Chameleon II Camera Simulator
Feature Guide

July 2021 - Rev 2.0

International Distributor

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2 Revision History

Version	Date	Notes
1.0	25.06.2020	Initial release
2.0	06.07.2021	CoaXPress 2 support was introduced in this software release, including CXP2 tagged command packets and the ability to generate CXP2 HeartBeats and Events

Table 1 – Revision History

3 Introduction

3.1 Safety Precautions

With your ***Chameleon II Simulator*** in hand, please take the time to read the precautions listed below in order to prevent preventable and unnecessary injuries and damage to you, other personnel or property. Read these safety instructions carefully prior to your first use of the product, as these precautions contain safety instructions that must be observed. After reading through this manual, be sure to follow it to prevent misuse of product.

⚠ Caution! Read Carefully and do not disregard these instructions.
In the event of a failure, disconnect the power supply Disconnect the power supply immediately and contact our sales personnel for repair. Continuing to use the product in this state may result in a fire or electric shock.
If an unpleasant smell or smoking occurs, disconnect the power supply. Disconnect the power supply immediately! Continuing to use the product in this state may result in a fire or electric shock. After verifying that no smoking is observed, contact our sales personnel for repair.
Do not disassemble, repair or modify the product. This may result in a fire or electric shock due to a circuit shortage or heat generation. Contact our sales personnel prior to inspection, modification or repair.
Do not place the product on unstable surfaces. Otherwise, it may drop or fall, resulting in injury to persons or the camera.
Do not use the product if dropped or damaged. Otherwise, a fire or electric shock may occur.
Do not touch the product with metallic objects. Otherwise, a fire or electric shock may occur.
Do not place the product in dusty or humid environments, nor where water may splash. Otherwise, a fire or electric shock may occur.
Do not wet the product or touch it with wet hands. Otherwise, the product may fail, or it may cause a fire, smoking or electric shock.
Do not touch the gold-plated sections of the connectors on the product. Otherwise, the surface of the connector may be contaminated by sweat or skin-oil, resulting in contact failure of a connector, malfunction, fire or electric shock due to static electricity discharge.
Do not use or place the product in the following locations. ▪ Unventilated areas such as closets or bookshelves. ▪ Near oils, smoke or steam. ▪ Next to heat sources. ▪ A closed (and not running) car where the temperature becomes high. ▪ Static electricity replete locations ▪ Near water or chemicals. Otherwise, a fire, electric shock, accident or deformation may occur due to a short circuit or heat generation.
Do not place heavy objects on the product. Otherwise, the product may be damaged.
Be sure to discharge static electricity from body before touching any sensitive electronic components. The electronic circuits in your computer and the circuits on the ***Chameleon II Simulator*** board is sensitive to static electricity and surges. Improper handling may seriously damage the circuits. In addition, do not let your clothing come in contact with the circuit boards or components. Otherwise, the product may be damaged.

3.2 Disclaimer

This product should only be used for image capturing and processing. KAYA Instruments will assume no responsibility for any damage that may ensue by the use of the camera for any purpose other than intended, as previously stated. Without detracting from what was previously written, please be advised that the company will take no responsibility for any damages caused by:

- Earthquake, thunder strike, natural disasters, fire caused by use beyond our control, wilful and/or accidental misuse and/or use under other abnormal and/or unreasonable conditions.
- Secondary damages caused by the use of this product or its unusable state (business interruption or others).
- Use of this product in any manner that contradicts this manual or malfunctions that may occur due to connection to other devices. Damage to this product that is out of our control or failure due to modification
- Accidents and/or third parties that may be involved.

Additionally, KAYA Instruments assumes no responsibility or liability for:

- Erasure or corruption of data caused by the use of this product.
- Any consequences or other abnormalities following the use of this product
- Repairs to this product are carried out by replacing it on a chargeable basis and not by repairing the faulty device. Non-chargeable replacement is offered for initial failure, as long as it is reported no later than two weeks post-delivery of the product.

4 Overview

The purpose of this document is to describe the provided functionality and features of KAYA's Camera Simulator. Camera connectivity and streaming can be easily achieved in few easy steps and almost no configurations. Camera control is provided through standard GenICam interface subordinate to camera's descriptive schema (xml) file. Advanced features and custom configurations can be done to enhance streaming and image processing of camera output. These are available using interactive GenICam interface and provided API functionality.
SDK functionality is subject to hardware device and burned firmware capabilities. A firmware and software upgrade might be needed to support complete functionality set.

For more information about API functionality and SDK usage please refer to "Vision Point API Data Book". All the parameters described in this document are ***Chameleon II Simulator*** parameters and can be accessed from GUI Camera tab in the project navigator or from API using KYFG_SetCameraValue and KYFG_GetCameraValue function variations (and their sub-functions) call, with CAMHANDLE (Connected Camera Handle) instead of FGHANDLE (Frame Grabber Handle).

It is important to note that some parameters might vary slightly compared to this document or may be absent entirely, subject to the active firmware capabilities: a firmware upgrade might be needed to support complete functionality set. Please feel free to contact our team over at support@kayainstruments.com with any questions that may arise.

4.1 Directories and File Hierarchy

The directory hierarchy of Vision Point App as can be seen after a complete installation:

