

# Luc Measurement Kinetic Organizer

To prepare tabular and tabular kinetic data for analysis in JMP

GNU GENERAL PUBLIC LICENSE v3

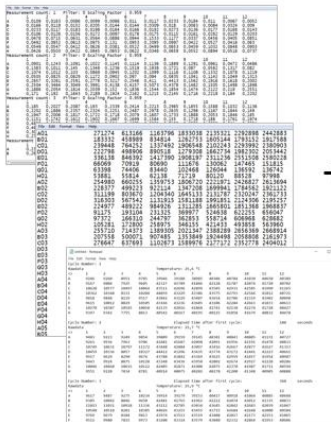
© 2019 Kenneth W. Berendzen

kenneth.berendzen@zmbp.uni-tuebingen.de

This is a GUI version of my scripts that convert plate reader output into a ready format needed by statistical programs like JMP® (SAS) or IBM® SPSS. The program is written in Java, but does not need an internet connection to run. It is just a GUI wrap for text manipulation. But, since it is a GUI, we can use drag drop functions to add our data. The data have to be prepared by the user as text files. This is very simple to do using the templates provided and following the instructions here. This program is the script mentioned in the publication: Wallmeroth and Jeschke et al., 2019; PMID: 30742656. This project is licensed under the GPLv3.

Program (jar), Source Code (zip), TEMPLATE files (xlsx), Tutorial (pdf), QuickGuide (pdf).

Various Plate Reader Outputs



Multi-well layout labeling and properties

		1	2	3	4	5	6	7
A	promoter	aa	aa	aa	aa			
B	promoter	aa	aa	aa	aa			
C	promoter	aa	aa	aa	aa			
D	promoter	aa	aa	aa	aa			
E	promoter	aa	aa	aa	aa			
A	protein	w	w	w	w			
B	protein	h	h	h	h			
C	protein	k	k	k	k			
D	protein	q	q	q	q			
E	protein	t	t	t	t			
	next block							
	next block							
	next block							
	next block							
	next block							

Input ready for i.e. JMP or SPSS

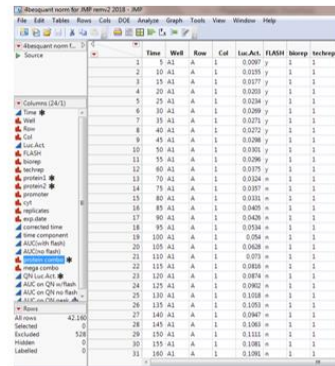


Figure 1. The Basic Idea

Your plate reader output needs to be graphed and analyzed. After drafting and the final output is a tab-delimited table that can be directly imported into JMP® or SPSS for analysis.

The idea is that graphing and primary statistical analysis in JMP® or SPSS is a much more intuitive and effective means of fondling your data to discover relationships as well as presenting it. But, input is made of columns of a specific datatype, followed by rows with the properties of individual items. When working with plate readers we can easily generate a lot of information, especially if one performs kinetic measurements, and this data is not usually in the format needed for JMP® or SPSS. One could move all the data by hand or use other programs/scripts to move the data around or even use the native analysis programs that many plate readers already come with, but the former is too time consuming and the

latter usually means that someone is blocking the machine. The Luc Measurement Kinetic Organizer solves this problem.

So, the data input and labels need to be in text files. A text file is a file that encodes only text, no colors, highlights, etc. This means that the basic idea is to open the output using a spreadsheet program of your choice and copy the data in the correct format into a text file using a simple text editor e.g. Notepad(Editor) or Notepad++. I recommend using UTF-8 format, but ASCII is also fine in most cases. In addition, we need to have a way to label all of the wells in a multi-well plate. This is also done in a spreadsheet program first, as it is much easier to label and mark things in color if it helps you keep track of what is what, and then copy the table into a text file as well. The text file will ignore all the color or lines of course. Once you have your data text file and your labels text file you are ready to use the program.

