Xbpm Tango Cpp Class

Contents :

Xbpm Class Identification :

Contact	: at nexeya.com - sebastien.gara
Class Family	: BeamDiag
Platform	: All Platforms
Bus	: Not Applicable
Manufacturer	: none
Manufacturer ref.	:

Xbpm Class Inheritance :

- Tango::DeviceImpl
  - Xbpm

Xbpm Class Description :

This class is an universal Xbpm controller.
Xpbm Currents (mA) and Beam Position X (ï¿½m) and Z (ï¿½m) will be processed by this class.

Xbpm Properties :

There is no class properties

Device Properties			
Name	**Description**	**Type**	**Default Value**
ElectrometerProxyName	Name of the Electrometer Device proxy (ex : LoCum-4 Device).	String	none
ElectrometerGainName	Name of the Electrometer Device gain attribute (ex: gain).	String	none
SaiControllerProxyName	Name of the SaiController Device proxy.	String	none
SaiControllerChan0Name	Name of the SaiController channel 0 attribute (ex: channel0).	String	none
SaiControllerChan1Name	Name of the SaiController channel 1 attribute (ex: channel1).	String	none
SaiControllerChan2Name	Name of the SaiController channel 2 attribute (ex: channel2).	String	none
SaiControllerChan3Name	Name of the SaiController channel 3 attribute (ex: channel3).	String	none
I1Offset	Current offset (in ï¿½A) on electrode 1.	double	0
I2Offset	Current offset (in ï¿½A) on electrode 2.	double	0
I3Offset	Current offset (in ï¿½A) on electrode 3.	double	0
I4Offset	Current offset (in ï¿½A) on electrode 4.	double	0
GI1	Gain correction (in ï¿½A/V) for electrode 1.	double	1
GI2	Gain correction (in ï¿½A/V) for electrode 2.	double	1
GI3	Gain correction (in ï¿½A/V) for electrode 3.	double	1
GI4	Gain correction (in ï¿½A/V) for electrode 4.	double	1
V1Offset	Voltage offset (in V) on electrode 1.	double	0
V2Offset	Voltage offset (in V) on electrode 2.	double	0
V3Offset	Voltage offset (in V) on electrode 3.	double	0
V4Offset	Voltage offset (in V) on electrode 4.	double	0
LowVoltageThreshold	If the input voltage of the ADC decrease this threshold (in V), the corresponding average current attribute become ALARM (i.e. if |Vmes| < threshold).	double	0.1
HighVoltageThreshold	If the input voltage of the ADC exceed this threshold (in V), the corresponding average current attribute become ALARM (i.e. |Vmes|> threshold).	double	10
IntensityThreshold	Current out of which the Measured Intensity has a meaning (in micro-A).	double	10e-6
StartAtInit	Launch start command at initialization time.	boolean	false
EnableSigmaIntensity	Enables or disables standard deviation intensity computing (standardDeviationIntensity & currentSpectrum attributes).	boolean	false
EnablePositionHistory	Enables or disables standard deviation position computing (standardDeviationPosition & historyPosition attributes)	boolean	false
EnableIntensityHistory	Enables or disables intensity history (historyIntensity attribute)	boolean	false
EnableFluxComputing	Enables or disables beam flux display (flux attribute).	boolean	false
BeamEnergyProxyName	Name of the beam Energy Device Proxy.	String	none
EnergyAttr	Name of the energy attribute to read from the beam energy Device Proxy.	String	none
ModeX	List of the properties needed by the computation mode `X`. Format: {key}::{value}	String[]	none
ScanMode	If true, this property enables the scan mode, i.e. the polling task is disabled and data is computed on each client`s request.	boolean	false

XbpmType	XBPM type among PSD, Quadrant. Determines the intensity calculation.	String	Quadrant

Xbpm Class Commands				
Name	**Input type**	**Output type**	**Level**	**Description**
State	DEV_VOID	DEV_STATE	OPERATOR	This command gets the device state (stored in its *device_state* data member) and returns it to the caller.
Status	DEV_VOID	CONST_DEV_STRING	OPERATOR	This command gets the device status (stored in its *device_status* data member) and returns it to the caller.
Start	DEV_VOID	DEV_VOID	OPERATOR	Starts acquisition in continuous mode.
Stop	DEV_VOID	DEV_VOID	OPERATOR	Stops acquisition
SetUnit	DEV_USHORT	DEV_VOID	OPERATOR	Sets currents unit.

