2D

2d-datarecording.com

- English -

Exports & Scripts

Content

Symbols used in the text

These paragraphs contain tips and practical advice for working with the 2D system

In the paragraphs highlighted with this symbol, you will find additional information and it is very important that you follow the instructions given.

Documentation reference
 ➢ A user manual reference number is provided so the user can seek further assistance
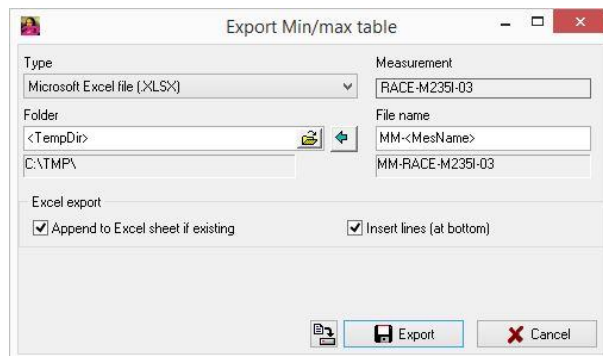
1   Exporting data of a Min/Max table into different data types

The easiest way to get the minimum, maximum, average and/or delta-values for different channels lap by lap into different datatypes is to export the values of a Min/Max table[1].

To do this please click with the right mouse button on a Min/Max table and select "Export":
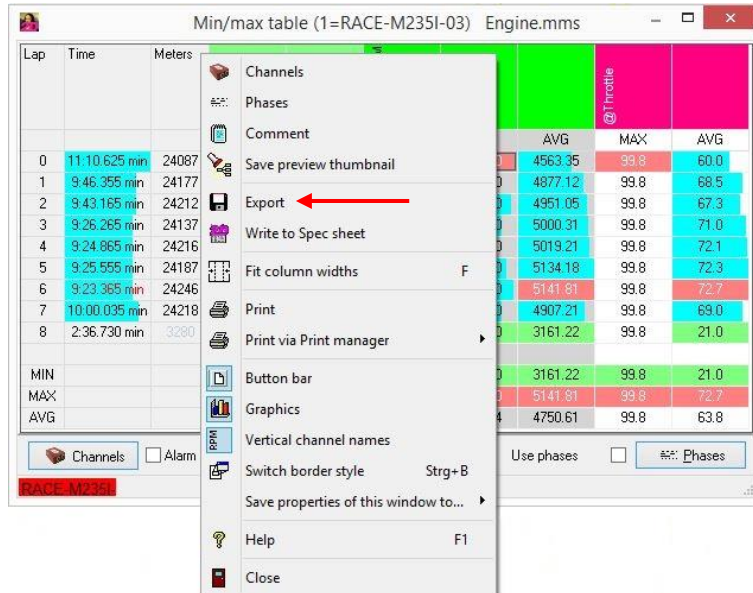
The following dialog will appear:

- Choose the format type from the drop-down list, for example "Microsoft Excel file (.XLSX)".
- Select a destination folder, for example the temporary directory ($<$TempDir$>$) "C:\TMP\". Please have a look at section 7.1 for available folder placeholders.
- Enter the name of the export. It is recommended to use naming elements (placeholders) to define a systematic file name, as these create different file names without changing the setting. For example "MM-$<$MesName$>$".
  Please have a look at section 7.2 for available naming elements (placeholders).
- By enabling "Append to Excel sheet if existing" it will create only one Excel sheet and append newer data below the already exported data. If this function is disabled, every time you execute the export a new Excel-file be created.
- Option "Insert lines (at bottom)" is only used for existing Excel-sheets, where a formula element had been placed at the bottom, below the data lines.

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[1] For more information regarding Min/Max tables please have a look at the Analyzer manual.
The manual can be downloaded from: 2d-datarecording.com/en/downloads/manuals ⇒ Analyzer

2   XY subdivision data export

A XY subdivision is often used to calculate the settings of the vehicle´s engine mapping.

First you need a XY plot, for example with the throttle signal on the X-axis, the RPM signal on the Y-axis and the lambda signal as the channel color. With the phases function you can select the conditions on which data is valid and which selection of the measurement should be used.[2]

With a right-mouse-click on the XY plot you can select "Subdivision". It opens a window where you can set the steps you need:
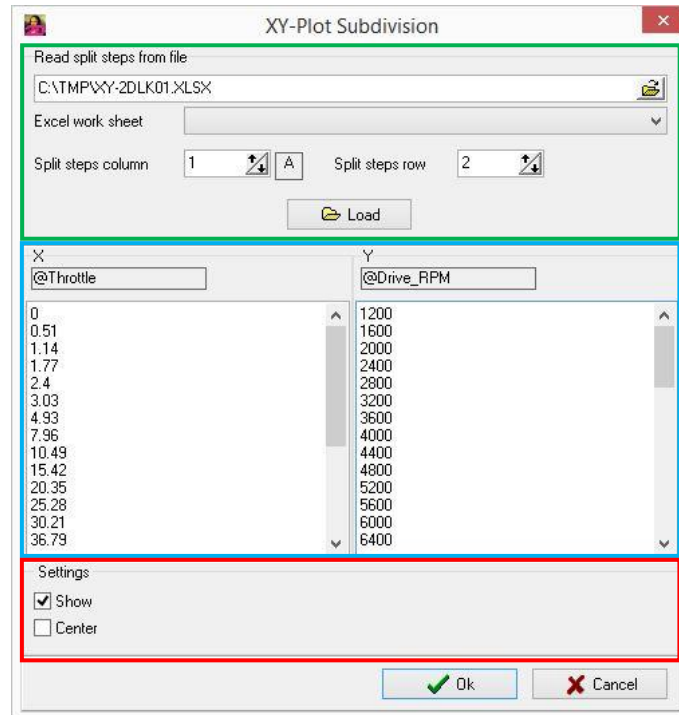

Read split steps from file: If you have prepared a file with the split steps for the subdivision, you can import your settings. Select the file, the Excel work sheet and the column and row to import. (Afterwards you can easily export the data into this prepared Excel sheet.)

