Allied Vision

USB3 Vision cameras

USB Features Reference

V1.0.0

Allied Vision Technologies GmbH // Taschenweg 2a, D-07646 Stadtroda // Germany

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Document at a glance

Read this document carefully

This avoids malfunctions or damage to the camera.

Applied standards

The document describes in alphabetical order the basic and advanced camera controls for Allied Vision USB3 Vision cameras as seen from the Vimba Viewer.

These features comply with:

- USB3 Vision Standard V1.0.1
- GenICam Standard Features Naming Convention V2.2 (SFNC)
- GenICam Transport Layer Standard Features Naming Convention V1.0 (GenTL SFNC)
- GenICam Pixel Format Naming Convention V2.0 (PFNC).

Download applied common standards

For SFNC, GenTL SFNC, and PFNC, see *http://genicam.org*

For USB3 Vision, see *http://www.visiononline.org*

Allied Vision proprietary features

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

Features availability

Availability of transport layer features

Features in the categories *StreamInformation* and *BufferHandlingControl* are not available with any other than the Allied Vision transport layer.

Different features for different camera models

This is the master document for all Allied Vision USB3 Vision camera models. Some features are not available for all camera models.

For particular characteristics, see the corresponding technical manual, Chapter *Camera features available in Vimba*.

What else do you need?

The following downloads provide additional information and software.

Document	**Web link**
USB camera manuals	*https://www.alliedvision.com/en/support/technical-documentation* See **Additional Documents** for your camera.
USB Triggering Concept	*https://www.alliedvision.com/en/support/technical-papers-knowledge-base*
Software	**Web link**
Vimba, including **Vimba Viewer** and **Vimba Driver Installer**	*https://www.alliedvision.com/en/products/software*

Table 1: *USB3 Vision Features Reference -> Additional downloads overview*

Contact us

Connect with Allied Vision by function

https://www.alliedvision.com/en/meta-header/contact

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Email

info@alliedvision.com
support@alliedvision.com

Telephone

EMEA: +49 36428-677-0
The Americas: +1 978-225-2030
Asia-Pacific: +65 6634-9027
China: +86 (21) 64861133

Headquarters

Allied Vision Technologies GmbH
Taschenweg 2a
07646 Stadtroda
Germany

Tel: +49 (0)36428 677-0
Fax: +49 (0)36428 677-28
President/CEO: Frank Grube
Registration Office: AG Jena HRB 208962

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Document history and conventions

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Document history

Version	Date	Remarks
V.1.0.0	06 November 2015	New document release status

Conventions used in this manual

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

Styles

Style	Function	Example
Emphasis	Programs, or highlighting important things	**Emphasis**
Publication title	Publication titles	*Title*
Cross reference	Links inside this document	*Link*
Web reference	Links to web pages	*Link*
Output	Outputs from software GUI	**`Output`**
Input	Input commands, modes	***`Input`***
Feature	Feature names	`Feature`
Non-SFNC feature	Adapted official features or proprietary Allied Vision features.	proprietary

SFNC compliant features

Features fully compliant with the official standard are not additionally marked.

Adapted SFNC features are marked as modified SFNC feature.
Proprietary features are marked as proprietary.

For applied standards, see *Applied standards* on page 2.

Abbreviations

Abbreviation	Meaning
Bps	Bytes per second
dB	Decibel
DN	Digital number
GenTL SFNC	GenICam Transport Layer Standard Features Naming Convention
Hz	Hertz
µs	Microseconds
ms	Milliseconds
ns	Nanoseconds
R/W	Read and write feature
Rc	Read only feature that is constant
R	Read only feature that may change
s	Seconds

Features term use

For easier reading, USB3 Vision features are just named features in this document.

Symbols and notes

Notice

Avoid material damage

Practical Tip

Further information available online

Features order

Features categories and features are listed in alphabetical order.

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 language convention for arrays: a pair of brackets follows the feature name, like in `SelectedFeature[Selector]`.

Features description scheme

Features are described according to the formatting scheme:

Category name

Subcategory

Feature[Selector]

[Type] Access mode/s Deviation from SFNC
Range [...]Unit: ...Default: Factory settings

Short feature description, including individual characteristics.

Note: Helpful information.

Value0	Description
Value1	Description
Value2	Description

Legislation

Trademarks

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Warranty

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Allied Vision Technologies GmbH 11.2015

President/CEO: Frank Grube
Tax ID: DE 184383113

Headquarters
Taschenweg 2a
D-07646 Stadtroda, Germany
Tel: +49 (0)36428 677-0
Fax: +49 (0)36428 677-28
Email: info@alliedvision.com

USB3 Vision features description

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Different features for different camera models

This is the master document for all Allied Vision USB3 Vision camera models. Some features are not available for all camera models.

To see particular characteristics see the corresponding technical manual, Chapter *Camera features available in Vimba*.

Selectors do not change feature settings

A selector determines a feature to be accessed. No feature settings are changed when a selector is set.

Camera state after reboot

After reboot the camera comes up in `UserSetDefault`. At delivery this feature is set to factory settings. To change the state of the camera after reboot, you can define UserSets.

AcquisitionControl

AcquisitionAbort

[Command] (R)/W

Aborts acquisition immediately. This ends the capture without completing the current frame or waiting for a trigger.

Note: If no acquisition is in progress, the command is ignored.

Deviation from the standard: A started exposure will be aborted immediately. If sensor readout is already active, the respective frame will be completed (behavior like `AcquisitionStop`).

AcquisitionFrameCount

[Integer] R/W
Unit: Frames

Controls the number of frames to acquire in `AcquisitionMode` = ***`MultiFrame`***.

AcquisitionFrameRate

[Float] R/W
Unit: Hz

Controls the acquisition rate at which the frames are captured.

Note: `TriggerMode[TriggerSelector]` for the frame trigger must be set to ***Off***.

Before you can change the value of `AcquisitionFrameRate`, you must set `AcquisitionFrameRateMode` to ***Basic***.

If `AcquisitionFrameRateMode` is set to ***Off***, the value shown in `AcquisitionFrameRate` does not influence the current framerate.

AcquisitionFrameRateMode

[Enumeration] R/W proprietary

Determines the behavior of `AcquisitionFrameRate`.

Note: If the selected `ExposureTime` is shorter than the maximum allowed by `AcquisitionFrameRate`, the maximum allowed value is used.