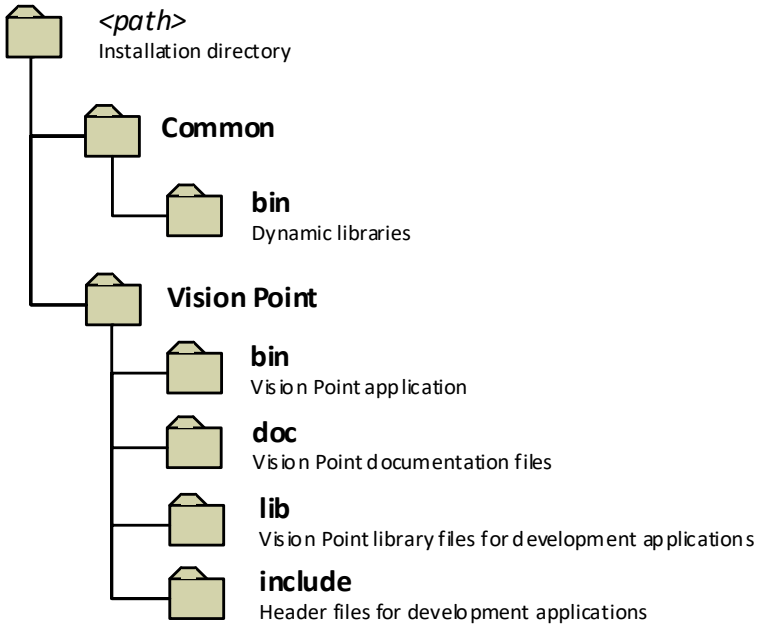

Figure 1 – Main directory and file hierarchy

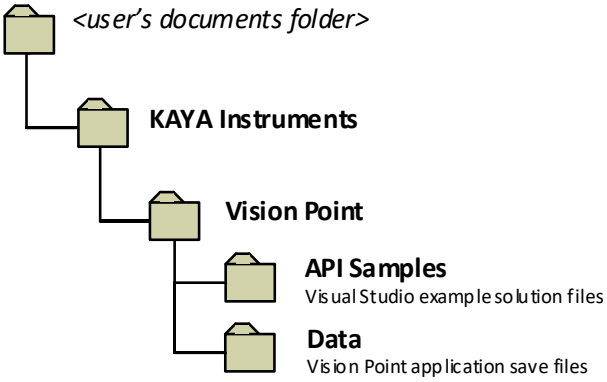

Figure 2 – Examples and save directories

5 Hardware Information

The Hardware information contains parameters describing the currently connected Simulator board and includes device capabilities, basic connectivity details and currently running firmware. This information can be used to identify the specific card and its capabilities, and inform if a firmware update is needed to support complete functionality set. It can also help to indicate about certain performance issues. The hardware information parameters can be found in the following table:

Parameter	Description	Gen<i>Cam name	Type	Possible values		Remarks
				Value	Gen<i>Cam name	
Gen<i>Cam Category: HardwareInformation						
Device Firmware Version	The firmware version of the device	DeviceFirmwareVersion	String			
Serial Number	Serial Number of the device	DeviceSerialNumber	String			
Device Revision	Revision of the device	DeviceRevision	Integer			
Maximum Links	Maximum available links on the device	MaxLinks	Integer			
PCIe Generation	Supported generation of connected PCIe	DevicePciGeneration	Integer	1,2,3		
PCIe lanes	Number of connected PCIe lanes	DevicePciLanes	Integer	1,2,4,8		
Core Temperature	Device CPU Temperature	DeviceTemperature	Integer			Temperature is in °C

Table 2 – Hardware information parameters

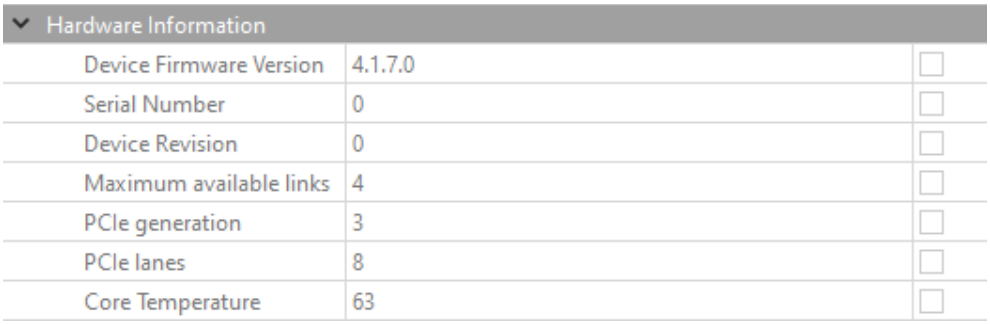

Figure 3 – Hardware information parameters in Vision Point App

6 Device General Control

The Device Control contains manufacturer parameters describing the currently connected hardware device. The information includes device vendor name, basic manufacturer information details and device identifier. The "Device Reset" command can be used to resets the device configuration and parameters to its power up state. The device information parameters summarized in the following table:

Parameter	Description	Gen<i>Cam name	Type	Possible values		Remarks
				Value	Gen<i>Cam name	
Gen<i>Cam Category: DeviceControl						
Device Vendor Name	Name of the manufacturer of the device	DeviceVendorName	String			
Device Model Name	The model of the device	DeviceModelName	String			
Device Manufacturer Info	Extended manufacturer information about the device	DeviceManufacturerInfo	String			
Device Version	The version of the device	DeviceVersion	Float			
Device ID	Stores a camera identifier	DeviceID	Float			
Device Reset	Resets the device to its power up state	DeviceReset	Command	1 - Activate		

Table 3 – Device control parameters

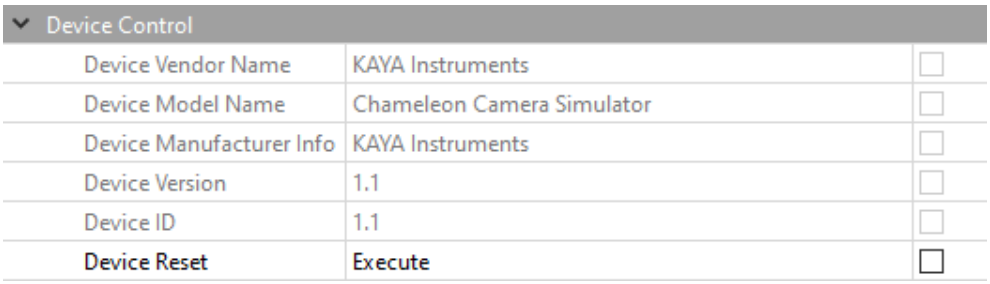

Figure 4 – Device control parameters in Vision Point App

7 Image Format Control

The Image Format Control is responsible for defining the output image dimensions and format type. The resolution of the image and output format will influence the maximum frame rate, which can be achieved.

