allPIXA evo/neo camera | Features Reference

VERSION 18.0.0

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1 Introduction

The **Features Reference Guide** describes the features for Allied Vision Konstanz alIPIXA evo cameras using the GenICam SFNC (Standard Feature Naming Convention).

In addition, the error codes of the camera are documented here.

1.1 Connection Timeouts

Reading and writing different features leads to different execution times on the camera and therefore to shorter or longer response times. To establish communication without getting timeouts the timeout parameters must be configured in a way to be within the execution time of all feature read/write requests.

Parameter	Value
Control Channel timeout *(CC_timeout)*	3000ms
Control Channel retry count	3
Device Link Heartbeat Timeout	9000ms

Special note for sphinx lib users. *In SphinxLib HeartbeatRate* corresponds to Device Link Heartbeat Timeout. The *cc_heartbeat_timeout* of sphinx lib should be set to a third of Device Link Heartbeat Timeout.

2 Feature Availability

The following table illustrates the availability of features for several camera variants.

Feature	ax_dxge	ax_cxp	g8_dxge	g8_cxp	p6_nxge	p16_cxp / p32_cxp	P6_cxp
Trigger Control	A	A	A	A	A	A	A
Encoder Control	A	A	A	A	A	A	A
Scan Direction Source	A	A	A	A	A	A	A
Master/Slave Mode	A	E	A	E	A	A	A
Led Flash Control	A	A	A	A	A	A	A
Dual PRNU for LED-Flashing	NA	NA	A	A	NA	NA	NA
Single ROI support	A	A	A	A	A	A	A
Multi ROI support	A	A	A	A	A	A	A
Reverse X	A	A	A	A	A	A	
Binning Horizontal	A	A	A	A	A	A	
Decimation Horizontal	A	A	A	A	NA	NA	NA
Gain Auto	A	A	A	A	A	A	
Sensor Sensitivity	A	A	A	A	A	A	
Internal DSNU/PRNU capturing	A	A	A	A	A	A	A
Color Transformation Control	A	A	A	A	A	A	A
Gamma	A	A	A	A	A	A	A
Brightness Contrast	A	A	A	A	A	A	A
User Set Control	A	A	A	A	A	A	A
File Access Control	A	A	A	A	A	A	A
Four Color Mode (RGB+NIR)	NA	NA	A	A	A	NA	A
IOAnalyzer	A	A	A	A	A	A	A

A: Available **NA**: Not Available **E**: Experimental

3 Camera Variants

The following table shows the different camera variants available:

Variant	Types
ALL	ax_dxge ax_dsxge ax_cxp g8_dxge g8_cxp p6_nxge p6_cxp

	p16_cxp p32_cxp
EVO	ax_dxge ax_dsxge ax_cxp g8_dxge g8_cxp p16_cxp p32_cxp
NEO	p6_nxge p6_cxp
ax_X	ax_dxge ax_dsxge ax_cxp
g8_X	g8_dxge g8_cxp
px	p6, p12, p16, p32 sensor, independent of the interface.
X_dxge	ax_dxge g8_dxge p6_nxge
X_cxp	ax_cxp g8_cxp p16_cxp p6_cxp p32_cxp
ax_dsxge	ax_dsxge
p6_nxge	p6_nxge
p16_cxp	p16_cxp
P32_cxp	P32_cxp

The following table shows the different camera types with the model names:

Types	**Model Name**
ax_dxge	allPIXA evo 10K DXGE allPIXA evo 10K DXGE mono allPIXA evo 15K DXGE allPIXA evo 15K DXGE mono
ax_dsxge	allPIXA evo 10K DXGE allPIXA evo 10K DXGE mono allPIXA evo 15K DXGE allPIXA evo 15K DXGE mono
ax_cxp	allPIXA evo 10K CXP allPIXA evo 10K CXP mono allPIXA evo 15K CXP allPIXA evo 15K CXP mono
g8_dxge	allPIXA evo 8K DXGE allPIXA evo 8K DXGE mono
g8_cxp	allPIXA evo 8K CXP allPIXA evo 8K CXP mono
p6_nxge	allPIXA neo 6K NXGE allPIXA neo 6K NXGE mono
p16_cxp	allPIXA evo 16K CXP
P6_cxp	allPIXA neo 6K CXP allPIXA neo 6K CXP mono
P32_cxp	allPIXA evo 32K CXP

4 Deprecated Features

The following table illustrates the deprecated features and their corresponding features to use.

Deprecated Features	New Features
Acquisition Integration Time	Exposure Time
Acquisition Integration Time Min	Min value from Exposure Time
Acquisition Line Rate Max	Max value from Acquisition Line Rate
Acquisition Line Time Min	Min value from Acquisition Line Time
Image Calibration Mode	Flat Field Correction Start Calibration and Flat Field Correction Calibration Mode
Dark Signal Non-Uniformity (DSNU) Selector	Flat Field Correction Selector
DSNU Dataset Information	-
DSNU Available Planes	Flat Field Correction Available Planes
First Valid Pixel	Flat Field Correction First Pixel
Last Valid Pixel	Flat Field Correction Last Pixel
DSNU Display Reference Values	Flat Field Correction Display Reference
Photo Response Non-Uniformity (PRNU) Selector	Flat Field Correction Selector
PRNU Dataset Information	-
PRNU Available Planes	Flat Field Correction Available Planes
First Valid Pixel	Flat Field Correction First Pixel
Last Valid Pixel	Flat Field Correction Last Pixel
PRNU Display Reference Values	Flat Field Correction Display Reference
Color Transformation Selector (ColortoGrey)	RGBtoMono
LUT Selector (DarkSignalNonUniformityLUT1, DarkSignalNonUniformityLUT2, PhotoResponseNonUniformityLUT1, PhotoResponseNonUniformityLUT2)	Flat Field Correction Selector
LUT Enable	Flat Field Correction Enable
LUT Dataset Name	Flat Field Correction DataSet Description
Gev Number of Interfaces	Device Link Selector
Gev Version Major	Device TL Version Major
Gev Version Minor	Device TL Version Minor
Gev Device Mode Is Big Endian	Device Registers Endianness
Gev Device Mode Character Set	Device Character Set
Gev First URL	-
Gev Second URL	-
Gev Message Channel Count	Device Event Channel Count
Gev Stream Channel Count	Device Stream Channel Count
Gev Heartbeat Timeout	Device Link Heartbeat Timeout
Gev Timestamp Tick Frequency	Timestamp Latch Value
Gev Timestamp Control Latch	Timestamp Latch
Gev Timestamp Control Reset	Timestamp Reset
Gev Timestamp Value	Timestamp Latch Value
Gev SCPSBig Endian	Device Stream Channel Endianness

5 Removed Features

The following table illustrates the removed features and their corresponding package version.

Removed Features	New Features	Package Version
Master Slave Interface	Master Slave Source and Master Slave Output	6.0.0
Master Slave Interface Enable	Master Slave Source and Master Slave Output	6.0.0
AutoSelect Source	-	6.0.0
Slave DelayLines	Trigger DelayLines	6.0.0
Master Slave Mode (AutoSelect)	-	6.0.0
LUT Selector (Gamma)	-	6.0.0

6 Camera Temperature Monitoring Limits

Temperature Selector	Camera Variants	Warning Level	Error Level
Sensor	ax_dxge, ax_dsxge, ax_cxp	80°C	85°C
	g8_dxge, g8_cxp	70°C	75°C
	p6_nxge, p6_cxp	60°C	65°C
	p16_cxp, p32_cxp	60°C	65°C
Mainboard	allPIXAevo, allPIXAneo	80°C	85°C
		80°C	85°C
		80°C	85°C
		80°C	85°C

7 Device Control

7.1 Device Vendor Name

Name	DeviceVendorName	**Standard**
Description	Name of the manufacturer of the device.	
Interface	String	
String length	32	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	Allied Vision	
Default value	-	
Availability	**ALL**	
Notes	-	
Error behavior	-	

7.2 Device Model Name

Name	DeviceModelName	**Standard**
Description	Model of the device.	
Interface	String	
String length	32	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	-	
Default value	-	
Availability	**ALL**	
Notes	-	
Error behavior	-	

7.3 Device Manufacturer Info

Name	DeviceManufacturerInfo	**Standard**
Description	Manufacturer information about the device.	
Interface	String	
String length	48	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	-	
Default value	**“Email: support-konstanz@alliedvision.com”**	
Availability	**ALL**	
Notes	-	
Error behavior	-	

7.4 Device Version

Name	DeviceVersion	**Standard**
Description	Version of the device.	
Interface	String	
String length	32	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	-	
Default value	**"SX-MX-TX-PWRX-P1XX-P2XX"**	
Availability	**ALL**	
Notes	String contains hardware version of **S**ensor, **M**ainboard, **T**ransport layer interface, **P**owerboard, **P**ower**1** and **P**ower**2**	
Error behavior	-	

7.5 Device User ID

Name	DeviceUserID	**Standard**
Description	User-programmable device identifier.	
Interface	String	
String length	16	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	-	
Default value	Empty String	
Availability	**ALL**	
Notes	-	
Error behavior	-	

7.6 Device Scan Type

Name	DeviceScanType	**Standard**
Description	Scan type of the sensor.	
Interface	Enumeration	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	See enum entry table below.	
Default value	Linescan	
Availability	**ALL**	
Notes	Even though the camera is a line scan device, the camera supports area scan features(frame)	
Error behavior	-	

Device Scan Type Enum Entries:

Name	Description
Areascan	The camera is operating in area scan mode
Linescan	The camera is operating in line scan mode

7.7 Device Package Version

Name	DevicePackageVersion	**Custom**
Description	Version of the software package of the camera. The version is defined in the package description file. By querying the **DevicePackageConsistency** feature you can check whether a package is consistent.	
Interface	String	
String length	16	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	-	
Default value	-	
Availability	**ALL**	
Notes	-	
Error behavior	-	

7.8 Device Package Description

Name	DevicePackageDescription	**Custom**
Description	Description of the device's software package.	
Interface	String	
String length	64	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	-	
Default value	-	
Availability	**ALL**	
Notes	-	
Error behavior	-	

7.9 Device Package Consistency

Name	DevicePackageConsistency	**Custom**
Description	Executes a package consistency check. Is set to **True** if the package is consistent otherwise it is set to **False**. A package is consistent if the files on the camera correspond to the files in the package description file.	
Interface	Boolean	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	**False**: Package is not consistent **True**: Package is consistent	
Default value	-	
Availability	**ALL**	
Notes	-	
Error behavior	-	

7.10 Device Sensor File Version

Name	DeviceSensorFileVersion	**Custom**
Description	Version of the sensor file in the device.	
Interface	String	
String length	40	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	-	
Default value	-	
Availability	**ALL**	
Notes	-	
Error behavior	-	

7.11 Device Hardware Calibration File Version

Name	DeviceHWCalibFileVersion	**Custom**
Description	Version of the Hardware Calibration File in the device.	
Interface	String	
String length	16	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	-	
Default value	-	
Availability	**ALL**	
Notes	Returns **-NA-** if the file is not available in the camera.	
Error behavior	-	

7.12 Device Firmware Version

Name	DeviceFirmwareVersion	**Standard**
Description	Version of the firmware in the device.	
Interface	String	
String length	64	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	-	
Default value	-	
Availability	**ALL**	
Notes	-	
Error behavior	-	

7.13 Device FPGA Version

Name	DeviceFPGAVersion	**Custom**
Description	Version of the FPGA in the device.	
Interface	String	
String length	16	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	-	
Default value	-	
Availability	**ALL**	
Notes	-	
Error behavior	-	

7.14 Device Product Number

Name	DeviceProductNumber	**Custom**
Description	Product number of the device.	
Interface	String	
String length	32	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	-	
Default value	-	
Availability	**ALL**	
Notes	-	
Error behavior	-	

7.15 Device Serial Number

Name	DeviceSerialNumber	**Standard**
Description	Serial number of the device.	
Interface	String	
String length	32	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	-	
Default value	-	
Availability	**ALL**	
Notes	-	
Error behavior	-	

7.16 Device SFNC Version Major

Name	DeviceSFNCVersionMajor	**Standard**
Description	Major version of the Standard Features Naming Convention that was used to create the device's GenICam XML.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	>0	
Default value	-	
Availability	**ALL**	
Notes	-	
Error behavior	-	

7.17 Device SFNC Version Minor

Name	DeviceSFNCVersionMinor	**Standard**
Description	Minor version of the Standard Features Naming Convention that was used to create the device's GenICam XML.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	≥0	
Default value	-	
Availability	**ALL**	
Notes	-	

7.18 Device SFNC Version SubMinor

Name	DeviceSFNCVersionSubMinor	**Standard**
Description	Sub-minor version of the Standard Features Naming Convention that was used to create the device's GenICam XML.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	≥0	
Default value	-	
Availability	**ALL**	
Notes	-	

7.19 Device Manifest XML Major Version

Name	DeviceManifestXMLMajorVersion	**Standard**
Description	Indicates the major version number of the GenICam XML file of the selected manifest entry.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	-	
Default value	≥0	
Availability	**ALL**	
Notes	-	
Error behavior	The XML version should match the DeviceFirmwareVersion.	

7.20 Device Manifest XML Minor Version

Name	DeviceManifestXMLMinorVersion	**Standard**
Description	Indicates the minor version number of the GenICam XML file of the selected manifest entry.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	≥0	
Default value	-	
Availability	**ALL**	
Notes	The XML version should match the DeviceFirmwareVersion.	

7.21 Device Manifest XML Sub Minor Version

Name	DeviceManifestXMLSubMinorVersion	**Standard**
Description	Indicates the sub-minor version number of the GenICam XML file of the selected manifest entry.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	≥0	
Default value	-	
Availability	**ALL**	
Notes	The XML version should match the DeviceFirmwareVersion.	

7.22 Device Manifest XML Extra Version

Name	DeviceManifestXMLExtraVersion	**Standard**
Description	Indicates the extra version (pre-relase/build metadata) of the GenICam XML file of the selected manifest entry.	
Interface	String	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	String	
Default value	-	
Availability	**ALL**	
Notes	The XML version should match the DeviceFirmwareVersion.	

7.23 Device Temperature Selector

Name	DeviceTemperatureSelector	**Standard**
Description	Selects the location within the device, where the temperature will be measured.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	-	
Value range	See enum entry table below.	
Default value	**Mainboard**	
Availability	**ALL**	
Notes	-	
Error behavior	-	

Device Temperature Selector Enum Entries:

Name	Description
Mainboard	Temperature of the mainboard
FPGA	Temperature of the FPGA. This is only available for EVO
Power1	Temperature of the power module 1
Power2	Temperature of the power module 2
Sensor	Temperature of the sensor

7.24 Device Temperature

Name	DeviceTemperature[DeviceTemperatureSelector]	**Standard**
Description	Device temperature in degrees Celsius.	
Interface	Float	
Access mode	Read only	
Adjustable while grabbing	-	
Value range		
Default value	-	
Availability	**ALL**	
Notes	-	
Error behavior	-	

7.25 Device Voltage Selector

Name	DeviceVoltageSelector	**Custom**
Description	Selects a voltage source.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	-	
Value range	See enum entry table below.	
Default value	**Channel1**	
Availability	**ALL**	
Notes	-	
Error behavior	-	

7.25.1 allPIXA evo

Device Voltage Selector Enum Entries:

Name	Description	Remarks
Channel1	Channel1 is 1V0_FPGA	Not available for power board version 2 (Check DeviceVersion feature)
Channel2	Channel2 is 1V8_FPGA	Available
Channel3	Channel3 is 2V5_FPGA	
Channel4	Channel4 is 3V3_VCC_FPGA	
Channel5	Channel5 is 1V35_GTX	
Channel6	Channel6 is 1V8_CIS (Sensor voltage varies for each sensor)	
Channel7	Channel7 is 3V3_CIS (Sensor voltage varies for each sensor)	
Channel8	Channel8 is 3V3_INTERF	
Channel9	Channel9 is VCCINT at FPGA.	Available only if main board version is at least 2 (Check DeviceVersion feature)
Channel10	Channel10 is VCCAUX at FPGA	
Channel11	Channel11 is VCCBRAM at FPGA	

7.25.2 allPIXA neo

Device Voltage Selector Enum Entries:

Name	Description
Channel1	Channel1 is VCCINT at FPGA
Channel2	Channel2 is VCCAUX at FPGA
Channel3	Channel3 is VP_VN. Currently not valid
Channel4	Channel4 is VCCBRAM at FPGA
Channel5	Channel5 is +5V at power multiplexer
Channel6	Channel6 is 1V5_CIS (Sensor Voltage) at FPGA
Channel7	Channel7 is +24V voltage at input main power (power cable)
Channel8	Channel8 is 3V5_CIS (Sensor Voltage) at FPGA
Channel9	Channel9 is VCCAUX at pmic
Channel10	Channel10 is MGTAVCC at pmic
Channel11	Channel11 is MGTVCCAUX at pmic
Channel12	Channel12 is MGTAVTT at pmic
Channel13	Channel13 is SENS_3V5 at pmic
Channel14	Channel14 is SENS_1V5 at pmic
Channel15	Channel15 is IO_1V5 at pmic
Channel16	Channel16 is IO_3V3 at pmic

7.26 Device Voltage

Name	DeviceVoltage[DeviceVoltageSelector]	**Custom**
Description	Displays the voltage for the selected element.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	-	
Default value	-	
Availability	**ALL**	
Notes	The unit of this feature is mV.	
Error behavior	-	

7.27 Device Fan Enable

Name	DeviceFanEnable	**Custom**
Description	Enables the camera's fan.	
Interface	Boolean	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	True – Enables the output of an IO to activate a fan connected to the device. False – Disables the output of an IO to disable a fan connected to the device.	
Default value	False	
Availability	**ALL**	
Notes	-	
Error behavior	-	

7.28 Device Identify

Name	DeviceIdentify	**Custom**
Description	Increases heartbeat speed for a short time to identify the camera.	
Interface	Command	
Access mode	Write only	
Adjustable while grabbing	Yes	
Value range	1	
Default value	1	

Availability	**ALL**
Notes	While grabbing images you will not see the heartbeat. Therefore, this only takes effect if the acquisition is not active.
Error behavior	-

7.29 Device Reset

Name	DeviceReset	**Standard**
Description	Resets the device to its power-up state.	
Interface	Command	
Access mode	Write only	
Adjustable while grabbing	Yes	
Value range	1	
Default value	1	
Availability	**ALL**	
Notes	This command always returns success. If you execute this command, the camera performs a power cycle. Afterwards you must reconnect to the camera.	
Error behavior	-	

7.30 Device Error Code

Name	DeviceErrorCode	**Custom**
Description	Most recent error status of the camera.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	See Device Error Code section for possible values.	
Default value	0x00000000	
Availability	**ALL**	
Notes	Reads the most recent error. Zero indicates no error. Any other value indicates an error. If a write access to any register is performed (except bootstrap registers), the device error code is cleared. The DeviceErrorMessage feature holds the corresponding error description.	
Error behavior	-	

7.31 Device Error Message

Name	DeviceErrorMessage	**Custom**
Description	Device error messages to the corresponding device error codes.	
Interface	Enumeration	
Access mode	Read Only	
Adjustable while grabbing	-	
Value range	See enum entry table below.	
Default value	**Success**	
Availability	**ALL**	
Notes	This feature is “Invisible” The device error message consists of the tool tip and display name of the enum entry. Please check section Device Error Code too. There you will find the description of the enum entries.	
Error behavior	-	

7.32 Device Status

Name	DeviceStatus	**Custom**
Description	Device status to the corresponding device status codes.	
Interface	Enumeration	
Access mode	Read Only	
Adjustable while grabbing	-	
Value range	See enum entry table below.	
Default value	**OK**	
Availability	**ALL**	
Notes	-	
Error behavior	-	

Device Status Enum Entries:

Name	Description
See section Device Status Code for device status enumeration entries.	

7.33 Device Log Level

Name	DeviceLogLevel	**Standard**
Description	Selects the current log level.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	-	
Value range	See enum entry table below.	
Default value	**Info**	
Availability	**ALL**	
Notes	-	
Error behavior	-	

Device Log Level Enum Entries:

Name	Description
Error	Only Error logging will be shown.
Warning	Only Warning logging will be shown.
Info	Only Info logging will be shown.
Verbose	Only Verbose logging will be shown.
Debug	Only Dedug logging will be shown.

7.34 Device TL Type

Name	DeviceTLType	**Standard**
Description	Transport Layer type of the device.	
Interface	Enumeration	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	See enum entry table below.	
Default value	GigEVision	
Availability	**ALL**	
Notes	-	
Error behavior	-	

Device TL Type Enum Entries:

Name	Description
GigEVision	GigE Vision
CoaXPress	CoaXPress
GenCP	GenCP

7.35 Device Link Selector

Name	DeviceLinkSelector	**Standard**
Description	Selects which link of the device to control.	
Interface	Integer	
Access mode	Read/Write	
Adjustable while grabbing	-	
Value range	0	
Default value	0	
Availability	**ALL**	
Notes	-	
Error behavior	-	

7.36 Device Link Connection Count

Name	DeviceLinkConnectionCount[DeviceLinkSelector]	**Standard**
Description	Returns the number of physical connections of the device used by a particular Link.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	≥0	
Default value	-	
Availability	**ALL**	
Notes	-	
Error behavior	-	

7.37 Device Link Speed

Name	DeviceLinkSpeed[DeviceLinkSelector]	**Standard**
Description	Indicates the speed of transmission negotiated on the specified link.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	≥0	
Default value	-	
Availability	**ALL**	
Notes	-	

Error behavior	-

7.38 Device Average Resolution – Not Available for AllPIXA-EVO

Name	DeviceAverageResolution	**Custom**
Description	Returns the average resolution in DPI (Dots Per Inch).	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	≥0	
Default value	-	
Notes	Average resolution of the system in sensor direction. It is measured in factory and programmed to the device.	
Error behavior	-	

7.39 Device TL Version Major

Name	DeviceTLVersionMajor	**Standard**
Description	Major version of the Transport Layer of the device.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	≥0	
Default value	-	
Availability	**ALL**	
Notes	-	
Error behavior	-	

7.40 Device TL Version Minor

Name	DeviceTLVersionMinor	**Standard**
Description	Minor version of the Transport Layer of the device.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	≥0	
Default value	-	
Availability	**ALL**	
Notes	-	
Error behavior	-	

7.41 Device TL Version Sub Minor

Name	DeviceTLVersionSubMinor	**Standard**
Description	Sub-minor version of the Transport Layer of the device.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	≥0	
Default value	-	
Availability	**ALL**	
Notes	-	
Error behavior	-	

7.42 Device Registers Endianness

Name	DeviceRegistersEndianness	**Standard**

Description	Endianness of the registers of the device.
Interface	Enumeration
Access mode	Read only
Adjustable while grabbing	-
Value range	See enum entry table below.
Default value	**Big**
Availability	**ALL**
Notes	-
Error behavior	-

Device Registers Endianness Enum Entries:

Name	Description
Little	Device's registers are little Endian
Big	Device's registers are big Endian

7.43 Device Character Set

Name	DeviceCharacterSet	**Standard**
Description	Character set used by the strings of the device's bootstrap registers.	
Interface	Enumeration	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	See enum entry table below.	
Default value	UTF8	
Availability	**ALL**	
Notes	-	
Error behavior	-	

Device Character Set Enum Entries:

Name	Description
UTF8	UTF 8

7.44 Device Event Channel Count

Name	DeviceEventChannelCount	**Standard**
Description	Indicates the number of event channels supported by the device.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	≥0	
Default value	-	
Availability	**ALL**	
Notes	-	
Error behavior	-	

7.45 Device Stream Channel Count

Name	DeviceStreamChannelCount	**Standard**
Description	Indicates the number of streaming channels supported by the device.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	≥0	
Default value	-	
Availability	**ALL**	
Notes	-	
Error behavior	-	

7.46 Device Link Heartbeat Timeout

Name	DeviceLinkHeartbeatTimeout	**Standard**
Description	Controls the current heartbeat timeout of the specific Link.	
Interface	Float	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	≥500000.0	
Default value	-	
Availability	**ALL**	
Notes	The unit is micro-seconds (µs)	
Error behavior	-	

7.47 Device Stream Channel Endianness

Name	DeviceStreamChannelEndianness	**Standard**
Description	Endianness of multi-pixel data for this stream.	
Interface	Enumeration	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	See enum entry table below.	
Default value	Little	
Availability	**ALL**	
Notes	-	
Error behavior	-	

Device Stream Channel Endianness Enum Entries:

Name	Description
Little	Stream channel data is little Endian.
Big	Stream channel data is big Endian.

7.48 Timestamp Reset

Name	TimestampReset	**Standard**
Description	Resets the current value of the device timestamp counter.	
Interface	Command	
Access mode	Write only	
Adjustable while grabbing	Yes	
Value range	1	
Default value	1	
Availability	**ALL**	
Notes	-	
Error behavior	-	

7.49 Timestamp Latch

Name	TimestampLatch	**Standard**
Description	Latches current timestamp counter into **TimestampLatchValue**.	
Interface	Command	
Access mode	Write only	
Adjustable while grabbing	Yes	
Value range	1	
Default value	1	
Availability	**ALL**	
Notes	-	
Error behavior	-	

7.50 Timestamp Latch Value

Name	TimestampLatchValue	**Standard**
Description	Returns the latched value of the timestamp counter.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	≥0	
Default value	-	
Availability	**ALL**	
Notes	-	
Error behavior	-	

8 Image Format Control

The parameters of this group describe how to influence and determine the image size and format. It also provides the necessary information to acquire and to display the image data. It assumes that the device has a source of data that generates a single rectangular image. This image can be entirely or partially streamed out of the device using one or many Region of interest (ROI).

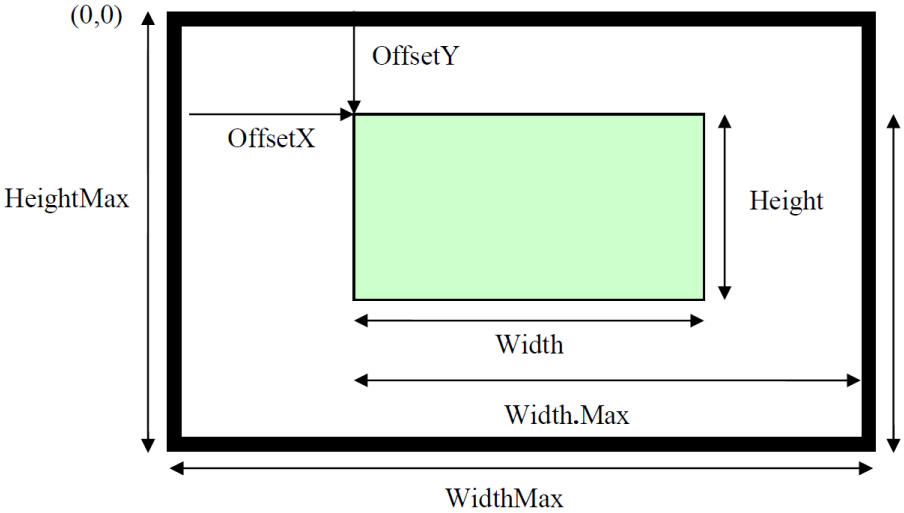


Image is taken from SFNC 2.4 p. 109

The sensor provides **Sensor Width** pixels.
The parameters **ReverseX** can be used to flip the image along the X-axis. The flipping is done before the Region of interest is applied.
Within the shrunk image the user can set a Region of interest using the parameters **OffsetX**, **Width**, and **Height**. The resulting image has **Width** time **Height** pixels. **OffsetX** refers to the upper left corner of the image which has the coordinate (0, 0).
The parameters **Region Selector** and **Region Mode** can be used to select and control each Region individually. All measures are given in pixel. As a result, the values should not change if the **Pixel Format** changes. For monochrome cameras, each pixel corresponds to a single gray value.
For color cameras in RGB mode each pixel corresponds to one RGB triplet.
The parameter **Height** describes the height of the image in lines.

8.1 Sensor Width

Name	SensorWidth	**Standard**
Description	Effective width of the sensor in pixels.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	Depends on the built-in sensor.	
Default value	1	
Availability	**ALL**	
Notes	-	
Error behavior	-	

8.2 Sensor Height

Name	SensorHeight	**Standard**
Description	Effective height of the sensor in pixels.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	1	
Default value	1	
Availability	**ALL**	
Notes	-	
Error behavior	-	

8.3 Sensor Color Filter

Name	SensorColorType	**Custom**
Description	Specifies the sensor color filter.	
Interface	Enumeration	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	See enum entry table below.	
Default value	-	
Availability	-	
Notes	Only the display name is changed to sensor color filter for backward compatibility.	
Error behavior	-	

Sensor Color Filter Enum Entries:

Name	Description
White	White
RGBW	Red, Green, Blue and White
RGBWIr	Red, Green, Blue, White and Infrared
RGBIr	Red, Green, Blue and Infrared

8.4 Width Max

Name	WidthMax	**Standard**
Description	Maximum width of the image (in pixels). The dimension is calculated after horizontal binning, decimation or any other function changing the horizontal dimensions of the image.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	>0	
Default value	SensorWidth	
Availability	**ALL**	
Notes	-	
Error behavior	-	

8.5 Height Max

Name	HeightMax	**Standard**
Description	Maximum height of the image (in pixels). This dimension is calculated after vertical binning, decimation or any other function changing the vertical dimensions of the image.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	>0	
Default value	-	
Availability	**ALL**	
Notes	**allPIXA neo:** The maximum height depends on the image size in bytes. Therefore, the image width and pixel format influence the maximum image height. The image width refers to the width of the transferred image. (After binning) **allPIXA evo:** The maximum height is 1015811 lines.	
Error behavior	-	

8.6 Region Selector

Name	RegionSelector	**Standard**
Description	Selects the Region of interest to control.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	-	
Value range	See enum entry table below.	
Default value	-	
Availability	**ALL**	
Notes	-	
Error behavior	-	

Region Selector Enum Entries:

Name	Description
Region1	Selected features will control the region 1
Region2	Selected features will control the region 2
Region3	Selected features will control the region 3
Region4	Selected features will control the region 4
RegionStream 0	RegionStream0 is read only feature. This is a virtual single region resulted from merging multiple regions (Region1 – 4). RegionMode will be ON only when MultiRegionMerge feature is enabled.

8.7 Region Mode

Name	RegionMode[RegionSelector]	**Standard**
Description	Controls whether the selected Region of interest is active and streaming.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	No	
Value range	See enum entry table below.	
Default value	-	
Availability	**ALL**	
Notes	-	
Error behavior	See the device error code documentation.	

Region Mode Enum Entries:

Name	Description
Off	Disable usage of the Region. For ax_dsxge only
On	Enable usage of the Region.

8.8 Width

Name	Width[RegionSelector]	**Standard**
Description	Width of the Image provided by the device (in pixels).	
Interface	Integer	
Access mode	Read/Write	
Adjustable while grabbing	No	
Value range	[128 , Width Max]	
Default value	WidthMax	
Availability	**ALL**	
Notes	The width value must be a multiple of eight for RGB.	
Error behavior	See the device error code documentation.	

8.9 Height

Name	Height[RegionSelector]	**Standard**
Description	Height of the Image provided by the device (in pixels).	
Interface	Integer	
Access mode	Read/Write	
Adjustable while grabbing	No	
Value range	[16 , Height Max]	
Default value	1024	
Availability	**ALL**	
Notes	This parameter influences the value range of **AcquisitionFrameRate**. Please read the **AcquisitionFrameRate** feature documentation for further details.	
Error behavior	See the device error code documentation.	

8.10 Offset X

Name	OffsetX[RegionSelector]	**Standard**
Description	Horizontal offset from the origin to the region of interest (in pixels).	
Interface	Integer	
Access mode	Read/Write	
Adjustable while grabbing	No	
Value range	≥0	
Default value	0	
Availability	**ALL**	
Notes	-	
Error behavior	See the device error code documentation.	

