

## allPIXA evo/neo camera | Features Reference



**VERSION 6.6.0**

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# 1 Introduction

The **Features Reference Guide** describes the features for Chromasens allPIXA 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
<b>Control Channel timeout</b> ( <i>CC_timeout</i> )	3000ms
<b>Control Channel retry count</b>	3
<a href="#">Device Link Heartbeat Timeout</a>	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_dsxge	ax_cxp	g8_dxge	g8_cxp	p6_nxge	p16_cxp
Trigger Control	A	A	A	A	A	A	A
Encoder Control	A	A	A	A	A	A	A
Scan Direction Source	A	NA	A	A	A	A	A
Master/Slave Mode	A	A	E	A	E	NA	A
Led Flash Control	A	E	A	A	A	NA	A
Dual PRNU for LED-Flashing	NA	NA	NA	A	A	NA	NA
Single ROI support	A	A	A	A	A	A	A
Multi ROI support	NA	A	NA	NA	NA	NA	NA
Reverse X	A	A	A	A	A	A	A
Binning Horizontal	A	A	A	A	A	A	A
Decimation Horizontal	A	NA	A	A	A	NA	NA
Gain Auto	A	A	A	A	A	A	A
Sensor Sensitivity	A	A	A	A	A	A	A
Internal DSNU/PRNU capturing	A	NA	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	NA	A	A	A	NA
IOAnalyzer	A	A	A	A	A	NA	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
EVO	ax_dxge ax_dsxge ax_cxp g8_dxge g8_cxp p16_cxp
NEO	p6_nxge
ax_X	ax_dxge ax_dsxge ax_cxp
g8_X	g8_dxge g8_cxp
X_dxge	ax_dxge g8_dxge

X_cxp	ax_cxp g8_cxp p16_cxp
ax_dsxge	ax_dsxge
p6_nxge	p6_nxge
p16_cxp	p16_cxp

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

<b>Types</b>	<b>Model Name</b>
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

## 4 Device Control

### 4.1 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	Chromasens GmbH	
Default value	-	
Availability	<a href="#">ALL</a>	
Notes	-	
Error behavior	-	

### 4.2 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	<a href="#">ALL</a>	
Notes	-	
Error behavior	-	

### 4.3 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@chromasens.de"	
Availability	<a href="#">ALL</a>	
Notes	-	
Error behavior	-	

#### 4.4 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	<b>"SX-MX-TX-P1XX-P2XX"</b>	
Availability	<a href="#">ALL</a>	
Notes	String contains hardware version of sensor, mainboard, transport interface, power1 and power2	
Error behavior	-	

#### 4.5 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	<a href="#">ALL</a>	
Notes	-	
Error behavior	-	

#### 4.6 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	-	
Availability	<a href="#">ALL</a>	
Notes	Even though the camera is a line scan device, this feature is set to Areascan. The camera supports frame trigger.	
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

## 4.7 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 <b>DevicePackageConsistency</b> 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	<a href="#">ALL</a>	
Notes	-	
Error behavior	-	

## 4.8 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	<a href="#">ALL</a>	
Notes	-	
Error behavior	-	

## 4.9 Device Package Consistency

Name	DevicePackageConsistency	Custom
Description	Executes a package consistency check. Is set to <b>True</b> if the package is consistent otherwise it is set to <b>False</b> . 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	<b>False</b> : Package is not consistent <b>True</b> : Package is consistent	
Default value	-	
Availability	<a href="#">ALL</a>	
Notes	-	
Error behavior	-	

#### 4.10 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	<a href="#">ALL</a>	
Notes	-	
Error behavior	-	

#### 4.11 Device Hardware Calibration File Version

Name	DeviceHWCaliFileVersion	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	<a href="#">ALL</a>	
Notes	Returns <b>-NA-</b> if the file is not available in the camera.	
Error behavior	-	

#### 4.12 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	<a href="#">ALL</a>	
Notes	-	
Error behavior	-	

#### 4.13 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	<a href="#">ALL</a>	
Notes	-	
Error behavior	-	



#### 4.14 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	<a href="#">ALL</a>	
Notes	-	
Error behavior	-	

#### 4.15 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	<a href="#">ALL</a>	
Notes	-	
Error behavior	-	

#### 4.16 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	<a href="#">ALL</a>	
Notes	-	
Error behavior	-	

#### 4.17 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	$\geq 0$	
Default value	-	
Availability	<a href="#">ALL</a>	
Notes	-	

#### 4.18 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	$\geq 0$	
Default value	-	
Availability	<a href="#">ALL</a>	
Notes	-	

#### 4.19 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	$\geq 0$	
Availability	<a href="#">ALL</a>	
Notes	-	
Error behavior	The XML version should match the <a href="#">DeviceFirmwareVersion</a> .	

#### 4.20 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	<a href="#">ALL</a>	
Notes	The XML version should match the <a href="#">DeviceFirmwareVersion</a> .	

#### 4.21 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	<a href="#">ALL</a>	
Notes	The XML version should match the <a href="#">DeviceFirmwareVersion</a> .	

#### 4.22 Device Manifest XML Extra Version

Name	DeviceManifestXMLExtraVersion	Standard
Description	Indicates the extra version (pre-release/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	<a href="#">ALL</a>	
Notes	The XML version should match the <a href="#">DeviceFirmwareVersion</a> .	

#### 4.23 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	<b>Mainboard</b>	
Availability	<a href="#">ALL</a>	
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 <a href="#">EVO</a>
Power1	Temperature of the power module 1
Power2	Temperature of the power module 2
Sensor	Temperature of the sensor

## 4.24 Device Temperature

Name	DeviceTemperature	<a href="#">DeviceTemperatureSelector</a>	Standard
Description	Device temperature in degrees Celsius.		
Interface	Float		
Access mode	Read only		
Adjustable while grabbing	-		
Value range			
Default value	-		
Availability	<a href="#">ALL</a>		
Notes	-		
Error behavior	-		

## 4.25 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	<a href="#">ALL</a>	
Notes	-	
Error behavior	-	

### 4.25.1 allPIXA evo

*Device Voltage Selector Enum Entries:*

Name	Description
Channel1	Channel1 is 1V0_FPGA
Channel2	Channel2 is 1V8_FPGA
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.
Channel10	Channel10 is VCCAUX at FPGA
Channel11	Channel11 is VCCBRAM at FPGA

### 4.25.2 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. <b>Currently not valid</b>
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

## 4.26 Device Voltage

Name	DeviceVoltage <a href="#">DeviceVoltageSelector</a>	Custom
Description	Displays the voltage for the selected element.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	-	
Default value	-	
Availability	<a href="#">ALL</a>	
Notes	The unit of this feature is mV.	
Error behavior	-	

## 4.27 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	<a href="#">ALL</a>	
Notes	-	
Error behavior	-	

## 4.28 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	<a href="#">ALL</a>	
Notes	While grabbing images you will not see the heartbeat. Therefore, this only takes effect if the acquisition is not active.	
Error behavior	-	

## 4.29 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	<a href="#">ALL</a>	
Notes	<p>This command always returns success.</p> <p>If you execute this command, the camera performs a power cycle. Afterwards you must reconnect to the camera.</p>	
Error behavior	-	

## 4.30 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 <a href="#">Device Error Code</a> section for possible values.	
Default value	0x00000000	
Availability	<a href="#">ALL</a>	
Notes	<p>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.</p> <p>The <a href="#">DeviceErrorMessage</a> feature holds the corresponding error description.</p>	
Error behavior	-	

## 4.31 Device Error Message

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

## 4.32 Device Status

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

### Device Status Enum Entries:

Name	Description
DEV_STATUS_WARNING_TEMPERATURE_TOO_HIGH	Warning: Device temperature high.
DEV_STATUS_ERROR_TEMPERATURE_TOO_HIGH	Error: Device temperature too high.
DEV_STATUS_ERROR_ILLUM_TEMPERATURE_TOO_HIGH	Error: Illumination temperature too high.
DEV_STATUS_ERROR_ILLUM_LED_ERROR	Error: Illumination Error.
SENSOR_STATUS_G8_PGOOD_ERROR	Error: G8 sensor PGOOD error.
SENSOR_STATUS_G8_TRAINING_DONE_ERROR	Error: G8 sensor training done error.
TL_STATUS_WARNING_CXP_LINK_CONFIGURATION	Warning: Cxp link configuration invalid.
TL_STATUS_WARNING_LICENSING_AUTHENTICATION_FAILED	Warning: License authentication failed. It is in evaluation mode, the stream channel will be closed after 20-30min.

## 4.33 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	<a href="#">ALL</a>	
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 Debug logging will be shown.

#### 4.34 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	<a href="#">ALL</a>	
Notes	-	
Error behavior	-	

Device TL Type Enum Entries:

Name	Description
GigEVision	GigE Vision

#### 4.35 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	<a href="#">ALL</a>	
Notes	-	
Error behavior	-	

#### 4.36 Device Link Connection Count

Name	DeviceLinkConnectionCount[ <a href="#">DeviceLinkSelector</a> ]	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	$\geq 0$	
Default value	-	
Availability	<a href="#">ALL</a>	
Notes	-	
Error behavior	-	

#### 4.37 Device Link Speed

Name	DeviceLinkSpeed[ <a href="#">DeviceLinkSelector</a> ]	Standard
Description	Indicates the speed of transmission negotiated on the specified link.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	$\geq 0$	
Default value	-	
Availability	<a href="#">ALL</a>	
Notes	-	
Error behavior	-	



#### 4.38 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	$\geq 0$	
Default value	-	
Notes	Average resolution of the system in sensor direction. It is measured in factory and programmed to the device.	
Error behavior	-	

#### 4.39 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	$\geq 0$	
Default value	-	
Availability	<a href="#">ALL</a>	
Notes	-	
Error behavior	-	

#### 4.40 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	$\geq 0$	
Default value	-	
Availability	<a href="#">ALL</a>	
Notes	-	
Error behavior	-	

#### 4.41 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	$\geq 0$	
Default value	-	
Availability	<a href="#">ALL</a>	
Notes	-	
Error behavior	-	

#### 4.42 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	<b>Big</b>
Availability	<a href="#">ALL</a>
Notes	-
Error behavior	-

*Device Registers Endianness Enum Entries:*

Name	Description
<i>Little</i>	Device's registers are little Endian
<i>Big</i>	Device's registers are big Endian

#### 4.43 Device Character Set

Name	DeviceCharacterSet	<b>Standard</b>
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	<a href="#">ALL</a>	
Notes	-	
Error behavior	-	

*Device Character Set Enum Entries:*

Name	Description
<i>UTF8</i>	UTF 8

#### 4.44 Device Event Channel Count

Name	DeviceEventChannelCount	<b>Standard</b>
Description	Indicates the number of event channels supported by the device.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	$\geq 0$	
Default value	-	
Availability	<a href="#">ALL</a>	
Notes	-	
Error behavior	-	

#### 4.45 Device Stream Channel Count

Name	DeviceStreamChannelCount	<b>Standard</b>
Description	Indicates the number of streaming channels supported by the device.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	$\geq 0$	
Default value	-	
Availability	<a href="#">ALL</a>	
Notes	-	
Error behavior	-	

#### 4.46 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	$\geq 500000.0$	
Default value	-	
Availability	<a href="#">ALL</a>	
Notes	The unit is micro-seconds ( $\mu$ s)	
Error behavior	-	

#### 4.47 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	<a href="#">ALL</a>	
Notes	-	
Error behavior	-	

*Device Stream Channel Endianness Enum Entries:*

Name	Description
<i>Little</i>	Stream channel data is little Endian.
<i>Big</i>	Stream channel data is big Endian.

#### 4.48 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	<a href="#">ALL</a>	
Notes	-	
Error behavior	-	

#### 4.49 Timestamp Latch

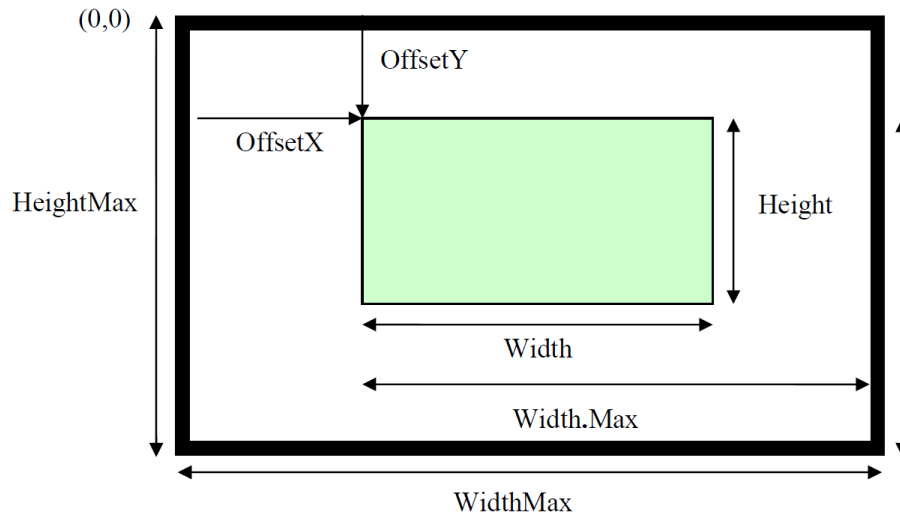
Name	TimestampLatch	Standard
Description	Latches current timestamp counter into <b>TimestampLatchValue</b> .	
Interface	Command	
Access mode	Write only	
Adjustable while grabbing	Yes	
Value range	1	
Default value	1	
Availability	<a href="#">ALL</a>	
Notes	-	
Error behavior	-	

## 4.50 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	$\geq 0$	
Default value	-	
Availability	<a href="#">ALL</a>	
Notes	-	
Error behavior	-	

## 5 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.

## 5.1 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	<a href="#">ALL</a>	
Notes	-	
Error behavior	-	

## 5.2 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	<a href="#">ALL</a>	
Notes	-	
Error behavior	-	

## 5.3 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

## 5.4 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	<a href="#">SensorWidth</a>	
Availability	<a href="#">ALL</a>	
Notes	-	
Error behavior	-	

## 5.5 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	<a href="#">ALL</a>	
Notes	The maximum height is 1015811 lines.	
Error behavior	-	

## 5.6 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	<a href="#">ALL</a>	
Notes	-	
Error behavior	-	

*Region Selector Enum Entries:*

Name	Description
Region1	Selected feature will control the region 1
Region2	Selected feature will control the region 2. <i>For ax_dsxge only.</i>

## 5.7 Region Mode

Name	RegionMode[ <a href="#">RegionSelector</a> ]	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	<a href="#">ALL</a>	
Notes	-	
Error behavior	See the <a href="#">device error code</a> documentation.	

Region Mode Enum Entries:

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

## 5.8 Width

Name	Width[ <a href="#">RegionSelector</a> ]	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 , <a href="#">Width Max</a> ]	
Default value	<a href="#">WidthMax</a>	
Availability	<a href="#">ALL</a>	
Notes	The width value must be a multiple of eight for RGB.	
Error behavior	See the <a href="#">device error code</a> documentation.	

## 5.9 Height

Name	Height[ <a href="#">RegionSelector</a> ]	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 , <a href="#">Height Max</a> ]	
Default value	1024	
Availability	<a href="#">ALL</a>	
Notes	This parameter influences the value range of <a href="#">AcquisitionFrameRate</a> . Please read the <a href="#">AcquisitionFrameRate</a> feature documentation for further details.	
Error behavior	See the <a href="#">device error code</a> documentation.	

## 5.10 Offset X

Name	OffsetX[ <a href="#">RegionSelector</a> ]	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	<a href="#">ALL</a>	
Notes	-	
Error behavior	See the <a href="#">device error code</a> documentation.	



## 5.11 Sensor Region Offset X

Name	SensorRegionOffsetX[ <a href="#">RegionSelector</a> ]	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	$\geq 0$	
Default value	0	
Availability	<a href="#">ALL</a>	
Notes	The display name is just Sensor Offset X.	
Error behavior	See the <a href="#">device error code</a> documentation.	

## 5.12 Sensor Region Width

Name	SensorRegionWidth[ <a href="#">RegionSelector</a> ]	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	$\geq 0$	
Default value	0	
Availability	<a href="#">ALL</a>	
Notes	The display name is just Sensor Width. The feature resides below the Region Selector. There is a <a href="#">SensorWidth</a> feature defining the sensor's full width which resides in the top level of the image format control category.	
Error behavior	See the <a href="#">device error code</a> documentation.	

## 5.13 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	<b>Variant</b>	<b>Value Range</b>
	<a href="#">ax_X</a>	1,2,4,8,16
	<a href="#">g8_X</a>	1,2,4,8,16
Default value	1 – Indicates that no horizontal binning is performed by the camera.	
Availability	<a href="#">ALL</a>	
Notes	<p>If you change this parameter, the Region <a href="#">OffsetX</a> and <a href="#">Width</a> is scaled according to the binning value.</p> <p>Please check these parameters after adapting Binning Horizontal.</p> <p><b>When <a href="#">Width</a> 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.</b></p>	
Error behavior	See the <a href="#">device error code</a> documentation.	

## 5.14 Decimation Horizontal Float

Name	DecimationHorizontalFloat	Custom
Description	<p>This is the same feature as <b>DecimationHorizontal</b> as defined in the SFNC. However, it supports float values for decimation.</p> <p>Horizontal sub-sampling of the image. This reduces the horizontal resolution (width) of the image by the specified horizontal decimation factor.</p>	
Interface	Float	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	[0.5 , 3.999]	
Default value	1.0	
Availability	<a href="#">g8_X</a>	
Notes	<p>A value of 1 indicates that the camera performs no horizontal decimation. If you change this parameter, the Region <a href="#">OffsetX</a> and <a href="#">Width</a> are scaled according to the decimation value. Please check these parameters after adapting Decimation Horizontal.</p> <p><b>When <a href="#">Width</a> 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.</b></p>	
Error behavior	See the <a href="#">device error code</a> documentation.	

