

AnalogDAQ Tango Cpp Class

Contents :

- [Description](#)
- [Properties](#)
- [Commands](#)
 - [State](#)
 - [Status](#)
 - [Start](#)
 - [Stop](#)
 - [ImportFile](#)
 - [ExportFile](#)
- [Attributes](#)
 - [SampleRate](#)
 - [ChannelSamplesPerTrigger](#)
 - [NumOfTriggers](#)
 - [MaxRefSource](#)
 - [MinRefSource](#)
 - [TriggerSources](#)
 - [TriggerMode](#)
 - [BufferPeriod](#)
 - [BufferedChannelsList](#)
 - [RawDATA](#)
 - [DoubleDATA](#)
 - [FileName](#)
 - [ScalarValue](#)
 - [ChannelSpectrum](#)
- [States](#)

AnalogDAQ Class Identification :

Contact : at null - null
 Class Family :
 Platform :
 Bus :
 Manufacturer :
 Manufacturer ref. :

AnalogDAQ Class Inheritance :

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

AnalogDAQ Class Description :

**Abstract Class for Analog Input Output Acquisition
 Device Description**

AnalogDAQ Class

AnalogDAQ Properties :

There is no class properties

Device Properties			
Name	Description	Type	Default Value
BoardId	It must be an unique identifier for each card on the PC/Rack where it is installed. It could be the Board Number in the Rack, the Serial Number or the Product Id.	String	none
BoardType	Product Descriptor that allow us to identify this card, its provider and its behavior	String	none
IsInput	Input/Output Direction of the Channels to be managed,defined in this context: 1. Each Tango Device will manage all the Channels of a same Type/Direction of a DAQ Card. 2. Won't be two Analog Inputs accessing to the same Card; and two different devices (1 AI + 1 AO) will be needed to manage a Multi-Purpose Card with Channels of both types. -> The Read/Write permissions of the DoubleDATA, RawDATA, *ChannelValues and *LastValue Attributes will be determined by the value of this Property The value will be 1 for input, and 0 for output	boolean	none
OnBoardBuffer	Onboard Buffer of the Physical Device.	int	none
MaxSampleRate	Maximum Sample Rate (per Channel) that is capable the DAQ Card. -> The SampleRate.MaxValue Attribute Property will be fixed each time this Property is modified.	int	none
MaxSourceRange	Maximum Source Range allowed (Bipolar), it is understood as +/-MaxSourceRange. -> The Attributes MaxSourceRef and MinSourceRef will adapt its MaxValue and MinValue Properties to the value stored in this Property.	double	none
DynamicRange	Number of Bits of the DAQ Converter. -> It allows to convert from RawDATA (binary obtained from the Analog to Digital converter) to DoubleDATA (float point values normalized in the SourceRange).	short	none
Units	Units concerning to the data measured/generated. -> This property will modify the units for all related Attributes.	String	none
NumOfChannels	Total number of channels available in the DAQ card. This Property refers only to the Physical Channels of the same type of the Abstract Class (e.g. in an Analog Input Device it will refer only to the Analog Input Channels). -> It determines the maximum size of the Attribute BufferedChannels List and fixes the Attribute default value.	short	none
AutoStart	If set to `True` the command `start` will be run automatically after initialization. It will respect memorized attributes, so `start` will be performed AFTER all memorized attributes have been applied.	boolean	none

AnalogDAQ 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	None.
Stop	DEV_VOID	DEV_VOID	OPERATOR	None.
ImportFile	DEV_STRING	DEV_BOOLEAN	OPERATOR	Imports the file defined by the FileName Attribute
ExportFile	DEV_STRING	DEV_BOOLEAN	OPERATOR	Exports to the file described by the FileName attribute

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 :

Start Definition		
Input Argument	Tango::DEV_VOID	
Output Argument	Tango::DEV_VOID	
DisplayLevel	OPERATOR	..
Inherited	null	..
Abstract	true	..
Polling Period	Not polled	..
Command NOT allowed for	<ul style="list-style-type: none">• UNKNOWN• ON• RUNNING	..

Command Stop :

Stop Definition		
Input Argument	Tango::DEV_VOID	
Output Argument	Tango::DEV_VOID	
DisplayLevel	OPERATOR	..
Inherited	null	..
Abstract	true	..
Polling Period	Not polled	..
Command NOT allowed for	• STANDBY	..

Command ImportFile :

Imports the file defined by the FileName Attribute

ImportFile Definition		
Input Argument	Tango::DEV_STRING	File Name
Output Argument	Tango::DEV_BOOLEAN	Ok
DisplayLevel	OPERATOR	..
Inherited	null	..
Abstract	true	..
Polling Period	Not polled	..
Command NOT allowed for	<ul style="list-style-type: none"> • ON • RUNNING • FAULT 	..

Command ExportFile :

Exports to the file described by the FileName attribute

ExportFile Definition		
Input Argument	Tango::DEV_STRING	File Name
Output Argument	Tango::DEV_BOOLEAN	Ok
DisplayLevel	OPERATOR	..
Inherited	null	..
Abstract	true	..