X/Y split steps: If you haven´t prepared a file with the split steps, you can enter them here manually.

Settings: Here you can select if the subdivisions should be shown in the XY plot and which position your split steps should have to calculate the average values.

For example you set your split steps every 1000 rpm (1000, 2000, 3000, 4000, 5000, 6000, …) and every 10% of throttle (0, 10, 20, 30, 40, 50, 60, 70,…), then the average value will be calculated for the values inside the "boxes":

Not centered: Centered:
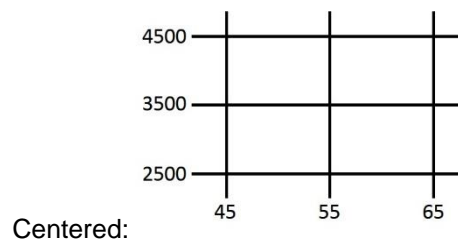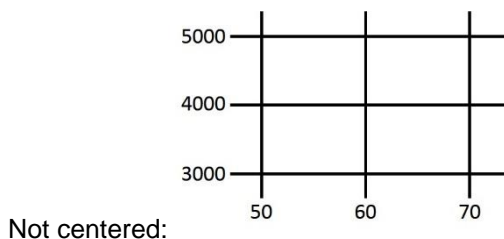
[2] You can find prepared XY plots and a script setting to export the data in the user data folder "Docu", 2D Injection map Excel export sample files (for example C:\Users\Public\Documents\Race2016\Docu\2D Injection map Excel export sample files). To use and modify these example files, please copy them into the user data settings folder (for example C:\Users\Public\Documents\Race2016\Settings).

To export the data click with the right-mouse button on the XY plot and select the export type:
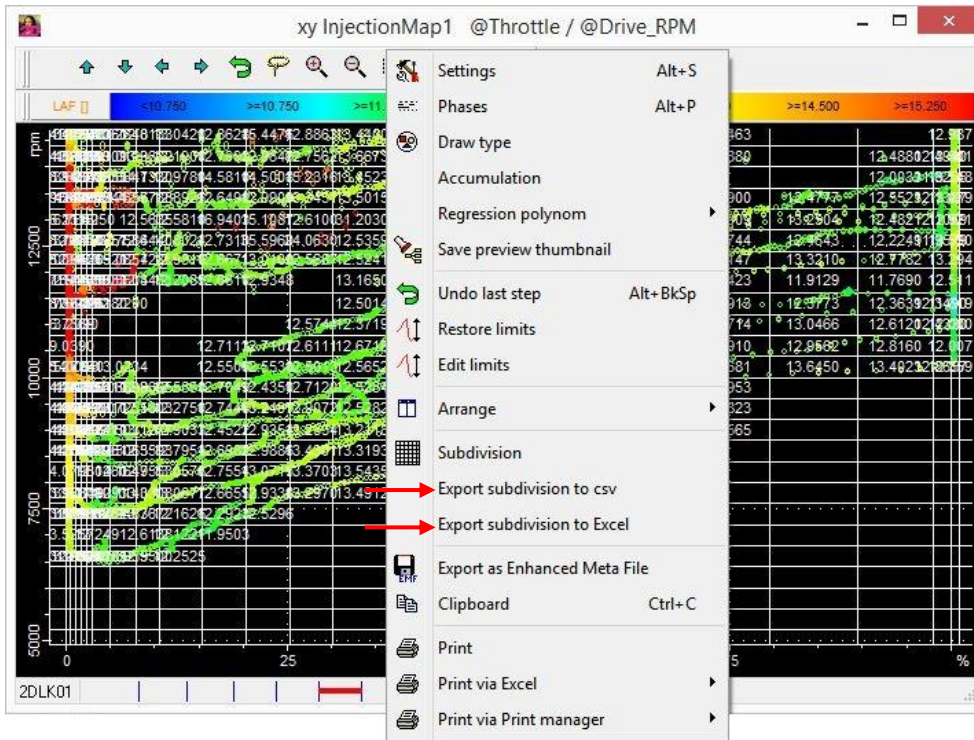
If you select "Export subdivision to csv" you only need to enter the file´s name and the data will be exported.

If you select "Export subdivision to Excel" you can choose different options:
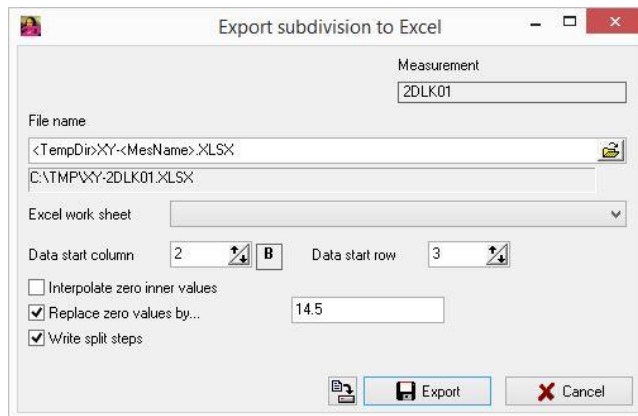
Enter the name of the export. It is recommended to use naming elements (placeholders) to define a systematic file name, as these create different file names without changing the setting. You can combine the naming elements with placeholders for the directory, for example "<TempDir>XY-<MesName>".

