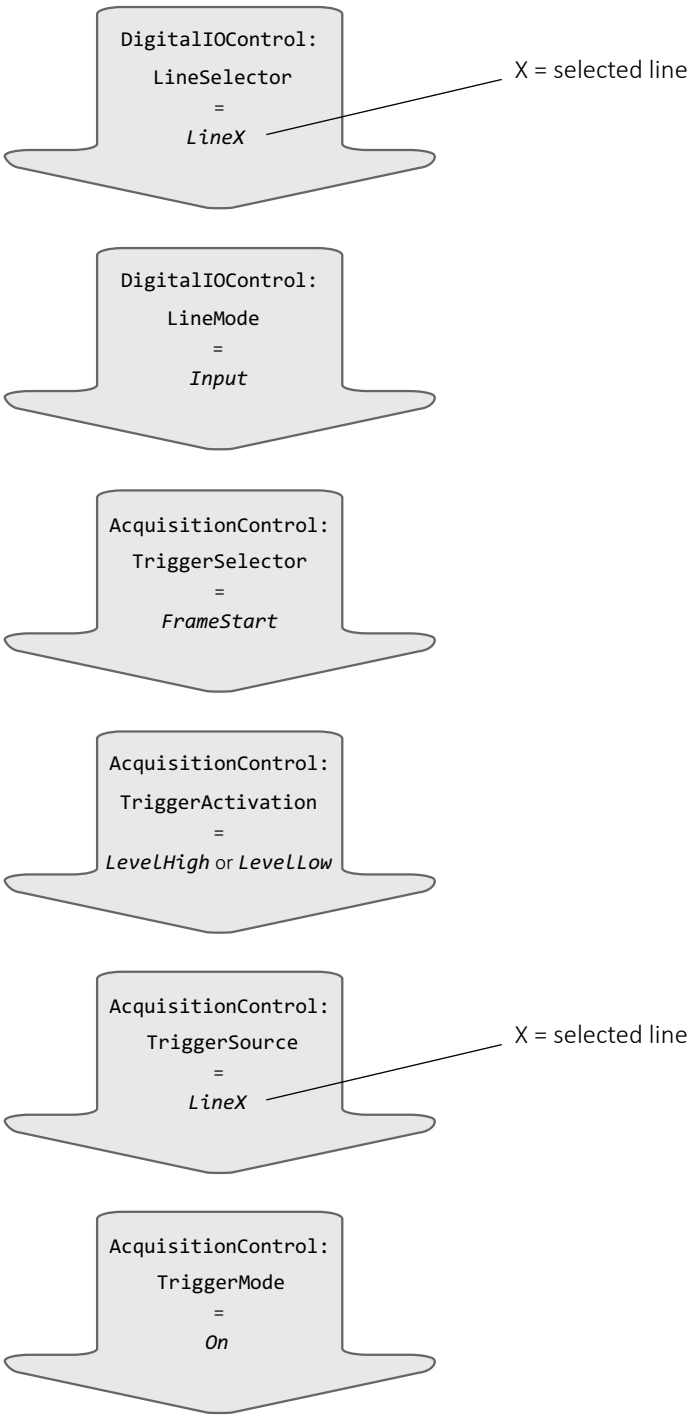


Figure 6: Workflow for using TriggerWidth

ExposureTime

Selects the exposure time when `ExposureMode` is *`Timed`* and `ExposureAuto` is *`Off`*. This controls the duration where the photosensitive cells are exposed to light.

Interface support	All
Display name	Exposure Time
Standard	SFNC
Origin of feature	Camera
Feature type	Float
Access	R/W
Unit	Microseconds
Affected features	`ExposureAutoMin`, `ExposureAutoMax`, `AcquisitionFrameRate`
Category	/AcquisitionControl

TriggerActivation

[TriggerSelector]

Selects the activation mode of the trigger.

Interface support	All
Display name	Trigger Activation
Standard	SFNC
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	Not applicable
Category	/AcquisitionControl

Values	Description
`RisingEdge`	The encoder on the rising edge of the signal is reset.
`FallingEdge`	The encoder on the falling edge of the signal is reset.
`AnyEdge`	The encoder on the falling or rising edge of the signal is reset.
`LevelHigh`	The encoder at a high signal level is reset.
`LevelLow`	The encoder at a low signal level is reset.

TriggerDelay

[TriggerSelector]

Controls the period of time before the camera corresponds after receiving a trigger signal.

Notes:

- Available only when `TriggeSelector` is set to *`FrameStart`* or *`AcquisitionStart`*.
- The value for `TriggerDelay` adds to the sensor related delay between trigger and exposure start. The sensor related delay depends on such as data rate and sensor characteristics.

Interface support	All
Display name	Trigger Delay
Standard	SFNC
Origin of feature	Camera
Feature type	Float
Access	R/W
Unit	Microseconds
Affected features	Not applicable
Category	/AcquisitionControl

Values	Description
`0`	Minimum
`20748634.2705`	Maximum

TriggerMode

[TriggerSelector]

Enables or disables the selected trigger.

Interface support	All
Display name	Trigger Mode
Standard	SFNC
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	`LineMode`, `TriggerSource`, `LineInverter`, `LineSource`
Category	/AcquisitionControl

Values	Description
On	Triggering is enabled
Off	Triggering is disabled.

TriggerSelector

Selects the type of trigger to configure.

Interface support	All
Display name	Trigger Selector
Standard	SFNC
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	`TriggerMode`, `LineMode`, `TriggerSoftware`, `LineInverter`, `LineSource`, `TriggerSource`, `TriggerActivation`
Category	/AcquisitionControl

Values	Description
`AcquisitionStart`	The selected trigger starts the acquisition process.
`AcquisitionActive`	The selected trigger controls the duration of the acquisition of a single frame or many frames. The acquisition is activated when the trigger signal becomes active and terminated when it goes back to the inactive state.
`AcquisitionEnd`	The trigger terminates the acquisition process.
`FrameStart`	The selected trigger starts the capture of a single frame (when acquisition is running).
*`ExposureStart`**	The selected trigger starts the exposure of a single frame (when acquisition is running).
*`ExposureEnd`**	The selected trigger ends the exposure of a single frame (when acquisition is running).
*`ExposureActive`**	The selected trigger controls the duration of exposure of a single frame (when acquisition is running).

*Not supported by cameras using rolling shutter sensors.

TriggerSoftware

[TriggerSelector]

Generates an internal trigger. `TriggerSource` must be set to *`Software`*.

Interface support	All
Display name	Trigger Software
Standard	SFNC
Origin of feature	Camera
Feature type	Command
Access	W
Affected features	Not applicable
Category	/AcquisitionControl

TriggerSource

[TriggerSelector]

Selects the internal signal or physical input line to use as the trigger source.

Note: The selected trigger must have its `TriggerMode` set to *`On`*.

Interface support	All
Display name	Trigger Source
Standard	SFNC
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	Not applicable
Category	/AcquisitionControl

Values	Description
`Off`	Triggering is disabled.
`Action0`[1]	Action0 command is used to signal triggers.
`Action1`[1]	Action1 command is used to signal triggers.
`Software`	Software is used to signal triggers.
`Line0`	Physical Line0 is used to signal triggers.
`Line1`	Physical Line1 is used to signal triggers.
`Line2`[2]	Physical Line2 is used to signal triggers.
`Line3`[2]	Physical Line3 is used to signal triggers.
`Timer0End`	Timer0End is used to signal triggers.
`Timer1End`	Timer1End is used to signal triggers.
`SoftwareSignal0`	SoftwareSignal0 is used to signal triggers.
`SoftwareSignal1`	SoftwareSignal1 is used to signal triggers.
`SoftwareSignal2`	SoftwareSignal2 is used to signal triggers.
`SoftwareSignal3`	SoftwareSignal3 is used to signal triggers.

[1] Currently, available with Alvium G1/G5 cameras only.

[2] Available with Alvium G1/G5 and Alvium USB cameras. Alvium CSI-2 cameras support Line0 and Line1 only.

ActionControl

Note: Features in this category are available for Alvium G5 cameras only. The features are not working properly for Alvium G1 yet. This will be fixed in the next firmware release.

Support for the other Alvium series is intended for a future firmware release.

The features in this category can be used by external devices to trigger actions within the camera by software commands. This includes ToE (Trigger over Ethernet) where the GigE interface is used for triggering instead of the I/Os.

See SoftwareSignalControl on page 173 for the interaction with features in this category.

Interface support	GigE
Display name	Action Control
Standard	SFNC
Origin of feature	Camera
Feature type	(Category)

ActionDeviceKey

Controls the device key that allows the device to check the validity of action commands.

Notes:

- `ActionDeviceKey` has the unconventional access mode "write only" to make sure that the primary application alone has control over it.
- 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.

Interface support	GigE
Display name	Action Device Key
Standard	SFNC
Origin of feature	Camera
Feature type	Integer
Access	W
Affected features	Not applicable
Category	/ActionControl

Values	Description
0	Minimum
4294967295	Maximum (32 Bits)

ActionGroupKey

[ActionSelector]

Controls the key that the device will use to validate the action on reception of the action protocol message.

The device asserts the selected Action signal only if:

- The camera's `ActionDeviceKey` is equal to the action device key in the action protocol message.
- The bitwise AND operation of the action group mask in the action protocol message against the selected `ActionGroupMask` is non-zero.
- The camera's `ActionGroupKey` is equal to the action group key in the action protocol message.

Interface support	GigE
Display name	Action Group Key
Standard	SFNC
Origin of feature	Camera
Feature type	Integer
Access	R/W
Affected features	Not applicable
Category	/ActionControl

Values	Description
0	Minimum
4294967295	Maximum

ActionGroupMask

[ActionSelector]

Controls the mask that the device will use to validate the action on reception of the action protocol message.

The device asserts the selected Action signal only if:

- The camera's `ActionDeviceKey` is equal to the action device key in the action protocol message.
- The bitwise AND operation of the action group mask in the action protocol message against the selected `ActionGroupMask` is non-zero.
- The camera's `ActionGroupKey` is equal to the action group key in the action protocol message.

Interface support	GigE
Display name	Action Group Mask
Standard	SFNC
Origin of feature	Camera
Feature type	Integer
Access	R/W
Affected features	Not applicable
Category	/ActionControl

Values	Description
0	Minimum
4294967295	Maximum

ActionQueueSize

[ActionSelector]

Displays the size of the scheduled action commands queue. This number represents the maximum number of scheduled action commands that can be pending at a given point in time.

Interface support	GigE
Display name	Action Queue Size
Standard	SFNC
Origin of feature	Camera
Feature type	Integer
Access	R
Affected features	Not applicable
Category	/ActionControl

Values	Description
0	Minimum
4294967295	Maximum

ActionSelector

Selects to which Action Signal further Action settings apply.

Interface support	GigE
Display name	Action Selector
Standard	SFNC
Origin of feature	Camera
Feature type	Integer
Access	R/W
Affected features	`ActionGroupKey`, `ActionGroupMask`, `ActionQueueSize`
Category	/ActionControl

Values	Description
0	Minimum
1	Maximum

AnalogControl

The features in this category can be used to control the intensity levels for monochrome and color imaging.

Interface support	All
Display name	Analog Control
Standard	SFNC
Origin of feature	Camera
Feature type	(Category)

BalanceRatio

[BalanceRatioSelector]

Controls the ratio of the selected color component to the green color component. This feature is used for white balance.

Interface support	All
Display name	Balance Ratio
Standard	SFNC
Origin of feature	Camera
Feature type	Float
Access	R/W
Affected features	Not applicable
Category	/AnalogControl

Values	Description
0	Minimum
8	Maximum
0.001	Increment

BalanceRatioSelector

Selects the balance ratio to control.

Interface support	All
Display name	Balance Ratio Selector
Standard	SFNC
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	`BalanceRatio`
Category	/AnalogControl

Values	Description
`Red`	The red channel is adjusted.
`Blue`	The blue channel is adjusted.

BalanceWhiteAuto

Selects the auto white balance mode.

Interface support	All
Display name	Balance White Auto
Standard	SFNC
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	`BalanceWhiteAutoRate`, `BalanceWhiteAutoTolerance`
Category	/AnalogControl

Values	Description
`Off`	Auto white balance is disabled.
`Once`	Auto white balance is applied once. After adjustments have been done, auto white balance is disabled.
`Continuous`	Auto white balance is applied continuously.

BlackLevel

[BlackLevelSelector]

Controls the analog black level as an absolute physical value. The feature represents a DC offset applied to the video signal.

Interface support	All
Display name	Black Level
Standard	SFNC
Origin of feature	Camera
Feature type	Float
Access	R/W
Affected features	Not applicable
Category	/AnalogControl

Values	Description
1	Increment

BlackLevelSelector

Selects the black level to be controlled by the various black level features.

Interface support	All
Display name	Black Level Selector
Standard	SFNC
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	BlackLevel
Category	/AnalogControl

Value	Description
ALL	All black levels are controlled.

Gain

[GainSelector]

Controls the selected gain as an absolute physical value. This is an amplification factor applied to the video signal.

Interface support	All
Display name	Gain
Standard	SFNC
Origin of feature	Camera
Feature type	Float
Access	R/W
Unit	Decibels [dB]
Affected features	`GainAutoMin`, `GainAutoMax`
Category	/AnalogControl

Values	Description
0.1	Increment

GainAuto

[GainSelector]

Selects the auto gain mode.

Note: The output of the auto gain function affects the whole image.

Interface support	All
Display name	Gain Auto
Standard	SFNC
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	Not applicable
Category	/AnalogControl

Values	Description
Off	Auto gain is disabled.
Once	Auto gain is being applied once. After adjustments have been done, gain is disabled.
Continuous	Gain is continuously adjusted to keep the value set for `IntensityControllerTarget`. This is triggered by such as changes in illumination or in object brightness.

GainSelector

Selects the gain to be controlled by the various gain features.

Interface support	All
Display name	Gain Selector
Standard	SFNC
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	`Gain`, `GainAuto`, `GainAutoMax`
Category	/AnalogControl

Value	Description
All	All gains are controlled.

Gamma

Controls the gamma correction of pixel intensity.

Interface support	All
Display name	Gamma
Standard	SFNC
Origin of feature	Camera
Feature type	Float
Access	R/W
Affected features	Not applicable
Category	/AnalogControl

Values	Description
0.4	Minimum
2.4	Maximum
0.5	Increment

AutoModeControl

The features in this category enable auto functions for white balance, gain, and exposure time.

Interface support	All
Display name	Auto Mode Control
Standard	Custom
Origin of feature	Camera
Feature type	(Category)

AutoModeRegionHeight

[AutoModeRegionSelector]

Controls the height of the region used to measure values for all auto functions.

Interface support	All
Display name	Auto Mode Region Height
Standard	Custom
Origin of feature	Camera
Feature type	Integer
Access	R/W
Unit	Pixel
Affected features	`AutoModeRegionOffsetY`
Category	/AutoModeControl

AutoModeRegionOffsetX

[AutoModeRegionSelector]

Controls the horizontal position of the window used to measure the actual value for the auto function.

Interface support	All
Display name	Auto Mode Region OffsetX
Standard	Custom
Origin of feature	Camera
Feature type	Integer
Access	R/W
Unit	Pixel
Affected features	`AutoModeRegionWidth`
Category	/AutoModeControl

AutoModeRegionOffsetY

[AutoModeRegionSelector]

Controls the vertical position of the window used to measure the actual value for the auto function.

Interface support	All
Display name	Auto Mode Region OffsetY
Standard	Custom
Origin of feature	Camera
Feature type	Integer
Access	R/W
Unit	Pixel
Affected features	`AutoModeRegionHeight`
Category	/AutoModeControl

AutoModeRegionSelector

Selects the auto mode region to configure.

Interface support	All
Display name	Auto Mode Region Selector
Standard	Custom
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	`AutoModeRegionWidth`, `AutoModeRegionOffsetX`, `AutoModeRegionHeight`, `AutoModeRegionOffsetY`
Category	/AutoModeControl

Value	Description
`AutoModeRegion1`	Auto Mode Region 1 is configured.

AutoModeRegionWidth

[AutoModeRegionSelector]

Controls the width of the window used to measure the actual value for the auto function.

Interface support	All
Display name	Auto Mode Region Width
Standard	Custom
Origin of feature	Camera
Feature type	Integer
Access	R/W
Unit	Pixel
Affected features	`AutoModeRegionOffsetX`
Category	/AutoModeControl

BalanceWhiteAutoRate

Controls the frequency of white balance adjustments.

Interface support	All
Display name	Balance White Auto Rate
Standard	Custom
Origin of feature	Camera
Feature type	Float
Access	R/W
Affected features	`BalanceWhiteAutoTolerance`
Category	/AutoModeControl

Values	Description
1	Minimum
100	Maximum
1	Increment

BalanceWhiteAutoTolerance

Controls the deviation of the current white balance value from the ideal value at which the white balance is adjusted.

Interface support	All
Display name	Balance White Auto Tolerance
Standard	Custom
Origin of feature	Camera
Feature type	Float
Access	R/W
Affected features	`BalanceWhiteAutoRate`
Category	/AutoModeControl

Values	Description
0	Minimum
50	Maximum
1	Increment

ExposureAutoMax

Controls the maximum value for auto exposure.

Note: The output of the auto exposure function affects the whole image.

Interface support	All
Display name	Exposure Auto Max
Standard	Custom
Origin of feature	Camera
Feature type	Float
Access	R/W
Affected features	`ExposureAutoMin`
Category	/AutoModeControl

ExposureAutoMin

Controls the minimum value for auto exposure.