Parameter	Description	Gen<i>Cam name	Type	Possible values		Remarks
				Value	Gen<i>Cam name	
Gen<i>Cam Category: ImageFormatControl						
Width	Represents the actual image width expelled by the camera (in pixels)	Width	Integer	≥ 1		
Height	Represents the actual image height expelled by the camera (in pixels)	Height	Integer	≥ 1		
Width Max	Maximum width (in pixels) of the image. The dimension is calculated after horizontal binning, decimation or any other function changing the horizontal dimension of the image	WidthMax	Integer			
Height Max	Maximum height (in pixels) of the image. This dimension is calculated after vertical binning, decimation or any other function changing the vertical dimension of the image	HeightMax	Integer			
Offset X	Horizontal offset from the origin to the area of interest (in pixels)	OffsetX	Integer			
Offset Y	Vertical offset from the origin to the area of interest (in pixels)	OffsetY	Integer			
Pixel Format	Indicates the format of the pixel to use during the generation	PixelFormat	Enumeration	0x00000101	Mono8	
				0x00000102	Mono10	
				0x00000103	Mono12	
				0x00000104	Mono14	
				0x00000105	Mono16	
				0x00000311	BayerGR8	
				0x00000312	BayerGR10	
				0x00000313	BayerGR12	
				0x00000314	BayerGR14	
				0x00000315	BayerGR16	
				0x00000321	BayerRG8	
				0x00000322	BayerRG10	
				0x00000323	BayerRG12	
				0x00000324	BayerRG14	
				0x00000325	BayerRG16	
				0x00000331	BayerGB8	
				0x00000332	BayerGB10	
				0x00000333	BayerGB12	
				0x00000334	BayerGB14	
				0x00000335	BayerGB16	
				0x00000341	BayerBG8	

				0x00000342	BayerBG10
				0x00000343	BayerBG12
				0x00000344	BayerBG14
				0x00000345	BayerBG16
				0x00000401	RGB8
				0x00000402	RGB10
				0x00000403	RGB12
				0x00000404	RGB14
				0x00000405	RGB16
				0x00000501	RGBA8
				0x00000502	RGBA10
				0x00000503	RGBA12
				0x00000504	RGBA14
				0x00000505	RGBA16
				0x00000621	YUV422_8
				0x00000625	YUV422_16
				0x00000821	YCBCR709_422_8
				0x00000825	YCBCR709_422_16
Scan Mode	Indicates whether generated picture is progressive or interlaced	ScanMode	Enumeration	0	Progressive
				1	Interlaced

Table 4 – Image Format control parameters

Image Format Control		
Width	640	☐
Height	480	☐
Width Max	5000	☐
Height Max	5000	☐
Offset X	0	☐
Offset Y	0	☐
Pixel Format	Mono 8	☐
Scan Mode	Progressive	☐

Figure 5 – Image Format Control category in Vision Point App

8 Acquisition Control

The Acquisition stream control section describes settings and state for data generation (commands and stream). Generation can be controlled trough executing the relevant commands from this category from the Frame Grabber side, after Chameleon II Simulator camera was detected. The acquisition control parameters are summarized in the following table.

Parameter	Description	Gen<i>Cam name	Type	Possible values		Remarks
				Value	Gen<i>Cam name	
Gen<i>Cam Category: AcquisitionControl						
Acquisition Mode	Controls the acquisition mode of the device	AcquisitionMode	Enumeration	0x00 0x01 0x02	Continuous SingleFrame MultiFrame	
Acquisition Start	Starts the Acquisition of the device	AcquisitionStart	Command	1 - Activate		
Acquisition Stop	Stops the Acquisition of the device at the end of the current Frame	AcquisitionStop	Command	0 - Activate		
Acquisition Frame Count	Number of frames to be sent in MultiFrame AcquisitionMode	AcquisitionFrameCount	Integer	≥ 1		
Frame Rate	Controls the acquisition rate at which the frames are captured	AcquisitionFrameRate	Float	≥ 1		In units of Hz
Video Source Type	Type of video source for stream generation	VideoSourceType	Enumeration	0 1 2	Pattern File Folder	
Pattern Type	Type of pattern in case pattern source is selected	VideoSourcePatternType	Enumeration	0 1 2 3 4 5 6	Horizontal ramp Horizontal ramp (color) Vertical ramp Vertical ramp (color) Diagonal ramp Diagonal ramp (color) Fixed	
Image source file	Path to a file if single file is selected as video source	SourceFilePath	String			
Images source folder	Path of a folder if folder with multiple files is selected as video source	SourceFolderPath	String			
Video Source File Type	Type of video source file in case folder source is selected	VideoSourceFileType	Enumeration	0 1 2 3	Raw Bmp Tif Png	
Source File Count	Number of files to read in case folder source is selected	VideoSourceFileCount	Integer			
Fixed pattern value 1	Fixed pattern value 1	VideoSourcePatternValue1	Integer			

Fixed pattern value 2	Fixed pattern value 2	VideoSourcePatternValue2	Integer
Fixed pattern value 3	Fixed pattern value 3	VideoSourcePatternValue3	Integer
Fixed pattern value 4	Fixed pattern value 4	VideoSourcePatternValue4	Integer

Table 5 – Acquisition Control parameters

Acquisition Control		
Acquisition Mode	Continuous	☐
Acquisition Start	Execute	☐
Acquisition Stop	Execute	☐
Acquisition Frame Count	1	☐
Acquisition Frame Rate	60.000000	☐
Video source type	Pattern	☐
Pattern type	Horizontal ramp	☐
Image source file		☐
Images source folder		☐
Source file type	RAW	☐
Source files count	1	☐
Fixed pattern value 1	0x0	☐
Fixed pattern value 2	0x0	☐
Fixed pattern value 3	0x0	☐
Fixed pattern value 4	0x0	☐

Figure 6 – Acquisition Control category in Vision Point App

9 Transport Layer Control

The Transport Layer Control section describes the characteristics of two main features:

9.1 Payload Size

Provides the number of bytes transferred for each image or chunk on the stream channel. This includes any end-of-line, end-of-frame statistics or other stamp data. This is the total size of data payload for a data block.

