

Spectrometer Tango Cpp Class

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Spectrometer Class Identification :

Contact : at nexeya.com - sebastien.gara
 Class Family : Acquisition
 Platform : Windows
 Bus : USB
 Manufacturer : Ocean Optics
 Manufacturer ref. : USB2000+

Spectrometer Class Inheritance :

- [Tango::DeviceImpl](#)
 - Spectrometer

Spectrometer Class Description :

This class controls an Ocean Optics Spectrometer interfaced in USB

Spectrometer Properties :

There is no class properties

Device Properties			
Name	Description	Type	Default Value
	Sets the triggering mode:		

TriggerMode	0= normal (free running) mode = INTERNAL_SINGLE 1= software trigger = INTERNAL_TRIGGERED_SINGLE 2= external hardware level trigger mode = EXTERNAL_MULTI 3= external synchronization trigger mode = EXTERNAL_GATE 4= external hardware edge trigger mode = EXTERNAL_SINGLE	short	0
SpectrometerIndex	USB index if there is several spectrometers	short	0
StopAcqOnSaturation	This property enables/disables the acquisition stop on spectrum saturation.	boolean	true
AlarmOnSaturation	Device change to ALARM state if saturated	boolean	false

Spectrometer Class Commands				
Name	Input type	Output type	Level	Description
State	DEV_VOID	DEV_STATE	OPERATOR	This command gets the device state (stored in its <i>device_state</i> data member) and returns it to the caller.
Status	DEV_VOID	CONST_DEV_STRING	OPERATOR	This command gets the device status (stored in its <i>device_status</i> data member) and returns it to the caller.
Start	DEV_VOID	DEV_VOID	OPERATOR	Starts multiple spectrum acquisitions according to chosen mode. Returns spectrum until a "Stop" command is sent by user.
Stop	DEV_VOID	DEV_VOID	OPERATOR	stops the current acquisition
GetFirmwareVersion	DEV_VOID	DEV_STRING	EXPERT	returns version number of code running on the microcontroller
Snap	DEV_VOID	DEV_VOID	OPERATOR	Start an acquisition for framesNb spectra. The final spectrum is the averaging of all spectra
GetIntensity	DEV_ULONG	DEVVAR_DOUBLEARRAY	OPERATOR	Get intensity spectrum by index

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	true	..
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	true	..
Polling Period	Not polled	..
Command allowed for	All states	..

Command Start :

Starts multiple spectrum acquisitions according to chosen mode. Returns spectrum until a "Stop" command is sent by user.

Start Definition		
Input Argument	Tango::DEV_VOID	Starts multiple spectrum acquisitions according to chosen mode. Returns spectrum until a Stop command is sent by user.
Output Argument	Tango::DEV_VOID	
DisplayLevel	OPERATOR	..
Inherited	false	..
Abstract	false	..
Polling Period	Not polled	..
Command allowed for	All states	..

Command Stop :

stops the current acquisition

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

Command GetFirmwareVersion :

returns version number of code running on the microcontroller

GetFirmwareVersion Definition		
Input Argument	Tango::DEV_VOID	
Output Argument	Tango::DEV_STRING	Firmware version
DisplayLevel	EXPERT	..
Inherited	false	..
Abstract	false	..
Polling Period	Not polled	..
Command allowed for	All states	..

Command Snap :

Start an acquisition for framesNb spectra.
The final spectrum is the averaging of all spectra

Snap 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 GetIntensity :

Get intensity spectrum by index

GetIntensity Definition		
Input Argument	Tango::DEV_ULONG	intensity spectrum index
Output Argument	Tango::DEVVAR_DOUBLEARRAY	intensity spectrum
DisplayLevel	OPERATOR	..
Inherited	false	..
Abstract	false	..
Polling Period	Not polled	..
Command allowed for	All states	..