Please have a look at sections 7.1 and 7.2 for available placeholders and naming elements.

If you´ve already prepared an Excel file, you can select the work sheet to which the data should be exported. If you don´t select a work sheet, the first work sheet will be used. Select the start column and row to not overwrite prepared information.

Additionally you can select if you want to interpolate zero inner values, replace zero values by an entered value and if you want to write the split steps into the export file while exporting the data.

These information will also be used, if you call the export via script.

3   Creating new export setting files

With the 2D software you are able to export any data in different data types (for example CSV, ASCII, 2D measurement, Excel, etc.). You can modify the setting to export only a selection of data. This selection could be of length (for example fastest lap, current selection, defined conditions, etc.) or of channels or a combination of both.

To create a new export setting start the *Analyzer* and select File ⇒ Export (Alt + E) ⇒ Create new
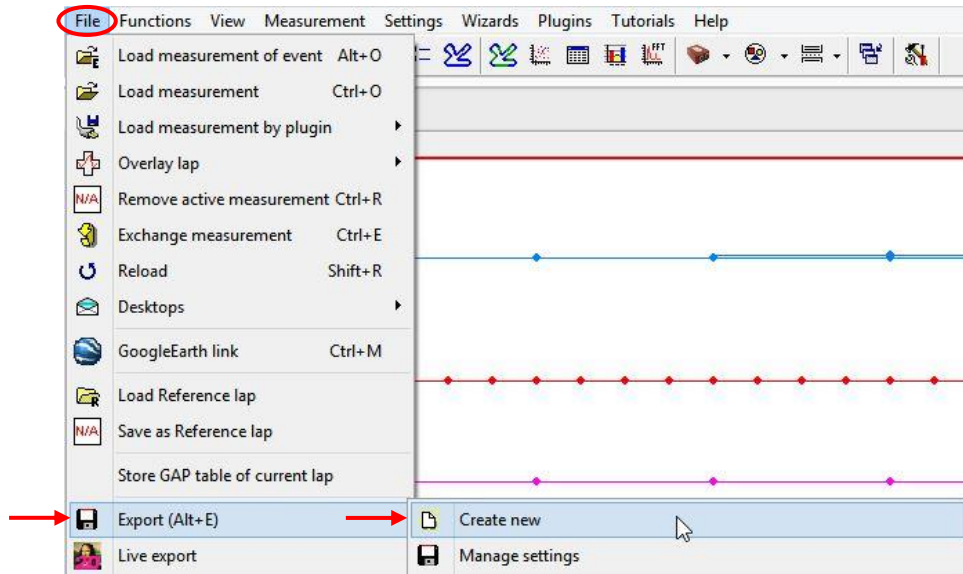
Enter a name for the new export setting and confirm with <**OK**>:
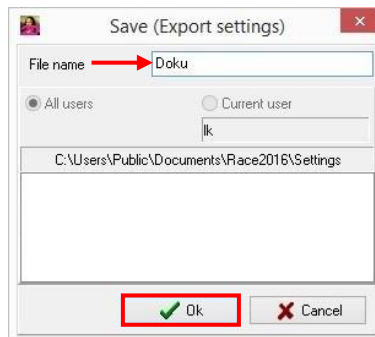
In the next window you define your export settings.

You start with the export type: Select the format the data should be exported to from the drop-down list. Depending on this the options to define the export settings will differ.

By exporting the data to a new 2D measurement, you can modify your measurement to your needs. For example you can select only the "driver relevant" channels, such as RPM, speed, gear, throttle, brake, etc., and set the phases to use only the fastest lap.

This smaller measurement you could use for a live export[3] to give to your driver.

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[3] For further information on a live export please refer to the Analyzer manual.

The manual can be downloaded from: 2d-datarecording.com/en/downloads/manuals ⇒ Analyzer

