WaveformChassis Project

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Contents

Chapter 1

Hierarchical Index

1.1 Class Hierarchy

This inheritance list is sorted roughly, but not completely, alphabetically:

Chapter 2

Class Index

2.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

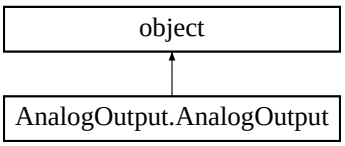
Chapter 3

Class Documentation

3.1 AnalogOutput.AnalogOutput Class Reference

This class will generate analog outputs using pyDAQmx.

Inheritance diagram for AnalogOutput.AnalogOutput:



Public Member Functions

- def __init__

  This function is a constructor for the AnalogOutput class.
- def init

  Initializes the analog outputs based on the object's configuration.
- def getSamplesPerChannel

  This function returns the samples per channel configured in the DAQmx Task.
- def setSamplesPerChannel

  This function sets the samples per channel in the DAQmx Task.
- def getClkSource

  This function returns the sample clock source configured in the DAQmx Task.
- def setClkSource

  This function sets the sample clock source in the DAQmx Task.
- def getStartTriggerSource

  This function return the start trigger source configured in the DAQmx Task.
- def setStartTriggerSource

  This function sets the start trigger source in the DAQmx Task.
- def getNumChannels

  This function returns the number of channels configured in the DAQmx Task.
- def getSampleRate

  This function returns the sample rate configured in the DAQmx Task.
- def setSampleRate

  This funciton sets the sample rate in the DAQmx Task.
- def createTestBuffer

This function returns a 1D numpy array of samples with random voltages.

- def createSineTestBuffer

  This function returns a 1D numpy array of sine waves.
- def writeToBuffer

  This function writes the specified values into the buffer.
- def start

  This function starts the analog output generation.
- def waitUntilDone

  This functions waits for the analog output generation to complete.
- def stop

  This function stops the analog output generation.
- def close

  This function will close connection to the analog ouput device and channels.
- def __del__

  This is the destructor for the AnalogOutput Class.

Public Attributes

- taskRef

  The DAQmx task reference.
- initialized

  This is a boolean that is true when the DAQmx task has been initialized.
- status

  This is the status of the DAQmx task.
- startTriggerSyncCard

  This is the start trigger terminal of the NI-Sync card.
- mode

  This is the mode of operation for the analog outputs.
- triggerType

  The trigger type for the analog outputs.
- loops

  The number of times to iterate over a Finite number of samples.
- estAcqTime

  The estimated time to generate the samples for a Finite generation.

Properties

- samplesPerChannel

  This is the number of samples per channel that will be generated in Finite mode.
- clkSource property(getClkSource, setClkSource, _delClkSource)

  This is the sample clock source terminal.
- startTriggerSource property(getStartTriggerSource, setStartTriggerSource, _delStartTriggerSource)

  This is the start trigger source terminal.
- numChannels property(getNumChannels)

  This is the number of channels configured in the task.
- sampleRate property(getSampleRate, setSampleRate, _delSampleRate)

  This is the sample rate of the analog output.

3.1.1 Detailed Description

This class will generate analog outputs using pyDAQmx.

3.1.2 Constructor & Destructor Documentation

3.1.2.1 def AnalogOutput.AnalogOutput.__init__ (*self*)

This function is a constructor for the AnalogOutput class.

It creates the internal variables required to perform functions within the class. This function does not initialize any hardware.

3.1.2.2 def AnalogOutput.AnalogOutput.__del__ (*self*)

This is the destructor for the AnalogOutput Class.

Parameters

self	The object pointer.

3.1.3 Member Function Documentation

3.1.3.1 def AnalogOutput.AnalogOutput.close (*self*)

This function will close connection to the analog ouput device and channels.

Parameters

self	The object pointer.

3.1.3.2 def AnalogOutput.AnalogOutput.createSineTestBuffer (*self*)

This function returns a 1D numpy array of sine waves.

The returned value is intended to be used to write samples to the buffer with the writeToBuffer() method.

Parameters

self	The object pointer.

3.1.3.3 def AnalogOutput.AnalogOutput.createTestBuffer (*self*, *numChannels* = 0)

This function returns a 1D numpy array of samples with random voltages.

The returned value is intended to be used to write samples to the buffer with the writeToBuffer() method.

Parameters

self	The object pointer.
numChannels	The number of channels to generate. If this parameter is not provided, Then the function will generate the number of channels configured in the analog output task.

3.1.3.4 def AnalogOutput.AnalogOutput.getClkSource (*self*)

This function returns the sample clock source configured in the DAQmx Task.

Parameters

self	The object pointer.

3.1.3.5 def AnalogOutput.AnalogOutput.getNumChannels (*self*)

This function returns the number of channels configured in the DAQmx Task.

Parameters

self	The object pointer.

3.1.3.6 def AnalogOutput.AnalogOutput.getSampleRate (*self*)

This function returns the sample rate configured in the DAQmx Task.

Parameters

self	The object pointer.

3.1.3.7 def AnalogOutput.AnalogOutput.getSamplesPerChannel (*self*)

This function returns the samples per channel configured in the DAQmx Task.

Parameters

self	The object pointer.

3.1.3.8 def AnalogOutput.AnalogOutput.getStartTriggerSource (*self*)

This function return the start trigger source configured in the DAQmx Task.

Parameters

self	The object pointer.

3.1.3.9 def AnalogOutput.AnalogOutput.init (*self, physicalChannel*)

Initializes the analog outputs based on the object's configuration.

Parameters

self	The object pointer.
physicalChannel	A string representing the device and analog output channels. Example Value: "PXI1Slot3/ao0-:7"

3.1.3.10 def AnalogOutput.AnalogOutput.setClkSource (*self, value*)

This function sets the sample clock source in the DAQmx Task.

Parameters

self	The object pointer.
value	The string value for the clock source terminal.

3.1.3.11 def AnalogOutput.AnalogOutput.setSampleRate (*self, value*)

This funciton sets the sample rate in the DAQmx Task.

Parameters

self	The object pointer.
value	The value of the sample rate.

3.1.3.12 def AnalogOutput.AnalogOutput.setSamplesPerChannel (*self, value*)

This function sets the samples per channel in the DAQmx Task.

Parameters

self	The object pointer.
value	The value to set the samples per channel.

3.1.3.13 def AnalogOutput.AnalogOutput.setStartTriggerSource (*self, value*)

This function sets the start trigger source in the DAQmx Task.

Parameters

self	The object pointer.
value	The string vaue of the start trigger source. Example value: "\PXI1Slot3\PFI0"

3.1.3.14 def AnalogOutput.AnalogOutput.start (*self*)

This function starts the analog output generation.

Parameters

self	The object pointer.

3.1.3.15 def AnalogOutput.AnalogOutput.stop (*self*)

This function stops the analog output generation.

Parameters

self	The object pointer.

3.1.3.16 def AnalogOutput.AnalogOutput.waitUntilDone (*self*)

This functions waits for the analog output generation to complete.

Parameters

self	The object pointer.

3.1.3.17 def AnalogOutput.AnalogOutput.writeToBuffer (*self, data*)

This function writes the specified values into the buffer.

Parameters

self	The object pointer.
data	This is a 1D 64-bit floating point numpy array that contians data for each channel. Channels are non-interleaved (channel1 n-samples then channel2 n-samples).

3.1.4 Member Data Documentation

3.1.4.1 AnalogOutput.AnalogOutput.estAcqTime

The estimated time to generate the samples for a Finite generation.

