

Sequencer Control with Bonito PRO Cameras

Introduction

This document presents information on how to use the new Sequencer Control feature set with Bonito PRO CoaXPress cameras. Sequencer Control allows the user to configure a sequence set of different frame parameters which are applied to frames on the fly. The user can configure up to 16 sequence sets which are stored in the internal FPGA memory.

Prerequisites

The following items are required:

- Allied Vision Bonito PRO camera
Supported models: Bonito PRO X-1250, X-2620
- Frame grabber and **GenICam browser** installed on the host PC to configure sequence sets.

SequencerControl

This feature group contains the features related to sequencer control. This group includes the features related to the control of the sequencers that can be used to change some features of the camera automatically based on different events and signals.

The purpose of a sequencer is to allow the user of a camera to define a series of feature sets for image acquisition which can consecutively be activated during the acquisition by the camera. Accordingly, the proposed sequence is configured by a list of parameter sets.

Each of these sequencer sets contains the settings for a number of camera features. Similar to user sets, the actual settings of the camera are overwritten when one of these sequencer sets is loaded. The order in which the features are applied to the camera is defined by Allied Vision. It is recommended to apply all the image related settings to the camera, before the first frame of this sequence is captured.

Sequencer sets can be loaded and saved by selecting them using `SequencerSetSelector`. The execution of the sequencer is completely controlled by the device.

The sequencer set is a collection of features defining an image frame (for example, `Exposure`, `Gain`, `BlackLevel`, `PixelFormat`, `Region`, `FrameCount`, `Gamma`, `LUTControl`). All sequencer sets (16)

contain a default configuration (unless modified using `SequencerSetSave`). Sequencer sets are saved in non-volatile memory.



You can configure up to 16 sequence sets. When configuring less sequence sets, ensure that the sequence sets are continuous, that is, no gaps between sequence sets.

Sequencer Control parameters

The sequencer supports up to 16 sequence sets with the following parameters in each sequence set:

- Multi-ROI



Up to four regions of interest are supported. The sequence set must use the current Multi-ROI setting. This settings cannot be changed during the sequence.

- Digital gain
- Digital black level
- Exposure
- Pixel format



Pixel format cannot be changed during sequencer control. This is a limitation of the frame grabber.

- Gamma mode
- LUT enable
- Sequence repetitions

Sequencer Control architecture

The following image illustrates the Sequencer Control architecture.

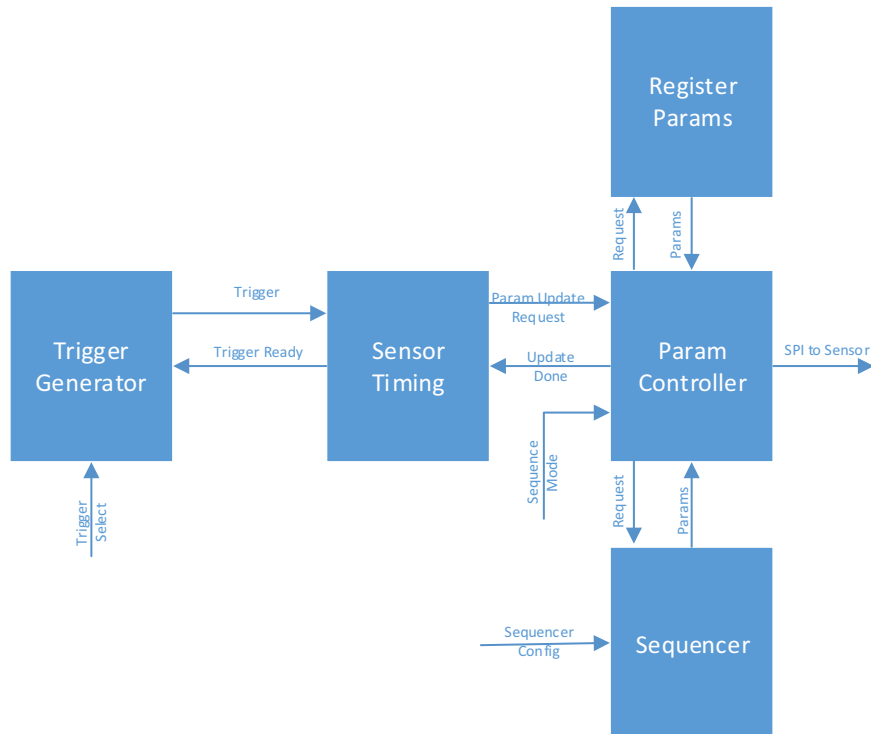


Figure 1: Sequencer Control architecture

Sequencer Control features

The Sequencer Control feature implementation is compliant with GenICam SFNC Version 2.2.