Select the settings for your export:
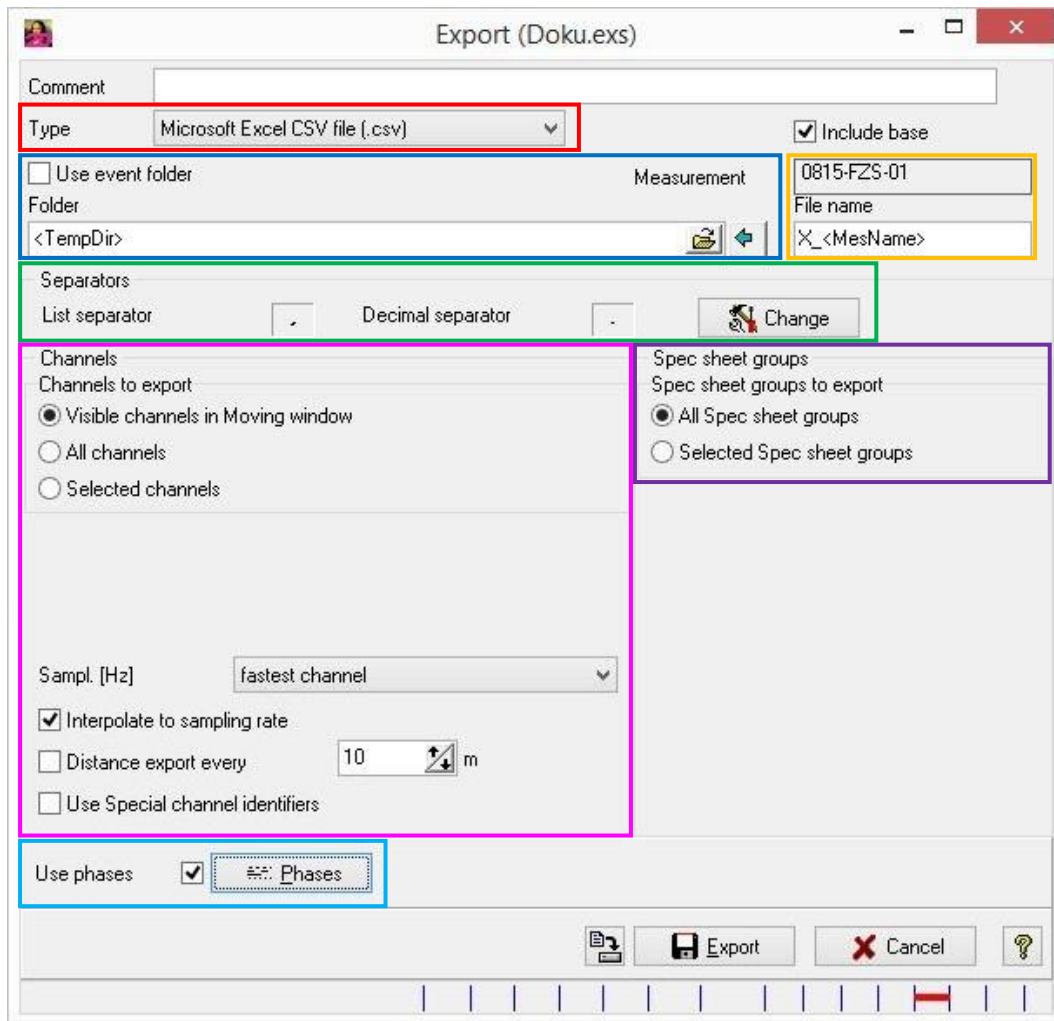
- **Export type**: Select the export´s type from the drop-down list
- **Storage location**: Set the folder, where your export will be saved. You can choose between "Use event folder" (then it will be saved in the current event folder) or select any folder. Please have a look at section 7.1 for available folder placeholders.
- **Export´s file name**: Enter the naming elements (placeholders) to define the file name, for example "X_<MesName>". Please have a look at section 7.2 for available naming elements (placeholders).
- **Separators**: Depending on the export type you can select the separators.

    The separators´ settings are global. This means if you change them, they will be changed for all export settings.

- **Channel settings**: Select the channels you want to export and their sampling rate.
- **SpecSheet groups**: Select the SpecSheet groups you want to export.
- **Phases**: Set the used phases for the export. If you don´t use phases, everything will be exported. If you want to use phases (for example the fastest lap), click on <**Phases**> and define your settings:
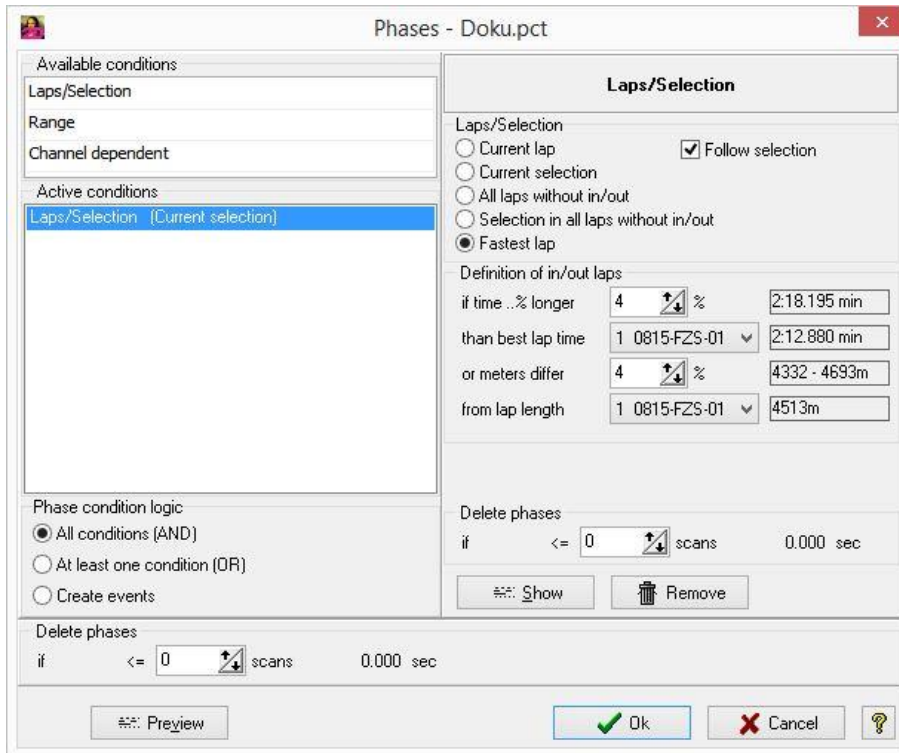
At the bottom of the export defining window you can see which part of the measurement will be exported:
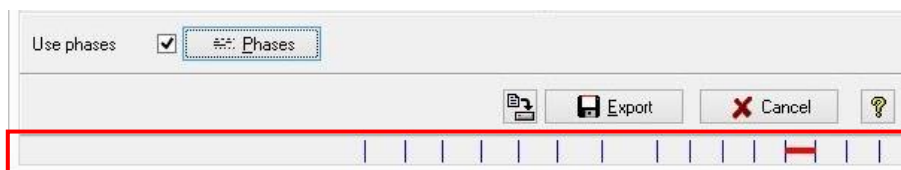
- Confirm the changes by saving the settings (<**Save Export settings**>) or exporting the data (<**Export**>).