Once the input buffer of the analog input is configured, the amount of time it takes to generate the voltages in the buffer can be estimated. This is a function of the sample rate and the number of samples per channel. (This attribute is for internal use only. This attribute may not return an accurate value.)

3.1.4.2 AnalogOutput.AnalogOutput.initialized

This is a boolean that is true when the DAQmx task has been initialized.

3.1.4.3 AnalogOutput.AnalogOutput.loops

The number of times to iterate over a Finite number of samples.

This value is only useful in the "Finite" mode. It is the number of times that a sequence of voltages will be looped. The default is allways 1.

3.1.4.4 AnalogOutput.AnalogOutput.mode

This is the mode of operation for the analog outputs.

There are currently three modes available. Static mode is where one static voltage is set with no need for a sample clock. Finite mode is where a finite number of voltages will be set at a sample clock rate. Continuous mode is where a sequence of voltages are generated at a sample rate and then repeated until the stop() method is called.

3.1.4.5 AnalogOutput.AnalogOutput.startTriggerSyncCard

This is the start trigger terminal of the NI-Sync card.

Setting this value will make sure that the start trigger will be propogated through the PXI backplane. If there is no sync card needed leave the value default.

3.1.4.6 AnalogOutput.AnalogOutput.status

This is the status of the DAQmx task.

A value greater than 0 means that an error has occurred. When the status is greater than 0 an error should be reported by the class.

3.1.4.7 AnalogOutput.AnalogOutput.taskRef

The DAQmx task reference.

3.1.4.8 AnalogOutput.AnalogOutput.triggerType

The trigger type for the analog outputs.

There are currently two trigger types - "Software" and "Hardware." The "Software" mode means that analog output channels are not syncronized. While "Hardware" means that analog output channels are syncronized to a start trigger. The startTriggerSouce attribute must be configured appropriately.

3.1.5 Property Documentation

3.1.5.1 AnalogOutput.AnalogOutput.clkSource property(getClkSource, setClkSource, _delClkSource) [static]

This is the sample clock source terminal.

It can be set to an internal clock or external clock such as a PFI line i.e. "/PXI1Slot3/PFI15."

3.1.5.2 AnalogOutput.AnalogOutput.numChannels property(getNumChannels) [static]

This is the number of channels configured in the task.

3.1.5.3 AnalogOutput.AnalogOutput.sampleRate property(getSampleRate, setSampleRate, _delSampleRate) [static]

This is the sample rate of the analog output.

3.1.5.4 AnalogOutput.AnalogOutput.samplesPerChannel [static]

Initial value:

```
1 property(getSamplesPerChannel, setSamplesPerChannel,
2             _delSamplesPerChannel)
```

This is the number of samples per channel that will be generated in Finite mode.

3.1.5.5 AnalogOutput.AnalogOutput.startTriggerSource property(getStartTriggerSource, setStartTriggerSource, _delStartTriggerSource) [static]

This is the start trigger source terminal.

The software ignores this value when the triggerType is set to "Software". Otherwise when the triggerType is "-Hardware," this terminal is used to start analog generation. Example Value: "/PXI1Slot3/PFI0"

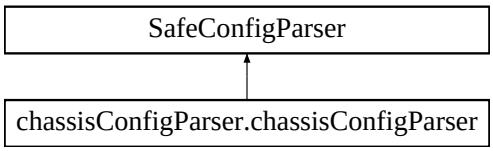
The documentation for this class was generated from the following file:

- AnalogOutput.py

3.2 chassisConfigParser.chassisConfigParser Class Reference

This class can read and write a WaveformChassis configuration file.

Inheritance diagram for chassisConfigParser.chassisConfigParser:



Public Member Functions

- def write

  The function writes and creates a configuration file based on the input parameters.
- def createDefaultFile

  This function will create a default file with default values at the location specified by the filePath parameter.
- def read

  This function will return the information read from the configuration file.
- def **readCntrSection**

Public Attributes

- **aoChannels**
- **doChannels**
- **niSyncDev**
- **edgeCounter**
- **clockCounter**

3.2.1 Detailed Description

This class can read and write a WaveformChassis configuration file.

3.2.2 Member Function Documentation

3.2.2.1 def chassisConfigParser.chassisConfigParser.createDefaultFile (*self, filePath*)

This function will create a default file with default values at the location specified by the filePath parameter.

Parameters

filePath	The location of the file to be created.

3.2.2.2 def chassisConfigParser.chassisConfigParser.read (*self, filePath*)

This function will return the information read from the configuration file.

3.2.2.3 def chassisConfigParser.chassisConfigParser.write (*self, filePath, data, niSyncDev, edgeCounter, clockCounter*)

The function writes and creates a configuration file based on the input parameters.

Parameters

self	The object pointer.
filePath	The location of the file to be created
data	A dictionary containing the analog output and digital output channel names.
niSyncDev	The name of the NI-Sync card.

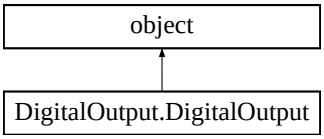
The documentation for this class was generated from the following file:

- chassisConfigParser.py

3.3 DigitalOutput.DigitalOutput Class Reference

This class will generate digital outputs using pyDAQmx.

Inheritance diagram for DigitalOutput.DigitalOutput:



Public Member Functions

- def getSampleRate

  This function returns the sample rate configured in the DAQmx Task.
- def setSampleRate

  This function sets the sample rate in the DAQmx Task.
- def getSamplesPerChannel

  This function returns the samples per channel configured in the DAQmx Task.
- def setSamplesPerChannel

  This function sets the samples per channel in the DAQmx Task.
- def getClkSource

  This function returns the sample clock source configured in the DAQmx Task.
- def setClkSource

  This function sets the sample clock source in the DAQmx Task.
- def __init__

  This function is a constructor for the DigitalOutput class.
- def init

  Initialize the digital outputs based on the object's configuration.
- def createTestBuffer

  This function returns a random 1D numpy array of samples for writing the buffer of digital output channels.
- def getNumLines

  This function returns the number of digital lines configured in the DAQmx Task.
- def getNumChannels

  This function returns the number of digital channels configured in the DAQmx Task.
- def writeToBuffer

  This function writes the specified values into the buffer.
- def **writeStatic**
- def start

  This function starts the digital output generation.

- def waitUntilDone

  This functions waits for the digital output generation to complete.
- def stop

  This function stops the digital output generation.
- def close

  This function will close connection to the digital ouput device and channels.
- def __del__

  This is the destructor for the DigitalOutput Class.

Public Attributes

- status

  This is the status of the DAQmx task.
- taskRef

  The DAQmx task reference.
- initialized

  This is a boolean that is true when the DAQmx task has been initialized.
- mode

  This is the mode of operation for the digital outputs.
- loops

  The number of time to iterate over a Finite number of samples.

Properties

- sampleRate

  This is the sample rate of the digital output.
- samplesPerChannel

  This is the number of samples per channel that will be generated in Finite mode.
- clkSource

  This is the sample clock source terminal.

3.3.1 Detailed Description

This class will generate digital outputs using pyDAQmx.

3.3.2 Constructor & Destructor Documentation

3.3.2.1 def DigitalOutput.DigitalOutput.__init__ (*self*)

This function is a constructor for the DigitalOutput class.

It creates the internal variables required to perform functions within the class. This function does not initialize any hardware.