9.2 Device Tap Geometry

This device tap geometry feature describes the geometrical properties characterizing the taps of a camera as presented at the output of the device. The following table specifies the transport layer control parameters:

Parameter	Description	Gen<i>Cam name	Type	Possible values		Remarks
				Value	Gen<i>Cam name	
Gen<i>Cam Category: TransportLayerControl						
Payload Size	Provides the number of bytes transferred for each image or chunk on the stream channel. This includes any end-of-line, end-of-frame statistics or other stamp data. This is the total size of data payload for a data block	PayloadSize	Integer			
Device Tap Geometry	This device tap geometry feature describes the geometrical properties characterizing the taps of a camera as presented at the output of the device	DeviceTapGeometry	Enumeration	1X-1Y		

Table 6 – Transport Layer Control parameters

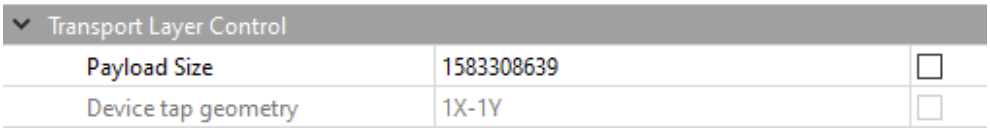

Figure 7 – Transport Layer Control category in Vision Point App

10 Simulation Control

This section describes features and state for data generation in the Camera Simulator. The Trigger Control describes all features related to image acquisition using trigger(s), and the Timer Control lists all features that relates to control and monitoring of timers. The Simulation control parameters summarized in the following table.

Parameter	Description	Gen<i>Cam name	Type	Possible values		Remarks
				Value	Gen<i>Cam name	
Gen<i>Cam Category: SimulationControl						
Link Discovery	Discovery speed settings	LinkDiscovery	Enumeration	0x010028	DISCOVERY_CXP_1	1.250 Gbps discovery speed
				0x010038	DISCOVERY_CXP_3	3.125 Gbps discovery speed
Bandwidth Utilization	Utilization percentage of set bandwidth	BandwidthUtilization	Float	0≤BW≤100		
Gen<i>Cam Category: SimulationControl / TriggerControl						
Trigger Mode	This feature controls the transmission trigger mode of the device	SimulationTriggerMode	Enumeration	0	FreeRun	
				1	Triggered	
Trigger Activation	Specifies the activation mode of the trigger	SimulationTriggerActivation	Enumeration	0x0000	RisingEdge	See section 10.1
				0x0001	FallingEdge	
				0x0002	AnyEdge	
				0x0003	LevelHigh	
				0x0004	LevelLow	
Trigger Source	Specifies the internal signal or physical input Line to use as the trigger source. The selected trigger must have its SimulationTriggerMode set to On	SimulationTriggerSource	Enumeration (Selector)			See Table 8
Trigger Delay	Specifies the delay in microseconds(us) to apply after the trigger reception before activating it	SimulationTriggerDelay	Integer			In units of microseconds (us) See section 10.2
Trigger Filter	Filter for trigger, helps prevent signal de-bouncing. 8ns resolution, units in microseconds(us)	SimulationTriggerFilter	Float	Min. Val. 0 Max. Val. 34359738		In units of microseconds (us) See section 0
Trigger Software	Generates an internal trigger. SimulationTriggerSource must be set to Software	SimulationTriggerSoftware	Command	1 - Activate		
Trigger Event Mode	Selects the trigger event generation mode	SimulationTriggerEventMode	Enumeration	0	Disabled	
				1	RisingEdge	
				2	FallingEdge	
				3	AnyEdge	
Gen<i>Cam Category: SimulationControl / TimerControl						
Timer Selector	Selects which Timer to configure	TimerSelector	Enumeration	0x00	Timer0	
				0x01	Timer1	
				0x02	Timer2	
				0x03	Timer3	
				0x04	Timer4	
				0x05	Timer5	
				0x06	Timer6	
				0x07	Timer7	

Line Duration	Specifies the delay in microseconds(us) to apply between each line	LineDuration	Float	Min. Val. 0 Max. Val. 8000000	In units of microseconds (us)
Frame Duration	Specifies the delay in microseconds(us) to apply between each frame	FrameDuration	Float	Min. Val. 0 Max. Val. 8000000	In units of microseconds (us)
Active Duration	Specifies the delay in microseconds(us) to apply between each frame	ActiveDuration	Float	Min. Val. 0 Max. Val. 8000000	In units of microseconds (us)

