

Writing Applications with xiAPI

Default parameters

After camera is opened by xiOpenDevice the default camera parameters are set by API. The default parameters might be different in different API versions. In order to ensure that your application will have camera in expected state with any API version - please set all parameters expected by your application to required value.

Image Format

Note: xiAPI allows to set different combinations of binning and decimation parameters.

On xiC, xiB, xiX, xiT cameras the parameters of units (Sensor, FPGA, CPU) are accessible with selectors (e.g. [XI_PRM_BINNING_SELECTOR](#)). After setting of selector, multiple parameters could be get of set for the selected unit. They can be divided into:

· [Patterns \(e.g. XI_PRM_BINNING_HORIZONTAL_PATTERN\)](#). If new pattern is set - the API might change the Values automatically in order to achieve setting of the new pattern.

· [Values \(e.g. XI_PRM_BINNING_HORIZONTAL\)](#). If new value is set - the API might change other values automatically in order to achieve setting of the new. Firstly it tries to find exact mode keeping the unchanged values, secondary it tries to find similar mode (trying to keep the other part - e.g. changing binning is trying to keep decimation parameters). If first and second attempts fails, the API tries to find any mode where new-value is found without keeping any other parameters, keeping Patterns.

· [Modes for binning \(e.g. XI_PRM_BINNING_VERTICAL_MODE\)](#)

XI_PRM_BINNING_SELECTOR or "binning_selector"

Description: Selects which binning engine is controlled by the BinningHorizontal and BinningVertical features.

Type: Enumerator.

Default value: XI_BIN_SELECT_SENSOR

Usage:

```
int binning_selector = 0;
xiGetParamInt(handle, XI_PRM_BINNING_SELECTOR, &binning_selector);
xiSetParamInt(handle, XI_PRM_BINNING_SELECTOR, XI_BIN_SELECT_SENSOR);
```

Value	Description
XI_BIN_SELECT_SENSOR	parameters for image sensor binning are selected
XI_BIN_SELECT_DEVICE_FPGA	parameters for device (camera) FPGA decimation are selected
XI_BIN_SELECT_HOST_CPU	parameters for Host CPU binning are selected

XI_PRM_BINNING_VERTICAL_MODE or "binning_vertical_mode"

Description: Sets the mode used to combine horizontal photo-sensitive cells together when BinningVertical is used.

Type: Enumerator.

Default value: XI_BIN_MODE_SUM

Usage:

```
int binning_vertical_mode = 0;  
xiGetParamInt(handle, XI_PRM_BINNING_VERTICAL_MODE, &binning_vertical_mode);  
xiSetParamInt(handle, XI_PRM_BINNING_VERTICAL_MODE, XI_BIN_MODE_SUM);
```

Value	Description
XI_BIN_MODE_SUM	The response from the combined pixels will be added, resulting in increased sensitivity.
XI_BIN_MODE_AVERAGE	The response from the combined pixels will be averaged, resulting in increased signal/noise ratio.

XI_PRM_BINNING_VERTICAL or "binning_vertical"

Description: Number of vertical photo-sensitive cells to combine together. This reduces the vertical resolution (height) of the image.

Note: Setting this parameter may automatically change other Binning/Decimation parameters in order to achieve a valid combination.

Type: Integer.

Default value: 1

Typical range: The value range depends on camera model or associated selectors or invalidators.

Is invalidated by: XI_PRM_BINNING_SELECTOR, XI_PRM_DOWNSAMPLING_TYPE, XI_PRM_DOWNSAMPLING, XI_PRM_SHUTTER_TYPE, XI_PRM_DECIMATION_VERTICAL, XI_PRM_DECIMATION_HORIZONTAL, XI_PRM_BINNING_HORIZONTAL, XI_PRM_DP_UNIT_SELECTOR, XI_PRM_DP_PROC_SELECTOR, XI_PRM_DP_PARAM_SELECTOR, XI_PRM_DP_PARAM_VALUE, XI_PRM_HDR

Usage:

```
int value = 0;  
xiGetParamInt(handle, XI_PRM_BINNING_VERTICAL, &value);  
xiSetParamInt(handle, XI_PRM_BINNING_VERTICAL, value);
```

XI_PRM_BINNING_VERTICAL_FLOAT or "binning_vertical_float"

Description: Number of vertical photo-sensitive cells to combine together. This reduces the vertical resolution (height) of the image.

Note: Setting this parameter may automatically change other Binning/Decimation parameters in order to achieve a valid combination.

Type: Float.

Default value: 1.0

Typical range: [1.0, 4.0]

Is invalidated by: XI_PRM_BINNING_SELECTOR, XI_PRM_DOWNSAMPLING_TYPE, XI_PRM_DOWNSAMPLING, XI_PRM_DECIMATION_VERTICAL, XI_PRM_DECIMATION_HORIZONTAL, XI_PRM_BINNING_HORIZONTAL, XI_PRM_DP_UNIT_SELECTOR, XI_PRM_DP_PROC_SELECTOR, XI_PRM_DP_PARAM_SELECTOR, XI_PRM_DP_PARAM_VALUE, XI_PRM_HDR

Usage:

```
float value = 0.0;  
xiGetParamFloat(handle, XI_PRM_BINNING_VERTICAL_FLOAT, &value);  
xiSetParamFloat(handle, XI_PRM_BINNING_VERTICAL_FLOAT, value);
```

XI_PRM_BINNING_HORIZONTAL_MODE or "binning_horizontal_mode"

Description: Sets the mode to use to combine horizontal photo-sensitive cells together when BinningHorizontal is used.