8.11 Sensor Region Offset X

Name	SensorRegionOffsetX[RegionSelector]	**Custom**
Description	Horizontal offset from the origin to the region of interest in sensor coordinates (pixels).	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	No	
Value range	≥0	
Default value	0	
Availability	**ALL**	
Notes	The display name is just Sensor Offset X.	
Error behavior	See the device error code documentation.	

8.12 Sensor Region Width

Name	SensorRegionWidth[RegionSelector]	**Custom**
Description	Width of the selected region of interest in sensor coordinates (in pixels).	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	No	
Value range	≥0	
Default value	0	
Availability	**ALL**	
Notes	The display name is just Sensor Width. The feature resides below the Region Selector. There is a **SensorWidth** feature defining the sensor's full width which resides in the top level of the image format control category.	
Error behavior	See the device error code documentation.	

8.13 Multi Region Merge

Name	MultiRegionMerge	**Custom**
Description	This feature enables merging multiple regions into a new virtual single region. This will enable RegionStream0 in the RegionSelector and disables other regions.	
Interface	Boolean	
Access mode	Read/Write	
Adjustable while grabbing	No	
Value range	**True** – Enables new virtual single region (RegionStream0) **False** – Disables new virtual single region (RegionStream0)	
Default value	**False**	
Availability	**ALL**	
Notes	-	
Error behavior	-	

8.14 Binning Horizontal

Name	BinningHorizontal	**Standard**
Description	Number of horizontal photo-sensitive cells to combine. This increases the intensity (or signal-to-noise ratio) of the pixels and reduces the horizontal resolution (width) of the image.	
Interface	Integer	
Access mode	Read/Write	
Adjustable while grabbing	No	
Value range	**Variant**	**Value Range**
	ALL	1,2,4,8
Default value	1 – Indicates that no horizontal binning is performed by the camera.	

Availability	**ALL**
Notes	If you change this parameter, the Region **OffsetX** and **Width** is scaled according to the binning value. Please check these parameters after adapting Binning Horizontal. **When Width is changed, the maximum BinningHorizontal value may be reduced and limited to that value. This is done to ensure that Width value doesn't go below the minimum width value.**
Error behavior	See the device error code documentation.

8.15 Decimation Horizontal Float

Name	DecimationHorizontalFloat	**Custom**
Description	This is the same feature as **DecimationHorizontal** as defined in the SFNC. However, it supports float values for decimation. Horizontal sub-sampling of the image. This reduces the horizontal resolution (width) of the image by the specified horizontal decimation factor.	
Interface	Float	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	[1.0 , 3.999]	
Default value	1.0	
Availability	- g8_x - ax_x	
Notes	A value of 1 indicates that the camera performs no horizontal decimation. If you change this parameter, the Region **OffsetX** and **Width** are scaled according to the decimation value. Please check these parameters after adapting Decimation Horizontal. **When Width is changed, the maximum DecimationHorizontalFloat value may be reduced and limited to that value. This is done to ensure that Width value doesn't go below the minimum width value.**	
Error behavior	See the device error code documentation.	

8.16 Reverse X

Name	ReverseX	**Standard**
Description	Flip the image sent by the device horizontally.	
Interface	Boolean	
Access mode	Read/Write	
Adjustable while grabbing	No	
Value range	**True** – Horizontally flipped image **False** – Normal Image	
Default value	**False**	
Availability	**ALL**	
Notes	This feature is effective only if **Test Pattern** is set to **Off**.	
Error behavior	-	

8.17 Pixel Format

Name	PixelFormat	**Standard**
Description	Format of the pixels provided by the device. It represents all the information provided by **PixelSize**, **PixelColorFilter** combined in a single feature.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	No	
Value range	See enum entry table below.	
Default value	**Variant**	**Value**
	Color Camera	RGB8
	Mono Camera	Mono8
Availability	**ALL**	
Notes	-	
Error behavior	See the device error code documentation.	

Pixel Format Enum Entries:

Name	Availability	Description

Mono8	ALL	8 bits per pixel Mono
Mono10	X_cxp, X_dxge, p6_nxge, p6_cxp, p32_cxp	10 bits per pixel Mono unpacked
Mono12	X_cxp, X_dxge, p6_nxge, p6_cxp, p32_cxp	12 bits per pixel Mono unpacked
RGB8	ALL	24 bits per pixel RGB linear memory
RGB10	X_cxp, X_dxge, p6_nxge, p6_cxp, p16_cxp	RGB at 10bit unpacked
RGB12	X_cxp, X_dxge, p6_nxge, p6_cxp, p16_cxp	RGB at 12bit unpacked
RGB10p32	-	32-bits per pixel RGB format. The bit depth is 10-bits. Please check the PFNC (Pixel Format Naming Convention) for more details – Not available for **g8_dxge** packages!
BGR8	X_dxge ax_dsxge	24 bits per pixel BGR linear memory
RGBa8	g8_X, p6_nxge, p6_cxp	32 bits per pixel RGBa linear memory. Component ‘a’ contains Infrared (Ir) or White(W).
RGBa10	g8_X, p6_nxge, p6_cxp	RGBa at 10bit unpacked. Component ‘a’ contains Infrared (Ir) or White(W).
RGBa12	g8_X, p6_nxge, p6_cxp	RGBa at 12bit unpacked. Component ‘a’ contains Infrared (Ir) or White(W).

8.18 Pixel Color Filter

Name	PixelColorFilter		**Standard**
Description	Selects the type of color filter that is applied to an image.		
Interface	Enumeration		
Access mode	Read/Write		
Adjustable while grabbing	No		
Value range	See enum entry table below.		
Default value	**Variant**	**Value**	
	ax_X	RGB	
	g8_X	RGBIr	
	p6_nxge, p6_cxp	RGBIr	
	p16_cxp	RGBW	
	ALL (Mono Camera)	White	
Availability	**ALL**		
Notes	For mono cameras the pixel color filter will be White only.		
Error behavior	See the device error code documentation.		

Pixel Color Filter Enum Entries:

Name	Availability	Description
RGB	ax_X	Three color planes RGB at the sensor is selected

RGBIr	g8_X, p6_nxge, p16_cxp	Four color planes RGB and Infrared at the sensor is selected. Infrared is transmitted as component 'a' in the pixel format RGBa8, RGBa10 and RGBa12.
RGBW	p6_nxge, p16_cxp	Four color planes RGB and White at the sensor is selected. White is transmitted as component 'a' in the pixel format RGBa8, RGBa10 and RGBa12.
White	g8_X, p32_cxp	Only White plane at the sensor is selected

8.19 Info Block Mode

Name	InfoBlockMode	**Custom**
Description	The info block can be enabled for the first line, for each line or for first and each line.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	Enum entries table below.	
Default value	Infoblock off	
Availability	**ALL**	
Notes	So far not all entries are working. There may be even differences between variants of allPIXAevo. The **LineCounter** entry is not supported for Mono mode. In case of Color To Grey conversion **Eachline** info will be inserted instead of **LineCounter**.	
Error behavior	none	

Info block Mode Entries:

Name	Description
Off	No info block is displayed in the image.
Firstline	First line Info block which is in line 0 of each transmitted image is displayed.
Eachline	In each line from line 0 of each transmitted image the Each line info block is displayed.
FirstandEachLine	First and each line info block are displayed in each image. In case both **FirstlineandEach** line info block are active, **Eachline** info block is always displayed from the second line in every transmitted image!
LineCounter	Slim each line info block which consists of a info block marker and two line counters.
FirstLineAndLineCounter	First Line Info and the slim each line counter will be insterted.

8.19.1 First Line Info (Mono/RGB/RGBa)

First line info block format

Pixel	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23

Line 0	**MARKER**	SERIAL NUMBER	**MARKER**	IMAGE COUNT	EXPOSURE TIME	**MARKER**	LINE TIME	ENCODER CLOCKS	ERROR CODE	TIME STAMP	**MARKER**

Information	Channel Content[1]	Description
MARKER	**DIVERSE**	Markers are used to mark the info block with red pixels in RGB and RGBa mode. **Color** / **Red** / **Green** / **Blue** / **(Alpha)** **Value** / 255@8bit / 0@8bit / 0@8bit / 0@8bit For mono cameras the marker is defined as follows: **Color** / **A** **Value** / 0@8bit
SERIAL NUMBER	**SAME**	These pixels encode the serial number of the camera. **Byte$_3$** / **Byte$_2$** / **Byte$_1$** / **Byte$_0$** Px_1 / Px_2 / Px_3 / Px_4 **SN 1ST PART** / **SN 2ND PART**
IMAGE COUNT	**SAME**	These pixels encode the image count of the camera. **Byte$_1$** / **Byte$_0$** Px_6 / Px_7 **IMAGE COUNT** *Will be reset by AcquisitionStart.*
EXPOSURE TIME	**SAME**	This is the current Exposure Time in camera internal clock cycles. **Byte$_1$** / **Byte$_0$** Px_8 / Px_9 **EXPOSURE TIME CLOCKS** To decode the exposure time, use the following formula to get the exposure time in micro seconds: $$ExposureTimeUs = \frac{EXPOURE_{¿}}{f_t}$$ *Package 6.0.0 and later:* **Camera Variant** / $f_t \in MHz$ ALL / *100* *Up to package 6.0.0:* **Camera Variant** / $f_t \in MHz$ ax_X / *50* g8_X / *80* p6_X / *66,66* p16_X / *75* For p6 and p16 the exposure time does not exactly match with the Exposure Time feature. This is due to an internal constant. (< 6.0.0)

<table>
<tr><td></td><td></td><td></td></tr>
<tr><td>LINE TIME</td><td>SAME</td><td>This is the current line time in camera internal clock cycles.
<table>
<tr><th>Byte$_2$</th><th>Byte$_1$</th><th>Byte$_0$</th></tr>
<tr><td>Px_{11}</td><td>Px_{12}</td><td>Px_{13}</td></tr>
<tr><td colspan="3">LINE TIME CLOCKS</td></tr>
</table>
To decode the line time, use the following formula:
$$LineTime = \frac{LINE_{¿}}{f_t}$$
Package 2.1.2 and later:
<table>
<tr><th>Camera Variant</th><th>$f_t \in MHz$</th></tr>
<tr><td>ALL</td><td>100</td></tr>
</table>
Up to package 2.1.1
<table>
<tr><th>Camera Variant</th><th>$f_t \in MHz$</th></tr>
<tr><td>ax_X</td><td>75</td></tr>
<tr><td>g8_X</td><td>80</td></tr>
</table></td></tr>
<tr><td>ENCODER CLOCKS</td><td>SAME</td><td>This is a 32-bit counter starting at power on with 0. These counts either the line trigger (LineStart) or Encoder pulses depending on the selected mode.
<table>
<tr><th>Byte$_3$</th><th>Byte$_2$</th><th>Byte$_1$</th><th>Byte$_0$</th></tr>
<tr><td>Px_{14}</td><td>Px_{15}</td><td>Px_{16}</td><td>Px_{17}</td></tr>
<tr><td colspan="4">ENCODER CLOCKS</td></tr>
</table>
When setting EncoderSourceA to Off the encoder clock counter will be reset.</td></tr>
<tr><td>ERROR CODE</td><td>UNUSED</td><td>CURRENTLY UNUSED PRESET WITH ZERO</td></tr>
<tr><td>TIMESTAMP</td><td>SAME</td><td>Timestamp starts counting from boot.
<table>
<tr><th>Byte$_2$</th><th>Byte$_1$</th><th>Byte$_0$</th></tr>
<tr><td>Px_{19}</td><td>Px_{20}</td><td>Px_{21}</td></tr>
<tr><td colspan="2">SECONDS</td><td>$\frac{Ms^1}{4}$</td></tr>
</table>
[1]MS= Milliseconds
To achieve the milliseconds part of the timestamp the Content of Px_{21} must be multiplied by four.</td></tr>
</table>

[1] **SAME** indicates that all color channels contain the same value. It is sufficient to evaluate a single color component.
DIVERSE indicates different values for individual color channels which should be taken into account when composing the information.

8.19.2 Each Line info (RGB/RGBa)

Pixel	0	1	2	3	4	5	6	7	8	9
RED	MARKER	ERROR CODE	SPEED2 HIGH	ENCODER CLOCKS	NEXT LINE POSITION	TIME STAMP	UNSUPPORTED	UNSUPPORTED	LINE STATUS/SCAN-DIR	MARKER
GREEN	CONTINUOUS LINE COUNT	LINE COUNT	LINE TIME							
BLUE										

If a 4th channel is present it will be always 0 for the each line info block.

Information	Channel Content[1]	Description
CONTINUOUS LINE COUNT	**DIVERSE**	This is the continuous line count across image boundaries. | - | **Byte$_1$** | **Byte$_0$** | | Px_{0Red} | Px_{0Green} | Px_{0Blue} | | | **CONT LINE COUNT** |
ERROR CODE	**DIVERSE**	This is an error code. *Currently not used!* | **Byte$_0$** | - | - | | Px_{1Red} | Px_{1Green} | Px_{1Blue} | | **ERROR CODE** | |
LINE COUNT	**DIVERSE**	This is a line counter starting from image start. | - | **Byte$_1$** | **Byte$_0$** | | Px_{1Red} | Px_{1Green} | Px_{1Blue} | | | **LINE COUNT** | *Reset by Info Block Trigger Source.*
SPEED2HIGH	**DIVERSE**	This bit is set if the line trigger exceeds the cameras maximum line rate. This is Bit7 of **Px_{1Red}**. | **BIT7** | BIT6 … BIT0 | | Px_{2Red} | | **SPEED2HIGH** | - |

<table>
<tr><td>LINE TIME</td><td>DIVERSE</td><td>This is the current measured line time in camera internal clock cycles.
<table>
<tr><td>BIT7…4</td><td>BIT3…0</td><td>Byte$_1$</td><td>Byte$_0$</td></tr>
<tr><td colspan="2">Px$_{2Red}$</td><td>Px$_{2Green}$</td><td>Px$_{2Blue}$</td></tr>
<tr><td></td><td colspan="3">LINE TIME CLOCKS</td></tr>
</table>
To decode the line time, use the following formula:
$$LineTime = \frac{LINE_{¿}}{f_t}$$
Up to package 2.1.1
<table>
<tr><td>Camera Variant</td><td>$f_t \in MHz$</td></tr>
<tr><td>ax_X</td><td>75</td></tr>
<tr><td>g8_X</td><td>80</td></tr>
</table>
Package 2.1.2 and later:
<table>
<tr><td>Camera Variant</td><td>$f_t \in MHz$</td></tr>
<tr><td>ALL</td><td>100</td></tr>
</table></td></tr>
<tr><td>ENCODER CLOCKS</td><td>DIVERSE</td><td>This is a 24-bit counter starting at power on with 0. These counts either the line trigger (LineStart) or Encoder pulses depending on the selected mode.
<table>
<tr><td>Byte$_2$</td><td>Byte$_1$</td><td>Byte$_0$</td></tr>
<tr><td>Px$_{3Red}$</td><td>Px$_{3Green}$</td><td>Px$_{3Blue}$</td></tr>
<tr><td colspan="3">ENCODER CLOCKS</td></tr>
</table>
When setting EncoderSourceA to Off the encoder clock counter will be reset.</td></tr>
<tr><td>NEXT LINE TRIGGER POSITION</td><td>DIVERSE</td><td>Information of the next line trigger position in encoder pulses (only at encoder mode). The calculated position is shown in a 16.8b value. If encoder averaging is used, the value is divided by the average size. At a slave camera, this field has the value zero.
<table>
<tr><td>Byte$_2$</td><td>Byte$_1$</td><td>Byte$_0$</td></tr>
<tr><td>Px$_{4Red}$</td><td>Px$_{4Green}$</td><td>Px$_{4Blue}$</td></tr>
<tr><td colspan="3">NEXT LT POS RAW</td></tr>
</table>
To achieve the actual value, follow this formula:
$$NextLTPos = \frac{NEXT_{¿}}{256}$$</td></tr>
<tr><td>TIMESTAMP</td><td>SAME</td><td>Timestamp starts counting from boot.
<table>
<tr><td>Byte$_2$</td><td>Byte$_1$</td><td>Byte$_0$</td></tr>
<tr><td>Px$_{5Red}$</td><td>Px$_{5Green}$</td><td>Px$_{5Blue}$</td></tr>
<tr><td colspan="2">SECONDS</td><td>$\frac{Ms^1}{4}$</td></tr>
</table>
[1]MS= Milliseconds
To achieve the milliseconds part of the timestamp the Content of Px$_{5Blue}$ must be multiplied by four.</td></tr>
<tr><td>LINE STATUS</td><td>DIVERSE</td><td>This entry reflects the logical level of the input lines</td></tr>
</table>

		before LineInverter. If LineInverter is enabled the value reflected by the Line Status feature is inverse. **Line** / **Pixel Bit** Line1 / $Px_{8Green0}$ Line2 / $Px_{8Green1}$ Line3 / $Px_{8Green2}$ Line4 / $Px_{8Green3}$ Line5 / $Px_{8Green4}$ Line6 / $Px_{8Green5}$ Line7 / $Px_{8Green6}$ Line8 / $Px_{8Green7}$ Line9 / -
SCAN-DIR	**DIVERSE**	The scan direction **Direction** / **Value** Forward / 0 Backward / 1 **Entry** / **Pixel Bit** Scan Direction / Px_{8Blue6}

[1] **SAME** indicates that all color channels contain the same value. It is sufficient to evaluate a single color component.
DIVERSE indicates different values for individual color channels which should be taken into account when composing the information.

8.19.3 Each Line info (Mono)

Pixel	0	1	2	3	4	5	6	7	8	9
Entry	MARKER	CONTINUOUS LINE COUNT (15:8)	CONTINUOUS LINE COUNT (7:0)	SPEED2HIGH LINE TIME (19:13)	LINE TIME (12:5)	ENCODER CLOCKS (23:16)	ENCODER CLOCKS (15:8)	ENCODER CLOCKS (7:0)	LINE STATE	MARKER

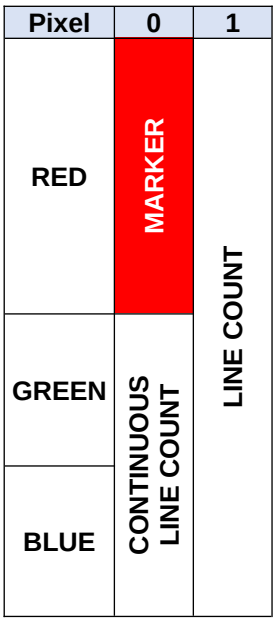
Information	Channel Content[1]	Description
CONTINUOUS LINE COUNT	**SAME**	This is the continuous line count across image boundaries. **$Byte_1$** / **$Byte_0$** Px_0 / Px_1 **CONT LINE COUNT**
SPEED2HIGH	**SAME**	This bit is set if the line trigger exceeds the cameras maximum line rate. This is Bit7 of **Px_3**.

		<table><tr><td>BIT7</td><td>BIT6 … BIT0</td></tr><tr><td colspan="2">Px_3</td></tr><tr><td>SPEED2HIGH</td><td>-</td></tr></table>

LINE TIME	**SAME**	This is the current measured line time in camera internal clock cycles. <table><tr><td>BIT7</td><td>BIT6…0</td><td>$Byte_0$</td></tr><tr><td colspan="2">Px_3</td><td>Px_4</td></tr><tr><td></td><td colspan="2">LINE TIME CLOCKS</td></tr></table> To decode the line time, use the following formula: $$LineTime = \frac{LINE_{¿}}{f_t} * 32$$ Multiply by 32 for mono mode. There is reduced accuracy for line time in mono mode. *Up to package 2.1.1* <table><tr><td>Camera Variant</td><td>$f_t \in MHz$</td></tr><tr><td>ax_X</td><td>75</td></tr><tr><td>g8_X</td><td>80</td></tr></table> *Package 2.1.2 and later:* <table><tr><td>Camera Variant</td><td>$f_t \in MHz$</td></tr><tr><td>ALL</td><td>100</td></tr></table>
ENCODER CLOCKS	**SAME**	This is a 24-bit counter starting at power on with 0. These counts either the line trigger (LineStart) or Encoder pulses depending on the selected mode. <table><tr><td>$Byte_2$</td><td>$Byte_1$</td><td>$Byte_0$</td></tr><tr><td>Px_5</td><td>Px_6</td><td>Px_7</td></tr><tr><td colspan="3">ENCODER CLOCKS</td></tr></table> *When setting EncoderSourceA to Off the encoder clock counter will be reset.*
LINE STATUS	**SAME**	This entry reflects the logical level of the input lines **before** LineInverter. If LineInverter is enabled the value reflected by the Line Status feature is inverse. <table><tr><td>Line</td><td>Pixel Bit</td></tr><tr><td>Line1</td><td>Px_{8-0}</td></tr><tr><td>Line2</td><td>Px_{8-1}</td></tr><tr><td>Line3</td><td>Px_{8-2}</td></tr><tr><td>Line4</td><td>Px_{8-3}</td></tr><tr><td>Line5</td><td>Px_{8-4}</td></tr><tr><td>Line6</td><td>Px_{8-5}</td></tr><tr><td>Line7</td><td>Px_{8-6}</td></tr><tr><td>Line8</td><td>Px_{8-7}</td></tr></table>

[1] **SAME** indicates that all color channels contain the same value. It is sufficient to evaluate a single color component.
DIVERSE indicates different values for individual color channels which should be taken into account when composing the information.

8.19.4 Line Counter (RGB/RGBa)



If a 4th channel is present it will be always 0 for the each line info block.

Information	Channel Content[1]	Description
CONTINUOUS LINE COUNT	**DIVERSE**	This is the continuous line count across image boundaries. | - | **Byte$_1$** | **Byte$_0$** | | Px_{0Red} | Px_{0Green} | Px_{0Blue} | | **0xFF** | **CONT LINE COUNT** |
LINE COUNT	**DIVERSE**	This is a line counter starting from image start. | **Byte$_2$** | **Byte$_1$** | **Byte$_0$** | | Px_{1Red} | Px_{1Green} | Px_{1Blue} | | **LINE COUNT** | *Reset by Info Block Trigger Source.*

[1] **SAME** indicates that all color channels contain the same value. It is sufficient to evaluate a single color component.
DIVERSE indicates different values for individual color channels which should be taken into account when composing the information.

8.20 Info Block Trigger Source

Name	InfoBlockTriggerSource	**Custom**
Description	This is the source to trigger first line info block.	
Interface	Integer	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	See enum entry table below.	
Default value	FrameStart	
Availability	**ALL**	
Notes	-	
Error behavior	See the device error code documentation.	

Info Block Trigger Source Enum Entries:

Name	Description
FrameStart	Triggers first line info block at start of each frame. (Default)

Line1	Specifies physical line (or pin) **Line1** and associated I/O control block to use as external source to trigger the first line info block.
Line2	Specifies physical line (or pin) **Line2** and associated I/O control block to use as external source to trigger the first line info block.
Line3	Specifies physical line (or pin) **Line3** and associated I/O control block to use as external source to trigger the first line info block.
Line4	Specifies physical line (or pin) **Line4** and associated I/O control block to use as external source to trigger the first line info block.
Line5	Specifies physical line (or pin) **Line5** and associated I/O control block to use as external source to trigger the first line info block.
Line6	Specifies physical line (or pin) **Line6** and associated I/O control block to use as external source to trigger the first line info block.
Line7	Specifies physical line (or pin) **Line7** and associated I/O control block to use as external source to trigger the first line info block.
Line8	Specifies physical line (or pin) **Line8** and associated I/O control block to use as external source to trigger the first line info block.
Line9	Specifies physical line (or pin) **Line9** and associated I/O control block to use as external source to trigger the first line info block.
LinkTrigger0	Specifies **LinkTrigger0** to use as source to trigger the first line info block (received from the CoaxPress transport layer)
LinkTrigger1	Specifies **LinkTrigger1** to use as source to trigger the first line info block (received from the CoaxPress transport layer)

8.21 Test Pattern Generator Selector

Name	TestPatternGeneratorSelector	**Standard**
Description	Selects which test pattern generator is controlled by the TestPattern feature.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	See enum entry table below.	
Default value	**ImageProcessing**	
Availability	**ALL**	
Notes	-	
Error behavior	-	

Test Pattern Generator Selector Enum Entries:

Name	Description
ImageProcessing	**TestPattern** feature controls the **Image Processing** test pattern generator.

8.22 Test Pattern

Name	TestPattern[TestPatternGeneratorSelector]	**Standard**
Description	Selects the type of test pattern that is generated by the device as image source.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	No	
Value range	See enum entry table below.	
Default value	Off	
Availability	**ALL**	
Notes	-	
Error behavior	See the device error code documentation.	

Test Pattern Generator Selector Enum Entries:

Name	Description
Off	Image is coming from the sensor.
GreyHorizontalRamp	Image is filled horizontally with pixels that go from the darkest

	possible value to the brightest.
GreyVerticalRamp	Image is filled vertically with pixels that go from the darkest possible value to the brightest.
GreyHorizontalRampMoving	Image is filled horizontally with pixels that go from the darkest possible value to the brightest and that move horizontally from left to right at each frame.
GreyVerticalRampMoving	Image is filled vertically with lines that go from the darkest possible value to the brightest and that move vertically from top to bottom at each frame.
ColorRamps	Horizontal ramp in red color channel. Vertical and horizontal ramp in green color channel. Vertical ramp in blue color channel.
TogglingPixels	Vertically and horizontally neighbored pixels have the inverse intensity value from each other.
PinStripes	Fixed pin stripe pattern with configurable background. The background is configurable with the test pattern value feature.

8.23 Test Pattern Value

Name	TestPatternValue[TestPatternGeneratorSelector]	**Custom**
Description	Test-Pattern-specific value that influences the appearance of the generated image.	
Interface	Integer	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	[0 – 4095]	
Default value	64	
Availability	**ALL**	
Notes	-	
Error behavior	See the device error code documentation.	

9 Acquisition Control

9.1 Acquisition Mode

Name	AcquisitionMode	**Standard**
Description	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.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	No	
Value range	See enum entries table below.	
Default value	**Continuous**	
Availability	**ALL**	
Notes	-	
Error behavior	-	

Acquisition Mode Enum Entries:

Name	Description
Continuous	Frames are captured continuously until stopped with the AcquisitionStop command.
SingleFrame	One Frame is captured.

9.2 Acquisition Start

Name	AcquisitionStart	**Standard**
Description	Starts the Acquisition of the device. The number of frames captured is specified by AcquisitionMode.	
Interface	Command	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	1	
Default value	1	
Availability	**ALL**	
Notes	-	
Error behavior	Success is returned on successful start otherwise some error code. See the device error code documentation.	

9.3 Acquisition Stop

Name	AcquisitionStop	**Standard**
Description	Stops the Acquisition of the device at the end of the current Frame.	
Interface	Command	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	[0, 1] For writing only command value 1 is supported.	
Default value	1	
Availability	**ALL**	
Notes	The command will return immediately however it is not finished and will continue execution in background. As soon as the command value changes from 1 to 0 the command has finished. Features locked by TLParamsLocked can be modified first after AcquisitionStop has finished execution completely.	
Error behavior	See the device error code documentation.	

9.4 Acquisition Abort

Name	AcquisitionAbort	**Standard**
Description	Aborts the Acquisition immediately.	
Interface	Command	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	[0, 1] For writing only command value 1 is supported.	
Default value	1	
Availability	**ALL**	
Notes	When command is executed, it aborts the current frame immediately without completing the current frame.	
Error behavior	See the device error code documentation.	

9.5 Acquisition Arm

Name	AcquisitionArm	**Standard**
Description	Validates all the current features for consistency and prepares the device for a fast start of the acquisition.	
Interface	Command	
Access mode	Write Only	
Adjustable while grabbing	No	
Value range	1	
Default value	1	
Availability	**ALL**	
Notes	-	
Error behavior	See the device error code documentation.	

9.6 Frame Count

Name	FrameCount	**Standard**
Description	Indicates the number of frames captured during an acquisition period.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	[0, 65535]	
Default value	1	
Availability	**ALL**	
Notes	This feature value will be resetted during an UserSet load and AcquisitionStart. This counter refers to the captured frames during an acquisition period. This is different than the CXP and GigE counters in the image headers - *The GigE image headers block ID starts from 1.* - *The CXP source tag starts from 0.*	
Error behavior	-	

9.7 Exposure Time Mode

Name	ExposureTimeMode	**Standard**
Description	Sets the configuration mode of the Exposure Time feature.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	See enum entries table below.	
Default value	Common	
Availability	**ALL**	

Notes	-
Error behavior	See the device error code documentation.

Exposure Time Mode Enum Entries:

Name	Availability	Description
Common	ALL	The exposure time is common to all the color components.
Individual	g8_X	The exposure time is individual for each color component.

9.8 Exposure Time Selector

Name	ExposureTimeSelector	**Standard**
Description	Selects which exposure time is controlled by the Exposure Time feature. This allows for independent control over the exposure components.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	No	
Value range	See enum entries table below.	
Default value	Common	
Availability	**ALL**	
Notes	-	
Error behavior	See the device error code documentation.	

Exposure Time Selector Enum Entries:

Name	Availability	Description
Common	ALL	Selects the common ExposureTime.
White	g8_X	Selects the White ExposureTime.
Infrared	g8_X	Selects the Infrared ExposureTime.
Red	g8_X	Selects the Red ExposureTime.
Green	g8_X	Selects the Green ExposureTime.
Blue	g8_X	Selects the Blue ExposureTime.

9.9 Exposure Time

Name	ExposureTime[ExposureTimeSelector]	**Standard**
Description	This controls the duration during which the photosensitive cells are exposed to light.	
Interface	Float	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	**Freerun:** The exposure time must be smaller than the **Acquisition Line Time** plus an offset. **LineTirgger On or Salve camera (MSMode is set to Slave):** The exposure time must be smaller than the maximum exposure time. The minimum difference of **Acquisition Line Time** and **ExposureTime** are camera variant specific. Therefore, query the min and max entries of this feature.	
Default value	30	
Availability	**ALL**	
Notes	The unit is micro-seconds.	
Error behavior	See the device error code documentation.	

9.10 Acquisition Integration Time – Deprecated

Name	AcquisitionIntegrationTime	**Custom**
Description	Controls the integration time. (unit: micro-seconds)	
Interface	Float	

Access mode	Read/Write
Adjustable while grabbing	-
Value range	See the value range of **Exposure Time**
Default value	-
Notes	This feature is deprecated please use **Exposure Time** instead.
Error behavior	See the device error code documentation.

9.11 Acquisition Integration Time Min – Deprecated

Name	AcquisitionIntegrationTimeMin	**Custom**
Description	Displays the minimum integration time. (unit: micro-seconds)	
Interface	Float	
Access mode	Read only	
Adjustable while grabbing	-	
Value range		
Default value	-	
Notes	This feature is deprecated; query the min and max values from **Exposure Time** instead.	
Error behavior	-	

9.12 Acquisition Line Rate

Name	AcquisitionLineRate	**Standard**
Description	Controls the rate (in Hertz) at which the Lines in a Frame are captured.	
Interface	Float	
Access mode	Read/Write	
Adjustable while grabbing	No	
Value range	[(1 / **Acquisition Line Time**.Max), (1 / **Acquisition Line Time**.Min)]	
Default value	18.18 KHz	
Availability	**ALL**	
Notes	This is the inverse of the **Acquisition Line Time** This feature is not available if MasterSlaveMode is configured as Slave or LedFlashEnable is enabled.	
Error behavior	See the device error code documentation.	