The maximum `ExposureTime` is also limited by factors such as readout time, camera internal processing, the interface, and `DeviceLinkThroughput-Limit`.

Off	`AcquisitionFrameRate` turns frame rate to read only.
Basic	`ExposureTime` has precedence over `AcquisitionFrameRate`; if `ExposureTime` gets longer than the inverse of `AcquisitionFrameRate`, this will be allowed.

AcquisitionMode

[Enumeration] R/W

Sets the acquisition mode of the device. It defines mainly the number of frames to capture during an acquisition and the way the acquisition stops.

SingleFrame	One frame is captured.
MultiFrame	Number of frames specified by `AcquisitionFrameCount` is captured.
Continuous	Frames are captured continuously until stopped with the `AcquisitionStop` or `AcquisitionAbort` command.

AcquisitionStart

[Command] (R)/W

Starts the acquisition of the device. The number of frames captured is specified by `AcquisitionMode`.

Note: In contrast to the SFNC, we normally perform a feature value validation when setting registers; this means before starting acquisition, values do not have to be validated. All features are consistent, you can call `AcquisitionStart`.

AcquisitionStatus[AcquisitionStatusSelector]

[Boolean] R

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

Note: Vimba Viewer polls the `AcquisitionStatus` every 500 ms.
The display in the Vimba Viewer may toggle between ***False*** and ***True***, depending on the selected signal and the current camera state.

False	Selected acquisition signal is not active.
True	Selected acquisition signal is active.

AcquisitionStatusSelector

[Enumeration] R/W

Selects the internal acquisition signal to read using image/payload data over the USB interface.

AcquisitionActive	Device is currently acquiring one or many frames.
AcquisitionTransfer	Device is currently transferring an acquisition of one or many frames.
AcquisitionTriggerWait	Device is currently waiting for an AcquisitionStart trigger.
ExposureActive	Device is currently exposing a frame.
FrameActive	Device is currently capturing a frame.
FrameTriggerWait	Device is currently waiting for a FrameStart trigger.

AcquisitionStop

[Command] (R)/W

Stops acquisition of the device at the end of the current frame. It is mainly used when `AcquisitionMode` is ***Continuous,*** but it can be used in any `AcquisitionMode`.

Note: If the camera is waiting for a trigger, the pending frame will be canceled. If no acquisition is in progress, the command is ignored.

Disabling the running acquisition means that an already running exposure will be finished and all images in the pipeline will be transfered.

ExposureMode

[Enumeration] R/W

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

Timed	Timed exposure. Exposure duration time is set using `ExposureTime`. Exposure starts with ***FrameStart***.
TriggerWidth	Timed exposure. Exposure duration time is set using width of the current frame or line trigger signal(s) pulse.

Note: If the frame or line `TriggerActivation[TriggerSelector]` is ***RisingEdge*** or ***LevelHigh***, the camera exposes as long as the trigger is high. If `TriggerActivation[TriggerSelector]` is ***FallingEdge*** or ***LevelLow***, the camera exposes as long as the trigger is low.

ExposureTime

[Float] R/W
Unit: µs

Controls the duration of the photosensitive cells assembling.

TriggerActivation[TriggerSelector]

[Enumeration] R/W

Specifies the activation mode of the trigger.

AnyEdge	Trigger is considered valid on the falling or rising edge of the source signal.
FallingEdge	Trigger is considered valid on the falling edge of the source signal.
LevelHigh	Trigger is considered valid when level is high.
LevelLow	Trigger is considered valid when level is low.
RisingEdge	Trigger is considered valid on the rising edge of the source signal.

TriggerDelay[TriggerSelector]

[Float] R/W
Unit: µs

Specifies the delay to apply after the trigger reception before activating it.

TriggerMode[TriggerSelector]

[Enumeration] R/W

Switches the selected trigger to ***On/Off***.

Off	Disables the selected trigger
On	Enables the selected trigger

TriggerSelector

[Enumeration] R/W

Selects the trigger to configure.

AcquisitionStart	Selects AquisitionStart trigger.
FrameStart	Selects FrameStart trigger.

TriggerSoftware[TriggerSelector]

[Command] (R)/W

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

TriggerSource[TriggerSelector]

[Enumeration] R/W

Specifies the internal signal or physical input line to use as trigger source. The selected trigger must have its `TriggerMode[TriggerSelector]` set to ***On***.

Software	Specifies that the trigger source will be generated by software using the `TriggerSoftware[TriggerSelector]` command.
Line0 to Line3	Specifies which physical line (or pin) and associated I/O control block to use as external source for the trigger signal.

AnalogControl

BlackLevel[BlackLevelSelector]

[Float] R/W
Unit: DN

Controls the analog black level as DC offset applied to the video signal.

BlackLevelSelector

[Enumeration] R/W

Selects that the `BlackLevel[BlackLevelSelector]` is controlled for ***All*** channels.

All	`BlackLevel` will be applied to all channels or taps.

Gain[GainSelector]

[Float] R/W
Unit: dB

Controls the selected gain as an amplification factor applied to the video signal.

GainSelector

[Enumeration] R/W

Selects which gain is controlled by the various `Gain` features.

All	`Gain` will be applied to all channels or taps.

Gamma

[Float] R/W
Unit: dB

Controls the gamma correction of pixel intensity.

BufferHandlingControl

Features availability for third-party software

- Features in this category are usually not available in the camera features of third-party software that is not based on **Vimba**.
- Features marked as proprietary in this category are not available with any other than the Allied Vision transport layer.

MaxDriverBuffersCount

[Integer] R/W proprietary

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

StreamAnnounceBufferMinimum

[Integer] Rc
Default: 0

Displays the minimal number of buffers to announce to enable the selected `StreamBufferHandlingMode`.

Corresponds to the STREAM_INFO_BUF_ANNOUNCE_MIN command of DSGetInfo function.

Note: For Vimba, the value is 0. Vimba buffers can be announced during streaming.

For third-party software, the value is 1, buffers must be announced before starting the streaming.

StreamAnnouncedBufferCount

[Integer] R

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

StreamBufferHandlingMode

[Enumeration] R/(W)

Controls the available acquisition modes of this stream.

Note: Use ***`Default`*** value to acquire images with the mean processing time being shorter than acquisition time. (Later GenTL SFNC versions have replaced ***`Default`*** by ***`OldestFirst`***.)

No buffer is discarded or overwritten in the output buffer queue. Filled buffers are delivered in the order they were acquired.