Command State :

This command gets the device state (stored in its *device_state* data member) and returns it to the caller.

State Definition		
Input Argument	Tango::DEV_VOID	none.
Output Argument	Tango::DEV_STATE	State Code
DisplayLevel	OPERATOR	..
Inherited	true	..
Abstract	false	..
Polling Period	Not polled	..
Command allowed for	All states	..

Command Status :

This command gets the device status (stored in its *device_status* data member) and returns it to the caller.

Status Definition		
Input Argument	Tango::DEV_VOID	none.
Output Argument	Tango::CONST_DEV_STRING	Status description

DisplayLevel	OPERATOR	..
Inherited	true	..
Abstract	false	..
Polling Period	Not polled	..
Command allowed for	All states	..

Command Start :

Starts acquisition in continuous mode.

Start Definition		
Input Argument	Tango::DEV_VOID	
Output Argument	Tango::DEV_VOID	
DisplayLevel	OPERATOR	..
Inherited	false	..
Abstract	false	..
Polling Period	Not polled	..
Command allowed for	All states	..

Command Stop :

Stops acquisition

Stop Definition		
Input Argument	Tango::DEV_VOID	
Output Argument	Tango::DEV_VOID	
DisplayLevel	OPERATOR	..
Inherited	false	..
Abstract	false	..
Polling Period	Not polled	..
Command allowed for	All states	..

Command SetUnit :

Sets currents unit.

SetUnit Definition		
Input Argument	Tango::DEV_USHORT	1: nA or 2 : ï¿½A or 3 : mA
Output Argument	Tango::DEV_VOID	
DisplayLevel	OPERATOR	..
Inherited	false	..
Abstract	false	..
Polling Period	Not polled	..
Command allowed for	All states	..

Xbpm Class Attributes							
Name	**Inherited**	**Abstract**	**Attr. type**	**R/W type**	**Data type**	**Level**	**Description**
gain	false	false	Scalar	READ	Tango::DEV_DOUBLE	OPERATOR	Gain read on the electrometer Device in ï¿½A/V.\nPossible values: 0.00001 0.0001 0.001 0.01 0.1 1 10 100\n
enableAutoRange	false	false	Scalar	READ_WRITE	Tango::DEV_BOOLEAN	OPERATOR	Enables or disables electrometer gain auto range.
current1	false	false	Scalar	READ	Tango::DEV_DOUBLE	OPERATOR	Average current on channel 0 (in measurementUnit).
current2	false	false	Scalar	READ	Tango::DEV_DOUBLE	OPERATOR	Average current on channel 1 (in measurementUnit).
current3	false	false	Scalar	READ	Tango::DEV_DOUBLE	OPERATOR	Average current on channel 2 (in measurementUnit).
current4	false	false	Scalar	READ	Tango::DEV_DOUBLE	OPERATOR	Average current on channel 3 (in measurementUnit).
intensity	false	false	Scalar	READ	Tango::DEV_DOUBLE	OPERATOR	Sum of the 4 average currents (in

							measurementUnit).
measurementUnit	false	false	Scalar	READ	Tango::DEV_STRING	OPERATOR	Current measurement unit among mA, nA ï¿½A. Default: ï¿½A
horizontalPosition	false	false	Scalar	READ	Tango::DEV_DOUBLE	OPERATOR	Beam horizontal position in mm.
verticalPosition	false	false	Scalar	READ	Tango::DEV_DOUBLE	OPERATOR	Beam vertical position in mm.
computationMode	false	false	Scalar	READ_WRITE	Tango::DEV_USHORT	EXPERT	Beam position computation mode. \nPossible values are: \nï¿½ 0: square geometry formula using corrected coefficients (Calibration and Offset tables) to compute beam position. \nï¿½ 1: square geometry formula using calculated Calibration and Offset table to compute beam position. \nï¿½ 2: cross geometry formula using corrected coefficients (Calibration and Offset tables) to compute beam position.\nï¿½ 3: dipole geometry formula using parametred offsets and calibration factors and gain correction tables to compute beam position. \nï¿½ 4: cross geometry formula using parametred offsets and calibration factors and gain correction tables to compute beam position. \nï¿½ 5: square geometry formula using parametred offsets and calibration factors and gain correction tables to

							compute beam position. \nï¿½ 6: square geometry formula using parametred offsets and calibration factors to compute beam position. \nï¿½ 7: cross geometry formula using parametred offsets and calibration factors to compute beam position.