Polling Period	Not polled	..
Command NOT allowed for	<ul style="list-style-type: none"> • ON • RUNNING • FAULT 	..

AnalogDAQ Class Attributes							
Name	Inherited	Abstract	Attr. type	R/W type	Data type	Level	Description
SampleRate	null	true	Scalar	READ_WRITE	Tango::DEV_LONG	OPERATOR	The sampling frequency used by the device.\n
ChannelSamplesPerTrigger	null	true	Scalar	READ_WRITE	Tango::DEV_LONG	OPERATOR	
NumOfTriggers	null	true	Scalar	READ_WRITE	Tango::DEV_LONG	OPERATOR	
MaxRefSource	null	true	Scalar	READ_WRITE	Tango::DEV_DOUBLE	OPERATOR	Maximum reference source value (rel. to Units Prop.)\n
MinRefSource	null	true	Scalar	READ_WRITE	Tango::DEV_DOUBLE	OPERATOR	Minimum reference source value (rel. to Units Prop.)\n\nThe Bipolar Range, Internal Reference and Reference Source Value can be deprecated, so they are more specific than needed. I think that itâ€™s better to use two values and allow asymmetric reference settings by default.
TriggerSources	null	true	Scalar	READ_WRITE	Tango::DEV_STRING	OPERATOR	An identifier to the available trigger signals used by the device, NULL for internal or software triggering.
TriggerMode	null	true	Scalar	READ_WRITE	Tango::DEV_USHORT	OPERATOR	A table ought to be defined with the possible triggering modes (Start, Start/Stop, Gate, FiniteStarts, etc ...).
BufferPeriod	null	true	Scalar	READ_WRITE	Tango::DEV_DOUBLE	OPERATOR	Just an Interface between BufferSize and its equivalent in time units (depending of SampleRate). BufferSize and BufferPeriod will be the same internal variable that could be readed/modified using different unit (Samples or milliseconds) from two different attributes.
BufferedChannelsList	null	true	Spectrum	READ_WRITE	Tango::DEV_STRING	OPERATOR	Array or Spectrum with the Identifiers of all channels actually used by this device that are sharing the internal Hardware Buffer (it wonâ€™t be equal to the number of channels available). If it is not written itâ€™s understood that all the available channels are used.\n\nThe Size/Length of this Array/Vector provides us the total number of channels used (and the *Values/*DATA Attributes Dimensions). It would be something like:

							[â€œai2â€¢,â€¢ai3â€¢,â€¢ai5â€¢] , each of strings identifying the channels used in the same order.
RawDATA	null	true	Image	READ_WRITE	Tango::DEV_LONG	OPERATOR	Raw Binary values acquired directly from the DAQ conversion. Read/Write permissions will depend of the Analog Input/Output Property implementation. \nThe Dimensions of this attribute will be determined by ChannelSamplesPerTrigger and the BufferedChannelsList Size, so it could be resized â€™on the flyâ€™.
DoubleDATA	null	true	Image	READ_WRITE	Tango::DEV_DOUBLE	OPERATOR	Just an interface to convert each value of the RawDATA image to its equivalent normalized inside the Reference Source Range specified (MaxSourceRef and MinSourceRef Attributes).
FileName	null	true	Scalar	READ_WRITE	Tango::DEV_STRING	OPERATOR	
ScalarValue	null	true	Scalar	READ_WRITE	Tango::DEV_DOUBLE	OPERATOR	
ChannelSpectrum	null	true	Spectrum	READ_WRITE	Tango::DEV_DOUBLE	OPERATOR	

There is no dynamic attribute defined.

Attribute SampleRate :

The sampling frequency used by the device.\n

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ_WRITE
Data Type	Tango::DEV_LONG
Display Level	OPERATOR
Inherited	null
Abstract	true
Polling Period	Not polled
Memorized	true
Write hardware at init.	true
Read NOT allowed for	<ul style="list-style-type: none"> ON RUNNING
Write allowed for	All states

Attribute Properties	
label	SampleRate
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 ChannelSamplesPerTrigger :

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ_WRITE
Data Type	Tango::DEV_LONG
Display Level	OPERATOR
Inherited	null
Abstract	true
Polling Period	Not polled
Memorized	Not set
Read NOT allowed for	<ul style="list-style-type: none">• ON• RUNNING
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 NumOfTriggers :

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ_WRITE
Data Type	Tango::DEV_LONG
Display Level	OPERATOR
Inherited	null
Abstract	true
Polling Period	Not polled
Memorized	Not set
Read NOT allowed for	<ul style="list-style-type: none">• ON• RUNNING
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 MaxRefSource :

Maximum reference source value (rel. to Units Prop.)\n

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ_WRITE
Data Type	Tango::DEV_DOUBLE
Display Level	OPERATOR
Inherited	null
Abstract	true
Polling Period	Not polled
Memorized	true
Write hardware at init.	true
Read NOT allowed for	<ul style="list-style-type: none"> • ON • RUNNING
Write allowed for	All states

Attribute Properties	
label	MaxRefSource
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 MinRefSource :

Minimum reference source value (rel. to Units Prop.)
 The Bipolar Range, Internal Reference and Reference Source Value can be deprecated, so they are more specific than needed. I think that it's better to use two values and allow asymmetric reference settings by default.