## 5.15 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	<b>True</b> – Horizontally flipped image <b>False</b> – Normal Image	
Default value	<b>False</b>	
Availability	<a href="#">ALL</a>	
Notes	This feature is effective only if <a href="#">Test Pattern</a> is set to <b>Off</b> .	
Error behavior	-	

## 5.16 Pixel Format

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

Pixel Format Enum Entries:

Name	Availability	Description
Mono8	<a href="#">ALL</a>	8 bits per pixel Mono

Mono10	<a href="#">X_cxp</a> , <a href="#">X_dxge</a> , <a href="#">p6_nxge</a>	10 bits per pixel Mono unpacked
Mono12	<a href="#">X_cxp</a> , <a href="#">X_dxge</a> , <a href="#">p6_nxge</a>	12 bits per pixel Mono unpacked
RGB8	<a href="#">ALL</a>	24 bits per pixel RGB linear memory
RGB10	<a href="#">X_cxp</a> , <a href="#">X_dxge</a> , <a href="#">p6_nxge</a>	RGB at 10bit unpacked
RGB12	<a href="#">X_cxp</a> , <a href="#">X_dxge</a> , <a href="#">p6_nxge</a>	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 <b>g8_dxge</b> packages!
BGR8	<a href="#">X_dxge</a> <a href="#">ax_dsxge</a>	24 bits per pixel BGR linear memory
RGBa8	<a href="#">g8_X</a> , <a href="#">p6_nxge</a>	32 bits per pixel RGBa linear memory. Component 'a' contains Infrared (Ir) or White(W).
RGBa10	<a href="#">g8_X</a> , <a href="#">p6_nxge</a>	RGBa at 10bit unpacked. Component 'a' contains Infrared (Ir) or White(W).
RGBa12	<a href="#">g8_X</a> , <a href="#">p6_nxge</a>	RGBa at 12bit unpacked. Component 'a' contains Infrared (Ir) or White(W).

## 5.17 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	<b>Variant</b>	<b>Value</b>
	<a href="#">ax_X</a>	RGB
	<a href="#">g8_X</a>	RGBIr
	<a href="#">p6_nxge</a>	RGBIr
	<a href="#">p16_cxp</a>	RGBIr
	<a href="#">ALL</a> (Mono Camera)	White
Availability	<a href="#">ALL</a>	
Notes	For mono cameras the pixel color filter will be White only.	
Error behavior	See the <a href="#">device error code</a> documentation.	

### Pixel Color Filter Enum Entries:

Name	Availability	Description
RGB	<a href="#">ax_X</a>	Three color planes RGB at the sensor is selected
RGBIr	<a href="#">g8_X</a> , <a href="#">p6_nxge</a> , <a href="#">p16_cxp</a>	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	<a href="#">p6_nxge</a> , <a href="#">p16_cxp</a>	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	<a href="#">g8_X</a>	Only White plane at the sensor is selected

## 5.18 Infoblock Mode

Name	InfoBlockMode	Standard
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	<a href="#">ALL</a>	
Notes	So far not all entries are working. There may be even differences between variants of allPIXAevo.	
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 <b>FirstlineandEach</b> line info block are active, <b>Eachline</b> info block is always displayed from line 1 in every transmitted image!

### 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 <sup>1</sup>	Description												
MARKER	DIVERSE	Markers are used to mark the info block with red pixels. <div><table><tr><th>Color</th><th>Red</th><th>Green</th><th>Blue</th></tr><tr><th>Value</th><td>255@8bit</td><td>0@8bit</td><td>0@8bit</td></tr></table></div>	Color	Red	Green	Blue	Value	255@8bit	0@8bit	0@8bit				
Color	Red	Green	Blue											
Value	255@8bit	0@8bit	0@8bit											
SERIAL NUMBER	SAME	These pixels encode the serial number of the camera. <div><table><tr><th>Byte<sub>3</sub></th><th>Byte<sub>2</sub></th><th>Byte<sub>1</sub></th><th>Byte<sub>0</sub></th></tr><tr><td>P<sub>X<sub>1</sub></sub></td><td>P<sub>X<sub>2</sub></sub></td><td>P<sub>X<sub>3</sub></sub></td><td>P<sub>X<sub>4</sub></sub></td></tr><tr><td colspan="2">SN 1<sup>ST</sup> PART</td><td colspan="2">SN 2<sup>ND</sup> PART</td></tr></table></div>	Byte <sub>3</sub>	Byte <sub>2</sub>	Byte <sub>1</sub>	Byte <sub>0</sub>	P <sub>X<sub>1</sub></sub>	P <sub>X<sub>2</sub></sub>	P <sub>X<sub>3</sub></sub>	P <sub>X<sub>4</sub></sub>	SN 1 <sup>ST</sup> PART		SN 2 <sup>ND</sup> PART	
Byte <sub>3</sub>	Byte <sub>2</sub>	Byte <sub>1</sub>	Byte <sub>0</sub>											
P <sub>X<sub>1</sub></sub>	P <sub>X<sub>2</sub></sub>	P <sub>X<sub>3</sub></sub>	P <sub>X<sub>4</sub></sub>											
SN 1 <sup>ST</sup> PART		SN 2 <sup>ND</sup> PART												
IMAGE COUNT	SAME	These pixels encode the image count of the camera. <div><table><tr><th>Byte<sub>1</sub></th><th>Byte<sub>0</sub></th></tr><tr><td>P<sub>X<sub>6</sub></sub></td><td>P<sub>X<sub>7</sub></sub></td></tr><tr><td colspan="2">IMAGE COUNT</td></tr></table></div>	Byte <sub>1</sub>	Byte <sub>0</sub>	P <sub>X<sub>6</sub></sub>	P <sub>X<sub>7</sub></sub>	IMAGE COUNT							
Byte <sub>1</sub>	Byte <sub>0</sub>													
P <sub>X<sub>6</sub></sub>	P <sub>X<sub>7</sub></sub>													
IMAGE COUNT														

EXPOSURE TIME	SAME	<p>This is the current Exposure Time in camera internal clock cycles.</p> <table><tr><td>Byte<sub>1</sub></td><td>Byte<sub>0</sub></td></tr><tr><td>PX<sub>8</sub></td><td>PX<sub>9</sub></td></tr><tr><td colspan="2">EXPOSURE TIME CLOCKS</td></tr></table> <p>To decode the exposure time, use the following formula:</p> $ExposureTime = \frac{EXPOURE\_TIME\_CLOCKS}{f_a}$ <table><tr><td>Camera Variant</td><td>f<sub>a</sub> in MHz</td></tr><tr><td><a href="#">ax_X</a></td><td>50</td></tr><tr><td><a href="#">q8_X</a></td><td>80</td></tr></table>	Byte <sub>1</sub>	Byte <sub>0</sub>	PX <sub>8</sub>	PX <sub>9</sub>	EXPOSURE TIME CLOCKS		Camera Variant	f <sub>a</sub> in MHz	<a href="#">ax_X</a>	50	<a href="#">q8_X</a>	80							
Byte <sub>1</sub>	Byte <sub>0</sub>																				
PX <sub>8</sub>	PX <sub>9</sub>																				
EXPOSURE TIME CLOCKS																					
Camera Variant	f <sub>a</sub> in MHz																				
<a href="#">ax_X</a>	50																				
<a href="#">q8_X</a>	80																				
LINE TIME	SAME	<p>This is the current line time in camera internal clock cycles.</p> <table><tr><td>Byte<sub>2</sub></td><td>Byte<sub>1</sub></td><td>Byte<sub>0</sub></td></tr><tr><td>PX<sub>11</sub></td><td>PX<sub>12</sub></td><td>PX<sub>13</sub></td></tr><tr><td colspan="3">LINE TIME CLOCKS</td></tr></table> <p>To decode the line time, use the following formula:</p> $LineTime = \frac{LINE\_TIME\_CLOCKS}{f_t}$ <p>Up to package 2.1.1</p> <table><tr><td>Camera Variant</td><td>f<sub>t</sub> in MHz</td></tr><tr><td><a href="#">ax_X</a></td><td>75</td></tr><tr><td><a href="#">q8_X</a></td><td>80</td></tr></table> <p>Package 2.1.2 and later:</p> <table><tr><td>Camera Variant</td><td>f<sub>t</sub> in MHz</td></tr><tr><td><a href="#">ALL</a></td><td>100</td></tr></table>	Byte <sub>2</sub>	Byte <sub>1</sub>	Byte <sub>0</sub>	PX <sub>11</sub>	PX <sub>12</sub>	PX <sub>13</sub>	LINE TIME CLOCKS			Camera Variant	f <sub>t</sub> in MHz	<a href="#">ax_X</a>	75	<a href="#">q8_X</a>	80	Camera Variant	f <sub>t</sub> in MHz	<a href="#">ALL</a>	100
Byte <sub>2</sub>	Byte <sub>1</sub>	Byte <sub>0</sub>																			
PX <sub>11</sub>	PX <sub>12</sub>	PX <sub>13</sub>																			
LINE TIME CLOCKS																					
Camera Variant	f <sub>t</sub> in MHz																				
<a href="#">ax_X</a>	75																				
<a href="#">q8_X</a>	80																				
Camera Variant	f <sub>t</sub> in MHz																				
<a href="#">ALL</a>	100																				
ENCODER CLOCKS	SAME	<p>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.</p> <table><tr><td>Byte<sub>3</sub></td><td>Byte<sub>2</sub></td><td>Byte<sub>1</sub></td><td>Byte<sub>0</sub></td></tr><tr><td>PX<sub>14</sub></td><td>PX<sub>15</sub></td><td>PX<sub>16</sub></td><td>PX<sub>17</sub></td></tr><tr><td colspan="4">ENCODER CLOCKS</td></tr></table>	Byte <sub>3</sub>	Byte <sub>2</sub>	Byte <sub>1</sub>	Byte <sub>0</sub>	PX <sub>14</sub>	PX <sub>15</sub>	PX <sub>16</sub>	PX <sub>17</sub>	ENCODER CLOCKS										
Byte <sub>3</sub>	Byte <sub>2</sub>	Byte <sub>1</sub>	Byte <sub>0</sub>																		
PX <sub>14</sub>	PX <sub>15</sub>	PX <sub>16</sub>	PX <sub>17</sub>																		
ENCODER CLOCKS																					
ERROR CODE	UNUSED	CURRENTLY UNUSED PRESET WITH ZERO																			
TIMESTAMP	SAME	<p>Timestamp starts counting from boot.</p> <table><tr><td>Byte<sub>2</sub></td><td>Byte<sub>1</sub></td><td>Byte<sub>0</sub></td></tr><tr><td>PX<sub>19</sub></td><td>PX<sub>20</sub></td><td>PX<sub>21</sub></td></tr><tr><td colspan="2">SECONDS</td><td><math>\frac{Ms^1}{4}</math></td></tr></table> <p><sup>1</sup>MS= Milliseconds</p> <p>To achieve the milliseconds part of the timestamp the Content of PX<sub>21</sub> must be multiplied by four.</p>	Byte <sub>2</sub>	Byte <sub>1</sub>	Byte <sub>0</sub>	PX <sub>19</sub>	PX <sub>20</sub>	PX <sub>21</sub>	SECONDS		$\frac{Ms^1}{4}$										
Byte <sub>2</sub>	Byte <sub>1</sub>	Byte <sub>0</sub>																			
PX <sub>19</sub>	PX <sub>20</sub>	PX <sub>21</sub>																			
SECONDS		$\frac{Ms^1}{4}$																			

<sup>1</sup> **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.



## Each Line info block format

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										

Information	Channel Content <sup>1</sup>	Description												
CONTINUOUS LINE COUNT	DIVERSE	<p>This is the continuous line count across image boundaries.</p> <table><tr><td>-</td><td>Byte<sub>1</sub></td><td>Byte<sub>0</sub></td></tr><tr><td>PX0Red</td><td>PX0Green</td><td>PX0Blue</td></tr><tr><td></td><td colspan="2">CONT LINE COUNT</td></tr></table>	-	Byte <sub>1</sub>	Byte <sub>0</sub>	PX0Red	PX0Green	PX0Blue		CONT LINE COUNT				
-	Byte <sub>1</sub>	Byte <sub>0</sub>												
PX0Red	PX0Green	PX0Blue												
	CONT LINE COUNT													
ERROR CODE	DIVERSE	<p>This is an error code. <i>Currently not used!</i></p> <table><tr><td>Byte<sub>0</sub></td><td>-</td><td>-</td></tr><tr><td>PX1Red</td><td>PX1Green</td><td>PX1Blue</td></tr><tr><td>ERROR CODE</td><td colspan="2"></td></tr></table>	Byte <sub>0</sub>	-	-	PX1Red	PX1Green	PX1Blue	ERROR CODE					
Byte <sub>0</sub>	-	-												
PX1Red	PX1Green	PX1Blue												
ERROR CODE														
LINE COUNT	DIVERSE	<p>This is a line counter starting from image start.</p> <table><tr><td>-</td><td>Byte<sub>1</sub></td><td>Byte<sub>0</sub></td></tr><tr><td>PX1Red</td><td>PX1Green</td><td>PX1Blue</td></tr><tr><td></td><td colspan="2">LINE COUNT</td></tr></table>	-	Byte <sub>1</sub>	Byte <sub>0</sub>	PX1Red	PX1Green	PX1Blue		LINE COUNT				
-	Byte <sub>1</sub>	Byte <sub>0</sub>												
PX1Red	PX1Green	PX1Blue												
	LINE COUNT													
SPEED2HIGH	DIVERSE	<p>This bit is set if the line trigger exceeds the cameras maximum line rate. This is Bit7 of <b>PX1Red</b>.</p> <table><tr><td>BIT7</td><td>BIT6</td><td>...</td><td>BIT0</td></tr><tr><td colspan="4">PX2Red</td></tr><tr><td>SPEED2HIGH</td><td colspan="3">-</td></tr></table>	BIT7	BIT6	...	BIT0	PX2Red				SPEED2HIGH	-		
BIT7	BIT6	...	BIT0											
PX2Red														
SPEED2HIGH	-													

LINE TIME	DIVERSE	<p>This is the current measured line time in camera internal clock cycles.</p> <table><tr><td>BIT7...4</td><td>BIT3...0</td><td>Byte<sub>1</sub></td><td>Byte<sub>0</sub></td></tr><tr><td colspan="2">PX2Red</td><td>PX2Green</td><td>PX2Blue</td></tr><tr><td colspan="4">LINE TIME CLOCKS</td></tr></table> <p>To decode the line time, use the following formula:</p> $LineTime = \frac{LINE\_TIME\_CLOCKS}{f_t}$ <p>Up to package 2.1.1</p> <table><tr><td>Camera Variant</td><td>f<sub>t</sub> in MHz</td></tr><tr><td>ax X</td><td>75</td></tr><tr><td>g8 X</td><td>80</td></tr></table> <p>Package 2.1.2 and later:</p> <table><tr><td>Camera Variant</td><td>f<sub>t</sub> in MHz</td></tr><tr><td>ALL</td><td>100</td></tr></table>	BIT7...4	BIT3...0	Byte <sub>1</sub>	Byte <sub>0</sub>	PX2Red		PX2Green	PX2Blue	LINE TIME CLOCKS				Camera Variant	f <sub>t</sub> in MHz	ax X	75	g8 X	80	Camera Variant	f <sub>t</sub> in MHz	ALL	100
BIT7...4	BIT3...0	Byte <sub>1</sub>	Byte <sub>0</sub>																					
PX2Red		PX2Green	PX2Blue																					
LINE TIME CLOCKS																								
Camera Variant	f <sub>t</sub> in MHz																							
ax X	75																							
g8 X	80																							
Camera Variant	f <sub>t</sub> in MHz																							
ALL	100																							
ENCODER CLOCKS	DIVERSE	<p>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.</p> <table><tr><td>Byte<sub>2</sub></td><td>Byte<sub>1</sub></td><td>Byte<sub>0</sub></td></tr><tr><td>PX3Red</td><td>PX3Green</td><td>PX3Blue</td></tr><tr><td colspan="3">ENCODER CLOCKS</td></tr></table>	Byte <sub>2</sub>	Byte <sub>1</sub>	Byte <sub>0</sub>	PX3Red	PX3Green	PX3Blue	ENCODER CLOCKS															
Byte <sub>2</sub>	Byte <sub>1</sub>	Byte <sub>0</sub>																						
PX3Red	PX3Green	PX3Blue																						
ENCODER CLOCKS																								
NEXT LINE TRIGGER POSITION	DIVERSE	<p>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.</p> <table><tr><td>Byte<sub>2</sub></td><td>Byte<sub>1</sub></td><td>Byte<sub>0</sub></td></tr><tr><td>PX4Red</td><td>PX4Green</td><td>PX4Blue</td></tr><tr><td colspan="3">NEXT LT POS RAW</td></tr></table> <p>To achieve the actual value, follow this formula:</p> $NextLTPos = \frac{NEXT\_LT\_POS\_RAW}{256}$	Byte <sub>2</sub>	Byte <sub>1</sub>	Byte <sub>0</sub>	PX4Red	PX4Green	PX4Blue	NEXT LT POS RAW															
Byte <sub>2</sub>	Byte <sub>1</sub>	Byte <sub>0</sub>																						
PX4Red	PX4Green	PX4Blue																						
NEXT LT POS RAW																								
TIMESTAMP	SAME	<p>Timestamp starts counting from boot.</p> <table><tr><td>Byte<sub>2</sub></td><td>Byte<sub>1</sub></td><td>Byte<sub>0</sub></td></tr><tr><td>PX5Red</td><td>PX5Green</td><td>PX5Blue</td></tr><tr><td colspan="2">SECONDS</td><td><math>\frac{MS^1}{4}</math></td></tr></table> <p><sup>1</sup>MS= Milliseconds</p> <p>To achieve the milliseconds part of the timestamp the Content of <i>PX5Blue</i> must be multiplied by four.</p>	Byte <sub>2</sub>	Byte <sub>1</sub>	Byte <sub>0</sub>	PX5Red	PX5Green	PX5Blue	SECONDS		$\frac{MS^1}{4}$													
Byte <sub>2</sub>	Byte <sub>1</sub>	Byte <sub>0</sub>																						
PX5Red	PX5Green	PX5Blue																						
SECONDS		$\frac{MS^1}{4}$																						