There is no dynamic attribute defined.

Attribute gain :

Gain read on the electrometer Device in ï¿½A/V.\nPossible values: 0.00001 0.0001 0.001 0.01 0.1 1 10 100\n

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ
Data Type	Tango::DEV_DOUBLE
Display Level	OPERATOR
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	Not set
Read allowed for	All states

Attribute Properties	
label	gain
unit	
standard unit	
display unit	ï¿½a/V
format	%1.4e
max_value	
min_value	
max_alarm	
min_alarm	
max_warning	
min_warning	
delta_time	
delta_val	

Attribute Event Criteria	
Periodic	Not set
Relative Change	Not set
Absolute Change	Not set
Archive Periodic	Not set
Archive Relative Change	Not set
Archive Absolute Change	Not set
Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	Not set

Attribute enableAutoRange :

Enables or disables electrometer gain auto range.

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ_WRITE
Data Type	Tango::DEV_BOOLEAN
Display Level	OPERATOR
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	Not set
Read allowed for	All states
Write allowed for	All states

Attribute Properties	
label	auto range
unit	
standard unit	
display unit	
format	
max_value	
min_value	
max_alarm	
min_alarm	
max_warning	
min_warning	
delta_time	
delta_val	

Attribute Event Criteria	
Periodic	Not set
Relative Change	Not set
Absolute Change	Not set
Archive Periodic	Not set
Archive Relative Change	Not set
Archive Absolute Change	Not set
Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	Not set

Attribute current1 :

Average current on channel 0 (in measurementUnit).

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ
Data Type	Tango::DEV_DOUBLE

Attribute Properties	
label	I1
unit	
standard unit	

Attribute Event Criteria	
Periodic	Not set
Relative Change	Not set

Display Level	OPERATOR
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	Not set
Read allowed for	All states

display unit	
format	%1.4e
max_value	
min_value	
max_alarm	
min_alarm	
max_warning	
min_warning	
delta_time	
delta_val	

Absolute Change	Not set
Archive Periodic	Not set
Archive Relative Change	Not set
Archive Absolute Change	Not set
Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	Not set

Attribute current2 :

Average current on channel 1 (in measurementUnit).

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ
Data Type	Tango::DEV_DOUBLE
Display Level	OPERATOR
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	Not set
Read allowed for	All states

Attribute Properties	
label	I2
unit	
standard unit	
display unit	
format	%1.4e
max_value	
min_value	
max_alarm	
min_alarm	
max_warning	
min_warning	
delta_time	
delta_val	

Attribute Event Criteria	
Periodic	Not set
Relative Change	Not set
Absolute Change	Not set
Archive Periodic	Not set
Archive Relative Change	Not set
Archive Absolute Change	Not set
Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	Not set

Attribute current3 :

Average current on channel 2 (in measurementUnit).

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ
Data Type	Tango::DEV_DOUBLE
Display Level	OPERATOR
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	Not set
Read allowed for	All states

Attribute Properties	
label	I3
unit	
standard unit	
display unit	
format	%1.4e
max_value	
min_value	
max_alarm	
min_alarm	
max_warning	
min_warning	
delta_time	
delta_val	

Attribute Event Criteria	
Periodic	Not set
Relative Change	Not set
Absolute Change	Not set
Archive Periodic	Not set
Archive Relative Change	Not set
Archive Absolute Change	Not set
Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	Not set

Attribute current4 :

Average current on channel 3 (in measurementUnit).

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ
Data Type	Tango::DEV_DOUBLE

Attribute Properties	
label	I4
unit	
standard unit	

Attribute Event Criteria	
Periodic	Not set
Relative Change	Not set
	Not

~~Display Level~~	~~OPERATOR~~
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	Not set
Read allowed for	All states

display unit	
format	%1.4e
max_value	
min_value	
max_alarm	
min_alarm	
max_warning	
min_warning	
delta_time	
delta_val	

Absolute Change	set
Archive Periodic	Not set
Archive Relative Change	Not set
Archive Absolute Change	Not set
Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	Not set

Attribute intensity :

Sum of the 4 average currents (in measurementUnit).