9.13 Acquisition Line Rate Max – Deprecated

Name	AcquisitionLineRateMax	**Custom**
Description	This value is calculated by the camera. It limits the **AcquisitionLineRate**. The unit is Hertz.	
Interface	Float	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	-	
Default value	-	
Notes	Please use the min and max node entries of the **Acquisition Line Rate** feature.	
Error behavior	-	

9.14 Acquisition Line Time

Name	AcquisitionLineTime	**Custom**
Description	Controls the processing time per scan line.	
Interface	Float	
Access mode	Read/Write	
Adjustable while grabbing	No	

Value range	The value range depends on: - The transport layer configuration (Link configuration, packet size) - The region width - The Exposure Time - Reduction parameters Binning Horizontal , Decimation Horizontal Float **Query the min and max values of the acquisition line time feature to get the valid range for current setting.** The exposure time always must be smaller than the line time: Range defined by exposure time: [**Exposure Time** + *gap* µs, 27900 µs] Gap = {ax_X = 1.5 ; g8_X = 2.0} Example range for gige-vision with one and two physical links connected. 1. [37.43[1] µs, 13981 µs] – For single link (10Gbps) + ax_X 2. [30.88[1] µs, 13981 µs] – For dual link (20Gbps) + ax_X 3. [37.43[1] µs, 13107.1875 µs] – For single link (10Gbps) + g8_X 4. [30.88[1] µs, 13107.1875 µs] – For dual link (20Gbps) + g8_X [1] *For Region **Width**: 15360, **GevSCPSPacketSize**: 8240 and **AcquisitionFrameRate** disabled.*
Default value	55
Availability	**ALL**
Notes	This is the inverse of the **Acquisition Line Rate** . If **AcquisitionLineTime** is set for higher values, then make sure to adopt image timeout to avoid timeout issues while grabbing. This parameter influences the value range of **AcquisitionFrameRate**. Please read the **AcquisitionFrameRate** feature documentation for further details. This feature is not available if MasterSlaveMode is configured as Slave or LedFlashEnable is enabled.
Error behavior	See the device error code documentation.

9.15 Acquisition Line Time Min – Deprecated

Name	AcquisitionLineTimeMin	**Custom**
Description	Displays the minimum processing time per scan line in µs.	
Interface	Float	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	[**Exposure Time** + 1.5 µs]	
Default value	-	
Notes	Please query the min and max values of the **Acquisition Line Time** feature instead of using this feature.	
Error behavior	-	

9.16 Acquisition Frame Rate Enable

Name	AcquisitionFrameRateEnable	**Standard**
Description	Controls whether the **AcquisitionFrameRate** feature is writable and used to control the acquisition rate. Otherwise, the acquisition rate is implicitly controlled by the combination of other features such as **AcquisitionLineTime**.	
Interface	Boolean	
Access mode	Read/Write	
Adjustable while grabbing	No	
Value range	**True**, **False**	

Default value	**False**
Availability	**ALL**
Notes	The **FrameActive** and **FrameStart** triggers must be set to **Off** to enable this feature. This feature is not available if MasterSlaveMode is configured as Slave or LedFlashEnable is enabled.
Error behavior	See the device error code documentation.

9.17 Acquisition Frame Rate

Name	AcquisitionFrameRate	**Standard**
Description	Controls the acquisition rate (in Hertz) at which the frames are captured.	
Interface	Float	
Access mode	Read/Write	
Adjustable while grabbing	No	
Value range	The value range depends on the line time as well as on the image height: *Min Acquisition Frame Rate:* $$Min = \frac{1}{AcquisitionLineTime * (ImageHeight + 32764)}$$ *Max Acquisition Frame Rate:* $$Max = \frac{1}{AcquisitionLineTime * ImageHeight}$$	
Default value	10	
Availability	**ALL**	
Notes	The **Acquisition Frame Rate** is based on the given **AcquisitionLineTime** even if a line trigger is used. Therefore, the real frame rate depends on the line trigger if this is used. The accuracy of this feature is limited. This feature is writeable only if **AcquisitionFrameRateEnable** is set to **True**. Changing the image height or the acquisition line time influences the value range of the **AcquisitionFrameRate**. It may be that while these parameters are changed. The current value for the **AcquisitionFrameRate** gets out of range. In this case the real acquisition frame rate is clamped internally to the maximum possible frame rate. This feature is not available if MasterSlaveMode is configured as Slave or LedFlashEnable is enabled.	
Error behavior	See the device error code documentation.	

9.18 Time Delay Integration Mode

Name	TimeDelayIntegrationMode	**Custom**
Description	Selects the Time Delay Integration Mode. This is not enabling or disabling the TDI, but choosing if high sensitivity or a high dynamic range is desired.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	No	
Value range	See enum entries table below.	
Default value	HighSensitivity	
Availability	**ALL**	
Notes	- Enabling the TDI will be done by setting the TimeDelayIntegration feature to a value greater than 1 - The DSNU and PRNU data sets must be created with the desired TDI Mode. When changing the mode, the DSNU/PRNU references must be recreated.	
Error behavior	See the device error code documentation.	

Exposure Time Mode Enum Entries:

Name	Availability	Description
HighSensitivity	ALL	The sensivitiy will be increased in this TDI mode. This is achieved by **summing up** the lines.

HighSNR	ALL	Opposed to HighSensitivity this mode leads to a higher dynamic range. The SNR will be greater. This is achieved by **averaging** the lines.

9.19 Time Delay Integration

Name	TimeDelayIntegration	**Custom**
Description	Selects the number of photo-sensitive cells combined (average).	
Interface	Integer	
Access mode	Read/Write	
Adjustable while grabbing	No	
Value range	[1, 3]	
Default value	1	
Availability	**ALL**	
Notes	This feature is available for the **Mono Cameras** and the g8 sensor. For the g8 sensor the sensor hardware revision should be at least 2 to support this feature for RGB(Ir). The sensor hardware version can be retrieved by the Device Version feature.	
Error behavior	See the device error code documentation.	

9.20 Master Slave Mode

Name	MasterSlaveMode	**Custom**
Description	Specifies the master slave mode of the camera.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	No	
Value range	See enum entries table below.	
Default value	Off	
Availability	**ALL**	
Notes	Whenever the Master and Slave camera maximum operating line frequency differs make sure to configure the Master to operate in the lower speed. Otherwise, the images delivered by Slave may be corrupt. The camera's maximum line frequency may differ e.g., by different Width, Pixel Format, Decimation Horizontal Float, Binning Horizontal or Exposure Time parameter. To be sure about the setting check the maximum value of Acquisition Line Rate by querying it from the camera. The following features are not available if the mode is set to **Slave:** TriggerSoftware, TriggerActivation, TriggerDivider, TriggerSignalDetectionMode and ExtendLines,	
Error behavior	See the device error code documentation.	

Master Slave Mode Enum Entries:

Name	Description
Off	No master slave is selected.
Master	Selects the camera to be Master.
Slave	Selects the camera to be Slave.

9.21 Master Slave Interface – (Removed from 13.0.0 version)

Name	MasterSlaveInterface[MasterSlaveMode]	**Custom**
Description	Specifies the interface type to be used for master/slave.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable	No	

while grabbing	
Value range	See enum entries table below.
Default value	External
Availability	**ALL**
Notes	**This feature is deprecated, use MasterSlaveSource, MasterSlaveAutoSelectSource and Digital IO configuration. It will be removed in a future package.** For External interface, **Master –** Line9 as output **Slave –** Line4 as input and Line9 as output
Error behavior	See the device error code documentation.

Master Slave Interface Enum Entries:

Name	Description
External	Interface between master and slave camera is external(physical)
Internal	Interface between master and slave camera is internal

9.22 Master Slave Interface Enable - (Removed from 13.0.0 version)

Name	MasterSlaveInterfaceEnable[MasterSlaveInterface]	**Custom**
Description	Enables the selected master/slave interface.	
Interface	Boolean	
Access mode	Read/Write	
Adjustable while grabbing	No	
Value range	**True** – Enables selected master/slave interface. **False** – Disables selected master/slave interface.	
Default value	**False**	
Availability	**ALL**	
Notes	**This feature is deprecated, use MasterSlaveSource, MasterSlaveAutoSelectSource and Digital IO configuration. It will be removed in a future package.**	
Error behavior	See the device error code documentation.	

9.23 Master Slave Source

Name	MasterSlaveSource	**Custom**
Description	Specifies the source to be used for master/slave.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	No	
Value range	See enum entries table below.	
Default value	-	
Availability	**ALL**	
Notes	allPIXAEvo – Line4 and Line10 allPIXANeo – Line3 and Line9 This feature is available only if MasterSlaveMode is slave	
Error behavior	See the device error code documentation.	

Master Slave Source Enum Entries:

Name	Description
Line1	Specifies physical line (or pin) **Line1** to use as source for the master slave signal.
Line2	Specifies physical line (or pin) **Line2** to use as source for the master slave signal.
Line3	Specifies physical line (or pin) **Line3** to use as source for the master slave signal.
Line4	Specifies physical line (or pin) **Line4** to use as source for the master

	slave signal.
Line5	Specifies physical line (or pin) **Line5** to use as source for the master slave signal.
Line6	Specifies physical line (or pin) **Line6** to use as source for the master slave signal.
Line7	Specifies physical line (or pin) **Line7** to use as source for the master slave signal.
Line8	Specifies physical line (or pin) **Line8** to use as source for the master slave signal.
Line9	Specifies physical line (or pin) **Line9** to use as source for the master slave signal.
Line10	Specifies physical line (or pin) **Line10** to use as source for the master slave signal.

9.24 Master Slave Output

Name	MasterSlaveOutput	**Custom**
Description	Specifies the output to be used for master/slave.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	No	
Value range	See enum entries table below.	
Default value	Off	
Availability	**ALL**	
Notes	allPIXAEvo – Line9 and Line10 allPIXANeo – Line4 and Line9	
Error behavior	See the device error code documentation.	

Master Slave Output Enum Entries:

Name	Description
Line1	Specifies physical line (or pin) **Line1** to use as output for the master slave signal.
Line2	Specifies physical line (or pin) **Line2** to use as output for the master slave signal.
Line3	Specifies physical line (or pin) **Line3** to use as output for the master slave signal.
Line4	Specifies physical line (or pin) **Line4** to use as output for the master slave signal.
Line5	Specifies physical line (or pin) **Line5** to use as output for the master slave signal.
Line6	Specifies physical line (or pin) **Line6** to use as output for the master slave signal.
Line7	Specifies physical line (or pin) **Line7** to use as output for the master slave signal.
Line8	Specifies physical line (or pin) **Line8** to use as output for the master slave signal.
Line9	Specifies physical line (or pin) **Line9** to use as output for the master slave signal.
Line10	Specifies physical line (or pin) **Line10** to use as output for the master slave signal.

9.25 AutoSelect Source - (Removed from 13.0.0 version)

Name	MasterSlaveAutoSelectSource	**Custom**
Description	Specifies the source to be used for AutoSelect.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	No	
Value range	See enum entries table below.	

Default value	Off
Availability	**ALL**
Notes	Only Line3 is available for allPIXAEvo
Error behavior	See the device error code documentation.

AutoSelect Source Enum Entries:

Name	Description
Line1	Specifies physical line (or pin) **Line1** to use as source for the autoselect signal.
Line2	Specifies physical line (or pin) **Line2** to use as source for the autoselect signal.
Line3	Specifies physical line (or pin) **Line3** to use as source for the autoselect signal.
Line4	Specifies physical line (or pin) **Line4** to use as source for the autoselect signal.
Line5	Specifies physical line (or pin) **Line5** to use as source for the autoselect signal.
Line6	Specifies physical line (or pin) **Line6** to use as source for the autoselect signal.
Line7	Specifies physical line (or pin) **Line7** to use as source for the autoselect signal.
Line8	Specifies physical line (or pin) **Line8** to use as source for the autoselect signal.
Line9	Specifies physical line (or pin) **Line9** to use as source for the autoselect signal.

9.26 Slave DelayLines - (Removed from 13.0.0 version)

Name	MasterSlaveDelayLines	**Custom**
Description	Specifies the delay in number of lines for the slave camera.	
Interface	Integer	
Access mode	Read/Write	
Adjustable while grabbing	No	
Value range	The value range varies when led flash is enabled depending on the number of patterns. 1. [0 , 32764] – LedFlashEnable is disabled 2. [0, 32764] – LedFlashEnable is enabled and NumberOfPattern=1 3. [0, 16382] – LedFlashEnable is enabled and NumberOfPattern=2 4. [0, 10921] – LedFlashEnable is enabled and NumberOfPattern=3 5. [0, 8191] – LedFlashEnable is enabled and NumberOfPattern=4	
Default value	0	
Availability	**ALL**	
Notes	This feature is valid and available only for the **Slave Camera**.	
Error behavior	See the device error code documentation.	

9.27 Acquisition Burst Frame Count

Name	AcquisitionBurstFrameCount	**Standard**
Description	Specifies the number of frames to acquire for each FrameBurstStart trigger	
Interface	Integer	
Access mode	Read/Write	
Adjustable while grabbing	No	
Value range	[1 , AcquisitionBurstFrameCount Max]	
Default value	1	
Availability	**ALL**	
Notes	This feature is valid and available only for **FrameBurstStart**.	
Error behavior	See the device error code documentation.	

9.28 Trigger Selector

Name	TriggerSelector	**Standard**
Description	Selects the type of trigger to configure.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	See enum entries table below.	
Default value	**FrameStart**	
Availability	**ALL**	
Notes		
Error behavior	See the device error code documentation.	

Trigger Selector Enum Entries:

Name	Description
FrameStart	Selects a trigger starting the capture of one frame.
FrameActive	Selects a trigger controlling the duration of one frame. This is not available for X_cxp.
FrameBurstStart	Selects a trigger starting of the bursts of frames in an acquisition.
FrameBurstActive	Selects the frame burst trigger. For capturing a burst of frames within a “frame” (not image) signal. **Currently only supported in combination with FrameEnd trigger.**
FrameEnd	Ends the current frame. **Currently only supported in combination with FrameBurstActive trigger.**
LineStart	Selects a trigger starting the capture of one Line of a Frame.

9.29 Trigger Mode

Name	TriggerMode[TriggerSelector]	**Standard**
Description	Controls whether the selected trigger is active.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	No	
Value range	See enum entries table below.	
Default value	**Off**	
Availability	**ALL**	
Notes		
Error behavior	See the device error code documentation.	

Trigger Mode Enum Entries:

Name	Description
Off	Disables the selected trigger.
On	Enables the selected trigger.

9.30 Trigger Software

Name	TriggerSoftware[TriggerSelector]	**Standard**
Description	Generates a software trigger signal that is used when the trigger source is set to Software.	
Interface	Command	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	1	
Default value	1	
Availability	**ALL**	
Notes	-	
Error behavior	See the device error code documentation	

9.31 Trigger Source

Name	TriggerSource[TriggerSelector]	**Standard**
Description	Specifies the internal signal or physical input Line to use as the trigger source.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	No	
Value range	See the enum entries for more information.	
Default value	-	
Availability	**ALL**	
Notes		
Error behavior	See the device error code documentation.	

Trigger Source Enum Entries:

Name	Description	Notes
Encoder0	Specifies Encoder0 signal to use as internal source for the trigger.	This enum entry is valid and available only for **LineStart**
Line1	Specifies physical line (or pin) **Line1** and associated I/O control block to use as external source for the trigger signal.	This enum entry is valid and available only for **LineStart**
Line2	Specifies physical line (or pin) **Line2** and associated I/O control block to use as external source for the trigger signal.	This enum entry is valid and available only for **Frame Trigger**
Line3	Specifies physical line (or pin) **Line3** and associated I/O control block to use as external source for the trigger signal.	This enum entry is valid and available for **Frame** or **Line** trigger
Line4	Specifies physical line (or pin) **Line4** and associated I/O control block to use as external source for the trigger signal.	This enum entry is valid and available for **Frame** or **Line** trigger
Line5	Specifies physical line (or pin) **Line5** and associated I/O control block to use as external source for the trigger signal.	This enum entry is valid and available for **Frame** or **Line** trigger
Line6	Specifies physical line (or pin) **Line6** and associated I/O control block to use as external source for the trigger signal.	This enum entry is valid and available for **Frame** or **Line** trigger
LinkTrigger0	Specifies LinkTrigger0 to use as source for the trigger (received from the CoaxPress transport layer)	This enum entry is valid and available for **FrameStart** and **LineStart**
LinkTrigger1	Specifies LinkTrigger1 to use as source for the trigger (received from the CoaxPress transport layer)	This enum entry is valid and available for **FrameStart** and **LineStart**
Software	Specifies that the trigger source will be generated by software using the TriggerSoftware command.	This enum entry is valid and available for **FrameStart**. And **LineStart**
FrameBurstActiveSourceEnd	This refers to the signal event leading to end the current FrameBurstActive burst. This is available only for the FrameEnd trigger. It can be used to finish the last frame of the burst in case immediately when the burst ends.	
MSIn	This refers to the master slave interface.	For Master/Off mode if MSIn source is used then camera is in Freerun. For slave

		camera it is triggered by master camera.

9.32 Trigger Activation

Name	TriggerActivation[TriggerSelector]	**Standard**
Description	Specifies the activation mode of the trigger.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	See enum entries table below.	
Default value	-	
Availability	**ALL**	
Notes	This feature is not available if MasterSlaveMode is configured as Slave.	
Error behavior	See the device error code documentation.	

Trigger Activation Enum Entries:

Name	Description	Notes
RisingEdge	Specifies that the trigger is considered valid on the rising edge of the source signal.	This enum entry is valid and available only for **LineStart** or **FrameStart or FrameBurstStart**
FallingEdge	Specifies that the trigger is considered valid on the falling edge of the source signal.	This enum entry is valid and available only for **FrameStart or FrameBurstStart**
LevelHigh	Specifies that the trigger is considered valid if the level of the source signal is high.	This enum entry is valid and available only for **FrameActive** and **FrameBurstActive**
LevelLow	Specifies that the trigger is considered valid if the level of the source signal is low.	This enum entry is valid and available only for **FrameActive** and **FrameBurstActive**

9.33 Trigger DelayLines

Name	TriggerDelayLines[TriggerSelector]	**Custom**
Description	Specifies the delay in number of lines to apply after the trigger reception before activating it	
Interface	Integer	
Access mode	Read/Write	
Adjustable while grabbing	No	
Value range	The value range varies when led flash is enabled depending on the number of patterns. 1. [0 , 32764] – LedFlashEnable is disabled 2. [0, 32764] – LedFlashEnable is enabled and NumberOfPattern=1 3. [0, 16382] – LedFlashEnable is enabled and NumberOfPattern=2 4. [0, 10921] – LedFlashEnable is enabled and NumberOfPattern=3 [0, 8191] – LedFlashEnable is enabled and NumberOfPattern=4	
Default value	0	
Availability	**ALL**	
Notes	This feature is valid and available only for **FrameStart, FrameBurstStart, FrameActive** and **FrameBurstActive**	
Error behavior	See the device error code documentation.	

9.34 Trigger Divider

Name	TriggerDivider[TriggerSelector]	**Standard**
Description	Specifies a division factor for the incoming line trigger pulses	
Interface	Integer	
Access mode	Read/Write	

Adjustable while grabbing	Yes
Value range	[1 , 256]
Default value	1
Availability	**ALL**
Notes	This feature is valid and available only for **LineStart**
Error behavior	See the device error code documentation.

9.35 Trigger Signal Detection Mode

Name	TriggerSignalDetectionMode[TriggerSelector]	**Custom**
Description	Specifies the debounce type to be evaluated.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	No	
Value range	See enum entries table below.	
Default value	**FrameStart - PeakholderDetection** **FrameBurstStart - PeakholderDetection** **FrameActive – Debouncing4Lines** **FrameBurstActive – Debouncing4Lines**	
Availability	**ALL**	
Notes	This feature is valid and available only for **FrameStart, FrameBurstStart, FrameActive** and **FrameBurstActive** The incoming Frame Trigger Signal can be delayed by the Trigger Delay Lines feature.	
Error behavior	See the device error code documentation.	

Trigger Signal Detection Mode Enum Entries:

Name	Description
PeakholderDetection	Peakholder detects very short input pulse. (Sensitive to spikes.)
Debouncing4Clocks	Debouncing 4 clocks. Very short debouncing by four FPGA internal clock cycles.
Debouncing4Lines	Debouncing 4 lines. Requires a 4-line stable trigger input signal, this leads to an image delay of 4 lines.
Debouncing60Lines	Debouncing 60 lines. Requires a 60 line stable trigger input signal, leading to an image delay of 60 lines.

9.36 Extend Lines

Name	FrameActiveExtendLines[TriggerSelector]	**Custom**
Description	Specifies the number of additional output lines for **FrameActive**.	
Interface	Integer	
Access mode	Read/Write	
Adjustable while grabbing	No	
Value range	[0, 65535]	
Default value	0	
Availability	**ALL**	
Notes	This feature is valid and available only for **FrameActive and FrameBurstActive** and if MasterSlaveMode is not configured as Slave.	
Error behavior	See the device error code documentation.	

9.37 Line Time (Measured)

Name	MeasuredLineTime[TriggerSelector]	**Custom**
Description	Measure the processing time per scan line during line/encoder trigger in us.	
Interface	Float	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	In freerun this feature holds the same value as AcquisitionLineTime. During LineStart mode 'ON', it displays the actual line trigger speed. But in both cases the maximum line time it can display is **13,107** us.	
Default value	-	
Availability	**ALL**	
Notes	This feature is valid and available only for **LineStart** and if MasterSlaveMode is not configured as Slave.	
Error behavior		

9.38 Line Trigger Status

Name	LineTriggerStatus[TriggerSelector]	**Custom**
Description	Display the line trigger status.	
Interface	Enumeration	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	See enum entries table below.	
Default value	-	
Availability	**ALL**	
Notes	This feature is valid and available only for **LineStart** and if MasterSlaveMode is not configured as Slave.	
Error behavior	-	

Line Trigger Status Enum Entries:

Name	Description
OK	OK
SpeedToHigh	Speed to high

10 Analog Control

10.1 Gain Selector

Name	GainSelector	**Standard**
Description	Selects which Gain is controlled by the Gain features.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	See enum entries table below.	
Default value	**All** – For color camera **White** – For mono camera	
Availability	**ALL**	
Notes	The linear gain reflects the product of the analog and digital gain. Setting the linear gain will adapt the analog (if available) as well as the digital gain. The analog gain is not supported for all products. If the analog gain is not available, the digital gain is not displayed separately. In this case the linear gain reflects the digital gain value. If the gain is read while **All**/**AnalogAll**/**DigitalAll** is selected, an average of all available color channels depending on PixelFormat is returned. If the gain is written, the value is written to all color channels defined in PixelFormat. In case of using ColorToGrey the PixelFormat will be Mono but the color channels for reading and writing the gain value will be Red,Green and Blue.	
Error behavior	See the device error code documentation.	

Gain Selector Enum Entries:

Name	Description
All	Selects linear gain of all available color channels.
Red	Selects linear gain red
Green	Selects linear gain green
Blue	Selects linear gain blue
White	Selects linear gain white
Infrared	Selects linear gain infrared
AnalogAll	Selects analog gain of all available color channels.
AnalogRed	Selects analog gain red
AnalogGreen	Selects analog gain green
AnalogBlue	Selects analog gain blue
AnalogWhite	Selects analog gain white
DigitalAll	Selects digital gain of all available color channels.
DigitalRed	Selects digital gain red
DigitalGreen	Selects digital gain green
DigitalBlue	Selects digital gain blue
DigitalWhite	Selects digital gain white

10.2 Gain

Name	Gain[GainSelector]	**Standard**
Description	This is an amplification factor applied to the video signal.	
Interface	Float	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	The value range varies for different camera variants. Therefore, query the value range from the feature parameters (min/max entries) However, for the digital gain the value range is the same for all camera variants. LinearGain = [DigitalMin * AnalogMin, DigitalMax * AnalogMax] AnalogGain = *camera dependent* DigitalGain = [1.0 , 3.999]	
Default value	1.0	
Availability	**ALL**	
Notes	This feature is available for Gain Selector You should create new DSNU reference when changing analog gain.	
Error behavior	See the device error code documentation.	

10.3 Gain Auto

Name	GainAuto[GainSelector]	**Standard**
Description	Sets the automatic gain control (AGC) mode. The exact algorithm used to implement AGC is device-specific.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	See enum entries table below.	
Default value	Off	
Availability	**ALL**	
Notes	This feature is available only if **Gain Selector** is **All or White** (**White** for Mono cameras) The status of automatic gain control is reflected in **GainAutoStatus** feature. When the **GainAuto** feature has changed its value to **Off** after performing the "Once" or "AdjustTargetValueToMaxVideo" calibration, please query **GainAutoStatus** to check whether the automatic gain control was successful.	
Error behavior	See the device error code documentation.	

Gain Auto Enum Entries:

Name	Description
Off	Gain is user-controlled using **Gain**.
Once	Gain is automatically adjusted once by the device. Once it has converged, it automatically returns to the **Off** state.
Continuous	Gain is constantly adjusted by the device.
AdjustTargetValueToMaxVideo	This process adjusts "Target value" for "GainControlRegion" that the resulting maximum video level fits to given "Target value". (see feature "Target value") Therefore, the Target value feature defines the target value for **AdjustTargetValueToMaxVideo** command but at the same time the command will adapt the same Target value feature. The adapted Target value will be the base for further GainAuto commands. Next to adapting the target values this command will perform *GainAuto Once* command implicitly.

	After process has finished it automatically return to **Off** state.

10.4 Gain Auto Status

Name	GainAutoStatus	**Standard**
Description	Returns the state of the automatic gain control	
Interface	Enumeration	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	See enum entries table below.	
Default value	Control off	
Availability	**ALL**	
Notes	-	
Error behavior	-	

Gain Auto Enum Entries:

Name	Description
ControlOff	No automatic gain control in progress.
ControlSuccessful	The automatic gain control was successfully performed.
ControlInProgress	The automatic gain control is in progress.
ControlStopped	Continuous gain control temporarily stopped. Gain stop control enabled; gain stop condition reached!
ReferenceTimeout	No reference data from the gain control region available! Camera might be in triggered mode. Probably there are no trigger pulses.
LowerGainLimit	Warning! The automatic gain control has reached lower gain limit!
UpperGainLimit	Warning! The automatic gain control has reached upper gain limit!
VideoLevelLowerLimit	Warning! Process "**AdjustTargetValueToMaxVideo**", video level too low for target value adjustment
VideoLevelUpperLimit	Warning! Process "AdjustTargetValueToMaxVideo", video level too high for target value adjustment
TargetValueOutOfRange	Warning! Process "AdjustTargetValueToMaxVideo", adjusted target values are out of range

10.5 Synchronization Mode Enable

Name	GainAutoSyncModeEnable	**Custom**
Description	Controls whether the gain control reference values are taken synchronous to frame start or independent of frame start. In case of synchronous mode is activated only one reference per frame will be captured. In case of synchronous mode is inactive the reference values are taken continuously from image data stream.	
Interface	Boolean	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	**True** – Enables synchronization mode **False** – Disables synchronization mode	
Default value	**False**	
Availability	**ALL**	
Notes	-	
Error behavior	See the device error code documentation.	

10.6 Stop Control Enable

Name	GainAutoStopControlEnable	**Custom**
Description	Controls whether the gain auto continuous mode is limited according to the gain stop factor.	
Interface	Boolean	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	**True** – Enables Gain Auto Stop Control **False** – Disables Gain Auto Stop Control	
Default value	**False**	
Availability	**ALL**	
Notes	-	
Error behavior	-	

10.7 Stop Factor

Name	GainAutoStopFactor	**Custom**
Description	The stop factor is used to limit the continuous gain control. The factor is multiplied with the target reference values. The result defines a threshold for the current reference values. Whenever the current reference values are equal or fall below the threshold, the continuous gain control is not performed till the current reference values are again larger than the threshold.	
Interface	Float	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	[0.0 , 1.0]	
Default value	0.8	
Availability	**ALL**	
Notes	-	
Error behavior	See the device error code documentation.	

10.8 Gain Control Region Offset X

Name	GainControlRegionOffsetX	**Custom**
Description	Sets the offset x of the gain control region. (in pixel)	
Interface	Integer	
Access mode	Read/Write	
Adjustable while grabbing	No	
Value range	[2 , (**SensorWidth**- **GainControlRegionWidth**)]	
Default value	(**SensorWidth** / 2) - 48	
Availability	**ALL**	
Notes	The actual offset x of the gain control region may differ from what is set in this feature. This depends especially on the pixel format and region offset x and multi ROI settings. You can enable the Gain Control Region visible feature to check the actual position and size. The following *maximum* deviations are expected:	

Pixel Format	allPIXA evo	allPIXA neo
Mono	11px	5px
RGB	3px	1px
RGBA	2px	1px

Error behavior	See the device error code documentation.

10.9 Gain Control Region Width

Name	GainControlRegionWidth	**Custom**
Description	Sets the width of the gain control region. (in pixels)	
Interface	Integer	
Access mode	Read/Write	
Adjustable while grabbing	No	
Value range	[8 , 240]	
Default value	48	
Availability	**ALL**	
Notes	The actual width of the gain control region may differ from what is set in this feature. This depends especially on the pixel format. You can enable the Gain Control Region visible feature to check the actual position and size. The following *maximum* deviations are expected: **Pixel Format** / **allPIXA evo** / **allPIXA neo** **Mono** / 11px / 5px **RGB** / 3px / 1px **RGBA** / 2px / 1px	
Error behavior	See the device error code documentation.	

10.10 Gain Control Region Offset Y

Name	GainControlRegionOffsetY	**Custom**
Description	Sets the offset y of the gain control region. (in pixels)	
Interface	Integer	
Access mode	Read/Write	
Adjustable while grabbing	No	
Value range	Frame trigger off: [3, **Height** – **GainControlRegionHeight**] Frame trigger on: [3 -**TriggerDelayLines**, 32767]	
Default value	3	
Availability	**ALL**	
Notes	This feature only takes effect if the Synchronization Mode Enable is set true!	
Error behavior	See the device error code documentation.	

10.11 Gain Control Region Height

Name	GainControlRegionHeight	**Custom**
Description	Sets the height of the gain control region. (in pixel)	
Interface	Integer	
Access mode	Read/Write	
Adjustable while grabbing	No	
Value range	[2 , 240]	
Default value	32	
Availability	**ALL**	
Notes	-	
Error behavior	See the device error code documentation.	

10.12 Gain Control Region visible

Name	GainControlRegionVisible	**Custom**
Description	The borders of the gain control region are drawn into the image if enabled.	
Interface	Boolean	

Access mode	Read/Write
Adjustable while grabbing	Yes
Value range	**True** – Displays the borders of the gain control region **False** – Does not display the borders of the gain control region
Default value	**False**
Availability	**ALL**
Notes	The color of the borders is usually blue. For the case that the device is in triggered mode and the incoming line trigger speed is too high, the color of the blue frame will be red.
Error behavior	-

10.13 Average Samples

Name	GainAutoAverageSamples	**Custom**
Description	The number of reference samples which are averaged before doing a gain control step.	
Interface	Integer	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	[1 , 32]	
Default value	4	
Availability	**ALL**	
Notes	-	
Error behavior	See the device error code documentation.	

10.14 Gain Control Region Channel Selector

Name	GainControlRegionChannelSelector	**Custom**
Description	Selects the color channel to define the target intensity value or to read the current intensity value of the gain control region.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	See enum entries table below.	
Default value	Red	
Availability	**ALL**	
Notes	-	
Error behavior	See the device error code documentation.	

Gain Control Region Channel Selector Enum Entries:

Name	Description
All	Selects all available channels for the actual PixelFormat to set the target value to same number. Reading the target value will return the average of all available channels for the current PixelFormat. Reading the current value will return the average of all available channels for the current PixelFormat.
Red	Selects red channel to define the target intensity value or to read the current intensity value of the gain control region.
Green	Selects green channel to define the target intensity value or to read the current intensity value of the gain control region.
Blue	Selects blue channel to define the target intensity value or to read the current intensity value of the gain control region.
White	Selects white channel to define the target intensity value or to read the current intensity value of the gain control region.
Infrared	Selects InfraRed channel to define the target intensity value or to read the current

	intensity value of the gain control region.