LINE STATUS	DIVERSE	<p>This entry reflects the logical level of the input lines <b>before</b> LineInverter. If LineInverter is enabled the value reflected by the <a href="#">Line Status</a> feature is inverse.</p> <table><tr><th>Line</th><th>Pixel Bit</th></tr><tr><td>Line1</td><td>PX<sub>8Green0</sub></td></tr><tr><td>Line2</td><td>PX<sub>8Green1</sub></td></tr><tr><td>Line3</td><td>PX<sub>8Green2</sub></td></tr><tr><td>Line4</td><td>PX<sub>8Green4</sub></td></tr><tr><td>Line5</td><td>PX<sub>8Green5</sub></td></tr><tr><td>Line6</td><td>PX<sub>8Green6</sub></td></tr><tr><td>Line7</td><td>PX<sub>8Green7</sub></td></tr><tr><td>Line9</td><td>PX<sub>8Red0</sub></td></tr><tr><td>Line10</td><td>-</td></tr></table>	Line	Pixel Bit	Line1	PX <sub>8Green0</sub>	Line2	PX <sub>8Green1</sub>	Line3	PX <sub>8Green2</sub>	Line4	PX <sub>8Green4</sub>	Line5	PX <sub>8Green5</sub>	Line6	PX <sub>8Green6</sub>	Line7	PX <sub>8Green7</sub>	Line9	PX <sub>8Red0</sub>	Line10	-
Line	Pixel Bit																					
Line1	PX <sub>8Green0</sub>																					
Line2	PX <sub>8Green1</sub>																					
Line3	PX <sub>8Green2</sub>																					
Line4	PX <sub>8Green4</sub>																					
Line5	PX <sub>8Green5</sub>																					
Line6	PX <sub>8Green6</sub>																					
Line7	PX <sub>8Green7</sub>																					
Line9	PX <sub>8Red0</sub>																					
Line10	-																					
SCAN-DIR	DIVERSE	<p>The scan direction</p> <table><tr><th>Direction</th><th>Value</th></tr><tr><td>Forward</td><td>0</td></tr><tr><td>Backward</td><td>1</td></tr></table> <table><tr><th>Entry</th><th>Pixel Bit</th></tr><tr><td>Scan Direction</td><td>PX<sub>8Blue6</sub></td></tr></table>	Direction	Value	Forward	0	Backward	1	Entry	Pixel Bit	Scan Direction	PX <sub>8Blue6</sub>										
Direction	Value																					
Forward	0																					
Backward	1																					
Entry	Pixel Bit																					
Scan Direction	PX <sub>8Blue6</sub>																					

**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.

## 5.19 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	<b>ImageProcessing</b>	
Availability	<a href="#">ALL</a>	
Notes	-	
Error behavior	-	

Test Pattern Generator Selector Enum Entries:

Name	Description
ImageProcessing	<b>TestPattern</b> feature controls the <b>Image Processing</b> test pattern generator.

## 5.20 Test Pattern

Name	TestPattern[ <a href="#">TestPatternGeneratorSelector</a> ]	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	<a href="#">ALL</a>	
Notes	-	
Error behavior	See the <a href="#">device error code</a> 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.

## 5.21 Test Pattern Value

Name	TestPatternValue <a href="#">[TestPatternGeneratorSelector]</a>	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	<a href="#">ALL</a>	
Notes	-	
Error behavior	See the <a href="#">device error code</a> documentation.	

## 6 Acquisition Control

### 6.1 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	<b>Continuous</b>	
Availability	<a href="#">ALL</a>	
Notes	-	
Error behavior	-	

*Acquisition Mode Enum Entries:*

Name	Description
Continuous	Frames are captured continuously until stopped with the <a href="#">AcquisitionStop</a> command.
SingleFrame	One Frame is captured.

### 6.2 Acquisition Start

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

### 6.3 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	<a href="#">ALL</a>	
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 TLPParamsLocked can be modified first after AcquisitionStop has finished execution completely.	
Error behavior	See the <a href="#">device error code</a> documentation.	

## 6.4 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	<a href="#">ALL</a>	
Notes	When command is executed, it aborts the current frame immediately without completing the current frame.	
Error behavior	See the <a href="#">device error code</a> documentation.	

## 6.5 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	<a href="#">ALL</a>	
Notes	This feature value will be resetted during an UserSet load.	
Error behavior	-	

## 6.6 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	No	
Value range	See enum entries table below.	
Default value	Common	
Availability	<a href="#">ALL</a>	
Notes	-	
Error behavior	See the <a href="#">device error code</a> 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.

## 6.7 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	<a href="#">ALL</a>
Notes	-
Error behavior	See the <a href="#">device error code</a> 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.

## 6.8 Exposure Time

Name	ExposureTime[ <a href="#">ExposureTimeSelector</a> ]	Standard
Description	This controls the duration during which the photosensitive cells are exposed to light.	
Interface	Float	
Access mode	Read/Write	
Adjustable while grabbing	No	
Value range	<b>Freerun:</b> The exposure time must be smaller than the <a href="#">Acquisition Line Time</a> plus an offset.  <b>LineTrigger On or Salve camera (MSMode is set to <a href="#">Slave</a>):</b> The exposure time must be smaller than the maximum exposure time.  The minimum difference of <a href="#">Acquisition Line Time</a> and <b>ExposureTime</b> are camera variant specific. Therefore, query the min and max entries of this feature.	
Default value	30	
Availability	<a href="#">ALL</a>	
Notes	The unit is micro-seconds.	
Error behavior	See the <a href="#">device error code</a> documentation.	

## 6.9 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 <a href="#">Exposure Time</a>	
Default value	-	
Notes	This feature is deprecated please use <a href="#">Exposure Time</a> instead.	
Error behavior	See the <a href="#">device error code</a> documentation.	

## 6.10 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 <a href="#">Exposure Time</a> instead.	

Error behavior	-
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## 6.11 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 / <a href="#">Acquisition Line Time</a> .Max), (1 / <a href="#">Acquisition Line Time</a> .Min)]	
Default value	18.18 KHz	
Availability	<a href="#">ALL</a>	
Notes	<p>This is the inverse of the <a href="#">Acquisition Line Time</a></p> <p>This feature is not available if <a href="#">MasterSlaveMode</a> is configured as Slave or <a href="#">LedFlashEnable</a> is enabled.</p>	
Error behavior	See the <a href="#">device error code</a> documentation.	

## 6.12 Acquisition Line Rate Max – Deprecated

Name	AcquisitionLineRateMax	Custom
Description	This value is calculated by the camera. It limits the <b>AcquisitionLineRate</b> . 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 <a href="#">Acquisition Line Rate</a> feature.	
Error behavior	-	

## 6.13 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	<p>The value range depends on:</p> <ul style="list-style-type: none"> <li>- The transport layer configuration (Link configuration, packet size)</li> <li>- The region <a href="#">width</a></li> <li>- The <a href="#">Exposure Time</a></li> <li>- Reduction parameters <a href="#">Binning Horizontal</a> , <a href="#">Decimation Horizontal Float</a></li> </ul> <p><b>Query the min and max values of the acquisition line time feature to get the valid range for current setting.</b></p> <p>The exposure time always must be smaller than the line time: Range defined by exposure time: [<a href="#">Exposure Time</a> + gap μs, 27900 μs]</p> <p>Gap = {<a href="#">ax_X</a> = 1.5 ; <a href="#">g8_X</a> = 2.0}</p> <p>Example range for gige-vision with one and two physical links connected.</p> <ol style="list-style-type: none"> <li>1. [37.431 μs, 13981 μs] – For single link (10Gbps) + <a href="#">ax_X</a></li> <li>2. [30.881 μs, 13981 μs] – For dual link (20Gbps) + <a href="#">ax_X</a></li> <li>3. [37.431 μs, 13107.1875 μs] – For single link (10Gbps) + <a href="#">g8_X</a></li> <li>4. [30.881 μs, 13107.1875 μs] – For dual link (20Gbps) + <a href="#">g8_X</a></li> </ol>	

	<sup>1</sup> For Region <b>Width</b> : 15360, <b>GevSCPSPacketSize</b> : 8240 and <b>AcquisitionFrameRate</b> disabled.
Default value	55
Availability	<a href="#">ALL</a>
Notes	<p>This is the inverse of the <a href="#">Acquisition Line Rate</a> .</p> <p>If <b>AcquisitionLineTime</b> is set for higher values, then make sure to adopt image timeout to avoid timeout issues while grabbing.</p> <p>This parameter influences the value range of <a href="#">AcquisitionFrameRate</a>. Please read the <a href="#">AcquisitionFrameRate</a> feature documentation for further details.</p> <p>This feature is not available if <a href="#">MasterSlaveMode</a> is configured as Slave or <a href="#">LedFlashEnable</a> is enabled.</p>
Error behavior	See the <a href="#">device error code</a> documentation.



## 6.14 Acquisition Line Time Min – Deprecated

Name	AcquisitionLineTimeMin	Custom
Description	Displays the minimum processing time per scan line in $\mu\text{s}$ .	
Interface	Float	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	<a href="#">Exposure Time</a> + 1.5 $\mu\text{s}$	
Default value	-	
Notes	Please query the min and max values of the <a href="#">Acquisition Line Time</a> feature instead of using this feature.	
Error behavior	-	

## 6.15 Acquisition Frame Rate Enable

Name	AcquisitionFrameRateEnable	Standard
Description	Controls whether the <b>AcquisitionFrameRate</b> 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 <b>AcquisitionLineTime</b> .	
Interface	Boolean	
Access mode	Read/Write	
Adjustable while grabbing	No	
Value range	True, False	
Default value	False	
Availability	<a href="#">ALL</a>	
Notes	<p>The <b>FrameActive</b> and <b>FrameStart</b> triggers must be set to <b>Off</b> to enable this feature.</p> <p>This feature is not available if <a href="#">MasterSlaveMode</a> is configured as Slave or <a href="#">LedFlashEnable</a> is enabled.</p>	
Error behavior	See the <a href="#">device error code</a> documentation.	

## 6.16 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	<p>The value range depends on the line time as well as on the image height:</p> <p><i>Min Acquisition Frame Rate:</i></p> $Min = \frac{1}{AcquisitionLineTime * (ImageHeight + 32764)}$ <p><i>Max Acquisition Frame Rate:</i></p> $Max = \frac{1}{AcquisitionLineTime * ImageHeight}$	
Default value	10	
Availability	<a href="#">ALL</a>	
Notes	<p>The <b>Acquisition Frame Rate</b> is based on the given <b>AcquisitionLineTime</b> 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.</p> <p>This feature is writeable only if <a href="#">AcquisitionFrameRateEnable</a> is set to <b>True</b>.</p>	

	<p>Changing the image height or the acquisition line time influences the value range of the <b>AcquisitionFrameRate</b>. It may be that while these parameters are changed. The current value for the <b>AcquisitionFrameRate</b> gets out of range. In this case the real acquisition frame rate is clamped internally to the maximum possible frame rate.</p> <p>This feature is not available if <a href="#">MasterSlaveMode</a> is configured as Slave or <a href="#">LedFlashEnable</a> is enabled.</p>
Error behavior	See the <a href="#">device error code</a> documentation.

## 6.17 Time Delay Integration Mode

Name	TimeDelayIntegrationMode	<b>Custom</b>
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	<a href="#">ALL</a>	
Notes	<ul style="list-style-type: none"> <li>- Enabling the TDI will be done by setting the TimeDelayIntegration feature to a value greater than 1</li> <li>- 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.</li> </ul>	
Error behavior	See the <a href="#">device error code</a> documentation.	

### Exposure Time Mode Enum Entries:

Name	Availability	Description
HighSensitivity	ALL	The sensitivity will be increased in this TDI mode. This is achieved by <b>summing up</b> the lines.
HighSNR	ALL	Opposed to HighSensitivity this mode leads to a higher dynamic range. The SNR will be greater. This is achieved by <b>averaging</b> the lines.

## 6.18 Time Delay Integration

Name	TimeDelayIntegration	<b>Custom</b>
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	<a href="#">ALL</a>	
Notes	This feature is valid and available for the <b>Mono Camera</b> only.	
Error behavior	See the <a href="#">device error code</a> documentation.	

## 6.19 Master Slave Mode

Name	MasterSlaveMode	<b>Custom</b>
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	<a href="#">ALL</a>
Notes	<p>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.</p> <p>The camera's maximum line frequency may differ e.g., by different <a href="#">Width</a>, <a href="#">Pixel Format</a>, <a href="#">Decimation Horizontal Float</a>, <a href="#">Binning Horizontal</a> or <a href="#">Exposure Time</a> parameter.</p> <p>To be sure about the setting check the maximum value of <a href="#">Acquisition Line Rate</a> by querying it from the camera.</p> <p>The following features are not available if the mode is set to <b>Slave</b> or <b>AutoSelect (Slave)</b>:</p> <ul style="list-style-type: none"> <li>- <a href="#">TriggerSelector</a>, <a href="#">TriggerMode</a>, <a href="#">TriggerSource</a>, <a href="#">TriggerActivation</a>, <a href="#">TriggerDelayLines</a>, <a href="#">TriggerDivider</a>, <a href="#">TriggerSignalDetectionMode</a>, <a href="#">ExtendLines</a>, <a href="#">LineTime(Measured)</a>, <a href="#">LineTriggerStatus</a></li> <li>- <a href="#">AcquisitionLineTime</a></li> <li>- <a href="#">EncoderControl</a></li> <li>- <a href="#">LedFlashControl</a></li> </ul>
Error behavior	See the <a href="#">device error code</a> 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.
AutoSelect	Automatically selects the camera to be either Master or Slave.
AutoSelect (Master)	This is available if <b>AutoSelect</b> is selected. If Line3 is in low level, then AutoSelect in Master mode.
AutoSelect (Slave)	This is available if <b>AutoSelect</b> is selected. If Line3 via pull-up(high level), then AutoSelect in Slave Mode.

## 6.20 Master Slave Interface - Deprecated

Name	MasterSlaveInterface <a href="#">MasterSlaveMode</a>	Custom
Description	Specifies the interface type 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	External	
Availability	<a href="#">ALL</a>	
Notes	<p><b>This feature is deprecated, use MasterSlaveSource, MasterSlaveAutoSelectSource and Digital IO configuration. It will be removed from package 3.0.0</b></p> <p>For External interface,  <b>Master</b> – Line9 as output  <b>Slave</b> – Line4 as input and Line9 as output</p>	
Error behavior	See the <a href="#">device error code</a> 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

## 6.21 Master Slave Interface Enable - Deprecated

Name	MasterSlaveInterfaceEnable[ <a href="#">MasterSlaveInterface</a> ]	Custom
Description	Enables the selected master/slave interface.	
Interface	Boolean	
Access mode	Read/Write	
Adjustable while grabbing	No	
Value range	<b>True</b> – Enables selected master/slave interface. <b>False</b> – Disables selected master/slave interface.	
Default value	<b>False</b>	
Availability	<a href="#">ALL</a>	
Notes	<b>This feature is deprecated, use <a href="#">MasterSlaveSource</a>, <a href="#">MasterSlaveAutoSelectSource</a> and Digital IO configuration. It will be removed from package 3.0.0</b>	
Error behavior	See the <a href="#">device error code</a> documentation.	

## 6.22 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	Off	
Availability	<a href="#">ALL</a>	
Notes	Only Line4 and Line11 are available for <a href="#">allPIXAEvo</a>	
Error behavior	See the <a href="#">device error code</a> documentation.	

### Master Slave Source Enum Entries:

Name	Description
Line1	Specifies physical line (or pin) <b>Line1</b> to use as source for the master slave signal.
Line2	Specifies physical line (or pin) <b>Line2</b> to use as source for the master slave signal.
Line3	Specifies physical line (or pin) <b>Line3</b> to use as source for the master slave signal.
Line4	Specifies physical line (or pin) <b>Line4</b> to use as source for the master slave signal.
Line5	Specifies physical line (or pin) <b>Line5</b> to use as source for the master slave signal.
Line6	Specifies physical line (or pin) <b>Line6</b> to use as source for the master slave signal.
Line7	Specifies physical line (or pin) <b>Line7</b> to use as source for the master slave signal.
Line8	Specifies physical line (or pin) <b>Line8</b> to use as source for the master slave signal.
Line9	Specifies physical line (or pin) <b>Line9</b> to use as source for the master slave signal.
Line10	Specifies physical line (or pin) <b>Line10</b> to use as source for the master slave signal.
Line11	Specifies physical line (or pin) <b>Line11</b> to use as source for the master slave signal.

## 6.23 AutoSelect Source

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	<a href="#">ALL</a>
Notes	Only Line3 is available for <a href="#">allPIXAEvo</a>
Error behavior	See the <a href="#">device error code</a> documentation.

*AutoSelect Source Enum Entries:*

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

**6.24 Slave DelayLines**

Name	MasterSlaveDelayLines	<b>Custom</b>
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. <ol style="list-style-type: none"> <li>[0 , 32764] – <a href="#">LedFlashEnable</a> is disabled</li> <li>[0, 32764] – <a href="#">LedFlashEnable</a> is enabled and <a href="#">NumberOfPattern</a>=1</li> <li>[0, 16382] – <a href="#">LedFlashEnable</a> is enabled and <a href="#">NumberOfPattern</a>=2</li> <li>[0, 10921] – <a href="#">LedFlashEnable</a> is enabled and <a href="#">NumberOfPattern</a>=3</li> <li>[0, 8191] – <a href="#">LedFlashEnable</a> is enabled and <a href="#">NumberOfPattern</a>=4</li> </ol>	
Default value	0	
Availability	<a href="#">ALL</a>	
Notes	This feature is valid and available only for the <b>Slave Camera</b> .	
Error behavior	See the <a href="#">device error code</a> documentation.	

**6.25 Acquisition Burst Frame Count**

Name	AcquisitionBurstFrameCount	<b>Standard</b>
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	<a href="#">ALL</a>	

Notes	This feature is valid and available only for <b>FrameBurstStart</b> and if <a href="#">MasterSlaveMode</a> is not configured as Slave.
Error behavior	See the <a href="#">device error code</a> documentation.