`Default`	In the buffer queue between camera and host, if the number of images exceeds the number of empty buffers, the camera drops new data until empty buffers are available again.

CorrectionControl

This is an Allied Vision proprietary category. The `CorrectionControl` feature tree enables access to correction data and settings saved in the camera.

To read from or write to the camera, `FileAccessControl` is used. The SFNC describes most included features in detail.

The following flow charts provide an example how to organize file operations. In the example, UserSet data are to be written for the first time. Factory settings are used as base information to be edited.

- *Reading the correction settings* on page 23
- *Reading the data size* on page 23
- *Deleting the correction settings* on page 24
- *Writing the correction settings* on page 24

Read-Delete-Write

Before writing new data:

- Read previous data to the PC and store it for recovery.
- Delete data from RAM.

Keep factory correction settings untouched

On delivery, factory data for ***`DefectPixelCorrection`*** and ***`FixedPatternNoiseCorrection`*** are saved as ***`Factory`*** settings.

Before editing DefectPixelCorrection, store the factory settings. This way, in case of an error, you can reset correction settings to factory settings.

Be extremely careful when writing correction settings

When you have replaced correction settings you cannot return to the previous settings. Read the following description carefully.

Reading the correction settings

The following example shows correction settings being read from the camera to the host PC for the Defect pixel correction (DPC).

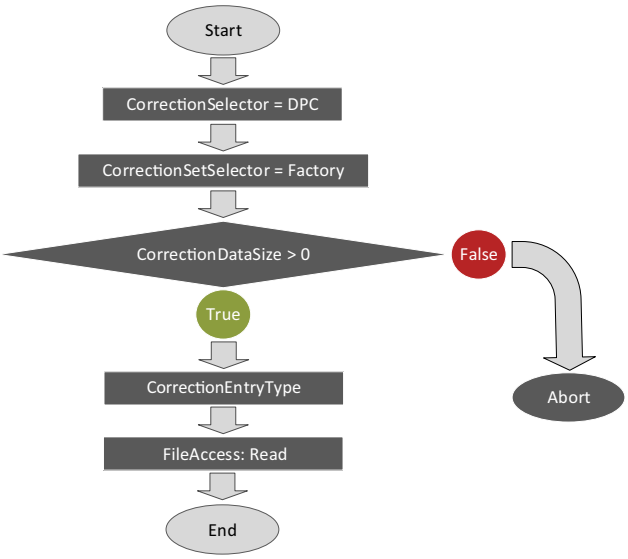

Figure 1: CorrectionControl -> Reading factory settings from the camera

Reading the data size

The following example shows the `CorrectionDataSizeMaxLimit` for the DPC being read from the camera. The value is camera specific.

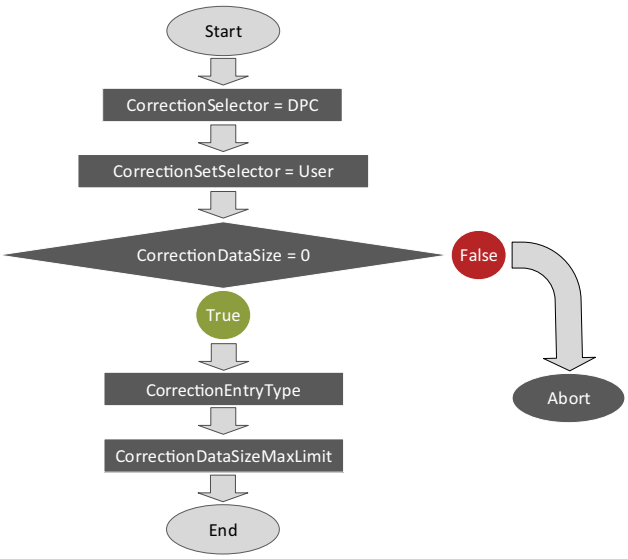

Figure 2: CorrectionControl -> Reading the CorrectionDataSizeMaxLimit

Deleting the correction settings

The following example shows the correction data for DPC being deleted to prepare writing new data to the camera.

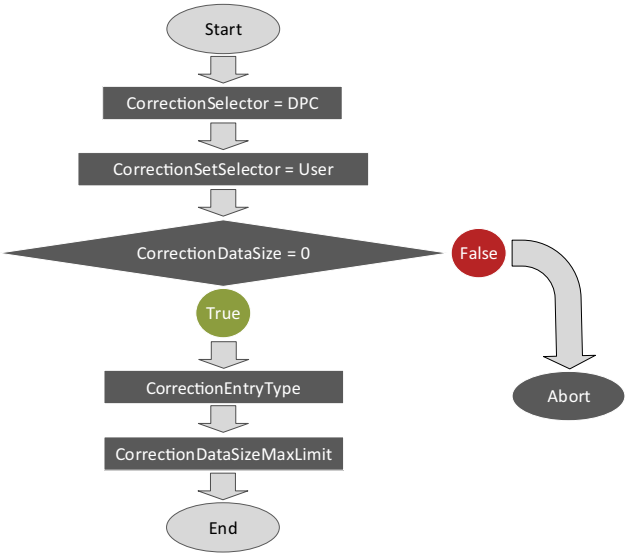

Figure 3: CorrectionControl ->Deleting the correction settings

Writing the correction settings

The following example shows the correction data for DPC being written to the camera.

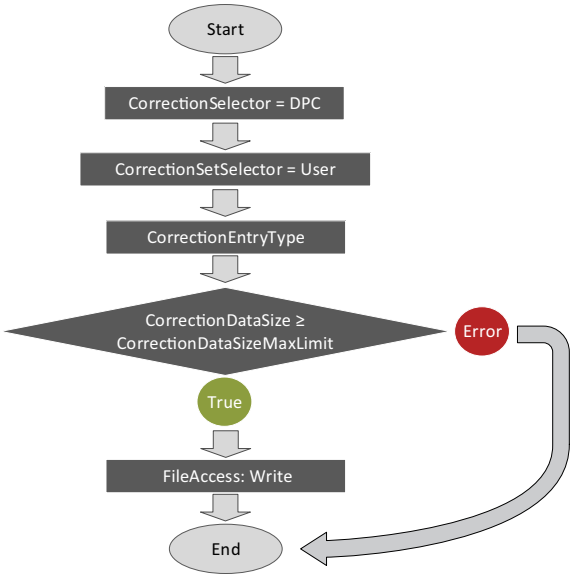

Figure 4: CorrectionControl -> Writing the correction settings

CorrectionMode[CorrectionSelector][CorrectionSetSelector]

[Enumeration] proprietary

Defines if the selected correction is active.