10.15 Target value

Name	GainControlRegionTargetValue[GainControlRegionChannelSelector]	**Custom**
Description	The target luminance intensity value of the selected channel in the gain control region. The bit depth of the value is 10-bit.	
Interface	Integer	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	[0 , 1023]	
Default value	700	
Availability	**ALL**	
Notes	Gain Auto "***Once***" or "***Continuous***": Internal Gain Control adjusts gain values until current value of GainControlRegion have reached target values. Gain Auto "***AdjustTargetValueToMaxVideo***": Target value determines the maximum video level which the raw image (without PRNU correction) should reach when doing gain adjustment with GainAuto (Once or Continuous). For that the camera adapts the Target value, until that criterion is fulfilled.	
Error behavior	See the device error code documentation.	

10.16 Current value

Name	GainControlRegionCurrentValue[GainControlRegionChannelSelector]	**Custom**
Description	The current luminance intensity value of the selected channel in the gain control region. The bit depth of the value is 10-bit.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	-	
Default value	-	
Availability	**ALL**	
Notes	-	
Error behavior	-	

10.17 Sensor Sensitivity Channel Selector

Name	SensorSensitivityChannelSelector	**Custom**
Description	Selects the color to be controlled for the sensor sensitivity.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	See enum entries table below.	
Default value	Red	
Availability	**ALL**	
Notes	-	
Error behavior	See the device error code documentation.	

Sensor Sensitivity Channel Selector Enum Entries:

Name	Availability	Description
All	ALL	Selects all color channels to control sensor sensitivity. If the sensor sensitivity is modified, the specified value is applied to all color channels. If you read the sensor sensitivity, the lastly set value is returned in this case. After a boot-up, 0 is returned.
White	ax_X	Selects white channel to control sensor sensitivity.
Red	ax_X	Selects red channel to control sensor sensitivity.
Green	ax_X	Selects green channel to control sensor sensitivity.
Blue	ax_X	Selects blue channel to control sensor sensitivity.

10.18 Sensor Sensitivity

Name	SensorSensitivity[SensorSensitivityChannelSelector]		**Custom**
Description	Controls the sensor sensitivity of the specified selector.		
Interface	Integer		
Access mode	Read/Write		
Adjustable while grabbing	Yes		
Value range	**Variant**	**Min Value**	**Max Value**
	ax_X	0	2
	g8_X	0	7
	px	0	1
	p16	1	1
Default value	**Variant**	**Default Value**	
	ax_X	2	
	g8_X	4	
	px	1	
Availability	**ALL**		
Notes	You should create new DSNU/PRNU reference when changing this parameter. g8_X: *At sensitivity value 0 the FullWell of the pixels can be exhausted and the maximum SNR of the sensor can be reached, but an analog signal limitation can be expected at ~168dn@8bit. This can be brought back to the full digital range of 0...255 by the PRNU or DigGain.*		
Error behavior	See the device error code documentation.		

10.19 Gamma

Name	Gamma	**Standard**
Description	Controls the gamma correction of pixel intensity. This is typically used to compensate for non-linearity of the display system (such as CRT).	
Interface	Float	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	[0.1 – 2.5]	
Default value	1.0	
Availability	**ALL**	
Notes	The gamma values 0.2 – 2.5 behave corresponding to the standard gamma definition. **The gamma value 0.1 enables a special sRGB gamma table.**	
Error behavior	See the device error code documentation.	

10.20 Brightness Contrast Enable

Name	BrightnessContrastEnable	**Custom**
Description	Enable brightness and contrast image processing unit.	
Interface	Boolean	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	True – Enables brightness and contrast image processing unit. False – Disables brightness and contrast image processing unit.	
Default value	False	
Availability	**ALL**	
Notes	-	
Error behavior	See the device error code documentation.	

10.21 Brightness Contrast Channel Selector

Name	BrightnessContrastChannelSelector	**Custom**
Description	Selects the color channel to control the brightness and contrast.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	See enum entries table below.	
Default value	Red	
Availability	**ALL**	
Notes	-	
Error behavior	See the device error code documentation.	

Brightness Contrast Channel Selector Enum Entries:

Name	Description
Red	**Brightness** or **Contrast** will be applicable to the red channel.
Green	**Brightness** or **Contrast** will be applicable to the green channel.
Blue	**Brightness** or **Contrast** will be applicable to the blue channel.
White	**Brightness** or **Contrast** will be applicable to the white channel.
Infrared	**Brightness** or **Contrast** will be applicable to the infrared channel.

10.22Contrast

Name	BrightnessContrastGain[BrightnessContrastChannelSelector]	**Custom**
Description	Controls the contrast (gain) value for the selected color channel.	
Interface	Float	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	[0.0 , 1.999]	
Default value	1.0	
Availability	**ALL**	
Notes	-	
Error behavior	See the device error code documentation.	

10.23Brightness

Name	BrightnessContrastOffset[BrightnessContrastChannelSelector]	**Custom**
Description	Controls the brightness (offset) value for the selected color channel.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	[-0.25 , 0.25]	
Default value	0.0	
Availability	**ALL**	
Notes	The resulting brightness (offset) is defined by the features value multiplied with the maximum value of a pixel defined by the pixel formats bit-depth. Example: The maximum value of a pixel using the pixel format RGB8 (bit-depth 8-bit) is 255. Brightness value of 0.1 would increase the output pixel value by: Offset= 0.1x 255 = 25dn's	
Error behavior	See the device error code documentation.	

11 Image Calibration Control

11.1 Image Calibration Mode - Deprecated

Name	ImageCalibrationMode	**Custom**
Description	Sets internal camera parameter for calibration DSNU or PRNU or even directly perform internal calibration . This feature is deprecated use: - **FlatFieldCorrectionStartCalibration** - **Flat Field Correction Calibration Mode**	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	No	
Value range	See enum entries table below.	
Default value	Off	
Availability	**ALL**	
Notes	**Mode = ImageCalibrationModeDSNU / ImageCalibrationModePRNU:** Features are set internally, so that raw, un-scaled and un-transformed image data is generated. With that image data DRNU or PRNU references can be generated. If an affected feature is read, the modified value is returned. While **ImageCalibrationMode** is active, the internally changed features cannot be modified. When **ImageCalibrationMode** is set to **Off**, features are restored to their previous values. The following features are read-only when ImageCalibrationMode is enabled: - ColorTransformationSelector - ColorTransformationEnable - BrightnessContrastEnable - DarkSignalNonUniformityReferenceOutput - PhotoResponseNonUniformityReferenceOutput - DecimationHorizontalFloat - BinningHorizontal - ReverseX - LutEnable - GainControlRegionVisible - UserSetLoad The Image Calibration Mode for DSNU-creation will additionally disable digital gain. This is not reflected by the features. **Mode = CalibrateDSNUInternal / CalibratePRNUInternal**: Internal DSNU or PRNU calibration is done. All internal parameters are adapted automatically. Calibration data is written to LUT selected by Dark Signal Non-Uniformity (DSNU) Selector or Photo Response Non-Uniformity (PRNU) Selector. **CalibrateDSNUInternal** or **CalibratePRNUInternal** can directly be started from Mode=Off. **ImageCalibrationModeDSNU** or **ImageCalibrationModePRNU** is not required to be set before. After calibration has finished ImageCalibrationMode returns to previous state. The **ImageCalibrationMode** feature should be polled to check the status of reference generation. Once the feature value changes from **Calibrate<DSNU|PRNU>Internal** to the previous state e.g., **Off** the process has finished. To cancel	

	the current process set the value to **Off**.
Error behavior	See the device error code documentation.

Image Calibration Mode Enum Entries:

Name	Description
Off	
ImageCalibrationModeDSNU	Image from camera is prepared for DSNU calibration. Former *CalibrateDarkSignalNonUniformity*
ImageCalibrationModePRNU	Image from camera is prepared for PRNU calibration Former *CalibratePhotoResponseNonUniformity*
CalibrateDSNUInternal	Camera performs internal DSNU calibration (**This feature is deprecated, use FlatFieldCorrectionStartCalibration. It will be removed in a future package.)**
CalibratePRNUInternal	Camera performs internal PRNU calibration (**This feature is deprecated, use FlatFieldCorrectionStartCalibration. It will be removed in a future package.)**

11.2 Dark Signal Non-Uniformity (DSNU) Selector - Deprecated

Name	DarkSignalNonUniformitySelector	**Custom**
Description	Selects a DSNU LUT.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	See enum entries table below.	
Default value	**LUT1**	
Availability	**ALL**	
Notes	**This feature is deprecated, use FlatFieldCorrectionSelector** **It will be removed in a future package.**	
Error behavior	See the device error code documentation.	

Dark Signal Non-Uniformity (DSNU) Selector Enum Entries:

Name	Description
LUT1	Look-Up-Table 1
LUT2	Look-Up-Table 2

11.3 DSNU Dataset Information - Deprecated

Name	DarkSignalNonUniformityDataSetInformation [DarkSignalNonUniformitySelector]	**Custom**
Description	Gives information of the selected DSNU LUT state.	
Interface	Enumeration	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	See enum entries table below.	
Default value	-	
Availability	**ALL**	
Notes	**This feature is deprecated.** **It will be removed in a future package.**	
Error behavior	-	

Dark Signal Non-Uniformity (DSNU) Selector Enum Entries:

Name	Description
InactiveUnconfigured	The selected DSNU correction dataset is not used in the image processing pipeline of the camera and does not contain valid DSNU correction values.
InactiveConfigured	The selected DSNU correction dataset is not used in the image processing pipeline of the camera but contains valid DSNU correction values.
ActiveConfigured	The selected DSNU correction dataset is used in the image processing pipeline of the camera and contains valid DSNU correction values.

11.4 DSNU Available Planes - Deprecated

Name	DarkSignalNonUniformityAvailablePlains	**Custom**
Description	Indicates which color planes are available.	
Interface	Enumeration	
Access mode	Read Write	
Adjustable while grabbing	Yes	
Value range	See enum entries table below.	
Default value	Red	
Availability	**ALL**	
Notes	**This feature is deprecated, use FlatFieldCorrectionAvailablePlanes** **It will be removed in a future package.**	
Error behavior	See the device error code documentation.	

DSNU Available Planes Enum Entries:

Name	Description
Red	Selects red channel to read the first and last valid pixel values.
Green	Selects green channel to read the first and last valid pixel values.
Blue	Selects blue channel to read the first and last valid pixel values.
White	Selects white channel to read the first and last valid pixel values.
Infrared	Selects Infrared channel to read the first and last valid pixel values.

11.5 First Valid Pixel - Deprecated

Name	DarkSignalNonUniformityFirstPixelReg [DarkSignalNonUniformityAvailablePlains]	**Custom**
Description	Indicates first valid pixel.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	≥0	
Default value	-	
Availability	**ALL**	
Notes	**This feature is deprecated, use FlatFieldCorrectionFirstPixel** **It will be removed in a future package.**	
Error behavior	-	

11.6 Last Valid Pixel - Deprecated

Name	DarkSignalNonUniformityLastPixelReg [DarkSignalNonUniformityAvailablePlains]	**Custom**
Description	Indicates last valid pixel.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	≥0	
Default value	**This feature is deprecated, use FlatFieldCorrectionLastPixel** **It will be removed in a future package.**	
Availability	**ALL**	
Notes	-	
Error behavior	-	

11.7 DSNU Display Reference Values - Deprecated

Name	DarkSignalNonUniformityReferenceOutput	**Custom**
Description	Displays the DSNU reference as a static output video.	
Interface	Boolean	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	**True** – Displays the DSNU reference values **False** – Does not display the DSNU reference values	
Default value	**False**	
Availability	**ALL**	
Notes	**This feature is deprecated, use FlatFieldCorrectionDisplayReference** **It will be removed in a future package.** This feature is available only if DSNU LUT is active and configured. This parameter is not stored in user set.	
Error behavior	See the device error code documentation.	

11.8 Photo Response Non-Uniformity (PRNU) Selector - Deprecated

Name	PhotoResponseNonUniformitySelector	**Custom**
Description	Selects a PRNU LUT.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	See enum entries table below.	
Default value	**LUT1**	
Availability	**ALL**	
Notes	**This feature is deprecated, use FlatFieldCorrectionSelector** **It will be removed in a future package.**	
Error behavior	See the device error code documentation.	

Photo Response Non-Uniformity (PRNU) Selector Enum Entries:

Name	Description
LUT1	Look-Up-Table 1
LUT2	Look-Up-Table 2

11.9 PRNU Dataset Information - Deprecated

Name	PhotoResponseNonUniformityDataSetInformation [PhotoResponseNonUniformitySelector]	**Custom**
Description	Gives information of the selected PRNU LUT state.	
Interface	Enumeration	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	See enum entries table below.	
Default value	-	
Availability	**ALL**	
Notes	**This feature is deprecated.** **It will be removed in a future package.**	
Error behavior	-	

Photo Response Non-Uniformity (DSNU) Selector Enum Entries:

Name	Description
InactiveUnconfigured	The selected PRNU correction dataset is not used in the image processing pipeline of the camera and does not contain valid PRNU correction values.
InactiveConfigured	The selected PRNU correction dataset is not used in the image processing pipeline of the camera but contains valid PRNU correction values.
ActiveConfigured	The selected PRNU correction dataset is used in the image processing pipeline of the camera and contains valid PRNU correction values.

11.10PRNU Available Planes - Deprecated

Name	PhotoResponseNonUniformityAvailablePlains	**Custom**
Description	Indicates first valid pixel.	
Interface	Enumeration	
Access mode	Read only	
Adjustable while grabbing	-	
Value range		
Default value	Red	
Availability	**ALL**	
Notes	**This feature is deprecated, use FlatFieldCorrectionAvailablePlanes** **It will be removed in a future package.**	
Error behavior	See the device error code documentation.	

PRNU Available Planes Enum Entries:

Name	Description
Red	Selects red channel to read the first and last valid pixel values.
Green	Selects green channel to read the first and last valid pixel values.
Blue	Selects blue channel to read the first and last valid pixel values.
White	Selects red channel to read the first and last valid pixel values.
Infrared	Selects Infrared channel to read the first and last valid pixel values.

11.11First Valid Pixel - Deprecated

Name	PhotoResponseNonUniformityFirstPixelReg [PhotoResponseNonUniformityAvailablePlains]	**Custom**
Description	Indicates first valid pixel.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	≥0	
Default value	-	
Availability	**ALL**	
Notes	**This feature is deprecated, use FlatFieldCorrectionFirstPixel** **It will be removed in a future package.**	
Error behavior	-	

11.12Last Valid Pixel - Deprecated

Name	PhotoResponseNonUniformityLastPixelReg [PhotoResponseNonUniformityAvailablePlains]	**Custom**
Description	Indicates last valid pixel.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	≥0	

Default value	-
Availability	ALL
Notes	**This feature is deprecated, use FlatFieldCorrectionLastPixel** **It will be removed in a future package.**
Error behavior	-

11.13PRNU Display Reference Values - Deprecated

Name	PhotoResponseNonUniformityReferenceOutput	**Custom**
Description	Displays the PRNU reference as a static output video.	
Interface	Boolean	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	**True** – Display the PRNU reference values **False** – Do not display the PRNU reference values	
Default value	**False**	
Availability	ALL	
Notes	**This feature is deprecated, use FlatFieldCorrectionDisplayReference** **It will be removed in a future package.** This feature is valid and available only if PRNU LUT is active and configured. This parameter is not stored in user set.	
Error behavior	See the device error code documentation.	

11.14Flat Field Correction Calibration Mode

Name	FlatFieldCorrectionCalibrationMode	**Custom**
Description	Sets camera into mode for calibration of DSNU or PRNU..	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	No	
Value range	See enum entries table below.	
Default value	Off	
Availability	ALL	
Notes	**Mode = DSNU / PRNU:** Features are temporarily configured, so that that image data to create a DRNU or PRNU references can be captured. If an affected feature is read, the modified value is returned. While **FlatFieldCorrectionCalibrationMode** is active, the temporarily changed features cannot be modified. When **FlatFieldCorrectionCalibrationMode** is set to **Off**, features are **restored** to their previous values. The following features are read-only when FlatFieldCorrectionCalibrationMode is enabled: - ColorTransformationSelector - ColorTransformationEnable - BrightnessContrastEnable - DarkSignalNonUniformityReferenceOutput - PhotoResponseNonUniformityReferenceOutput - DecimationHorizontalFloat - BinningHorizontal - ReverseX - LutEnable - GainControlRegionVisible - UserSetLoad	

	The Flat Field Correction Calibration Mode for DSNU-creation will additionally disable digital gain. This is not reflected by the features.
Error behavior	See the device error code documentation.

Flat Field Correction Calibration Mode Enum Entries:

Name	Description
Off	
DSNU	Image from camera is prepared for DSNU calibration. Former *ImageCalibrationModeDSNU*
PRNU	Image from camera is prepared for PRNU calibration Former *ImageCalibrationModePRNUy*

11.15 Flat Field Correction Selector

Name	FlatFieldCorrectionSelector	**Custom**
Description	Specifies the flat field correction type DSNU or PRNU data set.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	No	
Value range	See enum entries table below.	
Default value	DSNU DataSet 1	
Availability	**ALL**	
Notes		
Error behavior	See the device error code documentation.	

Flat Field Correction Selector Enum Entries:

Name	Description
DSNUDataSet1	Selects the DSNU DataSet1
DSNUDataSet2	Selects the DSNU DataSet 2
PRNUDataSet1	Selects the PRNU DataSet 1
PRNUDataSet2	Selects the PRNU DataSet 2

11.16 Enable

Name	FlatFieldCorrectionEnable[FlatFieldCorrectionSelector]	**Custom**
Description	Enable/Disable the selected DataSet.	
Interface	Boolean	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	**True** – Activates the selected DataSet **False** – Deactivates the selected DataSet	
Default value	**False**	
Availability	**ALL**	
Notes	For some camera variants Dual PRNU is supported for LED-Flashing. This means two PRNU Data Sets can be enabled and used for two pattern LED-Flash control. The PRNU1 Data set will be used for Pattern1 and the PRNU2 Data Set for Pattern two.	
Error behavior	See the device error code documentation.	

11.17 DataSet Description

Name	FlatFieldCorrectionDataSetDescription[FlatFieldCorrectionSelector]	**Custom**
Description	Leave the description to describe the chosen flat field correction selector.	
Interface	String	
String length	32	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	-	
Default value	-	
Availability	**ALL**	
Notes	-	
Error behavior	-	

11.18 Available Planes

Name	FlatFieldCorrectionAvailablePlanes [FlatFieldCorrectionSelector]	**Custom**
Description	Indicates which color planes are available.	
Interface	Enumeration	
Access mode	Read Write	
Adjustable while grabbing	Yes	
Value range	See enum entries table below.	
Default value	Red	
Availability	**ALL**	
Notes	-	
Error behavior	See the device error code documentation.	

Flat Field Correction Available Planes Enum Entries:

Name	Description
Red	Selects red channel to read the first and last valid pixel values.
Green	Selects green channel to read the first and last valid pixel values.
Blue	Selects blue channel to read the first and last valid pixel values.
White	Selects white channel to read the first and last valid pixel values.
Infrared	Selects Infrared channel to read the first and last valid pixel values.

11.19 First Valid Pixel

Name	FlatFieldCorrectionFirstPixel [FlatFieldCorrectionSelector] [FFCAvailablePlains]	**Custom**
Description	Indicates first valid pixel.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	≥0	
Default value	-	
Availability	**ALL**	
Notes	-	
Error behavior	-	

11.20 Last Valid Pixel

Name	FlatFieldCorrectionLastPixel [FlatFieldCorrectionSelector] [FFCAvailablePlains]	**Custom**
Description	Indicates last valid pixel.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	≥0	
Default value	-	
Availability	**ALL**	
Notes	-	
Error behavior	-	

11.21 Display Reference

Name	FlatFieldCorrectionDisplayReference[FlatFieldCorrectionSelector]	**Custom**
Description	Displays the selected flat field correction reference as a static output video.	
Interface	Boolean	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	**True** – Displays the selected flat field correction selector reference values **False** – Does not display the selected flat field correction selector reference values	
Default value	**False**	
Availability	**ALL**	
Notes	This feature is available only if the selected data set is active and configured. This parameter is not stored in user set.	
Error behavior	See the device error code documentation.	

11.22 Start Calibration

Name	FlatFieldCorrectionStartCalibration[FlatFieldCorrectionSelector]	Custom
Description	Camera performs internal calibration for the selected flat field correction.	
Interface	Command	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	1 When command is executed, 0 is returned	
Default value	1	
Availability	**ALL**	
Notes	When command is executed, Internal selected flat field correction calibration is done. All internal parameters are adapted automatically. Calibration data is written to the selected FlatFieldCorrectionSelector. **The FlatFieldCorrectionCalibrationMode feature should be set to Off.**	
Error behavior	See the device error code documentation.	

11.23 Stop Calibration

Name	FlatFieldCorrectionStopCalibration[FlatFieldCorrectionSelector]	Custom
Description	Camera stops performing internal calibration for the selected flat field correction.	
Interface	Command	
Access mode	Read/Write	

Adjustable while grabbing	Yes
Value range	1 When command is executed, 0 is returned
Default value	1
Availability	**ALL**
Notes	
Error behavior	See the device error code documentation.

11.24 Calibration Status

Name	FlatFieldCorrectionCalibrationStatus[FlatFieldCorrectionSelector]	**Custom**
Description	Displayes the calibration status.	
Interface	Enumeration	
Access mode	Read Only	
Adjustable while grabbing	No	
Value range	See enum entries table below.	
Default value	Off	
Availability	**ALL**	
Notes	-	
Error behavior	See the device error code documentation.	

Calibration Status Enum Entries:

Name	Description
Off	No Calibration is performed
Success	Internal flat field correction calibration success
DSNUWarning	Enable DSNU to perform internal flat field correction calibration (PRNU)
Error	Internal flat field correction calibration error
CalibrationInProgress	Internal flat field correction calibration in progress

11.25 Line Distance

Name	ImageCalibrationLineDistance		**Custom**
Description	This feature is used to compensate the line distance of the sensors color channels.		
Interface	Float		
Access mode	Read/Write		
Adjustable while grabbing	Yes		
Value range	**Package**	**Min Value**	**Max Value**
	Up to 2.3.0	0.0	3.0
	2.4.0 and above	0.0	3.0 – For 4 channel pixel format 6.0 – For 3 or 1 channel pixel format
Default value	2.0		
Availability	**ALL**		
Notes	-		
Error behavior	See the device error code documentation.		

11.26 Scan Direction Source

Name	ScanDirectionSource	**Custom**
Description	Selects the scan direction source.	
Interface	Enumeration	
Access mode	Read Write	
Adjustable while grabbing	Yes	

Value range	See enum entries table below.
Default value	**Internal**
Availability	**ALL**
Notes	This feature is not available if MasterSlaveMode is configured as Slave.
Error behavior	See the device error code documentation.

Scan Direction Source Enum Entries:

Name	Description
Internal	Specifies internal scanning direction source
Line3	Specifies scanning direction source by the level of Line3
Encoder0	Specifies scanning direction source by Encoder0 *Currently only for EncoderSourceB=Line2*

11.27 Scan Direction

Name	ImageCalibrationScanDirection[ScanDirectionSource]	**Custom**
Description	Controls scan direction processing.	
Interface	Enumeration	
Access mode	Read Write	
Adjustable while grabbing	Yes	
Value range	See enum entries table below.	
Default value	**Forward**	
Availability	**ALL**	
Notes	This feature is not available if MasterSlaveMode is configured as Slave. This feature is writable only if ScanDirectionSource is Internal otherwise Read only.	
Error behavior	See the device error code documentation.	

Scan Direction Enum Entries:

Name	Description
Forward	Specifies forward scanning direction of the camera (RGB).
Backward	Specifies backward scanning direction of the camera (BGR).

11.28 Image Center Offset – Not Available for AllPIXA-EVO

Name	ImageCenterOffset	**Custom**
Description	Displays the pixel offset between sensor center and scan target center.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	≥-15000	
Default value	-	
Notes	-	
Error behavior	-	

12 Color Transformation Control

12.1 Color Transformation Selector

Name	ColorTransformationSelector	**Standard**
Description	Selects which Color Transformation module is controlled by the various color transformation features.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	See enum entries table below.	
Default value	**ColortoColor**	
Availability	**ALL** *(Not available for mono cameras)*	
Notes	The transformations are defined as follows: **Color to Color** $$\begin{pmatrix} R_{out} \\ G_{out} \\ B_{out} \\ A_{out} \end{pmatrix} = \begin{pmatrix} Gain_{00} & Gain_{01} & Gain_{02} & Gain_{03} \\ Gain_{10} & Gain_{11} & Gain_{12} & Gain_{13} \\ Gain_{20} & Gain_{21} & Gain_{22} & Gain_{23} \\ Gain_{30} & Gain_{31} & Gain_{32} & Gain_{33} \end{pmatrix} \begin{pmatrix} R_{¿} \\ G_{¿} \\ B_{¿} \\ A_{¿} \end{pmatrix} + \begin{pmatrix} Offset_0 \\ Offset_1 \\ Offset_2 \\ Offset_3 \end{pmatrix}$$ In case of RGB pixel format the fourth entry A has no meaning. A could contain Ir color component for some camera variants. **RGBtoMono/RGBAtoMono** $$M_{out} = \begin{pmatrix} Gain_0 & Gain_1 & Gain_2 & Gain_3 \end{pmatrix} \begin{pmatrix} R_{¿} \\ G_{¿} \\ B_{¿} \\ A_{¿} \end{pmatrix}$$ Use Color Transformation Value Selector and Color Transformation Value to set the coefficients.	
Error behavior	See the device error code documentation.	

Color Transformation Selector Enum Entries:

Name	Description
ColortoColor	Color to color
ColortoGrey	Color to grey corresponds to RGBtoMono (Deprecated use RGBtoMono)
RGBtoMono	RGB to Mono
RGBAtoMono	RGBA to Mono
RGBtosRGB	RGB to sRGB

12.2 Color Transformation Enable

Name	ColorTransformationEnable[ColorTransformationSelector]	**Standard**
Description	Activates the selected Color Transformation module.	
Interface	Boolean	
Access mode	Read/Write	
Adjustable while grabbing	No	
Value range	**True** – Enables the selected color transformation module **False** – Disables the selected color transformation module	
Default value	False	
Availability	**ALL** *(Not available for mono cameras)*	
Notes	If the **RGBtoMono/RGBAtoMono/ColortoGrey** module is disabled, the pixel format internally is changed to either RGB8 or RGBa8 depending on the previously used color transformation.	
Error behavior	See the device error code documentation.	

12.3 Color Transformation Value Selector

Name	ColorTransformationValueSelector	**Standard**
Description	Selects the Gain factor or Offset of the transformation matrix to access in the selected color transformation module.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	See enum entries table below.	
Default value	**Gain00** – For **ColortoColor** module **Gain0** – For **RGBtoMono/ RGBAtoMono** module	
Availability	**ALL** *(Not available for mono cameras)*	
Notes	-	
Error behavior	See the device error code documentation.	

Color Transformation Value Selector Enum Entries:

Color to Color

Name	Description
Gain00	Gain 0, 0 of the transformation matrix.
Gain01	Gain 0, 1 of the transformation matrix.
Gain02	Gain 0, 2 of the transformation matrix.
Gain03	Gain 0, 3 of the transformation matrix.
Gain10	Gain 1, 0 of the transformation matrix.
Gain11	Gain 1, 1 of the transformation matrix.
Gain12	Gain 1, 2 of the transformation matrix.
Gain13	Gain 1, 3 of the transformation matrix.
Gain20	Gain 2, 0 of the transformation matrix.
Gain21	Gain 2, 1 of the transformation matrix.
Gain22	Gain 2, 2 of the transformation matrix.
Gain23	Gain 2, 3 of the transformation matrix.
Gain30	Gain 3, 0 of the transformation matrix.
Gain31	Gain 3, 1 of the transformation matrix.
Gain32	Gain 3, 2 of the transformation matrix.
Gain33	Gain 3, 3 of the transformation matrix.
Offset0	Offset 0 of the transformation matrix.
Offset1	Offset 1 of the transformation matrix.
Offset2	Offset 2 of the transformation matrix.
Offset3	Offset 3 of the transformation matrix.

Color to Grey

Name	Description
Gain0	Gain 1, 0 of the transformation matrix**.**

Gain1	Gain 1, 1 of the transformation matrix
Gain2	Gain 1, 2 of the transformation matrix
Gain3	Gain 1, 2 of the transformation matrix.

12.4 Color Transformation Value

Name	ColorTransformationValue[ColorTransformationValueSelector]	**Standard**
Description	Represents the value of the selected Gain factor or Offset inside the transformation matrix.	
Interface	Float	
Access mode	Read/Write	
Adjustable while grabbing	No	
Value range	[-2.0 , 2.0] – For Gain selector [-0.5, 0.5] – For Offset selector	
Default value	-	
Availability	**ALL** *(Not available for mono cameras)*	
Notes	-	
Error behavior	See the device error code documentation.	

13 LUT Control

13.1 LUT Selector

Name	LUTSelector	**Standard**
Description	Selects which LUT to control.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	See the enum entries table below.	
Default value	**Gamma**	
Availability	**ALL**	
Notes	-	
Error behavior	See the device error code documentation.	

LUT Selector Enum Entries:

Name	Description
Gamma	Selects the Gamma LUT (Removed from version 14.0.0)
DarkSignalNonUniformityLUT1	Selects the DSNU LUT 1(**This feature is deprecated, use FlatFieldCorrectionSelector. It will be removed in a future package.)**
DarkSignalNonUniformityLUT2	Selects the DSNU LUT2(**This feature is deprecated, use FlatFieldCorrectionSelector. It will be removed in a future package.)**
PhotoResponseNonUniformityLUT 1	Selects the PRNU LUT1(**This feature is deprecated, use FlatFieldCorrectionSelector. It will be removed in a future package.)**
PhotoResponseNonUniformityLUT 2	Selects the PRNU LUT2(**This feature is deprecated, use FlatFieldCorrectionSelector. It will be removed in a future package.)**

13.2 LUT Enable

Name	LUTEnable[LUTSelector]	**Standard**
Description	Activates/Deactivates the selected LUT.	
Interface	Boolean	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	**True** – Activates the selected LUT **False** – Deactivates the selected LUT	
Default value	**False**	
Availability	**ALL**	
Notes	**This feature is deprecated, use FlatFieldCorrectionEnable.** **It will be removed in a future package.**	
Error behavior	See the device error code documentation.	

13.3 LUT Dataset Name - Deprecated

Name	LUTDatasetNameReg[LUTSelector]	**Custom**
Description	Leave a comment here to describe the chosen LUT.	
Interface	String	
String length	32	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	-	
Default value	-	
Availability	**ALL**	
Notes	**This feature is deprecated, use** FlatFieldCorrectionDataSetDescription**.** **It will be removed in a future package.** This feature is not available for **Gamma**.	
Error behavior	-	

14 User Set Control

14.1 Loaded User Set

Name	LoadedUserSet	**Custom**
Description	Specifies the last loaded user set.	
Interface	String	
String length	32	
Access mode	Read Only	
Adjustable while grabbing	Yes	
Value range	-	
Default value	**Default**	
Availability	**ALL**	
Notes	**-**	
Error behavior	See the device error code documentation.	

14.2 User Set Selector

Name	UserSetSelector	**Standard**
Description	Selects the feature User Set to load, save or configure.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	See enum entries table below.	
Default value	**UserSet1**	
Availability	**ALL**	
Notes	-	
Error behavior	See the device error code documentation.	

User Set Selector Enum Entries:

Name	Description
UserSet1	Selects the UserSet 1
UserSet2	Selects the UserSet 2
UserSet3	Selects the UserSet 3
UserSet4	Selects the UserSet 4
UserSet5	Selects the UserSet 5
UserSet6	Selects the UserSet 6
UserSet7	Selects the UserSet 7
UserSet8	Selects the UserSet 8
Default	Selects the Default

14.3 User Set Load

Name	UserSetLoad[UserSetSelector]	**Standard**
Description	Loads the User Set specified by **UserSetSelector** to the device and activates it.	
Interface	Command	
Access mode	Read/Write	
Adjustable while grabbing	No	
Value range	1	
Default value	1	
Availability	**ALL**	
Notes	-	
Error behavior	See the device error code documentation.	