Note: The output of the auto exposure function affects the whole image.

Interface support	All
Display name	Exposure Auto Min
Standard	Custom
Origin of feature	Camera
Feature type	Float
Access	R/W
Affected features	`ExposureAutoMax`
Category	/AutoModeControl

GainAutoMax

Controls the maximum value for auto gain.

Note: The output of the auto gain function affects the whole image.

Interface support	All
Display name	Gain Auto Max
Standard	Custom
Origin of feature	Camera
Feature type	Float
Access	R/W
Affected features	`GainAutoMin`
Category	/AutoModeControl

GainAutoMin

Controls the minimum value for auto gain.

Note: The output of the auto gain function affects the whole image.

Interface support	All
Display name	Gain Auto Min
Standard	Custom
Origin of feature	Camera
Feature type	Float
Access	R/W
Affected features	`GainAutoMax`
Category	/AutoModeControl

IntensityAutoPrecedence

Selects the precedence of intensity controller.

Interface support	All
Display name	Intensity Auto Precedence
Standard	Custom
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	Not applicable
Category	/AutoModeControl

Values	Description
MinimizeNoise	Orders the control loops so that noise is minimized: exposure time first, gain second. Gain increases are avoided if possible.
MinimizeBlur	Orders the control loops so that image blur is minimized: gain first, exposure time second. Long exposure times are avoided if possible.

IntensityControllerAlgorithm

[IntensityControllerSelector]

Selects the algorithm determining how the histogram is used to determine the current intensity value.

Note: The outliers are disregarded.

Interface support	All
Display name	Intensity Controller Algorithm
Standard	Custom
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	Not applicable
Category	/AutoModeControl

Values	Description
Mean	After comparing the arithmetic mean of the current image's histogram to `ExposureAutoTarget`, the exposure time for the next image is adjusted to meet this target. Bright areas are allowed to saturate.

IntensityControllerOutliersBright

[IntensityControllerSelector]

Controls the number of pixels from the top of the distribution to be ignored.

Interface support	All
Display name#	Intensity Controller Outliers Bright
Standard	Custom
Origin of feature	Camera
Feature type	Float
Access	R/W
Affected features	Not applicable
Category	/AutoModeControl

Values	Description
0	Minimum
10	Maximum
0.01	Increment

IntensityControllerOutliersDark

IntensityControllerSelector]

Controls the number of pixels from the bottom of the distribution to be ignored.

Interface support	All
Display name	Intensity Controller Outliers Dark
Standard	Custom
Origin of feature	Camera
Feature type	Float
Access	R/W
Affected features	Not applicable
Category	/AutoModeControl

Values	Description
0	Minimum
10	Maximum
0.01	Increment

IntensityControllerRate

Controls the rate at which the controller should compute an intensity value.

Note: This value also defines the period at which the associated auto functions change their control value.

Interface support	All
Display name	Intensity Controller Rate
Standard	Custom
Origin of feature	Camera
Feature type	Integer
Access	R/W
Affected features	Not applicable
Category	/AutoModeControl

Values	Description
1	Minimum
100	Maximum

IntensityControllerRegion

Selects the subregion of the image that the intensity controller operates on.

Interface support	All
Display name	Intensity Controller Region
Standard	Custom
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	Not applicable
Category	/AutoModeControl

Values	Description
FullImage	The intensity controller controls the full sensor area.
AutoModeRegion1	The intensity controller controls Auto Mode Region 1.

IntensityControllerSelector

Selects the intensity controller to configure.

Interface support	All
Display name	Intensity Controller Selector
Standard	Custom
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	`IntensityControllerOutliersDark`, `IntensityControllerOutliersBright`, `IntensityControllerTolerance`, `IntensityControllerAlgorithm`
Category	/AutoModeControl

Value	Description
`IntensityController1`	Intensity Controller 1 is selected to be configured.

IntensityControllerTarget

Controls the target intensity value for auto intensity control as deviation from the mean value in [percent]. The default value for all auto features is 50.

Interface support	All
Display name	Intensity Controller Target
Standard	Custom
Origin of feature	Camera
Feature type	Float
Access	R/W
Unit	Percent [%]
Affected features	Not applicable
Category	/AutoModeControl

Values	Description
`10`	Minimum
`89.9`	Maximum
`0.0001`	Increment
`50`	Default

IntensityControllerTolerance

Controls the deviation of the current value from the target value at which the feature is inactive.

Interface support	All
Display name	Intensity Controller Tolerance
Standard	Custom
Origin of feature	Camera
Feature type	Integer
Access	R/W
Affected features	Not applicable
Category	/AutoModeControl

Values	Description
0	Minimum
50	Maximum
1	Increment

BufferHandlingControl

You need experience to use these features

We recommend you to use features in this category only if you are an advanced user.

The features in this category can be used to control the buffers in the acquisition engine of the data stream.

Interface support	All (most features)
Display name	Buffer Handling Control
Standard	GenTL SFNC
Origin of feature	Transport layer
Feature type	(Category)

MaxDriverBuffersCount

Controls the maximum number of driver buffers used by the acquisition engine.

Note: We recommend you to use this feature only if you are an advanced user.

Interface support	CSI-2, USB
Display name	Max Driver Buffers Count
Standard	GenTL SFNC
Origin of feature	Transport layer
Feature type	Integer
Access	R/W
Affected features	Not applicable
Category	/BufferHandlingControl

Values	Description
1	Minimum
4096	Maximum
1	Increment

StreamAnnounceBufferMinimum

Displays the minimum number of buffers to announce to enable selected buffer handling mode. Corresponds to the `STREAM_INFO_BUF_ANNOUNCE_MIN` command of `DSGetInfo` function.

Note: We recommend you to use this feature only if you are an advanced user.

Interface support	All
Display name	Stream Announce Buffer Minimum
Standard	GenTL SFNC
Origin of feature	Transport layer
Feature type	Integer
Access	R
Affected features	Not applicable
Category	/BufferHandlingControl

StreamAnnouncedBufferCount

Displays the number of announced (known) buffers on this stream. Corresponds to the `STREAM_INFO_NUM_ANNOUNCED` command of `DSGetInfo` function.

Note: We recommend you to use this feature only if you are an advanced user.

Interface support	All
Display name	Stream Announced Buffer Count
Standard	GenTL SFNC
Origin of feature	Transport layer
Feature type	Integer
Access	R
Affected features	Not applicable
Category	/BufferHandlingControl

Values	Description
0	Minimum
9223372036854775807	Maximum

StreamBufferHandlingMode

Selects the available acquisition modes of the stream.

Note: We recommend you to use this feature only if you are an advanced user.

Interface support	All
Display name	Stream Buffer Handling Mode
Standard	GenTL SFNC
Origin of feature	Transport layer
Feature type	Enumeration
Access	R
Affected features	`StreamAcquisitionModeSelector`
Category	/BufferHandlingControl

Value	Description
`Default`	Default stream buffer handling is available.

ChunkDataControl

Note: Features in this category are available for Alvium USB cameras only. Support for the other Alvium series is intended for a future firmware release.

The features in this category can be used to transfer current camera values with the image payload, such as for `ExposureTime` and `Gain`, color balance, ROI (region of interest), I/O line status, and `Timestamp`.

Interface support	USB
Display name	Chunk Data Control
Standard	SFNC / Custom
Origin of feature	Camera
Feature type	(Category)

ChunkBalanceRatioBlue

[ChunkSelector]

Displays the value for the blue color gain that was used for capturing the image.

Interface support	USB
Display name	Chunk Balance Ratio Blue
Standard	Custom
Origin of feature	Camera
Feature type	Float
Access	R
Affected features	Not applicable
Category	/ChunkDataControl

Values	Description
0	Minimum
8	Maximum
0.001	Increment

ChunkBalanceRatioRed

[ChunkSelector]

Displays the value for the red color gain that was used for capturing the image.

Interface support	USB
Display name	Chunk Balance Ratio Red
Standard	Custom
Origin of feature	Camera
Feature type	Float
Access	R
Affected features	Not applicable
Category	/ChunkDataControl

Values	Description
0	Minimum
8	Maximum
0.001	Increment

ChunkEnable

[ChunkSelector]

Enables or disables including of the selected chunk data in the image payload.

Interface support	USB
Display name	Chunk Enable
Standard	SFNC
Origin of feature	Camera
Feature type	Boolean
Access	R/W
Affected features	Not applicable
Category	/ChunkDataControl

Values	Description
False	Chunk data is excluded from the image payload (default).
True	Chunk data is included in the image payload.

ChunkExposureTime

[ChunkSelector]

Displays the `ExposureTime` that was used for capturing the image.

Interface support	USB
Display name	Chunk Exposure Time
Standard	SFNC
Origin of feature	Camera
Feature type	Float
Access	R
Unit	Microseconds
Affected features	Not applicable
Category	/ChunkDataControl

ChunkFrameID

[ChunkSelector]

Displays the unique identifier of the frame.

Note: Chunk frame IDs represent the frames (= images) generated in the camera, **not the frames sent to the host**. Especially cameras with rolling shutter, such as Alvium xx-500 models, may generate frames and discard them internally for reconfiguration. This behavior occurs after connecting the camera and if features are changed during acquisition. In this case, the first Frame ID is ≠ 1 and some expected Frame IDs are skipped (but not lost).

Interface support	USB
Display name	Chunk Frame ID
Standard	SFNC
Origin of feature	Camera
Feature type	Integer
Access	R
Affected features	Not applicable
Category	/ChunkDataControl

ChunkGain

[ChunkSelector]

Displays the current `Gain` that was used for capturing the image.

Interface support	USB
Display name	Chunk Gain
Standard	SFNC
Origin of feature	Camera
Feature type	Float
Access	R
Unit	Decibels [dB]
Affected features	Not applicable
Category	/ChunkDataControl

ChunkHeight

[ChunkSelector]

Displays the current `Height` that was used for capturing the image.

Interface support	USB
Display name	Chunk Height
Standard	SFNC
Origin of feature	Camera
Feature type	Integer
Access	R
Affected features	Not applicable
Category	/ChunkDataControl

ChunkLineStatusAll

[ChunkSelector]

Displays the status of all the I/O lines at the time of the *`FrameStart`* internal event.

Interface support	USB
Display name	Chunk Line Status All
Standard	SFNC
Origin of feature	Camera
Feature type	Integer
Access	R
Affected features	Not applicable
Category	/ChunkDataControl

ChunkModeActive

[ChunkSelector]

Enables or disables including chunk data in the transmitted image payload.

Interface support	USB
Display name	Chunk Mode Active
Standard	SFNC
Origin of feature	Camera
Feature type	Boolean
Access	R/W
Affected features	Not applicable
Category	/ChunkDataControl

Values	Description
`False`	Chunk data is excluded from the image payload (default).
`True`	Chunk data is transmitted with the image payload.

ChunkOffsetX

[ChunkSelector]

Displays the horizontal offset of the ROI (region of interest) that was used for capturing the image.

Interface support	USB
Display name	Chunk Offset X
Standard	SFNC
Origin of feature	Camera
Feature type	Integer
Access	R
Affected features	Not applicable
Category	/ChunkDataControl

ChunkOffsetY

[ChunkSelector]

Displays the vertical offset of the ROI (region of interest) that was used for capturing the image.

Interface support	USB
Display name	Chunk Offset Y
Standard	SFNC
Origin of feature	Camera
Feature type	Integer
Access	R
Affected features	Not applicable
Category	/ChunkDataControl

ChunkSelector

Selects the chunk type to be included in the image payload.

Interface support	USB
Display name	Chunk Selector
Standard	SFNC adapted
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	`ChunkBalanceRatioBlue`, `ChunkBalanceRatioRed`, `ChunkEnable`, `ChunkExposureTime`, `ChunkFrameID`, `ChunkGain`, `ChunkHeight`, `ChunkLineStatusAll`, `ChunkModeActive`, `ChunkOffsetX`, `ChunkOffsetY`, `ChunkSelector`, `ChunkSequencerSetActive`, `ChunkTimestamp`, `ChunkWidth`, `PayloadSize`
Category	/ChunkDataControl

Values	Description
`FrameID`	The frame ID is transmitted with the image payload.
`LineStatusAll`	The I/O line status is transmitted with the image payload.
`Timestamp`	The `TimeStamp` value is transmitted with the image payload.
`ExposureTime`	The `ExposureTíme` value is transmitted with the image payload.
`BalanceRatioBlue`	The *`BalanceRatioBlue`* value is transmitted with the image payload.
`BalanceRatioRed`	The *`BalanceRatioRed`* value is transmitted with the image payload.
`Gain`	The *`Gain`* value is transmitted with the image payload.
`Height`	The *`Height`* value is transmitted with the image payload.
`Width`	The *`With`* value is transmitted with the image payload.
`OffsetX`	The *`OffsetX`* value is transmitted with the image payload.
`OffsetY`	The *`OffsetY`* value is transmitted with the image payload.
`SequencerSetActive`	This option will be usable with a future firmware version.

ChunkSequencerSetActive

[ChunkSelector]

Displays the index of the active set of the running sequencer.

Interface support	USB
Display name	Chunk Sequencer Set Active
Standard	SFNC
Origin of feature	Camera
Feature type	Integer
Access	R
Affected features	Not applicable
Category	/ChunkDataControl

ChunkTimestamp

[ChunkSelector]

Displays the `Timestamp` value of the image at the time of the ***`FrameStart`*** internal event.

Interface support	USB
Display name	Chunk Timestamp
Standard	SFNC
Origin of feature	Camera
Feature type	Integer
Access	R
Affected features	Not applicable
Category	/ChunkDataControl

ChunkWidth

[ChunkSelector]

Displays the current `Width` that was used for capturing the image.

Interface support	USB
Display name	Chunk Width
Standard	SFNC
Origin of feature	Camera
Feature type	Integer
Access	R
Affected features	Not applicable
Category	/ChunkDataControl

ColorTransformationControl

The features in this category can be used to control the interpolation of the RGB channels for the color image output, and simple access to hue and saturation.

Interface support	All
Display name	Color Transformation Control
Standard	SFNC
Origin of feature	Camera
Feature type	(Category)

This section describes features related to color transformations in color cameras. The following features are only valid if using on-camera interpolated pixel formats.

The color transformation is a linear operation taking as input the triplet R_{in}, G_{in}, B_{in} for an RGB color pixel. This triplet is multiplied by a 3×3 matrix. This color transformation allows to change the coefficients of the 3×3 matrix.

$$\begin{bmatrix} R_{out} \\ G_{out} \\ B_{out} \end{bmatrix} = \begin{bmatrix} Gain00 & Gain01 & Gain02 \\ Gain10 & Gain11 & Gain12 \\ Gain20 & Gain21 & Gain22 \end{bmatrix} \times \begin{bmatrix} R_{in} \\ G_{in} \\ B_{in} \end{bmatrix}$$

ColorTransformationEnable

[ColorTransformationSelector]

Enables or disables the selected color transformation module.

Interface support	All
Display name	Color Transformation Enable
Standard	SFNC
Origin of feature	Camera
Feature type	Boolean
Access	R/W
Affected features	`ColorTransformationValue`
Category	/ColorTransformationControl

Values	Description
`True`	The selected color transformation module is enabled.
`False`	The selected color transformation module is disabled.

ColorTransformationValue

[ColorTransformationSelector][ColorTransformationValue-Selector]

Selects the gain factor or offset for the selected color transformation.

Interface support	All
Display name	Color Transformation Value
Standard	SFNC
Origin of feature	Camera
Feature type	Float
Access	R/W
Affected features	Not applicable
Category	/ColorTransformationControl

Values	Description
-4	Minimum
+4	Maximum
1	Default

ColorTransformationValueSelector

[ColorTransformationSelector]

Selects the gain factor or offset of the Transformation matrix for the selected Color Transformation module.

Interface support	All
Display name	Color Transformation Value Selector
Standard	SFNC
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	`ColorTransformationValue`
Category	/ColorTransformationControl

For values described in the following table, see ColorTransformationControl on page 73 for the color transformation matrix.

Values	Description
`Gain00`	Gain 00 for the red contribution to the red pixel (multiplicative factor) is selected.
`Gain01`	Gain 01 for the green contribution to the red pixel (multiplicative factor) is selected.
`Gain02`	Gain 02 for the red contribution to the red pixel (multiplicative factor) is selected.
`Gain10`	Gain 10 for the red contribution to the green pixel (multiplicative factor) is selected.
`Gain11`	Gain 11 for the green contribution to the green pixel (multiplicative factor) is selected.
`Gain12`	Gain 12 for the blue contribution to the green pixel (multiplicative factor) is selected.
`Gain20`	Gain 20 for the red contribution to the blue pixel (multiplicative factor) is selected.
`Gain21`	Gain 21 for the green contribution to the blue pixel (multiplicative factor) is selected.
`Gain22`	Gain 22 for the blue contribution to the blue pixel (multiplicative factor) is selected.

Hue

Controls the color tone correction by rotating the chrominance field clockwise with values > 0 and counter clockwise with values < 0 in degrees [°].