4   Automation via Script

Scripting means that you can make a list of orders to be carried out in a specific manner. For example after a download you would like to export some data in a different format and before this you need to execute a cal-file to get all information you want to export. Additionally you want to create a track map of the fastest lap with gear changes or corner speed. Then you create a script which contains all these steps in the correct order. This also makes sure that you won´t forget to execute the cal-file before exporting the data.

i   To create your own script, you need a Net- or Team-license.

- Start with: Functions ⇒ Scripts and select <**New**>
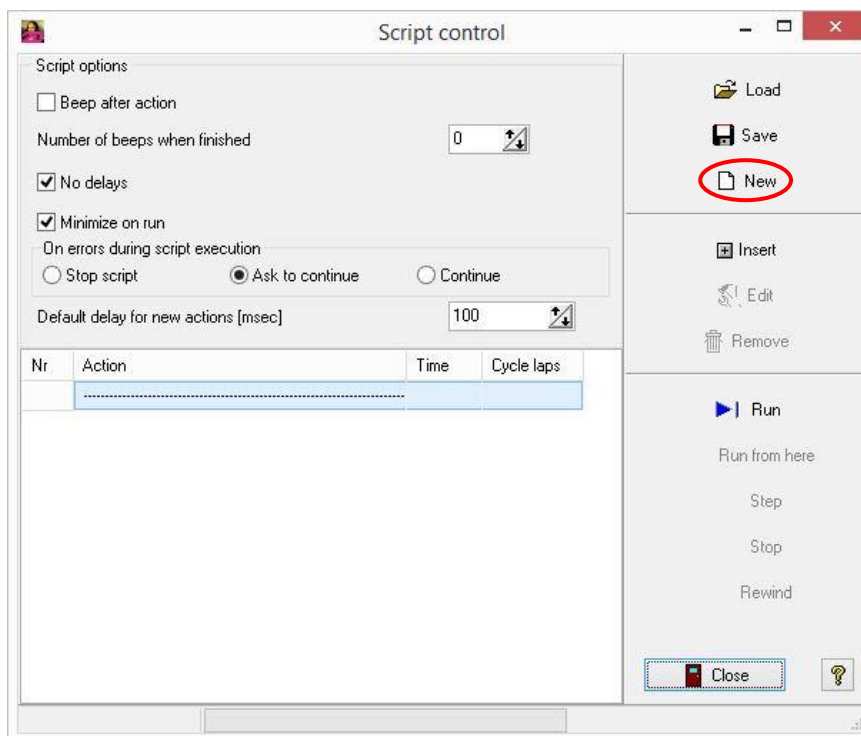
Other options in this window:

⇒ **Beep after action**: if you activate this checkbox, one beep will be made after each action
⇒ **Number of beeps when finished**: here you can define a number up to nine beeps to occur, after the whole script has been operated
⇒ **No delays**: if you activate this checkbox the steps of the script will be carried out without any delays in between
⇒ **Minimize on run**: this option will minimize the script control window while the script is running
⇒ **Default delay for new actions**: after execution of each script step (action) the Analyzer will wait for a short time. This delay may be defined individually for each single step. You can choose the default value of the delay time which will be used when inserting a new script step (action).

- To add a step to the script select <**Insert**>. A new window will open a list of available actions:
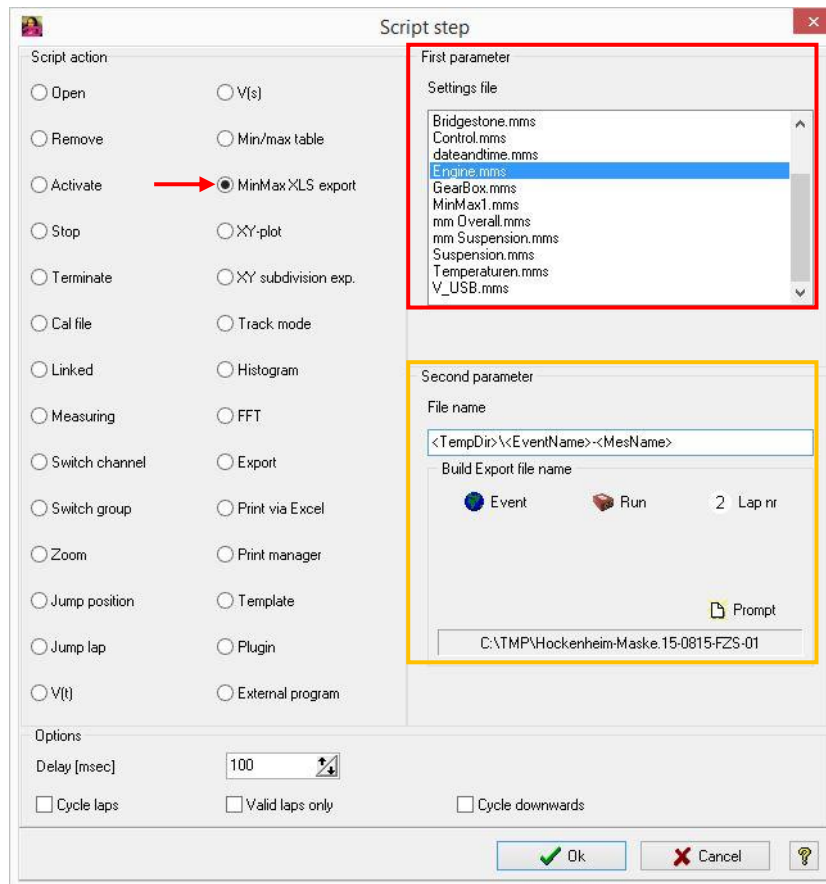
In this example the selected min/max table "Engine" will be exported as an Excel export (marked in red) and it is saved within the temporary directory. The export file name will consist of the event name and the measurement´s name (marked in orange).
Confirm with <**OK**>.