Note: This feature is disabled if no correction data is found in the camera memory.

Off	Selected correction is inactive.
On	Selected correction is active.

CorrectionSelector

[Enumeration] proprietary

Selects the correction type.

DefectPixelCorrection	Selects `DefectPixelCorrection`.
FixedPatternNoiseCorrection	Selects `FixedPatternNoiseCorrection`.

CorrectionSetSelector

[Enumeration] proprietary
Default: Factory

Defines which correction settings are used.

Factory	Selects the correction set stored by the manufacturer.
User	Selects the correction set created by the user.

CorrectionSetDefault[CorrectionSelector]

[Enumeration] proprietary
Default: Factory

Defines the default CorrectionSet used when the device is reset.

Note: This default setting is independent from the `UserSetDefault` feature.

Factory	Selects the correction set stored by the manufacturer.
User	Selects the correction set created by the user.

CorrectionInfo (subcategory)

This Allied Vision proprietary subcategory defines information about the selected correction type.

CorrectionDataSize[CorrectionSelector][CorrectionSetSelector]

[Integer] R proprietary
Unit: [Byte]

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

CorrectionDescription[CorrectionSelector]

[String] R proprietary

Displays information about the selected correction.

CorrectionEntryType[CorrectionSelector]

[Enumeration] R proprietary

Displays the correction type variant used inside the camera.

2	`CorrectionEntryType2` is active.

DeviceControl

DeviceFamilyName

[String] Rc

Identifies the product family of the device.

DeviceFirmwareID[DeviceFirmwareIDSelector]

[String] Rc proprietary

Displays the ID of the camera, depending on the settings of the `DeviceFirmwareIDSelector`.

DeviceFirmwareIDSelector

[Enumeration] Rc proprietary

Selects the ID given back by the `DeviceFirmwareID[DeviceFirmware-IDSelector].`

Current	Displays the active firmware ID.
Supported	Displays all allowed firmware IDs.

DeviceFirmwareVersion[DeviceFirmwareVersionSelector]

[String] Rc

Displays the version of the camera firmware depending on the settings of the `DeviceFirmwareVersionSelector`.

Checking consistency of a firmware update

A firmware update is executed in multiple files. On the camera, with each file received, all the firmware files are checked for consistency.

As long as not all the files have a consistent version number, the `DeviceFirm-wareVersion` outputs 0.0.0. When all the files have been transferred success-fully, the firmware version is displayed.

DeviceFirmwareVersionSelector

[Enumeration] R proprietary

Selects the version given back by the `DeviceFirmwareVersion[DeviceFirmwareVersionSelector]`.

Note: To avoid the following, apply a firmware update according to the instructions only. In an **inconsistent state of the programmed firmware**, after the next restart of the camera, the camera falls back into ***Bootloader Mode***.
In this case, please contact *support@alliedvision.com*.

Current	Displays the active firmware version.
Programmed	Displays the firmware version after the next restart of the camera.

DeviceGenCPVersionMajor

[Integer] Rc

Displays the major version of the GenCP protocol supported by the device.

DeviceGenCPVersionMinor

[Integer] Rc

Displays the minor version of the GenCP protocol supported by the device.

DeviceIndicatorMode

[Enumeration] R/W

Controls the behavior of the indicators (such as LEDs) showing the status of the device.

Active	Device's indicators are active showing their respective status.
ErrorStatus	Device's indicators are inactive unless an error occurs.
Inactive	Device's indicators are inactive (off).

DeviceLinkThroughputLimit

[Integer] R/(W)
Unit: Bps

Limits the maximum bandwidth of the data that will be streamed out by the device on the selected link. In order to control the peak bandwidth, delays will be uniformly inserted between transport layer packets.

Note: Any transport layer specific bandwidth control should be kept in sync with this control as much as possible.

DeviceLinkThroughputLimitMode

[Enumeration] R/W

Controls if `DeviceLinkThroughputLimit` is active.

When disabled, lower level transport layer specific features are expected to control the throughput. **When enabled**, `DeviceLinkThroughputLimit` controls the overall throughput.

Off	Disables `DeviceLinkThroughputLimit`.
On	Enables `DeviceLinkThroughputLimit`.

DeviceManufacturerInfo

[String] Rc

Displays manufacturer information about the device.

DeviceModelName

[String] Rc

Displays the model of the device.

DeviceReset

[Command] W

Resets the device to its power up state.

Note: After reset, the device must be rediscovered.

DeviceSFNCVersionMajor

[Integer] Rc

Displays the major version of the Standard Features Naming Convention that was used to create the device's GenICam XML.

DeviceSFNCVersionMinor

[Integer] Rc

Displays the minor version of the Standard Features Naming Convention that was used to create the device's GenICam XML.

DeviceSFNCVersionSubMinor

[Integer] Rc

Displays the sub minor version of the Standard Features Naming Convention that was used to create the device's GenICam XML.

DeviceScanType

[Enumeration] R

Displays the scan type of the sensor of the device.

Areascan	Using the sensor in area mode (not in line mode).

DeviceSerialNumber

[String] Rc

Identifies the device's serial number. This string is a unique identifier of the device.

DeviceTemperature

[Float] R
Unit: °C

Displays the device temperature measured at the location selected by `DeviceTemperatureSelector`.

DeviceTemperatureSelector

[Enumeration] R/W

Selects the location within the device where temperature is measured.

Mainboard	Selects measuring the mainboard temperature.

DeviceUserID

[String] R/W
Range [max 64 characters]

Controls a user-programmable device identifier.

DeviceVendorName

[String] Rc

Identifies the name of the device manufacturer.

DeviceVersion

[String] Rc
Range [max 64 Bytes]

Displays the version of the device as a string, consisting of custom build number, major version, minor version, and patch version of the camera firmware, divided by periods.

Timestamp

[Integer] R
Unit: ns

Displays the current value of the device timestamp counter.

DigitalIOControl

The `DigitalIOControl` feature tree controls the input of external signals to the camera and the output of camera signals to external devices. The following flow charts show I/O control settings for the typical use cases:

- *Controlling cameras with an external trigger*
- *Cameras as master and slave*

Controlling cameras with an external trigger

In the example, an external signal is used as FrameStart trigger. I/Os need no `LineMode[LineSelector]` settings. Set GPIOs to input or output as desired.