Interface support	All
Display name	Hue
Standard	Custom
Origin of feature	Camera
Feature type	Float
Access	R/W
Unit	Degrees [°]
Affected features	`PixelFormat`, `DeviceLinkThroughputLimit`, `ExposureAutoMin`, `ExposureAutoMax`, `ExposureTime`, `AcquisitionFrameRate`, `Width`, `OffsetX`, `AutoModeRegionWidth`, `AutoModeRegionOffsetX`, `AutoModeRegionHeight`, `AutoModeRegionOffsetY`, `PayloadSize`, `WidthMax`, `Height`, `OffsetY`, `HeightMax`, `PixelSize`, `ContrastEnable`, `ContrastDarkLimit`, `ContrastBrightLimit`, `BlackLevel`, `Saturation`, `ColorTransformationEnable`, `ColorTransformationValue`
Category	/ColorTransformationControl

Values	Description
-40	Minimum (40 degrees)
+40	Maximum (40 degrees)
0	Default

Saturation

Controls the amplification of the chrominance signal in the color space.

Interface support	All
Display name	Saturation
Standard	Custom
Origin of feature	Camera
Feature type	Float
Access	R/W
Affected features	Not applicable
Category	/ColorTransformationControl

Values	Description
0	Minimum
+2	Maximum
1	Default

CorrectionControl

The features in this category can be used to control DPC (Defect pixel correction) and FPNC (Fixed pattern noise correction) for image correction.

Interface support	All
Display name	Correction Control
Standard	Custom
Origin of feature	Camera
Feature type	(Category)

CorrectionMode

Enables or disables correction features.

Interface support	All
Display name	Correction Mode
Standard	Custom
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	Not applicable
Category	/CorrectionControl

Values	Description
On	Correction features are enabled.
Off	Correction features are disabled.

CorrectionSelector

Selects the type of correction to configure.

Interface support	All
Display name	Correction Selector
Standard	Custom
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	`CorrectionMode`, `CorrectionSet`, `CorrectionSetDefault`, `CorrectionDataSize`, `CorrectionEntryType`
Category	/CorrectionControl

Values	Description
*`DefectPixel Correction`**	Defect pixel correction (DPC) is selected.
*`FixedPattern NoiseCorrection`**	Fixed pattern noise correction (FPNC) is selected.

*Availability is camera model dependent.

CorrectionSet

[CorrectionSelector]

Selects the currently enabled correction settings.

Interface support	All
Display name	Correction Set
Standard	Custom
Origin of feature	Camera
Feature type	Enumeration
Access	R/(W)
Affected features	Not applicable
Category	/CorrectionControl

Values	Description
`Preset`	Factory settings are enabled (default).
*`User`**	User settings are enabled.

*Available only if a user correction set has been written to the camera memory.

CorrectionSetDefault

[CorrectionSelector]

Selects the correction set used when the camera is reset.

Interface support	All
Display name	Correction Set Default
Standard	Custom
Origin of feature	Camera
Feature type	Enumeration
Access	R
Affected features	Not applicable
Category	/CorrectionControl

Values	Description
Preset	Factory settings are used after camera reset.
*User**	User settings are used after camera reset.

*Available only if a user correction set has been written to the camera memory.

CorrectionInfo (subcategory)

The features in this subcategory can be used to display the correction type currently used.

Interface support	All
Display name	Correction Info
Standard	Custom
Origin of feature	Camera
Feature type	Subcategory
Category	/CorrectionControl

CorrectionDataSize

[CorrectionSelector]

Displays the current size of the correction data that is stored inside the camera.

Interface support	All
Display name	Correction Data Size
Standard	Custom
Origin of feature	Camera
Feature type	Integer
Access	R
Affected features	Not applicable
Category	/CorrectionControl/CorrectionInfo

CorrectionEntryType

Displays the entry type (correction type specific variant).

Interface support	All
Display name	Correction Entry Type
Standard	Custom
Origin of feature	Camera
Feature type	Integer
Access	R
Affected features	Not applicable
Category	/CorrectionControl/CorrectionInfo

CounterAndTimerControl

The features in this category can be used to control counters and timers to enable advanced triggering. For example, you can synchronize the timing for image acquisition with strobe lights.

Interface support	All
Display name	Counter And Timer Control
Standard	SFNC
Origin of feature	Camera
Feature type	(Category)

TimerDelay

[TimerSelector]

Controls the duration of the delay at the reception of a trigger before starting the timer.

Interface support	All
Display name	Timer Delay
Standard	SFNC
Origin of feature	Camera
Feature type	Float
Access	R/W
Unit	Microseconds
Affected features	Not applicable
Category	/CounterAndTimerControl

Values	Description
0	Minimum
429496729.5	Maximum

TimerDuration

[TimerSelector]

Controls the duration of the timer pulse.
When the timer reaches the TimerDuration value:

- For `TimerStatus`, the value is changed from *`TimerActive`* to *`TimerCompleted`*.
- The timer stops counting until the camera receives a new trigger, or until the timer is explicitly reset with `TimerReset`.

Interface support	All
Display name	Timer Duration
Standard	SFNC
Origin of feature	Camera
Feature type	Float
Access	R/W
Unit	Microseconds
Affected features	Not applicable
Category	/CounterAndTimerControl

Values	Description
0	Minimum
429496729.5	Maximum

TimerReset

[TimerSelector]

The selected timer is reset by software and restarted.

Note: The timer starts immediately after the reset unless a timer trigger is active.

Interface support	All
Display name	Time Reset
Standard	SFNC
Origin of feature	Camera
Feature type	Command
Access	W
Affected features	`TimerDelay`, `TimerDuration`, `TimerStatus`, `TimerSelector`, `TimerTriggerActivation`, `TimerTriggerSource`
Category	/CounterAndTimerControl

TimerSelector

Selects the timer to be configured.

Interface support	All
Display name	Timer Selector
Standard	SFNC
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	`TimerDelay`, `TimerDuration`, `TimerReset`, `TimerStatus`, `TimerTriggerActivation`, `TimerTriggerSource`
Category	/CounterAndTimerControl

Value	Description
`Timer0`	Timer0 is selected.
`Timer1`	Timer1 is selected.

TimerStatus

[TimerSelector]

Displays the current status of the selected timer.

Interface support	All
Display name	Timer Status
Standard	SFNC (adapted)
Origin of feature	Camera
Feature type	Enumeration
Access	R
Affected features	Not applicable
Category	/CounterAndTimerControl

Value	Description
`TimerActive`	The timer is active.
`TimerCompleted`	The timer has completed.
`TimerDelay`	The timer is delayed by the period of time set for `TimerDelay`.
`TimerTriggerWait`	The timer is waiting for a trigger.

TimerTriggerActivation

[TimerSelector]

Selects the type of trigger signal levels to activate the timer.

Interface support	All
Display name	Timer Trigger Activation
Standard	SFNC
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	Not applicable
Category	/CounterAndTimerControl

Value	Description
RisingEdge	The timer is triggered by a signal on the rising edge.
FallingEdge	The timer is triggered by a signal on the falling edge.
AnyEdge	The timer is triggered by a signal on any edge.
LevelHigh	The timer is triggered when signal level turns to high.
LevelLow	The timer is triggered when signal level turns to low.

TimerTriggerSource

[TimerSelector]

Selects the activation mode to start the selected timer.

Interface support	All
Display name	Timer Trigger Source
Standard	SFNC
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	Not applicable
Category	/CounterAndTimerControl

Value	Description
Off	The timer is disabled or stopped (default).
AcquitisionActive	The timer is triggered when the acquisition starts.
Action0[1]	The timer is triggered by the Action0 command.
Action1[1]	The timer is triggered by the Action1 command.
ExposureActive[2]	The timer is triggered when the exposure starts.
Line0	The timer is triggered by a signal on input line 0.
Line1	The timer is triggered by a signal on input line 1.
Line2[3]	The timer is triggered by a signal on input line 2.
Line3[3]	The timer is triggered by a signal on input line 3.
Timer0End	The timer is triggered when Timer0 has ended.
Timer1End	The timer is triggered when Timer1 has ended.
SoftwareSignal0	The timer is triggered by SoftwareSignal0.
SoftwareSignal1	The timer is triggered by SoftwareSignal1.
SoftwareSignal2	The timer is triggered by SoftwareSignal2.
SoftwareSignal3	The timer is triggered by SoftwareSignal3.

[1] Currently, available with Alvium G1/G5 cameras only.

[2] Available for cameras with global shutter sensors and with rolling shutter senors if `TriggerMode` is enabled or if `AcquisitionMode` is set to *`Continuous`*.

[3] Available with Alvium G1/G5 and Alvium USB cameras. Alvium CSI-2 cameras support Line0 and Line1 only.

DeviceControl

The features in this category can be used to display, such as the camera temperature and name, firmware version, transport layer, or applied standard versions for GenCP and SFNC.

Other features enable monitoring the link speed, controlling the bandwidth, and resetting the camera. Timestamp features are essential for counters and timers.

Interface support	All (most features)
Display name	Device Control
Standard	SFNC
Origin of feature	Camera
Feature type	(Category)

DeviceFamilyName

Displays the identifier of the product family of the camera.

Interface support	All
Display name	Device Family Name
Standard	SFNC
Origin of feature	Camera
Feature type	String
Access	R
Affected features	Not applicable
Category	/DeviceControl

DeviceFirmwareID

[DeviceFirmwareIDSelector]

Displays one or a list of firmware IDs of the camera.

Interface support	All
Display name	Device Firmware ID
Standard	Custom
Origin of feature	Camera
Feature type	String
Access	R
Affected features	Not applicable
Category	/DeviceControl

DeviceFirmwareIDSelector

Selects the `DeviceFirmwareID` to be read after restarting the camera.

Interface support	All
Display name	Device Firmware ID Selector
Standard	Custom
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	`DeviceFirmwareID`
Category	/DeviceControl

Values	Description
`Current`	The current firmware ID is selected to be read after the next camera restart.
`Supported`	Another than the current firmware ID is selected to be read after the next camera restart.

DeviceFirmwareVersion

[DeviceFirmwareVersionSelector]

Displays the version of the firmware in the camera.

Interface support	All
Display name	Device Firmware Version
Standard	SFNC
Origin of feature	Camera
Feature type	String
Access	R
Affected features	Not applicable
Category	/DeviceControl/DeviceControl

DeviceFirmwareVersionSelector

Selects the `DeviceFirmwareVersion` to be read after restarting the camera.

Interface support	All
Display name	Device Firmware Version Selector
Standard	Custom
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	`DeviceFirmwareVersion`
Category	/DeviceControl

Values	Description
`Current`	The current firmware version is selected to be read after the next camera restart.
`Programmed`	Another than the current firmware version is selected to be read after the next camera restart.

DeviceGenCPVersionMajor

Displays the major version of the GenCP supported by the camera.

Interface support	CSI-2, USB
Display name	Device GenCP Version Major
Standard	SFNC
Origin of feature	Camera
Feature type	Integer
Access	R
Affected features	`DeviceGenCPVersionMinor`
Category	/DeviceControl

DeviceGenCPVersionMinor

Displays the minor version of the GenCP supported by the camera.

Interface support	CSI-2, USB
Display name	Device GenCP Version Minor
Standard	SFNC
Origin of feature	Camera
Feature type	Integer
Access	R
Affected features	`DeviceGenCPVersionMajor`
Category	/DeviceControl

DeviceIndicatorLuminance

Controls the luminance of the indicators (such as LEDs) showing the status of the camera.

Interface support	All
Display name	Device Indicator Luminance
Standard	Custom
Origin of feature	Camera
Feature type	Integer
Access	R/W
Affected features	Not applicable
Category	/DeviceControl

Values	Description
0	Minimum
10	Maximum

DeviceIndicatorMode

Selects the behavior of the indicators (such as LEDs) showing the status of the camera.

Interface support	All
Display name	Device Indicator Mode
Standard	SFNC
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	Not applicable
Category	/DeviceControl

Values	Description
`Inactive`	The indicator is disabled.
`Active`	The indicator is enabled.
`ErrorStatus`	The indicator signals an error status.

DeviceLinkCommandTimeout

Displays the command timeout of the specified link.

Interface support	All
Display name	Device Link Command Timeout
Standard	SFNC
Origin of feature	Camera
Feature type	Float
Access	R
Unit	Microseconds
Affected features	Not applicable
Category	/DeviceControl

Values	Description
`0`	Minimum
`1,000,000,000`	Maximum

DeviceLinkSpeed

Displays the speed of transmission negotiated and represents the total speed of all the connections of the specified link.

Interface support	All
Display name	Device Link Speed
Standard	SFNC
Origin of feature	Camera
Feature type	Integer
Access	R
Unit	Bytes per second
Affected features	Not applicable
Category	/DeviceControl

DeviceLinkThroughputLimit

Controls the maximum bandwidth of the data streamed out by the camera on the selected link. Delays are uniformly inserted between transport layer packets reducing the peak bandwidth.

Notes:

- Use this feature to adjust camera data output to the performance of your host system to avoid lost frames. Additionally, you may reduce the frame rate to reduce bandwidth.
- Maximum values can be reduced by the bandwidth of the host system.

Interface support	GigE, USB
Display name	Device Link Throughput Limit
Standard	SFNC
Origin of feature	Camera
Feature type	Integer
Access	R/W
Unit	Bytes per second
Affected features	`ExposureTimeMax`, `ExposureTimeMin`, `ExposureAutoMin`, `ExposureAutoMax`, `ExposureTime`, `AcquisitionFrameRate`
Category	/DeviceControl

Values Alvium G1	Description
Camera model dependent	Minimum
125000000	Maximum

Values Alvium G5	Description
Camera model dependent	Minimum
625000000	Maximum

Values Alvium 1800 U	Description
Camera model dependent	Minimum
200000000	Default
450000000	Maximum

DeviceLinkThroughputLimitMode

Enable or disables `DeviceLinkThroughputLimit`.

When this feature is disabled, low-level transport layer (TL) specific features are expected to control the throughput.

When this feature is enabled, `DeviceLinkThroughputLimit` controls the overall throughput.

Interface support	GigE, USB
Display name	Device Link Throughput Limit Mode
Standard	SFNC
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	`ExposureTimeMax`, `ExposureTimeMin`, `ExposureAutoMin`, `ExposureAutoMax`, `ExposureTime`, `AcquisitionFrameRate`
Category	/DeviceControl

Values	Description
On	`DeviceLinkThroughputLimit` is enabled (USB default).
Off	`DeviceLinkThroughputLimit` is disabled (GigE default).

DeviceManufacturerInfo

Displays the manufacturer information about the camera.

Interface support	All
Display name	Device Manufacturer Info
Standard	SFNC
Origin of feature	Camera
Feature type	String
Access	R
Affected features	Not applicable
Category	/DeviceControl

DeviceModelName

Displays the model name of the camera.

Interface support	All
Display name	Device Model Name
Standard	SFNC
Origin of feature	Camera
Feature type	String
Access	R
Affected features	Not applicable
Category	/DeviceControl

DevicePowerSavingMode

Selects between standard power use and various power saving modes.

Interface support	USB
Display name	Device Power Saving Mode
Standard	Custom
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	Not applicable
Category	/DeviceControl

Values	Description
`Disabled`	The camera uses standard power (default).
`SuspendMode`	The camera is enabled to go into USB U3 power saving mode.[1]

[1]To apply the selected power saving mode, the host must send a `DevicePowerSave` command or a respective backend command to the camera.

DeviceReset

Resets the camera to its power up state.

Note: After reset, the camera must be rediscovered.

Interface support	All
Display name	Device Reset
Standard	SFNC
Origin of feature	Camera
Feature type	Command
Access	W
Affected features	Not applicable
Category	/DeviceControl

DeviceSFNCVersionMajor

Displays the major version of the SFNC that was used to create the camera`s GenICam XML.

Interface support	All
Display name	Device SFNC Version Major
Standard	SFNC
Origin of feature	Camera
Feature type	Integer
Access	R
Affected features	Not applicable
Category	/DeviceControl

DeviceSFNCVersionMinor

Displays the minor version of the SFNC that was used to create the camera’s GenICam XML.

Interface support	All
Display name	Device SFNC Version Minor
Standard	SFNC
Origin of feature	Camera
Feature type	Integer
Access	R
Affected features	Not applicable
Category	/DeviceControl

DeviceSFNCVersionSubMinor

Displays the sub minor version of the SFNC that was used to create the camera's GenICam XML.

Interface support	All
Display name	Device SFNC Version Sub Minor
Standard	SFNC
Origin of feature	Camera
Feature type	Integer
Access	R
Affected features	Not applicable
Category	/DeviceControl

DeviceScanType

Displays the scan type of the image sensor.

Interface support	All
Display name	Device Scan Type
Standard	SFNC
Origin of feature	Camera
Feature type	Enumeration
Access	R
Affected features	Not applicable
Category	/DeviceControl

Values	Description
Areascan	2D area readout is selected.

DeviceSerialNumber

Displays the camera's serial number.
Displays the unique identifier of the camera.

Interface support	All
Display name	Device Serial Number
Standard	SFNC
Origin of feature	Camera
Feature type	String
Access	R
Affected features	Not applicable
Category	/DeviceControl

DeviceStreamChannelPacketSize

Displays the stream packet size achieved on the selected channel for the transmitter or the maximum packet size supported by the receiver.

Interface support	GigE
Display name	Device Stream Channel Packet Size
Standard	SFNC
Origin of feature	Camera
Feature type	Integer
Access	R
Unit	Bytes
Affected features	Not applicable
Category	/DeviceControl

Value	Description
0	Minimum
4294967295	Maximum

DeviceTemperature

[DeviceTemperatureSelector]

Displays the camera temperature in degrees Celsius [°C], measured at the location selected by `DeviceTemperatureSelector`.