Although you may have defined a file name for a min/max table Excel export, the file name you defined in second parameter while creating the script setting will be used when running the script.

Available script actions in this window:

⇒ **Open**: when you activate this action, you will see the First Parameter: Load measurement. Here you can load any measurement by choosing it in the drop down menu.
⇒ **Remove**: this action removes a currently loaded measurement. Choose the appropriate number out of the list in the First parameter
⇒ **Activate**: this action activates a currently loaded measurement. Choose the appropriate number out of the list in the First parameter
⇒ **Stop**: with this action you can stop the script action list. If this action is inserted the script will jump to the end. It is useful for testing the script.
⇒ **Terminate**: it will close the Analyzer
⇒ **Cal file**: this action will execute a cal file. Choose the file name from a folder in the first parameter
⇒ **Linked**: this action will link the measurements so that they can be moved together
⇒ **Measuring**: if you activate the checkbox in the second parameter of this action you can switch the measuring mode on and off
⇒ **Switch channel**: select the channel in first parameter and choose if you would like to switch it on or off visibly in the second parameter

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⇒ **Switch group**: switch whole groups of channels on or off visibly in the second parameter and choose which group in the first parameter

⇒ **Zoom**: zoom in with this function. Depending on if the base axis is in time or distance, the first parameter will define meters or seconds.

⇒ **Jump position**: currently not available

⇒ **Jump lap**: jump to any lap from 1 to 30 or the fastest lap (F). Choose which lap you want to jump to in first parameter.

⇒ **V(t)**: this will change the base axis to a time scale

⇒ **V(s)**: this will change the base axis to a distance scale

⇒ **Min/Max table**: in the first parameter you can choose which table settings file you would like to use. All the previously saved settings for min/max tables will appear in this window. The checkbox in the second parameter will make it visible on screen or close it.

⇒ **MinMax XLS export**: in the first parameter you can choose which min/max table will be used for an Excel export. In the second parameter you define the export´s file name.

⇒ **XY-plot**: in the first parameter you can choose which settings file you would like to use. All the previously saved settings for XY-plots will appear in this window. The checkbox in the second parameter will make it visible on screen or close it.

⇒ **XY subdivision exp.**: exports a XY subdivision, please refer to section 2 for further information. Although you may have defined a file name for a XY subdivision Excel export, the file name you defined in second parameter while creating the script setting will be used when running the script.

⇒ **Track mode**: in the first parameter you can choose which settings file you would like to use. All the previously saved settings for track modes will appear in this window. The checkbox in the second parameter will make it visible on screen or close it.

⇒ **Histogram**: in the first parameter you can choose which settings file you would like to use. All the previously saved settings for histograms will appear in this window. The checkbox in the second parameter will make it visible on screen or close it.

⇒ **FFT**: in the first parameter you can choose which settings file you would like to use. All the previously saved settings for FFTs will appear in this window. The checkbox in the second parameter will make it visible on screen or close it.

⇒ **Export**: in the first parameter you can choose which settings file you would like to use. All the previously saved settings for exports will appear in this window. In the second parameter you must type in the file name of the file you would like to export to.

⇒ **Print via Excel**: print any of the given possibilities listed under the second parameter. You can select the moving window, XY-plot, FFT, track mode or the whole overview. In the first parameter you can choose through which Excel file you would like to print. These files must be prepared earlier and saved in the Race folder (depending on your version, Race 2016 for example: C:\ProgramData\Race2016\Excel Sheets\Analyzer) under Excel sheets ⇒ Analyzer

⇒ **Print manager**: print a set of information configured in the print manager. Select the print manager settings file in the first parameter. Choose a print file name in the second parameter. This will copy an image of the print file into the chosen file.

⇒ **Template**: the use of a template can save a lot of time and trouble. It can combine not only background and color settings but also a whole selection of visual information. It could be put together of different tables and diagrams all at once that maybe repeatedly used in combination. Choose the template in the first parameter. Take the time to create some useful templates beforehand.