You have to mouse-over the fields to activate them, but once activated you can do drag-drop

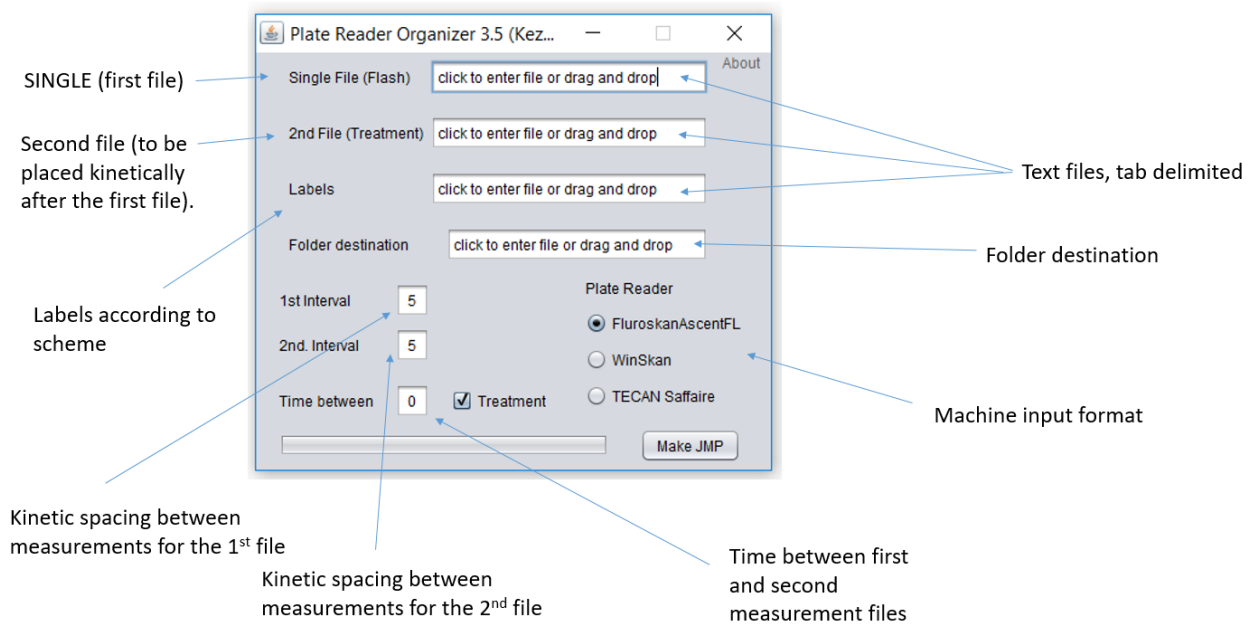


Figure 2. Explanation of the GUI interface.

## Preparing data input

The program accepts three input formats: FluoroSkAnFL (Thermo Fisher Scientific), WinSkAn (Berthold) format, and TECAN Safire. Keep in mind that my program is not affiliated with any of the companies mentioned here. If you don't have exactly the same machine, don't panic. It is likely that the same format is still used on your machine. You can find examples of all three formats in the TEMPLATE file. Just make sure that one of the formats matches. If you really like the program and don't want to program it yourself (the source files are available), then write me and send me an example of the output you have and I will consider adding it to the GUI.

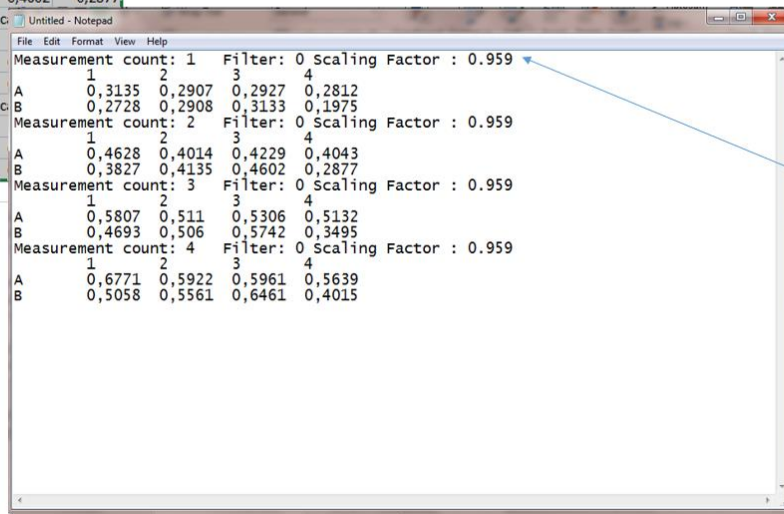
The program was designed with kinetic experiments in mind. In fact, it was designed for the transfection assays in publication Wallmeroth and Jeschke et al., 2019 whereby there is an initial kinetic measurement was followed by a treatment kinetic measurement. Therefore, the program accepts two data files and concatenates them together with the time running after the first kinetic file and whatever time delay existed before running the second kinetic measurement. Your data does not need to be a kinetic measurement nor does it have to have a second treatment file. In this case, you will have a single output. The program will still add a time to it, but you can just delete it, as it would be meaningless.