Table 7 – Simulation Control parameters

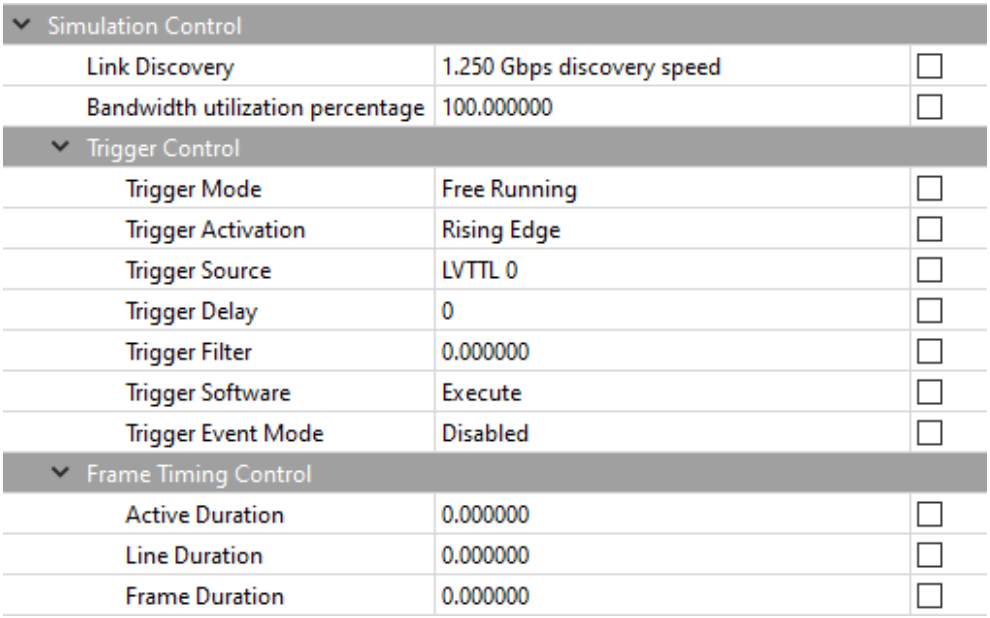

Figure 8 – Simulation Control category in Vision Point App

Value	Output	Gen<i>Cam parameter name
0	OptoCoupled Input 0	KY_OPTO_IN_0
1	OptoCoupled Input 1	KY_OPTO_IN_1
2	OptoCoupled Input 2	KY_OPTO_IN_2
3	OptoCoupled Input 3	KY_OPTO_IN_3
4	OptoCoupled Input 4	KY_OPTO_IN_4
5	OptoCoupled Input 5	KY_OPTO_IN_5
6	OptoCoupled Input 6	KY_OPTO_IN_6
7	OptoCoupled Input 7	KY_OPTO_IN_7
8	LVDS Input 0	KY_LVDS_IN_0
9	LVDS Input 1	KY_LVDS_IN_1
10	LVDS Input 2	KY_LVDS_IN_2
11	LVDS Input 3	KY_LVDS_IN_3
12	TTL 0	KY_TTL_0
13	TTL 1	KY_TTL_1
14	TTL 2	KY_TTL_2
15	TTL 3	KY_TTL_3
16	TTL 4	KY_TTL_4
17	TTL 5	KY_TTL_5
18	TTL 6	KY_TTL_6
19	TTL 7	KY_TTL_7

20	LVTTL 0	KY_LVTTL_0
21	LVTTL 1	KY_LVTTL_1
22	LVTTL 2	KY_LVTTL_2
23	LVTTL 3	KY_LVTTL_3
24	LVTTL 4	KY_LVTTL_4
25	LVTTL 5	KY_LVTTL_5
26	LVTTL 6	KY_LVTTL_6
27	LVTTL 7	KY_LVTTL_7
28	OptoCoupled Output 0	KY_OPTO_OUT_0
29	OptoCoupled Output 1	KY_OPTO_OUT_1
30	OptoCoupled Output 2	KY_OPTO_OUT_2
31	OptoCoupled Output 3	KY_OPTO_OUT_3
32	OptoCoupled Output 4	KY_OPTO_OUT_4
33	OptoCoupled Output 5	KY_OPTO_OUT_5
34	OptoCoupled Output 6	KY_OPTO_OUT_6
35	OptoCoupled Output 7	KY_OPTO_OUT_7
36	LVDS Output 0	KY_LVDS_OUT_0
37	LVDS Output 1	KY_LVDS_OUT_1
38	LVDS Output 2	KY_LVDS_OUT_2
39	LVDS Output 3	KY_LVDS_OUT_3

Table 8 – Line selection options

Large array of GPIO is available for configuring trigger source from external signal generators, such as TTL, LVDS, LVTTL and OptoCoupled. The auxiliary GPIO signals can be used to initiate on-board events, transmitted to other devices or rerouted from other signals, such as CoaXPress triggers and other GPIOs. The GPIOs can be configured from the API and be set as a trigger sources. The API enables routing of any input to any output as well as to the CoaXPress IO and Trigger lines.

10.1 Simulation Trigger Activation

The trigger activation mode configures the generation of signal state. Default value is Rising Edge, which will trigger generation of a frame on signal rising edge event. The different modes functionality is as follows:

1. Any Edge:
   The frames will be generated both on rising and falling edges of the trigger source.
2. Rising Edge:
   The frames will be generated only on rising edge of the trigger source. Falling edge of the source is ignored.
3. Falling Edge:
   The frames will be generated only on falling edge of the trigger source. Rising edge of the source is ignored.
4. Level High:
   High signal level enables a continuous image generated, Low signal level will halt the trigger generation.
5. Level Low:
   Low signal level enables a continuous image generated, High signal level will halt the trigger generation.

10.2 Simulation Trigger Delay

The trigger delay is a mechanism for postponing the outgoing signal for a specified number of microseconds (us). As a result, trigger will be issued after specified time delay to overcome known system latency or set trigger generation period. To disable, value 0 should be set.

10.3 Simulator Trigger Filter

The filter of the trigger signals acts as a de-bouncing mechanism for better noise immunity. By default the filter is disabled with the value of 0. The signal filter resolution can be set at 8ns intervals for high resolution functionality. If the trigger filter is set to a larger value than the width of the trigger pulse, then the pulse will be filtered out and no trigger will occur. Available interface in API provides input in microsecond (us); nevertheless, to achieve higher resolution, relevant fraction values should be entered after the decimal point.

10.4 Configuring Simulator Triggers

Configuring Chameleon II Simulator trigger sourced from remote host (e.g Frame Grabber). This example illustrates an optional configuration of Chameleon II Simulator trigger and Komodo CoaXPress Frame Grabber trigger, using Timer 0 as an input trigger source for incoming signals from the camera.

10.4.1.1 Camera Simulator configuration

1. "TriggerMode" configured to "Triggered" in order to set the Simulator to trigger mode.
2. "TriggerSource" configured to "Camera Trigger" in order to set the Simulator to trigger source.
3. The Trigger Filter resolution ("TriggerFilter"), Activation Mode ("TriggerActivation") and Trigger Delay ("TriggerDelay") parameters may be configured according to desired output.