Interface support	All
Display name	Device Temperature
Standard	SFNC
Origin of feature	Camera
Feature type	Float
Access	R
Unit	Degrees Celsius
Affected features	Not applicable
Category	/DeviceControl

DeviceTemperatureSelector

Selects the location in the camera, where the temperature is to be measured.

Interface support	All
Display name	Device Temperature Selector
Standard	SFNC
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	`DeviceTemperature`
Category	/DeviceControl

Value	Description
`Mainboard`	The mainboard temperature is measured.

DeviceTLVersionMajor

Displays the major version of the camera's transport layer.

Interface support	All
Display name	Device Transport Layer Version Major
Standard	SFNC
Origin of feature	Camera
Feature type	Integer
Access	R
Affected features	Not applicable
Category	/DeviceControl

Value	Description
`0`	Minimum
`4294967295`	Maximum

DeviceTLVersionMinor

Displays the minor version of the camera transport layer.

Interface support	All
Display name	Device Transport Layer Version Minor
Standard	SFNC
Origin of feature	Camera
Feature type	Integer
Access	R
Affected features	Not applicable
Category	/DeviceControl

Value	Description
0	Minimum
4294967295	Maximum

DeviceUserID

Controls the user-programmable camera identifier.

Note: Maximum 63 characters are allowed.

Interface support	All
Display name	Device User ID
Standard	SFNC
Origin of feature	Camera
Feature type	String
Access	R/W
Affected features	Not applicable
Category	/DeviceControl

DeviceVendorName

Displays the name of the camera manufacturer.

Interface support	All
Display name	Device Vendor Name
Standard	SFNC
Origin of feature	Camera
Feature type	String
Access	R
Affected features	Not applicable
Category	/DeviceControl

DeviceVersion

Displays the camera's product code.

Interface support	All
Display name	Device Version
Standard	SFNC
Origin of feature	Camera
Feature type	String
Access	R
Affected features	Not applicable
Category	/DeviceControl

TimestampLatch

Latches the current timestamp counter into `TimestampLatchValue`.

Interface support	All
Display name	Time Stamp Latch
Standard	SFNC
Origin of feature	Camera
Feature type	Command
Access	W
Affected features	`TimestampLatchValue`
Category	/DeviceControl

TimestampLatchValue

Displays the latched value of the timestamp counter.

Interface support	All
Display name	Timestamp Latch Value
Standard	SFNC
Origin of feature	Camera
Feature type	Integer
Access	R
Affected features	Not applicable
Category	/DeviceControl

Value	Description
0	Minimum
9223372036854775807	Maximum

TimestampReset

Resets the current value of the timestamp counter.

Note: After executing this command, the timestamp counter restarts automatically.

Interface support	All
Display name	Timestamp Reset
Standard	SFNC
Origin of feature	Camera
Feature type	Command
Access	W
Affected features	`TimestampLatchValue`
Category	/DeviceControl

DigitalIOControl

The features in this category can be used to control the physical input and output lines of the camera.

Interface support	All
Display name	Digital IO Control Info
Standard	SFNC
Origin of feature	Camera
Feature type	(Category)

LineInverter

[LineSelector]

Enables or disables the inversion of the signal of the selected input or output line.

Interface support	All
Display name	Line Inverter
Standard	SFNC
Origin of feature	Camera
Feature type	Boolean
Access	R/W
Affected features	Not applicable
Category	/DigitalIOControl

Values	**Description**
True	Signal of the input or output line is inverted.
False	Signal of the input or output line is not inverted.

LineMode

[LineSelector]

Selects the physical line to be used to input or output a signal.

Interface support	All
Display name	Line Mode
Standard	SFNC
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	`TriggerSource`, `LineInverter`, `LineSource`
Category	/DigitalIOControl

Values	Description
`Input`	The physical line is used for signal input.
`Output`	The physical line is used for signal output.

LineSelector

Selects the physical line (or pin) of the external camera connector or the virtual line of the transport layer to configure.

Interface support	All
Display name	Line Selector
Standard	SFNC
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	`LineMode`, `LineSource`, `LineInverter`, `LineStatus`, `LineStatusAll`
Category	/DigitalIOControl

Values	Description
`Line0`	Line 0 is selected for configuration.
`Line1`	Line 1 is selected for configuration.
`Line2`	Line 2 is selected for configuration.
`Line3`	Line 3 is selected for configuration.

LineSource

[LineSelector]

Set the output signal for the selected line.

Note: `LineMode` must be set to *`Output`*.

Interface support	All
Display name	Line Source
Standard	SFNC
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	Not applicable
Category	/DigitalIOControl

Values	Description
`Off`	No signal is output.
`AcquisitionActive`	The *`AcquisitionActive`* signal is output.
`Action0`[1]	The Action0 command is output.
`Action1`[1]	The Action1 command is output.
`FrameTriggerWait`	The *`FrameTriggerWait`* signal is output.
`ExposureActive`[2]	The *`ExposureActive`* signal is output.
`Line0Signal`	The *`Line0Signal`* signal is output.
`Line1Signal`	The *`Line1Signal`* signal is output.
`Line2Signal`[3]	The *`Line2Signa`* signal is output.
`Line3Signal`[3]	The *`Line3Signal`* signal is output.
`PpsSignal`	The PpsSignal of the pulse is output. You can use this signal to verify that the devices' clocks are synchronized sufficiently for PTP.
`Stream0TransferActive`	The *`Stream0TransferActive`* signal is output.
`Timer0Active`	The *`Timer0Active`* signal is output.
`Timer1Active`	The *`Timer1Active`* signal is output.

[1] Currently, available with Alvium G1/G5 cameras only.

[2] Available for cameras with global shutter sensors and with rolling shutter senors if `TriggerMode` is enabled or if `AcquisitionMode` is set to *`Continuous`*.

[3] Available with Alvium G1/G5 and Alvium USB cameras. Alvium CSI-2 cameras support Line0 and Line1 only.

LineStatus

[LineSelector]

Displays the current status of the selected input or output line.

Interface support	All
Display name	Line Status
Standard	SFNC
Origin of feature	Camera
Feature type	Boolean
Access	R
Affected features	Not applicable
Category	/DigitalIOControl

Values	Description
True	Line status is enabled.
False	Line status is disabled.

LineStatusAll

Displays the current status of every input or output line in a sequence from Line0 to LineN in a single bitfield.

Interface support	All
Display name	Line Status All
Standard	SFNC
Origin of feature	Camera
Feature type	Integer
Access	R
Affected features	Not applicable
Category	/DigitalIOControl

Values	Description
0	Minimum
15	Maximum

SerialHubEnable

Enables or disables the serial port (UART).

Note: When this features is enabled, the corresponding lines become Rx and Tx. Therefore, the user application can't control these lines then.

Interface support	All
Display name	Serial Hub Enable
Standard	Custom
Origin of feature	Camera
Feature type	Boolean
Access	R/W
Affected features	`LineInverter`, `LineMode`, `LineSource`
Category	/DigitalIOControl

Values	Description
`False`	The serial port is disabled (default).
`True`	The serial port is enabled.

Available lines

For Alvium G1 and G5 cameras and for Alvium USB cameras, 2 lines can be used as serial ports while 2 lines can be accessed by the user application at the same time.

For Alvium CSI-2 camera, 2 lines can be used as serial ports while the remaining 2 lines are reserved for I2C traffic.:

UART signal	CSI-2 Lines	G1 / G5 lines	USB lines
UART Tx	Line2	Line0	Line2
UART Rx	Line3	Line1	Line3

Table 5: I/O lines available for serial ports by Alvium series

Changing between enabled and disabled serial ports

Previous line settings are not stored. You must reconfigure the corresponding lines if you want to change between use as serial ports and access by the user application.

SerialHub (subcategory)

The features in this subcategory enable using the I/Os by UART for serial port.

Interface support	All
Display name	Serial Hub
Standard	Custom
Origin of feature	Camera
Feature type	Subcategory
Category	/DigitalIOControl

SerialBaudRate

Selects the baud rate of the UART port.

Interface support	All
Display name	Uart Baud Rate
Standard	Custom
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Unit	Baud = Bps (Bits per second)
Affected features	`LineMode`, `LineInverter`, `LineSource`
Category	/DigitalIOControl/SerialHub

Values	Description
`Baud_9600`	9600 Baud is selected.
`Baud_115200`	115200 Baud is selected.
`Baud_230400`	230400 Baud is selected.

SerialParityBit

Selects the Parity Bit at the end of UART frames.

Interface support	All
Display name	Serial Parity Bit
Standard	Custom
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Unit	Baud = Bps (Bits per second)
Affected features	Not applicable
Category	/DigitalIOControl/SerialHub

Values	Description
None	No parity bit is in the frame.
Even	The number of 1 bits in frame is even.
Odd	The number of 1 bits in frame is odd.
Mark	The parity bit is always set to 1.
Space	The parity bit is always set to 0.

SerialRxData

Displays the data to be fetched from the Rx queue.

Interface support	All
Display name	Serial Rx Data
Standard	Custom
Origin of feature	Camera
Feature type	Raw
Access	R
Affected features	Not applicable
Category	/DigitalIOControl/SerialHub

SerialRxSize

Controls the number of bytes inserted from the Rx queue.

Interface support	All
Display name	Serial Rx Size
Standard	Custom
Origin of feature	Camera
Feature type	Integer
Access	R/W
Unit	Bytes
Affected features	Not applicable
Category	/DigitalIOControl/SerialHub

Values	Description
1	Minimum
4	Default
128	Maximum

SerialRxWaiting

Displays the number of bytes from the Rx queue waiting to be received.

Interface support	All
Display name	Serial Rx Waiting
Standard	Custom
Origin of feature	Camera
Feature type	Integer
Access	R
Unit	Bytes
Affected features	Not applicable
Category	/DigitalIOControl/SerialHub

Values	Description
0	Minimum
128	Maximum

SerialStopBits

Controls the number of stop bits at the end of UART frames.

Interface support	All
Display name	Serial Stop Bits
Standard	Custom
Origin of feature	Camera
Feature type	Integer
Access	R/W
Affected features	Not applicable
Category	/DigitalIOControl/SerialHub

Values	Description
1	Minimum (default)
2	Maximum

SerialTxData

Controls the data that will be transmitted to the TX queue of the serial interface..

Interface support	All
Display name	Serial Tx Data
Standard	Custom
Origin of feature	Camera
Feature type	Raw
Access	R/W
Affected features	Not applicable
Category	/DigitalIOControl/SerialHub

SerialTxRemaining

Displays the number bytes from the Tx queue that remain free.

Interface support	All
Display name	Serial Tx Remaining
Standard	Custom
Origin of feature	Camera
Feature type	Integer
Access	R
Unit	Bytes
Affected features	Not applicable
Category	/DigitalIOControl/SerialHub

Values	Description
0	Minimum
128	Maximum

SerialTxSize

Controls the number of bytes from the Tx data to be inserted into the Tx queue.

Interface support	All
Display name	Serial Tx Size
Standard	Custom
Origin of feature	Camera
Feature type	Integer
Access	R/W
Unit	Bytes
Affected features	Not applicable
Category	/DigitalIOControl/SerialHub

Values	Description
1	Minimum
4	Default
128	Maximum

FileAccessControl

The features in this category enable to read from and write files to the camera, including such as firmware, user data, or datasets for DPC (Defect pixel correction) and FPNC (Fixed pattern noise correction).

Interface support	All
Display name	File Access Control
Standard	SFNC
Origin of feature	Camera
Feature type	(Category)

FileAccessBuffer

Displays the intermediate access buffer that allows the exchange of data between the camera file storage and the application.

Interface support	All
Display name	File Access Buffer
Standard	SFNC
Origin of feature	Camera
Feature type	Register
Access	R
Affected features	Not applicable
Category	/FileAccessControl

FileAccessLength

Displays the length of the mapping between the camera file storage and `FileAccessBuffer`.

Interface support	All
Display name	File Access Length
Standard	SFNC
Origin of feature	Camera
Feature type	Register
Access	R
Affected features	Not applicable
Category	/FileAccessControl

FileAccessOffset

Displays the offset of the mapping between the camera file storage and the `FileAccessBuffer`.

Interface support	All
Display name	File Access Offset
Standard	SFNC
Origin of feature	Camera
Feature type	Integer
Access	R
Affected features	Not applicable
Category	/FileAccessControl

FileOpenMode

Selects the access mode in which a file is opened in the camera.

Interface support	All
Display name	File Open Mode
Standard	SFNC
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	Not applicable
Category	/FileAccessControl

Values	Description
`Read`	Read access is enabled.
`Write`	Write access is enabled.

FileOperationExecute

Executes the operation selected by `FileOperationSelector` on the selected file.

Interface support	All
Display name	File Operation Execute
Standard	SFNC
Origin of feature	Camera
Feature type	Command
Access	W
Affected features	`FileAccessBuffer`, `FileAccessOffset`, `FileAccessLength`, `FileOperationStatus`, `FileOperationResult`, `FileSize`
Category	/FileAccessControl

FileOperationResult

[FileSelector][FileOperationSelector]

Displays the file operation result. For read or write operations, the number of successfully read or written bytes is returned.

Interface support	All
Display name	File Operation Result
Standard	SFNC
Origin of feature	Camera
Feature type	Integer
Access	R
Affected features	Not applicable
Category	/FileAccessControl

FileOperationSelector

[FileSelector]

Selects the target operation for the selected file in the camera. This operation is executed when the `FileOperationExecute` feature is called.

Damage to the defect pixel correction data set

If you select *`DefectPixelCorrectionPreset`* for `FileSelector`, you also have write access. This way, the DPC correction data from manufacturing can be overwritten.

Before you write to this data set, read and save the data to an external source for recovery!

Interface support	All
Display name	File Operation Selector
Standard	SFNC
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	`FileOperationExecute`, `FileAccessBuffer`, `FileAccessOffset`, `FileAccessLength`, `FileOperationStatus`, `FileOperationResult`, `FileSize`
Category	/FileAccessControl

Values	Description
`Open`	The selected file is opened.
`Close`	The selected file s closed.
`Read`	The selected file is read from.
`Write`	The selected file is written to.
`Delete`	The selected file is deleted.

FileOperationStatus

[FileSelector][FileOperationSelector]

Displays the file operation execution status.

Interface support	All
Display name	File Operation Status
Standard	SFNC
Origin of feature	Camera
Feature type	Enumeration
Access	R
Affected features	Not applicable
Category	/FileAccessControl

Values	Description
Success	File operation was successful (default).
Failure	File operation failed.

FileProcessStatus

[FileSelector]

Displays an additional process status.

Interface support	All
Display name	File Process Status
Standard	Custom
Origin of feature	Camera
Feature type	Enumeration
Access	R
Affected features	Not applicable
Category	/FileAccessControl

Values	Description
None	No extended status (default).
UpdateNotRequired	No file operation is required, because flash and file content are identical.

FileSelector

Selects the target file in the camera.

Damage to the defect pixel correction data set

If you select *DefectPixelCorrectionPreset* for FileSelector, you also have write access. This way, the DPC correction data from manufacturing can be overwritten.

Before you write to this data set, read and save the data to an external source for recovery!

Interface support	All
Display name	File Selector
Standard	SFNC
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	FileStatus, FileSize, FileOpenMode, FileOperationSelector, FileOperationExecute, FileAccessBuffer, FileAccessOffset, FileAccessLength, FileOperationStatus, FileOperationResult
Category	/FileAccessControl

Values	Description
Firmware	Firmware is target for file operations.
UserData	User data is target for file operations.
DefectPixelCorrectionPreset	The preset for defect pixel correction (DPC) is target for file operations.
DefectPixelCorrectionUser	User defined defect pixel correction (DPC) is target for file operations.
FixedPatternNoiseCorrectionPreset	The preset for fixed pattern noise correction (FPNC) is target for file operations.
FixedPatternNoiseCorrectionUser	User defined fixed pattern noise correction (FPNC) user set is target for file operations.
UserSet1	UserSet1 target for file operations.
UserSet2	UserSet2 target for file operations.
UserSet3	UserSet3 target for file operations.
UserSet4	UserSet4 target for file operations.

FileSize

[FileSelector]

Displays the size of the selected file in bytes.

Interface support	All
Display name	File Size
Standard	SFNC
Origin of feature	Camera
Feature type	Integer
Access	R
Affected features	Not applicable
Category	/FileAccessControl

FileStatus

[FileSelector]

Displays the status of the selected file.

Interface support	All
Display name	File Status
Standard	Custom
Origin of feature	Camera
Feature type	Enumeration
Access	R
Affected features	Not applicable
Category	/FileAccessControl

Values	Description
Open	The selected file is currently open.
Closed	The selected file is currently closed (default).

GigE

Note: Features in this category are available for Alvium GigE cameras only.

The features in this category can be used to control IP settings, the communication between the host and the camera, and the transfer of data packets.

Interface support	GigE
Display name	GigE
Standard	Custom
Origin of feature	Transport Layer
Feature type	(Category)

Configuration (subcategory)

Note: Features in this subcategory are available for Alvium GigE cameras only.

The feature in this subcategory can be used to select IP settings between DHCP, LLA and user defined.

Interface support	GigE
Display name	Configuration
Standard	Custom
Origin of feature	Transport Layer
Feature type	(Subcategory)

Note: Open the camera in the Vimba Viewer's Config mode to write features in this subcategory. See Config mode for IP settings on page 23.

IPConfigurationMode

Selects if IP settings are configured by DHCP or by feature settings in GigE/Persistent (subcategory) on page 129.