### FluoroSkanFL format

	A	B	C	D	E
1	Measurement count: 1 Filter: 0 Scaling Factor : 0.959				
2		1	2	3	4
3	A	0,3135	0,2907	0,2927	0,2812
4	B	0,2728	0,2908	0,3133	0,1975
5	Measurement count: 2 Filter: 0 Scaling Factor : 0.959				
6		1	2	3	4
7	A	0,4628	0,4014	0,4229	0,4043
8	B	0,3827	0,4135	0,4602	0,2877
9	Measurement count: 3 Filter: 0 Scaling Factor : 0.959				
10		1	2	3	4
11	A	0,5807	0,511	0,5306	0,5132
12	B	0,4693	0,506	0,5742	0,3495
13	Measurement count: 4 Filter: 0 Scaling Factor : 0.959				
14		1	2	3	4
15	A	0,6771	0,5922	0,5961	0,5639
16	B	0,5058	0,5561	0,6461	0,4015
17					

### FluoroskanAscentFL format

Move to text editor  
**And save as text**



Header lines need to be there in order for the kinetic information to work; and for the program to work in general for this format.

Figure 3. Preparing the FluoroSkanFL output.

The raw output file part containing the raw values is used as input for the program. A kinetic run will appear as above, whereas a single run will lack the line “Measurement Count: X Filt...”. You need to add one to use the program for a single non-kinetic experiment. You can take from the template file. I left it like this since it is easy to add a line and I would have had to add another radio button, unnecessarily crowding the GUI. Keep in mind that the Tecan has a different header line from the FluoroSkanFL which you will see below. Observe that only the relevant data (highlighted) should be moved otherwise it will cause an error, do nonsense, or crash.

## TECAN format

Cycle Number: 1												
Rawdata												
Temperature: 25,6 °C												
<>	1	2	3	4	5	6	7	8	9	10	11	12
A	9246	9260	8951	9785	39946	39188	38985	40306	40784	41030	40650	40389
B	9167	9804	7925	9605	42327	41789	41846	42128	41787	42074	41720	40702
C	10628	10577	10497	10864	43511	42696	42899	43505	42931	42585	41990	41265
D	10362	10348	8131	10204	44059	43229	43386	43575	42793	42544	41812	40721
E	9818											
F	9615											
G	10270											
H	9397											
Cycle Number: 2												
Rawdata												
Temperature: 25,6 °C												
<>	1	2	3	4	5	6	7	8	9	10	11	12
A	9246	9260	8951	9785	39946	39188	38985	40306	40784	41030	40650	40389
B	9167	9804	7925	9605	42327	41789	41846	42128	41787	42074	41720	40702
C	10628	10577	10497	10864	43511	42696	42899	43505	42931	42585	41990	41265
D	10362	10348	8131	10204	44059	43229	43386	43575	42793	42544	41812	40721
E	9818	9848	8119	9517	43842	43129	43407	43654	42706	42319	41902	40898
F	9615	10012	8029	10105	43166	43236	43685	43106	42284	42663	41833	40613
G	10270	10387	10545	10010	42135	42016	41868	41741	42138	42274	41728	40427
H	9397	9342	7755	8813	40542	40167	40195	40125	41058	41679	40832	40478
Cycle Number: 2												
Rawdata												
Temperature: 25,7 °C												
<>	1	2	3	4	5	6	7	8	9	10	11	12
A	9483	9223	9249	9854	39809	39159	39145	40381	40843	40805	41131	40727
B	9261	9936	7963	9706	42481	41687	42098	42091	41956	42191	41478	40833
C	10749	10631	10797	11172	43448	42884	43097	43416	42667	42877	41627	41313
D	10459	10336	8057	10327	44412	43296	43435	43774	43172	42441	42223	40661
E	9917	9629	8290	9674	43788	43842	43369	43625	42959	42457	41954	40987
F	9443	9924	8075	10128	43348	43436	43950	42802	42674	42927	42228	40286
G	10046	10460	10615	10122	42405	41871	41900	42075	42370	41987	41711	40594
H	9551	9228	7834	8781	40914	40075	40202	40278	41200	41348	40905	40888
Cycle Number: 3												
Rawdata												
Temperature: 25,9 °C												
<>	1	2	3	4	5	6	7	8	9	10	11	12
A	9617	9487	9275	10234	39914	39179	39153	40417	40918	41064	40885	40448
B	9305	10042	8046	9650	42481	41765	41962	42222	42074	42012	41335	40833
C	11023	11031	10918	11336	43212	42785	43034	43645	42842	42683	42039	41047
D	10540	10518	8201	10385	44026	43255	43455	43715	42684	42648	42000	40584
E	9769	9679	8104	9813	43974	43513	43519	43408	42817	42173	42153	41065
F	9511	9980	7815	9973	43200	43314	43579	43040	42332	42864	41953	40606