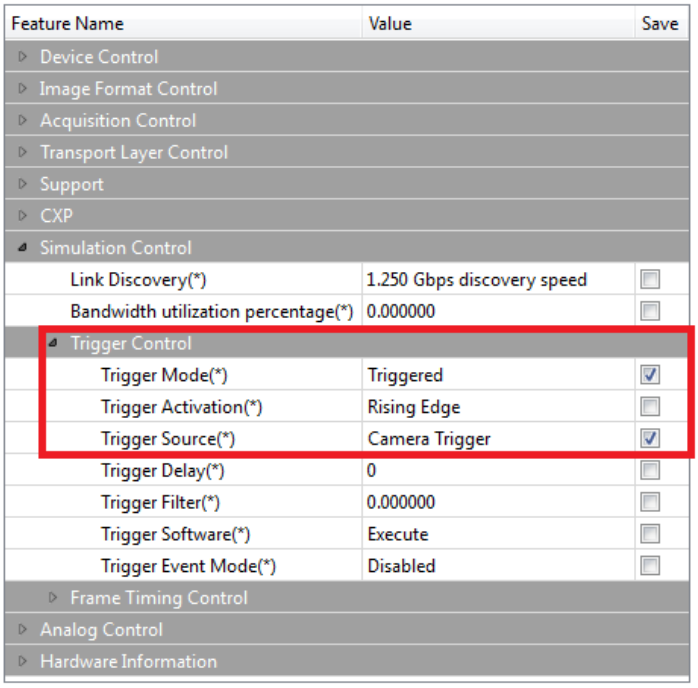

Figure 9 – Chameleon II Simulator trigger configuration in Vision Point App

11 Analog Control

VOD and Pre Emphasis define the configurations of physical analog components responsible for synchronization with the host device. Therefore changing these values will influence directly on the stability of the communication with host device, and may cause link de-synchronization. The VOD and Pre Emphasis parameters summarized in the following tables.

Parameter	Description	Gen<i>Cam name	Type	Possible values		Remarks
				Value	Gen<i>Cam name	
Gen<i>Cam Category: AnalogControl						
Vod	TX VOD settings	Vod	Enumeration (Selector)			See Table 10
Pre Emphasis	Transmitter Pre-Emphasis Levels	PreEmphasis	Enumeration (Selector)			See Table 11

Table 9 – Analog Control parameters

Enum	Value	Output	Gen<i>Cam parameter name
0	0x09	180 mV	VOD_180
1	0x0A	200 mV	VOD_200
2	0x0B	220 mV	VOD_220
3	0x0C	240 mV	VOD_240
4	0x0D	260 mV	VOD_260
5	0x0E	280 mV	VOD_280
6	0x0F	300 mV	VOD_300
7	0x10	320 mV	VOD_320
8	0x11	340 mV	VOD_340
9	0x12	360 mV	VOD_360
10	0x13	380 mV	VOD_380
11	0x14	400 mV	VOD_400
12	0x15	420 mV	VOD_420
13	0x16	440 mV	VOD_440
14	0x17	460 mV	VOD_460
15	0x18	480 mV	VOD_480
16	0x19	500 mV	VOD_500
17	0x1A	520 mV	VOD_520
18	0x1B	540 mV	VOD_540
19	0x1C	560 mV	VOD_560
20	0x1D	580 mV	VOD_580
21	0x1E	600 mV	VOD_600
22	0x1F	620 mV	VOD_620
23	0x20	640 mV	VOD_640
24	0x21	660 mV	VOD_660
25	0x22	680 mV	VOD_680
26	0x23	700 mV	VOD_700
27	0x24	720 mV	VOD_720
28	0x25	740 mV	VOD_740
29	0x26	760 mV	VOD_760

30	0x27	780 mV	VOD_780
31	0x28	800 mV	VOD_800
32	0x29	820 mV	VOD_820
33	0x2A	840 mV	VOD_840
34	0x2B	860 mV	VOD_860
35	0x2C	880 mV	VOD_880
36	0x2D	900 mV	VOD_900
37	0x2E	920 mV	VOD_920
38	0x2F	940 mV	VOD_940
39	0x30	960 mV	VOD_960
40	0x31	980 mV	VOD_980
41	0x32	1000 mV	VOD_1000
42	0x33	1020 mV	VOD_1020
43	0x34	1040 mV	VOD_1040
44	0x35	1060 mV	VOD_1060
45	0x36	1080 mV	VOD_1080
46	0x37	1100 mV	VOD_1100
47	0x38	1120 mV	VOD_1120
48	0x39	1140 mV	VOD_1140
49	0x3A	1160 mV	VOD_1160
50	0x3B	1180 mV	VOD_1180
51	0x3C	1200 mV	VOD_1200
32	0x29	820 mV	VOD_820
33	0x2A	840 mV	VOD_840
34	0x2B	860 mV	VOD_860
35	0x2C	880 mV	VOD_880
36	0x2D	900 mV	VOD_900
37	0x2E	920 mV	VOD_920
38	0x2F	940 mV	VOD_940
39	0x30	960 mV	VOD_960
40	0x31	980 mV	VOD_980
41	0x32	1000 mV	VOD_1000
42	0x33	1020 mV	VOD_1020
43	0x34	1040 mV	VOD_1040
44	0x35	1060 mV	VOD_1060
45	0x36	1080 mV	VOD_1080
46	0x37	1100 mV	VOD_1100
47	0x38	1120 mV	VOD_1120
48	0x39	1140 mV	VOD_1140
49	0x3A	1160 mV	VOD_1160
50	0x3B	1180 mV	VOD_1180
51	0x3C	1200 mV	VOD_1200