⇒ **External program**: starts an external program

Options in this window:

⇒ **Delay**: changes the delay time after execution of this step

⇒ **Cycle laps**:

⇒ **Valid laps only**: takes only valid laps into account

⇒ **Cycle downwards**:

- You can add as many steps as you need. Take care of the order, as the script is executed from top to bottom. If you insert another step, it will be inserted above the selected step:
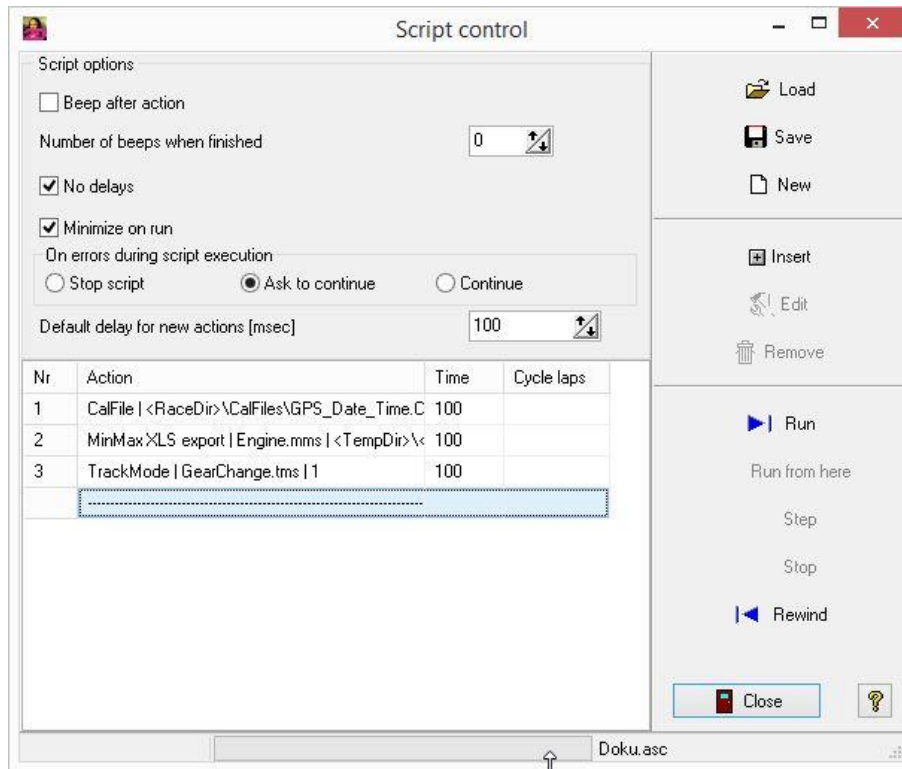
- To check or run the script you can use the control panel on the right hand side:
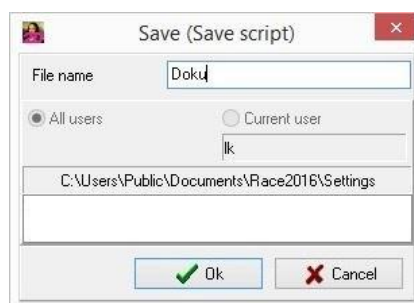

Run: run the script

Run from here: if you are not at the beginning of the script, you can also give this order

Step: will only execute the currently selected step
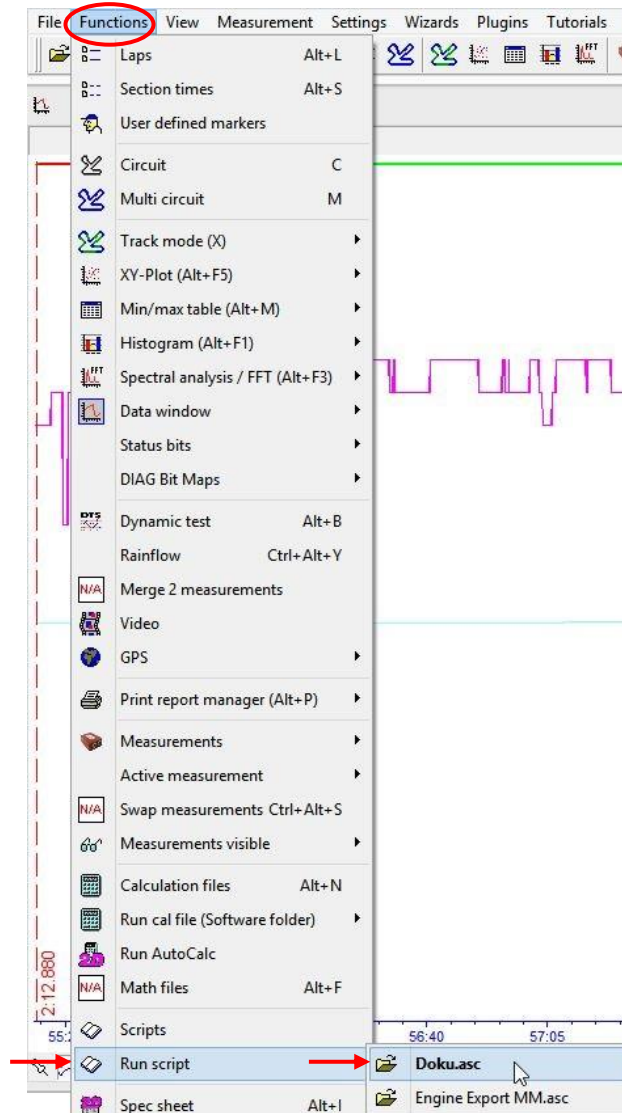
Stop: will stop the procedure and jump to the end of the script

Rewind: goes back to the top of the list

- To save the script select <**Save**> and enter a name, for example "Doku":