## Tecan (Safire) format

Move to text editor

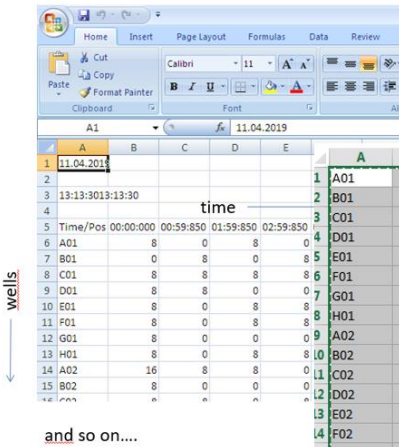
**And save as text**

Header lines need to be there in order for the kinetic information to work; and for the program to work in general for this format. The temperature line is ignored.

Figure 4. Preparing the TECAN Safire output.

The raw TECAN output file part containing the raw values is used as input for the program. A kinetic run will appear as above, whereas a single run will lack the line "Cycle Number: 1". You need to add one to use the program for a single non-kinetic experiment. You can take from the template file. Observe that only the relevant data (highlighted) should be moved otherwise it will cause an error, do nonsense, or crash.

# WinSkAn format



and so on....

# WinSkAn (Berthold) format

Move to text editor

**And save as text**

Note: each column is a time point

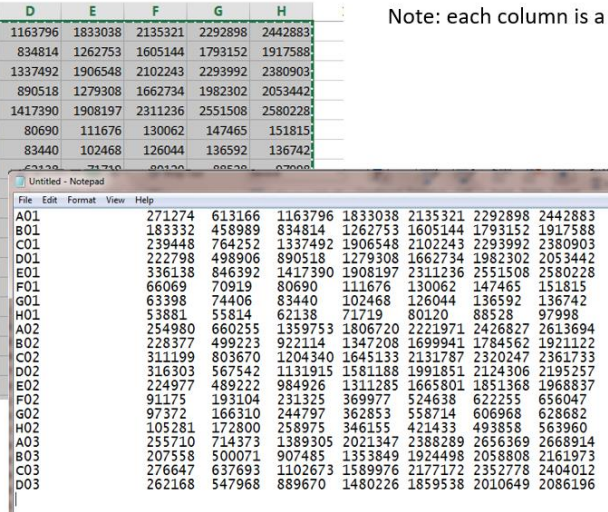


Figure 5. Preparing the WinSkAn output.

The raw output file part of the WinSkAn output containing the raw values is used as input for the program. Notice that you can copy just the data without the header information, which is in this case columns the different times. Therefore, you do not need to add anything for a single non-kinetic experiment. Observe that only the relevant data (highlighted) should be moved otherwise it will cause an error, do nonsense, or crash.

## Preparing the labels

**Prepare labels/properties in Excel**

**Start here!**

**Copy table from Excel. Notice there are two blank wells At the top right.**

**Move to text editor And save as text**

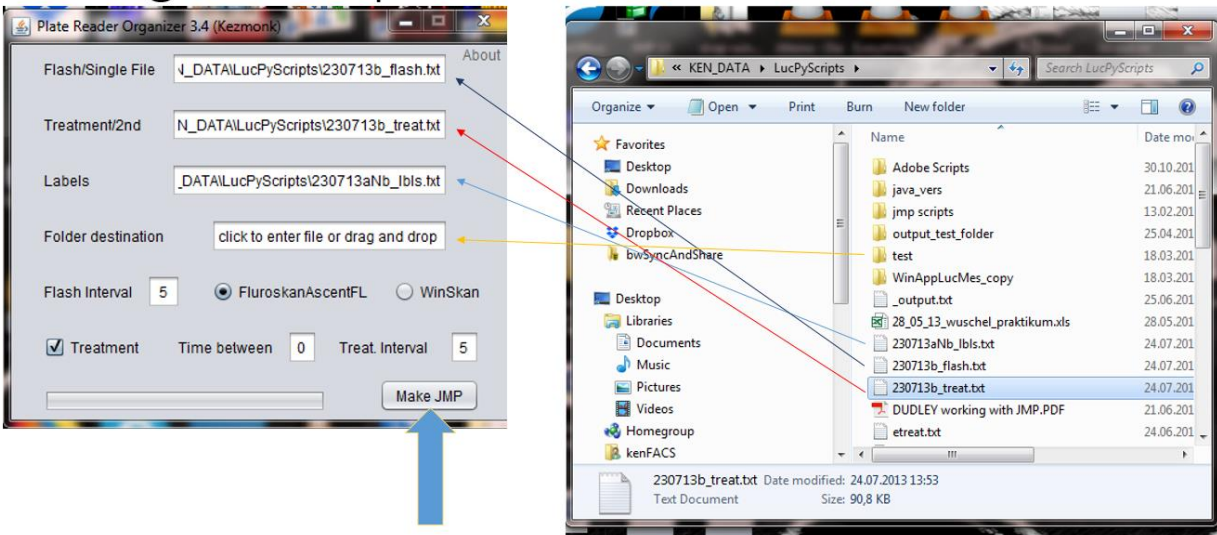
Figure 6. Preparing the labels input.