Optional settings

`TriggerActivation[TriggerSelector]` selects, for example, the rising edge of the signal as trigger.

`LineInverter[LineSelector]` enables to set a common logic level as active signal for all in and outputs.

`InputDebounceMode[LineSelector]` enables to filter the accepted signal by its length defined by `InputDebounceTime[LineSelector]`.

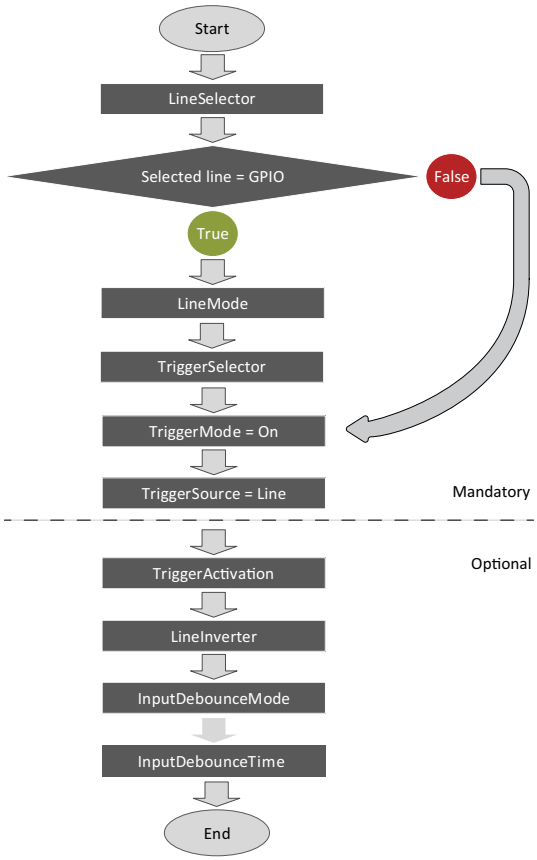

Figure 5: DigitalIOControl -> Settings to control the camera with an external signal

Cameras as master and slave

For simultaneous exposure, instead of signaling cameras individually, cameras can be signaled as daisy chain with master and slave cameras.

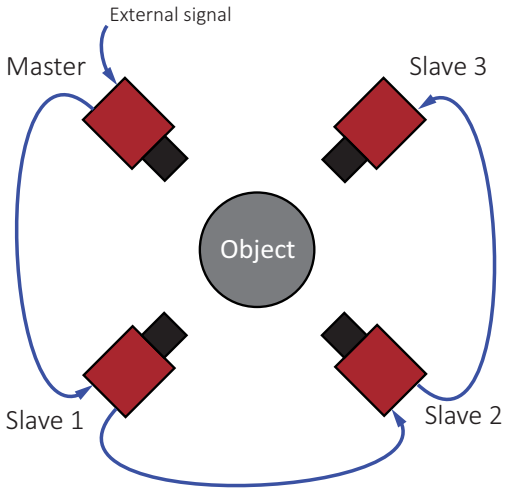

Figure 6: DigitalIOControl -> Master and slave cameras

Master camera settings

In the example, when the master camera is exposing it signals the slave cameras.

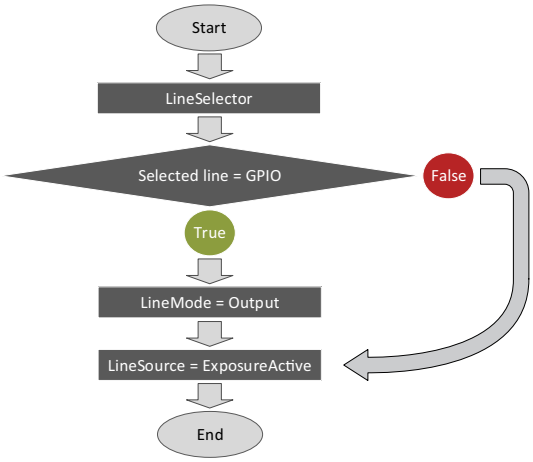

Figure 7: DigitalIOControl -> Settings to control the camera with an external signal

Slave camera settings

The slave cameras are controlled as shown in *Controlling cameras with an external trigger* on page 32.

InputDebounceMode[LineSelector]

[Boolean] R/W proprietary

Switches the debounce function for a particular input line to ***On/Off***. If a line is configured as output (dedicated or selectable), this feature has no effect.

Off	Signals of any length are accepted/valid for the I/Os.
On	Only signals are accepted for the I/Os that have a length defined in `InputDebounceTime[LineSelector]`.

InputDebounceTime[LineSelector]

[Float]R/W proprietary
Unit: µs

Sets the minimum time for a glitched input signal to be definite before it is accepted.

Note: If a line is configured as output (dedicated or selectable), this feature has no effect.

LineInverter[LineSelector]

[Boolean] R/W

Controls the inversion of the signal of the selected input or output line.

False	Line signal is not inverted.
True	Line signal is inverted.

LineMode[LineSelector]

[Enumeration] R/W

Controls if the physical Line is used to input or output a signal.

Note: When a line supports input and output mode, the default state is ***Input*** to avoid damage to camera and peripheral electronics.

Input	The selected physical line is used to input an electrical signal.
Output	The selected physical line is used to output an electrical signal.

LineSelector

[Enumeration] R/W

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

Note: When a line is selected, all other line features will be applied to the line's associated I/O control block and will condition the resulting input or output signal.

Line0	Selects physical Line0 and the associated I/O control block.
Line1	Selects physical Line1 and the associated I/O control block.
Line2	Selects physical Line2 and the associated I/O control block.
Line3	Selects physical Line3 and the associated I/O control block.

LineSource[LineSelector]

[Enumeration] R/W modified SFNC feature
Proprietary ***values*** are formatted ***red***.

Selects which internal acquisition or I/O source signal to output on the selected line.

Note: `LineMode[LineSelector]` must be set to ***Output***.

The ***UserOutput*** can be used to loop a signal from the host through the camera to another device.