Table 10 – Vod selection options

Enum	Value	Output	Gen<i>Cam parameter name
0	0x00	Pre emphasis setting 0	PRE_EMPHASIS_0
1	0x01	Pre emphasis setting 1	PRE_EMPHASIS_1
2	0x02	Pre emphasis setting 2	PRE_EMPHASIS_2
3	0x03	Pre emphasis setting 3	PRE_EMPHASIS_3
4	0x04	Pre emphasis setting 4	PRE_EMPHASIS_4
5	0x05	Pre emphasis setting 5	PRE_EMPHASIS_5
6	0x06	Pre emphasis setting 6	PRE_EMPHASIS_6
7	0x07	Pre emphasis setting 7	PRE_EMPHASIS_7
8	0x08	Pre emphasis setting 8	PRE_EMPHASIS_8
9	0x09	Pre emphasis setting 9	PRE_EMPHASIS_9
10	0x0A	Pre emphasis setting 10	PRE_EMPHASIS_10
11	0x0B	Pre emphasis setting 11	PRE_EMPHASIS_11
12	0x0C	Pre emphasis setting 12	PRE_EMPHASIS_12
13	0x0D	Pre emphasis setting 13	PRE_EMPHASIS_13
14	0x0E	Pre emphasis setting 14	PRE_EMPHASIS_14
15	0x0F	Pre emphasis setting 15	PRE_EMPHASIS_15
16	0x10	Pre emphasis setting 16	PRE_EMPHASIS_16
17	0x11	Pre emphasis setting 17	PRE_EMPHASIS_17
18	0x12	Pre emphasis setting 18	PRE_EMPHASIS_18
19	0x13	Pre emphasis setting 19	PRE_EMPHASIS_19
20	0x14	Pre emphasis setting 20	PRE_EMPHASIS_20
21	0x15	Pre emphasis setting 21	PRE_EMPHASIS_21
22	0x16	Pre emphasis setting 22	PRE_EMPHASIS_22
23	0x17	Pre emphasis setting 23	PRE_EMPHASIS_23
24	0x18	Pre emphasis setting 24	PRE_EMPHASIS_24
25	0x19	Pre emphasis setting 25	PRE_EMPHASIS_25
26	0x1A	Pre emphasis setting 26	PRE_EMPHASIS_26
27	0x1B	Pre emphasis setting 27	PRE_EMPHASIS_27
28	0x1C	Pre emphasis setting 28	PRE_EMPHASIS_28
29	0x1D	Pre emphasis setting 29	PRE_EMPHASIS_29
30	0x1E	Pre emphasis setting 30	PRE_EMPHASIS_30
31	0x1F	Pre emphasis setting 31	PRE_EMPHASIS_31

Table 11 – Pre Emphasis selection options

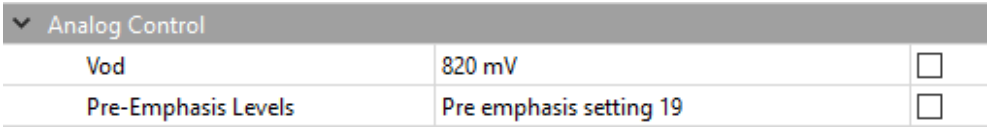

Figure 10 – Analog Control category in Vision Point App

12 Support

The Support category describes the standard CoaXPress bootstrap registers for device and protocol information. The support bootstrap parameters are summarized in the following table.

Parameter	Description	Gen<i>Cam name	Type	Possible values		Remarks
				Value	Gen<i>Cam name	
Gen<i>Cam Category: Support						
Standard	Bootstrap register Standard	Standard	Integer			
Revision	Bootstrap register Revision	Revision	Integer			
Xml Manifest Size	Bootstrap register XmlManifestSize	XmlManifestSize	Integer			
Xml Manifest Selector	Bootstrap register XmlManifestSelector	XmlManifestSelector	Integer			
Xml Version	Bootstrap register XmlVersion	XmlVersion	Integer			
Xml Schema Version	Bootstrap register XmlSchemaVersion	XmlSchemaVersion	Integer			
Xml Url Address	Bootstrap register XmlUrlAddress	XmlUrlAddress	Integer			
Iidc Pointer	Bootstrap register IidcPointer	IidcPointer	Integer			

Table 12 – Support category parameters

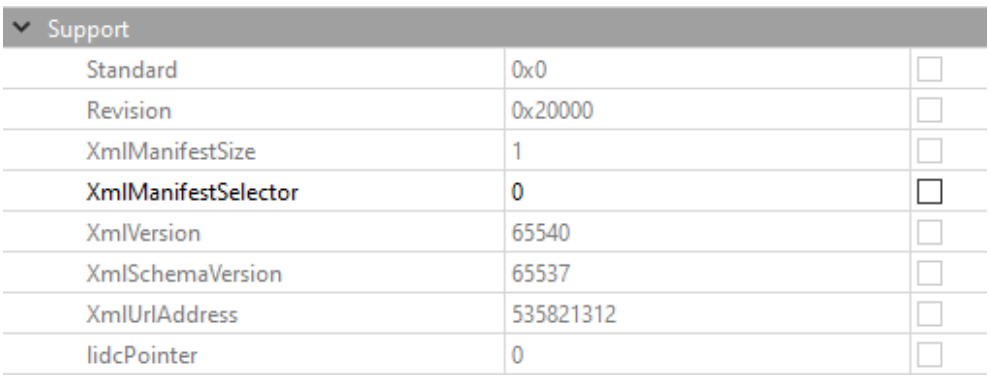

Figure 11 – Support category in Vision Point App

13 CoaXPress

The CoaXPress section describes the bootstrap registers to determine the configuration parameters of connection, as described in JIIA CXP-001-2013 (CoaXPress Standard) document. The CoaXPress parameters are summarized the following table.