The format is above and in the template file. I guess the only special thing is that the top row has two tabs inside that have to be there before the column names appear. Make sure that you copy the entire label block, left justified and place it in a text file. If you have an alphabet other than English, you may need to save it in UTF-8 if you have characters that are not in 7-bit ASCII. I think it tolerates some gaps, but I haven't really tried to break it all the way. Each property type does not have to be right after each other; you'll see that in the TEMPLATE file. I think if you accidentally made one twice with the same type(property), the program will only take the last one and discard the first.

## Putting it all together

After you have moved your data to your text files and have the labels as a text file as well then you are ready to drag and drop them into the program. You can also click the white text box space to bring up a file browser if you prefer that. I like the drag and drop – which, on the PCs I have tested it on, needs to be activated by first gently moving the mouse over the text fields, without clicking, activates them. Now you drag and drop into the text boxes.

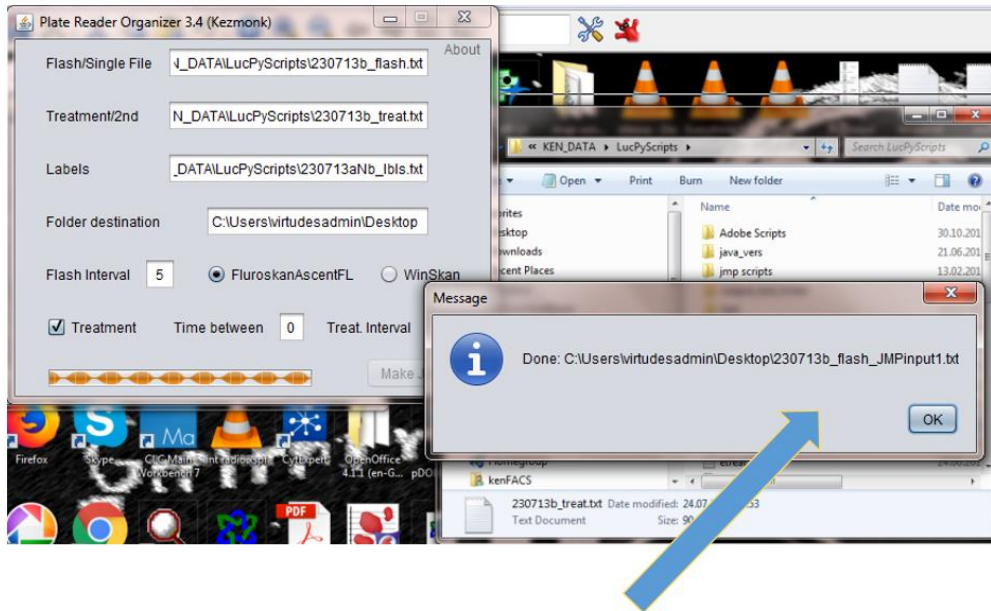
### Drag and drop the text files



After entering all the text files run it!

Figure 7. Drag and dropping text files. Remember to mouse over the text boxes first and then you can drag and drop into them, including the output folder you want to use.

Click “Make JMP”: if you did it all correctly, you’re done. Open in JMP by drag-drop or import, double check the column formats.



If successful you have a file, and a message that the program is done.

Figure 8. Executing the program.

Once you have all the text file paths entered into the program, run it. The text files are dynamically read so if you are running it over a network server it can sometimes be slow if you have a slow connection; it is not the program but saving it over the network server. Better to run it locally and then transfer the data when it is done. You get a message when the script is done.