Parameters

self	This object pointer

3.3.2.2 def DigitalOutput.DigitalOutput.__del__ (*self*)

This is the destructor for the DigitalOutput Class.

Parameters

self	The object pointer.

3.3.3 Member Function Documentation

3.3.3.1 def DigitalOutput.DigitalOutput.close (*self*)

This function will close connection to the digital ouput device and channels.

Parameters

self	The object pointer.

3.3.3.2 def DigitalOutput.DigitalOutput.createTestBuffer (*self*)

This function returns a random 1D numpy array of samples for writing the buffer of digital output channels.

Parameters

self	The objet pointer.

3.3.3.3 def DigitalOutput.DigitalOutput.getClkSource (*self*)

This function returns the sample clock source configured in the DAQmx Task.

Parameters

self	The object pointer.

3.3.3.4 def DigitalOutput.DigitalOutput.getNumChannels (*self*)

This function returns the number of digital channels configured in the DAQmx Task.

Parameters

self	The object pointer.

3.3.3.5 def DigitalOutput.DigitalOutput.getNumLines (*self*)

This function returns the number of digital lines configured in the DAQmx Task.

Parameters

self	The object pointer.

3.3.3.6 def DigitalOutput.DigitalOutput.getSampleRate (*self*)

This function returns the sample rate configured in the DAQmx Task.

Parameters

self	The object pointer.

3.3.3.7 def DigitalOutput.DigitalOutput.getSamplesPerChannel (*self*)

This function returns the samples per channel configured in the DAQmx Task.

Parameters

self	The object pointer.

3.3.3.8 def DigitalOutput.DigitalOutput.init (*self, physicalChannel*)

Initialize the digital outputs based on the object's configuration.

Parameters

self	The object pointer.
physicalChannel	A string representing the device and digital output channels. Example value: "PXI1Slot3/ao0-:7"

3.3.3.9 def DigitalOutput.DigitalOutput.setClkSource (*self, value*)

This function sets the sample clock source in the DAQmx Task.

Parameters

self	The object pointer.
value	The value to set the clock source.

3.3.3.10 def DigitalOutput.DigitalOutput.setSampleRate (*self, value*)

This function sets the sample rate in the DAQmx Task.

Parameters

self	The object pointer.
value	The value to set the sample rate.

3.3.3.11 def DigitalOutput.DigitalOutput.setSamplesPerChannel (*self, value*)

This function sets the samples per channel in the DAQmx Task.

Parameters

self	The object pointer.
value	The value to set the samples per channel.

3.3.3.12 def DigitalOutput.DigitalOutput.start (*self*)

This function starts the digital output generation.

Parameters

self	The object pointer.

3.3.3.13 def DigitalOutput.DigitalOutput.stop (*self*)

This function stops the digital output generation.

Parameters

self	The object pointer.

3.3.3.14 def DigitalOutput.DigitalOutput.waitUntilDone (*self*)

This functions waits for the digital output generation to complete.

Parameters

self	The object pointer.

3.3.3.15 def DigitalOutput.DigitalOutput.writeToBuffer (*self, data*)

This function writes the specified values into the buffer.

Parameters

self	The object pointer.
data	This is a 1D 8-bit unsigned integer array that contians samples for each digital channel. Channels are non-interleaved (channel1 n-samples then channel2 n-samples).

3.3.4 Member Data Documentation

3.3.4.1 DigitalOutput.DigitalOutput.initialized

This is a boolean that is true when the DAQmx task has been initialized.

3.3.4.2 DigitalOutput.DigitalOutput.loops

The number of time to iterate over a Finite number of samples.

This value is only useful in the "Finite" mode. It is the number of times that a sequence of digital samples will be looped. The default is allways 1.

3.3.4.3 DigitalOutput.DigitalOutput.mode

This is the mode of operation for the digital outputs.

There are currently three modes available. Static mode is where one static digital sample is set with no need for a sample clock. Finite mode is where a finite number of digital samples will be set at a sample clock rate. Continuous mode is where a sequence of voltages are generated at a sample rate and then repeated until the stop() method is called.

3.3.4.4 DigitalOutput.DigitalOutput.status

This is the status of the DAQmx task.

A value greater than 0 means that an error has occurred. When the status is greater than 0 an error should be reported by the class.

3.3.4.5 DigitalOutput.DigitalOutput.taskRef

The DAQmx task reference.

3.3.5 Property Documentation

3.3.5.1 DigitalOutput.DigitalOutput.clkSource [static]

Initial value:

```
1 property(getClkSource, setClkSource, _delClkSource,
2     """The clock source for the digital outputsample clock.""")
```

This is the sample clock source terminal.

It can be set to an internal clock or external clock such as a PFI line i.e. "/PXI1Slot3/PFI15."

3.3.5.2 DigitalOutput.DigitalOutput.sampleRate [static]

Initial value:

```
1 property(getSampleRate, setSampleRate, _delSampleRate, doc=
2                             """The sample rate of the digital output.""")
```

This is the sample rate of the digital output.

3.3.5.3 DigitalOutput.DigitalOutput.samplesPerChannel [static]

Initial value:

```
1 property(getSamplesPerChannel, setSamplesPerChannel,
2             _delSamplesPerChannel,
3             """The samples per channel of the digital output.""")
```

This is the number of samples per channel that will be generated in Finite mode.

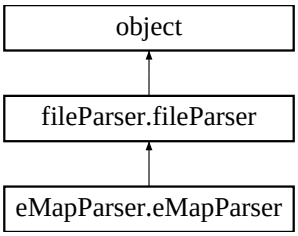
The documentation for this class was generated from the following file:

- DigitalOutput.py

3.4 eMapParser.eMapParser Class Reference

This class will parse the electrode mape file.

Inheritance diagram for eMapParser.eMapParser:



Public Member Functions

- def read

  This function will read all of the data from the eMap file and return a list of electrodes, ao numbers, and dsub numbers.

Additional Inherited Members

3.4.1 Detailed Description

This class will parse the electrode mape file.

3.4.2 Member Function Documentation

3.4.2.1 def eMapParser.eMapParser.read (*self*)

This function will read all of the data from the eMap file and return a list of electrodes, ao numbers, and dsub numbers.

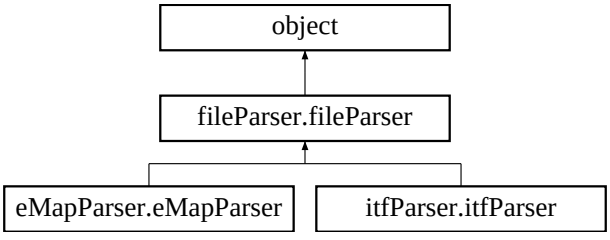
The documentation for this class was generated from the following file:

- eMapParser.py

3.5 fileParser.fileParser Class Reference

This class is the parent class of all file parsers.

Inheritance diagram for fileParser.fileParser:



Public Member Functions

- def __init__

  This funciton is the constructor of the fileParser class.
- def open

  This function opens the file in the filePath argument.
- def getNumLines

This function will return the number of lines within the file.

- def close

  This function will close the file.

Public Attributes

- fileObj

  The file object for the file.

- comments

  The comments within the file as a list.

- meta

  The meta data of the file as a list.

- empty

  A boolean value that is true if the file is empty, and false otherwise.

Properties

- totalLines

  This is the total number of lines of data within the itf file.

3.5.1 Detailed Description

This class is the parent class of all file parsers.