14.4 User Set Save

Name	UserSetSave[UserSetSelector]	**Standard**
Description	Save the current user settings to the selected user set in the non-volatile memory of the device.	
Interface	Command	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	1	
Default value	1	
Availability	**ALL**	
Notes	**Default** is Read only.	
Error behavior	See the device error code documentation.	

14.5 User Set Comment

Name	UserSetComment[UserSetSelector]	**Custom**
Description	Leave a comment here to describe the chosen setting.	
Interface	String	
String length	32	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	-	
Default value	**Default**	
Availability	**ALL**	
Notes	**Default** user set is Read only. When executing User Set Save the comment of the active user set is stored to flash.	
Error behavior	See the device error code documentation.	

15 Transport Layer Control

15.1 TLParamsLocked

Name	TLParamsLocked	**Standard**
Description	This feature is used to lock critical features from changing during acquisition.	
Interface	Integer	
Access mode	Read/Write	
Adjustable while grabbing	No	
Value range	[0, 1] 0 – No features are locked 1 – Critical features are locked and cannot be changed	
Default value	0	
Availability	**ALL**	
Notes	-	
Error behavior	See the device error code documentation.	

15.2 Payload Size

Name	PayloadSize	**Standard**
Description	Provides the number of bytes transferred for each image or chunk on the stream channel.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	≥0	
Default value	-	
Availability	**ALL**	
Notes	-	
Error behavior	-	

15.3 Device Tap Geometry

Name	DeviceTapGeometry	**Standard**
Description	This describes the geometrical properties characterizing the taps of a camera as presented at the output of the device.	
Interface	Enumeration	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	See enum entries below.	
Default value	-	
Availability	**ALL**	
Notes	-	
Error behavior	-	

Device Tap Geometry Enum Entries:

Name	Description
Geometry_1X_1Y	1X 1Y tap geometry

15.4 GigE Vision

15.4.1 Gev Version Major - Deprecated

Name	GevVersionMajor	**Standard**
Description	Major version of the specification.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	>0	
Default value	-	
Notes	This feature is deprecated (See DeviceTLVersionMajor).	
Error behavior	-	

15.4.2 Gev Version Minor - Deprecated

Name	GevVersionMinor	**Standard**
Description	Minor version of the specification.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	≥0	
Default value	-	
Notes	This feature is deprecated (See DeviceTLVersionMinor).	
Error behavior	-	

15.4.3 Gev Device Mode Is Big Endian - Deprecated

Name	GevDeviceModeIsBigEndian	**Standard**
Description	Endianess of the device registers.	
Interface	Boolean	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	**True** – Represents the endianness of the device registers **False** – Does not represents the Endianness of the device registers	
Default value	-	
Notes	This feature is deprecated (See DeviceRegistersEndianness).	
Error behavior	-	

15.4.4 Gev Device Mode Character Set - Deprecated

Name	GevDeviceModeCharacterSet	**Standard**
Description	Character set used by all the strings of the bootstrap registers.	
Interface	Enumeration	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	See enum entries table below.	
Default value	UTF8	
Notes	This feature is deprecated (See DeviceCharacterSet).	
Error behavior	-	

Gev Device Mode Character Set Enum Entries:

Name	Description
UTF8	UTF 8

15.4.5 Gev Interface Selector

Name	GevInterfaceSelector	**Standard**
Description	Selects which physical network interface to control.	
Interface	Integer	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	0	
Default value	0	
Availability	**X_dxge**, **ax_dsxge**	
Notes	-	
Error behavior	-	

15.4.6 Gev MACAddress

Name	GevMACAddress[GevInterfaceSelector]	**Standard**
Description	MAC address of the network interface.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	≥0	
Default value	-	
Availability	**X_dxge**, **ax_dsxge**	
Notes	-	
Error behavior	-	

15.4.7 Gev Supported Option Selector

Name	GevSupportedOptionSelector	**Standard**
Description	Selects the GEV option to interrogate for existing support.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	See enum entries table below.	
Default value	-	
Availability	**X_dxge**, **ax_dsxge**	
Notes	-	
Error behavior	-	

Gev Supported Option Selector Enum Entries:

Name	Description
UserDefinedName	Indicates if the Userdefined name register is supported.
SerialNumber	Indicates if the Serial number register is supported.
HeartbeatDisable	Indicates if the Heartbeat can be disabled.
LinkSpeed	Indicates if the Link Speed registers are supported.
CCPApplicationSocket	Indicates if the CCP Application Port and IP address registers are supported.
ManifestTable	Indicates if the Manifest Table is supported.
TestData	Indicates if the test packet is filled with data from the LFSR generator.
DiscoveryAckDelay	When Discovery ACK Delay register is supported, this bit indicates that the application can write it. If this bit is 0, the register is read-only.
DiscoveryAckDelayWritable	Indicates if the Discovery ACK Delay register is supported.
ExtendedStatusCodes	It indicates if the generation of extended status codes is supported.
PrimaryApplicationSwitchover	It indicates if the authenticate primary application

	switchover requests are supported.
Action	It indicates if Actions are supported.
PendingAck	It indicates if the generation of PENDING_ACK is supported.
EventData	It indicates if the EVENTDATA_CMD and EVENTDATA_ACK are supported.
Event	It indicates if the EVENT_CMD and EVENT_ACK are supported.
PacketResend	It indicates if the PACKETRESEND_CMD is supported.
WriteMem	It indicates if the WRITEMEM_CMD and WRITEMEM_ACK are supported.
CommandsConcatenation	It indicates if the Multiple operations in a single message are supported.
IPConfigurationLLA	It indicates if Link Local Address IP configuration scheme is supported.
IPConfigurationDHCP	It indicates if DHCP IP configuration scheme is supported.
IPConfigurationPersistentIP	It indicates if PersistentIP configuration scheme is supported.
StreamChannelSourceSocket	Indicates the SCSP register (stream channel source port) is available.
MessageChannelSourceSocket	Indicates the MCSP register (message channel source port) is available.
StreamChannel0BigAndLittleEndian	Stream Channel0 Big And Little Endian.
StreamChannel0IPReassembly	Stream Channel0 IP Reassembly
StreamChannel0UnconditionalStreaming	Stream Channel0 Unconditional Streaming.
StreamChannel0ExtendedChunkData	Stream Channel0 Extended Chunk Data.

15.4.8 Gev Supported Option

Name	GevSupportedOption[GevSupportedOptionSelector]	**Standard**
Description	Returns if the selected GEV option is supported.	
Interface	Boolean	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	**True** – Selected GEV option is supported **False** – Selected GEV option is not supported	
Default value	-	
Availability	**X_dxge**, **ax_dsxge**	
Notes	-	
Error behavior	-	

15.4.9 Gev Current IP Configuration LLA

Name	GevCurrentIPConfigurationLLA[GevInterfaceSelector]	**Standard**
Description	Indicates if Link Local Address IP configuration scheme is activated on the given network interface.	
Interface	Boolean	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	**True** – Link Local Address IP configuration scheme is activated on the given logical link. **False** – Link Local Address IP configuration scheme is not activated on the given logical link.	
Default value	True	
Availability	**X_dxge**, **ax_dsxge**	

Notes	-
Error behavior	-

15.4.10 Gev Current IP Configuration DHCP

Name	GevCurrentIPConfigurationDHCP[GevInterfaceSelector]	**Standard**
Description	Indicates if DHCP IP configuration scheme is activated on the given network interface.	
Interface	Boolean	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	**True** – DHCP IP configuration scheme is activated on the given logical link. **False** – DHCP IP configuration scheme is not activated on the given logical link.	
Default value	-	
Availability	**X_dxge**, **ax_dsxge**	
Notes	-	
Error behavior	-	

15.4.11 Gev Current IP Configuration Persistent IP

Name	GevCurrentIPConfigurationPersistentIP[GevInterfaceSelector]	**Standard**
Description	Indicates if PersistentIP configuration scheme is activated on the given network interface.	
Interface	Boolean	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	**True** – PersistentIP configuration scheme is activated on the given logical link. **False** – PersistentIP configuration scheme is not activated on the given logical link.	
Default value	-	
Availability	**X_dxge**, **ax_dsxge**	
Notes	-	
Error behavior	-	

15.4.12 Gev Current IP Address

Name	GevCurrentIPAddress[GevInterfaceSelector]	**Standard**
Description	Reports the IP address for the given network interface.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	≥0	
Default value	-	
Availability	**X_dxge**, **ax_dsxge**	
Notes	-	
Error behavior	-	

15.4.13 Gev Current Subnet Mask

Name	GevCurrentSubnetMask[GevInterfaceSelector]	**Standard**
Description	Provides the subnet mask of the given interface.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	≥0	

Default value	-
Availability	**X_dxge**, **ax_dsxge**
Notes	-
Error behavior	-

15.4.14 Gev Current Default Gateway

Name	GevCurrentDefaultGateway[GevInterfaceSelector]	**Standard**
Description	Indicates the default gateway IP address to be used on the given network interface.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	≥0	
Default value	-	
Availability	**X_dxge**, **ax_dsxge**	
Notes	-	
Error behavior	-	

15.4.15 Gev First URL - Deprecated

Name	GevFirstURL	**Standard**
Description	Indicates the first URL to the XML device description file. The First URL is used as the first choice by the application to retrieve the XML device description file.	
Interface	String	
String Length	512	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	-	
Default value	-	
Notes	This feature is deprecated.	
Error behavior	-	

15.4.16 Gev Second URL - Deprecated

Name	GevSecondURL	**Standard**
Description	Indicates the second URL to the XML device description file. This URL is an alternative if the application was unsuccessful to retrieve the device description file using the first URL.	
Interface	String	
String Length	512	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	-	
Default value	-	
Notes	This feature is deprecated.	
Error behavior	-	

15.4.17 Gev Number of Interfaces – Deprecated

Name	GevNumberOfInterfaces	**Standard**
Description	Indicates the number of physical network interfaces supported by this device.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	>0	

Default value	-
Notes	This feature is deprecated (See DeviceLinkSelector).
Error behavior	-

15.4.18 Gev Persistent IP Address

Name	GevPersistentIPAddress	**Standard**
Description	Indicates the Persistent IP address for this network interface. It is only used when the device boots with the Persistent IP configuration scheme.	
Interface	Integer	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	≥0	
Default value	-	
Availability	**X_dxge**, **ax_dsxge**	
Notes	-	
Error behavior	-	

15.4.19 Gev Persistent Subnet Mask

Name	GevPersistentSubnetMask	**Standard**
Description	Indicates the Persistent subnet mask associated with the Persistent IP address on this network interface. It is only used when the device boots with the Persistent IP configuration scheme.	
Interface	Integer	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	≥0	
Default value	-	
Availability	**X_dxge**, **ax_dsxge**	
Notes	-	
Error behavior	-	

15.4.20 Gev Persistent Default Gateway

Name	GevPersistentDefaultGateway	**Standard**
Description	Indicates the persistent default gateway for this network interface. It is only used if the device boots with the Persistent IP configuration scheme.	
Interface	Integer	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	≥0	
Default value	-	
Availability	**X_dxge**, **ax_dsxge**	
Notes	-	
Error behavior	-	

15.4.21 Gev Persistent IP Address

Name	GevPersistentIPAddress	**Standard**
Description	Indicates the Persistent IP address for this network interface. It is only used when the device boots with the Persistent IP configuration scheme.	
Interface	Integer	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	≥0	

Default value	-
Availability	X_dxge, ax_dsxge
Notes	-
Error behavior	-

15.4.22 GevLinkSpeed

Name	GevLinkSpeed	Standard
Description	Indicates the speed of transmission negotiated by the given network interface.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	>0	
Default value	-	
Availability	X_dxge, ax_dsxge	
Notes	The unit is Mbs.	
Error behavior	-	

15.4.23 Gev Message Channel Count - Deprecated

Name	GevMessageChannelCount	Standard
Description	Indicates the number of message channels supported by this device.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	≥0	
Default value	-	
Notes	This feature is deprecated (See DeviceEventChannelCount).	
Error behavior	-	

15.4.24 Gev Stream Channel Count - Deprecated

Name	GevStreamChannelCount	Standard
Description	Indicates the number of stream channels supported by this device.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	≥0	
Default value	-	
Notes	This feature is deprecated (See Device Stream Channel Count).	
Error behavior	-	

15.4.25 Gev Heartbeat Timeout - Deprecated

Name	GevHeartbeatTimeout	Standard
Description	Indicates the current heartbeat timeout in milliseconds.	
Interface	Integer	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	≥500	
Default value	-	
Notes	This feature is deprecated (See Device Link Heartbeat Timeout).	
Error behavior	-	

15.4.26 Gev Timestamp Tick Frequency - Deprecated

Name	GevTimestampTickFrequency	**Standard**
Description	Indicates the number of timestamp ticks during 1 second (frequency in Hz).	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	≥0	
Default value	-	
Notes	This feature is deprecated (See increment of the **Timestamp Latch Value** feature).	
Error behavior	-	

15.4.27 Gev Timestamp Control Latch - Deprecated

Name	GevTimestampControlLatch	**Standard**
Description	Latches current timestamp counter into **GevTimestampValue**.	
Interface	Command	
Access mode	Write only	
Adjustable while grabbing	Yes	
Value range	1	
Default value	1	
Notes	This feature is deprecated (See **Timestamp Latch**).	
Error behavior	-	

15.4.28 Gev Timestamp Control Reset - Deprecated

Name	GevTimestampControlReset	**Standard**
Description	Resets the Timestamp counter to 0.	
Interface	Command	
Access mode	Write only	
Adjustable while grabbing	Yes	
Value range	1	
Default value	1	
Notes	This feature is deprecated (See **Timestamp Reset**).	
Error behavior	-	

15.4.29 Gev Time stamp Value - Deprecated

Name	GevTimestampValue	**Standard**
Description	Returns the latched 64-bit value of the timestamp counter.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	≥0	
Default value	-	
Notes	This feature is deprecated (See Timestamp Latch Value).	
Error behavior	-	

15.4.30 Gev CCP

Name	GevCCP	**Standard**
Description	Controls the device access privilege of an application.	
Interface	Enumeration	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	See enum entries table below.	
Default value	-	
Availability	X_dxge, ax_dsxge	
Notes	-	
Error behavior	-	

Gev CCP Enum Entries:

Name	Description
OpenAccess	Open access
ExclusiveAccess	Exclusive access
ControlAccess	Control access

15.4.31 Gev MCPHost Port

Name	GevMCPHostPort	**Standard**
Description	I Indicates the port to which the device must send messages. Setting this value to 0 closes the message channel.	
Interface	Integer	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	≥0	
Default value	-	
Availability	X_dxge, ax_dsxge	
Notes	-	
Error behavior	-	

15.4.32 Gev MCDA

Name	GevMCDA	**Standard**
Description	Indicates the destination IP address for the message channel.	
Interface	Integer	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	≥0	
Default value	-	
Availability	X_dxge, ax_dsxge	
Notes	-	
Error behavior	-	

15.4.33 Gev MCTT

Name	GevMCTT	**Standard**
Description	Provides the transmission timeout value in milliseconds.	
Interface	Integer	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	≥0	
Default value	0	
Availability	X_dxge, ax_dsxge	

Notes	-
Error behavior	-

15.4.34 Gev MCRC

Name	GevMCRC	**Standard**
Description	Indicates the number of retransmissions allowed if a message channel message times out.	
Interface	Integer	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	≥0	
Default value	0	
Availability	**X_dxge**, **ax_dsxge**	
Notes	-	
Error behavior	-	

15.4.35 Gev MCSP

Name	GevMCSP	**Standard**
Description	This feature indicates the source port for the message channel.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	≥0	
Default value	-	
Availability	**X_dxge**, **ax_dsxge**	
Notes	-	
Error behavior	-	

15.4.36 Gev Stream Channel Selector

Name	GevStreamChannelSelector	**Standard**
Description	Selects the stream channel to control.	
Interface	Integer	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	≥0	
Default value	0	
Availability	**X_dxge**, **ax_dsxge**	
Notes	-	
Error behavior	-	

15.4.37 Gev SCP Interface Index

Name	GevSCPInterfaceIndex[GevStreamChannelSelector]	**Standard**
Description	Index of network interface to use.	
Interface	Integer	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	0	
Default value	0	
Availability	**X_dxge**, **ax_dsxge**	
Notes	-	
Error behavior	-	

15.4.38 Gev SCPHost Port

Name	GevSCPHostPort[GevStreamChannelSelector]	**Standard**
Description	Indicates the port to which the device must send data stream. Setting this value to 0 closes the stream channel.	
Interface	Integer	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	≥0	
Default value	-	
Availability	**X_dxge**, **ax_dsxge**	
Notes	-	
Error behavior	-	

15.4.39 Gev SCPSFire Test Packet

Name	GevSCPSFireTestPacket[GevStreamChannelSelector]	**Standard**
Description	Sends a test packet. If this feature is set, the device fires one test packet.	
Interface	Boolean	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	**True** – The device will fire one test packet. **False** – The device will not send a test packet.	
Default value	-	
Availability	**X_dxge**, **ax_dsxge**	
Notes	-	
Error behavior	-	

15.4.40 Gev SCPSDo Not Fragment

Name	GevSCPSDoNotFragment[GevStreamChannelSelector]	**Standard**
Description	The state of this feature is copied into the “do not fragment” bit of IP header of each stream packet. It can be used by the application to prevent IP fragmentation of packets on the stream channel.	
Interface	Boolean	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	**True** **False**	
Default value	-	
Availability	**X_dxge**, **ax_dsxge**	
Notes	-	
Error behavior	-	

15.4.41 Gev SCPSBig Endian - Deprecated

Name	GevSCPSBigEndian	**Standard**
Description	Endianess of multi-byte pixel data for this stream.	
Interface	Boolean	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	**True** **False**	
Default value	-	
Notes	This feature is deprecated (See **Device Stream Channel Endianness**).	
Error behavior	-	

15.4.42 Gev SCPSPacket Size

Name	GevSCPSPacketSize[GevStreamChannelSelector]	**Standard**
Description	Specifies the stream packet size in bytes to send on this channel.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	>0	
Default value	-	
Availability	**X_dxge**, **ax_dsxge**	
Notes	-	
Error behavior	-	

15.4.43 Gev SCPD

Name	GevSCPD[GevStreamChannelSelector]	**Standard**
Description	Indicates the delay (in timestamp counter unit) to insert between each packet for this stream channel. This can be used as a crude flow-control mechanism if the application or the network infrastructure cannot keep up with the packets coming from the device.	
Interface	Integer	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	≥0	
Default value	-	
Availability	**X_dxge**, **ax_dsxge**	
Notes	-	
Error behavior	-	

15.4.44 Gev SCDA

Name	GevSCDA[GevStreamChannelSelector]	**Standard**
Description	Indicates the destination IP address for this stream channel.	
Interface	Integer	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	≥0	
Default value	-	
Availability	**X_dxge**, **ax_dsxge**	
Notes	-	
Error behavior	-	

15.4.45 Frame Buffer Overflow Status

Name	GevFrameBufferOverflowStatus	**Custom**
Description	This indicates the frame buffer overflow status. This includes several FIFO overflow status.	
Interface	Boolean	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	**True** **False**	
Default value	-	
Availability	**X_dxge**	
Notes	-	
Error behavior	See the device error code documentation.	

15.4.46 Stream Statistics Selector

Name	GevStreamStatisticsSelector	Custom
Description	Selects the statistic value.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	-	
Value range	See enum entries table below.	
Default value	-	
Availability	**X_dxge**	
Notes	-	
Error behavior	See the device error code documentation.	

Gev Stream Statistics Selector:

Name	Description
FramesSuccessfullySent	Successfully sent out frames since last statistics clear.
FramesDropped	This is the count of dropped frames (write and read module) since last statistics clear.
ResendOK	This is the count of successfully replied resend requests since the last statistics clear.
ResendNOK	This is the count of unhandled packet resend requests since the last statistics clear.

15.4.47 Stream Statistics Value

Name	GevStreamStatisticsValue[GevStreamStatisticsselector]	Custom
Description	Indicates the number of blocks of the GevStreamStatisticsSelector.	
Interface	Integer	
Access mode	Read Only	
Adjustable while grabbing	-	
Value range	≥0	
Default value	-	
Availability	**X_dxge**	
Notes	-	
Error behavior	See the device error code documentation.	

15.4.48 Clear Stream Statistics

Name	GevClearStreamStatistics	Custom
Description	This is the command to clear statistics.	
Interface	Command	
Access mode	Read/Write	
Adjustable while grabbing	-	
Value range	1 When command is executed, 0 is returned	
Default value	1	
Availability	**X_dxge**	
Notes	-	
Error behavior	See the device error code documentation.	

15.5 CoaXPress

15.5.1 Cxp Link Configuration Preferred

Name	CxpLinkConfigurationPreferred	**Standard**
Description	This feature provides the default link configuration.	
Interface	Enumeration	
Access mode	Read Only	
Adjustable while grabbing	-	
Value range	See enum entries below.	
Default value	-	
Availability	X_cxp	
Notes	-	
Error behavior	-	

Cxp Link Configuration Preferred Enum Entries:

Name	Description
CXP1_X1	Force the Link to 1 Connections operating at CXP-1 speed (1.250 Gbps)
CXP1_X2	Force the Link to 2 Connections operating at CXP-1 speed (1.250 Gbps)
CXP1_X3	Force the Link to 3 Connections operating at CXP-1 speed (1.250 Gbps)
CXP1_X4	Force the Link to 4 Connections operating at CXP-1 speed (1.250 Gbps)
CXP2_X1	Force the Link to 1 Connections operating at CXP-2 speed (2.500 Gbps)
CXP2_X2	Force the Link to 2 Connections operating at CXP-2 speed (2.500 Gbps)
CXP2_X3	Force the Link to 3 Connections operating at CXP-2 speed (2.500 Gbps)
CXP2_X4	Force the Link to 4 Connections operating at CXP-2 speed (2.500 Gbps)
CXP3_X1	Force the Link to 1 Connections operating at CXP-3 speed (3.125 Gbps)
CXP3_X2	Force the Link to 2 Connections operating at CXP-3 speed (3.125 Gbps)
CXP3_X3	Force the Link to 3 Connections operating at CXP-3 speed (3.125 Gbps)
CXP3_X4	Force the Link to 4 Connections operating at CXP-3 speed (3.125 Gbps)
CXP5_X1	Force the Link to 1 Connections operating at CXP-5 speed (5.000 Gbps)
CXP5_X2	Force the Link to 2 Connections operating at CXP-5 speed (5.000 Gbps)
CXP5_X3	Force the Link to 3 Connections operating at CXP-5 speed (5.000 Gbps)
CXP5_X4	Force the Link to 4 Connections operating at CXP-5 speed (5.000 Gbps)
CXP6_X1	Force the Link to 1 Connections operating at CXP-6 speed (6.250 Gbps)
CXP6_X2	Force the Link to 2 Connections operating at CXP-6 speed (6.250 Gbps)
CXP6_X3	Force the Link to 3 Connections operating at CXP-6 speed (6.250 Gbps)
CXP6_X4	Force the Link to 4 Connections operating at CXP-6 speed (6.250 Gbps)
CXP10_X1	Force the Link to 1 Connections operating at CXP-10 speed (10.000 Gbps)

CXP10_X2	Force the Link to 2 Connections operating at CXP-10 speed (10.000 Gbps)
CXP10_X3	Force the Link to 3 Connections operating at CXP-10 speed (10.000 Gbps)
CXP10_X4	Force the Link to 4 Connections operating at CXP-10 speed (10.000 Gbps)
CXP12_X1	Force the Link to 1 Connections operating at CXP-12 speed (12.500 Gbps)
CXP12_X2	Force the Link to 2 Connections operating at CXP-12 speed (12.500 Gbps)
CXP12_X3	Force the Link to 3 Connections operating at CXP-12 speed (12.500 Gbps)
CXP12_X4	Force the Link to 4 Connections operating at CXP-12 speed (12.500 Gbps)

15.5.2 Cxp Link Configuration

Name	CxpLinkConfiguration	**Standard**
Description	This feature allows specifying the Link configuration for the communication between the Receiver and Transmitter Device.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	-	
Value range	See enum entries below.	
Default value	-	
Availability	**X_cxp**	
Notes	-	
Error behavior	-	

Cxp Link Configuration Enum Entries:

Name	Description
CXP1_X1	Force the Link to 1 Connections operating at CXP-1 speed (1.250 Gbps)
CXP1_X2	Force the Link to 2 Connections operating at CXP-1 speed (1.250 Gbps)
CXP1_X3	Force the Link to 3 Connections operating at CXP-1 speed (1.250 Gbps)
CXP1_X4	Force the Link to 4 Connections operating at CXP-1 speed (1.250 Gbps)
CXP2_X1	Force the Link to 1 Connections operating at CXP-2 speed (2.500 Gbps)
CXP2_X2	Force the Link to 2 Connections operating at CXP-2 speed (2.500 Gbps)
CXP2_X3	Force the Link to 3 Connections operating at CXP-2 speed (2.500 Gbps)
CXP2_X4	Force the Link to 4 Connections operating at CXP-2 speed (2.500 Gbps)
CXP3_X1	Force the Link to 1 Connections operating at CXP-3 speed (3.125 Gbps)
CXP3_X2	Force the Link to 2 Connections operating at CXP-3 speed (3.125 Gbps)
CXP3_X3	Force the Link to 3 Connections operating at CXP-3 speed (3.125 Gbps)
CXP3_X4	Force the Link to 4 Connections operating at CXP-3 speed (3.125 Gbps)
CXP5_X1	Force the Link to 1 Connections operating at CXP-5 speed (5.000 Gbps)
CXP5_X2	Force the Link to 2 Connections operating at CXP-5 speed (5.000 Gbps)

CXP5_X3	Force the Link to 3 Connections operating at CXP-5 speed (5.000 Gbps)
CXP5_X4	Force the Link to 4 Connections operating at CXP-5 speed (5.000 Gbps)
CXP6_X1	Force the Link to 1 Connections operating at CXP-6 speed (6.250 Gbps)
CXP6_X2	Force the Link to 2 Connections operating at CXP-6 speed (6.250 Gbps)
CXP6_X3	Force the Link to 3 Connections operating at CXP-6 speed (6.250 Gbps)
CXP6_X4	Force the Link to 4 Connections operating at CXP-6 speed (6.250 Gbps)
CXP10_X1	Force the Link to 1 Connections operating at CXP-10 speed (10.000 Gbps)
CXP10_X2	Force the Link to 2 Connections operating at CXP-10 speed (10.000 Gbps)
CXP10_X3	Force the Link to 3 Connections operating at CXP-10 speed (10.000 Gbps)
CXP10_X4	Force the Link to 4 Connections operating at CXP-10 speed (10.000 Gbps)
CXP12_X1	Force the Link to 1 Connections operating at CXP-12 speed (12.500 Gbps)
CXP12_X2	Force the Link to 2 Connections operating at CXP-12 speed (12.500 Gbps)
CXP12_X3	Force the Link to 3 Connections operating at CXP-12 speed (12.500 Gbps)
CXP12_X4	Force the Link to 4 Connections operating at CXP-12 speed (12.500 Gbps)

15.5.3 Cxp Version Used

Name	CxpVersionUsed	**Custom**
Description	Version of the CoaXPress specification used for communication between Device and Host.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	See enum entries table below.	
Default value	-	
Availability	**X_cxp**	
Notes	-	
Error behavior	See the device error code documentation.	

Cxp Version Used Enum Entries:

Name	Description
CXP_Version_1_1	Cxp Version 1.1
CXP_Version_2_0	Cxp Version 2.0

15.5.4 Cxp Connection Selector

Name	CxpConnectionSelector	**Standard**
Description	Selects the coaxpress physical connection to control.	
Interface	Integer	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	≥0	
Default value	-	
Availability	**X_cxp**	

Notes	-
Error behavior	-

15.5.5 Cxp Connection Test Mode

Name	CxpConnectionTestMode[CxpConnectionSelector]	**Standard**
Description	Enables the test mode for an individual physical connection of the device.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	-	
Value range	See enum entries below.	
Default value	Off	
Availability	**X_cxp**	
Notes	-	
Error behavior	-	

Cxp Connection Test Mode Enum Entries:

Name	Description
Off	Test mode disabled
Mode1	Test mode enabled

15.5.6 Cxp Connection Test Packet Count Tx

Name	CxpConnectionTestPacketCountTx[CxpConnectionSelector]	**Custom**
Description	Reports the current count for the test packets sent on selected physical connection.	
Interface	Integer	
Access mode	Read/Write	
Adjustable while grabbing	No	
Value range	≥0	
Default value	-	
Availability	**X_cxp**	
Notes	-	
Error behavior	-	

15.5.7 Cxp Connection Test Packet Count Rx

Name	CxpConnectionTestPacketCountRx[CxpConnectionSelector]	**Custom**
Description	Reports the current count for the test packets received on selected physical connection.	
Interface	Integer	
Access mode	Read/Write	
Adjustable while grabbing	No	
Value range	≥0	
Default value	-	
Availability	**X_cxp**	
Notes	-	
Error behavior	-	

15.5.8 Cxp Connection Test Error Count

Name	CxpConnectionTestErrorCount[CxpConnectionSelector]	**Standard**
Description	Reads the current connection error count for the test packets received by the device on the selected connector.	
Interface	Integer	
Access mode	Read/Write	
Adjustable	No	

while grabbing	
Value range	≥0
Default value	-
Availability	X_cxp
Notes	-
Error behavior	-

16 File Access Control

In general, make sure to always use consistent packages as delivered by Allied Vision Konstanz and do not mix files from different packages!

16.1 File Selector

Name	FileSelector	**Standard**
Description	Select a file to read/write.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	See enum entries table below.	
Default value	**NoFile**	
Availability	**ALL**	
Notes	-	
Error behavior	See the device error code documentation.	

File Selector Enum Entries:

Name	Description
NoFile	No file selected
Bitstream	Enables bitstream access
Application	Enables application access
Xml	Enables GenICam XML access
DSNULUT1	Enables DSNU LUT 1 access[1]
DSNULUT2	Enables DSNU LUT 2 access[1]
PRNULUT1	Enables PRNU LUT 1 access[1]
PRNULUT2	Enables PRNU LUT 2 access[1]
SensorFile	Enables Sensor File access
GammaLUT	Enables Gamma LUT access
UserSet1	Enables User set 1 access
UserSet2	Enables User set 2 access
UserSet3	Enables User set 3 access
UserSet4	Enables User set 4 access
UserSet5	Enables User set 5 access
UserSet6	Enables User set 6 access
UserSet7	Enables User set 7 access
UserSet8	Enables User set 8 access
LightCtrlSet1	Enables Light controller set 1 access (Not for allPIXA Evo)
PackageDescriptionFile	Enables Package Description File access
MemoryFile	Enables memory file access
IOAnalyzerEventFile	Enables IO Analyzer Event File access
LogFile	Firmware logging (For debugging purposes)
CustomerFile	File for customer or application specific data. It can be any file content. The file size is 1MB.
Configuration3DFile	File for configuration 3D camera
Calibration3DFile	File for calibration 3D camera

[1] *If the LUT is enabled in the image processing unit, it will be updated with the newly downloaded file.*

16.2 File Operation Selector

Name	FileOperationSelector[FileSelector]	**Standard**
Description	Select an operation which shall be performed on a file.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	See enum entries table below.	
Default value	NoOperation	
Availability	**ALL**	
Notes	-	
Error behavior	See the device error code documentation.	