Interface support	GigE
Display name	IP Configuration Mode
Standard	SFNC adapted
Origin of feature	Transport Layer
Feature type	Enumeration
Access	R/W
Affected features	Not applicable
Category	/GigE/Configuration

Values	Description
DHCP	IP settings are configured by DHCP (dynamic host configuration protocol). (Default) If no DHCP server is found, DHCP falls back to LLA automatically i.
LLA	IP settings are configured by LLA (link-local address).
Persistent	IP settings are configured manually by the user.

Note: Open the camera in the Vimba Viewer's Config mode to write this feature. See Config mode for IP settings on page 23.

Current (subcategory)

Note: Features in this subcategory are available for Alvium GigE cameras only.

The features in this subcategory can be used to display the current IP settings of the camera.

Interface support	GigE
Display name	Current
Standard	Custom
Origin of feature	Transport Layer
Feature type	(Subcategory)

CurrentDefaultGateway

Displays the current default gateway address.

Interface support	GigE
Display name	Current Default Gateway
Standard	SFNC adapted
Origin of feature	Transport Layer
Feature type	Integer
Access	R
Affected features	Not applicable
Category	/GigE/Current

CurrentIPAddress

Displays the current IP address.

Interface support	GigE
Display name	Current IP Address
Standard	SFNC adapted
Origin of feature	Transport Layer
Feature type	Integer
Access	R
Affected features	Not applicable
Category	/GigE/Current

CurrentSubnetMask

Displays the current subnet mask address.

Interface support	GigE
Display name	Current Subnet Mask
Standard	SFNC adapted
Origin of feature	Transport Layer
Feature type	Integer
Access	R
Affected features	Not applicable
Category	/GigE/Current

GVCP (subcategory)

Note: Features in this subcategory are available for Alvium GigE cameras only.

The features in this subcategory can be used to control command traffic and timings between the host and the camera.

Interface support	GigE
Display name	GVCP
Standard	Custom
Origin of feature	Transport Layer
Feature type	(Subcategory)

GVCPCmdRetries

Controls the number of times a particular command to the camera is resent when no answer is being received.

Interface support	GigE
Display name	Command Retries
Standard	Custom
Origin of feature	Transport Layer
Feature type	Integer
Access	R/W
Affected features	`GevHeartbeatTimeout`, `GevHeartbeatInterval`, `GVCPHBInterval`
Category	/GigE/GVCP

Values	Description
1	Minimum
9	Maximum

GVCPCmdTimeout

Controls the period of time for the host to wait for an answer from the camera.

Interface support	GigE
Display name	Command Timeout
Standard	Custom
Origin of feature	Transport Layer
Feature type	Integer
Access	R/W
Unit	ms (milliseconds)
Affected features	`GevHeartbeatTimeout`, `GevHeartbeatInterval`, `GVCPHBInterval`
Category	/GigE/GVCP

Values	Description
100	Minimum
10000	Maximum

GevHeartbeatInterval

Controls the period of time after which a heartbeat is sent by the host.

Interface support	GigE
Display name	Heartbeat Interval
Standard	Custom
Origin of feature	Transport Layer
Feature type	Integer
Access	R/W
Unit	ms (milliseconds)
Affected features	`GVCPHBInterval`
Category	/GigE/GVCP

Values	Description
200	Minimum
200	Maximum

GevHeartbeatTimeout

Controls the period of time after which the camera rejects control by the host if no heartbeat activity is registered.

Interface support	GigE
Display name	Heartbeat Timeout
Standard	Custom
Origin of feature	Transport Layer
Feature type	Integer
Access	R/W
Unit	ms (milliseconds)
Affected features	`GevHeartbeatInterval`, `GVCPHBInterval`
Category	/GigE/GVCP

Values	Description
`25100`	Minimum
`100000`	Maximum

GigE (category continued)

The feature descriptions for the `/GigE/GVCP` subcategory have ended on the previous page. The following feature continues the `GigE` category, without a subcategory.

GevSCPSPacketSize

Sets the current packet size of the stream channel.

Interface support	GigE
Display name	Gev SCPS Packet Size
Standard	SFNC adapted
Origin of feature	Transport Layer
Feature type	Integer
Access	R/W
Affected features	`DeviceStreamChannelPacketSize`, `GVSPPacketSize`
Category	/GigE

Values	Description
500	Minimum value for Alvium G1
9190	Maximum value for Alvium G1
500	Minimum value for Alvium G5
16358	Maximum value for Alvium G5

Persistent (subcategory)

Note: Features in this subcategory are available for Alvium GigE cameras only.

The features in this subcategory can be used to adjust the IP settings of the camera.

Interface support	GigE
Display name	Persistent
Standard	Custom
Origin of feature	Transport Layer
Feature type	(Subcategory)

Note: Open the camera in the Vimba Viewer's Config mode to write features in this subcategory. See Config mode for IP settings on page 23.

PersistentDefaultGateway

Selects the default gateway address.

Interface support	GigE
Display name	Persistent Default Gateway
Standard	SFNC adapted
Origin of feature	Transport Layer
Feature type	Integer
Access	R/W
Affected features	Not applicable
Category	/GigE/Persistent

Note: Open the camera in the Vimba Viewer's Config mode to write this feature. See Config mode for IP settings on page 23

PersistentIPAddress

Selects the IP address.

Interface support	GigE
Display name	Persistent IP Address
Standard	SFNC adapted
Origin of feature	Transport Layer
Feature type	Integer
Access	R/W
Affected features	Not applicable
Category	/GigE/Persistent

Note: Open the camera in the Vimba Viewer's Config mode to write this feature.
See Config mode for IP settings on page 23.

PersistentSubnetMask

Selects the subnet mask address.

Interface support	GigE
Display name	Persistent Subnet Mask
Standard	SFNC adapted
Origin of feature	Transport Layer
Feature type	Integer
Access	R/W
Affected features	Not applicable
Category	/GigE/Persistent

Note: Open the camera in the Vimba Viewer's Config mode to write this feature.
See Config mode for IP settings on page 23.

ImageFormatControl

The features in this category can be used to control pixel related data, including binning and ROI (region of interest), and reverse image. `PixelFormat` and `PixelSize` enable selecting between different modes for monochrome and color pixel readout.

`SensorBitDepth` can be used to control the bandwidth by different sensor readout modes (ADC).

When set to ***`GlobalResetReleaseShutter`***, sensor lines are integrated simultaneously for selected rolling shutter sensors with `ShutterMode.`

Interface support	All (most features)
Display name	Image Format Control
Standard	SFNC
Origin of feature	Camera
Feature type	(Category)

BinningHorizontal

Controls the number of horizontal pixels combined into one. This reduces the horizontal resolution (width) of the image.

Note: For Alvium models ≥12 MP resolution, if `BinningVertical` is used, `BinningHorizontal` is set to 2.

Interface support	All
Display name	Binning Horizontal
Standard	SFNC
Origin of feature	Camera
Feature type	Integer
Access	R/W
Unit	Pixel
Affected features	`WidthMax`
Category	/ImageFormatControl

Values	Description
1	Minimum
8	Maximum

BinningHorizontalMode

Determines whether the result of binned pixels is averaged or summed up.

Note: Changing `BinningHorizontalMode` sets `BinningVerticalMode` to the same value.

Interface support	All
Display name	Binning Horizontal Mode
Standard	SFNC
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	`AcquisitionFrameRate, BinningHorizontal, BinningVertical, BinningVerticalMode, DeviceLinkThroughputLimit, ExposureAutoMax, ExposureAutoMin, ExposureTime, HeightMax, WidthMax`
Category	/ImageFormatControl

Values	Description
`Sum`	The charge or gray value of adjacent pixels is summed up.
`Average`	The charge or gray value of adjacent pixels is averaged.

BinningSelector

Selects which binning engine is controlled by `BinningHorizontal` and `BinningVertical`.

Interface support	All
Display name	Binning Selector
Standard	SFNC
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	`AcquisitionFrameRate, BinningHorizontal, BinningHorizontalMode, BinningVertical, BinningVerticalMode, DeviceLinkThroughputLimit, ExposureAutoMax, ExposureAutoMin, ExposureTime, HeightMax, WidthMax`
Category	/ImageFormatControl

Values	Description
`Digital`	Digital binning is used.

BinningVertical

Controls the number of vertical pixels combined into one. This reduces the vertical resolution (height) of the image.

Interface support	All
Display name	Binning Vertical
Standard	SFNC
Origin of feature	Camera
Feature type	Integer
Access	R/W
Unit	Pixel
Affected features	`AcquisitionFrameRate`, `BinningHorizontal`, `DeviceLinkThroughputLimit`, `ExposureAutoMax`, `ExposureAutoMin`, `ExposureTime`, `HeightMax`, `WidthMax`
Category	/ImageFormatControl

Values	Description
1	Minimum
8	Maximum

BinningVerticalMode

Determines whether the result of binned pixels is averaged or summed up.

Note: Changing `BinningVerticalMode` sets `BinningHorizontalMode` to the same value.

Interface support	All
Display name	Binning Vertical Mode
Standard	SFNC
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	`AcquisitionFrameRate`, `BinningHorizontal`, `BinningVertical`, `BinningHorizontalMode`, `DeviceLinkThroughputLimit`, `ExposureAutoMax`, `ExposureAutoMin`, `ExposureTime`, `HeightMax`, `WidthMax`
Category	/ImageFormatControl

Values	Description
Sum	The charge or gray value of adjacent pixels is summed up.
Average	The charge or gray value of adjacent pixels is averaged.

Height

Controls the image height output by the camera.

Interface support	All
Display name	Height
Standard	SFNC
Origin of feature	Camera
Feature type	Integer
Access	R/W
Unit	Pixel
Affected features	`OffsetY`, `AutoModeRegionOffsetY`, `AutoModeRegionHeight`, `AcquisitionFrameRate`, `PayloadSize`
Category	/ImageFormatControl

HeightMax

Displays the available maximum image height.

Note: This dimension is calculated after vertical binning or any other function changing the vertical dimension of the image.

Interface support	All
Display name	Height Max
Standard	SFNC
Origin of feature	Camera
Feature type	Integer
Access	R
Unit	Pixel
Affected features	`Height`, `OffsetY`
Category	/ImageFormatControl

OffsetX

Controls the horizontal offset from the origin to the ROI.

Interface support	All
Display name	Offset X
Standard	SFNC
Origin of feature	Camera
Feature type	Integer
Access	R/W
Unit	Pixel
Affected features	`AutoModeRegionOffsetX`, `AutoModeRegionWidth`
Category	/ImageFormatControl

Values	Description
0	Minimum

OffsetY

Controls the vertical offset from the origin to the ROI.

Interface support	All
Display name	Offset Y
Standard	SFNC
Origin of feature	Camera
Feature type	Integer
Access	R/W
Unit	Pixel
Affected features	`AutoModeRegionOffsetY`, `AutoModeRegionHeight`
Category	/ImageFormatControl

Values	Description
0	Minimum

PixelFormat

Selects the pixel format output by the camera.

Note: The feature represents all the information provided by `PixelCoding`, `PixelSize`, and `PixelColorFilter` combined in a single feature.

Interface support	All
Display name	Pixel Format
Standard	SFNC
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	`DeviceLinkThroughputLimit`, `PayloadSize`, `PixelSize`, `BlackLevel`, `ContrastEnable`, `ContrastDarkLimit`, `ContrastBrightLimit`, `BlackLevel`, `Hue`, `Saturation`, `ColorTransformationEnable`, `ColorTransformationValue`, `HeightMax`, `WidthMax`
Category	/ImageFormatControl

PixelSize

Displays the total size of a pixel of the image as Bits per pixel (Bpp).

Interface support	All
Display name	Pixel Size
Standard	SFNC
Origin of feature	Camera
Feature type	Enumeration
Access	R
Unit	Bits
Affected features	Not applicable
Category	/ImageFormatControl

ReverseX

Enables or disables to flip the image horizontally.
Note: The ROI is applied after the flipping.

Interface support	All
Display name	Reverse X
Standard	SFNC
Origin of feature	Camera
Feature type	Boolean
Access	R/W
Affected features	`Width`, `WidthMax` (color cameras)
Category	/ImageFormatControl

Values	Description
`True`	Image is flipped horizontally.
`False`	Image is not flipped horizontally.

ReverseY

Enables or disables to flip the image vertically.
Note: The ROI is applied after the flipping.

Interface support	All
Display name	Reverse Y
Standard	SFNC
Origin of feature	Camera
Feature type	Boolean
Access	R/W
Affected features	`Height`, `HeightMax` (color cameras)
Category	/ImageFormatControl

Values	Description
`True`	Image is flipped vertically.
`False`	Image is not flipped vertically.

SensorBitDepth

Selects the readout mode of the camera sensor.

If you are using pixel formats that do not require 12-bit readout and you want to achieve higher frame rates, you can select between readout modes for 12-bit, 10-bit, and 8-bit.

Notes

- The sensor ADC bit depth is the default value.
- In the *`Adaptive`* mode, the bit depth is switched between 10-bit and 12-bit automatically, depending on the selected pixel format and limitations of sensor and camera.

Interface support	GigE, USB
Display name	Sensor Bit Depth
Standard	Custom
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Unit	Bits
Affected features	`AcquisitionFrameRate`, `DeviceLinkThroughputLimit`, `ExposureActiveMode`, `ExposureAuto`, `ExposureAutoMax`, `ExposureAutoMin`, `ExposureMode`, `ExposureTime`
Category	/ImageFormatControl

Values[1]	Description
`Adaptive`	The sensor bit depth is switched automatically between 12-bit and 10-bit readout, depending on the pixel format. (Default value for all camera models.)
`Bpp8`	The sensor bit depth is set to 8-bit, if supported by the sensor.
`Bpp10`	The sensor bit depth is set to 10-bit, if supported by the sensor.
`Bpp12`	The sensor bit depth is set to 12-bit if the camera sensor supports 12-bit readout mode.

[1]Camera model dependent

SensorHeight

Displays the effective sensor height.

Interface support	All
Display name	Sensor Height
Standard	SFNC
Origin of feature	Camera
Feature type	Integer
Access	R
Unit	Pixel
Affected features	`HeightMax`
Category	/ImageFormatControl

SensorWidth

Displays the effective sensor width.

Interface support	All
Display name	Sensor Width
Standard	SFNC
Origin of feature	Camera
Feature type	Integer
Access	R
Unit	Pixel
Affected features	`WidthMax`
Category	/ImageFormatControl

ShutterMode

Selects the shutter type for cameras where the sensor can be operated in different shutter modes.

Interface support	All
Display name	Shutter Mode
Standard	SFNC adapted
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	Not applicable
Category	/ImageFormatControl

Values*	Description
`GlobalResetReleaseShutter`	The camera is operated using global reset release shutter (GRS).
`GlobalShutter`	The camera is operated using global shutter (GS).
`RollingShutter`	The camera is operated using rolling shutter (RS).

*Camera model dependent

Width

Controls the image width of the image output by the camera.

Interface support	All
Display name	Width
Standard	SFNC
Origin of feature	Camera
Feature type	Integer
Access	R/W
Unit	Pixel
Affected features	`OffsetX`, `AutoModeRegionOffsetX`, `AutoModeRegionWidth`, `AcquisitionFrameRate`, `ExposureAutoMin`, `ExposureAutoMax`, `ExposureTime`, `PayloadSize`
Category	/ImageFormatControl

WidthMax

Displays the available maximum image width.

Note: The dimension is calculated after horizontal binning or any other function changing the horizontal dimension of the image.

Interface support	All
Display name	Width Max
Standard	SFNC
Origin of feature	Camera
Feature type	Integer
Access	R
Unit	Pixel
Affected features	`Width`, `OffsetX`
Category	/ImageFormatControl

ImageProcessingControl

The features in this category enable on-board image processing for contrast, noise suppression and convolution filters, sharpness and blur. You can use `ColorInterpolation` to select the number of merged pixels used for debayering.

Interface support	All
Display name	Image Processing Control
Standard	Custom
Origin of feature	Camera
Feature type	(Category)

AdaptiveNoiseSupressionFactor

Controls the amount of the noise suppression.

Interface support	All
Display name	Adaptive Noise Supression Factor
Standard	Custom
Origin of feature	Camera
Feature type	Float
Access	R/W
Affected features	Not applicable
Category	/ImageProcessingControl

Values	Description
0.5	Minimum value
1	The feature is disabled.
2	Maximum value

ColorInterpolation

Selects the `ColorInterpolation` filter.

Note: This feature is available only with color models.

Interface support	All
Display name	Color Interpolation
Standard	Custom
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	Not applicable
Category	/ImageProcessingControl

Values	Description
`Basic2x2`	Basic 2×2 algorithm for debayering is selected.
`Bilinear3x3`	A standard 3×3 algorithm for debayering is selected.
`HighQuality Linear5x5`	A high-quality linear interpolation for debayering is selected (default).

ContrastControl (subcategory)

The features in this subcategory enable on-board image processing for contrast.

Interface support	All
Display name	Contrast Control
Standard	Custom
Origin of feature	Camera
Feature type	Subcategory
Category	/ImageProcessingControl

ContrastBrightLimit

Selects the maximum gray value for the image.

Note: The current **value ranges displayed for 8-bit and 10-bit pixel formats are higher than the calculated values**.

Interface support	All
Display name	Contrast Bright Limit
Standard	Custom
Origin of feature	Camera
Feature type	Integer
Access	R/W
Affected features	`ContrastDarkLimit`
Category	/ImageProcessingControl/ContrastControl

Values	Description
`ContrastDarkLimit + 1`	The minimum value is selected.
4095	The maximum value is selected.