3.5.2 Constructor & Destructor Documentation

3.5.2.1 def fileParser.fileParser.__init__ (*self*, *fileObj* = None, *filePath* = None)

This funciton is the constructor of the fileParser class.

It creates class data and opens the file if the filePath argument is provided.

Parameters

self	The object pointer.
fileObj	The file object that gets returned by the file open() function.
filePath	A string that represents the location of the file.

3.5.3 Member Function Documentation

3.5.3.1 def fileParser.fileParser.close (*self*)

This function will close the file.

Parameters

self	The object pointer.

3.5.3.2 def fileParser.fileParser.getNumLines (*self*)

This function will return the number of lines within the file.

This function is equivalent to reading the totalLines variable within the class.

Parameters

self	The object pointer.

3.5.3.3 def fileParser.fileParser.open (*self, filePath*)

This function opens the file in the filePath argument.

Parameters

self	The object pointer.
filePath	This is the path to the file.

3.5.4 Member Data Documentation

3.5.4.1 fileParser.fileParser.comments

The comments within the file as a list.

3.5.4.2 fileParser.fileParser.empty

A boolean value that is true if the file is empty, and false otherwise.

3.5.4.3 fileParser.fileParser.fileObj

The file object for the file.

3.5.4.4 fileParser.fileParser.meta

The meta data of the file as a list.

The dt variable is often within an itf file. The value of this variable will be a value within meta.

3.5.5 Property Documentation

3.5.5.1 fileParser.fileParser.totalLines [static]

Initial value:

```
1 property(getNumLines,
2                doc = """The total number of lines in the file.""")
```

This is the total number of lines of data within the itf file.

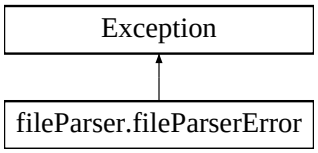
The documentation for this class was generated from the following file:

- fileParser.py

3.6 fileParser.fileParserError Class Reference

This is a class that creates a specific exception for the fileParser class.

Inheritance diagram for fileParser.fileParserError:



Public Member Functions

- def __init__

  This is the constructor for the fileParserError class.
- def __str__

  This function defines how the class operates when a the class is asked to represent itself as a string.

Public Attributes

- msg

  The message to display to the user.

3.6.1 Detailed Description

This is a class that creates a specific exception for the fileParser class.

Havinga a specific exception help when trying to explain to the user why a certain function generated an error.

3.6.2 Constructor & Destructor Documentation

3.6.2.1 def fileParser.fileParserError.__init__ (*self, msg*)

This is the constructor for the fileParserError class.

This function creates the msg class attribute.

Parameters

self	The object pointer.
msg	The message to display to the user.

3.6.3 Member Function Documentation

3.6.3.1 def fileParser.fileParserError.__str__ (*self*)

This function defines how the class operates when a the class is asked to represent itself as a string.

This function just returns the value of the msg class attribute.

3.6.4 Member Data Documentation

3.6.4.1 fileParser.fileParserError.msg

The message to display to the user.

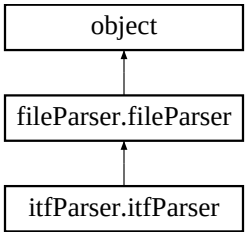
The documentation for this class was generated from the following file:

- fileParser.py

3.7 itfParser.itfParser Class Reference

This class will parse through an itf file.

Inheritance diagram for itfParser.itfParser:



Public Member Functions

- def __init__

  This function is the constructor of the itfParser class.
- def readline

  This function will read a line from the itf file and returns the data as a dictionary.
- def eMapReadLine

  This function reads a line from the itf file and uses an electrode map file to sort the data by the electrode order within the file.
- def readlines

  This function will read the number of lines specified by the numLines argument and return the data as a dictionary.
- def eMapReadLines

  This function reads lines from the itf file and uses an electrode map file to sort the data by the electrode order within the file.
- def read

  This function will read all of the lines within the file and returns the data as a dictionary.
- def eMapRead

  This function reads all lines from the itf file and uses an electrode map file to sort the data by the electrode order within the file.
- def appendline

  This function will append a line of data to the itf file.

Public Attributes

- tableHeader

  This is the names of the columns for the table header of the itf file.
- eMapFilePath

  This is the file patht to the electrode map file.
- comments

  The comments within the file as a list.
- meta

  The meta data of the file as a dictionary.
- empty

  A boolean file that is true if the file is empty, and false otherwise.

Additional Inherited Members

3.7.1 Detailed Description

This class will parse through an itf file.

3.7.2 Constructor & Destructor Documentation

3.7.2.1 def itfParser.itfParser.__init__ (*self*, *fileObj* = None, *filePath* = None)

This function is the constructor of the itfParser class.

It initializes class attributes.

Parameters

self	The object pointer.
fileObj	A file object pointer for a file that has already been opened.
filePath	A path to the itf file that hasn't already been opened.

3.7.3 Member Function Documentation

3.7.3.1 def itfParser.itfParser.appendline (*self*, *data*)

This function will append a line of data to the itf file.

Parameters

self	The object reference.
data	This will take mulitple data types. Supported types are numpy 1D float64, a list, and a dictionary.

3.7.3.2 def itfParser.itfParser.eMapRead (*self*, *eMapFilePath* = None)

This function reads all lines from the itf file and uses an electrode map file to sort the data by the electrode order within the file.

This function returns a numpy float64 array, which is compatible with the array fromat accepted by the WaveformChassis class.

Parameters

self	The object pointer.
eMapFilePath	The file path to the eletrode map.

3.7.3.3 def itfParser.itfParser.eMapReadLine (*self*, *lineNum* = None, *eMapFilePath* = None)

This function reads a line from the itf file and uses an electrode map file to sort the data by the electrode order within the file.

This function returns a numpy float64 array, which is compatible with the array fromat accepted by the WaveformChassis class.

Parameters

self	The object pointer.

lineNum	If this argument is provided then the line number refered to by this argument is returned. Otherwise the next line is returned. (This argument is zero-based. Meaning that passing a value of zero will return the first line in the file.)
eMapFilePath	The file path to the eletrode map.

3.7.3.4 def itfParser.itfParser.eMapReadLines (*self, numLines, eMapFilePath =* `None`)

This function reads lines from the itf file and uses an electrode map file to sort the data by the electrode order within the file.

This function returns a numpy float64 array, which is compatible with the array fromat accepted by the Waveform-Chassis class.

Parameters

self	The object pointer.
numLines	The number of lines to return from the itf file.
eMapFilePath	The file path to the eletrode map.

3.7.3.5 def itfParser.itfParser.read (*self*)

This function will read all of the lines within the file and returns the data as a dictionary.

Parameters

self	The object pointer.

3.7.3.6 def itfParser.itfParser.readline (*self, lineNum =* `None`)

This function will read a line from the itf file and returns the data as a dictionary.

Parameters

self	The object pointer.
lineNum	If this argument is provided then the line number refered to by this argument is returned. Otherwise the next line is returned. (This argument is zero-based. Meaning that passing a value of zero will return the first line in the file.)

3.7.3.7 def itfParser.itfParser.readlines (*self, numLines*)

This function will read the number of lines specified by the numLines argument and return the data as a dictionary.

Parameters

self	The object pointer.
numLines	The number of lines to pull from the file.

3.7.4 Member Data Documentation

3.7.4.1 itfParser.itfParser.comments

The comments within the file as a list.

3.7.4.2 itfParser.itfParser.eMapFilePath

This is the file patht to the electrode map file.