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ
Data Type	Tango::DEV_DOUBLE
Display Level	OPERATOR
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	Not set
Read allowed for	All states

Attribute Properties	
label	intensity
unit	
standard unit	
display unit	
format	%1.4e
max_value	
min_value	
max_alarm	
min_alarm	
max_warning	
min_warning	
delta_time	
delta_val	

Attribute Event Criteria	
Periodic	Not set
Relative Change	Not set
Absolute Change	Not set
Archive Periodic	Not set
Archive Relative Change	Not set
Archive Absolute Change	Not set
Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	Not set

Attribute measurementUnit :

Current measurement unit among mA, nA ï¿½A. Default: ï¿½A

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ
Data Type	Tango::DEV_STRING
Display Level	OPERATOR
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	Not set
Read allowed for	All states

Attribute Properties	
label	current unit
unit	
standard unit	
display unit	
format	
max_value	
min_value	
max_alarm	
min_alarm	
max_warning	
min_warning	
delta_time	
delta_val	

Attribute Event Criteria	
Periodic	Not set
Relative Change	Not set
Absolute Change	Not set
Archive Periodic	Not set
Archive Relative Change	Not set
Archive Absolute Change	Not set
Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	Not set

Attribute horizontalPosition :

Beam horizontal position in mm.

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ
Data Type	Tango::DEV_DOUBLE
Display Level	OPERATOR

Attribute Properties	
label	X
unit	mm
standard unit	mm
display unit	mm

Attribute Event Criteria	
Periodic	Not set
Relative Change	Not set
Absolute Change	Not set

Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	Not set
Read allowed for	All states

format	%1.4e
max_value	
min_value	
max_alarm	
min_alarm	
max_warning	
min_warning	
delta_time	
delta_val	

Archive Periodic	Not set
Archive Relative Change	Not set
Archive Absolute Change	Not set
Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	Not set

Attribute verticalPosition :

Beam vertical position in mm.

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ
Data Type	Tango::DEV_DOUBLE
Display Level	OPERATOR
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	Not set
Read allowed for	All states

Attribute Properties	
label	Z
unit	mm
standard unit	mm
display unit	mm
format	%1.4e
max_value	
min_value	
max_alarm	
min_alarm	
max_warning	
min_warning	
delta_time	
delta_val	

Attribute Event Criteria	
Periodic	Not set
Relative Change	Not set
Absolute Change	Not set
Archive Periodic	Not set
Archive Relative Change	Not set
Archive Absolute Change	Not set
Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	Not set

Attribute computationMode :

Beam position computation mode.
\nPossible values are:
\nï¿½ 0: square geometry formula using corrected coefficients (Calibration and Offset tables) to compute beam position.
\nï¿½ 1: square geometry formula using calculated Calibration and Offset table to compute beam position.
\nï¿½ 2: cross geometry formula using corrected coefficients (Calibration and Offset tables) to compute beam position.\nï¿½ 3: dipole geometry formula using parametred offsets and calibration factors and gain correction tables to compute beam position.
\nï¿½ 4: cross geometry formula using parametred offsets and calibration factors and gain correction tables to compute beam position.
\nï¿½ 5: square geometry formula using parametred offsets and calibration factors and gain correction tables to compute beam position.
\nï¿½ 6: square geometry formula using parametred offsets and calibration factors to compute beam position.
\nï¿½ 7: cross geometry formula using parametred offsets and calibration factors to compute beam position.

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ_WRITE
Data Type	Tango::DEV_USHORT
Display Level	EXPERT
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	Not set
Read allowed for	All states
Write allowed for	All states

Attribute Properties	
label	computation mode
unit	
standard unit	
display unit	
format	%1d
max_value	7
min_value	0
max_alarm	
min_alarm	
max_warning	
min_warning	
delta_time	
delta_val	

Attribute Event Criteria	
Periodic	Not set
Relative Change	Not set
Absolute Change	Not set
Archive Periodic	Not set
Archive Relative Change	Not set
Archive Absolute Change	Not set
Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	Not set

Xbpm Class States	
Name	**Description**
INIT	Device initialization in progress.
FAULT	DAQ hardware failure or fatal error occured.
STANDBY	Device is up and ready to acquire data.
RUNNING	DAQ is running.
ALARM	At least one voltage is above high threshold.