## 6.26 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	<b>FrameStart</b>	
Availability	<a href="#">ALL</a>	
Notes	This feature is not available if <a href="#">MasterSlaveMode</a> is configured as Slave.	
Error behavior	See the <a href="#">device error code</a> 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.
FrameBurstStart	Selects a trigger starting of the bursts of frames in an acquisition.
LineStart	Selects a trigger starting the capture of one Line of a Frame.

## 6.27 Trigger Mode

Name	TriggerMode[ <a href="#">TriggerSelector</a> ]	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	<b>Off</b>	
Availability	<a href="#">ALL</a>	
Notes	This feature is not available if <a href="#">MasterSlaveMode</a> is configured as Slave.	
Error behavior	See the <a href="#">device error code</a> documentation.	

*Trigger Mode Enum Entries:*

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

## 6.28 Trigger Source

Name	TriggerSource[ <a href="#">TriggerSelector</a> ]	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	<a href="#">ALL</a>	
Notes	This feature is not available if <a href="#">MasterSlaveMode</a> is configured as Slave.	
Error behavior	See the <a href="#">device error code</a> 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 <b>LineStart</b>
Line1	Specifies physical line (or pin) <b>Line1</b> and associated I/O control block to use as external source for the trigger signal.	This enum entry is valid and available only for <b>LineStart</b>
Line2	Specifies physical line (or pin) <b>Line2</b> and associated I/O control block to use as external source for the trigger signal.	This enum entry is valid and available only for <b>Frame Trigger</b>
Line3	Specifies physical line (or pin) <b>Line3</b> and associated I/O control block to use as external source for the trigger signal.	This enum entry is valid and available for <b>Frame</b> or <b>Line</b> trigger
Line4	Specifies physical line (or pin) <b>Line4</b> and associated I/O control block to use as external source for the trigger signal.	This enum entry is valid and available for <b>Frame</b> or <b>Line</b> trigger

**6.29 Trigger Activation**

Name	TriggerActivation[ <a href="#">TriggerSelector</a> ]	<b>Standard</b>
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	<a href="#">ALL</a>	
Notes	This feature is not available if <a href="#">MasterSlaveMode</a> is configured as Slave.	
Error behavior	See the <a href="#">device error code</a> 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 <b>LineStart</b> or <b>FrameStart</b> or <b>FrameBurstStart</b>
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 <b>FrameStart</b> or <b>FrameBurstStart</b>
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 <b>FrameActive</b>
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 <b>FrameActive</b>

**6.30 Trigger DelayLines**

Name	TriggerDelayLines[ <a href="#">TriggerSelector</a> ]	<b>Custom</b>
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] – <a href="#">LedFlashEnable</a> is disabled	

	2. [0, 32764] – <a href="#">LedFlashEnable</a> is enabled and <a href="#">NumberOfPattern</a> =1 3. [0, 16382] – <a href="#">LedFlashEnable</a> is enabled and <a href="#">NumberOfPattern</a> =2 4. [0, 10921] – <a href="#">LedFlashEnable</a> is enabled and <a href="#">NumberOfPattern</a> =3 [0, 8191] – <a href="#">LedFlashEnable</a> is enabled and <a href="#">NumberOfPattern</a> =4
Default value	0
Availability	<a href="#">ALL</a>
Notes	This feature is valid and available only for <b>FrameStart</b> , <b>FrameBurstStart</b> and <b>FrameActive</b> .  This feature is not available if <a href="#">MasterSlaveMode</a> is configured as Slave.
Error behavior	See the <a href="#">device error code</a> documentation.

### 6.31 Trigger Divider

Name	TriggerDivider[ <a href="#">TriggerSelector</a> ]	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	<a href="#">ALL</a>	
Notes	This feature is valid and available only for <b>LineStart</b> and if <a href="#">MasterSlaveMode</a> is not configured as Slave.	
Error behavior	See the <a href="#">device error code</a> documentation.	



## 6.32 Trigger Signal Detection Mode

Name	TriggerSignalDetectionMode[ <a href="#">TriggerSelector</a> ]	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	<b>FrameStart - PeakholderDetection</b> <b>FrameBurstStart - PeakholderDetection</b> <b>FrameActive – Debouncing4Lines</b>	
Availability	<a href="#">ALL</a>	
Notes	<p>This feature is valid and available only for <b>FrameStart</b>, <b>FrameBurstStart</b> and <b>FrameActive</b> and if <a href="#">MasterSlaveMode</a> is not configured as Slave.</p> <p>The incoming Frame Trigger Signal can be delayed by the <a href="#">Trigger Delay Lines</a> feature.</p>	
Error behavior	See the <a href="#">device error code</a> 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.

## 6.33 Extend Lines

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

## 6.34 Line Time (Measured)

Name	MeasuredLineTime[ <a href="#">TriggerSelector</a> ]	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 <a href="#">AcquisitionLineTime</a> .	

	During LineStart mode 'ON', it displays the actual line trigger speed. But in both cases the maximum line time it can display is <b>13,107</b> us.
Default value	-
Availability	<a href="#">ALL</a>
Notes	This feature is valid and available only for <b>LineStart</b> and if <a href="#">MasterSlaveMode</a> is not configured as Slave.
Error behavior	

### 6.35 Line Trigger Status

Name	LineTriggerStatus <a href="#">TriggerSelector</a>	<b>Custom</b>
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	<a href="#">ALL</a>	
Notes	This feature is valid and available only for <b>LineStart</b> and if <a href="#">MasterSlaveMode</a> is not configured as Slave.	
Error behavior	-	

#### Line Trigger Status Enum Entries:

Name	Description
OK	OK
SpeedToHigh	Speed to high

## 7 Analog Control

### 7.1 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	<b>All</b> – For color camera <b>White</b> – For mono camera	
Availability	<a href="#">ALL</a>	
Notes	<p>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.</p> <p>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.</p> <p>If the gain is read while <b>All/AnalogAll/DigitalAll</b> is selected, an average of all available color channels depending on <a href="#">PixelFormat</a> is returned. If the gain is written, the value is written to all color channels defined in <a href="#">PixelFormat</a>. In case of using <a href="#">ColorToGrey</a> the <a href="#">PixelFormat</a> will be Mono but the color channels for reading and writing the gain value will be Red, Green and Blue.</p>	
Error behavior	See the <a href="#">device error code</a> 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

## 7.2 Gain

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

## 7.3 Gain Auto

Name	GainAuto[ <a href="#">GainSelector</a> ]	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	<a href="#">ALL</a>	
Notes	<p>This feature is available only if <a href="#">Gain Selector</a> is <b>All</b> or <b>White</b> (White for Mono cameras)</p> <p>The status of automatic gain control is reflected in <a href="#">GainAutoStatus</a> feature.</p> <p>When the <b>GainAuto</b> feature has changed its value to <b>Off</b> after performing the "Once" or "AdjustTargetValueToMaxVideo" calibration, please query <a href="#">GainAutoStatus</a> to check whether the automatic gain control was successful.</p>	
Error behavior	See the <a href="#">device error code</a> documentation.	

### Gain Auto Enum Entries:

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

	After process has finished it automatically return to <b>Off</b> state.
--	---

## 7.4 Gain Auto Status

Name	GainAutoStatus	<b>Standard</b>
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	<a href="#">ALL</a>	
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 " <b>AdjustTargetValueToMaxVideo</b> ", video level too low for target value adjustment
VideoLevelUpperLimit	Warning! Process " <b>AdjustTargetValueToMaxVideo</b> ", video level too high for target value adjustment
TargetValueOutOfRange	Warning! Process " <b>AdjustTargetValueToMaxVideo</b> ", adjusted target values are out of range

## 7.5 Synchronization Mode Enable

Name	GainAutoSyncModeEnable	<b>Custom</b>
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 asynchronous 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	<b>True</b> – Enables synchronization mode <b>False</b> – Disables synchronization mode	
Default value	<b>False</b>	
Availability	<a href="#">ALL</a>	
Notes	-	
Error behavior	See the <a href="#">device error code</a> documentation.	

## 7.6 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	<b>True</b> – Enables Gain Auto Stop Control <b>False</b> – Disables Gain Auto Stop Control	
Default value	<b>False</b>	
Availability	<a href="#">ALL</a>	
Notes	-	
Error behavior	-	

## 7.7 Stop Factor

Name	GainAutoStopFactor	Custom
Description	<p>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.</p>	
Interface	Float	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	[0.0 , 1.0]	
Default value	0.8	
Availability	<a href="#">ALL</a>	
Notes	-	
Error behavior	See the <a href="#">device error code</a> documentation.	

## 7.8 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 , ( <a href="#">SensorWidth</a> - <a href="#">GainControlRegionWidth</a> )]	
Default value	( <a href="#">SensorWidth</a> / 2 ) - 48	
Availability	<a href="#">ALL</a>	
Notes	The minimal step of the value is one.	
Error behavior	See the <a href="#">device error code</a> documentation.	

## 7.9 Gain Control Region Width

Name	GainControlRegionWidth	<b>Custom</b>
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	<a href="#">ALL</a>	
Notes	The step of the width is two.	
Error behavior	See the <a href="#">device error code</a> documentation.	

## 7.10 Gain Control Region Offset Y

Name	GainControlRegionOffsetY	<b>Custom</b>
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, <a href="#">Height</a> – <a href="#">GainControlRegionHeight</a> ] Frame trigger on: [ <a href="#">3 - TriggerDelayLines</a> , 32767]	
Default value	3	
Availability	<a href="#">ALL</a>	
Notes	This feature only takes effect if the <a href="#">Synchronization Mode Enable</a> is set true!	
Error behavior	See the <a href="#">device error code</a> documentation.	

## 7.11 Gain Control Region Height

Name	GainControlRegionHeight	<b>Custom</b>
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	<a href="#">ALL</a>	
Notes	-	
Error behavior	See the <a href="#">device error code</a> documentation.	

## 7.12 Gain Control Region visible

Name	GainControlRegionVisible	<b>Custom</b>
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	<b>True</b> – Displays the borders of the gain control region <b>False</b> – Does not display the borders of the gain control region	
Default value	<b>False</b>	
Availability	<a href="#">ALL</a>	
Notes	-	
Error behavior	-	

## 7.13 Average Samples

Name	GainAutoAverageSamples	<b>Custom</b>
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	<a href="#">ALL</a>	
Notes	-	
Error behavior	See the <a href="#">device error code</a> documentation.	

## 7.14 Gain Control Region Channel Selector

Name	GainControlRegionChannelSelector	<b>Custom</b>
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	<a href="#">ALL</a>	
Notes	-	
Error behavior	See the <a href="#">device error code</a> documentation.	

*Gain Control Region Channel Selector Enum Entries:*

Name	Description
All	<p>Selects all available channels for the actual PixelFormat to set the target value to same number.</p> <p>Reading the target value will return the average of all available channels for the current PixelFormat.</p> <p>Reading the current value will return the average of all available channels for the current PixelFormat.</p>
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.



## 7.15 Target value

Name	GainControlRegionTargetValue[ <a href="#">GainControlRegionChannelSelector</a> ]	<b>Custom</b>
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	<a href="#">ALL</a>	
Notes	<p><a href="#">Gain Auto</a> “<b>Once</b>” or “<b>Continuous</b>”: Internal Gain Control adjusts gain values until current value of GainControlRegion have reached target values.</p> <p><a href="#">Gain Auto</a> “<b>AdjustTargetValueToMaxVideo</b>”: <a href="#">Target value</a> 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 <a href="#">Target value</a>, until that criterion is fulfilled.</p>	
Error behavior	See the <a href="#">device error code</a> documentation.	

## 7.16 Current value

Name	GainControlRegionCurrentValue[ <a href="#">GainControlRegionChannelSelector</a> ]	<b>Custom</b>
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	<a href="#">ALL</a>	
Notes	-	
Error behavior	-	

## 7.17 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	<a href="#">ALL</a>	
Notes	-	
Error behavior	See the <a href="#">device error code</a> 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.

## 7.18 Sensor Sensitivity

Name	SensorSensitivity[ <a href="#">SensorSensitivityChannelSelector</a> ]			Custom
Description	Controls the sensor sensitivity of the specified <a href="#">selector</a> .			
Interface	Integer			
Access mode	Read/Write			
Adjustable while grabbing	Yes			
Value range	Variant	Min Value	Max Value	
	<a href="#">ax_X</a>	0	2	
	<a href="#">g8_X</a>	0	7	
Default value	Variant	Default Value		
	<a href="#">ax_X</a>	2		
	<a href="#">g8_X</a>	4		
Availability	<a href="#">ALL</a>			
Notes	<p>You should create new DSNU/PRNU reference when changing this parameter.</p> <p><a href="#">g8_X</a>: <i>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.</i></p>			
Error behavior	See the <a href="#">device error code</a> documentation.			

## 7.19 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	<a href="#">ALL</a>	
Notes	The gamma values 0.2 – 2.5 behave corresponding to the standard gamma definition. <b>The gamma value 0.1 enables a special sRGB gamma table.</b> The gamma feature is effective only if the <a href="#">Gamma LUT</a> is enabled.	
Error behavior	See the <a href="#">device error code</a> documentation.	

## 7.20 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	<a href="#">ALL</a>	
Notes	-	
Error behavior	See the <a href="#">device error code</a> documentation.	

## 7.21 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	<a href="#">ALL</a>	
Notes	-	
Error behavior	See the <a href="#">device error code</a> documentation.	

*Brightness Contrast Channel Selector Enum Entries:*

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

## 7.22 Contrast

Name	BrightnessContrastGain <a href="#">[BrightnessContrastChannelSelector]</a>	<b>Custom</b>
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	<a href="#">ALL</a>	
Notes	-	
Error behavior	See the <a href="#">device error code</a> documentation.	

## 7.23 Brightness

Name	BrightnessContrastOffset <a href="#">[BrightnessContrastChannelSelector]</a>	<b>Custom</b>
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	<a href="#">ALL</a>	
Notes	<p>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.</p> <p>Example:</p> <p>The maximum value of a pixel using the pixel format RGB8 (bit-depth 8-bit) is 255.</p> <p>Brightness value of 0.1 would increase the output pixel value by:</p> <p>Offset= 0.1x 255 = 25dn's</p>	
Error behavior	See the <a href="#">device error code</a> documentation.	

## 8 Image Calibration Control

### 8.1 Image Calibration Mode - Deprecated

Name	ImageCalibrationMode	Custom
Description	Sets internal camera parameter for calibration DSNU or PRNU or even directly perform internal calibration .	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	No	
Value range	See enum entries table below.	
Default value	Off	
Availability	<a href="#">ALL</a>	
Notes	<p><b><u>Mode = ImageCalibrationModeDSNU / ImageCalibrationModePRNU:</u></b>  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 <b>ImageCalibrationMode</b> is active, the internally changed features cannot be modified.  When <b>ImageCalibrationMode</b> is set to <b>Off</b>, features are restored to their previous values.</p> <p>The following features are read-only when ImageCalibrationMode is enabled:</p> <ul style="list-style-type: none"> <li>- ColorTransformationSelector</li> <li>- ColorTransformationEnable</li> <li>- BrightnessContrastEnable</li> <li>- DarkSignalNonUniformityReferenceOutput</li> <li>- PhotoResponseNonUniformityReferenceOutput</li> <li>- DecimationHorizontalFloat</li> <li>- BinningHorizontal</li> <li>- ReverseX</li> <li>- LutEnable</li> <li>- GainControlRegionVisible</li> <li>- UserSetLoad</li> </ul> <p>The Image Calibration Mode for DSNU-creation will additionally disable digital gain. This is not reflected by the features.</p> <p><b><u>Mode = CalibrateDSNUInternal / CalibratePRNUInternal:</u></b>  Internal DSNU or PRNU calibration is done. All internal parameters are adapted automatically.  Calibration data is written to LUT selected by <a href="#">Dark Signal Non-Uniformity (DSNU) Selector</a> or <a href="#">Photo Response Non-Uniformity (PRNU) Selector</a>.</p> <p><b>CalibrateDSNUInternal</b> or <b>CalibratePRNUInternal</b> can directly be started from Mode=Off.  <b>ImageCalibrationModeDSNU</b> or <b>ImageCalibrationModePRNU</b> is not required to be set before.</p> <p>After calibration has finished ImageCalibrationMode returns to previous state.</p> <p>The <b>ImageCalibrationMode</b> feature should be polled to check the status of reference generation. Once the feature value changes from <b>Calibrate&lt;DSNU PRNU&gt;Internal</b> to the previous state e.g., <b>Off</b> the process has finished. To cancel the current process set the value to <b>Off</b>.</p>	
Error behavior	See the <a href="#">device error code</a> documentation.	

*Image Calibration Mode Enum Entries:*

Name	Description
Off	
ImageCalibrationModeDSNU	Image from camera is prepared for DSNU calibration. Former <i>CalibrateDarkSignalNonUniformity</i>
ImageCalibrationModePRNU	Image from camera is prepared for PRNU calibration Former <i>CalibratePhotoResponseNonUniformity</i>
CalibrateDSNUInternal	Camera performs internal DSNU calibration ( <b>This feature is deprecated, use <a href="#">FlatFieldCorrectionStartCalibration</a>. It will be removed from package 3.0.0</b> )
CalibratePRNUInternal	Camera performs internal PRNU calibration ( <b>This feature is deprecated, use <a href="#">FlatFieldCorrectionStartCalibration</a>. It will be removed from package 3.0.0</b> )

**8.2 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	<a href="#">ALL</a>	
Notes	<b>This feature is deprecated, use <a href="#">FlatFieldCorrectionSelector</a>. It will be removed from package 3.0.0</b>	
Error behavior	See the <a href="#">device error code</a> documentation.	

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

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

**8.3 DSNU Dataset Information - Deprecated**

Name	DarkSignalNonUniformityDataSetInformation <a href="#">[DarkSignalNonUniformitySelector]</a>	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	<a href="#">ALL</a>	
Notes	<b>This feature is deprecated. It will be removed from package 3.0.0</b>	
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.
------------------	--

## 8.4 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	<a href="#">ALL</a>	
Notes	<b>This feature is deprecated, use <a href="#">FlatFieldCorrectionAvailablePlanes</a> It will be removed from package 3.0.0</b>	
Error behavior	See the <a href="#">device error code</a> 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.