If this variable is populated then this file path will be used when a eMapReadLine() method is called.

3.7.4.3 itfParser.itfParser.empty

A boolean file that is true if the file is empty, and false otherwise.

3.7.4.4 itfParser.itfParser.meta

The meta data of the file as a dictionary.

3.7.4.5 itfParser.itfParser.tableHeader

This is the names of the columns for the table header of the itf file.

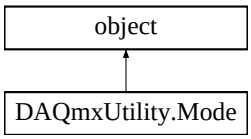
The documentation for this class was generated from the following file:

- itfParser.py

3.8 DAQmxUtility.Mode Class Reference

This class defines the mode variable which is used as an enumerated typedef.

Inheritance diagram for DAQmxUtility.Mode:



Static Public Attributes

- int Finite 0

  The Finite mode is a mode where a finite number of samples are generated.
- int Continuous 1

  The Continuous mode is a mode where a set of samples are continuously repeated.
- int Static 2

  The Static mode is a mode where only one sample is generated.

3.8.1 Detailed Description

This class defines the mode variable which is used as an enumerated typedef.

3.8.2 Member Data Documentation

3.8.2.1 int DAQmxUtility.Mode.Continuous 1 [static]

The Continuous mode is a mode where a set of samples are continuously repeated.

They samples are repeared until the stop() method is called. Default value: 1.

3.8.2.2 int DAQmxUtility.Mode.Finite 0 [static]

The Finite mode is a mode where a finite number of samples are generated.

Default value: 0.

3.8.2.3 int DAQmxUtility.Mode.Static 2 [static]

The Static mode is a mode where only one sample is generated.

Default Value: 2.

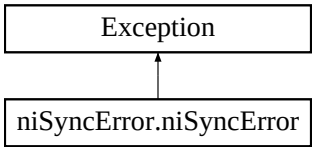
The documentation for this class was generated from the following file:

- DAQmxUtility.py

3.9 niSyncError.niSyncError Class Reference

This is a class to handle errors generated by the niSync python module.

Inheritance diagram for niSyncError.niSyncError:



Public Member Functions

- def __init__
  This is the constructor of the niSyncError class.
- def __str__
  This function returns a string containing the code and message describing the error that occurred.

Public Attributes

- code
  This is the status code returned by the NI-Sync drivers.
- msg
  This is the message returned by the NI-Sync drivers.

3.9.1 Detailed Description

This is a class to handle errors generated by the niSync python module.

3.9.2 Constructor & Destructor Documentation

3.9.2.1 def niSyncError.niSyncError.__init__ (*self, code, msg*)

This is the constructor of the niSyncError class.

3.9.3 Member Function Documentation

3.9.3.1 def niSyncError.niSyncError.__str__ (*self*)

This function returns a string containing the code and message describing the error that occurred.

This strig will be displayed to the stderr output when a NI-Sync error occurs.

3.9.4 Member Data Documentation

3.9.4.1 niSyncError.niSyncError.code

This is the status code returned by the NI-Sync drivers.

The code value is useful, because error codes can be searched on the National Instruments website (www.ni.com).

3.9.4.2 niSyncError.niSyncError.msg

This is the message returned by the NI-Sync drivers.

The message give a more detailed explanation as to why an error occurred.

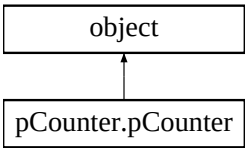
The documentation for this class was generated from the following file:

- niSyncError.py

3.10 pCounter.pCounter Class Reference

This class will count edges of a ditial signal at a sample clock rate specified, and has capability of being triggered to start.

Inheritance diagram for pCounter.pCounter:



Public Member Functions

- def __init__

  This function is the constructor for the pCounter class.
- def init

  This function initializes the pCounter class and opens a reference to the DAQmx device(s).
- def initFromFile

  This function initializes the pCounter class using the chassis config file and opens a reference to the DAQmx device(s).
- def start

  This function starts the measurement.
- def stop

  This function stops the measurement.
- def read

  This function returns an array of the edge counts with an array size equal to the number of samples.

- def measure

  This function performs the start(), read(), and stop() methods in one function call.

- def close

  This function closes the refences to the DAQmx devices.

- def __del__

  This function is the destructor for the pCounter class.

Public Attributes

- edgeCounter

  The string that identifies the DAQmx device and counter for the counter that is used to count edges.

- clockCounter

  The string that identifies the DAQmx device and counter for the counter that is used to create the sample clock.

- enableStartTrigger

  A boolean that enables the start trigger.

- edgeCntrTerm

  A string that identifies the DAQmx digital line that will be used as an input to the edge counter.

- triggerSource

  A string that identifies the DAQmx digital line that will be used as the start trigger.

- clockSourceTerm

  A string that identifies the DAQmx digital line that will output the sample clock.

- edgeCntrTask

  The task reference for the edge counter.

- clockCntrTask

  The task reference for the sample clock counter.

- timeout

  This is the time to wait for a start trigger.

Properties

- samples property(_getSamples, _setSamples)

  This is the number of samples to take.

- sampleRate property(_getSampleRate, _setSampleRate)

  This is the sample rate to use when counting edges.

- binTime property(_getBinTime, _setBinTime)

  This is the time in millisenconds to take a single sample.

- acqTime property(_getAcqTime, _setAcqTime)

  This is the time in milliseconds for a full acquisition period.

3.10.1 Detailed Description

This class will count edges of a ditial signal at a sample clock rate specified, and has capability of being triggered to start.

3.10.2 Constructor & Destructor Documentation

3.10.2.1 def pCounter.pCounter.__init__ (*self*)

This function is the constructor for the pCounter class.

It creates internal variables required to perform functions within the class. This function does not initialize any hardware.

Parameters

self	The object pointer.

3.10.2.2 def pCounter.pCounter.__del__ (*self*)

This function is the destructor for the pCounter class.

It deletes internal variables and closes the references to the DAQmx devices if they are not already closed.

Parameters

self	The object pointer.

3.10.3 Member Function Documentation

3.10.3.1 def pCounter.pCounter.close (*self*)

This function closes the refences to the DAQmx devices.

Parameters

self	The object pointer.

3.10.3.2 def pCounter.pCounter.init (*self*, *clockCounter* = None, *edgeCounter* = None, *acqTime* = None, *binTime* = None, *samples* = None, *sampleRate* = None)

This function initializes the pCounter class and opens a reference to the DAQmx device(s).

Parameters

self	The object pointer.
clockCounter	The string that identifies the DAQmx device and counter for the counter that is used to create the sample clock.
edgeCounter	The string that identifies the DAQmx device and counter for the counter that is used to count edges.
acqTime	This is the time in milliseconds for a full acquisition period.
binTime	This is the time in millisenconds to take a single sample.

3.10.3.3 def pCounter.pCounter.initFromFile (*self*, *filepath*)

This function initializes the pCounter class using the chassis config file and opens a reference to the DAQmx device(s).

Parameters

self	The object reference.
filepath	The path to the chassis config file.

3.10.3.4 def pCounter.pCounter.measure (*self*)

This function performs the start(), read(), and stop() methods in one function call.

This is useful for when the results of the read() method can be retrieved immediately after a start()

Parameters

self	The object pointer.

3.10.3.5 def pCounter.pCounter.read (*self*)

This function returns an array of the edge counts with an array size equal to the number of samples.

Parameters

self	The object pointer.

3.10.3.6 def pCounter.pCounter.start (*self*)

This function starts the measurement.