Off	Line output is disabled (Tri-State).
AcquisitionActive	Device is currently acquiring one or many frames.
AcquisitionTriggerWait	Device is currently waiting for an AcquisitionStart trigger.
ExposureActive	Device is currently exposing a frame.
FrameActive	Device is currently exposing a frame or reading out from the sensor.
FrameTriggerWait	Device is currently waiting for a FrameStart trigger.
ReadoutActive	Device is currently reading out from the sensor.
Stream0TransferActive	Image data is transferred over the USB interface. For this transfer the logical channel Stream0 is used. The SFNC defines the ability of multiple streams using multiple channels.
UserOutput0	Bit state of UserOutput0, defined by its current `UserOutputValue[UserOutputSelector]`
UserOutput1	Bit state of UserOutput1, defined by its current `UserOutputValue[UserOutputSelector]`
UserOutput2	Bit state of UserOutput2, defined by its current `UserOutputValue[UserOutputSelector]`
UserOutput3	Bit state of UserOutput3, defined by its current `UserOutputValue[UserOutputSelector]`

LineStatus[LineSelector]

[Boolean] R

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

False	Level of the line signal is low.
True	Level of the line signal is high.

OutputDurationMode[LineSelector]

[Enumeration] R/W proprietary

Switches `OutputDurationTime[LineSelector]` for a particular output line to ***On/Off***.

Note: If a line is configured as input (dedicated or selectable), this feature has no effect.

Off	`OutputDurationTime` is disabled.
On	`OutputDurationTime` is enabled.

OutputDurationTime[LineSelector]

[Float] R/W proprietary
Unit: µs

Specifies the minimum time a signal is provided at the output line. This feature may be used for internal signals that are active for a very short time frame (such as a single clock cycle).

Note: If a line is configured as input (dedicated or selectable), this feature has no effect.

UserOutputSelector

[Enumeration] R/W

Selects which bit of the UserOutput register will be set by `UserOutputValue[UserOutputSelector]`.

UserOutput0	Selects the bit 0 of the UserOutput register.
UserOutput1	Selects the bit 1 of the UserOutput register.
UserOutput2	Selects the bit 2 of the UserOutput register.
UserOutput3	Selects the bit 3 of the UserOutput register.

UserOutputValue[UserOutputSelector]

[Boolean] R/W

Controls the value of the bit selected by `UserOutputSelector`.

Note: If a line is configured as input (dedicated or selectable), writing this feature has no effect.

This feature has an effect only on features set up with `LineSource[LineSelector]` = ***UserOutputX***.

False	Feature is disabled.
True	Feature is enabled.

FileAccessControl

The `FileAccessControl` feature tree enables access to data and settings saved in the camera. The SFNC describes all included features in detail. The following flow charts show general examples how to organize file operations.

- *Reading a file* on page 39
- *Deleting a file* on page 40
- *Writing a file* on page 41

Read-Delete-Write

Before writing new data:

- Read previous data to the PC and store it for recovery.
- Delete data from RAM.

Keep factory correction settings untouched

On delivery, factory data for ***DefectPixelCorrection*** and ***FixedPatternNoiseCorrection*** are saved as ***Factory*** settings.

Before editing DefectPixelCorrection, store the factory settings. This way, in case of an error, you can reset correction settings to factory settings.

Use Vimba Viewer to ease software coding for camera controls

Features in this category are shown in **Vimba Viewer** for completeness, not for using them.

Therefore, we recommend to execute `FileAccessControl` using tools, such as the Firmware Updater.

To get an overview, see coding examples in **Vimba**.

The camera closes the file after timeout

Setting `FileOperationSelector[FileSelector]` = ***Open*** is followed by a 5 s timeout. The timeout is restarted with each `FileOperationExecute[FileSelector][FileOperationSelector]`. After timeout, the camera automatically returns to `FileOperatioSelector` = ***Closed***.