Pixel bit depth [bit]	Value range	Calculated value range	Pixel count per increment
8	*0* to *4095*	*0* to *255*	$^1/_{16}$
10	*0* to *4095*	*0* to *1023*	$^1/_4$
12	*0* to *4095*		1

ContrastDarkLimit

Selects the minimum gray value for the image.

Note: The current **value ranges displayed for 8-bit and 10-bit pixel formats are higher than the calculated values**. See ContrastBrightLimit on page 145.

Interface support	All
Display name	Contrast Dark Limit
Standard	Custom
Origin of feature	Camera
Feature type	Integer
Access	R/W
Affected features	`ContrastBrightLimit`
Category	/ImageProcessingControl/ContrastControl

Values	Description
`0`	The minimum value is selected.
`ContrastBrightLimit - 1`	The maximum value is selected.

ContrastEnable

Enables or disables the contrast enhancement features.

Interface support	All
Display name	Contrast Enable
Standard	Custom
Origin of feature	Camera
Feature type	Boolean
Access	R/W
Affected features	Not applicable
Category	/ImageProcessingControl/ContrastControl

Values	Description
`True`	The feature is enabled.
`False`	The feature is disabled.

ContrastShape

Controls the sigmoid shape of the transfer curve.

Interface support	All
Display name	Contrast Shape
Standard	Custom
Origin of feature	Camera
Feature type	Integer
Access	R/W
Affected features	Not applicable
Category	/ImageProcessingControl/ContrastControl

Values	Description
1	Minimum value
4	Default value
10	Maximum value
1	Increment

Figure 7 and Figure 8 on page 148 show the transfer curves for different values.

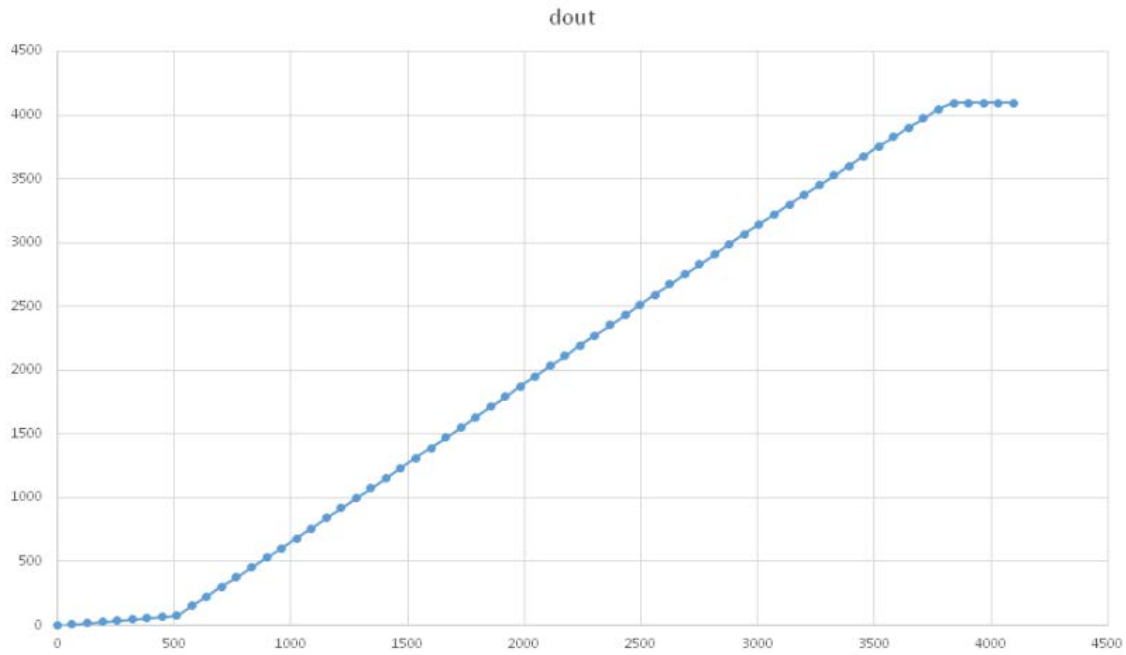


Figure 7: Image transfer for a value of 1.

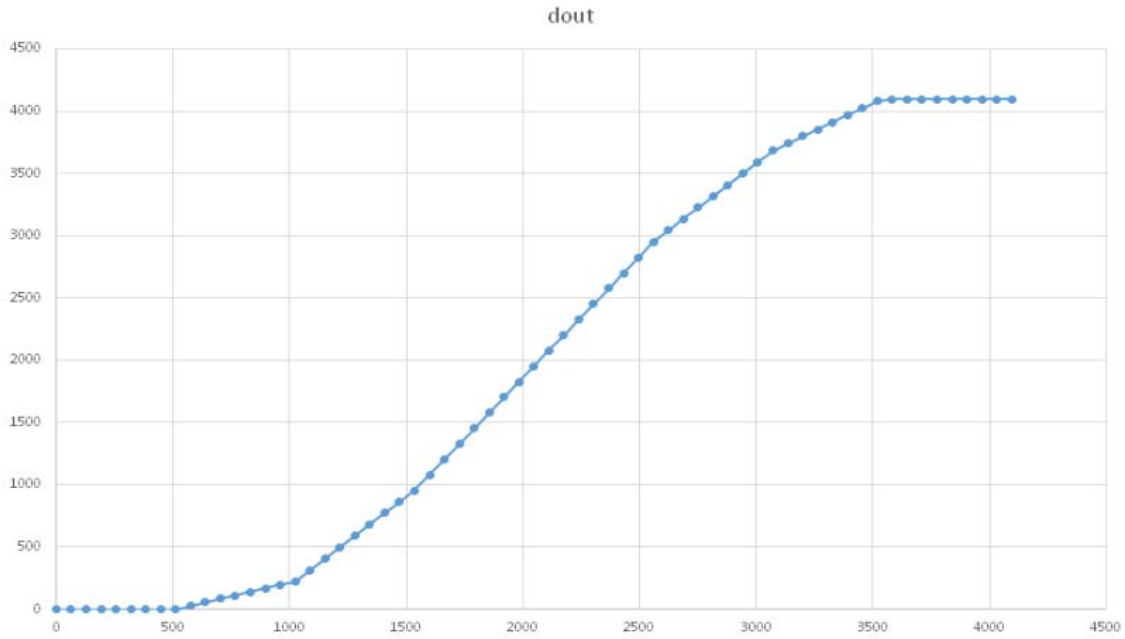


Figure 8: Image transfer for a value of 9.

ImageProcessingControl (category continued)

The feature descriptions for the `/ImageProcessingControl/ContrastControl` subcategory have ended on the previous page. The following features continue the `ImageProcessingControl` category, without a subcategory.

ConvolutionMode

Selects the convolution filter to process the image.

Various filters enable to reduce image noise, emphasize the edges of an image, or to perform individual image processing.

Interface support	All
Display name	Convolution Mode
Standard	Custom
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	`AdaptiveNoiseSuppression`, `CustomConvolutionValue`, `Sharpness`
Category	/ImageProcessingControl

Values	Description
`Off`	The feature is disabled (default).
`AdaptiveNoiseSuppression`	To reduce noise while keeping the edges, the adaptive noise suppression is selected, (controlled by `AdaptiveNoiseSuppressionFactor`).
`CustomConvolution`	Your individual settings defined in `CustomConvolutionValue` are selected.
`Sharpness`	To increase the contrast of edges, the sharpness mode is selected, (controlled by `Sharpness`).

CustomConvolutionValue

[CustomConvolutionValueSelector]

Sets the value for the convolution filter selected by `CustomConvolutionValueSelector`.

Interface support	All
Display name	Custom Convolution Value
Standard	Custom
Origin of feature	Camera
Feature type	Integer
Access	R/W
Affected features	Not applicable
Category	/ImageProcessingControl

Values	Description
0	Minimum value
255	Maximum value

CustomConvolutionValueSelector

Defines the position to read from or write to the selceted *`CustomConvolution`* filter, using `CustomConvolutionValue`.

Interface support	All
Display name	Custom Convolution Value Selector
Standard	Custom
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	`AdaptiveNoiseSuppressionFactor`, `CustomConvolutionValue`, `Sharpness`
Category	/ImageProcessingControl

Values	Description
`Coefficient 00...04`	Selects coefficients from 00 to 04.
`Coefficient 10...14`	Selects coefficients from 10 to 14.
`Coefficient 20...24`	Selects coefficients from 20 to 24.
`Coefficient 30...34`	Selects coefficients from 30 to 34.

	0	1	2	3	4
0	00	01	02	03	04
1	10	11	12	13	14
2	20	21	22	23	24
3	30	31	32	33	34
4	40	41	42	43	44

Figure 9: Matrix for coefficient values

Sharpness

Selects the degree of sharpness or blurring of the image.

Interface support	All
Display name	Sharpness
Standard	Custom
Origin of feature	Camera
Feature type	Integer
Access	R/W
Affected features	Not applicable
Category	/ImageProcessingControl

Values	Description
-12	Maximum blurring is applied.
0	The image is not affected (default).
12	Maximum sharpness is applied.

LUTControl

The features in this category can be used to change intensity values, adjusted by luminance and RGB color channels.

Interface support	All
Display name	LUT Control
Standard	SFNC
Origin of feature	Camera
Feature type	(Category)

LUTEnable

[LUTSelector]

Enables or disables the selected LUT.

Interface support	All
Display name	LUT Enable
Standard	SFNC
Origin of feature	Camera
Feature type	Boolean
Access	R/W
Affected features	`LUTIndex`, `LUTValue`
Category	/LUTControl

Values	Description
`True`	The selected LUT is enabled.
`False`	The selected LUT is disabled.

LUTIndex

[LUTSelector]

Controls the index (offset) of the coefficient to access in the selected LUT.

Interface support	All
Display name	LUT Index
Standard	SFNC
Origin of feature	Camera
Feature type	Integer
Access	R/W
Affected features	`LUTValue`
Category	/LUTControl

Values	Description
0	Minimum
4095	Maximum

LUTSelector

Selects the LUT to be controlled.

Interface support	All
Display name	LUT Selector
Standard	SFNC
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	`LUTEnable`, `LUTIndex`, `LUTValue`
Category	/LUTControl

Values	Description
Luminance	The LUT for luminance is selected.
Red	The LUT for red is selected.
Green	The LUT for green is selected.
Blue	The LUT for blue is selected.

LUTValue

[LUTSelector][LUTIndex]

Controls the value for the selected LUT.

Interface support	All
Display name	LUT Value
Standard	SFNC
Origin of feature	Camera
Feature type	Integer
Access	R/W
Affected features	Not affected
Category	/LUTControl

Values	Description
0	Minimum
4095	Maximum

SequencerControl

Note: Features in this category are available for Alvium USB cameras with Sony IMX global shutter sensors only. The features in this category are still in the testing phase and not fully validated, support for the other Alvium series is intended for a future firmware release.

The features in this category can be used to trigger camera feature settings in sequencer sets (**"set" on this page**) during acquisition in a predefined order..

Interface support	USB
Display name	Sequencer Control
Standard	SFNC
Origin of feature	Camera
Feature type	(Category)

Functional overview

`SequencerSetSelector` is used to load and save the sets.

Configuring the feature adjustments in a set

- `SequencerFeatureSelector` displays features to be enabled or disabled for sequencing.
- `SequencerFeatureEnable[SequencerFeatureSelector]` displays if a feature can be used for sequencing.
- `SequencerConfigurationMode` enables the configuration of sets.
- `SequencerSetSelector` selects the set to be loaded or saved.
- `SequencerSetSave[SequencerSetSelector]` stores the settings on the camera.
- `SequencerSetLoad[SequencerSetSelector]` reads and activates a stored set.

Configuring the triggering between sets

- `SequencerSetStart` controls the initial set to be activated. The default value is 0, it is not included in the 8 paths defined by the features below.
- `SequencerPathSelector[SequencerSetSelector]` offers 8 different paths (higher IDs = indices have the higher priority) with 3 parameters to activate sequencer sets:
  - `TriggerSource`
  - `TriggerActivation`
  - `SequencerSetNext`
- `SequencerSetNext[SequencerSetSelector][SequencerPathSelector]` controls the set to be activated after the current set.

Controlling triggers to activate sets

- `SequencerTriggerSource[SequencerSetSelector][SequencerPathSelector]` selects the trigger source to activate a set.
- `SequencerTriggerActivation[SequencerSetSelector][SequencerPathSelector]` selects the activation mode for triggering a set.

Pseudo code example

The following example reuses content of the SFNC V2.4 document. 4 sequencer sets are used to adjust `ExposureTime` and `Gain`. The end of exposure triggers the next sequencer. In parallel, two timers trigger sequencers.

Set	Code example	Description
0	ExposureTime = 4000 Gain = 1.0	Initial settings for ExposureTime and Gain are adjusted.
	SequencerSetNext[0] = 1 SequencerTriggerSource[0] = ExposureEnd	ExposureEnd triggers SequencerSet1.
	SequencerSetNext[1] = 3 SequencerTriggerSource[1] = Timer0End	Timer0End triggers SequencerSet3.
1	ExposureTime = 4000 Gain = 2.0	Settings for ExposureTime and Gain are changed.
	SequencerSetNext[0] = 0 SequencerTriggerSource[0] = ExposureEnd	ExposureEnd triggers SequencerSet0.
2	ExposureTime = 32000 Gain = 1.0	Settings for ExposureTime and Gain are changed.
	SequencerSetNext[0] = 0 SequencerTriggerSource[0] = ExposureEnd	ExposureEnd triggers SequencerSet0.
3	ExposureTime = 16000 Gain = 2.0	Settings for ExposureTime and Gain are changed.
	SequencerSetNext[0] = 0 SequencerTriggerSource[0] = Timer1End	Timer1End triggers SequencerSet0.
	SequencerSetNext[1] = 2 SequencerTriggerSource[1] = Timer0End	Timer0End triggers SequencerSet2.

SequencerConfigurationMode

Enables or disables configuration of the sequencer.

Interface support	USB
Display name	Sequencer Configuration Mode
Standard	SFNC
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	`ExposureAutoMin`, `ExposureAutoMax`
Category	/SequencerControl

Values	Description
Off	Configuration of the sequencer is disabled (default).
On	Configuration of the sequencer is enabled.

SequencerFeatureEnable

[SequencerFeatureSelector]

Displays which feature can be used in sequencer sets.

Interface support	USB
Display name	Sequencer Feature Enable
Standard	SFNC
Origin of feature	Camera
Feature type	Boolean
Access	R
Affected features	Not applicable
Category	/SequencerControl

Values	Description
False	The selected feature is disabled (default).
True	The selected feature is enabled.

SequencerFeatureSelector

Selects the features to be included in the corresponding sequencer sets.

Interface support	USB
Display name	Sequencer Feature Selector
Standard	SFNC
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	Not applicable
Category	/SequencerControl

Values
`AcquisitionFrameRate`, `AcquisitionFrameRateEnable`, `BalanceRatio`, `BinningHorizontal`, `BinningVertical`, `ChunkEnable`, `ChunkModeActive`, `ColorTransformationEnable`, `ColorTransformationValue`, `ExposureTime`, `Gain`, `Gamma`, `Height`, `Hue`, `LUTEnable`, `OffsetX`, `OffsetY`, `PixelFormat`, `Saturation`, `Width`

SequencerMode

Enables or disables the sequencer.

Interface support	USB
Display name	Sequencer Mode
Standard	SFNC
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	`PayloadSize`
Category	/SequencerControl

Values	**Description**
Off	The sequencer is disabled (default).
On	The sequencer is enabled.

SequencerSetActive

Displays the index of the currently active sequencer set.

Interface support	USB
Display name	Sequencer Set Active
Standard	SFNC
Origin of feature	Camera
Feature type	Integer
Access	R
Affected features	Not applicable
Category	/SequencerControl

Values	Description
0	Minimum
4294967295	Maximum

SequencerSetLoad

[SequencerSetSelector]

Loads and activates the sequencer set selected by `SequencerSetSelector`.

Note: Even if `SequencerMode` is *Off*, the configuration of the selected sequencer is activated on the camera.

Interface support	USB
Display name	Sequencer Set Load
Standard	SFNC
Origin of feature	Camera
Feature type	Command
Access	W
Affected features	`AcquisitionFrameRate`, `AcquisitionFrameRateEnable`, `BalanceRatio`, `ChunkEnable`, `ChunkModeActive`, `ColorTransformationEnable`, `ColorTransformationValue`, `ExposureTime`, `Gain`, `Gamma`, `Hue`, `PayloadSize`, `Saturation`, `SequencerSetNext`, `SequencerTriggerActivation`, `SequencerTriggerSource`
Category	/SequencerControl

SequencerSetSave

[SequencerSetSelector]

Saves the sequencer set selected by `SequencerSetSelector`.
Note: Even if `SequencerMode` is *`Off`*, the selected set is saved.

Interface support	USB
Display name	Sequencer Set Save
Standard	SFNC
Origin of feature	Camera
Feature type	Command
Access	W
Affected features	See `SequencerSetLoad`.
Category	/SequencerControl

SequencerSetSelector

Selects the sequencer set to be configured or used.

Interface support	USB
Display name	Sequencer Set Selector
Standard	SFNC
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	See `SequencerSetLoad`.
Category	/SequencerControl

Values	Description
`Set0`	Set0 is selected (default).
`Set1`	Set1 is selected.
`...`	...
`Set15`	Set15 is selected.