If the start trigger is enabled, then a the pCounter waits for that digital trigger. Otherwise the measurement takes place immediately.

Parameters

self	The object pointer.

3.10.3.7 def pCounter.pCounter.stop (*self*)

This function stops the measurement.

It needs to be called everytime the start() method is called.

Parameters

self	The object pointer.

3.10.4 Member Data Documentation

3.10.4.1 pCounter.pCounter.clockCntrTask

The task reference for the sample clock counter.

3.10.4.2 pCounter.pCounter.clockCounter

The string that identifies the DAQmx device and counter for the counter that is used to create the sample clock.

Example: /PXI1Slot5/ctr0

3.10.4.3 pCounter.pCounter.clockSourceTerm

A string that identifies the DAQmx digital line that will output the sample clock.

Default: PFI12

3.10.4.4 pCounter.pCounter.edgeCntrTask

The task reference for the edge counter.

3.10.4.5 pCounter.pCounter.edgeCntrTerm

A string that identifies the DAQmx digital line that will be used as an input to the edge counter.

Default: PFI0

3.10.4.6 pCounter.pCounter.edgeCounter

The string that identifies the DAQmx device and counter for the counter that is used to count edges.

Example: PXISlot5/ctr0

3.10.4.7 pCounter.pCounter.enableStartTrigger

A boolean that enables the start trigger.

The default is false, which disables the start trigger. The measurement will immediately start when the start() method is called. A true value will make the measurement start when a digital trigger is received on the line specified by the triggerSource variable.

3.10.4.8 pCounter.pCounter.timeout

This is the time to wait for a start trigger.

If the timeout passes, then an error is generated. Ignore this variable if the start trigger is disabled.

3.10.4.9 pCounter.pCounter.triggerSource

A string that identifies the DAQmx digital line that will be used as the start trigger.

Default: PFI1

3.10.5 Property Documentation

3.10.5.1 pCounter.pCounter.acqTime property(_getAcqTime, _setAcqTime) [static]

This is the time in milliseconds for a full acquisition period.

3.10.5.2 pCounter.pCounter.binTime property(_getBinTime, _setBinTime) [static]

This is the time in millisenconds to take a single sample.

3.10.5.3 pCounter.pCounter.sampleRate property(_getSampleRate, _setSampleRate) [static]

This is the sample rate to use when counting edges.

3.10.5.4 pCounter.pCounter.samples property(_getSamples, _setSamples) [static]

This is the number of samples to take.

It is the size of the data array returned by the read() method.

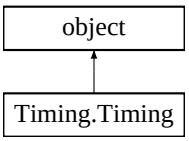
The documentation for this class was generated from the following file:

- pCounter.py

3.11 Timing.Timing Class Reference

This class will generate perform the timing and synchronization required to synchronize all cards on the PXI backplane.

Inheritance diagram for Timing.Timing:



Public Member Functions

- def __init__

  This function is a constructor for the Timing class.
- def init

  This function connects to the niSync device and starts to setup clock and trigger connections.
- def sendSoftwareTrigger

  This function will send a trigger to all devices when it is called.
- def close

  This function will close the connection to the niSync device.
- def __del__

  This is the destructor for the Timing class.

Public Attributes

- session

  This is the reference to the NI-Sync session.
- resourceName

  This the name of the NI-Sync resource that refers to the synchronization PXI card.
- status

  This is the status of the NI-Sync session.
- initialized

  This is a boolean that is true when the NI-Sync session has been initialized.
- sampleRate

  This is the sample rate of the sample clock that gets distributed to all of the cards on a PXI Chassis.

- divisor

  The dds is used to generate the sample clock.
- ddsFreq

  This is the DDS frequency that is calculated from the sample rate and the divisor.
- pxiStarSlots

  This is the number of pxi star slots available on the chassis.

3.11.1 Detailed Description

This class will generate perform the timing and synchronization required to synchronize all cards on the PXI backplane.

3.11.2 Constructor & Destructor Documentation

3.11.2.1 def Timing.Timing.__init__ (*self*)

This function is a constructor for the Timing class.

Parameters

self	The object pointer.

3.11.2.2 def Timing.Timing.__del__ (*self*)

This is the destructor for the Timing class.

Parameters

self	The object pointer.

3.11.3 Member Function Documentation

3.11.3.1 def Timing.Timing.close (*self*)

This function will close the connection to the niSync device.

Parameters

self	The object pointer.

3.11.3.2 def Timing.Timing.init (*self, deviceName*)

This function connects to the niSync device and starts to setup clock and trigger connections.

Parameters

self	The object pointer.
deviceName	The name of the niSync device. This name can be found in Measurement and Automation Explorer. Example value: "PXI1Slot14"

3.11.3.3 def Timing.Timing.sendSoftwareTrigger (*self*)

This function will send a trigger to all devices when it is called.

Parameters

self	The object pointer.

3.11.4 Member Data Documentation

3.11.4.1 Timing.Timing.ddsFreq

This is the DDS frequency that is calculated from the sample rate and the divisor.

The DDS frequency is the sample rate divided by the divisor.

3.11.4.2 Timing.Timing.divisor

The dds is used to generate the sample clock.

The lower the value of the divisor the more inaccurate the sample clock. This value is defualted to its maximum of 32.

3.11.4.3 Timing.Timing.initialized

This is a boolean that is true when the NI-Sync session has been initialized.

3.11.4.4 Timing.Timing.pxiStarSlots

This is the number of pxi star slots available on the chassis.

In order for the sample clock to be distributed to all cards, this value must be equal to or larger than the number of potential cards on the Chassis.

3.11.4.5 Timing.Timing.resourceName

This the name of the NI-Sync resource that refers to the synchronization PXI card.

3.11.4.6 Timing.Timing.sampleRate

This is the sample rate of the sample clock that gets distributed to all of the cards on a PXI Chassis.

3.11.4.7 Timing.Timing.session

This is the reference to the NI-Sync session.

3.11.4.8 Timing.Timing.status

This is the status of the NI-Sync session.

A value greater than 0 means that an error has occurred. When the status is greater than 0 an error should be reported by the class.

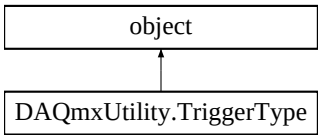
The documentation for this class was generated from the following file:

- Timing.py

3.12 DAQmxUtility.TriggerType Class Reference

This class defines the trigger type variable which is used as an enumerated typedef.

Inheritance diagram for DAQmxUtility.TriggerType:



Static Public Attributes

- int Software 0

  The Software trigger type is used when a single software command starts the signal generation.
- int Hardware 1

  The Hardware trigger types is used when a start trigger is utilized to start the signal generation.

3.12.1 Detailed Description

This class defines the trigger type variable which is used as an enumerated typedef.

3.12.2 Member Data Documentation

3.12.2.1 int DAQmxUtility.TriggerType.Hardware 1 [static]

The Hardware trigger types is used when a start trigger is utilized to start the signal generation.

A software command may still be used to start the generation. However, that command will set the generator to wait for a trigger such that all signal are synchronized. Defualt value: 1

3.12.2.2 int DAQmxUtility.TriggerType.Software 0 [static]

The Software trigger type is used when a single software command starts the signal generation.

Default value: 0.

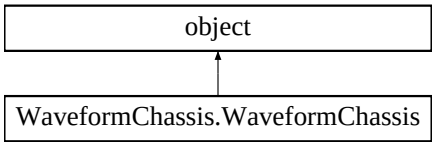
The documentation for this class was generated from the following file:

- DAQmxUtility.py

3.13 WaveformChassis.WaveformChassis Class Reference

This class contains a list of WaveformGenerator objects and a Timing object.

