Quick Guide

elements
enabling technologies for Life Science

10MHz controller - Online analyses

Revision History

Date	Version	Description
29/03/2022	1.0	First version of document

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Analyses overview

The 10MHz controller is capable of performing real time analyses while the data is being acquired.

In particular 10MHz controller offers these predefined online analyses:

- Noise report;
- I/V graph.

New analyses requests

It is possible to suggest new analyses to be added in the next software releases.

To do so write to support@elements-ic.com and provide:

- A brief explanation of the analysis;
- A minimum set of specifications (e.g., parameters settable by the user, useful noise reductions or spurious data rejection, etc.);
- A sample recording with expected analysis result (e.g., obtained with Python, Matlab, etc.);
- If available, any useful reference is very welcome (e.g., reference to paper/book explaining the analysis, code/pseudocode, etc.).

Analysis common features

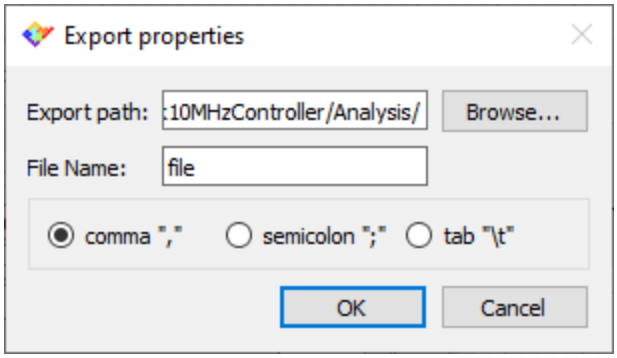
Control buttons

Each online analysis has a dedicated widget, and different features, but there are some common controls that apply to most or of the analyses:

- The start button  starts the analysis;
- The stop button  stops the analysis;
- The export analysis button  stores the analysis results in a .csv file;
- The linear  fit button allows the user to fit the analysis results with a linear regression model. The formula  and table  buttons allow to visualize the fitted models as formulae or tables.

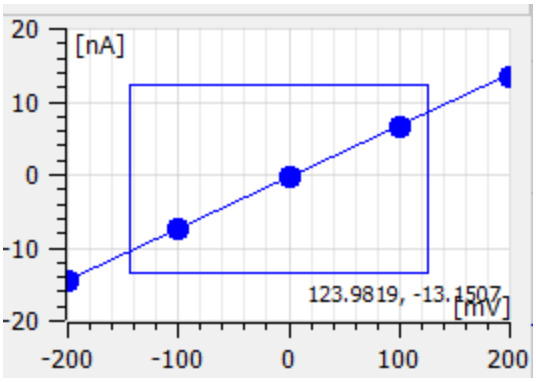
Analysis export

Most analyses' results can be exported to .csv files. In order to do so, click the export button  . In the dialog window that will open browse for a location to save the .csv file, select a filename and select the value separator (the comma may create conflicts in some applications depending on your local machine configuration).



Analysis zoom

All the plots of the analyses can be zoomed. To do it simply left click in one corner of the rectangular area you want to zoom, drag the mouse cursor to the opposite corner of the area and finally release the left button of the mouse.



In order to zoom only along the x-axis or y-axis draw a thin rectangle, elongated along the horizontal or vertical axes respectively. When done properly the rectangle will become a horizontal or vertical line.

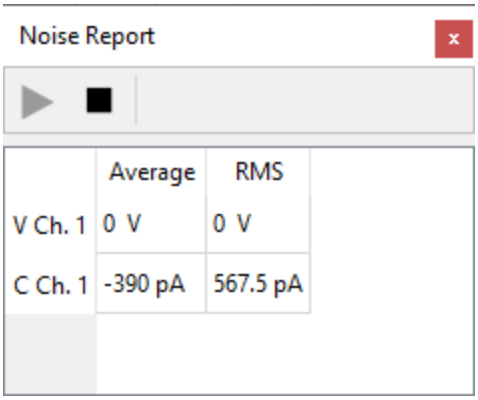
To go back to the previous zoom setting right click anywhere within the plot areas.

Analyses description

Noise report

To have an indication of the noise and offset values for every channel select the corresponding entry from the Analysis menu.