## 8.5 First Valid Pixel - Deprecated

Name	DarkSignalNonUniformityFirstPixelReg <a href="#">[DarkSignalNonUniformityAvailablePlains]</a>	Custom
Description	Indicates first valid pixel.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	$\geq 0$	
Default value	-	
Availability	<a href="#">ALL</a>	
Notes	<b>This feature is deprecated, use <a href="#">FlatFieldCorrectionFirstPixel</a> It will be removed from package 3.0.0</b>	
Error behavior	-	

## 8.6 Last Valid Pixel - Deprecated

Name	DarkSignalNonUniformityLastPixelReg <a href="#">[DarkSignalNonUniformityAvailablePlains]</a>	Custom
Description	Indicates last valid pixel.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	$\geq 0$	
Default value	<b>This feature is deprecated, use <a href="#">FlatFieldCorrectionLastPixel</a> It will be removed from package 3.0.0</b>	
Availability	<a href="#">ALL</a>	
Notes	-	
Error behavior	-	



## 8.7 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	<b>True</b> – Displays the DSNU reference values <b>False</b> – Does not display the DSNU reference values	
Default value	<b>False</b>	
Availability	<a href="#">ALL</a>	
Notes	<b>This feature is deprecated, use <a href="#">FlatFieldCorrectionDisplayReference</a> It will be removed from package 3.0.0</b>  This feature is available only if DSNU LUT is active and configured. This parameter is not stored in user set.	
Error behavior	See the <a href="#">device error code</a> documentation.	

## 8.8 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	<b>LUT1</b>	
Availability	<a href="#">ALL</a>	
Notes	<b>This feature is deprecated, use <a href="#">FlatFieldCorrectionSelector</a> It will be removed from package 3.0.0</b>	
Error behavior	See the <a href="#">device error code</a> documentation.	

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

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

## 8.9 PRNU Dataset Information - Deprecated

Name	PhotoResponseNonUniformityDataSetInformation <a href="#">[PhotoResponseNonUniformitySelector]</a>	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	<a href="#">ALL</a>	
Notes	<b>This feature is deprecated.</b> <b>It will be removed from package 3.0.0</b>	
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.

## 8.10 PRNU 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	<a href="#">ALL</a>	
Notes	<b>This feature is deprecated, use <a href="#">FlatFieldCorrectionAvailablePlanes</a> It will be removed from package 3.0.0</b>	
Error behavior	See the <a href="#">device error code</a> 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.

## 8.11 First Valid Pixel - Deprecated

Name	PhotoResponseNonUniformityFirstPixelReg <a href="#">[PhotoResponseNonUniformityAvailablePlains]</a>	Custom
Description	Indicates first valid pixel.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	$\geq 0$	
Default value	-	
Availability	<a href="#">ALL</a>	
Notes	<b>This feature is deprecated, use <a href="#">FlatFieldCorrectionFirstPixel</a> It will be removed from package 3.0.0</b>	
Error behavior	-	

## 8.12 Last Valid Pixel - Deprecated

Name	PhotoResponseNonUniformityLastPixelReg <a href="#">[PhotoResponseNonUniformityAvailablePlains]</a>	Custom
Description	Indicates last valid pixel.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	$\geq 0$	
Default value	-	
Availability	<a href="#">ALL</a>	
Notes	<b>This feature is deprecated, use <a href="#">FlatFieldCorrectionLastPixel</a> It will be removed from package 3.0.0</b>	

Error behavior	-
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### 8.13 PRNU 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	<b>True</b> – Display the PRNU reference values <b>False</b> – Do not display the PRNU reference values	
Default value	<b>False</b>	
Availability	<a href="#">ALL</a>	
Notes	<p><b>This feature is deprecated, use <a href="#">FlatFieldCorrectionDisplayReference</a> It will be removed from package 3.0.0</b></p> <p>This feature is valid and available only if PRNU LUT is active and configured. This parameter is not stored in user set.</p>	
Error behavior	See the <a href="#">device error code</a> documentation.	

### 8.14 Flat 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	<a href="#">ALL</a>	
Notes	<p><b>Mode = DSNU / PRNU:</b> 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 <b>FlatFieldCorrectionCalibrationMode</b> is active, the internally changed features cannot be modified. When <b>FlatFieldCorrectionCalibrationMode</b> is set to <b>Off</b>, features are restored to their previous values.</p> <p>The following features are read-only when FlatFieldCorrectionCalibrationMode is enabled:</p> <ul style="list-style-type: none"> <li>- ColorTransformationSelector</li> <li>- ColorTransformationEnable</li> <li>- BrightnessContrastEnable</li> <li>- DarkSignalNonUniformityReferenceOutput</li> <li>- PhotoResponseNonUniformityReferenceOutput</li> <li>- DecimationHorizontalFloat</li> <li>- BinningHorizontal</li> <li>- ReverseX</li> <li>- LutEnable</li> <li>- GainControlRegionVisible</li> <li>- UserSetLoad</li> </ul> <p>The Flat Field Correction Calibration Mode for DSNU-creation will additionally disable digital gain. This is not reflected by the features.</p> <p><b>DSNU or PRNU</b> is not required to be set before.</p>	

	<p>After calibration has finished FlatFieldCorrectionCalibrationMode returns to previous state.</p> <p>The <b>FlatFieldCorrectionCalibrationMode</b> feature should be polled to check the status of reference generation. To cancel the current process set the value to <b>Off</b>.</p>
Error behavior	See the <a href="#">device error code</a> documentation.

*Flat Field Correction Calibration Mode Enum Entries:*

Name	Description
Off	
DSNU	Image from camera is prepared for DSNU calibration. Former <i>ImageCalibrationModeDSNU</i>
PRNU	Image from camera is prepared for PRNU calibration Former <i>ImageCalibrationModePRNUy</i>

## 8.15 Flat Field Correction Selector

Name	FlatFieldCorrectionSelector	<b>Custom</b>
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	<a href="#">ALL</a>	
Notes		
Error behavior	See the <a href="#">device error code</a> documentation.	

*Flat Field Correction Selector Enum Entries:*

Name	Description
DSNU DataSet 1	Selects the DSNU DataSet1
DSNU DataSet 2	Selects the DSNU DataSet 2
PRNU DataSet 1	Selects the PRNU DataSet 1
PRNU DataSet 2	Selects the PRNU DataSet 2

## 8.16 Enable

Name	FlatFieldCorrectionEnable[ <a href="#">FlatFieldCorrectionSelector</a> ]	<b>Custom</b>
Description	Enable/Disable the selected DataSet.	
Interface	Boolean	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	<b>True</b> – Activates the selected DataSet <b>False</b> – Deactivates the selected DataSet	
Default value	<b>False</b>	
Availability	<a href="#">ALL</a>	
Notes	<a href="#">For some camera variants</a> 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 <a href="#">device error code</a> documentation.	

## 8.17 DataSet Description

Name	FlatFieldCorrectionDataSetDescription[ <a href="#">FlatFieldCorrectionSelector</a> ]	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	<a href="#">ALL</a>	
Notes	-	
Error behavior	-	

## 8.18 Available Planes

Name	FlatFieldCorrectionAvailablePlanes <a href="#">FlatFieldCorrectionSelector</a>	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	<a href="#">ALL</a>	
Notes	-	
Error behavior	See the <a href="#">device error code</a> 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.

## 8.19 First Valid Pixel

Name	FlatFieldCorrectionFirstPixel <a href="#">FlatFieldCorrectionSelector</a> [ <a href="#">FFCAvailablePlains</a> ]	Custom
Description	Indicates first valid pixel.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	$\geq 0$	
Default value	-	
Availability	<a href="#">ALL</a>	
Notes	-	
Error behavior	-	

## 8.20 Last Valid Pixel

Name	FlatFieldCorrectionLastPixel <a href="#">[FlatFieldCorrectionSelector]</a> <a href="#">[FFCAvailablePlains]</a>	Custom
Description	Indicates last valid pixel.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	$\geq 0$	
Default value	-	
Availability	<a href="#">ALL</a>	
Notes	-	
Error behavior	-	

## 8.21 Display Reference

Name	FlatFieldCorrectionDisplayReference <a href="#">[FlatFieldCorrectionSelector]</a>	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	<b>True</b> – Displays the selected flat field correction selector reference values <b>False</b> – Does not display the selected flat field correction selector reference values	
Default value	<b>False</b>	
Availability	<a href="#">ALL</a>	
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 <a href="#">device error code</a> documentation.	

## 8.22 Start Calibration

Name	FlatFieldCorrectionStartCalibration <a href="#">[FlatFieldCorrectionSelector]</a>	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	<a href="#">ALL</a>	
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 <a href="#">FlatFieldCorrectionSelector</a> .	
Error behavior	See the <a href="#">device error code</a> documentation.	

## 8.23 Stop Calibration

Name	FlatFieldCorrectionStopCalibration <a href="#">[FlatFieldCorrectionSelector]</a>	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	<a href="#">ALL</a>
Notes	
Error behavior	See the <a href="#">device error code</a> documentation.

## 8.24 Calibration Status

Name	FlatFieldCorrectionCalibrationStatus[FlatFieldCorrectionSelector]	<b>Custom</b>
Description	Displays the calibration status.	
Interface	Enumeration	
Access mode	Read Only	
Adjustable while grabbing	No	
Value range	See enum entries table below.	
Default value	Off	
Availability	<a href="#">ALL</a>	
Notes	-	
Error behavior	See the <a href="#">device error code</a> 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

## 8.25 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	<a href="#">ALL</a>			
Notes	-			
Error behavior	See the <a href="#">device error code</a> documentation.			

## 8.26 Scan Direction Source

Name	ScanDirectionSource	<b>Custom</b>
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	<b>Internal</b>	
Availability	<a href="#">ALL</a>	

Notes	This feature is not available if <a href="#">MasterSlaveMode</a> is configured as Slave.
Error behavior	See the <a href="#">device error code</a> 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 <i>Currently only for EncoderSourceB=Line2</i>



## 8.27 Scan Direction

Name	ImageCalibrationScanDirection[ <a href="#">ScanDirectionSource</a> ]	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	<b>Forward</b>	
Availability	<b>ALL</b>	
Notes	<p>This feature is not available if <a href="#">MasterSlaveMode</a> is configured as Slave.</p> <p>This feature is writable only if <a href="#">ScanDirectionSource</a> is Internal otherwise Read only.</p>	
Error behavior	See the <a href="#">device error code</a> 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).

## 8.28 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	$\geq -15000$	
Default value	-	
Notes	-	
Error behavior	-	

## 9 Color Transformation Control

### 9.1 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	<b>ColortoColor</b>	
Availability	<b>ALL</b> (Not available for mono cameras)	
Notes	<p>The transformations are defined as follows:</p> <p><b>Color to Color</b></p> $\begin{pmatrix} R_{out} \\ G_{out} \\ B_{out} \\ A_{out} \end{pmatrix} = \begin{pmatrix} Gain_{00} & Gain_{01} & Gain_{02} & Gain_{03} \\ Gain_{10} & Gain_{11} & Gain_{12} & Gain_{13} \\ Gain_{20} & Gain_{21} & Gain_{22} & Gain_{23} \\ Gain_{30} & Gain_{31} & Gain_{32} & Gain_{33} \end{pmatrix} \begin{pmatrix} R_{in} \\ G_{in} \\ B_{in} \\ A_{in} \end{pmatrix} + \begin{pmatrix} Offset_0 \\ Offset_1 \\ Offset_2 \\ Offset_3 \end{pmatrix}$ <p>In case of RGB <a href="#">pixel format</a> the fourth entry <i>A</i> has no meaning. <i>A</i> could contain <i>Ir</i> color component for some camera variants.</p> <p><b>Color to Grey</b></p> $M_{out} = (Gain_0 \quad Gain_1 \quad Gain_2 \quad Gain_3) \begin{pmatrix} R_{in} \\ G_{in} \\ B_{in} \\ A_{in} \end{pmatrix}$ <p>Attention: For current implementation color to grey is supported only for RGB. So the formula reduces to <math>Gain_{0-2}</math> and RGB!</p> <p>Use <a href="#">Color Transformation Value Selector</a> and <a href="#">Color Transformation Value</a> to set the coefficients.</p>	
Error behavior	See the <a href="#">device error code</a> documentation.	

Color Transformation Selector Enum Entries:

Name	Description
ColortoColor	Color to color
ColortoGrey	Color to grey

## 9.2 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	<b>True</b> – Enables the selected color transformation module <b>False</b> – Disables the selected color transformation module	
Default value	False	
Availability	<a href="#">ALL</a> (Not available for mono cameras)	
Notes	If the <b>ColortoGrey</b> module is disabled, the pixel format internally is changed to RGB8.	
Error behavior	See the <a href="#">device error code</a> documentation.	

## 9.3 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	<b>Gain00</b> – For <b>ColortoColor</b> module <b>Gain0</b> – For <b>ColortoGrey</b> module	
Availability	<a href="#">ALL</a> (Not available for mono cameras)	
Notes	-	
Error behavior	See the <a href="#">device error code</a> 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.

## 9.4 Color Transformation Value

Name	ColorTransformationValue[ <a href="#">ColorTransformationValueSelector</a> ]	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	<a href="#">ALL</a> (Not available for mono cameras)	
Notes	-	
Error behavior	See the <a href="#">device error code</a> documentation.	

## 10 LUT Control

### 10.1 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	<b>Gamma</b>	
Availability	<a href="#">ALL</a>	
Notes	-	
Error behavior	See the <a href="#">device error code</a> documentation.	

#### LUT Selector Enum Entries:

Name	Description
Gamma	Selects the Gamma LUT
DarkSignalNonUniformityLUT1	Selects the DSNU LUT 1( <b>This feature is deprecated, use <a href="#">FlatFieldCorrectionSelector</a>. It will be removed from package 3.0.0</b> )
DarkSignalNonUniformityLUT2	Selects the DSNU LUT2( <b>This feature is deprecated, use <a href="#">FlatFieldCorrectionSelector</a>. It will be removed from package 3.0.0</b> )
PhotoResponseNonUniformityLUT1	Selects the PRNU LUT1( <b>This feature is deprecated, use <a href="#">FlatFieldCorrectionSelector</a>. It will be removed from package 3.0.0</b> )
PhotoResponseNonUniformityLUT2	Selects the PRNU LUT2( <b>This feature is deprecated, use <a href="#">FlatFieldCorrectionSelector</a>. It will be removed from package 3.0.0</b> )

### 10.2 LUT Enable

Name	LUTEnable[ <a href="#">LUTSelector</a> ]	Standard
Description	Activates/Deactivates the selected LUT.	
Interface	Boolean	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	<b>True</b> – Activates the selected LUT <b>False</b> – Deactivates the selected LUT	
Default value	<b>False</b>	
Availability	<a href="#">ALL</a>	
Notes	<b>This feature is deprecated, use <a href="#">FlatFieldCorrectionEnable</a>. It will be removed from package 3.0.0</b>	
Error behavior	See the <a href="#">device error code</a> documentation.	

### 10.3 LUT Dataset Name - Deprecated

Name	LUTDatasetNameReg[ <a href="#">LUTSelector</a> ]	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	<a href="#">ALL</a>	
Notes	<p><b>This feature is deprecated, use <a href="#">FlatFieldCorrectionEnable</a>. It will be removed from package 3.0.0</b></p> <p>This feature is not available for <b>Gamma</b>.</p>	
Error behavior	-	

## 11 User Set Control

### 11.1 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	<b>Default</b>	
Availability	<a href="#">ALL</a>	
Notes	-	
Error behavior	See the <a href="#">device error code</a> documentation.	

### 11.2 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	<b>UserSet1</b>	
Availability	<a href="#">ALL</a>	
Notes	-	
Error behavior	See the <a href="#">device error code</a> 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

### 11.3 User Set Load

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

## 11.4 User Set Save

Name	UserSetSave[ <a href="#">UserSetSelector</a> ]	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	<a href="#">ALL</a>	
Notes	<b>Default</b> is Read only.	
Error behavior	See the <a href="#">device error code</a> documentation.	

## 11.5 User Set Comment

Name	UserSetComment[ <a href="#">UserSetSelector</a> ]	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	<b>Default</b>	
Availability	<a href="#">ALL</a>	
Notes	<b>Default</b> user set is Read only. When executing <a href="#">User Set Save</a> the comment of the active user set is stored to flash.	
Error behavior	See the <a href="#">device error code</a> documentation.	



## 12 Transport Layer Control

### 12.1 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	<a href="#">ALL</a>	
Notes	-	
Error behavior	See the <a href="#">device error code</a> documentation.	

### 12.2 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	<a href="#">ALL</a>	
Notes	-	
Error behavior	-	

### 12.3 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	<a href="#">ALL</a>	
Notes	-	
Error behavior	-	

*Device Tap Geometry Enum Entries:*

Name	Description
Geometry_1X_1Y	1X 1Y tap geometry

## 12.4 GigE Vision

### 12.4.1 Gev Version Major

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 <a href="#">DeviceTLVersionMajor</a> ).	
Error behavior	-	

### 12.4.2 Gev Version Minor

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 <a href="#">DeviceTLVersionMinor</a> ).	
Error behavior	-	

### 12.4.3 Gev Device Mode Is Big Endian

Name	GevDeviceModelsBigEndian	Standard
Description	Endianness of the device registers.	
Interface	Boolean	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	<b>True</b> – Represents the endianness of the device registers <b>False</b> – Does not represents the Endianness of the device registers	
Default value	-	
Notes	This feature is deprecated (See <a href="#">DeviceRegistersEndianness</a> ).	
Error behavior	-	

### 12.4.4 Gev Device Mode Character Set

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 <a href="#">DeviceCharacterSet</a> ).	
Error behavior	-	

*Gev Device Mode Character Set Enum Entries:*

Name	Description
UTF8	UTF 8

### 12.4.5 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	<a href="#">X_dxge</a> , <a href="#">ax_dsxge</a>	
Notes	-	
Error behavior	-	

### 12.4.6 Gev MACAddress

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

### 12.4.7 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	<a href="#">X_dxge</a> , <a href="#">ax_dsxge</a>	
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.