Type: Enumerator.

Default value: XI_BIN_MODE_SUM

Usage:

```
int binning_horizontal_mode = 0;  
xiGetParamInt(handle, XI_PRM_BINNING_HORIZONTAL_MODE, &binning_horizontal_mode);  
xiSetParamInt(handle, XI_PRM_BINNING_HORIZONTAL_MODE, XI_BIN_MODE_SUM);
```

Value	Description
XI_BIN_MODE_SUM	The response from the combined pixels will be added, resulting in increased sensitivity.
XI_BIN_MODE_AVERAGE	The response from the combined pixels will be averaged, resulting in increased signal/noise ratio.

XI_PRM_BINNING_HORIZONTAL or "binning_horizontal"

Description: Number of horizontal photo-sensitive cells to combine together. This reduces the horizontal resolution (width) of the image.

Note: Setting this parameter may automatically change other Binning/Decimation parameters in order to achieve a valid combination.

Type: Integer.

Default value: 1

Typical range: The value range depends on camera model or associated selectors or invalidators.

Is invalidated by: XI_PRM_BINNING_SELECTOR, XI_PRM_DOWNSAMPLING_TYPE, XI_PRM_DOWNSAMPLING, XI_PRM_SHUTTER_TYPE, XI_PRM_DECIMATION_VERTICAL, XI_PRM_DECIMATION_HORIZONTAL, XI_PRM_BINNING_VERTICAL, XI_PRM_DP_UNIT_SELECTOR, XI_PRM_DP_PROC_SELECTOR, XI_PRM_DP_PARAM_SELECTOR, XI_PRM_DP_PARAM_VALUE

Usage:

```
int value = 0;  
xiGetParamInt(handle, XI_PRM_BINNING_HORIZONTAL, &value);
```

```
xiSetParamInt(handle, XI_PRM_BINNING_HORIZONTAL, value);
```

XI_PRM_BINNING_HORIZONTAL_FLOAT or "binning_horizontal_float"

Description: Number of horizontal photo-sensitive cells to combine together. This reduces the horizontal resolution (width) of the image.

Note: Setting this parameter may automatically change other Binning/Decimation parameters in order to achieve a valid combination.

Type: Float.

Default value: 1.0

Typical range: [1.0, 4.0]

Is invalidated by: XI_PRM_BINNING_SELECTOR, XI_PRM_DOWNSAMPLING_TYPE, XI_PRM_DOWNSAMPLING, XI_PRM_DECIMATION_VERTICAL, XI_PRM_DECIMATION_HORIZONTAL, XI_PRM_BINNING_VERTICAL, XI_PRM_DP_UNIT_SELECTOR, XI_PRM_DP_PROC_SELECTOR, XI_PRM_DP_PARAM_SELECTOR, XI_PRM_DP_PARAM_VALUE

Usage:

```
float value = 0.0;
```

```
xiGetParamFloat(handle, XI_PRM_BINNING_HORIZONTAL_FLOAT, &value);
```

```
xiSetParamFloat(handle, XI_PRM_BINNING_HORIZONTAL_FLOAT, value);
```

XI_PRM_BINNING_HORIZONTAL_PATTERN or "binning_horizontal_pattern"

Description: Defines number of horizontal photo-sensitive cells to combine.

Note: Setting this parameter may automatically change other Binning/Decimation parameters in order to achieve a valid combination.

Type: Enumerator.

Default value: XI_BIN_MONO

Usage:

```
int binning_horizontal_pattern = 0;
```

```
xiGetParamInt(handle, XI_PRM_BINNING_HORIZONTAL_PATTERN, &binning_horizontal_pattern);
```

```
xiSetParamInt(handle, XI_PRM_BINNING_HORIZONTAL_PATTERN, XI_BIN_MONO);
```

Value	Description
XI_BIN_MONO	adjacent pixels are combined
XI_BIN_BAYER	Bayer pattern is preserved during pixel combining

XI_PRM_BINNING_VERTICAL_PATTERN or "binning_vertical_pattern"

Description: Defines binning vertical pattern.

Note: Setting this parameter may automatically change other Binning/Decimation parameters in order to achieve a valid combination.

Type: Enumerator.

Default value: XI_BIN_MONO

Usage:

```
int binning_vertical_pattern = 0;
xiGetParamInt(handle, XI_PRM_BINNING_VERTICAL_PATTERN, &binning_vertical_pattern);
xiSetParamInt(handle, XI_PRM_BINNING_VERTICAL_PATTERN, XI_BIN_MONO);
```

Value	Description
XI_BIN_MONO	adjacent pixels are combined
XI_BIN_BAYER	Bayer pattern is preserved during pixel combining

XI_PRM_DECIMATION_SELECTOR or "decimation_selector"

Description: Selects Decimation engine to configure.