File Operation Selector Enum Entries:

Name	Description	Notes
NoOperation	Selects no operation	-
Open	Open a file	Fails if a file is already opened.
Close	Close a file	When this command is executed, the file is verified and internally copied. This is a time-consuming process. A file is always closed, even if an error occurs. The **File Operation Status** is set appropriately. Therefore **Success** indicates a successful file update and **Failure** an erroneous update. If a **Fatal Error** occurs, the File Operation Status is set to **Fatal Error**. In this case you must not switch off the camera if the file type is one of the following: - Bitstream - Application - XML - Bootfile (sensorfile) For these files, please try to download the file again to avoid damage! For other files you may switch off the camera. ***In general, make sure to always use consistent packages as delivered by* Allied Vision Konstanz *and do not mix files from different packages!***
Read	Read a file	-
Write	Write a file	-

16.3 File Operation Execute

Name	FileOperationExecute[FileOperationSelector]	**Standard**
Description	Executes the selected file operation.	
Interface	Command	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	{0,1}	
Default value	1	
Availability	**ALL**	
Notes	To check whether the operation is finished, read the value of the **FileOperationExecute** command periodically. If the value is not equal to the commands value of the node in the xml, the command has finished execution.	
Error behavior	See the device error code documentation.	

16.4 File Open Mode

Name	FileOpenMode	**Standard**
Description	Select an open mode.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	See enum entries table below.	
Default value	**NoOpenMode**	
Availability	**ALL**	
Notes	-	
Error behavior	See the device error code documentation.	

File Open Mode Enum Entries:

Name	Description	Notes
NoOpenMode	No open mode selected	-
Read	Open a file in read-only mode	-
Write	Open a file in write-only mode	With this open mode no read command is permitted. In addition, if the **FileAccessOffset** is set after a write command occurred, the new value of the **FileAccessOffset** must be at least new_**FileAccessOffset** = (old_**FileAccessOffset**+ old_**FileAccessLength**).

16.5 File Access Offset

Name	FileAccessOffset[FileOperationSelector]	**Standard**
Description	Controls the starting position of the access in the file.	
Interface	Integer	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	≥0	
Default value	0	
Availability	**ALL**	
Notes	The unit is Byte. Please see Write for restrictions.	
Error behavior	See the device error code documentation.	

16.6 File Access Length

Name	FileAccessLength[FileOperationSelector]	**Standard**
Description	Controls the length of the mapping between the device file storage and the FileAccessBuffer.	
Interface	Integer	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	≥0	
Default value	0	
Availability	**ALL**	
Notes	The unit is Byte. Please see Write for restrictions.	
Error behavior	See the device error code documentation.	

16.7 File Operation Result

Name	FileOperationResult[FileOperationSelector]	**Standard**
Description	The number of the successfully read/written bytes of the last file operation.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	≥0	
Default value	0	
Availability	**ALL**	
Notes	-	
Error behavior	-	

16.8 File Operation Status

Name	FileOperationStatus[FileOperationSelector]	**Standard**
Description	Status of recent operation.	
Interface	Enumeration	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	See enum entries table below.	
Default value	**Success**	
Availability	**ALL**	
Notes	-	
Error behavior	-	

File Operation Status Enum Entries:

Name	Description	Notes
Success	The last operation succeeded	-
Failure	The last operation failed	-
FatalError	If this error occurs, do not switch off the device and repeat the update immediately! Otherwise, the system may refuse to boot next time!	A fatal error occurred during the last operation. Please see the Close command for more information.

16.9 File Size

Name	FileSize[FileSelector]	**Standard**
Description	Represents the size of the selected file in bytes.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	≥0	
Default value	0	
Availability	**ALL**	
Notes	-	
Error behavior	See the device error code documentation.	

16.10 File Checksum

Name	FileChecksum[FileSelector]	**Custom**
Description	The checksum of a file.	
Interface	Integer	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	≥0	
Default value	0	
Availability	**ALL**	
Notes	This feature must be set by the user after the file is opened and before the file is closed if a file is uploaded to the camera. Only if the checksum feature corresponds to the checksum calculated internally by the camera, the file download succeeds. For reading operations there is no need to set the checksum feature. **Calculation:** The checksum is an unsigned 32-bit value. It is the sum of all 4-Byte words (Little Endian) of the file. If a files size is not a multiple of four, the “missing” bytes are interpreted as zero. *Pseudo code for calculation:* *u32 file[N]* *u32 checksum = 0* *checksum += file[0]* *checksum += file[1]* *…* *checksum += file[N-1]*	
Error behavior	See the device error code documentation.	

16.11 File Access Buffer

Name	FileAccessBuffer	**Standard**
Description	This buffer is used for the GenICam file update mechanism.	
Interface	Register	
Size	65536	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	-	
Availability	**ALL**	
Default value	-	
Notes	See the device error code documentation.	

17 Digital IO Control

17.1 Functional scope

This section shows the capabilities of digital IO lines.

17.1.1 allPIXA evo

This table contains the supported LineMode and LineFormat entries for each supported line.

Line	LineMode	LineFormat	Comment
Line1	Input	RS422	
Line1	Output	Not Supported	Output mode not supported
Line2	Input	RS422	
Line2	Output	Not Supported	Output mode not supported
Line3	Input	SingleEnded_3V3	
Line3	Output	SingleEnded_3V3	
Line4	Input	SingleEnded_3V3	
Line4	Output	SingleEnded_3V3	
Line5	Input	SingleEnded_3V3	
Line5	Output	SingleEnded_3V3	
Line6	Input	SingleEnded_3V3	
Line6	Output	SingleEnded_3V3	
Line7	Input	SingleEnded_3V3	
Line7	Output	SingleEnded_3V3	
Line8	Input	SingleEnded_3V3	
Line8	Output	SingleEnded_3V3	
Line9	Input	SingleEnded_3V3	
Line9	Output	SingleEnded_3V3	
Line10	Input	SingleEnded_3V3	
Line10	Output	SingleEnded_3V3	
Line11	Input	Not Supported	Input mode not supported
Line11	Output	Misc	

This table contains the supported LineSource entries for each supported line.

Line	LineSource
Line1	Not Supported
Line2	Not Supported
Line3	Off FrameActive LineActive UserOutput3
Line4	Off FrameActive LineActive UserOutput4
Line5	Off FrameActive LineActive FlashOut1 UserOutput5
Line6	Off FrameActive LineActive FlashOut2 UserOutput6
Line7	Off FrameActive LineActive FlashOut3

	UserOutput7
Line8	Off FrameActive LineActive FlashOut4 UserOutput8
Line9	Off FrameActive LineActive MSOut FlashSync UserOutput9
Line10	Off MSOut CLSCVsy
Line11	Fan

17.1.2 allPIXA neo

This table contains the supported LineMode and LineFormat entries for each supported line.

Note: Global single ended voltage level control for Line1 – Line4. Line1 – Line4 offers several LineFormat for single ended voltage levels, but it is globally controlled therefore it is not possible to set different single ended voltage level configurations for each line!

Line	LineMode	LineFormat	Comment
Line1	Input	RS422 RS422_NoTerm SingleEnded_3V3 SingleEnded_5V SingleEnded_12V SingleEnded_24V	
Line1	Output	Not Supported	Output mode not supported.
Line2	Input	RS422 RS422_NoTerm SingleEnded_3V3 SingleEnded_5V SingleEnded_12V SingleEnded_24V	
Line2	Output	Not Supported	Output mode not supported.
Line3	Input	RS422 RS422_NoTerm SingleEnded_3V3 SingleEnded_5V SingleEnded_12V SingleEnded_24V	
Line3	Output	RS422 SingleEnded_3V3	
Line4	Input	RS422 RS422_NoTerm SingleEnded_3V3 SingleEnded_5V SingleEnded_12V SingleEnded_24V	
Line4	Output	RS422 SingleEnded_3V3	
Line5	Input	NoConnect SingleEnded_3V3	
Line5	Output	NoConnect SingleEnded_3V3 RS422	
Line6	Input	NoConnect	

		SingleEnded_3V3	
Line6	Output	NoConnect SingleEnded_3V3 RS422	
Line7	Input	NoConnect SingleEnded_3V3	If Line5 format is configured as RS422 then Line7 is not available.
Line7	Output	NoConnect SingleEnded_3V3	
Line8	Input	NoConnect SingleEnded_3V3	If Line6 format is configured as RS422 then Line8 is not available.
Line8	Output	NoConnect SingleEnded_3V3	
Line9	Input	SingleEnded_3V3	
Line9	Output	SingleEnded_3V3	
Line10	Input	Not Supported	Input mode not supported
Line10	Output	Misc	

This table contains the supported LineSource entries for each supported line.

Line	LineSource
Line1	Not Supported
Line2	Not Supported
Line3	Off FrameActive LineActive UserOutput3 LineTrigger FrameTrigger Exposure
Line4	Off FrameActive LineActive UserOutput4 LineTrigger FrameTrigger Exposure MSOut
Line5	Off FrameActive LineActive UserOutput5 LineTrigger FrameTrigger Exposure FrameSyncPWM FLASHOUT4
Line6	Off FrameActive LineActive UserOutput6 LineTrigger FrameTrigger Exposure FrameSyncPWM FLASHOUT1
Line7	Off FrameActive LineActive UserOutput7 FLASHOUT3
Line8	Off FrameActive LineActive

	UserOutput8 FLASHOUT2
Line9	Off MSOut
Line10	Fan UART0

17.2 Line Selector

Name	LineSelector	**Standard**
Description	Selects the physical line (or pin) of the external device connector.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	See enum entries table below.	
Default value	Line1	
Availability	See enum entries table below.	
Notes	Also check allPIXA evo and allPIXA neo for availability.	
Error behavior	See the device error code documentation.	

Line Selector Enum Entries:

Name	Availability	Description
Line1	ALL	Selects Line1
Line2	ALL	Selects Line2
Line3	ALL	Selects Line3
Line4	ALL	Selects Line4
Line5	ALL	Selects Line5
Line6	ALL	Selects Line6
Line7	ALL	Selects Line7
Line8	ALL	Selects Line8
Line9	ALL	Selects Line9
Line10	ALL	Selects Line10
Line11	EVO	Selects Line11

17.3 Line Mode

Name	LineMode[LineSelector]	**Standard**
Description	Controls whether the physical line is used to input or output a signal.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	See enum entries table below.	
Default value	Input	
Notes	-	
Error behavior	See the device error code documentation.	

Line Mode Enum Entries:

Name	Description
Input	The selected physical line is used to Input an electrical signal
Output	The selected physical line is used to Output an electrical signal

17.4 Line Inverter

Name	LineInverter[LineSelector]	**Standard**
Description	Controls the inversion of the signal of the selected input or output Line.	
Interface	Boolean	
Access mode	Read/Write	
Adjustable	Yes	

while grabbing	
Value range	**True** – The Line signal is inverted **False** – The Line signal is not inverted
Default value	**False**
Availability	**ALL**
Notes	-
Error behavior	See the device error code documentation.

17.5 Line Status

Name	LineStatus[LineSelector]	**Standard**
Description	Returns the current status of the selected input or output Line.	
Interface	Boolean	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	-	
Default value	**True** – The level of the Line signal is High **False** – The level of the Line signal is low	
Availability	**ALL**	
Notes	-	
Error behavior	-	

17.6 Line Source

Name	LineSource[LineSelector]	**Standard**
Description	Selects which internal acquisition or I/O source signal to output on the selected Line. LineMode must be output.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	See enum entries table below.	
Default value	**Off**	
Availability	See enum entries table below.	
Notes	Also check allPIXA evo and allPIXA neo for availability. When acquisition is stopped and if led flash is active then internally FlashOut1-4 are disabled otherwise flash outs are enabled. Same thing applies for FlashSync source but it should be configured by the user.	
Error behavior	See the device error code documentation.	

Line Source Enum Entries:

Name	Availability	Description
Off	ALL	Line output is disabled
FlashOut1	ALL	Line output is Flash out 1 state.
FlashOut2	ALL	Line output is Flash out 2 state.
FlashOut3	ALL	Line output is Flash out 3 state.
FlashOut4	ALL	Line output is Flash out 4 state.
FrameActive	ALL	Line output is Frame active state.
LineActive	ALL	Line output is Line active state.
MSOut	ALL	Line output is MasterSlave out state.
UserOutput3	ALL	The UserOutput3 bit state as defined by its current UserOutputValue.
UserOutput4	ALL	The UserOutput4 bit state as defined by its current UserOutputValue.
UserOutput5	ALL	The UserOutput5 bit state as defined by its current UserOutputValue.
UserOutput6	ALL	The UserOutput6 bit state as defined by its current UserOutputValue.

UserOutput7	ALL	The UserOutput7 bit state as defined by its current UserOutputValue.
UserOutput8	ALL	The UserOutput8 bit state as defined by its current UserOutputValue.
Fan	ALL	Line output is Fan
UART0	NEO	Line output is UART
LineTrigger	NEO	Device is receiving a Line start trigger
FrameTrigger	NEO	Device is receiving a Frame start trigger
Exposure	NEO	Line output is Exposure
FlashSync	EVO	Line output is flash synchronization
FrameSyncPWM	NEO	Line output is Frame Sync PWM signal.
UserOutput9	EVO	The UserOutput9 bit state as defined by its current UserOutputValue.

17.7 Frame Sync PWM Period

Name	FrameSyncPWMPeriod[LineSource]	**Standard**
Description	Sets the frame sync period as a number of lines.	
Interface	Integer	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	2-4095	
Default value	**512**	
Availability	NEO	
Notes	This is the period of the Frame Sync signal. The Duty cycle will be 50% of the period. So a period of 512 lines results in a duty cycle of 256 lines.	
Error behavior	See the device error code documentation.	

17.8 Line Format

Name	LineFormat[LineSelector]	**Standard**
Description	Controls the current electrical format of the selected physical input or output line.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	See enum entries table below.	
Default value	**It depends on the LineSelector and the variant.**	
Availability	See enum entries table below.	
Notes	Also check allPIXA evo and allPIXA neo for availability.	
Error behavior	See the device error code documentation.	

Line Format Enum Entries:

Name	Availability	Description
NoConnect	NEO	The line is not connected.
SingleEnded_3V3	ALL	The line is single ended input or output for 3.3V. Input signals less than 1.5V are considered as level low, signals higher than 1.5V as level high.
SingleEnded_5V	NEO	The line is single ended input for 5.0V or output for 3.3V. Input signals less than 2.5V are considered as level low, signals higher than 2.5V as level high.
SingleEnded_12V	NEO	The line is single ended input for 12.0V or output for 3.3V. Input signals less than 5.0V are considered as level low, signals higher than 5.0V as level high.
SingleEnded_24V	NEO	The line is single ended input for 24.0V or output for 3.3V. Input signals less than 5.0V are considered as level low, signals higher than 5.0V as level high.

RS422_NoTerm	NEO	The line is currently accepting or sending RS422 level signals with no electrical termination.
RS422	ALL	The line is currently accepting or sending RS422 level signals.
Misc	ALL	The line is a special one

17.9 UserOutput Selector

Name	UserOutputSelector	**Standard**
Description	Selects which bit of the User Output register will be set by UserOutputValue.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	See enum entries table below.	
Default value	**UserOutput3**	
Availability	ALL	
Notes	-	
Error behavior	See the device error code documentation.	

UserOutput Selector Enum Entries:

Name	Description	Remarks
UserOutput3	Select the bit 3 of the User Output register.	Available for ALL variants
UserOutput4	Select the bit 4 of the User Output register.	
UserOutput5	Select the bit 5 of the User Output register.	
UserOutput6	Select the bit 6 of the User Output register.	
UserOutput7	Select the bit 7 of the User Output register.	
UserOutput8	Select the bit 8 of the User Output register.	
UserOutput9	Select the bit 9 of the User Output register	Available only for EVO

17.10 UserOutput Value

Name	UserOutputValue[UserOutputSelector]	**Standard**
Description	Sets the value of the bit selected by UserOutputSelector.	
Interface	Boolean	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	**True** – The selected UserOutput bit set to 1 **False** – The selected UserOutput bit set to 0	
Default value	**False**	
Availability	ALL	
Notes	-	
Error behavior	See the device error code documentation.	

17.11 Trigger Activation

Name	IOAnalyzerTriggerActivation	**Custom**
Description	Selects the trigger condition for sampling.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	See enum entries table below.	
Default value	Auto	
Availability	ALL	
Notes	-	
Error behavior	See the device error code documentation.	

Trigger Activation Enum Entries:

Name	Description
Auto	Auto

FallingEdgeChA	Falling Edge Channel A
RisingEdgeChA	Rising Edge Channel A
FallingEdgeChB	Falling Edge Channel B
RisingEdgeChB	Rising Edge Channel B
FallingEdgeChAor B	Falling Edge Channel A or Channel B
RisingEdgeChAorB	Rising Edge Channel A or Channel B

17.12Source Channel A

Name	IOAnalyzerSourceChannelA	**Custom**
Description	Selects an analyzer source for channel A.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	See enum entries table below.	
Default value	Off	
Availability	ALL	
Notes	-	
Error behavior	See the device error code documentation.	

Source Channel A Enum Entries:

Name	Description
Off	Off
Line1	Line1
Line2	Line2
Line3	Line3
Line4	Line4
Line5	Line5
Line6	Line6
Line7	Line7
Line8	Line8
Line9	Line9
LinkTrigger0	LinkTrigger0
LinkTrigger1	LinkTrigger1

17.13Source Channel B

Name	IOAnalyzerSourceChannelB	**Custom**
Description	Selects an analyzer source for channel B.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	See enum entries table below.	
Default value	Off	
Availability	ALL	
Notes	-	
Error behavior	See the device error code documentation.	

Source Channel B Enum Entries:

Name	Description
Off	Off
Line1	Line1
Line2	Line2
Line3	Line3
Line4	Line4
Line5	Line5
Line6	Line6

Line7	Line7
Line8	Line8
Line9	Line9
LinkTrigger0	LinkTrigger0
LinkTrigger1	LinkTrigger1

17.14 Start Sampling

Name	IOAnalyzerStartSampling	**Custom**
Description	Starts sampling for the selected trigger condition.	
Interface	Command	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	See enum entries table below.	
Default value	1	
Availability	ALL	
Notes	-	
Error behavior	See the device error code documentation.	

17.15 Stop Sampling

Name	IOAnalyzerStopSampling	**Custom**
Description	Stops sampling for the selected trigger condition.	
Interface	Command	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	See enum entries table below.	
Default value	1	
Availability	ALL	
Notes	-	
Error behavior	See the device error code documentation.	

17.16 Sample Rate Reduction

Name	IOAnalyzerSampleRateReduction	**Custom**
Description	Selects the sample rate reduction factor.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	See enum entries table below.	
Default value	ReductionFactor_1	
Availability	ALL	
Notes	-	
Error behavior	See the device error code documentation.	

Sample Rate Reduction Enum Entries:

Name	Description
ReductionFactor_1	No sample rate reduction
ReductionFactor_10	Sample rate reduction by factor 10
ReductionFactor_100	Sample rate reduction by factor 100
ReductionFactor_1000	Sample rate reduction by factor 1000

17.17 Sample Rate

Name	IOAnalyzerSampleRate	**Custom**
Description	Displays the sample rate in Hz.	
Interface	Float	
Access mode	Read Only	
Adjustable while grabbing	No	
Value range	-	
Default value	-	
Availability	ALL	
Notes	-	
Error behavior	See the device error code documentation.	

17.18 Trigger Position

Name	IOAnalyzerTriggerPosition	**Custom**
Description	Selects the trigger position for an io analyzer.	
Interface	Integer	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	[0, 2047]	
Default value	0	
Availability	ALL	
Notes	-	
Error behavior	See the device error code documentation.	

17.19 IO Analyzer State

Name	IOAnalyzerState	**Custom**
Description	Displays the state of an IO analyzer.	
Interface	Enumeration	
Access mode	Read Only	
Adjustable while grabbing	No	
Value range	See enum entries table below.	
Default value	PreEventSampling	
Availability	ALL	
Notes	-	
Error behavior	See the device error code documentation.	

IO Analyzer State Enum Entries:

Name	Description
PreEventSampling	An IO Analyzer is in pre-event sampling state.
WaitForTrigger	An IO Analyzer is waiting for the trigger.
Sampling	An IO Analyzer is sampling the signal.
Finished	An IO Analyzer is stopped manually, or the buffer is full.

17.20IO Analyzer State

Name	IOAnalyzerState	**Custom**
Description	Displays the state of an IO analyzer.	
Interface	Enumeration	
Access mode	Read Only	
Adjustable while grabbing	No	
Value range	See enum entries table below.	
Default value	PreEventSampling	
Availability	ALL	
Notes	-	
Error behavior	See the device error code documentation.	

IO Analyzer State Enum Entries:

Name	Description
PreEventSampling	An IO Analyzer is in pre-event sampling state.
WaitForTrigger	An IO Analyzer is waiting for the trigger.
Sampling	An IO Analyzer is sampling the signal.
Finished	An IO Analyzer is stopped manually, or the buffer is full.

17.21IO Analyzer Status

Name	IOAnalyzerStatus	**Custom**
Description	Displays the status of an IO analyzer.	
Interface	Enumeration	
Access mode	Read Only	
Adjustable while grabbing	No	
Value range	See enum entries table below.	
Default value	AnalyzerInactive	
Availability	ALL	
Notes	-	
Error behavior	See the device error code documentation.	

IO Analyzer Status Enum Entries:

Name	Description
AnalyzerInactive	Analyzer is not active.
AnalyzerInProgress	Analyzer is either waiting for trigger or sampling.
Success	Sampling finished successfully.
Warning	An IO Analyzer is finished with warning.
AliasingWarning	Could not sample all the signal transition.

17.22Event Count

Name	IOAnalyzerEventCount	**Custom**
Description	Displays the valid IO analyzer events occurred.	
Interface	Integer	
Access mode	Read Only	
Adjustable while grabbing	No	
Value range	[0, 2048]	
Default value	2048	
Availability	ALL	
Notes	-	
Error behavior	See the device error code documentation.	

18 Encoder Control

18.1 Encoder Selector

Name	EncoderSelector	**Standard**
Description	Selects which Encoder to configure.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	See enum entries table below.	
Default value	**Encoder0**	
Availability	**ALL**	
Notes	This feature is not available if MasterSlaveMode is configured as Slave.	
Error behavior	See the device error code documentation.	

Encoder Selector Enum Entries:

Name	Description
Encoder0	Selects Encoder0

18.2 Encoder Source A

Name	EncoderSourceA[EncoderSelector]	**Standard**
Description	Selects the signal which will be the source of the input A of the encoder.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	No	
Value range	See enum entries table below.	
Default value	**Off**	
Availability	**ALL**	
Notes	This feature is not available if MasterSlaveMode is configured as Slave.	
Error behavior	See the device error code documentation.	

Encoder Source A Enum Entries:

Name	Description	Availability
Off	Encoder does not forward any input. When set to off the encoder counter inserted into the info block gets reset.	ALL
Line1	Encoder forward input is taken from the I/O Line1	ALL
Line2	Encoder forward input is taken from the I/O Line1	NEO
Line3	Encoder forward input is taken from the I/O Line3	ALL
Line4	Encoder forward input is taken from the I/O Line4	ALL
Line5	Encoder forward input is taken from the I/O Line5	ALL
Line6	Encoder forward input is taken from the I/O Line6	ALL
Line7	Encoder forward input is taken from the I/O Line7	NEO
Line8	Encoder forward input is taken from the I/O Line8	NEO
LinkTrigger0	Specifies LinkTrigger0 to use as encoder source (received from the CoaxPress transport layer)	X_cxp
LinkTrigger1	Specifies LinkTrigger1 to use as encoder source (received from the CoaxPress transport layer)	X_cxp

18.3 Encoder Source B

Name	EncoderSourceB[EncoderSelector]	**Standard**
Description	Selects the signal which will be the source of the input B of the encoder.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	No	
Value range	See enum entries table below.	
Default value	**Off**	
Availability	**ALL**	
Notes	This feature is not available if MasterSlaveMode is configured as Slave.	
Error behavior	See the device error code documentation.	

Encoder Source B Enum Entries:

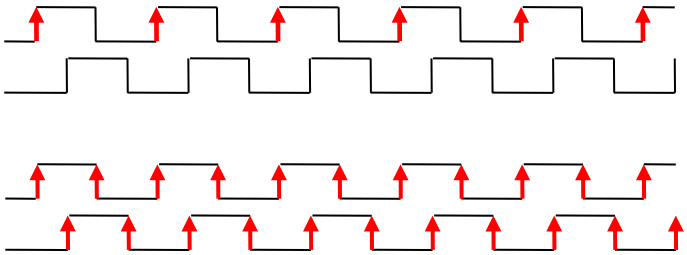
Name	Description	Availability
Off	Encoder does not forward any input	ALL
Line1	Encoder forward input is taken from the I/O Line1	NEO
Line2	Encoder forward input is taken from the I/O Line2	ALL
Line3	Encoder forward input is taken from the I/O Line3	ALL
Line4	Encoder forward input is taken from the I/O Line4	ALL
Line5	Encoder forward input is taken from the I/O Line5	NEO
Line6	Encoder forward input is taken from the I/O Line6	NEO
Line7	Encoder forward input is taken from the I/O Line7	NEO
Line8	Encoder forward input is taken from the I/O Line8	NEO
LinkTrigger 0	Specifies LinkTrigger0 to use as encoder source (received from the CoaxPress transport layer)	X_cxp
LinkTrigger 1	Specifies LinkTrigger1 to use as encoder source (received from the CoaxPress transport layer)	X_cxp

18.4 Encoder Mode

Name	EncoderMode[EncoderSelector]	**Standard**
Description	Selects whether the count of encoder uses FourPhase mode or the HighResolution mode.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	No	
Value range	See enum entries table below.	
Default value	**FourPhase**	
Availability	**ALL**	
Notes	A jitter filter is applied to the encoder sources for all encoder modes. To achieve higher jitter filtering use Encoder Average feature. The scan direction detection is based on Encoder Source B and independent of the encoder mode. This feature is not available if MasterSlaveMode is configured as Slave.	
Error behavior	See the device error code documentation.	

Encoder Mode Enum Entries:

Name	Description
FourPhase	The counter increments or decrements 1 for every full quadrature cycle. *The Allied Vision Konstanz FourPhase mode is deviating from standard because the state machine defined by SFNC is not implemented.*
HighResolution	The counter increments or decrements every quadrature phase for high resolution counting. *This mode is not recommended due to jitter of the encoder.*



18.5 Encoder Output Mode

Name	EncoderOutputMode[EncoderSelector]	**Standard**
Description	Selects the conditions for the encoder interface to generate a valid encoder output signal.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	See enum entries table below.	
Default value	**Motion**	
Availability	**ALL**	
Notes	This feature is not available if MasterSlaveMode is configured as Slave.	
Error behavior	See the device error code documentation.	

Encoder Output Mode Enum Entries:

Name	Description
Motion	Output pulses are generated at all motion increments in both directions.
PositionUp	Output pulses are generated at all new positions in the positive direction. If encoder reverses no output pulse are generated until it has again passed the position where the reversal started.
PositionDown	Output pulses are generated at all new positions in the negative direction. If encoder reverses no output pulse are generated until it has again passed the position where the reversal started.

18.6 Encoder Divider Float

Name	EncoderDividerFloat[EncoderSelector]	**Custom**
Description	Specifies the number of encoder steps needed to generate an encoder output pulse	
Interface	Float	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	[0.02 , 255.999]	
Default value	1.0	
Availability	**ALL**	
Notes	This is the minimum divider value working in combination with other factors! This feature is not available if MasterSlaveMode is configured as Slave.	
Error behavior	See the device error code documentation.	

18.7 Encoder Average

Name	EncoderAverage[EncoderSelector]	**Custom**
Description	Specifies the number of averaged encoder input pulses.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable	Yes	

while grabbing	
Value range	See enum entries table below.
Default value	**Average1**
Availability	**ALL**
Notes	This feature is not available if MasterSlaveMode is configured as Slave.
Error behavior	See the device error code documentation.

Encoder Output Mode Enum Entries:

Name	Description
Average1	No averaged performed
Average2	Average 2
Average4	Average 4
Average8	Average 8
Average16	Average 16

18.8 Encoder Value

Name	EncoderValue[EncoderSelector]	**Standard**
Description	Reads the current value of the position counter of the selected counter.	
Interface	Integer	
Access mode	Read Only	
Adjustable while grabbing	-	
Value range	[0, 65535]	
Default value	**0**	
Availability	**ALL**	
Notes	This feature is available only if EncoderOutputMode is either PositionUp or PositionDown.	
Error behavior	See the device error code documentation.	

19 Led Flash Control

19.1 Led Flash Enable

Name	LedFlashEnable	**Custom**
Description	Enables Led flashing feature to support LED drivers with strobe signals for flashing	
Interface	Boolean	
Access mode	Read/Write	
Adjustable while grabbing	No	
Value range	**True** – Led flash is enabled **False** – Led flash is disabled	
Default value	False	
Availability	**ALL**	
Notes	-	
Error behavior	See the device error code documentation.	

19.2 Led Flash Number of Pattern

Name	LedFlashNumberOfPattern	**Custom**
Description	Number of Led Flash pattern per flashing sequence	
Interface	Integer	
Access mode	Read/Write	
Adjustable while grabbing	No	
Value range	[1 , 4]	
Default value	1	
Availability	**ALL**	
Notes	-	
Error behavior	See the device error code documentation.	

19.3 Led Flash Pattern Selector

Name	LedFlashPatternSelector	**Custom**
Description	Selects which Led Flash Pattern to configure	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	See enum entries table below.	
Default value	**LedFlashPattern1**	
Availability	**ALL**	
Notes	This feature is not available if MasterSlaveMode is configured as Slave.	
Error behavior	See the device error code documentation.	

Led Flash Pattern Selector Enum Entries:

Name	Description
LedFlashPattern1	Led Flash Pattern 1
LedFlashPattern2	Led Flash Pattern 2
LedFlashPattern3	Led Flash Pattern 3
LedFlashPattern4	Led Flash Pattern 4

19.4 Out1 OnTime

Name	LedFlashOut1OnTime[LedFlashPatternSelector]		**Custom**
Description	This controls the On time for Flash Output 1		
Interface	Float		
Access mode	Read/Write		
Adjustable while grabbing	No		
Value range	**Variant**	**Value Range**	
	ax_X	[0.0, 3495.04]	
	g8_X	[0.0, 3276.60]	
Default value	0.0		
Availability	**ALL**		
Notes	This feature is not available if MasterSlaveMode is configured as Slave.		
Error behavior	See the device error code documentation.		

19.5 Out2 OnTime

Name	LedFlashOut2OnTime[LedFlashPatternSelector]		**Custom**
Description	This controls the On time for Flash Output 2		
Interface	Float		
Access mode	Read/Write		
Adjustable while grabbing	No		
Value range	**Variant**	**Value Range**	
	ax_X	[0.0, 3495.04]	
	g8_X	[0.0, 3276.60]	
Default value	0.0		
Availability	**ALL**		
Notes	This feature is not available if MasterSlaveMode is configured as Slave.		
Error behavior	See the device error code documentation.		

19.6 Out3 OnTime

Name	LedFlashOut3OnTime[LedFlashPatternSelector]		**Custom**
Description	This controls the On time for Flash Output 3		
Interface	Float		
Access mode	Read/Write		
Adjustable while grabbing	No		
Value range	**Variant**	**Value Range**	
	ax_X	[0.0, 3495.04]	
	g8_X	[0.0, 3276.60]	
Default value	0.0		
Availability	**ALL**		
Notes	This feature is not available if MasterSlaveMode is configured as Slave.		
Error behavior	See the device error code documentation.		

19.7 Out4 OnTime

Name	LedFlashOut4OnTime[LedFlashPatternSelector]		**Custom**
Description	This controls the On time for Flash Output 4		
Interface	Float		
Access mode	Read/Write		
Adjustable while grabbing	No		
Value range	**Variant**	**Value Range**	
	ax_X	[0.0, 3495.04]	
	g8_X	[0.0, 3276.60]	
Default value	0.0		
Availability	**ALL**		
Notes	This feature is not available if MasterSlaveMode is configured as Slave.		
Error behavior	See the device error code documentation.		