#### 12.4.8 Gev Supported Option

Name	GevSupportedOption[ <a href="#">GevSupportedOptionSelector</a> ]	<b>Standard</b>
Description	Returns if the selected GEV option is supported.	
Interface	Boolean	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	<b>True</b> – Selected GEV option is supported <b>False</b> – Selected GEV option is not supported	
Default value	-	
Availability	<a href="#">X dxge</a> , <a href="#">ax dsxge</a>	
Notes	-	
Error behavior	-	

#### 12.4.9 Gev Current IP Configuration LLA

Name	GevCurrentIPConfigurationLLA[ <a href="#">GevInterfaceSelector</a> ]	<b>Standard</b>
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	<b>True</b> – Link Local Address IP configuration scheme is activated on the given logical link. <b>False</b> – Link Local Address IP configuration scheme is not activated on the given logical link.	
Default value	True	
Availability	<a href="#">X dxge</a> , <a href="#">ax dsxge</a>	

Notes	-
Error behavior	-

#### 12.4.10 Gev Current IP Configuration DHCP

Name	GevCurrentIPConfigurationDHCP[ <a href="#">GevInterfaceSelector</a> ]	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	<b>True</b> – DHCP IP configuration scheme is activated on the given logical link. <b>False</b> – DHCP IP configuration scheme is not activated on the given logical link.	
Default value	-	
Availability	<a href="#">X dxge</a> , <a href="#">ax dsxge</a>	
Notes	-	
Error behavior	-	

#### 12.4.11 Gev Current IP Configuration Persistent IP

Name	GevCurrentIPConfigurationPersistentIP[ <a href="#">GevInterfaceSelector</a> ]	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	<b>True</b> – PersistentIP configuration scheme is activated on the given logical link. <b>False</b> – PersistentIP configuration scheme is not activated on the given logical link.	
Default value	-	
Availability	<a href="#">X dxge</a> , <a href="#">ax dsxge</a>	
Notes	-	
Error behavior	-	

#### 12.4.12 Gev Current IP Address

Name	GevCurrentIPAddress[ <a href="#">GevInterfaceSelector</a> ]	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	<a href="#">X dxge</a> , <a href="#">ax dsxge</a>	
Notes	-	
Error behavior	-	

#### 12.4.13 Gev Current Subnet Mask

Name	GevCurrentSubnetMask[ <a href="#">GevInterfaceSelector</a> ]	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	<a href="#">X dxge</a> , <a href="#">ax dsxge</a>
Notes	-
Error behavior	-

#### 12.4.14      **Gev Current Default Gateway**

Name	GevCurrentDefaultGateway <a href="#">[GevInterfaceSelector]</a>	<b>Standard</b>
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	$\geq 0$	
Default value	-	
Availability	<a href="#">X dxge</a> , <a href="#">ax dsxge</a>	
Notes	-	
Error behavior	-	

#### 12.4.15      **Gev First URL**

Name	GevFirstURL	<b>Standard</b>
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	<b>This feature is deprecated.</b>	
Error behavior	-	

#### 12.4.16      **Gev Second URL**

Name	GevSecondURL	<b>Standard</b>
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	<b>This feature is deprecated.</b>	
Error behavior	-	

#### 12.4.17      **Gev Number of Interfaces – Deprecated**

Name	GevNumberOfInterfaces	<b>Standard</b>
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	<b>This feature is deprecated (See <a href="#">DeviceLinkSelector</a>).</b>
Error behavior	-

#### 12.4.18      **Gev Persistent IP Address**

Name	GevPersistentIPAddress	<b>Standard</b>
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	<a href="#">X dxge</a> , <a href="#">ax dsxge</a>	
Notes	-	
Error behavior	-	

#### 12.4.19      **Gev Persistent Subnet Mask**

Name	GevPersistentSubnetMask	<b>Standard</b>
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	<a href="#">X dxge</a> , <a href="#">ax dsxge</a>	
Notes	-	
Error behavior	-	

#### 12.4.20      **Gev Persistent Default Gateway**

Name	GevPersistentDefaultGateway	<b>Standard</b>
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	<a href="#">X dxge</a> , <a href="#">ax dsxge</a>	
Notes	-	
Error behavior	-	

#### 12.4.21      **Gev Persistent IP Address**

Name	GevPersistentIPAddress	<b>Standard</b>
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	<a href="#">X dxge</a> , <a href="#">ax dsxge</a>
Notes	-
Error behavior	-

#### 12.4.22 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	<a href="#">X dxge</a> , <a href="#">ax dsxge</a>	
Notes	The unit is Mbs.	
Error behavior	-	

#### 12.4.23 Gev Message Channel Count

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 <a href="#">DeviceEventChannelCount</a> ).	
Error behavior	-	

#### 12.4.24 Gev Stream Channel Count

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 <a href="#">Device Stream Channel Count</a> ).	
Error behavior	-	

#### 12.4.25 Gev Heartbeat Timeout

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 <a href="#">Device Link Heartbeat Timeout</a> ).	
Error behavior	-	



**12.4.26      Gev Timestamp Tick Frequency**

Name	GevTimestampTickFrequency	<b>Standard</b>
Description	Indicates the number of timestamp ticks during 1 second (frequency in Hz).	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	$\geq 0$	
Default value	-	
Notes	This feature is deprecated (See increment of the <a href="#">Timestamp Latch Value</a> feature).	
Error behavior	-	

**12.4.27      Gev Timestamp Control Latch**

Name	GevTimestampControlLatch	<b>Standard</b>
Description	Latches current timestamp counter into <b>GevTimestampValue</b> .	
Interface	Command	
Access mode	Write only	
Adjustable while grabbing	Yes	
Value range	1	
Default value	1	
Notes	This feature is deprecated (See <a href="#">Timestamp Latch</a> ).	
Error behavior	-	

**12.4.28      Gev Timestamp Control Reset**

Name	GevTimestampControlReset	<b>Standard</b>
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 <a href="#">Timestamp Reset</a> ).	
Error behavior	-	

**12.4.29      Gev Time stamp Value**

Name	GevTimestampValue	<b>Standard</b>
Description	Returns the latched 64-bit value of the timestamp counter.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	$\geq 0$	
Default value	-	
Notes	This feature is deprecated (See <a href="#">Timestamp Latch Value</a> ).	
Error behavior	-	

**12.4.30      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	<a href="#">X dxge</a> , <a href="#">ax dsxge</a>	
Notes	-	
Error behavior	-	

*Gev CCP Enum Entries:*

Name	Description
OpenAccess	Open access
ExclusiveAccess	Exclusive access
ControlAccess	Control access

**12.4.31      Gev MCPHost Port**

Name	GevMCPHostPort	Standard
Description	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	<a href="#">X dxge</a> , <a href="#">ax dsxge</a>	
Notes	-	
Error behavior	-	

**12.4.32      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	<a href="#">X dxge</a> , <a href="#">ax dsxge</a>	
Notes	-	
Error behavior	-	

**12.4.33      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	<a href="#">X dxge</a> , <a href="#">ax dsxge</a>	

Notes	-
Error behavior	-

#### 12.4.34      **Gev MCRC**

Name	GevMCRC	<b>Standard</b>
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	$\geq 0$	
Default value	0	
Availability	<a href="#">X dxge</a> , <a href="#">ax dsxge</a>	
Notes	-	
Error behavior	-	

#### 12.4.35      **Gev MCSP**

Name	GevMCSP	<b>Standard</b>
Description	This feature indicates the source port for the message channel.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	$\geq 0$	
Default value	-	
Availability	<a href="#">X dxge</a> , <a href="#">ax dsxge</a>	
Notes	-	
Error behavior	-	

#### 12.4.36      **Gev Stream Channel Selector**

Name	GevStreamChannelSelector	<b>Standard</b>
Description	Selects the stream channel to control.	
Interface	Integer	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	$\geq 0$	
Default value	0	
Availability	<a href="#">X dxge</a> , <a href="#">ax dsxge</a>	
Notes	-	
Error behavior	-	

#### 12.4.37      **Gev SCP Interface Index**

Name	GevSCPInterfaceIndex <a href="#">[GevStreamChannelSelector]</a>	<b>Standard</b>
Description	Index of network interface to use.	
Interface	Integer	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	0	
Default value	0	
Availability	<a href="#">X dxge</a> , <a href="#">ax dsxge</a>	
Notes	-	
Error behavior	-	

**12.4.38      Gev SCPHost Port**

Name	GevSCPHostPort[ <a href="#">GevStreamChannelSelector</a> ]	<b>Standard</b>
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	<a href="#">X dxge</a> , <a href="#">ax dsxge</a>	
Notes	-	
Error behavior	-	

**12.4.39      Gev SCPSFire Test Packet**

Name	GevSCPSFireTestPacket[ <a href="#">GevStreamChannelSelector</a> ]	<b>Standard</b>
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	<b>True</b> – The device will fire one test packet. <b>False</b> – The device will not send a test packet.	
Default value	-	
Availability	<a href="#">X dxge</a> , <a href="#">ax dsxge</a>	
Notes	-	
Error behavior	-	

**12.4.40      Gev SCPSTo Not Fragment**

Name	GevSCPSToNotFragment[ <a href="#">GevStreamChannelSelector</a> ]	<b>Standard</b>
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	<b>True</b> <b>False</b>	
Default value	-	
Availability	<a href="#">X dxge</a> , <a href="#">ax dsxge</a>	
Notes	-	
Error behavior	-	

**12.4.41      Gev SCPSBig Endian**

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

**12.4.42      Gev SCPSPacket Size**

Name	GevSCPSPacketSize[ <a href="#">GevStreamChannelSelector</a> ]	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	<a href="#">X dxge</a> , <a href="#">ax dsxge</a>	
Notes	-	
Error behavior	-	

**12.4.43      Gev SCPD**

Name	GevSCPD[ <a href="#">GevStreamChannelSelector</a> ]	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	<a href="#">X dxge</a> , <a href="#">ax dsxge</a>	
Notes	-	
Error behavior	-	

**12.4.44      Gev SCDA**

Name	GevSCDA[ <a href="#">GevStreamChannelSelector</a> ]	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	<a href="#">X dxge</a> , <a href="#">ax dsxge</a>	
Notes	-	
Error behavior	-	

## 12.5 CoaXPress

### 12.5.1 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	<a href="#">X_cxp</a>	
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)

### 12.5.2 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	<a href="#">X_cxp</a>	
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)

### 12.5.3 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	<a href="#">X_cxp</a>	
Notes	-	
Error behavior	See the <a href="#">device error code</a> documentation.	

#### Cxp Version Used Enum Entries:

Name	Description
CXP_Version_1_1	Cxp Version 1.1
CXP_Version_2_0	Cxp Version 2.0

### 12.5.4 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	<a href="#">X_cxp</a>	



Notes	-
Error behavior	-

### 12.5.5 Cxp Connection Test Mode

Name	CxpConnectionTestMode[ <a href="#">CxpConnectionSelector</a> ]	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	<a href="#">X_cxp</a>	
Notes	-	
Error behavior	-	

*Cxp Connection Test Mode Enum Entries:*

Name	Description
Off	Test mode disabled
Mode1	Test mode enabled

### 12.5.6 Cxp Connection Test Packet Count Tx

Name	CxpConnectionTestPacketCountTx[ <a href="#">CxpConnectionSelector</a> ]	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	$\geq 0$	
Default value	-	
Availability	<a href="#">X_cxp</a>	
Notes	-	
Error behavior	-	

### 12.5.7 Cxp Connection Test Packet Count Rx

Name	CxpConnectionTestPacketCountRx[ <a href="#">CxpConnectionSelector</a> ]	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	$\geq 0$	
Default value	-	
Availability	<a href="#">X_cxp</a>	
Notes	-	
Error behavior	-	

### 12.5.8 Cxp Connection Test Error Count

Name	CxpConnectionTestErrorCount[ <a href="#">CxpConnectionSelector</a> ]	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	$\geq 0$
Default value	-
Availability	<a href="#">X_cxp</a>
Notes	-
Error behavior	-

## 13 File Access Control

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

### 13.1 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	<b>NoFile</b>	
Availability	<a href="#">ALL</a>	
Notes	-	
Error behavior	See the <a href="#">device error code</a> 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 <sup>1</sup>
DSNULUT2	Enables DSNU LUT 2 access <sup>1</sup>
PRNULUT1	Enables PRNU LUT 1 access <sup>1</sup>
PRNULUT2	Enables PRNU LUT 2 access <sup>1</sup>
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.

<sup>1</sup> If the LUT is enabled in the image processing unit, it will be updated with the newly downloaded file.

## 13.2 File Operation Selector

Name	FileOperationSelector[ <a href="#">FileSelector</a> ]	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	<a href="#">ALL</a>	
Notes	-	
Error behavior	See the <a href="#">device error code</a> 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	<p>When this command is executed, the file is verified and internally copied. This is a time-consuming process.</p> <p>A file is always closed, even if an error occurs.</p> <p>The <a href="#">File Operation Status</a> is set appropriately. Therefore <a href="#">Success</a> indicates a successful file update and <a href="#">Failure</a> an erroneous update.</p> <p>If a <a href="#">Fatal Error</a> occurs, the File Operation Status is set to <a href="#">Fatal Error</a>. In this case you must not switch off the camera if the file type is one of the following:</p> <ul style="list-style-type: none"> <li>- Bitstream</li> <li>- Application</li> <li>- XML</li> <li>- Bootfile (sensorfile)</li> </ul> <p>For these files, please try to download the file again to avoid damage!</p> <p>For other files you may switch off the camera.</p> <p><b><i>In general, make sure to always use consistent packages as delivered by chromasens and do not mix files from different packages!</i></b></p>
Read	Read a file	-
Write	Write a file	-

### 13.3 File Operation Execute

Name	FileOperationExecute[ <a href="#">FileOperationSelector</a> ]	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	<a href="#">ALL</a>	
Notes	To check whether the operation is finished, read the value of the <b>FileOperationExecute</b> 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 <a href="#">device error code</a> documentation.	

### 13.4 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	<b>NoOpenMode</b>	
Availability	<a href="#">ALL</a>	
Notes	-	
Error behavior	See the <a href="#">device error code</a> 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 <b>FileAccessOffset</b> is set after a write command occurred, the new value of the <b>FileAccessOffset</b> must be at least new_ <b>FileAccessOffset</b> = (old_ <b>FileAccessOffset</b> + old_ <b>FileAccessLength</b> ).

### 13.5 File Access Offset

Name	FileAccessOffset[ <a href="#">FileOperationSelector</a> ]	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	<a href="#">ALL</a>	
Notes	The unit is Byte. Please see <a href="#">Write</a> for restrictions.	
Error behavior	See the <a href="#">device error code</a> documentation.	

### 13.6 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	$\geq 0$	
Default value	0	
Availability	<a href="#">ALL</a>	
Notes	The unit is Byte. Please see <a href="#">Write</a> for restrictions.	
Error behavior	See the <a href="#">device error code</a> documentation.	

### 13.7 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	$\geq 0$	
Default value	0	
Availability	<a href="#">ALL</a>	
Notes	-	
Error behavior	-	

### 13.8 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	<b>Success</b>	
Availability	<a href="#">ALL</a>	
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 <a href="#">Close</a> command for more information.

## 13.9 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	$\geq 0$	
Default value	0	
Availability	<a href="#">ALL</a>	
Notes	-	
Error behavior	See the <a href="#">device error code</a> documentation.	

## 13.10 File Checksum

Name	FileChecksum[FileSelector]	Custom
Description	The checksum of a file.	
Interface	Integer	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	$\geq 0$	
Default value	0	
Availability	<a href="#">ALL</a>	
Notes	<p>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.</p> <p><b>Calculation:</b> 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.</p> <p><i>Pseudo code for calculation:</i>  <pre> u32 file[N] u32 checksum = 0 checksum += file[0] checksum += file[1] ... checksum += file[N-1] </pre> </p>	
Error behavior	See the <a href="#">device error code</a> documentation.	

### 13.11 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	<a href="#">ALL</a>	
Default value	-	
Notes	See the <a href="#">device error code</a> documentation.	



## 14 Digital IO Control

### 14.1 Functional scope

This section shows the capabilities of digital IO lines.

#### 14.1.1 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	Not Supported	Input mode not supported
Line10	Output	Misc	
Line11	Input	SingleEnded_3V3	
Line11	Output	SingleEnded_3V3	

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

Line	LineSource
Line1	Not Supported
Line2	Not Supported
Line3	Off FrameActive LineActive
Line4	Off FrameActive LineActive
Line5	Off FrameActive LineActive FlashOut1
Line6	Off FrameActive LineActive FlashOut2
Line7	Off FrameActive LineActive FlashOut3
Line8	Off FrameActive LineActive FlashOut4

Line9	Off FrameActive LineActive MSOut
Line10	Fan
Line11	Off MSOut

### 14.1.2 allPIXA neo

This table contains the supported LineMode and LineFormat entries for each supported 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	Not Supported	Input mode not supported
Line9	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 UserOutput5
Line6	Off FrameActive LineActive UserOutput6
Line7	Off FrameActive LineActive UserOutput7
Line8	Off FrameActive LineActive UserOutput7
Line9	Fan UART0

## 14.2 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 <a href="#">allPIXA evo</a> and <a href="#">allPIXA neo</a> for availability.	
Error behavior	See the <a href="#">device error code</a> documentation.	

*Line Selector Enum Entries:*

Name	Availability	Description
Line1	<a href="#">ALL</a>	Selects Line1
Line2	<a href="#">ALL</a>	Selects Line2
Line3	<a href="#">ALL</a>	Selects Line3
Line4	<a href="#">ALL</a>	Selects Line4

Line5	<a href="#">ALL</a>	Selects Line5
Line6	<a href="#">ALL</a>	Selects Line6
Line7	<a href="#">ALL</a>	Selects Line7
Line8	<a href="#">ALL</a>	Selects Line8
Line9	<a href="#">EVO</a>	Selects Line9
Line10	<a href="#">ALL</a>	Selects Line10
Line11	<a href="#">EVO</a>	Selects Line11

### 14.3 Line Mode

Name	LineMode[ <a href="#">LineSelector</a> ]	<b>Standard</b>
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 <a href="#">device error code</a> 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

### 14.4 Line Inverter

Name	LineInverter[ <a href="#">LineSelector</a> ]	<b>Standard</b>
Description	Controls the inversion of the signal of the selected input or output Line.	
Interface	Boolean	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	<b>True</b> – The Line signal is inverted <b>False</b> – The Line signal is not inverted	
Default value	<b>False</b>	
Availability	<a href="#">ALL</a>	
Notes	-	
Error behavior	See the <a href="#">device error code</a> documentation.	