Type: Enumerator.

Default value: XI_DEC_SELECT_SENSOR

Usage:

```
int decimation_selector = 0;
xiGetParamInt(handle, XI_PRM_DECIMATION_SELECTOR, &decimation_selector);
xiSetParamInt(handle, XI_PRM_DECIMATION_SELECTOR, XI_DEC_SELECT_SENSOR);
```

Value	Description
XI_DEC_SELECT_SENSOR	parameters for image sensor decimation are selected
XI_DEC_SELECT_DEVICE_FPGA	parameters for device (camera) FPGA decimation are selected
XI_DEC_SELECT_HOST_CPU	parameters for Host CPU decimation are selected

XI_PRM_DECIMATION_VERTICAL or "decimation_vertical"

Description: Vertical sub-sampling of the image. This reduces the vertical resolution (height) of the image by the specified vertical decimation factor.

Note: Setting this parameter may automatically change other Binning/Decimation parameters in order to achieve a valid combination.

Type: Integer.

Default value: 1

Typical range: The value range depends on camera model or associated selectors or invalidators.

Is invalidated by: XI_PRM_DECIMATION_VERTICAL, XI_PRM_DOWNSAMPLING_TYPE, XI_PRM_DOWNSAMPLING, XI_PRM_BINNING_VERTICAL, XI_PRM_BINNING_HORIZONTAL, XI_PRM_DECIMATION_HORIZONTAL, XI_PRM_DP_UNIT_SELECTOR, XI_PRM_DP_PROC_SELECTOR, XI_PRM_DP_PARAM_SELECTOR, XI_PRM_DP_PARAM_VALUE, XI_PRM_DECIMATION_SELECTOR, XI_PRM_HDR

Usage:

```
int value = 0;
xiGetParamInt(handle, XI_PRM_DECIMATION_VERTICAL, &value);
```

```
xiSetParamInt(handle, XI_PRM_DECIMATION_VERTICAL, value);
```

XI_PRM_DECIMATION_HORIZONTAL or "decimation_horizontal"

Description: Horizontal sub-sampling of the image. This reduces the horizontal resolution (width) of the image by the specified horizontal decimation factor.

Note: Setting this parameter may automatically change other Binning/Decimation parameters in order to achieve a valid combination.

Type: Integer.

Default value: 1

Typical range: The value range depends on camera model or associated selectors or invalidators.

Is invalidated by: XI_PRM_DECIMATION_VERTICAL, XI_PRM_DOWNSAMPLING_TYPE, XI_PRM_DOWNSAMPLING, XI_PRM_BINNING_VERTICAL, XI_PRM_BINNING_HORIZONTAL, XI_PRM_DECIMATION_VERTICAL, XI_PRM_DP_UNIT_SELECTOR, XI_PRM_DP_PROC_SELECTOR, XI_PRM_DP_PARAM_SELECTOR, XI_PRM_DP_PARAM_VALUE, XI_PRM_DECIMATION_SELECTOR

Usage:

```
int value = 0;  
xiGetParamInt(handle, XI_PRM_DECIMATION_HORIZONTAL, &value);  
xiSetParamInt(handle, XI_PRM_DECIMATION_HORIZONTAL, value);
```

XI_PRM_DECIMATION_HORIZONTAL_PATTERN or "decimation_horizontal_pattern"

Description: Defines decimation horizontal pattern.

Note: Setting this parameter may automatically change other Binning/Decimation parameters in order to achieve a valid combination.

Type: Enumerator.

Default value: XI_DEC_MONO

Usage:

```
int decimation_horizontal_pattern = 0;  
xiGetParamInt(handle, XI_PRM_DECIMATION_HORIZONTAL_PATTERN, &decimation_horizontal_pattern);  
  
xiSetParamInt(handle, XI_PRM_DECIMATION_HORIZONTAL_PATTERN, XI_DEC_MONO);
```

Value	Description
XI_DEC_MONO	adjacent pixels are decimated
XI_DEC_BAYER	Bayer pattern is preserved during pixel decimation

XI_PRM_DECIMATION_VERTICAL_PATTERN or "decimation_vertical_pattern"

Description: Defines decimation vertical pattern.

Note: Setting this parameter may automatically change other Binning/Decimation parameters in order to achieve a valid combination.

Type: Enumerator.

Default value: XI_DEC_MONO

Usage:

```
int decimation_vertical_pattern = 0;
```

```
xiGetParamInt(handle, XI_PRM_DECIMATION_VERTICAL_PATTERN, &decimation_vertical_pattern);
```

```
xiSetParamInt(handle, XI_PRM_DECIMATION_VERTICAL_PATTERN, XI_DEC_MONO);
```

Value	Description
XI_DEC_MONO	adjacent pixels are decimated
XI_DEC_BAYER	Bayer pattern is preserved during pixel decimation