Inheritance diagram for WaveformChassis.WaveformChassis:



Public Member Functions

- def __init__

  This function is a constructor for the WaveformChassis class.
- def init

  Initializes the waveform chassis based on the object's configuration.
- def initFromFile

  This function will initialize the waveform chassis based on the configuration file specified by the filePath parameter.
- def getNumAoChannels

  This function returns the total number of AO channels configured.
- def getNumDoChannels

  This function returns the total number of AO channels configured.
- def createAoSineBuffer

  This function returns a 1D numpy array of sine waves - one for each channel configured by the init function.
- def createDoTestBuffer

  This function returns a 1d array of random U8s for writing to the buffer of digital output channels.
- def writeAoBuffer

  This function will write data into the buffer of the analog outputs that are a part of the WaveformChassis class.
- def writeDoBuffer

  This function will write data into the buffer of the digital outputs that are a part of the WaveformChassis.
- def start

  This function starts the analog and digital output generation.
- def waitUntilDone

  This functions waits for the analog and digital output generation to complete.
- def stop

  This function stops the analog and digital output generation.
- def writeStartStop

  This function will perform the write, start, waitUntilDone, and stop functions wrapped in one funciton.
- def close

  This function will close connection to the WaveformChassis.

Public Attributes

- timing

  This is a Timing object created using the Timing class.
- useTiming

  This is a boolean value that will be true if the WaveformChassis is configured to use Timing.
- gens

  This is a list of WaveformGenerator objects created using the WaveformGenerator class.
- sampleRate

  This is the sample rate of all the Analog and Digital outputs.
- samplesPerChannel

  This is the number of channels configured for the WaveformChassis.
- mode

This is the mode of operation for all generators.

- loops

  The number of times to iterate over a Finite number of samples.

- triggerType

  The trigger type for the analog outputs.

- clkSource

  This is the sample clock source terminal for every WaveformGenerator configured in the WaveformChassis.

- startTriggerSource

  This is the start trigger source terminal for every WaveformGenerator configured in the WaveformChassis.

3.13.1 Detailed Description

This class contains a list of WaveformGenerator objects and a Timing object.

It is intended to represent a chasis with a NiSync Card and a number of PXI-6733s.

3.13.2 Constructor & Destructor Documentation

3.13.2.1 def WaveformChassis.WaveformChassis.__init__ (*self*)

This function is a constructor for the WaveformChassis class.

It creates the internal variables required to perform functions within the class. This function does not initialize any hardware.

3.13.3 Member Function Documentation

3.13.3.1 def WaveformChassis.WaveformChassis.close (*self*)

This function will close connection to the WaveformChassis.

Parameters

self	The object pointer.

3.13.3.2 def WaveformChassis.WaveformChassis.createAoSineBuffer (*self*)

This function returns a 1D numpy array of sine waves - one for each channel configured by the init function.

Parameters

self	The object pointer.

3.13.3.3 def WaveformChassis.WaveformChassis.createDoTestBuffer (*self*)

This function returns a 1d array of random U8s for writing to the buffer of digital output channels.

Parameters

self	The object pointer.

3.13.3.4 def WaveformChassis.WaveformChassis.getNumAoChannels (*self*)

This function returns the total number of AO channels configured.

Parameters

self	The object pointer.

3.13.3.5 def WaveformChassis.WaveformChassis.getNumDoChannels (*self*)

This function returns the total number of AO channels configured.

Parameters

self	The object pointer.

3.13.3.6 def WaveformChassis.WaveformChassis.init (*self, aoDevsAndChnls, doDevsAndChnls =* `None`*, syncDevice =* `None`)

Initializes the waveform chassis based on the object's configuration.

Parameters

self	The object pointer.
aoDevsAnd-Chnls	This is a list of strings representing the devices and analog output channels.
doDevsAnd-Chnls	This is a list of strings representing the divices and digital output channels.
syncDevice	This is the device name for the NI Sync card.

3.13.3.7 def WaveformChassis.WaveformChassis.initFromFile (*self, filePath*)

This function will initialize the waveform chassis based on the configuration file specified by the filePath parameter.

Parameters

self	The object pointer
filePath	The file path to the configuration file.

3.13.3.8 def WaveformChassis.WaveformChassis.start (*self*)

This function starts the analog and digital output generation.

Parameters

self	The object pointer.

3.13.3.9 def WaveformChassis.WaveformChassis.stop (*self*)

This function stops the analog and digital output generation.

Parameters

self	The object pointer.

3.13.3.10 def WaveformChassis.WaveformChassis.waitUntilDone (*self*)

This functions waits for the analog and digital output generation to complete.

Parameters

self	The object pointer.

3.13.3.11 def WaveformChassis.WaveformChassis.writeAoBuffer (*self, data*)

This function will write data into the buffer of the analog outputs that are a part of the WaveformChassis class.

Parameters

self	The object pointer
data	This is a 1D 8-bit unsigned integer array that contians data for each digital channel. Channels are non-interleaved (channel1 n-samples then channel2 n-samples).

3.13.3.12 def WaveformChassis.WaveformChassis.writeDoBuffer (*self, data*)

This function will write data into the buffer of the digital outputs that are a part of the WaveformChassis.

Parameters

self	The object pointer.
data	This is a 1D 8-bit unsigned integer array that contians data for each digital channel. Channels are non-interleaved (channel1 n-samples then channel2 n-samples).

3.13.3.13 def WaveformChassis.WaveformChassis.writeStartStop (*self, aoData, doData* = `None`)

This function will perform the write, start, waitUntilDone, and stop functions wrapped in one funciton.

This funciton is no complete and may not exist in a later release!!!

Parameters

self	The object pointer.

3.13.4 Member Data Documentation

3.13.4.1 WaveformChassis.WaveformChassis.clkSource

This is the sample clock source terminal for every WaveformGenerator configured in the WaveformChassis.

It is defaulted to "PXI_Star."

3.13.4.2 WaveformChassis.WaveformChassis.gens

This is a list of WaveformGenerator objects created using the WaveformGenerator class.

It is a list of PXI6733 cards configured for the WaveformChassis.

3.13.4.3 WaveformChassis.WaveformChassis.loops

The number of times to iterate over a Finite number of samples.

This value is only useful in the "Finite" mode. It is the number of times that a sequence of voltages will be looped. The default is allways 1.

3.13.4.4 WaveformChassis.WaveformChassis.mode

This is the mode of operation for all generators.

There are currently three modes available. Static mode is where one static voltage is set with no need for a sample clock. Finite mode is where a finite number of voltages will be set at a sample clock rate. Continuous mode is where a sequence of voltages are generated at a sample rate and then repeated until the stop() method is called.

3.13.4.5 WaveformChassis.WaveformChassis.sampleRate

This is the sample rate of all the Analog and Digital outputs.

The sample rate must be the same for all devices configured in the WaveformChassis.

3.13.4.6 WaveformChassis.WaveformChassis.samplesPerChannel

This is the number of channels configured for the WaveformChassis.

The samples per channel must be the same for all devices configured in the WaveformChassis.

3.13.4.7 WaveformChassis.WaveformChassis.startTriggerSource

This is the start trigger source terminal for every WaveformGenerator configured in the WaveformChassis.

It is defaulted to "PXI_Trig1"

3.13.4.8 WaveformChassis.WaveformChassis.timing

This is a Timing object created using the Timing class.