### 14.5 Line Status

Name	LineStatus[ <a href="#">LineSelector</a> ]	<b>Standard</b>
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	<b>True</b> – The level of the Line signal is High <b>False</b> – The level of the Line signal is low	
Availability	<a href="#">ALL</a>	
Notes	-	
Error behavior	-	

## 14.6 Line Source

Name	LineSource[ <a href="#">LineSelector</a> ]	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	<b>Off</b>	
Availability	See enum entries table below.	
Notes	Also check <a href="#">allPIXA evo</a> and <a href="#">allPIXA neo</a> for availability.	
Error behavior	See the <a href="#">device error code</a> documentation.	

### Line Source Enum Entries:

Name	Availability	Description
Off	<a href="#">ALL</a>	Line output is disabled
FlashOut1	<a href="#">EVO</a>	Line output is Flash out 1 state.
FlashOut2	<a href="#">EVO</a>	Line output is Flash out 2 state.
FlashOut3	<a href="#">EVO</a>	Line output is Flash out 3 state.
FlashOut4	<a href="#">EVO</a>	Line output is Flash out 4 state.
FrameActive	<a href="#">ALL</a>	Line output is Frame active state.
LineActive	<a href="#">ALL</a>	Line output is Line active state.
MSOut	<a href="#">EVO</a>	Line output is MasterSlave out state.
UserOutput3	<a href="#">NEO</a>	The UserOutput3 bit state as defined by its current UserOutputValue.
UserOutput4	<a href="#">NEO</a>	The UserOutput4 bit state as defined by its current UserOutputValue.
UserOutput5	<a href="#">NEO</a>	The UserOutput5 bit state as defined by its current UserOutputValue.
UserOutput6	<a href="#">NEO</a>	The UserOutput6 bit state as defined by its current UserOutputValue.
UserOutput7	<a href="#">NEO</a>	The UserOutput7 bit state as defined by its current UserOutputValue.
UserOutput8	<a href="#">NEO</a>	The UserOutput8 bit state as defined by its current UserOutputValue.
Fan	<a href="#">ALL</a>	Line output is Fan
UART0	<a href="#">NEO</a>	Line output is UART

## 14.7 Line Format

Name	LineFormat[ <a href="#">LineSelector</a> ]	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	<b>It depends on the <a href="#">LineSelector</a> and the <a href="#">variant</a>.</b>	
Availability	See enum entries table below.	
Notes	Also check <a href="#">allPIXA evo</a> and <a href="#">allPIXA neo</a> for availability.	
Error behavior	See the <a href="#">device error code</a> documentation.	

### Line Format Enum Entries:

Name	Availability	Description
NoConnect	<a href="#">NEO</a>	The line is not connected.
SingleEnded_3V3	<a href="#">ALL</a>	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	<a href="#">NEO</a>	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	<a href="#">NEO</a>	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	<a href="#">NEO</a>	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	<a href="#">NEO</a>	The line is currently accepting or sending RS422 level signals with no electrical termination.
RS422	<a href="#">ALL</a>	The line is currently accepting or sending RS422 level signals.
Misc	<a href="#">ALL</a>	The line is a special one

## 14.8 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	<b>UserOutput3</b>	
Availability	<a href="#">NEO</a>	
Notes	-	
Error behavior	See the <a href="#">device error code</a> documentation.	

### UserOutput Selector Enum Entries:

Name	Description
UserOutput3	Select the bit 3 of the User Output register.
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.

## 14.9 UserOutput Value

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

## 14.10 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	<a href="#">EVO</a>	
Notes	-	
Error behavior	See the <a href="#">device error code</a> 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
FallingEdgeChAorB	Falling Edge Channel A or Channel B
RisingEdgeChAorB	Rising Edge Channel A or Channel B

## 14.11 Source 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	<a href="#">ALL</a>	
Notes	-	
Error behavior	See the <a href="#">device error code</a> 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

## 14.12 Source 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	<a href="#">ALL</a>	
Notes	-	
Error behavior	See the <a href="#">device error code</a> 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



### 14.13 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	<a href="#">ALL</a>	
Notes	-	
Error behavior	See the <a href="#">device error code</a> documentation.	

### 14.14 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	<a href="#">ALL</a>	
Notes	-	
Error behavior	See the <a href="#">device error code</a> documentation.	

### 14.15 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	<a href="#">ALL</a>	
Notes	-	
Error behavior	See the <a href="#">device error code</a> 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

## 14.16 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	<a href="#">ALL</a>	
Notes	-	
Error behavior	See the <a href="#">device error code</a> documentation.	

## 14.17 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	<a href="#">ALL</a>	
Notes	-	
Error behavior	See the <a href="#">device error code</a> documentation.	

## 14.18 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	<a href="#">ALL</a>	
Notes	-	
Error behavior	See the <a href="#">device error code</a> 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.

## 14.19 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	<a href="#">ALL</a>	
Notes	-	
Error behavior	See the <a href="#">device error code</a> 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.

## 14.20 IO 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	<a href="#">ALL</a>	
Notes	-	
Error behavior	See the <a href="#">device error code</a> 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.

## 14.21 Event 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	<a href="#">ALL</a>	
Notes	-	
Error behavior	See the <a href="#">device error code</a> documentation.	

## 15 Encoder Control

### 15.1 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	<b>Encoder0</b>	
Availability	<a href="#">ALL</a>	
Notes	This feature is not available if <a href="#">MasterSlaveMode</a> is configured as Slave.	
Error behavior	See the <a href="#">device error code</a> documentation.	

*Encoder Selector Enum Entries:*

Name	Description
Encoder0	Selects Encoder0

### 15.2 Encoder Source A

Name	EncoderSourceA[ <a href="#">EncoderSelector</a> ]	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	<b>Off</b>	
Availability	<a href="#">ALL</a>	
Notes	This feature is not available if <a href="#">MasterSlaveMode</a> is configured as Slave.	
Error behavior	See the <a href="#">device error code</a> documentation.	

*Encoder Source A Enum Entries:*

Name	Description
Off	Encoder does not forward any input
Line1	Encoder forward input is taken from the I/O Line1
Line3	Encoder forward input is taken from the I/O Line3
Line4	Encoder forward input is taken from the I/O Line4

## 15.3 Encoder Source B

Name	EncoderSourceB[ <a href="#">EncoderSelector</a> ]	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	<b>Off</b>	
Availability	<b>ALL</b>	
Notes	This feature is not available if <a href="#">MasterSlaveMode</a> is configured as Slave.	
Error behavior	See the <a href="#">device error code</a> documentation.	

Encoder Source B Enum Entries:

Name	Description
Off	Encoder does not forward any input
Line2	Encoder forward input is taken from the I/O Line2

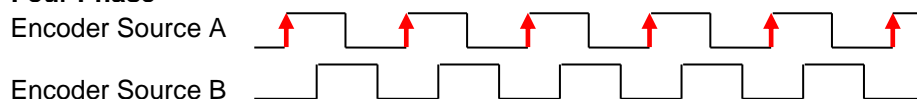
## 15.4 Encoder Mode

Name	EncoderMode[ <a href="#">EncoderSelector</a> ]	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	<b>FourPhase</b>	
Availability	<b>ALL</b>	
Notes	<p>A jitter filter is applied to the encoder sources for all encoder modes. To achieve higher jitter filtering use <a href="#">Encoder Average</a> feature.</p> <p>The <a href="#">scan direction detection</a> is based on <a href="#">Encoder Source B</a> and independent of the encoder mode.</p> <p>This feature is not available if <a href="#">MasterSlaveMode</a> is configured as Slave.</p>	
Error behavior	See the <a href="#">device error code</a> documentation.	

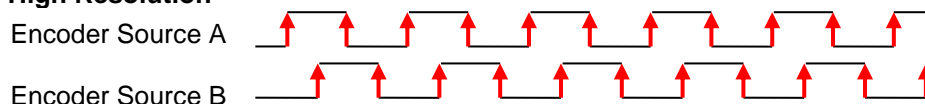
Encoder Mode Enum Entries:

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

### Four Phase



### High Resolution



## 15.5 Encoder Output Mode

Name	EncoderOutputMode[ <a href="#">EncoderSelector</a> ]	<b>Standard</b>
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	<b>Motion</b>	
Availability	<a href="#">ALL</a>	
Notes	This feature is not available if <a href="#">MasterSlaveMode</a> is configured as Slave.	
Error behavior	See the <a href="#">device error code</a> 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.

## 15.6 Encoder Divider Float

Name	EncoderDividerFloat[ <a href="#">EncoderSelector</a> ]	<b>Custom</b>
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	<a href="#">ALL</a>	
Notes	This is the minimum divider value working in combination with other factors!	
	This feature is not available if <a href="#">MasterSlaveMode</a> is configured as Slave.	
Error behavior	See the <a href="#">device error code</a> documentation.	

## 15.7 Encoder Average

Name	EncoderAverage[ <a href="#">EncoderSelector</a> ]	<b>Custom</b>
Description	Specifies the number of averaged encoder input pulses.	
Interface	Enumeration	
Access mode	Read/Write	
Adjustable while grabbing	Yes	
Value range	See enum entries table below.	
Default value	<b>Average1</b>	
Availability	<a href="#">ALL</a>	
Notes	This feature is not available if <a href="#">MasterSlaveMode</a> is configured as Slave.	
Error behavior	See the <a href="#">device error code</a> documentation.	

Encoder Output Mode Enum Entries:

Name	Description
Average1	No averaged performed
Average2	Average 2

Average4	Average 4
Average8	Average 8
Average16	Average 16

## 15.8 Encoder Value

Name	EncoderValue[ <a href="#">EncoderSelector</a> ]	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	<b>0</b>	
Availability	<a href="#">ALL</a>	
Notes	This feature is available only if <a href="#">EncoderOutputMode</a> is either PositionUp or PositionDown.	
Error behavior	See the <a href="#">device error code</a> documentation.	

## 16 Led Flash Control

### 16.1 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	<b>True</b> – Led flash is enabled <b>False</b> – Led flash is disabled	
Default value	False	
Availability	<a href="#">ALL</a>	
Notes	-	
Error behavior	See the <a href="#">device error code</a> documentation.	

### 16.2 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	<a href="#">ALL</a>	
Notes	-	
Error behavior	See the <a href="#">device error code</a> documentation.	

### 16.3 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	<b>LedFlashPattern1</b>	
Availability	<a href="#">ALL</a>	
Notes	This feature is not available if <a href="#">MasterSlaveMode</a> is configured as Slave.	
Error behavior	See the <a href="#">device error code</a> 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



## 16.4 Out1 OnTime

Name	LedFlashOut1OnTime <a href="#">LedFlashPatternSelector</a>		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	<a href="#">ALL</a>		
Notes	This feature is not available if <a href="#">MasterSlaveMode</a> is configured as Slave.		
Error behavior	See the <a href="#">device error code</a> documentation.		

## 16.5 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.		

## 16.6 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.		

## 16.7 Out4 OnTime

Name	LedFlashOut4OnTime <a href="#">LedFlashPatternSelector</a>		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	<a href="#">ALL</a>		
Notes	This feature is not available if <a href="#">MasterSlaveMode</a> is configured as Slave.		
Error behavior	See the <a href="#">device error code</a> documentation.		

## 16.8 Pattern Off Delay

Name	LedFlashPatternOffDelay[ <a href="#">LedFlashPatternSelector</a> ]		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	<a href="#">ALL</a>		
Notes	This feature is not available if <a href="#">MasterSlaveMode</a> is configured as Slave.		
Error behavior	See the <a href="#">device error code</a> documentation.		

## 16.9 Pattern duration

Name	LedFlashPatternDuration[ <a href="#">LedFlashPatternSelector</a> ]		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	<a href="#">ALL</a>		
Notes	This feature is not available if <a href="#">MasterSlaveMode</a> is configured as Slave.		
Error behavior	-		

## 16.10 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	<a href="#">ALL</a>	
Default value	<b>Continuous</b>	
Notes	This feature is not available if <a href="#">MasterSlaveMode</a> is configured as Slave.	
Error behavior	See the <a href="#">device error code</a> documentation.	

Led Flash Frame Control Enum Entries:

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

## 16.11 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	<b>Variant</b>	<b>Value Range</b>
	<b>ax_X</b>	$[(\text{MinLineTime} * \text{NoOfPattern}), 13980.8]$
	<b>g8_X</b>	$[(\text{MinLineTime} * \text{NoOfPattern}), 13107.0]$
	The minimum value depends on different factors like minimum line time of the system together with number of patterns.	
Default value	-	
Availability	<a href="#">ALL</a>	
Notes	This feature is not available if <a href="#">MasterSlaveMode</a> is configured as Slave.	
Error behavior	See the <a href="#">device error code</a> documentation.	

## 17 Lighting Control – Not Available for AllPIXA-EVO

### 17.1 Light Controller Set Load

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

### 17.2 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	-	

### 17.3 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	-	

## 17.4 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

## 17.5 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	$\geq 0$	
Default value	-	
Notes	-	
Error behavior	-	

## 17.6 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

**17.7 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

## 17.8 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

## 17.9 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	-	

## 17.10 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	-	

## 17.11 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	-	

## 17.12 Light 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

## 17.13 Light 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	-	

## 17.14 Light 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

**17.15Light 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	-	

**17.16Light Enable**

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

**17.17Light 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	-	

**17.18Light 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	-	

## 18 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.

### 18.1 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
<a href="#">IMF_ERROR_CATEGORY</a>	0x0001	Image format control error category
<a href="#">ALG_CTRL_ERROR_CATEGORY</a>	0x0002	Analog control error category
<a href="#">ACQ_CTRL_ERROR_CATEGORY</a>	0x0003	Acquisition control error category
<a href="#">DIG_IO_CTRL_ERROR_CATEGORY</a>	0x0004	Digital I/O control error category
<a href="#">ENC_CTRL_ERROR_CATEGORY</a>	0x0005	Encoder control error category
<a href="#">USER_SET_CTRL_ERROR_CATEGORY</a>	0x0006	User set control error category
<a href="#">ICC_ERROR_CATEGORY</a>	0x0007	Image calibration control error category
<a href="#">LUT_CTRL_ERROR_CATEGORY</a>	0x0008	Look-up table control error category
<a href="#">CT_CTRL_ERROR_CATEGORY</a>	0x0009	Color transformation control error category.
<a href="#">DEV_CTRL_ERROR_CATEGORY</a>	0x000A	Device control error category
<a href="#">FAC_ERROR_CATEGORY</a>	0x000B	File access control error category
<a href="#">LED_FLASH_CTRL_ERROR_CATEGORY</a>	0x000C	Led flash control error category
<a href="#">IO_ANALYZER_ERROR_CATEGORY</a>	0x000D	IO Analyzer error category

## 18.2 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.

### 18.2.1 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 139ffset 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 139ffset corresponding to pixel format. Increase the gain control region width or 139ffset 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_PIXEL_FORMAT_AT_SENSOR	0x000E	An internal error occurred while setting the pixel format
IMF_ERR_FAILED_TO_SET_PIXEL_FORMAT_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 139ffset 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 139ffset 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!

### 18.2.2 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 140ffset 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 140ffset or width
ALG_CTRL_ERR_GAINCTRL_OFFSET_X_RANGE	0x0005	The gain control region 140ffset 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 140ffset 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 140ffset must be atleast 2.
ALG_CTRL_ERR_GAINCTRL_OFFSET_Y_TOO_LARGE	0x000C	The gain control region 140ffset 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 140ffset 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

### 18.2.3 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_ACQ	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_DETECTOR_MODE_NOT_AVAILABLE	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_ACTIVATION_INVALID	0x0005	The trigger activation value is invalid
ACQ_CTRL_ERR_TRG_SRC_USED_BY_OTHER_TRIGGER	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_ACTIVATION_INVALID	0x0007	The trigger activation is invalid for FrameStart/FrameBurstStart. You can use RisingEdge/FallingEdge for FrameStart/FrameBurstStart
ACQ_CTRL_ERR_TRG_FRAME_ACTIVE_ACTIVATION_INVALID	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_EXPOSURE_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. It must be at least 1.5us larger than integration 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_TRIGGER_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_MASTER_SLAVE_INTERFACE_INVALID	0x0020	The master slave interface is invalid Or invalid interface with respect to master or slave.
ACQ_CTRL_ERR_MASTER_SLAVE_NOT_CONFIGURED	0x0021	Master slave is not configured properly. Enable any master slave interface.
ACQ_CTRL_ERR_MS_AUTOSELECT_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_AVAILABLE	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 acquisition 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_MODE_ON_NOT_ALLOWED	0x002F	FrameBurstActive trigger must be ON to enable the FrameEnd trigger mode

### 18.2.4 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.

### 18.2.5 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.
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### 18.2.6 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

### 18.2.7 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.

### 18.2.8 LUT Control (LUT\_CTRL\_ERROR\_CATEGORY)

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

### 18.2.9 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

### 18.2.10 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.

### 18.2.11 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.
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### 18.2.12 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.

### 18.2.13 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

## 19 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.

### 19.1 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
TRANSPORT LAYER	0x03	Transport layer status category

### 19.2 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

- 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.