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ_WRITE
Data Type	Tango::DEV_DOUBLE
Display Level	OPERATOR
Inherited	null
Abstract	true
Polling Period	Not polled
Memorized	true
Write hardware at init.	true
Read NOT allowed for	<ul style="list-style-type: none"> • ON • RUNNING
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 TriggerSources :

An identifier to the available trigger signals used by the device, NULL for internal or software triggering.

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ_WRITE
Data Type	Tango::DEV_STRING
Display Level	OPERATOR
Inherited	null
Abstract	true
Polling Period	Not polled
Memorized	true
Write hardware at init.	true
Read NOT allowed for	<ul style="list-style-type: none"> • ON • RUNNING
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 TriggerMode :

A table ought to be defined with the possible triggering modes (Start, Start/Stop, Gate, FiniteStarts, etc ...).

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ_WRITE
Data Type	Tango::DEV_USHORT
Display Level	OPERATOR
Inherited	null
Abstract	true
Polling Period	Not polled
Memorized	true
Write hardware at init.	true
Read NOT allowed for	<ul style="list-style-type: none"> • ON • RUNNING
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 BufferPeriod :

Just an Interface between BufferSize and its equivalent in time units (depending of SampleRate). BufferSize and BufferPeriod will be the same internal variable that could be readed/modified using different unit (Samples or milliseconds) from two different attributes.

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ_WRITE
Data Type	Tango::DEV_DOUBLE
Display Level	OPERATOR
Inherited	null
Abstract	true
Polling Period	Not polled
Memorized	true
Write hardware at init.	true
Read NOT allowed for	<ul style="list-style-type: none"> • ON • RUNNING
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 BufferedChannelsList :

Array or Spectrum with the Identifiers of all channels actually used by this device that are sharing the internal Hardware Buffer (it won't be equal to the number of channels available). If it is not written it's understood that all the available channels are used. The Size/Length of this Array/Vector provides us the total number of channels used (and the *Values/ *DATA Attributes Dimensions). It would be something like: [2, 3, 5] , each of strings identifying the channels used in the same order.

Attribute Definition	
Attribute Type	Spectrum (256)
R/W Type	READ_WRITE
Data Type	Tango::DEV_STRING
Display Level	OPERATOR
Inherited	null
Abstract	true
Polling Period	Not polled
Memorized	Not set
Read NOT allowed for	<ul style="list-style-type: none"> • ON • RUNNING
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 RawDATA :

Raw Binary values acquired directly from the DAQ conversion. Read/Write permissions will depend on the Analog Input/Output Property implementation. The Dimensions of this attribute will be determined by ChannelSamplesPerTrigger and the BufferedChannelsList Size, so it could be resized on the fly.

Attribute Definition	
Attribute Type	Image (10000000 x 256)
R/W Type	READ_WRITE
Data Type	Tango::DEV_LONG
Display Level	OPERATOR
Inherited	null
Abstract	true
Polling Period	Not polled
Memorized	Not set
Read NOT allowed for	• RUNNING
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 DoubleDATA :

Just an interface to convert each value of the RawDATA image to its equivalent normalized inside the Reference Source Range specified (MaxSourceRef and MinSourceRef Attributes).

Attribute Definition	
Attribute Type	Image (10000000 x 256)
R/W Type	READ_WRITE
Data Type	Tango::DEV_DOUBLE
Display Level	OPERATOR
Inherited	null
Abstract	true
Polling Period	Not polled
Memorized	Not set
Read NOT allowed for	• RUNNING
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 FileName :

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Attribute Definition	
Attribute Type	Scalar
R/W Type	READ_WRITE
Data Type	Tango::DEV_STRING
Display Level	OPERATOR
Inherited	null
Abstract	true
Polling Period	Not polled
Memorized	true
Write hardware at init.	true
Read NOT allowed for	• RUNNING
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 ScalarValue :

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ_WRITE
Data Type	Tango::DEV_DOUBLE
Display Level	OPERATOR
Inherited	null
Abstract	true
Polling Period	Not polled
Memorized	true
Write hardware at init.	true
Read NOT allowed for	• RUNNING
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 ChannelSpectrum :

Attribute Definition	
Attribute Type	Spectrum (1000000)
R/W Type	READ_WRITE
Data Type	Tango::DEV_DOUBLE
Display Level	OPERATOR

Attribute Properties	
label	
unit	
standard unit	
display unit	

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

Inherited	null
Abstract	true
Polling Period	Not polled
Memorized	Not set
Read NOT allowed for	• RUNNING
Write allowed for	All states

format	
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

AnalogDAQ Class States	
Name	Description
UNKNOWN	Device uncorrectly initialized
STANDBY	Device ready to start
ON	Device started, but not processing data at this moment
RUNNING	Device started and processing data
FAULT	Hardware error