SequencerSetStart

Selects the sequencer set to start with.

Note: The sequencer set selected by `SequencerSetStart`equencer is the initial sequencer set, including sets grouped in paths. See SequencerPathControl (subcategory) on page 163.

Interface support	USB
Display name	Sequencer Set Start
Standard	SFNC
Origin of feature	Camera
Feature type	Integer
Access	R/W
Affected features	Not applicable
Category	/SequencerControl

Values	Description
0	Minimum
15	Maximum

SequencerPathControl (subcategory)

Note: Features in this subcategory are available for Alvium USB cameras with Sony IMX global shutter sensors only. The features in this subcategory are still in the testing phase and not fully validated, support for the other Alvium series is intended for a future firmware release.

The features in this subcategory can be used to configure the Sequencer Paths of sequencer sets to be triggered. .

Interface support	USB
Display name	Sequencer Path Control
Standard	Custom
Origin of feature	Camera
Feature type	(Subcategory)

SequencerPathSelector

[SequencerSetSelector]

Selects the SequencerPath including the sequencer sets to be configured or used.

Interface support	USB
Display name	Sequencer Path Selector
Standard	SFNC
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	`SequencerSetNext`, `SequencerTriggerSource`, `SequencerTriggerActivation`
Category	/SequencerControl/SequencerPathControl

Values	Description
`Path0`	Path0 is selected to be configured (default).
`Path1`	Path1 is selected to be configured.
`...`	...
`Path7`	Path7 is selected to be configured.

SequencerSetNext

[SequencerSetSelector][SequencerPathSelector]

Selects the next sequencer set to be configured or used..

Interface support	USB
Display name	Sequencer Set Next
Standard	SFNC (adapted)
Origin of feature	Camera
Feature type	Integer
Access	R/W
Affected features	`SequencerSetNext`, `SequencerTriggerSource`, `SequencerTriggerActivation`
Category	/SequencerControl/SequencerPathControl

Values	Description
0	Minimum value
15	Maximum value

SequencerTriggerActivation

[SequencerSetSelector][SequencerPathSelector]

Selects the activation mode to trigger the corresponding sequencer set..

Interface support	USB
Display name	Sequencer Trigger Activation
Standard	SFNC (adapted)
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	Not applicable
Category	/SequencerControl/SequencerPathControl

Values	Description
RisingEdge	The sequencer is triggered on the rising edge of the signal.
FallingEdge	The sequencer is triggered on the falling edge of the signal.
AnyEdge	The sequencer is triggered on the falling or rising edge of the signal.
LevelHigh	The sequencer is triggered at a high signal level.
LevelLow	The sequencer is triggered at a low signal level.

SequencerTriggerSource

[SequencerSetSelector][SequencerPathSelector]

Selects the internal signal or physical input line to use as source for triggering the sequencer.

Note: The selected trigger must have its `TriggerMode` set to *`On`*.

Interface support	All
Display name	Sequencer Trigger Source
Standard	SFNC (adapted)
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	Not applicable
Category	/AcquisitionControl

Values	Description
`Off`	Triggering is disabled.
`Action0`[1]	The Action0 command is output as source signal.
`Action1`[1]	The Action1 command is output as source signal.
`ExposureActive`[2]	The `ExposureActive` signal triggers the sequencer.
`FrameActive`	The `FrameActive` signal triggers the sequencer.
`Line0`	Physical Line0 triggers the sequencer.
`Line1`	Physical Line1 triggers the sequencer.
`Line2`[3]	Physical Line2 triggers the sequencer.
`Line3`[3]	Physical Line3 triggers the sequencer.
`Timer0Active`	The `Timer0Active` signal triggers the sequencer.
`Timer1Active`	The `Timer1Active` signal triggers the sequencer.
`SoftwareSignal0`	SoftwareSignal0 triggers the sequencer.
`SoftwareSignal1`	SoftwareSignal1 triggers the sequencer.
`...`	...
`SoftwareSignal7`	SoftwareSignal7 triggers the sequencer.

[1] Currently, available with Alvium G1/G5 cameras only.

[2] Available for cameras with global shutter sensors and with rolling shutter senors if TriggerMode is enabled or if AcquisitionMode is set to Continuous.

[3] Available with Alvium G1/G5 and Alvium USB cameras. Alvium CSI-2 cameras support Line0 and Line1 only.

PtpControl

Note: Features in this subcategory are available for Alvium GigE cameras only.

The features in this category can be used to synchronize your camera, for example, with other cameras.

Interface support	GigE
Display name	Ptp Control
Standard	SFNC
Origin of feature	Camera
Feature type	(Category)

PtpClockAccuracy

Displays the expected accuracy of the camera's PTP clock when it is the grandmaster, or in the event it becomes the grandmaster.

Interface support	GigE
Display name	Ptp Clock Accuracy
Standard	SFNC
Origin of feature	Camera
Feature type	Enumeration
Access	R
Affected features	Not applicable
Category	/PtpControl

Values	Description
Unknown	The accuracy cannot be stated (default).

PtpClockID

Displays the latched **parent** clock ID of the PTP device (=camera).

Interface support	GigE
Display name	Ptp Clock ID
Standard	SFNC
Origin of feature	Camera
Feature type	Enumeration
Access	R
Affected features	Not applicable
Category	/PtpControl

Values	Description
0	Minimum
9223372036854775807	Maximum

PtpDataSetLatch

Latches the current values from the camera's PTP clock data set.

Interface support	GigE
Display name	Ptp Data Set Latch
Standard	SFNC
Origin of feature	Camera
Feature type	Command
Access	W
Affected features	Not applicable
Category	/PtpControl

PtpEnable

Enable or disables using the Precision Time Protocol (PTP).

Interface support	GigE
Display name	Ptp Enable
Standard	SFNC
Origin of feature	Camera
Feature type	Boolean
Access	R/W
Affected features	Not applicable
Category	/PtpControl

Values	Description
True	PTP is enabled.
False	PTP is disabled.

PtpGrandmasterClockID

Displays the latched **grandmaster** clock ID of the PTP device (=camera).

Interface support	GigE
Display name	Ptp Grandmaster Clock ID
Standard	SFNC
Origin of feature	Camera
Feature type	Integer
Access	R
Affected features	Not applicable
Category	/PtpControl

Values	Description
0	Minimum
9223372036854775807	Maximum

PtpOffsetFromMaster

Displays the latched offset from the PTP master clock.

Interface support	GigE
Display name	Ptp Offset From Master
Standard	SFNC
Origin of feature	Camera
Feature type	Integer
Access	R
Unit	ns (nanoseconds)
Affected features	Not applicable
Category	/PtpControl

Values	Description
-2147483648	Minimum
2147483647	Maximum

PtpOperationMode

Controls the IEEE 1588 operation mode.

Interface support	GigE
Display name	Ptp Operation Mode
Standard	Custom
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	Not applicable
Category	/PtpControl

Values	Description
Auto	The status for the camera is set automatically.
Slave	Sets the camera to be slave.
Master	Sets the camera to be master.

PtpParentClockID

Displays the latched **parent** (=current master) clock ID of the PTP device (=camera).

Interface support	GigE
Display name	Ptp Parent Clock ID
Standard	SFNC
Origin of feature	Camera
Feature type	Integer
Access	R
Affected features	Not applicable
Category	/PtpControl

Values	Description
0	Minimum
9223372036854775807	Maximum

PtpServoStatus

Displays the latched state of the PTP Servo Clock.

PTP accuracy

The average accuracy for PTP is 12 µs.

- **Typical PTP lock type** with Alvium cameras:
  Floating lock state in cycles: *Idle* > *Locked* > *Stepchange*
  Average offset from Master: < 12 µs
- **Other PTP lock type** with Alvium cameras (temporary, cannot be forced):
  Strong lock state: *Locked*.
  Average offset from Master: < 1 µs

Interface support	GigE
Display name	Ptp Servo Status
Standard	SFNC adapted
Origin of feature	Camera
Feature type	Enumeration
Access	R
Affected features	Not applicable
Category	/PtpControl

Values	Description
Idle	The status of the clock controller is in idle state (waiting for all data collection).
Locked	The status of the clock controller is in adjusting state, the PI controller is used to follow the master clock drift.
ClockChange	The status of the clock frequency configuration is changed. This occurs when there is a big difference between master and slave clock frequency.
StepChange	The status of the clock counter is changed step-by-step.
Unknown	The status of the clock controller is set to Unknown (for example, if the camera works as a Master).

PtpStatus

Displays the PTP status.

Interface support	GigE
Display name	Ptp Status
Standard	SFNC
Origin of feature	Camera
Feature type	Enumeration
Access	R
Affected features	Not applicable
Category	/PtpControl

Values	**Description**[1]
1	Initializing
2	Faulty
3	Disabled
4	Listening
5	Pre Master
6	Master
7	Passive
8	Uncalibrated
9	Slave

[1]Refer to the IEEE 1588-2008 specification for additional information on PTP states.

SoftwareSignalControl

Note: The features in this category are still in the testing phase and not fully validated.

The features in this category can be used by external devices to trigger actions within the camera by software commands.

See ActionControl on page 41 for the interaction with features in this category.

Interface support	All
Display name	Software Signal Control
Standard	SFNC
Origin of feature	Camera
Feature type	(Category)

SoftwareSignalPulse

[SoftwareSignalSelector]

Generates a pulse signal used by external devices to trigger actions within the camera by software commands.

Interface support	All
Display name	Software Signal Pulse
Standard	SFNC
Origin of feature	Camera
Feature type	Command
Access	W
Affected features	Not applicable
Category	/SoftwareSignalControl

SoftwareSignalSelector

Selects which Software Signal features to control.

Interface support	All
Display name	Software Signal Selector
Standard	SFNC
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	`SoftwareSignalPulse`
Category	/SoftwareSignalControl

Values Alvium CSI-2 /G1 / G5	Description
SoftwareSignal0	Selects software signal 0. (Default)
SoftwareSignal1	Selects software signal 1.
SoftwareSignal2	Selects software signal 2.
SoftwareSignal3	Selects software signal 3.

Values Alvium USB	Description
SoftwareSignal0	Selects software signal 0. (Default)
SoftwareSignal1	Selects software signal 1.
SoftwareSignal2	Selects software signal 2.
SoftwareSignal3	Selects software signal 3.
SoftwareSignal4	Selects software signal 4.
SoftwareSignal5	Selects software signal 5.
SoftwareSignal6	Selects software signal 6.
SoftwareSignal7	Selects software signal 7.

Stream

Note: Features in this category are available for Alvium GigE cameras only.

The features in this category can be used to control data traffic between the host and the camera. This includes functions to avoid dropped frames. `MultiCast` can be used to synchronize the timing between cameras.

Interface support	GigE
Display name	Stream
Standard	Custom
Origin of feature	Transport layer
Feature type	(Category)

Info (subcategory)

Note: Features in this subcategory are available for Alvium GigE cameras only.

The features in this subcategory can be used to display the MAC address of the camera and the version of the filter version for the GigE Vision Streaming Protocol.

Interface support	GigE
Display name	Info
Standard	Custom
Origin of feature	Transport layer
Feature type	(Subcategory)

DeviceMACAddress

Displays the 48-bit MAC address of the camera's GVCP interface.

Interface support	GigE
Display name	Device MAC Address
Standard	Custom
Origin of feature	Transport layer
Feature type	String
Access	R
Affected features	Not applicable
Category	/Stream/Info

GVSPFilterVersion

Displays the GVSP filter version.

Interface support	GigE
Display name	GVSP Filter Version
Standard	Custom
Origin of feature	Transport layer
Feature type	String
Access	R
Affected features	Not applicable
Category	/Stream/Info

Multicast (subcategory)

Note: Features in this subcategory are available for Alvium GigE cameras only.

The features in this subcategory enable synchronizing the timing between cameras.

Interface support	GigE
Display name	Multicast
Standard	Custom
Origin of feature	Transport layer
Feature type	(Subcategory)

MulticastEnable

Enables or disables multicast.

Interface support	GigE
Display name	Multicast Enable
Standard	Custom
Origin of feature	Transport layer
Feature type	Boolean
Access	R/W
Affected features	Not applicable
Category	/Stream/Multicast

Values	Description
False	Disables multicast.
True	Enables multicast.

MulticastIPAddress

Selects the IP address of the target multicasting group. The Multicast transport layer protocol enables multiple cameras to use IP connections most effectively by sending packets to many receivers at the same time.

Interface support	GigE
Display name	Multicast IP Address
Standard	Custom
Origin of feature	Transport Layer
Feature type	Integer
Access	R/W
Affected features	Not applicable
Category	/Stream/Multicast

Values	Description
224.0.0.0	Minimum value (0xE0.00.00.00 in hexadecimal or 3.758.096.384 in decimal)
239.255.255.255	Maximum value (0xEF.FF.FF.FF in hexadecimal or 4.026.531.839 in decimal)

Settings (subcategory)

Note: Features in this subcategory are available for Alvium GigE cameras only.

The features in this subcategory can be used to control settings for the packet transfer between the host and the camera. `GVSPDriverSelector` enables to select between using the transport layer or the filter driver.

Interface support	GigE
Display name	Settings
Standard	Custom
Origin of feature	Transport layer
Feature type	(Subcategory)

GVSPAdjustPacketSize

Request the packet size used to be adjusted automatically.

Interface support	GigE
Display name	GVSP Adjust Packet Size
Standard	Custom
Origin of feature	Transport layer
Feature type	Command
Access	W
Affected features	`GVSPPacketSize, GevSCPSPacketSize, DeviceStreamChannelPacketSize`
Category	/Stream/Settings

GVSPBurstSize

Controls the maximum number of GVSP packets to be processed in a burst.

Interface support	GigE
Display name	GVSP Burst Size
Standard	Custom
Origin of feature	Transport Layer
Feature type	Integer
Access	R/W
Affected features	Not applicable
Category	/Stream/Settings

Values	Description
1	Minimum value
256	Maximum value

GVSPDriverSelector

Selects the streaming driver to be used.

Interface support	GigE
Display name	GVSP Driver Selector
Standard	Custom
Origin of feature	Transport layer
Feature type	Enumeration
Access	R/W
Affected features	Not applicable
Category	/Stream/Settings

Values	Description
Filter	Selects the filter drivers stream engine. (Default)
Socket	Selects the transport layers stream engine.

GVSPHostReceiveBufferSize

Controls the socket buffer space used to receive GVSP packets.

The operating system adjusts the socket buffer continuously. The value may be limited internally by the operating system. See the SO_RCVBUF documentation of the operating system.

Note: This feature cannot be used with the filter driver.

Interface support	GigE
Display name	GVSP Host Receive Buffer Size
Standard	Custom
Origin of feature	Transport Layer
Feature type	Integer
Access	R/W
Unit	Bytes
Affected features	Not applicable
Category	/Stream/Settings

GVSPMaxLookBack

Controls the size for the detection of the missing GVSP packets under Windows. This feature can be used to delay the first RESEND_CMD for a missing GVSP packet by X packets.

Interface support	GigE
Display name	GVSP Max Look Back
Standard	Custom
Origin of feature	Transport Layer
Feature type	Integer
Access	R/W
Affected features	Not applicable
Category	/Stream/Settings

Values	Description
1	Minimum value
1024	Maximum value

GVSPMaxRequests

Controls the maximum amount of RESEND_CMDs requested for a missing GVSP packet.

Note: Setting the feature to 0 disables the GigE Vision resend mechanism. The transport layer or filter driver does not request the re-transmission of any missing GVSP packet.

Interface support	GigE
Display name	GVSP Max Requests
Standard	Custom
Origin of feature	Transport Layer
Feature type	Integer
Access	R/W
Affected features	Not applicable
Category	/Stream/Settings

Values	Description
0	Minimum value, disables GigE Vision resend mechanism.
512	Maximum value

GVSPMaxWaitSize

Controls the maximum number of received GVSP packets following a resend request to wait before requesting again. The transport layer or the filter driver waits until `GVSPMaxWaitSize` of packets has been reached before requesting a resend for the same packet again.

Interface support	GigE
Display name	GVSP Max Wait Size
Standard	Custom
Origin of feature	Transport Layer
Feature type	Integer
Access	R/W
Affected features	Not applicable
Category	/Stream/Settings

Values	Description
8	Minimum value
1024	Maximum value

GVSPMissingSize

Controls the maximum number of simultaneously missing GVSP packets before dropping the frame.

You can use this feature to cancel the reception of a single frame if the resend limit `GVSPMaxRequests` is reached for too many packets. The frame is marked as incomplete and returned to the GenTL consumer.

Interface support	GigE
Display name	GVSP Missing Size
Standard	Custom
Origin of feature	Transport Layer
Feature type	Integer
Access	R/W
Affected features	Not applicable
Category	/Stream/Settings

Values	Description
0	Minimum value, disables the feature.
1024	Maximum value

GVSPPacketSize

Controls the total size of a GVSP packet, including the IP, UDP, and GVSP headers.

Interface support	GigE
Display name	GVSP Packet Size
Standard	Custom
Origin of feature	Transport Layer
Feature type	Integer
Access	R/W
Unit	Bytes
Affected features	`GevSCPSPacketSize, DeviceStreamChannelPacketSize`
Category	/Stream/Settings

Values	Description
500	Minimum value for Alvium G1
9190	Maximum value for Alvium G1
500	Minimum value for Alvium G5
16358	Maximum value for Alvium G5

GVSPTiltingSize

Controls the maximum number of GVSP packets received from a following frame before dropping the frame.