Reading a file

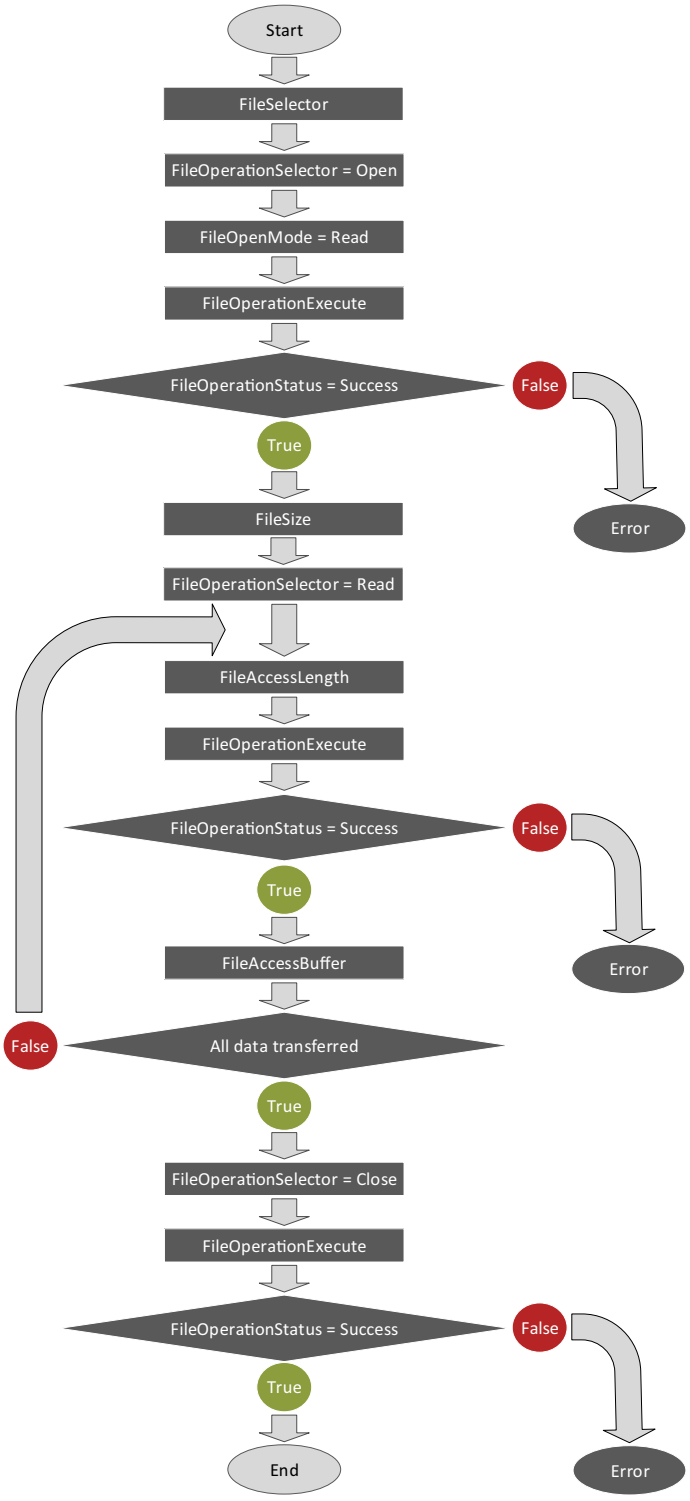

Figure 8: FileAccess -> Reading a file

Deleting a file

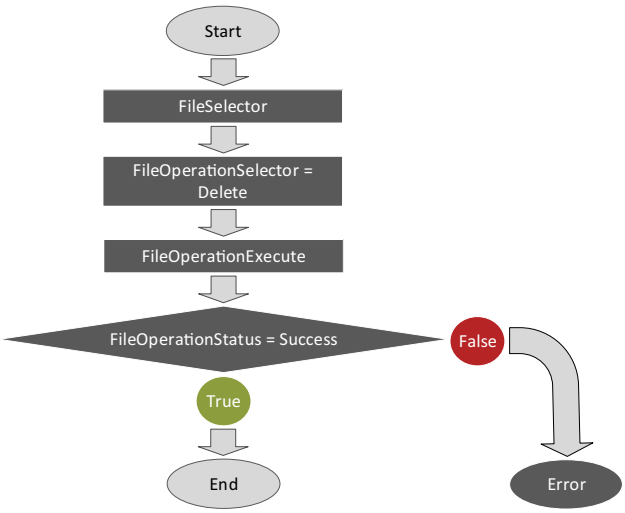

Figure 9: FileAccess -> Deleting a file

Writing a file

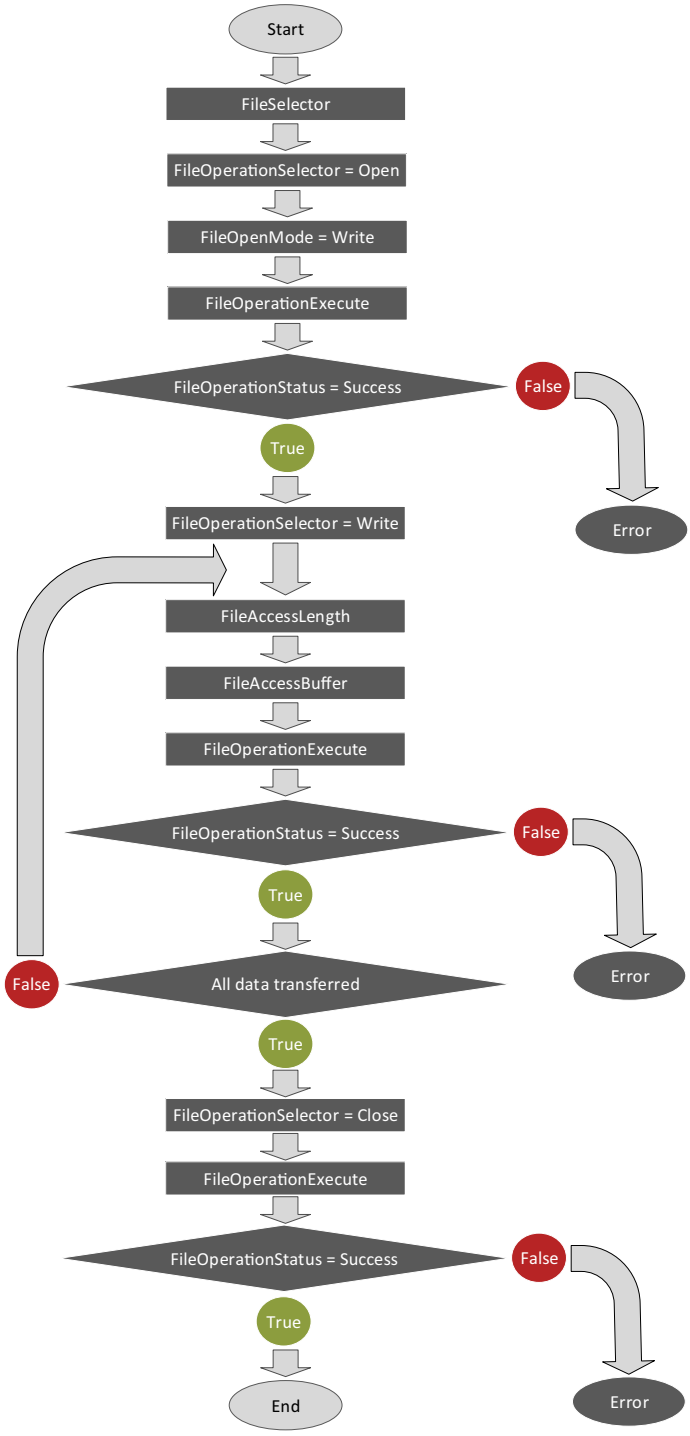

Figure 10: FileAccess -> Writing a file

FileAccessBuffer

[DataRaw] R/(W)

Controls the intermediate access buffer for the exchange of data between the device file storage and the application.

Note: For write operation, `FileAccessBuffer` must be written with the target data first.

For read operation, data can be read from the `FileAccessBuffer` after the read operation has been executed.

`FileOperationExecute[FileSelector][FileOperationSelector]` controls the effective data transfer.

Click here to open	Input field to enter data

FileAccessLength[FileSelector][FileOperationSelector]

[Integer] R/W
Unit: bytes

Controls the number of bytes transferred between the device file storage and the `FileAccessBuffer`.

Note: This feature is available only when `FileOperationSelector[FileSelector]` is set to ***Read*** or ***Write***.

FileAccessOffset[FileSelector][FileOperationSelector]

[Integer] R/(W)
Unit: bytes

Controls the offset of the mapping between the device file storage and the `FileAccessBuffer`.

FileOpenMode[FileSelector]

[Enumeration] R/W

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

Read	Value to select read-only open mode.
Write	Value to select write-only open mode.

FileOperationExecute[FileSelector][FileOperationSelector]

[Command] (R)/W

Executes the operation selected by `FileOperationSelector[FileSelector]` for the selected file.

FileOperationResult[FileSelector][FileOperationSelector]

[Integer] R

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

FileOperationSelector[FileSelector]

[Enumeration] R/W

Selects the target operation for the selected file in the device. This operation is executed when `FileOperationExecute[FileSelector][FileOperationSelector]` is called.