SequencerConfigurationMode

Standard	GenICam SFNC Version 2.2
Feature type	Enumeration
Access	Read/Write
Visibility	Expert
Possible values	<i>On, Off</i>
Category	<i>/SequencerControl</i>

Controls if the sequencer configuration mode is enabled or disabled.
SequencerConfigurationMode must be set to *On* to configure the sequencer.

Available only if `SequencerMode` is set to *Off*, and no binning or decimation is currently enabled.

Value	Description
<i>Off</i>	Disables the sequencer configuration mode
<i>On</i>	Enables the sequencer configuration mode

SequencerMode

Standard	GenICam SFNC Version 2.2
Feature type	Enumeration
Access	Read/Write
Visibility	Expert
Possible values	<i>On, Off</i>
Category	/SequencerControl

Controls if the sequencer mechanism is active. `SequencerMode` must be set to *On* for sequencer operation to be in effect.

Available only if `SequencerConfigurationMode` is set to *Off*, no binning or decimation is enabled, and the camera is not streaming.

Value	Description
<i>Off</i>	Disables the sequencer
<i>On</i>	Enables the sequencer

SequencerFrameRate

Standard	Custom
Feature type	Integer
Access	Read/Write
Visibility	Expert
Range	≥ 0
Unit	Frames per second
Category	/SequencerControl

Sequencer frame rate, in frames per second. This is applicable when either the `FrameStart` trigger mode is disabled, or the `FrameStart` trigger source is *FixedRate*. Any value up to `SequencerFrameRateLimit` is accepted.

SequencerMaxFrameRate

Standard	Custom
Feature type	Integer
Access	Read/Write
Visibility	Expert
Range	≥ 0
Unit	Frames per second
Category	/SequencerControl

Sequencer frame rate limit, in frames per second. This is a calculation of the maximum achievable frame rate based on current active sequencer sets.

SequencerSetSelector

Standard	GenICam SFNC Version 2.2
Feature type	Integer
Access	Read/Write
Visibility	Expert
Range	≥ 0
Category	/SequencerControl

Selects the `SequencerSet` to which further feature settings applies.

Available only if `SequencerConfigurationMode` is set to `On`.

SequencerSetActive

Standard	GenICam SFNC Version 2.2
Feature type	Integer
Access	Read
Visibility	Expert
Range	≥ 0
Category	/SequencerControl

Contains the currently active `SequencerSet`.

Available only if `SequencerMode` is set to `On`. Shows which sequencer set is currently in use.

SequencerSetLoad

Standard	GenICam SFNC Version 2.2
Feature type	Command
Access	(Read)/Write
Visibility	Expert
Category	/SequencerControl

Loads the `SequencerSet` selected by `SequencerSetSelector` in the device. Even if `SequencerMode` is set to `Off`, this changes the device state to the configuration of the selected set.

SequencerSetSave

Standard	GenICam SFNC Version 2.2
Feature type	Command
Access	(Read)/Write
Visibility	Expert
Category	/SequencerControl

Saves the current device state to the `SequencerSet` selected by the `SequencerSetSelector`. The `SequencerSet` is loaded from non-volatile memory.

Available only if `SequencerConfigurationMode` is set to `On` and if camera is not streaming. This is similar in operation as `UserSetLoad` except that only a subset of the camera settings are loaded.

SequencerSetStart

Standard	GenICam SFNC Version 2.2
Feature type	Integer
Access	Read/Write
Visibility	Expert
Range	≥ 0
Category	/SequencerControl

Sets the initial or start `SequencerSet`, which is the first set used within a sequencer.

Available only if `SequencerConfigurationMode` is set to `On`. `SequencerSetEnd` is automatically adjusted if `SequencerSetStart` is greater than `SequencerSetEnd`.

SequencerSetEnd

Standard	Custom
Feature type	Integer
Access	Read/Write
Visibility	Expert
Range	≥ 0
Category	/SequencerControl

Sets the final or end `SequencerSet`, which is the last set used within a sequencer.

Available only if `SequencerConfigurationMode` is set to *On*. Once `SequencerSetFrameCount` frames are captured from the `SequencerSet` specified by `SequencerSetEnd` the sequencer resumes operation using the `SequencerSet` specified by `SequencerSetStart`.

SequencerSetFrameCount

Standard	Custom
Feature type	Integer
Access	Read/Write
Visibility	Expert
Range	≥ 0
Category	/SequencerControl

Sets the number of frames captured by the `SequencerSet` selected by `SequencerSetSelector` before the sequencer advances to the next sequential `SequencerSet`.

SequencerSetGammaEnable

Standard	Custom
Feature type	Enumeration
Access	Read/Write
Visibility	Expert
Possible values	<i>On, Off</i>
Category	/SequencerControl

Controls if the current gamma setting is applied to the `SequencerSet` selected by `SequencerSetSelector`.

Available only if `SequencerConfigurationMode` is set to *On*.

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