You can use this feature to cancel the reception of a single frame if a certain number of GVSP packets of the following frame have already been received. The frame is marked as incomplete and returned to the GenTL consumer.

Interface support	GigE
Display name	GVSP Tilting Size
Standard	Custom
Origin of feature	Transport Layer
Feature type	Integer
Access	R/W
Affected features	Not applicable
Category	/Stream/Settings

Values	Description
0	Minimum value, disables the feature.
1024	Maximum value

GVSPTimeout

Controls the timeout used for stream packets.

You can use this feature to react on a possible streaming interruptions. If no GVSP packet is received during the last `GVSPTimeout` milliseconds, the stream engine forces a resend of currently missing GVSP packets.

Interface support	GigE
Display name	GVSP Timeout
Standard	Custom
Origin of feature	Transport Layer
Feature type	Integer
Access	R/W
Unit	Milliseconds [ms]
Affected features	Not applicable
Category	/Stream/Settings

Values	Description
0	Minimum value, disables the feature.
5000	Maximum value

Statistics (subcategory)

Note: Features in this subcategory are available for Alvium GigE cameras only.

The features in this subcategory can be used to display frame rates, streaming duration, and the transfer status of packets between the host and the camera.

Interface support	GigE
Display name	Statistics
Standard	Custom
Origin of feature	Transport layer
Feature type	(Subcategory)

StatFrameRate

Displays the frequency at which the device is sending frames to the host (derived from the frame timestamps).

Interface support	GigE
Display name	Stat Frame Rate
Standard	Custom
Origin of feature	Transport layer
Feature type	Float
Access	R
Unit	Hertz [Hz] (frames per second)
Affected features	Not applicable
Category	/Stream/Statistics

Values	Description
0	Minimum value
1.79769313486e+308	Maximum value

StatFramesDelivered

Displays the number of frames that have been delivered to the TL consumer without errors.

Interface support	GigE
Display name	Stat Frames Delivered
Standard	Custom
Origin of feature	Transport layer
Feature type	Integer
Access	R
Affected features	Not applicable
Category	/Stream/Statistics

Values	Description
0	Minimum value
4294967295	Maximum value

StatFramesDropped

Displays the number of frames received by the host that are incomplete due to missing packets.

Note: This does not include shoved frames.

Interface support	GigE
Display name	Stat Frames Dropped
Standard	Custom
Origin of feature	Transport layer
Feature type	Integer
Access	R
Affected features	Not applicable
Category	/Stream/Statistics

Values	Description
0	Minimum value
4294967295	Maximum value

StatFramesRescued

Displays the number of frames that initially had missing packets but were successfully completed after packet resend.

Interface support	GigE
Display name	Stat Frames Rescued
Standard	Custom
Origin of feature	Transport layer
Feature type	Integer
Access	R
Affected features	Not applicable
Category	/Stream/Statistics

Values	Description
0	Minimum value
4294967295	Maximum value

StatFramesShoved

Displays the number of frames dropped because the transfer of a following frame was completed earlier.

Interface support	GigE
Display name	Stat Frames Shoved
Standard	Custom
Origin of feature	Transport layer
Feature type	Integer
Access	R
Affected features	Not applicable
Category	/Stream/Statistics

Values	Description
0	Minimum value
4294967295	Maximum value

StatFramesUnderrun

Displays the number of frames missed due to the non-availability of a user supplied buffer (buffer underrun).

Interface support	GigE
Display name	Stat Frames Underrun
Standard	Custom
Origin of feature	Transport layer
Feature type	Integer
Access	R
Affected features	Not applicable
Category	/Stream/Statistics

Values	Description
0	Minimum value
4294967295	Maximum value

StatLocalRate

Displays the frequency at which the host has received complete and incomplete frames (derived from the host clock).

Interface support	GigE
Display name	Stat Local Rate
Standard	Custom
Origin of feature	Transport layer
Feature type	Float
Access	R
Unit	Hz (frames per second)
Affected features	Not applicable
Category	/Stream/Statistics

Values	Description
0	Minimum value
1.79769313486e+308	Maximum value

StatPacketsErrors

Displays the number of received packets that are erroneous.

Interface support	GigE
Display name	Stat Packets Errors
Standard	Custom
Origin of feature	Transport layer
Feature type	Integer
Access	R
Affected features	Not applicable
Category	/Stream/Statistics

Values	Description
0	Minimum value
4294967295	Maximum value

StatPacketsMissed

Displays the number of packets expected, but not received by the host.

Note: This does not include successfully resent packets.

Interface support	GigE
Display name	Stat Packets Missed
Standard	Custom
Origin of feature	Transport layer
Feature type	Integer
Access	R
Affected features	Not applicable
Category	/Stream/Statistics

Values	Description
0	Minimum value
4294967295	Maximum value

StatPacketsReceived

Displays the number of error-free packets received and processed by the host.

Note: This includes successfully resent packets.

Interface support	GigE
Display name	Stat Packets Received
Standard	Custom
Origin of feature	Transport layer
Feature type	Integer
Access	R
Affected features	Not applicable
Category	/Stream/Statistics

Values	Description
0	Minimum value
4294967295	Maximum value

StatPacketsRequested

Displays the number of missing packets that were requested for resend from the camera.

Interface support	GigE
Display name	Stat Packets Requested
Standard	Custom
Origin of feature	Transport layer
Feature type	Integer
Access	R
Affected features	Not applicable
Category	/Stream/Statistics

Values	Description
0	Minimum value
4294967295	Maximum value

StatPacketsResent

Displays the number of missing packets that were resent by the camera after having been requested.

Interface support	GigE
Display name	Stat Packets Resent
Standard	Custom
Origin of feature	Transport layer
Feature type	Integer
Access	R
Affected features	Not applicable
Category	/Stream/Statistics

Values	Description
0	Minimum value
4294967295	Maximum value

StatPacketsUnavailable

Displays the number of packets that could not be resent by the camera after having been requested.

Interface support	GigE
Display name	Stat Packets Unavailable
Standard	Custom
Origin of feature	Transport layer
Feature type	Integer
Access	R
Affected features	Not applicable
Category	/Stream/Statistics

Values	Description
0	Minimum value
4294967295	Maximum value

StatTimeElapsed

Displays the Elapsed time since the streaming was started.

Interface support	GigE
Display name	Stat Time Elapsed
Standard	Custom
Origin of feature	Transport layer
Feature type	Float
Access	R
Unit	Seconds [s]
Affected features	Not applicable
Category	/Stream/Statistics

Values	Description
0	Minimum value
1.79769313486e+308	Maximum value

StreamInformation

The features in this category can be used to display, such as the streaming status, the frame rate, and the transfer status of frames sent by the camera.

Interface support	All (most features)
Display name	Stream Information
Standard	GenTL SFNC
Origin of feature	Transport layer
Feature type	(Category)

StreamID

Displays the camera's unique ID for the stream, for instance a GUID.

Interface support	All
Display name	Stream ID
Standard	GenTL SFNC
Origin of feature	Transport layer
Feature type	String
Access	R
Affected features	Not applicable
Category	/StreamInformation

StreamIsGrabbing

Displays the status of the acquisition engine.

Interface support	CSI-2, USB
Display name	Stream Is Grabbing
Standard	GenTL SFNC
Origin of feature	Transport layer
Feature type	Boolean
Access	R
Affected features	`MaxDriverBuffersCount`, `StreamPayloadSizeMode`, `StreamPayloadSizeAlignment`, `ManualStreamPayloadSize`
Category	/StreamInformation

Values	Description
`True`	Acquisition engine is started.
`False`	Acquisition engine is not started.

StreamType

Displays the transport layer type of the data stream.

Interface support	All
Display name	Stream Type
Standard	GenTL SFNC (adapted)
Origin of feature	Transport layer
Feature type	Enumeration
Access	R
Affected features	Not applicable
Category	/StreamInformation

Values	Description
CSI-2	The transport layer is MIPI CSI-2 type.
GEV	The transport layer is GigE type.
USB3	The transport layer is USB 3.x type.

Statistics (subcategory)

Note: Features in this subcategory are available for Alvium CSI-2 cameras only.

The features in this subcategory can be used to display the frame rate and the transfer status of frames sent by the camera.

Interface support	CSI-2
Display name	Statistics
Standard	Custom
Origin of feature	Transport layer
Feature type	Subcategory
Category	/StreamInformation

StatFrameRate

Displays the rate at which the device is sending frames to the host, derived from the frame timestamps.

Interface support	CSI-2
Display name	Stat Frame Rate
Standard	Custom
Origin of feature	Transport layer
Feature type	Float
Access	R
Unit	fps [frames per second]
Affected features	Not applicable
Category	/StreamInformation/Statistics

Values	Description
0	Minimum value
1.79769313486e+308	Maximum value

StatFramesCRCError

Displays the number of frames received with CRC errors.

Interface support	CSI-2
Display name	Stat Frames CRC Error
Standard	Custom
Origin of feature	Transport layer
Feature type	Integer
Access	R
Affected features	Not applicable
Category	/StreamInformation/Statistics

Values	Description
0	Minimum value
9223372036854775807	Maximum value

StatFramesDelivered

Displays the number of frames received without errors.

Interface support	CSI-2
Display name	Stat Frames Delivered
Standard	Custom
Origin of feature	Transport layer
Feature type	Integer
Access	R
Affected features	Not applicable
Category	/StreamInformation/Statistics

Values	Description
0	Minimum value
9223372036854775807	Maximum value

StatFramesIncomplete

Displays the number of incomplete frames received.

Note: Shoved frames are not included.

Interface support	CSI-2
Display name	Stat Frames Incomplete
Standard	Custom
Origin of feature	Transport layer
Feature type	Integer
Access	R
Affected features	Not applicable
Category	/StreamInformation/Statistics

Values	Description
0	Minimum value
9223372036854775807	Maximum value

StatFramesUnderrun

Displays the number of missed frames caused by a missing user supplied buffer (buffer underrun).

Interface support	CSI-2
Display name	Stat Frames Underrun
Standard	Custom
Origin of feature	Transport layer
Feature type	Integer
Access	R
Affected features	Not applicable
Category	/StreamInformation/Statistics

Values	Description
0	Minimum value
9223372036854775807	Maximum value

TestControl

The feature in this category can be used to test if packets are transmitted successfully between the host and the camera.

Interface support	CSI-2, USB
Display name	Test Control
Standard	SFNC
Origin of feature	Camera
Feature type	(Category)

TestPendingAck

Tests the camera's pending acknowledge feature. When this feature is written, the camera waits a time period corresponding to the value of `TestPendingAck` before acknowledging the write.

Note: If you select a high value, the camera does not respond for a long time.

Interface support	CSI-2, USB
Display name	Test Pending Ack
Standard	SFNC
Origin of feature	Camera
Feature type	Integer
Access	R/W
Unit	ms
Affected features	Not applicable
Category	/TestControl

Values	Description
0	Minimum
60000	Maximum

TransportLayerControl

The features in this category can be used to display the current bandwidth use and the transfer status of packets between the host and the camera on the transport layer level.

Interface support	All
Display name	Transport Layer Control
Standard	SFNC
Origin of feature	Camera
Feature type	(Category)

PayloadSize

Displays 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. Therefore, the feature displays the total size of data payload for a data block.

Interface support	All
Display name	Payload Size
Standard	SFNC
Origin of feature	Camera
Feature type	Integer
Access	R
Unit	Bytes
Affected features	Not applicable
Category	/TransportLayerControl

Values	Description
0	Minimum

GigEVision

Note: The feature in this subcategory is

- Available for Alvium GigE cameras only
- Invisible in Vimba Viewer.

The feature in this subcategory can be used to control the stream packet size to be transmitted on the selected channel for a GVSP transmitter.

Interface support	GigE
Display name	GigE Vison
Standard	SFNC
Origin of feature	Transport layer
Feature type	(Subcategory)

GevSCPSPacketSize

Controls the stream packet size to be transmitted on the selected channel for a GVSP transmitter.

Displays the maximum packet size supported by a GVSP receiver.

Notes:

- The following data is excluded: Data leader, data trailer, the last data packet (which might be of smaller size because the packet size is not necessarily a multiple of block size for stream channel).
- If cameras cannot support the requested packet size, they must not fire test packets when requested to do so.
- `DeviceStreamChannelPacketSize` is updated after writing to `GevSCPSPacketSize`.

Interface support	GigE
Display name	Gev SCPS Packet Size
Standard	SFNC
Origin of feature	Transport layer
Feature type	Integer
Access	R/W
Affected features	`DeviceStreamChannelPacketSize`
Category	/TransportLayerControl/GigEVision

Info (subcategory)

Note: Features in this subcategory are available for Alvium CSI-2 cameras only.

The features in this subcategory can be used to display the transfer status of packets between the host and the camera on the transport layer level.

Interface support	CSI-2
Display name	Info
Standard	Custom
Origin of feature	Transport layer
Feature type	Subcategory
Category	/TransportLayerControl

CSI2ClockFrequency

Displays the MIPI CSI-2 clock frequency.

Interface support	CSI-2
Display name	CSI-2 Clock Frequency
Standard	Custom
Origin of feature	Transport layer
Feature type	Float
Access	R
Unit	Hz [Hertz]
Affected features	Not applicable
Category	/TransportLayerControl/Info

CSI2DriverInterfaceVersion

Displays the version of the MIPI CSI-2 interface.

Interface support	CSI-2
Display name	CSI-2 Driver Interface Version
Standard	Custom
Origin of feature	Transport layer
Feature type	String
Access	R
Affected features	Not applicable
Category	/TransportLayerControl/Info

CSI2LaneCount

Displays the number of used MIPI CSI-2 lanes.

Interface support	CSI-2
Display name	CSI-2 Lane Count
Standard	Custom
Origin of feature	Transport layer
Feature type	Integer
Access	R
Affected features	Not applicable
Category	/TransportLayerControl/Info

LibcsiVersion

Displays the libcsi version.

Interface support	CSI-2
Display name	libcsi Version
Standard	Custom
Origin of feature	Transport layer
Feature type	String
Access	R
Affected features	Not applicable
Category	/TransportLayerControl/Info

CSI2DriverVersion

Displays the version of the MIPI CSI-2 driver.

Interface support	CSI-2
Display name	CSI-2 Driver Version
Standard	Custom
Origin of feature	Transport layer
Feature type	String
Access	R
Affected features	Not applicable
Category	/TransportLayerControl/Info

PacketCount

Displays the number of MIPI CSI-2 packets per frame.

Interface support	CSI-2
Display name	Packet Count
Standard	Custom
Origin of feature	Transport layer
Feature type	Integer
Access	R
Affected features	Not applicable
Category	/TransportLayerControl/Info

Values	Description
0	Minimum
4294967295	Maximum

PacketSize

Displays the size of MIPI CSI-2 packets.

Interface support	CSI-2
Display name	Packet Size
Standard	Custom
Origin of feature	Transport layer
Feature type	Integer
Access	R
Unit	Bytes
Affected features	Not applicable
Category	/TransportLayerControl/Info

Values	Description
0	Minimum
4294967295	Maximum

UserSetControl

The features in this category enable to store and select user-specific camera settings, or to revert the camera to defined settings.

User sets can be loaded by default, without needing to set values by software after every restart of the camera. Or they can be used to switch between different settings, for example, to adjust from daylight to artificial light.

Supported features

User sets on Alvium cameras support all features except for:

- Selectors
- Command features
- Read-only features
- Features that do not apply to the corresponding interface, such as CSI-2 related features on a USB camera
- Features in the `LUTControl` category.

Interface support	All
Display name	User Set Control
Standard	SFNC
Origin of feature	Camera
Feature type	(Category)

UserSetDefault

Selects the user set to be loaded by default when the camera is reset.

Interface support	All
Display name	User Set Default
Standard	SFNC
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	Not applicable
Category	/UserSetControl

Value	Description
`Default`	The default user set is loaded at camera reset.
`UserSet1`	Your individual UserSet1 is loaded at camera reset.
`UserSet2`	Your individual UserSet2 is loaded at camera reset.
`UserSet3`	Your individual UserSet3 is loaded at camera reset.
`UserSet4`	Your individual UserSet4 is loaded at camera reset.

UserSetLoad

[UserSetSelector]

Loads the user set specified by `UserSetSelector` to the camera.

Interface support	All
Display name	User Set Load
Standard	SFNC
Origin of feature	Camera
Feature type	Command
Access	W
Affected features	All features that are not excluded from user sets. See your Alvium camera's user guide for exceptions.
Category	/UserSetControl

UserSetSave

[UserSetSelector]

Writes and saves the current setup and state of the camera to the user set specified by `UserSetSelector`.

Interface support	All
Display name	User Set Save
Standard	SFNC
Origin of feature	Camera
Feature type	Command
Access	W
Affected features	All features that are not excluded from user sets. See your Alvium camera's user guide for exceptions.
Category	/UserSetControl

UserSetSelector

Selects the user set to be loaded or saved.

Interface support	All
Display name	User Set Selector
Standard	SFNC
Origin of feature	Camera
Feature type	Enumeration
Access	R/W
Affected features	`UserSetLoad`, `UserSetSave` All features that are not excluded from user sets. See your Alvium camera's user guide for exceptions.
Category	/UserSetControl

Value	Description
`Default`	The default user set is selected.
`UserSet1`	Your individual UserSet1 set is selected.
`UserSet2`	Your individual UserSet2 set is selected.
`UserSet3`	Your individual UserSet3 set is selected.
`UserSet4`	Your individual UserSet4 set is selected.

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