Close	Closes the file selected by `FileSelector` in the device.
Delete	Deletes the file selected by `FileSelector` in the device. Note that deleting a device file should not remove the associated `FileSelector` entry to allow future operation on this file.
Open	Opens the file selected by `FileSelector` in the device. The access mode in which the file is opened is selected by `FileOpenMode[FileSelector]`.
Read	Reads `FileAccessLength[FileSelector][FileOperationSelector]` bytes from the device storage at the file relative offset `FileAccessOffset[FileSelector][FileOperationSelector]` into `FileAccessBuffer`.
Write	Writes `FileAccessLength[FileSelector][FileOperationSelector]` bytes taken from the `FileAccessBuffer` into the device storage at the file relative offset `FileAccessOffset[FileSelector][FileOperationSelector]`.

FileOperationStatus

[Enumeration] R

Displays the file operation execution status.

Success	File operation was successful.

FileProcessStatus[FileSelector][FileOperationSelector]

[Enumeration] R proprietary
Default: None

Displays the status of files processing during a file access to the host, saving time and data traffic.

None	No action by the host is required, either because no file is being processed or because file processing is executed properly.
UpdateNotRequired	The resident file version is current. Therefore, no update is needed.

FileSelector

[Enumeration] R/W

Selects the target file in the device.

Note: UserData are stored in the camera's UserData memory.

Firmware	Selects firmware.
DefectPixelCorrection	Selects Defect pixel correction.
FixedPatternNoiseCorrection	Selects Fixed pattern noise correction.
UserData	Selects UserData.

FileSize[FileSelector]

[Integer] R
Unit: bytes

Displays the size of the selected file in bytes.

FileStatus

[Enumeration] R proprietary

Represents the status of the selected file.

Open	Selected file is open.
Closed	Selected file is closed.

ImageFormatControl

Height

[Integer] R/W
Unit: Pixels

Controls the height of the image provided by the device used for Region of interest (ROI).

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

For other ROI settings concerning image height, see `HeightMax` and `OffsetY`.

HeightMax

[Integer] R
Unit: Pixels

Displays the maximum height of the image.

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

For other ROI settings concerning image height, see `Height` and `OffsetY`.

OffsetX

[Integer] R/W
Unit: Pixels

Controls the horizontal offset from the origin to the Region of interest (ROI).

OffsetY

[Integer] R/W
Unit: Pixels

Controls the vertical offset from the origin to the Region of interest (ROI).

PixelFormat

[Enumeration] R/(W)

Controls the format of the pixels provided by the device.

Download PFNC standard

For GenICam Pixel Format Naming Convention (PFNC) see:
http://www.visiononline.org

Mono8	Mono8 unpacked according to AIA Pixel Format Naming Convention.
Mono10	Mono10 unpacked according to AIA Pixel Format Naming Convention.
Mono10p	Mono10 packed according to AIA Pixel Format Naming Convention.
Mono12	Mono12 unpacked according to AIA Pixel Format Naming Convention.
Mono12p	Mono12 packed according to AIA Pixel Format Naming Convention.

PixelSize

[Enumeration] R

Despite the name, this feature returns the bit depth of the current `PixelFormat`.

Note: This may be useful when controlling the `BlackLevel[BlackLevelSelector]` if the values of the enumeration (hence the register values) correspond directly to the bit depth.

Bpp8	bit depth per pixel is 8 bit.
Bpp10	bit depth per pixel is 10 bit.
Bpp12	bit depth per pixel is 12 bit.

ReverseX

[Boolean] R/W

Flips the image horizontally.

Note: Region of interest (ROI) is applied after the flipping.

False	Image is not flipped horizontally.
True	Image is flipped horizontally.

SensorHeight

[Integer] Rc
Unit: Pixels

Displays the effective height of the sensor.

SensorWidth

[Integer] Rc
Unit: Pixels

Displays the effective width of the sensor.

Width

[Integer] R/W
Unit: Pixels

Controls the width of the image provided by the device for Region of interest (ROI).

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

For other ROI settings concerning image height, see `WidthMax` and `OffsetX`.

WidthMax

[Integer] R
Unit: Pixels

Displays the maximum width of the image.

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

For other ROI settings concerning image height, see `Width` and `OffsetX`.

StreamInformation

Features availability for third-party software

- Features in this category are usually not available in the camera features of third-party software that is not based on **Vimba**.
- Features marked as proprietary in this category are not available with any other than the Allied Vision transport layer.

StreamID

[String] R

Displays the device unique ID for the stream, for instance a Globally unique identifier (GUID).

StreamIsGrabbing

[Boolean] R

Indicates whether the acquisition engine is started or not.

False	Acquisition engine is not started.
True	Acquisition engine is started.

StreamType

[Enumeration] R

Displays the transport layer type of the data stream.

USB3	USB3 Vision type is active.

TestControl

TestPendingAck

[Integer] R/W
Values: ≥0 Unit: ms

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

Note: For writing this feature, the device must use a pending acknowledge during the completion of this request if its duration exceeds the maximum device response time.

When read, the device returns the current feature value within the defined time. However, communications with the host can exceed this time.

TransportLayerControl

PayloadSize

[Integer] R
Unit: bytes

Displays the number of bytes transferred for each image on the stream channel. This is the total size of data payload for a data block.

UserSetControl

UserSetDefault and trigger settings

When you save a UserSet including trigger settings, consider that after restart, the camera expects a trigger before you can receive an image.

UserSetDefault

[Enumeration] R/W

Selects the UserSet to be loaded by default when the device is reset.

Note: In ***`Default`*** value, the device boots with the default factory settings for continuous acquisition.

`Default`	Selects the factory settings UserSet.
`UserSet1`	Selects UserSet1.
`UserSet2`	Selects UserSet2.
`UserSet3`	Selects UserSet3.
`UserSet4`	Selects UserSet4.

UserSetLoad[UserSetSelector]

[Command] (R)/W

Loads the UserSet specified by `UserSetSelector` to the device to enable it.

UserSetSave[UserSetSelector]

[Command] (R)/W

Saves the UserSet specified by `UserSetSelector` to the non-volatile memory of the device.

UserSetSelector

[Enumeration] R/W

Selects the UserSet to be loaded, saved, or configured.

Default	Selects the factory settings UserSet, read only.
UserSet1	Selects UserSet1.
UserSet2	Selects UserSet2.
UserSet3	Selects UserSet3.
UserSet4	Selects UserSet4.

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