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# **Reimagined Quantum Documentation**

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## DOCUMENTATION

## ReimaginedQuantum library

Created on Mon Apr 10 11:19:25 2017

@author: juan

**class** reimaginedQuantum.**Channel** (*name, port*)

Constants

**END\_COMMUNICATION = 4**

End of message

**READ\_VALUE = 14**

Reading operation signal

**START\_COMMUNICATION = 2**

Begin message signal

**WRITE\_VALUE = 15**

Writing operation signal

**construct\_message** (*read=False*)

Constructs a message with project requirements.

**Returns:** list: list of bytes containing channel info.

**exchange\_values** (*read=True*)

Exchanges values from computer to utility.

**Returns:** can return None, or a list containing a *hex\_list*

**read\_value** (*hex\_list*)

Reads a *hex\_list* and updates class attributes values.

**set\_value** (*value*)

Writes and incoming int value to class attributes.

**split\_value** ()

Updates the most/least significant byte.

**verify\_values** (*hex\_list*)

Verifies if current values have changed.

**Returns:** bool: The return value. True if values are the same, False otherwise.

**class** reimaginedQuantum.**CommunicationPort** (*device, baudrate=115200, timeout=0.02, bounce\_timeout=20*)

Constants

**BAUDRATE = 115200**

Default baudrate for the serial port communication

**BOUNCE\_TIMEOUT = 20**

Number of times a specific transmission is tried

**BYTE\_SIZE = 8**

One byte = 8 bits

**PARITY = 'N'**

Message will not have any parity

**STOP\_BITS = 1**

Message contains only one stop bit

**TIMEOUT = 0.02**

Maximum time without answer from the serial port

**begin\_serial ()**

Initializes pyserial instance.

**Returns:** pyserial.serial object

**Raises:** PermissionError: user is not allowed to use port. SerialException: if it could not open port

**checksum (hex\_list)**

Implements a simple checksum to verify message integrity.

**Returns:** bool: The return value. True for success, False otherwise.

**message (content, wait\_for\_answer=False)**

Sends a message, and waits for answer.

**Returns:**

**list: each position on list is made up with a tuple containing** channel and value in hexadecimal base.

**Raises:** Exception: any type occurred with during *bounce\_timeout*.

**read ()**

Reads a message through the serial port.

**Returns:** list: hexadecimal values decoded as strings.

**Raises:** Exception: Noisy answer, or timeout.

**receive ()**

Organizes information according to project requirements.

**Returns:**

**list: each position on list is made up with a tuple containing** channel and value in hexadecimal base.

**Raises:** Exception: if wrong checksum.

**send (content)**

Sends a message through the serial port.

**Raises:** PySerialExceptions

**class** reimaginedQuantum.**DataChannel** (*prefix, port*)

Constants

```

class reimagedQuantum.Detector (identifier, port, data_interval=100, timer_check_interval=1000)
    Constants

    BASE_DELAY = 1e-09
        Default channel delay time (seconds)

    BASE_SLEEP = 1e-09
        Default channel sleep time (seconds)

class reimagedQuantum.Experiment (port, number_detectors=2)
    Constants

    BASE_COINWIN = 1e-09
        Default coincidence window (seconds)

    BASE_SAMPLING = 0.001
        Default sampling time (seconds)

class reimagedQuantum.TimerChannel (prefix, port, base)
    Constants

```

## Graphical User Interface

Created on Tue Apr 11 11:31:32 2017

@author: juan

```

class mainGUI.AutoSizeLabel (text, value)
    from reclosedev at http://stackoverflow.com/questions/8796380/automatically-resizing-label-text-in-qt-strange-behaviour
    and Jean-Sébastien http://stackoverflow.com/questions/29852498/syncing-label-fontsize-with-layout-in-pyqt

class mainGUI.Main
    Defines the mainwindow.

    Constants

    channelsCaller ()
        creates a property window to define number of channels

    choose_file ()
        user interaction with saving file

    eventFilter (source, event)
        Creates event to handle serial combobox opening.

    file_changed = None
        set

    format = None
        fig

    select_serial (index)
        Selects port at index position of combobox.

    serial_refresh ()
        Loads serial port described at user combobox.

    widget_activate (status)
        most of the tools will be disabled if there is no UART detected

```

**class** `mainGUI.RingBuffer` (*rows, columns, output\_file, fmt, delimiter='t'*)

Based on <https://scimusing.wordpress.com/2013/10/25/ring-buffers-in-pythonnumpy/>

**extend** (*x*)

adds array *x* to ring buffer

**get** ()

Returns the first-in-first-out data in the ring buffer

**save** ()

Saves the buffer

`mainGUI.heavy_import` ()

Imports matplotlib and NumPy.

Useful to be combined with threading processes.

**class** `mainGUI.propertiesWindow` (*parent=None*)

Defines the channel configuration dialog.

**DEFAULT\_CHANNELS** = 2

Default number of channels

**creator** (*n*)

creates the spinboxes and labels required by the user

**delete** (*n, N*)

deletes unnecessary rows of labels and spinboxes

**reset** ()

sets everything to default

**update** ()

sends message with the updated information

`mainGUI.savetxt` (*file, matrix, delimiter=',', fmt='%.3f', typ=<class 'float'>*)

Saves data to a text file.

Used to save matrix contents to plain text files. Depending whether or not matrix contains strings or floats uses `np.savetxt` function.



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