19.8 Pattern Off Delay

Name	LedFlashPatternOffDelay[LedFlashPatternSelector]		**Custom**
Description	This increases the duration of the specified pattern		
Interface	Float		
Access mode	Read/Write		
Adjustable while grabbing	No		
Value range	**Variant**	**Value Range**	
	ax_X	[0.0, (3495.04 – MaxOutXOnTime)]	
	g8_X	[0.0, (3276.60 – MaxOutXOnTime)]	
	MaxOutXOnTime is the maximum of the flash out on time of the specified pattern.		
Default value	0.0		
Availability	**ALL**		
Notes	This feature is not available if MasterSlaveMode is configured as Slave.		
Error behavior	See the device error code documentation.		

19.9 Pattern duration

Name	LedFlashPatternDuration[LedFlashPatternSelector]	**Custom**
Description	This is the resulting duration of the specified pattern	
Interface	Float	
Access mode	Read Only	
Adjustable while grabbing	-	
Value range	The value depends on the minimum line time and on the maximum flash out on time of the specified pattern.	
Default value	-	
Availability	**ALL**	
Notes	This feature is not available if MasterSlaveMode is configured as Slave.	
Error behavior	-	

19.10 Led Flash Frame Control

Name	LedFlashFrameControl	**Custom**
Description	Determine if Led flash signals are generated continuously or only while image scan	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	No	
Value range	See enum entries table below.	
Availability	**ALL**	
Default value	**Continuous**	
Notes	This feature is not available if MasterSlaveMode is configured as Slave.	
Error behavior	See the device error code documentation.	

Led Flash Frame Control Enum Entries:

Name	Description
Continuous	Flash pulses are generated continuously
ImageFrame	Flash pulses are generated only during image scan

19.11 Led Flash Sequence Time

Name	LedFlashSequenceTime		**Custom**
Description	This is the time to repeat all defined pattern in free-run mode.		
Interface	Float		
Access mode	Read/Write		
Adjustable while grabbing	No		
Value range	**Variant**	**Value Range**	
	ax_X	[(MinLineTime * NoOfPattern), 13980.8]	
	g8_X	[(MinLineTime * NoOfPattern), 13107.0]	
	The minimum value depends on different factors like minimum line time of the system together with number of patterns.		
Default value	-		
Availability	**ALL**		
Notes	This feature is not available if MasterSlaveMode is configured as Slave.		
Error behavior	See the device error code documentation.		

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20.1 Light Controller Set Load

Name	LightControllerSetLoad	**Custom**
Description	Loads the Light Controller Set to the device and actives it.	
Interface	Command	
Access mode	Read/Write	
Adjustable while grabbing	-	
Value range	1	
Default value	1	
Notes	-	
Error behavior	-	

20.2 Light Controller Set Save

Name	LightControllerSetSave	**Custom**
Description	Save the Light Controller Set to the non-volatile memory of the device.	
Interface	Command	
Access mode	Read/Write	
Adjustable while grabbing	-	
Value range	1	
Default value	1	
Notes	-	
Error behavior	-	

20.3 Light Controller Scan Devices

Name	LightControlScanDevices	**Custom**
Description	Performs a scan for XLCs.	
Interface	Command	
Access mode	Write only	
Adjustable while grabbing	-	
Value range	1	
Default value	1	
Notes	-	
Error behavior	-	

20.4 Light Controller Scan Status

Name	LightControllerScanStatus	**Custom**
Description	Displays Light Controller scan status information.	
Interface	Enumeration	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	See enum entries table below.	
Default value	-	
Notes	-	
Error behavior	-	

Light Controller Scan Status Enum Entries:

Name	Description
NoScanExecuted	No scan executed
ScanInProgress	Scan in progress
ScanFinished	Scan finished

20.5 Light Controller Detected Devices

Name	LightControllerDetectedDevices	**Custom**
Description	The bit position represents the on/off state of the light controller.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	≥0	
Default value	-	
Notes	-	
Error behavior	-	

20.6 Light Controller General Error

Name	LightControllerGeneralError	**Custom**
Description	Displays Light Controller General Error Information.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	-	
Value range	See enum entries table below.	
Default value	-	
Notes	-	
Error behavior	-	

Light Controller General Error Enum Entries:

Name	Description
No Error	NoError
Communication Not Enabled	CommunicationNotEnabled
No Device Available	NoDeviceAvailable
Device Not Available	DeviceNotAvailable
Invalid Controller Selector	InvalidControllerSelector
Invalid Channel Selector	InvalidChannelSelector
Link May Be Broken	LinkMayBeBroken
Invalid ID	InvalidID
ID Already Assigned	IDAlreadyAssigned

20.7 Light Controller Selector

Name	LightControllerSelector	**Standard**
Description	Selects the Light Controller to configure.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	-	
Value range	See enum entries table below.	
Default value	-	
Notes	-	
Error behavior	-	

Light Controller Selector Enum Entries:

Name	Description
LightControllerBroadcast	Light Controller Broadcast
LightController2	Light Controller 2
LightController3	Light Controller 3
LightController4	Light Controller 4
LightController5	Light Controller 5
LightController6	Light Controller 6
LightController7	Light Controller 7
LightController8	Light Controller 8
LightController9	Light Controller 9
LightController10	Light Controller 10
LightController11	Light Controller 11
LightController12	Light Controller 12
LightController13	Light Controller 13
LightController14	Light Controller 14
LightController15	Light Controller 15

20.8 Light Connection Status

Name	LightConnectionStatus	**Standard**
Description	Status of a light connected to the controller's output line.	
Interface	Enumeration	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	See enum entries table below.	
Default value	-	
Notes	-	
Error behavior	-	

Light Connection Status Enum Entries:

Name	Description
Sensing	Sensing
Ready	Ready
NoConnect	No connect
ResponseError	Response error
Error	Error

20.9 Light Controller Reset

Name	LightControllerReset	**Custom**
Description	Resets the selected XLC.	
Interface	Command	
Access mode	Write only	
Adjustable while grabbing	-	
Value range	1	
Default value	1	
Notes	-	
Error behavior	-	

20.10 Light Controller Assign ID

Name	LightControllerAssignID	**Custom**
Description	Represents the current Light Controller ID and changes it if another one has been entered.	
Interface	Integer	
Access mode	Read/Write	
Adjustable while grabbing	-	
Value range	-	
Default value	-	
Notes	-	
Error behavior	-	

20.11 Light Controller Input Voltage

Name	LightControllerInputVoltage	**Custom**
Description	Displays the Light Controller input voltage.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	-	
Default value	-	
Notes	The unit is mV.	
Error behavior	-	

20.12Light Controller Detailed Error Information

Name	LightControllerDetailedErrorInformation	**Custom**
Description	Detailed error information about the selected light controller.	
Interface	Enumeration	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	See enum entries table below.	
Default value	-	
Notes	-	
Error behavior	-	

Light Controller Detailed Error Enum Entries:

Name	Description
NoError	No Error
InvalidCommando	Invalid Commando
InvalidParameter	Invalid Parameter
Parameter	Parameter
CommandNotSupported	Command Not Supported
InputVoltage	Input Voltage
AnalogVoltage	Analog Voltage
LedOutput	Led Output
FailNoSignal	Fail No Signal
TemperatureWarning	Temperature Warning
TemperatureError	Temperature Error
ShutdownSignal	Shutdown Signal
EepromWriteDriverUnit	EEPROM Write Driver Unit
EepromReadDriverUnit	EEPROM Read Driver Unit
EepromWriteLed	EEPROM Write LED
EepromReadLed	EEPROM Read LED
Fan	Fan
AnalogOutputVoltage	Analog Output Voltage
SeeGeneralError	See General Error

20.13Light Controller Serial Number

Name	LightControllerSerialNumberReg	**Custom**
Description	Serial Number of the Light Controller	
Interface	String	
String Length	32	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	-	
Default value	-	
Notes	-	
Error behavior	-	

20.14Light Controller Channel Selector

Name	LightControllerChannelSelector	**Custom**
Description	Selects the Light Controller Channel to configure.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	-	
Value range	See enum entries table below.	
Default value	-	
Notes	-	
Error behavior	-	

Light Controller Selector Enum Entries:

Name	Description
LightControllerChannelA	Light Controller Channel A
LightControllerChannelB	Light Controller Channel B
LightControllerChannelC	Light Controller Channel C
LightControllerChannelD	Light Controller Channel D
LightControllerChannelBroadcast	Light Controller Channel Broadcast

20.15Light Current Rating

Name	LightCurrentRating	**Standard**
Description	Set the current rating of the lighting output.	
Interface	Float	
Access mode	Read/Write	
Adjustable while grabbing	-	
Value range	≥0	
Default value	-	
Notes	The unit is Amp.	
Error behavior	-	

20.16Light Enable

Name	LightEnable	**Custom**
Description	Controls the light for the selected Lighting Controller.	
Interface	Boolean	
Access mode	Read/Write	
Adjustable while grabbing	-	
Value range	**True** – Enables the selected lighting controller **False** – Disables the selected lighting controller	
Default value	-	
Notes	-	
Error behavior	-	

20.17Light Controller Driver Temperature

Name	LightControllerDriverTemperatureReg	**Custom**
Description	Light Controller Driver Temperature	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	-	
Default value	-	
Notes	The unit is degrees Celsius.	
Error behavior	-	

20.18Light Controller Luminant Temperature

Name	LightControllerLuminantTemperatureReg	**Custom**
Description	Light Controller Luminant Temperature	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	-	
Default value	-	
Notes	The unit is degrees Celsius.	
Error behavior	-	

21 Device Error Code

The Device error code is organized in two parts. The upper two bytes define a category The lower two bytes define the specific error that occurred in this category.

Example

If the region of interest exceeds the sensor boundaries, the following error code is provided by the DeviceErrorCode:

0x00010003

The yellow part defines the category and the green part the specific error. Use the category error number to figure out, in which section you need to search for the specific error code.
So 0x0001 is the category code of the image format control (IMF_ERROR_CATEGORY) group. In this category the code 0x0003 defines the specific error code for the case when the region of interest exceeds the sensor boundaries.

21.1 Error Category (Upper 2 bytes)

This section contains an overview of the categories error codes. This is the upper part of the DeviceErrorCode.

Definition	Value	Description
IMF_ERROR_CATEGORY	0x0001	Image format control error category
ALG_CTRL_ERROR_CATEGORY	0x0002	Analog control error category
ACQ_CTRL_ERROR_CATEGORY	0x0003	Acquisition control error category
DIG_IO_CTRL_ERROR_CATEGORY	0x0004	Digital I/O control error category
ENC_CTRL_ERROR_CATEGORY	0x0005	Encoder control error category
USER_SET_CTRL_ERROR_CATEGORY	0x0006	User set control error category
ICC_ERROR_CATEGORY	0x0007	Image calibration control error category
LUT_CTRL_ERROR_CATEGORY	0x0008	Look-up table control error category
CT_CTRL_ERROR_CATEGORY	0x0009	Color transformation control error category.
DEV_CTRL_ERROR_CATEGORY	0x000A	Device control error category
FAC_ERROR_CATEGORY	0x000B	File access control error category
LED_FLASH_CTRL_ERROR_CATEGORY	0x000C	Led flash control error category
IO_ANALYZER_ERROR_CATEGORY	0x000D	IO Analyzer error category

21.2 Specific Error (Lower 2 bytes)

This section contains the specific error codes (lower part of the DeviceErrorCode) grouped by the category. Check the DeviceErrorMessage feature to get a description of the error occurred.

21.2.1 Image Format Control (IMF_ERROR_CATEGORY)

The below table contains the details of specific error belongs to the IMF_ERROR_CATEGORY (0x0001).

Definition	Value	Description
IMF_ERR_ROI_INVALID_ WIDTH_OFFSET_MODULO	0x0001	The width or the offset is not a multiple of 8(RGB) or 24(Mono)
IMF_ERR_ROI_WIDTH_ TOO_SMALL	0x0002	The region width is too small
IMF_ERR_ROI_EXCEEDS_ SENSOR_BOUDARIES	0x0003	The region of interest exceeds the sensor boundaries. You need to use a smaller ffset or width.
IMF_ERR_WREF_IN_ MULTIPLE_ROIS	0x0004	The complete gain control region is located in multiple regions. You need to use the gain control region only in one region
IMF_ERR_BV_MAX_ LINE_WIDTH_EXCEEDED	0x0005	The sum of all active region widths and gain control region width (if not completely in one region) exceeds an internal limit of 15360
IMF_ERR_FAILED_TO_ SET_ROI_AT_SENSOR	0x0006	An internal error occurred while setting the region parameters
IMF_ERR_FAILED_TO_ SET_ROI_AT_TRANSPORT_LAYER	0x0007	An internal error occurred while setting the region parameters
IMF_ERR_INVALID_ BINNING_PARAMETER	0x0008	The binning parameter is not supported. You need to use either 1 or 2 for binning parameter
IMF_ERR_INVALID_ PIXEL_FORMAT	0x0009	Invalid value for pixel format. You need to use a supported pixel format
IMF_ERR_COULD_NOT_ ADJUST_ROI_WIDTH_TO_PXFMT	0x000A	Could not adjust region width corresponding to pixel format. Increase the region width before changing the pixel format
IMF_ERR_COULD_NOT_ADJUST_ WREF_OFFSET_WIDTH_TO_PXFMT	0x000B	Could not adjust gain control region width or ffset corresponding to pixel format. Increase the gain control region width or ffset before changing the pixel format
IMF_ERR_INVALID_ROI_WIDTH_ OFFSET_MODULO_PXFMT	0x000C	Invalid region width or offsetX
IMF_ERR_ INVALID_WREF_WIDTH_ OFFSET_MODULO_PXFMT	0x000D	Invalid gain control region width or offsetX
IMF_ERR_FAILED_TO_SET_ PIXFMT_AT_SENSOR	0x000E	An internal error occurred while setting the pixel format
IMF_ERR_ FAILED_TO_SET_ PIXFMT_AT_TRANSPORT_LAYER	0x000F	An internal error occurred while setting the pixel format
IMF_ERR_TRIGGER_SLAVE_DELAY_ LINES_OUT_OF_RANGE	0x0010	The trigger or slave delay lines value is out of range
IMF_ERR_IMAGE_HEIGHT_ OUT_OF_RANGE	0x0011	The image height is out of range
IMF_ERR_TRG_SLAVE_DEL_GCTRL_ OFFSET_Y_TOO_SMALL	0x0012	The trigger or slave delay lines value is too small with respect to gain control region offset. The sum of trigger delay lines and gain control region ffset must be atleast 2
IMF_ERR_ TRG_SLAVE_DEL_GCTRL _ OFFSET_Y_TOO_LARGE	0x0013	The trigger or slave delay lines value is too large with respect to gain

		control region offset. The sum of trigger delay lines and gain control region ffset must be less than 32767
IMF_ERR_TESTPATTERN_ VALUE_OUT_OF_RANGE	0x0014	The test pattern value is out of range
IMF_ERR_INVALID_PARAMETER	0x0015	Invalid Parameter
IMF_ERR_DECIMATION_HOR_OUT_OF_RANGE	0x0016	The Decimation Horizontal Float value is out of range!
IMF_ERR_INVALID_PIXEL_COLOR_FILTER	0x0017	Invalid pixel color filter!
IMF_ERR_INFO_BLOCK_TRG_SRC_LINE_MODE_INVALID	0x0018	Selected info block trigger source line mode is invalid. Please change the Line Mode to Input.
IMF_ERR_REGION_FEATURES_LOCKED	0x0019	Selected region features are locked and cannot be written. RegionStream0 is read only feature.

21.2.2 Analog Control (ALG_CTRL_ERROR_CATEGORY)

The below table contains the details of specific error belongs to the ALG_CTRL_ERROR_CATEGORY (0x0002).

Definition	Value	Description
ALG_CTRL_ERR_GAINCTRL_ OFFSET_Y_RANGE	0x0001	The gain control region ffset is out of range
ALG_CTRL_ERR_GAINCTRL_ WIDTH_RANGE	0x0002	The gain control region width is out of range
ALG_CTRL_ERR_GAINCTRL_ HEIGHT_RANGE	0x0003	The gain control region height is out of range
ALG_CTRL_ERR_GAINCTRL_ EXCEEDS_SENSOR_BOUNDARIES	0x0004	The gain control region exceeds the sensor boundaries. You need to use a smaller ffset or width
ALG_CTRL_ERR_GAINCTRL_ OFFSET_X_RANGE	0x0005	The gain control region ffset is out of range
ALG_CTRL_ERR_GAINCTRL_ INVALID_WIDTH_OFFSET_MODULO	0x0006	The width or the offset is not a multiple of 8(RGB) or 24(Mono)
ALG_CTRL_ERR_GAINCTRL_ EXCEEDS_BV_WIDTH_LIMIT	0x0007	The sum of all active region widths and gain control region width (if not completely in one region) exceeds an internal limit of 15360
ALG_CTRL_ERR_GAINCTRL_ IN_MULTIPLE_ROIS	0x0008	The complete gain control region is located in multiple regions. You need to use the gain control region only in one region
ALG_CTRL_ERR_FAILED_TO_ SET_GAINCTRL_AT_SENSOR	0x0009	An internal error occurred while setting the gain control region parameters
ALG_CTRL_ERR_STOP_GAIN_ FACTOR_OUT_OF_RANGE	0x000A	The stop gain factor is out of range
ALG_CTRL_ERR_GAINCTRL_ OFFSET_Y_TOO_SMALL	0x000B	The gain control region ffset is too small! It must be larger than 2 when using no frame trigger. When using frame trigger the sum of trigger delay lines and gain control region ffset must be atleast 2.

ALG_CTRL_ERR_GAINCTRL_ OFFSET_Y_TOO_LARGE	0x000C	The gain control region ffset is too large! It must be less than or equals to: Height – GainControlRegionHeight when using no frame trigger. When using frame trigger the sum of trigger delay lines and gain control region ffset must be less than 32767.
ALG_CTRL_ERR_GAINCTRL_ TARGET_VALUE_OUT_OF_RANGE	0x000D	The gain control target value is out of range
ALG_CTRL_ERR_BRIGHTNESS_ CONTRAST_GAIN_OUT_OF_RANGE	0x000E	The contrast (gain) value of the brightness contrast feature is out of range
ALG_CTRL_ERR_ BRIGHTNESS_ CONTRAST_OFFSET_OUT_OF_RANGE	0x000F	The brightness (offset) value of the brightness contrast feature is out of range
ALG_CTRL_ERR_GAIN_ VALUE_OUT_OF_RANGE	0x0010	The gain value is out of range
ALG_CTRL_ERR_GAIN_ AUTO_AVG_SAMPLES_OUT_OF_RANGE	0x0011	The average samples value is out of range
ALG_CTRL_ERR_GAMMA_ VALUE_OUT_OF_RANGE	0x0012	The gamma value is out of range
ALG_CTRL_ERR_INVALID_PARAMETER	0x0013	The parameter is invalid!
ALG_CTRL_ERR_SENSOR_SENSITIVITY_VALUE_OUT_OF_RANGE	0x0014	The sensor sensitivity is out of range
ALG_CTRL_TIMEOUT_READING_VIDEOLEVEL	0x0015	Timeout occurred at reading video level
ALG_CTRL_ERROR_ADAPT_TARGETVALUE	0x0016	Error at adapting Target value for GainControlRegion

21.2.3 Acquisition Control (ACQ_CTRL_ERROR_CATEGORY)

The below table contains the details of specific error belongs to the ACQ_CTRL_ERROR_CATEGORY (0x0003).

Definition	Value	Description
ACQ_CTRL_ERR_FEATURE_ CHANGE_DURING_IMG_AC Q	0x0001	The feature change is not allowed while grabbing
ACQ_CTRL_ERR_TRG_ SELECTOR_INVALID	0x0002	The trigger selector is invalid
ACQ_CTRL_ERR_TRG_SIG_ DETEC_MODE_NOT_AVAILA BLE	0x0003	The trigger signal detection mode is invalid for LineStart. You need to use TriggerSignalDetectionMode feature only for Frame trigger
ACQ_CTRL_ERR_LINE_ TRG_SRC_INVALID	0x0004	The selected source for line trigger is invalid
ACQ_CTRL_ERR_TRG_ ACTIV_INVALID	0x0005	The trigger activation value is invalid
ACQ_CTRL_ERR_TRG_ SRC_USED_BY_OTHER_TRI GGER	0x0006	The trigger source is already assigned for another trigger. You need to use different source for LineStart and Frame trigger
ACQ_CTRL_ERR_TRG_ FRAME_START_ACTIV_INVA LID	0x0007	The trigger activation is invalid for FrameStart/FrameBurstStart. You can use RisingEdge/FallingEdge for FrameStart/FrameBurstStart
ACQ_CTRL_ERR_TRG_ FRAME_ACTIVE_ACTIV_INV ALID	0x0008	The trigger activation is invalid for FrameActive. You can use LevelHigh/LevelLow for FrameActive
ACQ_CTRL_ERR_FRAME_ TRG_SRC_INVALID	0x0009	The selected source for frame trigger is invalid
ACQ_CTRL_ERR_MASTER_ TRG_SRC_INVALID	0x000A	The source (encoder0, Line1, Line2 and InternalLB) for SelectMaster_Input trigger is invalid
ACQ_CTRL_ERR_EXPOSUR E_ TIME_TOO_SMALL	0x000B	The exposure time is too small

ACQ_CTRL_ERR_EXPOSURE_ TIME_TOO_LARGE	0x000C	The exposure time is too large
ACQ_CTRL_ERR_LINE_TIME_ TOO_SMALL	0x000D	The line time is too small with respect to exposure time.
ACQ_CTRL_ERR_LINE_TIME_ TOO_LARGE	0x000E	The line time is too large
ACQ_CTRL_ERR_LINE_TIME_ TOO_SMALL_RUNTIME	0x000F	The line time is too small, when considering run time parameters
ACQ_CTRL_ERR_OTHER_FRAME_TRG_MODE_ON	0x0010	Selected frame trigger mode cannot be made On because other frame trigger mode is already On
ACQ_CTRL_ERR_TRG_FRAME_END_SRC_INVALID	0x0011	Invalid FrameEnd source
ACQ_CTRL_ERR_DEBOUNCING_ MODE_INVALID	0x0012	Invalid debouncing mode
ACQ_CTRL_ERR_TRIGGER_ DIV_OUT_OF_RANGE	0x0013	The trigger divider value is out of range
ACQ_CTRL_ERR_TRIGGER_ DIV_NOT_AVAILABLE	0x0014	The trigger divider is not available for any frame trigger
ACQ_CTRL_ERR_TRG_ LINE_ACTIV_INVALID	0x0015	The trigger activation value is invalid for LineStart. You can use only RisingEdge for LineStart
ACQ_CTRL_ERR_TRG_ DELAY_LINES_NOT_AVAILABLE	0x0016	The trigger delay lines is invalid for LineStart. You can use trigger delay lines only for any Frame trigger
ACQ_CTRL_ERR_LINE_ START_DISABLE_INVALID	0x0017	Invalid LineStart Disable
ACQ_CTRL_ERR_INVALID_ SELECTOR_TRIGGER_DISABLE	0x0018	The trigger disable is invalid for FrameStart/Active. You can use trigger disable only for LineStart
ACQ_CTRL_ERR_SELECTED_ LINE_IS_OUTPUT	0x0019	The trigger source used is not configured correctly which is the line mode to output. You need to set the selected line mode to input
ACQ_CTRL_ERR_INVALID_ PARAMETER	0x001A	The parameter is invalid!
ACQ_CTRL_ERR_FRAME_RATE_ ENABLE	0x001B	The AcquisitionFrameRateEnable feature can be enabled only if the mode of all frame triggers is set to off!
ACQ_CTRL_ERR_FRAME_RATE_ RANGE	0x001C	The acquisition frame rate value is out of range!
ACQ_CTRL_ERR_FEATURE_ LOCKED	0x001D	The feature is currently locked and cannot be written.
ACQ_CTRL_ERR_TRG_FRAME_ RATE_ENABLE_INVALID	0x001E	Enabling a frame trigger is not permitted if the AcquisitionFrameRateEnable feature is set.
ACQ_CTRL_ERR_MASTER_ SLAVE_MODE_INVALID	0x001F	The master slave mode is invalid.
ACQ_CTRL_ERR_MS_SOURCE_LINE_USED_BY_MS_OUT	0x0020	Selected Master slave source line is already used by master slave output. Please use other line.
ACQ_CTRL_ERR_MASTER_ SLAVE_NOT_CONFIGURED	0x0021	Master slave is not configured properly. Enable any master slave interface.
ACQ_CTRL_ERR_MS_AUTO SELECT_LINE_USED_AS_TRIGGER_SOURCE	0x0022	Enabling AutoSelect mode is not permitted if MS Autoselect line is used as TriggerSource.
ACQ_CTRL_ERR_AUTOSELECT_MODE_ON	0x0023	Enabling the selected trigger is not allowed if trigger source is MS master or slave or autoselect line master slave configuration.
ACQ_CTRL_ERR_TDI_INVALID	0x0024	Invalid time delay integration value.
ACQ_CTRL_TDI_NOT_AVIALABLE	0x0025	TDI feature is not available for color sensor.
ACQ_CTRL_ERR_FRAME_ACTIVE_EXTEND_LINES_IS_ OUT_RANGE	0x0026	Frame active extend lines is out of range.
ACQ_CTRL_ERR_EXTEND_LINES_NOT_AVAILABLE	0x0027	Frame Active Extend Lines feature is not available for FrameStart, frameBurstStart and LineStart trigger.

ACQ_CTRL_ERR_ACQ_START_DURING_IMG_CAL	0x0028	Acquisition cannot be started during internal DSNU or PRNU calibration process. Try again later.
ACQ_CTRL_ERR_TL_THROUGHPUT_TOO_LOW	0x0029	Too low transport layer throughput! Change the link configuration for an image acquisition.
ACQ_CTRL_ERR_MS_LINE_USED_AS_TRIGGER_SOURCE	0x002A	Enabling master or slave mode is not permitted if MS master or slave line is used as TriggerSource.
ACQ_CTRL_ERR_MS_MASTER_MODE_ON	0x002B	Enabling the selected trigger is not allowed if trigger source is MS master line of master slave configuration.
ACQ_CTRL_ERR_LED_FLASH_ON	0x002C	Enabling the selected trigger is not allowed if trigger source is flash out line during led flash is active
ACQ_CTRL_ERR_TL_ACQUISITION_START	0x002D	Error occurred during acuisition start at transport layer! Check the transport layer configuration
ACQ_CTRL_ERR_EXCEEDS_MAX_PAYLOAD_SIZE	0x002E	The calculated payload size exceeds the maximum limit
ACQ_CTRL_ERR_FRAME_END_TRIGGER_NOT_ENABLED	0x002F	FrameBurstActive trigger mode requires to enable the FrameEnd trigger as well!
ACQ_CTRL_ERR_SOFTWARE_TRG_SRC_INVALID_FOR_TRG_SELECTOR	0x0030	Software trigger source is valid only for FrameStart trigger. Please change the trigger selector to FrameStart.
ACQ_CTRL_ERR_MS_OUT_LINE_USED_BY_MS_SOURCE	0x0031	Selected Master slave output line is already used by master slave source. Please use other line.
ACQ_CTRL_ERR_SLAVE_TRIGGER_PARAM_NOT_CONFIGURED	0x0032	Slave trigger parameters are not configured. Please enable trigger mode of any one frame and LineStart trigger.
ACQ_CTRL_ERR_ACQUISITION_LOCKED	0x0033	The acquisition is locked. This may be due to an invalid firmware package for this device.

21.2.4 Digital IO Control (DIG_IO_CTRL_ERROR_CATEGORY)

The below table contains the details of specific error belongs to the DIG_IO_CTRL_ERROR_CATEGORY (0x0004).

Definition	Value	Description
DIG_IO_CTRL_ERR_LINE_SELECTOR_INVALID	0x0001	The line selector is invalid
DIG_IO_CTRL_ERR_USEROUTPUT_SELECTOR_INVALID	0x0002	The user output selector is invalid
DIG_IO_CTRL_ERR_LINE_INVALID_MODE	0x0003	The line mode is invalid with respect to the line format.
DIG_IO_CTRL_ERR_INVALID_LINE_MODE_SOURCE	0x0004	The selected line mode is not valid with respect to the line source. You need to use the selected line mode to output or line source to off
DIG_IO_CTRL_ERR_LINE_MODE_SRC_CHANGE_NOT_ALLOWED	0x0005	The selected line mode or source change is not allowed. The selected line is used either as a trigger source or as an encoder source or MS mode is on
DIG_IO_CTRL_ERR_LINE_INVERTER_NOT_SUPPORTED	0x0006	The selected line does not support enabling or disabling line inverter
DIG_IO_CTRL_ERR_INVALID_LINE_SOURCE	0x0007	Invalid line source
DIG_IO_CTRL_ERR_LINE_SOURCE_NOT_AVAILABLE	0x0008	The line source is not available for the selected line
DIG_IO_CTRL_ERR_LINE_MODE_SOURCE_INVALID	0x0009	The selected line cannot be used as trigger source or Master/slave mode. You need to configure the line mode to Input and line source to Off.
DIG_IO_CTRL_ERR_LINE_FORMAT_INVALID	0x000A	Invalid line format.
DIG_IO_CTRL_ERR_VALUE_OUT_OF_RANGE	0x000B	A value related to digital IO control is out of range.

21.2.5 Encoder Control (ENC_CTRL_ERROR_CATEGORY)

The below table contains the details of specific error belongs to the ENC_CTRL_ERROR_CATEGORY (0x0005).

Definition	Value	Description
ENC_CTRL_ERR_ENC_ SELECTOR_INVALID	0x0001	The encoder selector is invalid
ENC_CTRL_ERR_SRC_ A_INVALID	0x0002	The encoder source A is invalid
ENC_CTRL_ERR_SRC_ B_INVALID	0x0003	The encoder source B is invalid
ENC_CTRL_ERR_ENC_ MODE_INVALID	0x0004	The encoder mode is invalid
ENC_CTRL_ERR_ENC_ AVG_INC_OUT_OF_RANGE	0x0005	The encoder average is out of range
ENC_CTRL_ERR_OUT_ MODE_INVALID	0x0006	The encoder output mode is invalid
ENC_CTRL_ERR_SRC_ IN_USE_BY_OTHER_INPUT	0x0007	The source is already assigned to other input of the selected encoder. You need to use different source for input A and input B
ENC_CTRL_ERR_ENC_ DIV_OUT_OF_RANGE	0x0008	The encoder divider value is out of range
ENC_CTRL_ERR_ SELECTED_LINE_IS_OUTPUT	0x0009	The encoder source A or B used is not configured correctly. You need to set the selected line mode to input.
ENC_CTRL_ERR_ENC_ SRC_B_INVALID_CONFIG	0x000A	Invalid configuration. You need to set some source for input A
ENC_CTRL_ERR_SRC_IN_ USE_BY_INPUTA_OR_INPUTB	0x000B	The source is already assigned for either encoder source input A or B
ENC_CTRL_ERR_ENCODER_SOURCE_ NOT_CONFIGURED	0x000C	Encoder source is not configured. Set Encoder source input A to any line.

21.2.6 User Set Control (USER_SET_CTRL_ERROR_CATEGORY)

The below table contains the details of specific error belongs to the USER_SET_CTRL_ERROR_CATEGORY (0x0006).

Definition	Value	Description
USER_SET_CTRL_ERR_ SELECTOR_INVALID	0x0001	Invalid user set selector
USER_SET_CTRL_ERR_ DEFAULT_READ_ONLY	0x0002	The default user set modification is not allowed
USER_SET_CTRL_ERR_ LOAD_USER_SET_FAILED	0x0003	An error occurred while loading the user set
USER_SET_CTRL_ERR_LOAD_ USER_SET_CMD_VAL_INVALID	0x0004	Invalid load user set command value

21.2.7 Image Calibration Control (ICC_ERROR_CATEGORY)

The below table contains the details of specific error belongs to the ICC_ERROR_CATEGORY (0x0007).