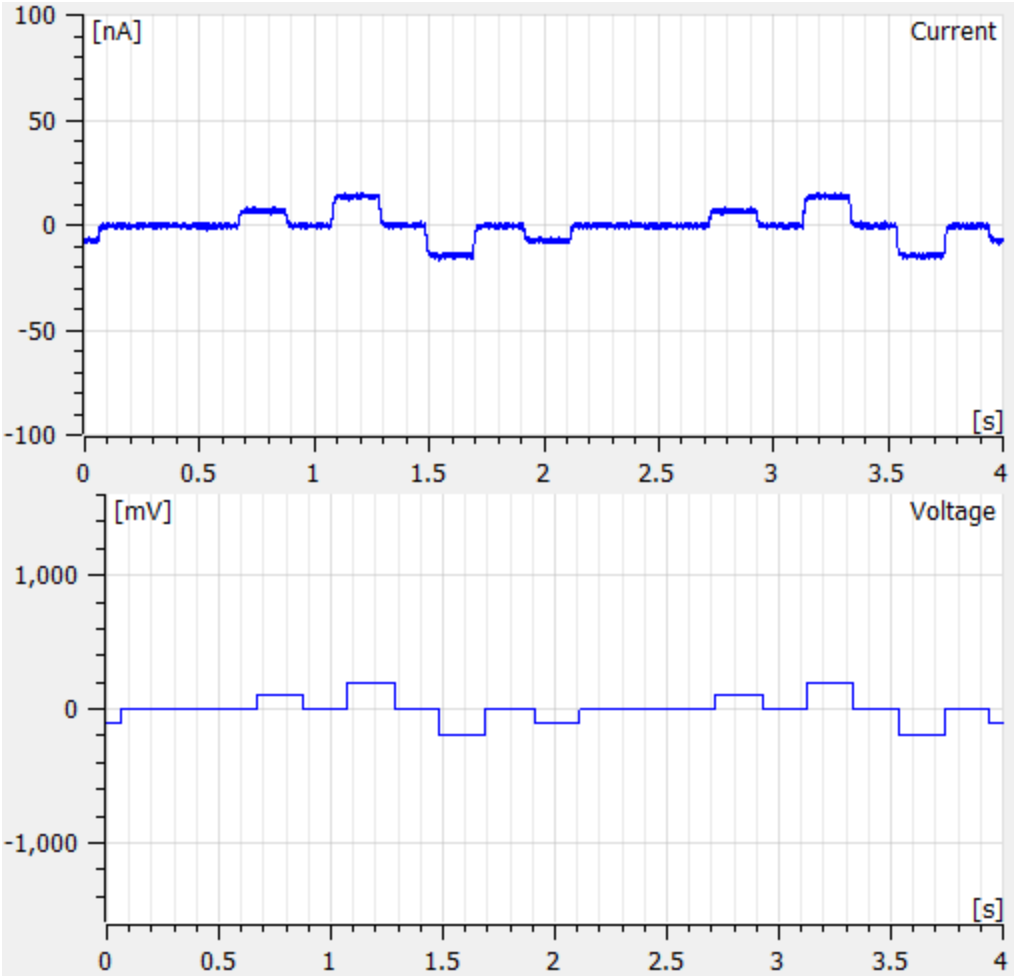
The analysis will compute the offset and the RMS (root mean square) of the current channel.

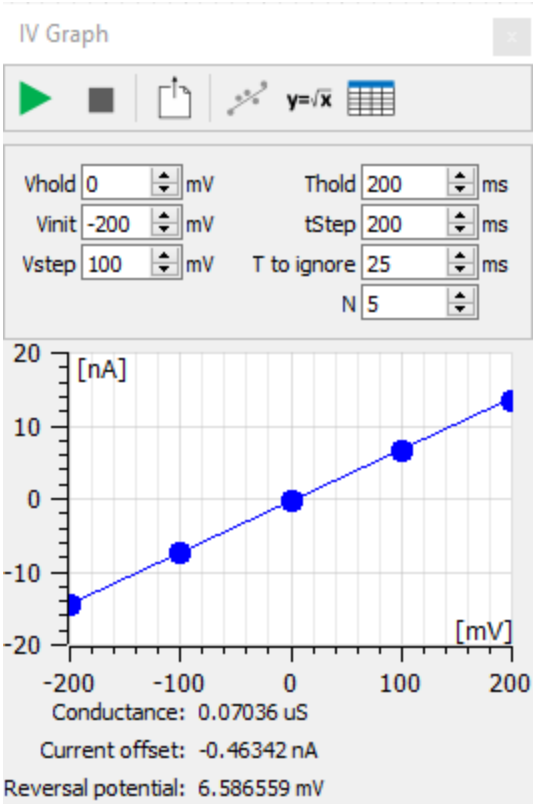


I/V graph

To compute an I/V graph select the corresponding entry from the Analysis menu.

The analysis will generate a repeating sequence of N voltage steps of duration tStep starting from Vinit, with step Vstep. Between one step and the following Vhold is applied for Thold. In each step “T to ignore” ms are ignored to neglect possible capacitive peaks.


100
[nA]
Current
50
0
-50
-100
[s]
0
0.5
1
1.5
2
2.5
3
3.5
4
[mV]
Voltage
1,000
0
-1,000
[s]
0
0.5
1
1.5
2
2.5
3
3.5
4



Clicking the linear fit button a fit of the I/V graph will be performed. Performing the linear fit provides also a brief report including the estimated conductance, the current offset and the reverse potential.