Parameter	Description	Gen<i>Cam name	Type	Possible values		Remarks
				Value	Gen<i>Cam name	
Gen<i>Cam Category: CoaXPress						
CXP Versions Supported	Bootstrap register. The bitmask indicates all version(s) of the CoaXPress specification supported by the Device	VersionsSupported	Integer			If CXP 2.0 is not implemented (**CoaXPress_Revision_2_0_NotImplemented**) this parameter become "RO" for debugging purposes
CXP Version Used	Currently selected version of the CoaXPress specification used to communicate between the Device and Host	VersionUsed	Enumeration	0x00010000 0x00010001 0x00020000	CXP 1.0 CXP 1.1 CXP 2.0	
Low Speed timeout	Low Speed timeout. 8ns resolution, units in microseconds(us). Default value is 800ms	LowSpeedTimeout	Integer	Min: Max:	0 34359738	Depends on **CoaXPress_Revision_2_0_IsImplemented**
Heartbeat period	Heartbeat period. 8ns resolution, units in microseconds(us). Default value is 10ms	HeartbeatPeriod	Float			Depends on **CoaXPress_Revision_2_0_IsImplemented**
Device Link ID	Bootstrap register DeviceLinkID	DeviceLinkID	Integer			
Master Host Link ID	Bootstrap register MasterHostLinkID	MasterHostLinkID	Integer			
Control Packet Data Size	Bootstrap register ControlPacketDataSize	ControlPacketDataSize	Integer			
Stream Packet Data Size	Bootstrap register StreamPacketDataSize	StreamPacketDataSize	Integer			
Link Config	Bootstrap register LinkConfig	LinkConfig	Enumeration (Selector)			See Table 14 Values depend on **TwelveG_IsImplemented**
Link Config Default	Bootstrap register LinkConfigDefault	LinkConfigDefault	Enumeration (Selector)			See Table 14 Values depend on **TwelveG_IsImplemented**
Test Mode	Bootstrap register TestMode	TestMode	Integer			
Test Error Count Selector	Bootstrap register TestErrorCountSelector	TestErrorCountSelector	Integer (Selector)			
TestErrorCount	Bootstrap register TestErrorCount	TestErrorCount [TestErrorCountSelector]	Integer			
TestPacketCountTx	Bootstrap register TestPacketCountTx	TestPacketCountTx [TestErrorCountSelector]	Integer			
TestPacketCountRx	Bootstrap register TestPacketCountRx	TestPacketCountRx [TestErrorCountSelector]	Integer			
Image 1 Stream ID	Image 1 Stream ID	Image1StreamID	Integer			

Table 13 – CoaXPress category parameters

Value	Output	Gen<i>Cam parameter name
0x00010028	1 Link 1.250 Gbps	x1_CXP_1
0x00010030	1 Link 2.500 Gbps	x1_CXP_2
0x00010038	1 Link 3.125 Gbps	x1_CXP_3
0x00010040	1 Link 5.0 Gbps	x1_CXP_5
0x00010048	1 Link 6.25 Gbps	x1_CXP_6
0x00010050	1 Link 10 Gbps	x1_CXP_10
0x00010058	1 Link 12 Gbps	x1_CXP_12
0x00020028	2 Link 1.250 Gbps	x2_CXP_1
0x00020030	2 Link 2.500 Gbps	x2_CXP_2
0x00020038	2 Link 3.125 Gbps	x2_CXP_3
0x00020040	2 Link 5.0 Gbps	x2_CXP_5
0x00020048	2 Link 6.25 Gbps	x2_CXP_6
0x00020050	2 Link 10 Gbps	x2_CXP_10
0x00020058	2 Link 12 Gbps	x2_CXP_12
0x00040028	4 Link 1.250 Gbps	x4_CXP_1
0x00040030	4 Link 2.500 Gbps	x4_CXP_2
0x00040038	4 Link 3.125 Gbps	x4_CXP_3
0x00040040	4 Link 5.0 Gbps	x4_CXP_5
0x00040048	4 Link 6.25 Gbps	x4_CXP_6
0x00040050	4 Link 10 Gbps	x4_CXP_10
0x00040058	4 Link 12 Gbps	x4_CXP_12

Table 14 – Link Config selection options

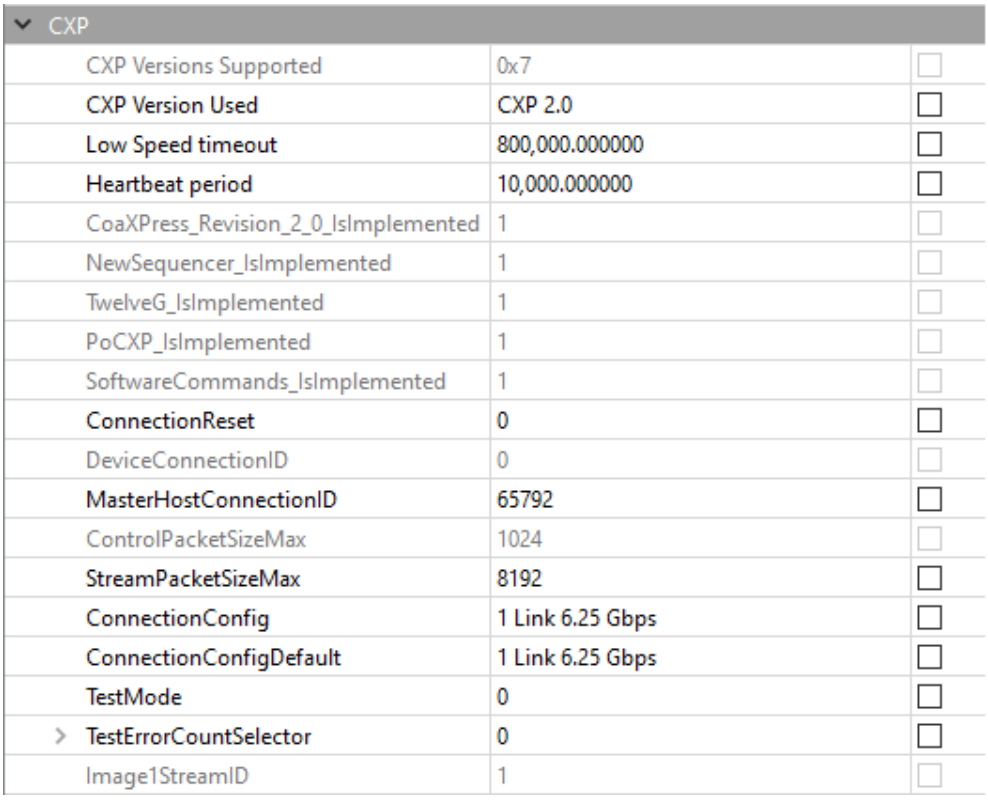

Figure 12 – CoaXPress category in Vision Point App