Definition	Value	Description
ICC_ERR_LINE_DISTANCE_ OUT_OF_RANGE	0x0001	The line distance is out of range
ICC_IMGCALMODE_ERR_ INVALID_PARAMETER	0x0002	ImageCalibrationMode is out of range
ICC_IMGCALAUTO_ERR_ INVALID_PARAMETER	0x0003	ImageCalibrationAuto is out of range
ICC_IMG_CAL_FEATURES_LOCKED	0x0004	The selected feature is locked due to an image calibration mode is active
ICC_IMGCALPRNU_NODSNULUT_ACTIVE	0x0005	For PRNU calibration a valid and loaded DSNU is needed
ICC_ERR_SCAN_DIR_CHANGE_ NOT_ALLOWED	0x0006	Scan direction is read only when scan direction source is not internal
ICC_ERR_SCAN_DIR_EXT_SRC_ NOT_CONFIGURED	0x0007	The Encoder0 is not configured properly for the use of ScanDirectionSource. You need to configure EncoderSourceA and EncoderSourceB

ICC_CTRL_FFC_ERR_MULTI_ DATASETS_ENABLING_NOT_SUPPORTED	0x0008	Enabling multiple flat field correction data sets is not supported for this mode or device. It is supported only with LED-Flash and some camera variants. See also the feature reference feature availability table.
ICC_CTRL_ERR_FFC_DATASET_ INVALID_WRT_PIXELFORMAT	0x0009	The selected flat field correction data set does not contain valid data for the configured pixel format.
ICC_CTRL_ERR_FFC_DATASET_ PARAMETER_INVALID	0x000A	Invalid flat field correction data set selector or available plane selector.
ICC_CTRL_ERR_FFC_DATASET_ LOAD_DATA_FAILS	0x000B	Fails to load the selected flat field correction data set.

21.2.8 LUT Control (LUT_CTRL_ERROR_CATEGORY) – Removed from version 14.2.0

The below table contains the details of specific error belongs to the LUT_CTRL_ERROR_CATEGORY (0x0008).

Definition	Value	Description
LUT_CTRL_ERR_FFC_LUT_ COULD_NOT_LOAD_DATA	0x0001	An error occurred while loading the LUT's data from flash
LUT_CTRL_ERR_INVALID_ FFC_LUT	0x0002	The LUT does not contain valid data according to the pixel format
LUT_CTRL_ERR_INVALID_ PARAMETER	0x0003	The parameter is invalid!
LUT_CTRL_ERR_IMGCALAUTO_TIMEOUT	0x0004	Timeout at Internal ImageCalibration
LUT_CTRL_ERR_IMGCALAUTO_INTERNALERROR	0x0005	Error at Internal ImageCalibration

21.2.9 Color Transformation Control (CT_CTRL_ERROR_CATEGORY)

The below table contains the details of specific error belongs to the CT_CTRL_ERROR_CATEGORY (0x0009).

Definition	Value	Description
CT_CTRL_ERR_SELECTOR_INVALID	0x0001	Invalid color transformation module selector.
CT_CTRL_VALUE_SELECTOR_INVALID	0x0002	Invalid color transformation value (gain or offset) selector.
CT_CTRL_ERR_ENABLING_NOT_ALLOWED	0x0003	Already other color transformation module is active.
CT_CTRL_ERR_GAIN_OUT_OF_RANGE	0x0004	Color transformation module gain value is out of range.
CT_CTRL_ERR_OFFSET_OUT_OF_RANGE	0x0005	Color transformation module offset value is out of range.
CT_CTRL_ERR_MODIFICATION_NOT_ALLOWED	0x0006	
CT_CTRL_ERR_PIXELFORMAT_INVALID_WRT_SRGB	0x0007	Invalid pixel format to activate sRGB. Set the pixel format to RGB8

21.2.10 Device Control (DEV_CTRL_ERROR_CATEGORY)

The below table contains the details of specific error belongs to the DEV_CTRL_ERROR_CATEGORY (0x000A).

Definition	Value	Description
DEV_CTRL_ERROR_COULD_ NOT_GET _TEMPERATURE	0x0001	An internal error occurred while getting the temperature
DEV_CTRL_ERROR_INVALID_VALUE	0x0002	Invalid value set.

21.2.11 File Access Control (FAC_ERROR_CATEGORY)

The below table contains the details of specific error belongs to the FAC_ERROR_CATEGORY (0x000B).

Definition	Value	Description
FAC_ERROR_FILE_ALREADY_OPEN	0x0001	A file is already open
FAC_ERROR_INVALID_FILE_SELECTOR	0x0002	Invalid file selector

FAC_ERROR_INVALID_FILE_OPERATION_SELECTOR	0x0003	Invalid file operation selector
FAC_ERROR_INVALID_FILE_OPERATION_EXEC_VAL	0x0004	Invalid file operation execute command value
FAC_ERROR_FILE_OPERATION_IN_PROGRESS	0x0005	File operation is in progress
FAC_ERROR_NO_FILE_OPEN	0x0006	No file is open
FAC_ERROR_FILE_NOT_OPEN_OR_INVALID_OPEN_MODE	0x0007	Either file is not open or file open mode is not write operation
FAC_ERROR_NO_FILE_SELECTED	0x0008	No file is selected. Select any one file
FAC_ERROR_INVALID_FILE_CONTENT	0x0009	Invalid file content
FAC_ERROR_CHECKSUM_CALCULATION_FAILED	0x000A	Calculation of file checksum failed
FAC_ERROR_CHECKSUM_ERROR	0x000B	Comparison of calculated checksum is not matching with the given checksum
FAC_ERROR_INVALID_OPEN_MODE	0x000C	File open mode is not according to the set operation (read, write)
FAC_ERROR_EXCESS_FILE_SIZE	0x000D	File access (read, write) exceeds the file size(max size for writing)
FAC_ERROR_EXCESS_FILE_ACCESS_BUFFER_SIZE	0x000E	File read access exceeds the file access buffer size
FAC_ERROR_COPY_DATA_TO_FILE_ACCESS_BUF_FAILED	0x000F	An error occurred while copying data to the file access buffer
FAC_ERROR_INVALID_FILE_ACCESS_OFFSET	0x0010	Invalid file access offset
FAC_ERROR_FLASH_ACCESS_ERROR	0x0011	An error occurred during flash access like erase, write
FAC_ERROR_INVALID_OPEN_MODE_SELECTOR	0x0012	Invalid file open mode selector
FAC_ERROR_FILE_ACCESS_BUFFER_OVERRUN	0x0013	File access buffer overrun
FAC_ERROR_CLOSE	0x0014	Error during file close operation. The file has not been updated. The file might be invalid.
FAC_ERROR_CLOSE_FATAL	0x0015	Fatal error during file close operation. Avoid switching off camera! Redo the update! Otherwise, the camera might refuse to boot or problems while connecting might occur.

21.2.12 Led Flash Control (LED_FLASH_CTRL_ERROR_CATEGORY)

The below table contains the details of specific error belongs to the LED_FLASH_CTRL_ERROR_CATEGORY (0x000C).

Definition	Value	Description
LED_FLASH_CTRL_ERR_NO_OF_PATTERN_INVALID	0x0001	Number of pattern value is invalid
LED_FLASH_CTRL_ERR_PATTERN_SELECTOR_INVALID	0x0002	Invalid pattern selector
LED_FLASH_CTRL_ERR_INVALID_FRAME_CONTROL	0x0003	Frame control is invalid
LED_FLASH_CTRL_ERR_SEQUENCE_TIME_INVALID	0x0004	Sequence time is less than the sum of all active pattern on time
LED_FLASH_CTRL_ERR_FLASH_OUT_ON_TIME_INVALID	0x0005	Flash out on time of the selected pattern is invalid
LED_FLASH_CTRL_ERR_FLASH_OUT_OFF_DELAY_INVALID	0x0006	Flash out off delay of the selected pattern is invalid
LED_FLASH_CTRL_ERR_MULTI_PRNU_FLASHING_ DISABLE_INVALID	0x0007	Disabling led flashing is not permitted if the multiple PRNU data sets are active.

21.2.13 IO Analyzer (IO_ANALYZER_ERROR_CATEGORY)

The below table contains the details of specific error belongs to the IO_ANALYZER_ERROR_CATEGORY (0x000D).

Definition	Value	Description

IO_ANALYZER_ERR_ TRIGGER_ACTIVATION_INVALID	0x0001	The trigger activation is invalid
IO_ANALYZER_ERR_ SOURCE_CHA_INVALID	0x0002	Invalid source channel A
IO_ANALYZER_ERR_ TRIG_POSITION_OUT_OF_RANGE	0x0003	The trigger position is out of range
IO_ANALYZER_ERR_ INVALID_SRC_CH_CONFIG	0x0004	Invalid source channel configuration. Either use both source channel or only channel A
IO_ANALYZER_ERR_ SOURCE_CHB_INVALID	0x0005	Invalid source channel B
IO_ANALYZER_ERR_SAMPLE_ RATE_REDUCTION_INVALID	0x0006	Invalid sample rate reduction

22 Device Status Code

The Device status code is organized in two parts. The upper two bytes define a status category. The lower two bytes define the specific status that occurred in this category.

22.1 Device Status Category (Upper 2 bytes)

This section contains an overview of the status categories codes. This is again divided into 2 parts. The upper 1 byte contain the error category.

Definition	Value	Description
NO_ERROR	0x00	No error status category
WARNING	0x01	Warning status category
ERROR	0x02	Error status category

The lower 1 byte contain the component code:

Definition	Value	Description
SYSTEM	0x00	System status category
ILLUMINATION	0x01	Illumination status category
SENSOR	0x02	Sensor status category
TRANPORT LAYER	0x03	Transport layer status category

22.2 Specific status (Lower 2 bytes)

This section contains the specific status codes (lower part of the DeviceStatusCode) grouped by the category. This again divided into 2 parts. The upper 1 byte for the specific component id and lower 1 byte for the error code.

1. **System and Illumination**

Definition	Value	Description
DEV_STATUS_OK	0x0000	OK
DEV_STATUS_WARNING_ TEMPERATURE_TOO_HIGH	0x0001	Warning: Device temperature high.
DEV_STATUS_ERROR_ TEMPERATURE_TOO_HIGH	0x0002	Error: Device temperature too high.
DEV_STATUS_ERROR_ILLUM_ TEMPERATURE_TOO_HIGH	0x0003	Error: Illumination temperature too high.
DEV_STATUS_ERROR_ILLUM_LED_ERROR	0x0004	Error: Illumination Error.

2. **Sensor**
   - AX

Definition	Value	Description
SENSOR_STATUS_AX_BLACK_LEVEL_WARNING	0x0001	Failure in black level control. The black level may be invalid.

   - G8

Definition	Value	Description
SENSOR_STATUS_G8_PGOOD_ERROR	0x0101	Error: g8 sensor PGOOD error.
SENSOR_STATUS_G8_TRAINING_DONE_ERROR	0x0102	Error: g8 sensor training done error.
SENSOR_STATUS_GX_BLACK_LEVEL_WARNING	0x0103	Failure in black level control. The black level may be invalid.
SENSOR_STATUS_GX_NO_SENSOR_CONNECTED_WARNING	0x0104	Warning: No sensor connected

   - PX

Definition	Value	Description
SENSOR_STATUS_PX_SYNC_ERROR	0x020 1	Sensor sync error.
SENSOR_STATUS_P6_INIT_ERROR	0x020	Error: p6 sensor initialization

	2	error
SENSOR_STATUS_PX_BLACK_LEVEL_WARNING	0x0203	Failure in black level control. The black level may be invalid.
SENSOR_STATUS_PX_RSTL_SMALL_DAC_COUNT_WARNING	0x0204	Small amount of good DAC for reset level!
SENSOR_STATUS_PX_RSTL_CALIBRATION_ERROR	0x0205	Px reset level calibration failed!
SENSOR_STATUS_PX_RSTL_USED_LEGACY_WARNING	0x0206	Reset level calibration failed – Used a legacy implementation! Please boot the camera without light exposed to the sensor.
SENSOR_STATUS_PX_SENSOR_LOCKED_ERROR	0x0207	No acquisition due to sensor firmware lock. This can occur if an invalid firmware package will be used for this device.

3. Transport layer

- Cxp

Definition	Value	Description
TL_STATUS_WARNING_CXP_LINK_CONFIGURATION	0x0301	Warning: Cxp link configuration invalid.

- Gige

Definition	Value	Description
TL_STATUS_WARNING_LICENSING_ AUTHENTICATION_FAILED	0x0401	Warning: License authentication failed. It is in evaluation mode, the stream channel will be closed after 20-30min.

23 Document History

Date	Version	Author	Changes
5th February 2020	1.0.0	-	Prepared document for initial release.
29th April 2020	1.2.0	FG	Introduced RGB10p32 pixel format. Adapted the maximum exposure time and min line time.
20th May 2020	1.3.0	FG	Set the maximum Image Height to 1015811.
8th June 2020	1.4.0	FG	Added Decimation Horizontal Float. It is not available in this version.
8th June 2020	1.4.0	HR	Chapter Sensor Resync Counter removed
10th June 2020	1.5.0	FG	Added the Stream Region Width feature.
8th July 2020	1.6.0	FG	Removed the Stream Region Width Feature. It's not required anymore from sphinx library version 2.4.1 and later.
16th July 2020	1.7.0	AB	Added CDS Gain, FullWellCapacity and LedFlashControl
24st August 2020	1.9.0	FG	Reduced the value range of GainControlRegionOffsetY. Minimum value is now set to 3 (If no frame trigger is used) Adapted description of DecimationHorizontalFloat and BinningHorizontal. Added note that the Region parameters will be scaled. Adapted range of BinningHorizontal feature and added a note regarding the value range. Added new error code IMF_ERR_DECIMATION_HOR_OUT_OF_RANGE Adapted value range of Gain Control Region Width. It is independent of binning now. The GainControlRegionOffsetX value range depends on the SensorWidth now and not on the WidthMax feature anymore.
12th October 2020	2.0.0	AB	Removed CDS Gain, FullWellCapacity and FileValidateCommand Added SensorSensitivityChannelSelector and SensorSensitivity Replaced cds gain error code with sensor sensitivity error code
13th October 2020	2.0.0	AB	Introduced Frame Active Extend Lines feature
14th October 2020	2.0.0	FG	Added features Sensor Offset X and Sensor Region Width
29th October 2020	2.1.0	FG	Extended description for All entry of sensor sensitivity channel selector.
17th November 2020	2.2.0	FG	Introduced GainAutoStatus feature. Adapted description of GainSelector as well as Gain feature for analog and digital gain. Added hint in GainAuto to check GainAutoStatus after performing Once gain calibration.
24th November 2020	2.3.0	AB	Introduced ExposureTimeMode and ExposureTimeSelector feature.

1st December 2020	2.4.0	FG	Added list of locked features in description of Image Calibration Mode.
10th December 2020	2.5.0	FG	- Revised Document (Adaptions from PK inserted) - Updated the ExposureTime value range description. - Added information concerning the Digital Gain to ImageCalibrationMode.
11th December 2020	2.5.0	AB	- Added new device error code - Added DeviceErrorMessage feature
14th December 2020	2.5.0	FG	- Adapted description of DeviceErrorMessage feature. - Added some additional information to DeviceErrorCode feature. - Reference DeviceErrorMessage feature in section 6.2 now.
14th December 2020	2.5.0	AB	- Removed extra rows from the specific error code table of Digital IO control
2nd February 2021	2.6.0	UB	- ***AdjustTargetValueToMaxVideo*** added to Gain Auto - Enums added to Gain Auto Status - Enum "All" added to Gain Control Region Channel Selector - Enums changed and new added to Image Calibration Mode - Some Items added to DeviceErrorCode
10th February 2021	2.6.0	FG	- Removed EEPROM file from File Selector. - Added some device error codes for File Access Control - Adapted the File Operation Status fatal error description. - Added some general note to File Access Control section. - Removed timeout description from File Operation Execute - Added section for timeout parameters Connection Timeouts
24th February 2021	2.7.0	HR	- Added new feature Infoblock Mode
18th March 2021	2.8.0	AB	- Added features of CoaxPress in Transport Layer category - Added new feature DeviceTapGeometry
4th June 2021	2.11.0	AB	- Added new feature ScanDirectionSource - Added some note for ScanDirection feature. - Increased document version
10th June 2021	2.12.0	FG	- Added SingleFrame entry to AcquisitionMode feature. - Revised AcquisitionStart and AcquisitionStop description.
14th June 2021	2.12.0	AB	- Added AcquisitionAbort and TLParamsLocked features
16th June 2021	2.13.0	FG	- Extended description for GainAuto AdjustTargetValueToMaxVideo
16th June 2021	2.13.0	AB	- Extended the description for AutoSelect in MasterSlaveMode - Adopted 'note' for AcquisitionAbort
18th June 2021	2.13.0	AB	- Added CxpLinkConfigurationPreferred feature. - Removed Auto enum entry from CxpLinkConfiguration
21st June 2021	2.13.0	FG	- Added new device error code to Acquisition

			Control (ACQ_CTRL_ERROR_CATEGORY)
25th June 2021	2.15.0	AB	- Changed Minimum value of EncoderDividerFloat
29th June 2021 1st July 2021	3.0.0	FG/AB	- Added Feature Availability overview. - Change heading levels - Change format to match more to allPIXA evo manual. - Moved Light Controller section more to end. - Removed Special Feature section TLParamsLocked is part from Transport Layer Control. - Grouped transport layer into GigE Vision and CoaXPress features. - Extended the features and linking, depending on their selector. - Some bug fixes, cleaning, and minor changes.
19th August 2021	3.5.0	AB	- Added value range for MeasuredLineTime feature
23rd August 2021	3.6.0	AB	- Added PixelColorFilter feature - Added Availability row in all features table to indicate for which camera variants is available - Added RGBa enum entry in PixelFormat feature - Adopted value range and default value for SensorSenitivity, ExposureTimeMode, ExposureTimeSelector, LineDistance and BinningHorizontal.
28th September 2021	3.7.0	AB	- Increased xml and document version
22nd October 2021	3.8.0	FG	- Adapted the encoder mode feature description.
28th October 2021	3.9.0	FG	- Updated the feature availability matrix.
November 2021	3.10.0	AB/FG	- Adapted description of some features: o Synchronization Mode Enable o Gain Control Region Offset X o Gain Control Region Channel Selector o Gamma - Corrected some page breaks - Adapted description of Color Transformation Features regarding availability. - Added Notes for AcquisitionLineRate, AcquisitionLineTime, AcquisitionFrameRateEnable, AcquisitionFrameRate and all the TriggerSelector features - Reworked Color Transformation Value Selector a little. Added transformation matrices to Color Transformation Selector - Added Notes for ScanDirectionSource and ScanDirection features
26th November 2021	3.11.0	FG	- Added note to create new DSNU/PRNU references in Gain, Sensor Sensitivity
November/December	3.12.0	FG/AB	- Extended the info block mode description and fixed some error there. - Adapted the LineDistance and AcquisitionLineTime/AcquisitionLineRate default values. - Refactored document. Updated and extended some entries and fixed some bugs. - Updated the valid range for Out1OnTime, Out2OnTime, Out3OnTime, Out4OnTime, PatternOffDelay and LedFlashSequenceTime for different variants.

			- Added some Info to Led Flash Enable regarding Master Slave Mode
December 2021	3.13.0	FG	- Fixed some typos in Infoblock Mode
January 2022	3.14.0	FG	- Removed outdated information in Color Transformation Enable
19th January 2022	3.15.0	FG	- Added notes to Master Slave Mode concerning operating speed.
21st January 2022	3.15.0	AB	- Added notes to EncoderControl and LedFlashControl regarding the availability of these features - Adapted the Maximum Acquisition line time depending on the camera variants - In MasterSlaveMode, extended the notes for features not available when mode is set to Slave
01st February 2022	3.15.0	AB	- Added notes to BinnigHorizontal and DecimationHorizontalFloat regarding the maximum value. - Removed notes from LedFlashEnable and LedFlashnumberOfPattern regarding the availability. - Adapted the value range for TriggerDelayLines and SlaveDelayLines - Added missing error codes
04th February 2022	3.15.0	AB	- Updated device error code for ACQ_CTRL category - Adapt the MasterSlaveInterface for available interfaces and notes
10th February 2022	3.16.0	AB	- Increased the version to 3.16.0 and xml version - Updated the FeatureAvailability for DecimationHorizontalFloat feature
11th February 2022	3.16.0	HR	- added description of DeviceHWCalibFileVersion feature Device Hardware Calibration File Version.
24 th February 2022	3.17.0	HR	- added feature Device Fan Enable.
01st March 2022	3.18.0	AB	- Updated the device error code for AcquisitionControl and DigitalIOControl specific error
04th March 2022	3.18.0	AB	- Updated the error code for AcquisitionControl and EncoderControl category
07th March 2022	3.18.0	AB	- Update the error code for EncoderControl category
22nd March 2022	3.18.0	AB	- Update the error code for DigitalIOControl category
23rd March 2022	3.18.0	AB	- LineMode Output and LineSource are made available
27th April 2022	3.18.0	HR	- Changes in chapter Device Control (DEV_CTRL_ERROR_CATEGORY) - Renamed Device Control error code - New Device Control error code introduced
28th April 2022	3.18.0	AB	- Updated device error coder ACQ_CTRL_ERROR_CATEGORY - Extended LineSource for MSOut
6th May 2022	4.0.0	FG	- Reworked the Image Calibration Mode feature. Added some information about canceling the calibration process.
16th May 2022	4.1.0	FG	- Introduced new feature for xml extra version part Device Manifest XML Extra Version. - Added note to the the xml version features.
30th May 2022	4.1.0	FG	- Extended description for Info block concerning

			future package 2.1.2 in line time calculation. - Updated feature availability.
1st June 2022	4.1.0	FG	- Fixed/Adapted description of Acquisition Abort
3rd June 2022	4.1.0	AB	- Added DeviceStatusMessage feature and DeviceStatusCode. - Updated the Device Control specific error codes
7th June 2022	4.1.0	AB	- Added new enum entry in FileSelector for MemoryFile
29th July 2022	4.1.0	AB	- Added DeviceLinkSpeed feature
26th August 2022	4.2.0	FG	- Updated Feature Availability table
30th August 2022	4.3.0	FG	- Corrected the minimum width value to 128
7th September 2022	4.3.0	AB	- Added LineFormat, UserOutputSelector and UserOutputValue features - Extended the LineSource enum entries - Added CameraTypes with the model name and DigitalIOCompatibilitiesEvo and DigitalIOCompatibilitiesNeo - Updated the DigitalIOControl error codes
8th September 2022	4.3.0	AB	- Renamed DigitalIOCompatibilities to allPIXA evo and neo. Separated the table for line and LineSource
20th September 2022	4.3.0	AB	- Adapted the SensorColorType feature
21st September 2022	4.3.0	AB	- Adapted the DeviceStatus feature - Updated the DeviceStatusCode
26th September 2022	4.3.0	AB	- Added FrameCount feature
17th October 2022	4.3.0	AB	- Added AcquisitionBurstFrameCount - Extended the TriggerSelector for FrameBurstStart entry - Updated the device error code in AcquisitionControl
29th November 2022	6.0.0	FG	- Versioning of the feature reference has changed. The version corresponds to the Firmware/XML version from now.
15th February 2023	6.1.0	AB	- Added IOAnalyzer features in DigitalIOControl - Added device error code category for IO Analyzer - Updated the FeatureAvailability table - Updated FileSelector entries for IOAnalyzerEventFile
9th March 2023	6.1.0	FG	- Added new Device Status Codes for p6 sensor
25th April 2023	6.1.0	FG	- Added note concerning the Sensor Sensitivity of the g8 sensor. - Added description for Line Status and Scan-Direction of the Infoblock Mode - Added hint, that the ScanDirectionSource Encoder is currently only for EncoderSourceB=Line2
18th August 2023	6.1.0	AB	- Added Gige TL device status code. - Adapted value range for LineDistance feature
23rd August 2023	6.2.0	AB/FG	- Adapted digital IO function scope for Line10 and Line11 - Added Time Delay Integration Mode feature - Marked Master Slave Interface and Master Slave Interface Enable as deprecated - Added MasterSlaveSource and AutoSelectSource features - Updated LineSelector for Line10 and Line11 - Updated LineFormat for Misc

			- Updated LineSource for Fan and UART0
13th September 2023	6.2.0	AB	- Added new flat field correction features o Flat Field Correction Selector o Enable o DataSet Description o Avaialble Planes o First Valid Pixel o Last valid Pixel o Display Reference o Start Calibration o Stop Calibration o Calibration Status - Marked few features in Image Calibration control category as deprecated
5th October 2023	6.2.0	AB	- Updated pixel format and pixel color filter availability for the camera variants - Update FeatureAvialability for p6_nxge and added new column for p16_cxp
6th October 2023	6.2.0	AB	- Updated SensorColorFilter enum entry
10th October 2023	6.3.0	AB	- IO analyzer features are not available for p6_nxge camera
31st October 2023	6.3.0	AB	- Added DeviceLogLevel and FlatFieldCorrectionCalibrationMode features - Marked ImageCalibrationMode as deprecated feature
15th November 2023	6.4.0	AB	- Added EncoderValue and enum entries of EncoderOutputMode
24th November 2023	6.5.0	FG/AB	- Added the Dual PRNU mode in Feature Availability table and the FFC-Enable feature. - Added error code in Image Calibration Control and Led Flash Control - Added new enum entry in DeviceStatus feature
5th January 2024	6.5.0	FG	- Improved and extended the Description of Trigger Signal Detection Mode
1st February 2024	6.6.0	FG	- Added Log File and Customer File to the file selector.
15th February 2024	6.6.0	AB	- Added detailed description of voltage selectors for evo and neo separately. - Extended the temperature selector for FPGA entry
13th March 2024	6.6.0	AB	- Update DeviceVersion and DeviceManufacturerInfo features
4th April 2024	6.6.0	AB	- Extended the enum entry tables of DeviceVoltageSelector(evo) and DeviceVoltageSelector(neo)
6th May 2024	6.6.0	FG	- Adapted the Time Delay Integration feature description for g8 sensor TDI support. - Modified the Device Version feature description.
25th June 2024	6.8.0	AB	- Added TriggersSource0, TriggerSource1 and Exposure for neo LineSource
7th August 2024	6.8.0	FG	- Set the exposure time to adjustable while grabbing - Added new DeviceStatusCodes related to black level. - Added information about reset of the encoder clocks in info block, when setting EncoderSourceA to Off.
15th August 2024	6.8.0	AB	- Added TriggerSoftware feature

			- Added the missing TriggerSource Line5, Line6, LinkTrigger0, LinkTrigger1 and Software enum entries - Added new error code in AcquisitionControl
19th August 2024	6.8.0	AB	- Adapted names of TriggerSource0 and TriggerSource1 in LineSource to LineTrigger and FrameTrigger
28th August 2024	6.8.0	FG	- Added information regarding Info-Block image counter and 4th channel. - Added info regarding CXP and GigE counters in image headers to Frame Count
2nd September 2024	6.8.0	AB	- Updated Trigger Selector FrameActive enum entry availability
18th September 2024	6.8.0	AB	- Added FlashSync line source for evo - Updated notes for LineSource - Added new error message in ACQ_CTRL_ERROR_CATEGORY
1st October 2024	6.9.0	FG	- Introduced FrameBurstActive, FrameEnd, FrameBurstActiveSourceEnd - Added Info block mode for mono. - Adapted the error code: ACQ_CTRL_ERR_FRAME_END_TRIGGER_NOT_ENABLED
15th November	6.9.0	FG	- Added two new device status codes for the PX sensor related to reset level.
16th November	6.9.0	AB	- Added Camera Temperature Monitoring Limits
4th February	7.1.0	FG	- Extended the Height Max and Sensor Sensitivity features for the px sensors.
25th February	7.3.0	FG	- Added the FrameSyncPWMPeriod feature. - New Device Error code for the digital IO control
19th March	7.4.0	FG	- Added information regarding GCR color if it is visible.
27th March	8.0.0	FG	- Fixed wrong enum entry names in Flat Field Correction Selector - Added missing hint on the Flat Field Calibration Mode for the internal calibration. - Added missing DeviceStatus for PX sensors. - New chromasens logo in header
4th April	8.0.0	FG	- Set the ExposureTime feature to adjustable while grabbing - New Device Status Code for G8 sensor
17th April	8.0.0	AB	- Added Gige Stream statistics features: GevFrameBufferOverflowStatus, GevStreamStatisticsSelector, GevStreamStatisticsValue, GevClearStreamStatistics - Extended DeviceTLType enum entries - Removed DebugControl of FullFlag feature
22nd April 2025	8.0.0	FG	- Adapted the DecimationHorizontalFloat range and its availability.
11th June 2025	8.0.1	AB	- Adapted the LineStatus description in Each Line InfoBlock
17th June 2025	8.0.1	AB	- Updated function scope of allPIXA neo in digital io
24th July 2025	8.2.0	FG	- Added new device status code and error codes. ACQ_CTRL_ERR_SLAVE_TRIGGER_PARAM_NOT_CONFIGURED ACQ_CTRL_ERR_ACQUISITION_LOCKED SENSOR_STATUS_PX_SENSOR_LOCKED_ERROR
28th August 2025	9.0.0	AB	- Added InfoBlockTriggerSource feature - Added new device error code in ImageFormat

			Control
29th August 2025	9.1.0	AB	- Updated UserOutputSelector feature for availability and enum entries - Updated LineSource availability for allPIXAevo - Extended the camera variants and feature availability for p6_cxp
2nd September 2025	9.1.0	AB	- Updated DeviceVersion feature - Updated DeviceVoltageSelector allPIXAevo
9th September 2025	10.0.0	FG	- Adapted the notes for the gain control region offset X and width regarding the precision.
10th September 2025	10.0.0	AB	- Added MultiRegionMerge feature - Extended RegionSelector enum entries for Regio3, Region4 and RegionStream0
1st October 2025	11.1.1	FG	- Adapted the description of Flat Field Correction Calibration Mode - Replaced in many places the text: o *"It will be removed from package 3.0.0"* o By a text without version information. - Adapted Feature Availability for Multi ROI. Removed ax_dsxge
7th October 2025	11.2.0	FG/AB	- Added new Info block Entries - Added information for Exposure time calculation of p6 and p16 sensors to the info block description. - Updated ColorTransformationSelector enum entries
8th October	11.2.0	FG/AB	- Adapted the ColorTransformationSelector notes. - Adapted the ColorTransformationEnable notes. - Updated FeatureAvailability of IOAnalyzer for p6_nxge and p6_cxp
14th October 2025	12.0.0	FG	- Adapted the minimum sensor sensitivity for p16
23rd October 2025	12.1.0	FG	- Adapted the Info Block description. o Especially for the exposure time calculation.
29th October 2025	12.1.0	AB	- Updated EncoderSourceA and EncoderSourceB enum entries - Marked SlaveDelayLines as Deprecated - Added MSIn in TriggerSource enum entry - TriggerSelector, TriggerMode, TriggerSource and TriggerDelayLines will be available even for slave camera
31st October 2025	13.0.0	AB	- Update MasterSlave, MasterSlaveSource and MasterSlaveOutput features - Marked MasterSlaveInterface, MasterSlaveInetrfaceEnable and MasterSlaveAutoselectSource and SlaveDelayLines features removed - Made MasterSlave and LedFlash features available for neo
11th November 2025	13.0.0	AB	- Added DeprecatedFeatures and RemovedFeatures chapter
13th Noveber 2025	14.0.0	AB	- Updated Gamma entry in LUTSelector
2nd December 2025	14.1.0	AB	- Marked in red color for unused specific error codes - Marked LUT_CTRL_ERR category removed from version 14.2.0
9th December 2025	14.2.0	AB	- Added AcquisitionArm feature
21st January 2026	15.0.0	AB	- Added new Allied Vision logo in header

			-	Updated DeviceVendorName, ManufacturerInfo
21st January 2026	15.1.0	FG	-	Adapted the PX sensor training error. See Specific status (Lower 2 bytes)
5th February 2026	15.3.0	AB	-	Updated BinningHorizontal value range