- P6

Definition	Value	Description
SENSOR_STATUS_P6_TRAINING_DONE_ERROR	0x0201	Error: p6 sensor training done error.
SENSOR_STATUS_P6_INIT_ERROR	0x0202	Error: p6 sensor initialization error

#### 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.

## 20 Debug Control

*This feature might be removed in future releases!*

### 20.1 Full-Flag

Name	FullFlag	Custom
Description	Indicates an internal framebuffer FIFO overflow.	
Interface	Integer	
Access mode	Read only	
Adjustable while grabbing	-	
Value range	0: No overflow 1: An overflow occurred	
Default value	-	
Notes	-	
Error behavior	-	

## 21 Document History

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

24 <sup>th</sup> November 2020	2.3.0	AB	Introduced <a href="#">ExposureTimeMode</a> and <a href="#">ExposureTimeSelector</a> feature.
1 <sup>st</sup> December 2020	2.4.0	FG	Added list of locked features in description of <a href="#">Image Calibration Mode</a> .
10 <sup>th</sup> December 2020	2.5.0	FG	<ul style="list-style-type: none"> <li>- Revised Document (Adaptions from PK inserted)</li> <li>- Updated the <a href="#">ExposureTime</a> value range description.</li> <li>- Added information concerning the Digital Gain to <a href="#">ImageCalibrationMode</a>.</li> </ul>
11 <sup>th</sup> December 2020	2.5.0	AB	<ul style="list-style-type: none"> <li>- Added new <a href="#">device error code</a></li> <li>- Added <a href="#">DeviceErrorMessage</a> feature</li> </ul>
14 <sup>th</sup> December 2020	2.5.0	FG	<ul style="list-style-type: none"> <li>- Adapted description of <a href="#">DeviceErrorMessage</a> feature.</li> <li>- Added some additional information to <a href="#">DeviceErrorCode</a> feature.</li> <li>- Reference <a href="#">DeviceErrorMessage</a> feature in section 6.2 now.</li> </ul>
14 <sup>th</sup> December 2020	2.5.0	AB	<ul style="list-style-type: none"> <li>- Removed extra rows from the specific error code table of <a href="#">Digital IO control</a></li> </ul>
2 <sup>nd</sup> February 2021	2.6.0	UB	<ul style="list-style-type: none"> <li>- <b>AdjustTargetValueToMaxVideo</b> added to <a href="#">Gain Auto</a></li> <li>- Enums added to <a href="#">Gain Auto Status</a></li> <li>- Enum "All" added to <a href="#">Gain Control Region Channel Selector</a></li> <li>- Enums changed and new added to <a href="#">Image Calibration Mode</a></li> <li>- Some Items added to <a href="#">DeviceErrorCode</a></li> </ul>
10 <sup>th</sup> February 2021	2.6.0	FG	<ul style="list-style-type: none"> <li>- Removed EEPROM file from <a href="#">File Selector</a>.</li> <li>- Added some device error codes for <a href="#">File Access Control</a></li> <li>- Adapted the <a href="#">File Operation Status</a> fatal error description.</li> <li>- Added some general note to <a href="#">File Access Control</a> section.</li> <li>- Removed timeout description from <a href="#">File Operation Execute</a></li> <li>- Added section for timeout parameters <a href="#">Connection Timeouts</a></li> </ul>
24 <sup>th</sup> February 2021	2.7.0	HR	<ul style="list-style-type: none"> <li>- Added new feature <a href="#">Infoblock Mode</a></li> </ul>
18 <sup>th</sup> March 2021	2.8.0	AB	<ul style="list-style-type: none"> <li>- Added features of CoaxPress in Transport Layer category</li> <li>- Added new feature <a href="#">DeviceTapGeometry</a></li> </ul>
4 <sup>th</sup> June 2021	2.11.0	AB	<ul style="list-style-type: none"> <li>- Added new feature <a href="#">ScanDirectionSource</a></li> <li>- Added some note for <a href="#">ScanDirection</a> feature.</li> <li>- Increased document version</li> </ul>
10 <sup>th</sup> June 2021	2.12.0	FG	<ul style="list-style-type: none"> <li>- Added SingleFrame entry to <a href="#">AcquisitionMode</a> feature.</li> <li>- Revised <a href="#">AcquisitionStart</a> and <a href="#">AcquisitionStop</a> description.</li> </ul>
14 <sup>th</sup> June 2021	2.12.0	AB	<ul style="list-style-type: none"> <li>- Added <a href="#">AcquisitionAbort</a> and <a href="#">TLParamsLocked</a> features</li> </ul>
16 <sup>th</sup> June 2021	2.13.0	FG	<ul style="list-style-type: none"> <li>- Extended description for <a href="#">GainAuto</a> <a href="#">AdjustTargetValueToMaxVideo</a></li> </ul>
16 <sup>th</sup> June 2021	2.13.0	AB	<ul style="list-style-type: none"> <li>- Extended the description for AutoSelect in <a href="#">MasterSlaveMode</a></li> <li>- Adopted 'note' for <a href="#">AcquisitionAbort</a></li> </ul>
18 <sup>th</sup> June 2021	2.13.0	AB	<ul style="list-style-type: none"> <li>- Added <a href="#">CxpLinkConfigurationPreferred</a> feature.</li> </ul>

			<ul style="list-style-type: none"> <li>- Removed Auto enum entry from <a href="#">CxpLinkConfiguration</a></li> </ul>
21 <sup>st</sup> June 2021	2.13.0	FG	<ul style="list-style-type: none"> <li>- Added new device error code to <a href="#">Acquisition Control (ACQ_CTRL_ERROR_CATEGORY)</a></li> </ul>
25 <sup>th</sup> June 2021	2.15.0	AB	<ul style="list-style-type: none"> <li>- Changed Minimum value of <a href="#">EncoderDividerFloat</a></li> </ul>
29 <sup>th</sup> June 2021 1 <sup>st</sup> July 2021	3.0.0	FG/AB	<ul style="list-style-type: none"> <li>- Added <a href="#">Feature Availability</a> overview.</li> <li>- Change heading levels</li> <li>- Change format to match more to allPIXA evo manual.</li> <li>- Moved <a href="#">Light Controller</a> section more to end.</li> <li>- Removed Special Feature section <a href="#">TLParamsLocked</a> is part from Transport Layer Control.</li> <li>- Grouped transport layer into <a href="#">GigE Vision</a> and <a href="#">CoaXPress</a> features.</li> <li>- Extended the features and linking, depending on their selector.</li> <li>- Some bug fixes, cleaning, and minor changes.</li> </ul>
19 <sup>th</sup> August 2021	3.5.0	AB	<ul style="list-style-type: none"> <li>- Added value range for <a href="#">MeasuredLineTime</a> feature</li> </ul>
23 <sup>rd</sup> August 2021	3.6.0	AB	<ul style="list-style-type: none"> <li>- Added <a href="#">PixelColorFilter</a> feature</li> <li>- Added Availability row in all features table to indicate for which camera variants is available</li> <li>- Added RGBa enum entry in <a href="#">PixelFormat</a> feature</li> <li>- Adopted value range and default value for <a href="#">SensorSensitivity</a>, <a href="#">ExposureTimeMode</a>, <a href="#">ExposureTimeSelector</a>, <a href="#">LineDistance</a> and <a href="#">BinningHorizontal</a>.</li> </ul>
28 <sup>th</sup> September 2021	3.7.0	AB	<ul style="list-style-type: none"> <li>- Increased xml and document version</li> </ul>
22 <sup>nd</sup> October 2021	3.8.0	FG	<ul style="list-style-type: none"> <li>- Adapted the <a href="#">encoder mode</a> feature description.</li> </ul>
28 <sup>th</sup> October 2021	3.9.0	FG	<ul style="list-style-type: none"> <li>- Updated the <a href="#">feature availability</a> matrix.</li> </ul>
November 2021	3.10.0	AB/FG	<ul style="list-style-type: none"> <li>- Adapted description of some features: <ul style="list-style-type: none"> <li>o <a href="#">Synchronization Mode Enable</a></li> <li>o <a href="#">Gain Control Region Offset X</a></li> <li>o <a href="#">Gain Control Region Channel Selector</a></li> <li>o <a href="#">Gamma</a></li> </ul> </li> <li>- Corrected some page breaks</li> <li>- Adapted description of <a href="#">Color Transformation Features</a> regarding availability.</li> <li>- Added Notes for <a href="#">AcquisitionLineRate</a>, <a href="#">AcquisitionLineTime</a>, <a href="#">AcquisitionFrameRateEnable</a>, <a href="#">AcquisitionFrameRate</a> and all the <a href="#">TriggerSelector</a> features</li> <li>- Reworked <a href="#">Color Transformation Value Selector</a> a little. Added transformation matrices to <a href="#">Color Transformation Selector</a></li> <li>- Added Notes for <a href="#">ScanDirectionSource</a> and <a href="#">ScanDirection</a> features</li> </ul>
26 <sup>th</sup> November 2021	3.11.0	FG	<ul style="list-style-type: none"> <li>- Added note to create new DSNU/PRNU references in <a href="#">Gain</a>, <a href="#">Sensor Sensitivity</a></li> </ul>
November/December	3.12.0	FG/AB	<ul style="list-style-type: none"> <li>- Extended the <a href="#">info block mode</a> description and fixed some error there.</li> <li>- Adapted the <a href="#">LineDistance</a> and <a href="#">AcquisitionLineTime/AcquisitionLineRate</a> default values.</li> <li>- Refactored document. Updated and extended some entries and fixed some bugs.</li> <li>- Updated the valid range for <a href="#">Out1OnTime</a>, <a href="#">Out2OnTime</a>, <a href="#">Out3OnTime</a>, <a href="#">Out4OnTime</a>,</li> </ul>



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



30 <sup>th</sup> May 2022	4.1.0	FG	<ul style="list-style-type: none"> <li>- Extended description for <a href="#">Info block</a> concerning future package 2.1.2 in line time calculation.</li> <li>- Updated <a href="#">feature availability</a>.</li> </ul>
1 <sup>st</sup> June 2022	4.1.0	FG	<ul style="list-style-type: none"> <li>- Fixed/Adapted description of <a href="#">Acquisition Abort</a></li> </ul>
3 <sup>rd</sup> June 2022	4.1.0	AB	<ul style="list-style-type: none"> <li>- Added <a href="#">DeviceStatusMessage</a> feature and <a href="#">DeviceStatusCode</a>.</li> <li>- Updated the <a href="#">Device Control</a> specific error codes</li> </ul>
7 <sup>th</sup> June 2022	4.1.0	AB	<ul style="list-style-type: none"> <li>- Added new enum entry in <a href="#">FileSelector</a> for MemoryFile</li> </ul>
29 <sup>th</sup> July 2022	4.1.0	AB	<ul style="list-style-type: none"> <li>- Added <a href="#">DeviceLinkSpeed</a> feature</li> </ul>
26 <sup>th</sup> August 2022	4.2.0	FG	<ul style="list-style-type: none"> <li>- Updated <a href="#">Feature Availability</a> table</li> </ul>
30 <sup>th</sup> August 2022	4.3.0	FG	<ul style="list-style-type: none"> <li>- Corrected the minimum <a href="#">width</a> value to 128</li> </ul>
7 <sup>th</sup> September 2022	4.3.0	AB	<ul style="list-style-type: none"> <li>- Added <a href="#">LineFormat</a>, <a href="#">UserOutputSelector</a> and <a href="#">UserOutputValue</a> features</li> <li>- Extended the <a href="#">LineSource</a> enum entries</li> <li>- Added <a href="#">CameraTypes</a> with the model name and <a href="#">DigitalIOCompatibilitiesEvo</a> and <a href="#">DigitalIOCompatibilitiesNeo</a></li> <li>- Updated the <a href="#">DigitalIOControl</a> error codes</li> </ul>
8 <sup>th</sup> September 2022	4.3.0	AB	<ul style="list-style-type: none"> <li>- Renamed DigitalIOCompatibilities to allPIXA evo and neo. Separated the table for line and LineSource</li> </ul>
20 <sup>th</sup> September 2022	4.3.0	AB	<ul style="list-style-type: none"> <li>- Adapted the <a href="#">SensorColorType</a> feature</li> </ul>
21 <sup>st</sup> September 2022	4.3.0	AB	<ul style="list-style-type: none"> <li>- Adapted the <a href="#">DeviceStatus</a> feature</li> <li>- Updated the <a href="#">DeviceStatusCode</a></li> </ul>
26 <sup>th</sup> September 2022	4.3.0	AB	<ul style="list-style-type: none"> <li>- Added <a href="#">FrameCount</a> feature</li> </ul>
17 <sup>th</sup> October 2022	4.3.0	AB	<ul style="list-style-type: none"> <li>- Added <a href="#">AcquisitionBurstFrameCount</a></li> <li>- Extended the TriggerSelector for <a href="#">FrameBurstStart</a> entry</li> <li>- Updated the device error code in AcquisitionControl</li> </ul>
29 <sup>th</sup> November 2022	6.0.0	FG	<ul style="list-style-type: none"> <li>- Versioning of the feature reference has changed. The version corresponds to the Firmware/XML version from now.</li> </ul>
15 <sup>th</sup> February 2023	6.1.0	AB	<ul style="list-style-type: none"> <li>- Added <a href="#">IOAnalyzer</a> features in <a href="#">DigitalIOControl</a></li> <li>- Added device error code category for <a href="#">IO Analyzer</a></li> <li>- Updated the <a href="#">FeatureAvailability</a> table</li> <li>- Updated <a href="#">FileSelector</a> entries for IOAnalyzerEventFile</li> </ul>
9 <sup>th</sup> March 2023	6.1.0	FG	<ul style="list-style-type: none"> <li>- Added new <a href="#">Device Status Codes</a> for p6 sensor</li> </ul>
25 <sup>th</sup> April 2023	6.1.0	FG	<ul style="list-style-type: none"> <li>- Added note concerning the <a href="#">Sensor Sensitivity</a> of the g8 sensor.</li> <li>- Added description for Line Status and Scan-Direction of the <a href="#">Infoblock Mode</a></li> <li>- Added hint, that the <a href="#">ScanDirectionSource</a> Encoder is currently only for <a href="#">EncoderSourceB=Line2</a></li> </ul>
18 <sup>th</sup> August 2023	6.1.0	AB	<ul style="list-style-type: none"> <li>- Added <a href="#">Gige TL</a> device status code.</li> <li>- Adapted value range for <a href="#">LineDistance</a> feature</li> </ul>
23 <sup>rd</sup> August 2023	6.2.0	AB/FG	<ul style="list-style-type: none"> <li>- Adapted digital IO <a href="#">function scope</a> for Line10 and Line11</li> <li>- Added <a href="#">Time Delay Integration Mode</a> feature</li> <li>- Marked <a href="#">Master Slave Interface</a> and <a href="#">Master Slave Interface Enable</a> as deprecated</li> <li>- Added <a href="#">MasterSlaveSource</a> and <a href="#">AutoSelectSource</a> features</li> <li>- Updated <a href="#">LineSelector</a> for Line10 and Line11</li> <li>- Updated <a href="#">LineFormat</a> for Misc</li> <li>- Updated <a href="#">LineSource</a> for Fan and UART0</li> </ul>

13 <sup>th</sup> September 2023	6.2.0	AB	<ul style="list-style-type: none"> <li>- Added new flat field correction features <ul style="list-style-type: none"> <li>o <a href="#">Flat Field Correction Selector</a></li> <li>o <a href="#">Enable</a></li> <li>o <a href="#">DataSet Description</a></li> <li>o <a href="#">Avaialble Planes</a></li> <li>o <a href="#">First Valid Pixel</a></li> <li>o <a href="#">Last valid Pixel</a></li> <li>o <a href="#">Display Reference</a></li> <li>o <a href="#">Start Calibration</a></li> <li>o <a href="#">Stop Calibration</a></li> <li>o <a href="#">Calibration Status</a></li> </ul> </li> <li>- Marked few features in Image Calibration control category as deprecated</li> </ul>
5 <sup>th</sup> October 2023	6.2.0	AB	<ul style="list-style-type: none"> <li>- Updated <a href="#">pixel format</a> and <a href="#">pixel color filter</a> availability for the camera variants</li> <li>- Update <a href="#">FeatureAvialability</a> for p6_nxge and added new column for p16_cxp</li> </ul>
6 <sup>th</sup> October 2023	6.2.0	AB	<ul style="list-style-type: none"> <li>- Updated <a href="#">SensorColorFilter</a> enum entry</li> </ul>
10 <sup>th</sup> October 2023	6.3.0	AB	<ul style="list-style-type: none"> <li>- IO analyzer features are not available for p6_nxge camera</li> </ul>
31 <sup>st</sup> October 2023	6.3.0	AB	<ul style="list-style-type: none"> <li>- Added <a href="#">DeviceLogLevel</a> and <a href="#">FlatFieldCorrectionCalibrationMode</a> features</li> <li>- Marked <a href="#">ImageCalibrationMode</a> as deprecated feature</li> </ul>
15 <sup>th</sup> November 2023	6.4.0	AB	<ul style="list-style-type: none"> <li>- Added <a href="#">EncoderValue</a> and enum entries of <a href="#">EncoderOutputMode</a></li> </ul>
24 <sup>th</sup> November 2023	6.5.0	FG/AB	<ul style="list-style-type: none"> <li>- Added the Dual PRNU mode in <a href="#">Feature Availability</a> table and the <a href="#">FFC-Enable</a> feature.</li> <li>- Added error code in <a href="#">Image Calibration Control</a> and <a href="#">Led Flash Control</a></li> <li>- Added new enum entry in <a href="#">DeviceStatus</a> feature</li> </ul>
5 <sup>th</sup> January 2024	6.5.0	FG	<ul style="list-style-type: none"> <li>- Improved and extended the Description of <a href="#">Trigger Signal Detection Mode</a></li> </ul>
1 <sup>st</sup> February 2024	6.6.0	FG	<ul style="list-style-type: none"> <li>- Added Log File and Customer File to the <a href="#">file selector</a>.</li> </ul>
15 <sup>th</sup> February 2024	6.6.0	AB	<ul style="list-style-type: none"> <li>- Added detailed description of <a href="#">voltage selectors</a> for evo and neo separately.</li> <li>- Extended the <a href="#">temperature selector</a> for FPGA entry</li> </ul>
13 <sup>th</sup> March 2024	6.6.0	AB	<ul style="list-style-type: none"> <li>- Update <a href="#">DeviceVersion</a> and <a href="#">DeviceManufacturerInfo</a> features</li> </ul>
4 <sup>th</sup> April 2024	6.6.0	AB	<ul style="list-style-type: none"> <li>- Extended the enum entry tables of <a href="#">DeviceVoltageSelector(evo)</a> and <a href="#">DeviceVoltageSelector(neo)</a></li> </ul>