Spectrometer Class Attributes							
Name	Inherited	Abstract	Attr. type	R/W type	Data type	Level	Description
averagingNb	false	false	Scalar	READ_WRITE	Tango::DEV_USHORT	OPERATOR	Sets the number of acquisitions to be used for spectrum calculation
boxcar	false	false	Scalar	READ_WRITE	Tango::DEV_USHORT	OPERATOR	sets the number of pixels to be averaged together
integrationTime	false	false	Scalar	READ_WRITE	Tango::DEV_LONG	OPERATOR	sets the integration time in milliseconds
lampEnable	false	false	Scalar	READ_WRITE	Tango::DEV_BOOLEAN	OPERATOR	sets the lamp status:\n0 light off, 1 light on
acquisitionCount	false	false	Scalar	READ	Tango::DEV_ULONG	OPERATOR	
triggerMode	false	false	Scalar	READ_WRITE	Tango::DEV_USHORT	OPERATOR	Sets the triggering mode:\n0= normal (free running) mode = INTERNAL_SINGLE\n1= software trigger = INTERNAL_TRIGGERED_SINGLE\n2= external hardware level trigger mode = EXTERNAL_MULT\n3= external synchronization trigger mode = EXTERNAL_GATE\n4= external hardware edge trigger mode = EXTERNAL_SINGLE\n
maxBufferDepth	false	false	Scalar	READ_WRITE	Tango::DEV_ULONG	EXPERT	max buffer depth when running a continuous acquisition.
nbGates	false	false	Scalar	READ_WRITE	Tango::DEV_ULONG	EXPERT	Expected number of gates (in Mode 2). 0 means infinite, until STOP command.
acqDelay	false	false	Scalar	READ_WRITE	Tango::DEV_ULONG	EXPERT	time delay (ms) before starting a new acquisition (in START mode)
lambda	false	false	Spectrum	READ	Tango::DEV_DOUBLE	OPERATOR	wavelengths values
intensity	false	false	Spectrum	READ	Tango::DEV_DOUBLE	OPERATOR	spectral intensity (in counts) resulting from one acquisition

There is no dynamic attribute defined.

Attribute averagingNb :

Sets the number of acquisitions to be used for spectrum calculation

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ_WRITE
Data Type	Tango::DEV_USHORT
Display Level	OPERATOR
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	true
Write hardware at init.	true
Read allowed for	All states

Attribute Properties	
label	Averaging Number
unit	
standard unit	
display unit	
format	%4d
max_value	5000
min_value	1
max_alarm	
min_alarm	
max_warning	
min_warning	

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

Write allowed for	All states
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delta_time	
delta_val	

Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	Not set

Attribute boxcar :

sets the number of pixels to be averaged together

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ_WRITE
Data Type	Tango::DEV_USHORT
Display Level	OPERATOR
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	true
Write hardware at init.	true
Read allowed for	All states
Write allowed for	All states

Attribute Properties	
label	Boxcar width
unit	
standard unit	
display unit	
format	%4d
max_value	15
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

Attribute integrationTime :

sets the integration time in milliseconds

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ_WRITE
Data Type	Tango::DEV_LONG
Display Level	OPERATOR
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	true
Write hardware at init.	true

Attribute Properties	
label	Integration Time
unit	ms
standard unit	ms
display unit	ms
format	%5d
max_value	65000
min_value	1
max_alarm	
min_alarm	
max_warning	
min_warning	

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

Read allowed for	All states
Write allowed for	All states

delta_time	
delta_val	

Attribute lampEnable :

sets the lamp status:\n0 light off, 1 light on

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	true
Write hardware at init.	true
Read allowed for	All states
Write allowed for	All states

Attribute Properties	
label	Lamp Enabled
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 acquisitionCount :

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

Attribute Properties	
label	
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 triggerMode :

Sets the triggering mode:\n0= normal (free running) mode = INTERNAL_SINGLE\n1= software trigger = INTERNAL_TRIGGERED_SINGLE\n2= external hardware level trigger mode = EXTERNAL_MULT\n3= external synchronization trigger mode = EXTERNAL_GATE\n4= external hardware edge trigger mode = EXTERNAL_SINGLE\n

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ_WRITE
Data Type	Tango::DEV_USHORT
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	
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 maxBufferDepth :

max buffer depth when running a continuous acquisition.

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ_WRITE
Data Type	Tango::DEV_ULONG
Display Level	EXPERT
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	Not set
Read NOT allowed for	<ul style="list-style-type: none"> RUNNING
Write allowed for	All states

Attribute Properties	
label	Max Buffer Depth
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

Attribute nbGates :

Expected number of gates (in Mode 2). 0 means infinite, until STOP command.

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ_WRITE
Data Type	Tango::DEV_ULONG
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	
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 acqDelay :

time delay (ms) before starting a new acquisition (in START mode)

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ_WRITE
Data Type	Tango::DEV_ULONG
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	
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 lambda :

wavelengths values

Attribute Definition	
Attribute Type	Spectrum (4096)
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	
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 intensity :

spectral intensity (in counts) resulting from one acquisition

Attribute Definition	
Attribute Type	Spectrum (4096)
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	
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

Spectrometer Class States	
Name	Description
INIT	Device initialization
RUNNING	acquisition is running
STANDBY	acquisition is in standby
FAULT	error occurred during acquisition time
ALARM	Acquired spectrum is saturated (only if AlarmOnSaturation flag is set to true)