It is used to synchronize all of the PXI cards.

3.13.4.9 WaveformChassis.WaveformChassis.triggerType

The trigger type for the analog outputs.

There are currently two trigger types - "Software" and "Hardware." The "Software" mode means that analog output channels are not syncronized. While "Hardware" means that analog output channels are syncronized to a start trigger. The startTriggerSouce attribute must be configured appropriately.

3.13.4.10 WaveformChassis.WaveformChassis.useTiming

This is a boolean value that will be true if the WaveformChassis is configured to use Timing.

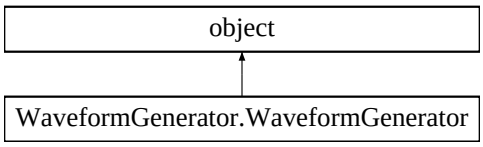
The documentation for this class was generated from the following file:

- WaveformChassis.py

3.14 WaveformGenerator.WaveformGenerator Class Reference

This class contains an AnalogOutput and DigitalOutput object.

Inheritance diagram for WaveformGenerator.WaveformGenerator:



Public Member Functions

- def __init__

  This function is a constructor for the WaveformGenerator class.
- def init

  Initialize the analog and digital outputs based on the object's configuration.
- def writeAoBuffer

  This function writes the specified values into the buffer.
- def writeDoBuffer

  This function writes the specified values into the buffer.
- def start

  This function starts the analog and digital output generation.
- def waitUntilDone

  This functions waits for the analog and digital output generation to complete.
- def stop

  This function stops the analog and digital output generation.
- def **writeStartStop**
- def close

  This function will close connection to the analog and digital ouput device and channels.

Public Attributes

- ao

  This is an AnalogOutput object created using the AnalogOutput class.
- do

  This is a DigitalOutput object created using the DigitaOutput class.
- sampleRate

  This is the sample rate of the waveform generator.
- samplesPerChannel

  This is the number of channels configured in the waveform generator.
- clkSource

  This is the sample clock source terminal.
- startTriggerSource

  This is the start trigger source terminal.
- mode

  There are currently three modes available.
- loops

  This value is only useful in the "Finite" mode.
- triggerType

There are currently two trigger types - "Software" and "Hardware." The "Software" mode means that analog output channels are not syncronized.

- useAo

  This is a boolean value that will be true if the WaveformGenerator is configured to utilize analog outputs.

- useDo

  This is a boolean value that will be true if the WaveformGenerator is configured to utilize digital outputs.

3.14.1 Detailed Description

This class contains an AnalogOutput and DigitalOutput object.

It is intended to represent a single PXI-6733 in software.

3.14.2 Constructor & Destructor Documentation

3.14.2.1 def WaveformGenerator.WaveformGenerator.__init__ (*self*)

This function is a constructor for the WaveformGenerator class.

It creates the internal variables required to perform functions within the class. This function does not initialize any hardware.

3.14.3 Member Function Documentation

3.14.3.1 def WaveformGenerator.WaveformGenerator.close (*self*)

This function will close connection to the analog and digital ouput device and channels.

3.14.3.2 def WaveformGenerator.WaveformGenerator.init (*self, aoChannels, doChannels = ''*)

Initialize the analog and digital outputs based on the object's configuration.

Parameters

self	The object pointer.
aoChannels	This is a string representing the device and analog output channels. Example value: "PXI1-Slot3/ao0:7"
doChannels	This is a string representing the device and digital output channels. Example value: "PXI1-Slot3/port0/line0:7"

3.14.3.3 def WaveformGenerator.WaveformGenerator.start (*self*)

This function starts the analog and digital output generation.

Parameters

self	The object pointer.

3.14.3.4 def WaveformGenerator.WaveformGenerator.stop (*self*)

This function stops the analog and digital output generation.

Parameters

self	The object pointer.

3.14.3.5 def WaveformGenerator.WaveformGenerator.waitUntilDone (*self*)

This functions waits for the analog and digital output generation to complete.

3.14.3.6 def WaveformGenerator.WaveformGenerator.writeAoBuffer (*self, data*)

This function writes the specified values into the buffer.

Parameters

self	The object pointer.
data	This is a 1D 64-bit float numpy array that contians data for each analog output. Channels are non-interleaved (channel1 n-samples then channel2 n-samples).

3.14.3.7 def WaveformGenerator.WaveformGenerator.writeDoBuffer (*self, data*)

This function writes the specified values into the buffer.

Parameters

self	The object pointer.
data	This is a 1D 8-bit unsigned integer array that contians data for each digital line. Lines are non-interleaved (line1 n-samples then line2 n-samples).

3.14.4 Member Data Documentation

3.14.4.1 WaveformGenerator.WaveformGenerator.ao

This is an AnalogOutput object created using the AnalogOutput class.

3.14.4.2 WaveformGenerator.WaveformGenerator.clkSource

This is the sample clock source terminal.

It can be set to an internal clock or external clock such as a PFI line i.e. "/PXI1Slot3/PFI15."

3.14.4.3 WaveformGenerator.WaveformGenerator.do

This is a DigitalOutput object created using the DigitaOutput class.

3.14.4.4 WaveformGenerator.WaveformGenerator.loops

This value is only useful in the "Finite" mode.

It is the number of times that a sequence of voltages will be looped. The default is allways 1.

3.14.4.5 WaveformGenerator.WaveformGenerator.mode

There are currently three modes available.

Static mode is where one static voltage is set with no need for a sample clock. Finite mode is where a finite number of voltages will be set at a sample clock rate. Continuous mode is where a sequence of voltages are generated at a sample rate and then repeated until the stop() method is called.

3.14.4.6 WaveformGenerator.WaveformGenerator.sampleRate

This is the sample rate of the waveform generator.

3.14.4.7 WaveformGenerator.WaveformGenerator.samplesPerChannel

This is the number of channels configured in the waveform generator.

3.14.4.8 WaveformGenerator.WaveformGenerator.startTriggerSource

This is the start trigger source terminal.

The software ignores this value when the triggerType is set to "Software". Otherwise when the triggerType is "-Hardware," this terminal is used to start analog generation. Example Value: "/PXI1Slot3/PFI0"

3.14.4.9 WaveformGenerator.WaveformGenerator.triggerType

There are currently two trigger types - "Software" and "Hardware." The "Software" mode means that analog output channels are not syncronized.

While "Hardware" means that analog output channels are syncronized to a start trigger. The startTriggerSouce attribute must be configured appropriately.

3.14.4.10 WaveformGenerator.WaveformGenerator.useAo

This is a boolean value that will be true if the WaveformGenerator is configured to utilize analog outputs.

3.14.4.11 WaveformGenerator.WaveformGenerator.useDo

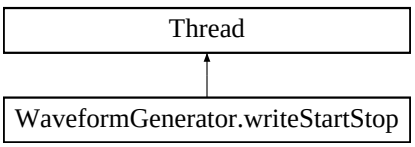
This is a boolean value that will be true if the WaveformGenerator is configured to utilize digital outputs.

The documentation for this class was generated from the following file:

- WaveformGenerator.py

3.15 WaveformGenerator.writeStartStop Class Reference

Inheritance diagram for WaveformGenerator.writeStartStop:



Public Member Functions

- def **__init__**
- def **run**

Public Attributes

- **wfrmGen**
- **aoBuffer**
- **doBuffer**

The documentation for this class was generated from the following file:

- WaveformGenerator.py

Index