- To execute the script select Functions ⇒ Run script and select the script
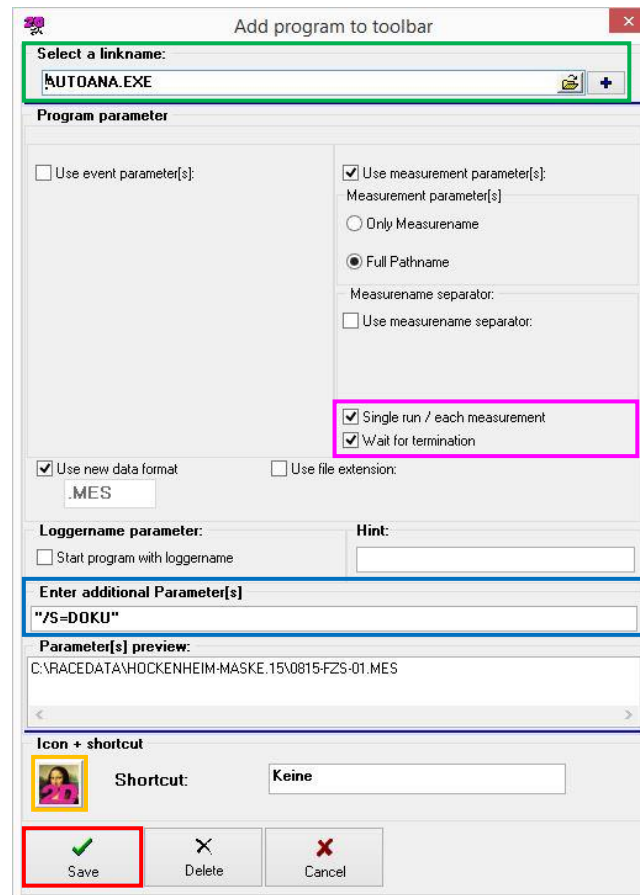
5 Linking a script to the WinARace toolbar

To create a new link in the *WinARace* toolbar, please click with the right mouse button on the toolbar and select "Add":

Program the toolbar button:

- **Select a program to call**: Scripts are executed by the 2D Analyzer. Therefore you should link the Analyzer to the toolbar. To be able to work normally with the Analyzer and additionally execute the scripts, you can select the AutoAna.exe, which is a copy of the Analyzer.
- **Script call**: Enter the additional parameter to tell, what should be done, for example *"/S=Doku"* to execute the script "Doku"
- **Toolbar icon**: Select an icon, which will be used in the toolbar
- **Save setting**: Confirm your changes with <**Save**>
- **Single run/each measurement**: Enables to execute the script on each selected measurement
- **Wait for termination**: Makes sure to execute the script on one measurement after the other

If you have a license with multiple users, you can program the toolbar button to execute the script as a defined user. Add the user information to the additional parameters, in this example the user is named "GP-Test":

6 Execute scripts on several measurements via Toolbar entries

It is very easy to execute scripts which are linked to the *WinARace* toolbar on several measurements. You simply select the measurements to work with and start the linked script. Then it will automatically execute the script routine measurement by measurement.

To select several measurements, please start the event explorer or file explorer (button **<...>**) in *WinARace.*

In there you can select several files. Then you have to options to execute a script, which is available in your *WinARace* toolbar:

1. Select File ⇒ Execute programs from the 2D Toolbar ⇒ select the script you want to execute
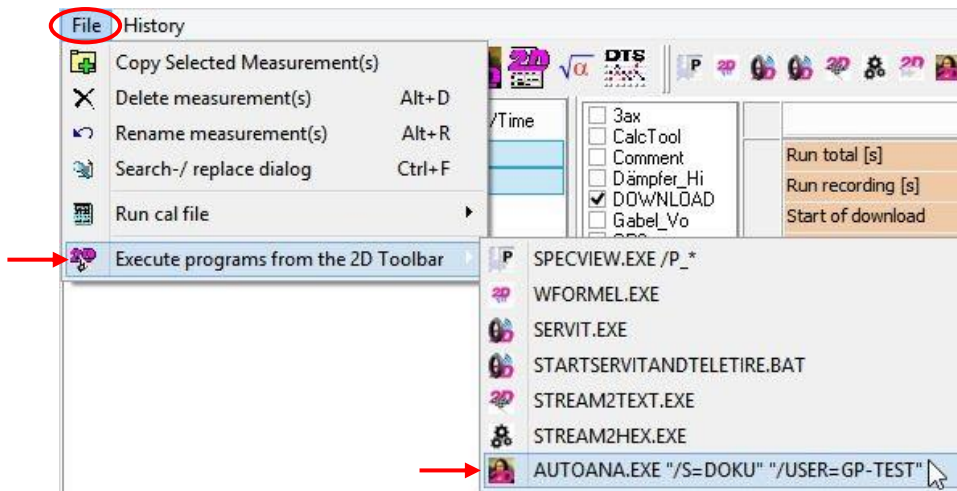
2. Select the toolbar icon in the event/file explorer to execute the script
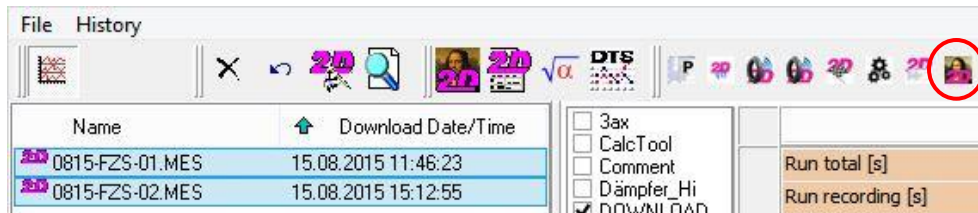
The script will then automatically be executed sequentially on all the selected measurements.

7 Appendix

7.1 Storage location placeholders

To save the exports in the correct place, there are some defined placeholders to use for different storage locations:

- o <DriveName=volume>
- o <TempDir>   temporary directory
- o <DataDir>   current data directory, which is selected in *WinARace*
- o <EventDir>   current event folder
- o <MesDir>   current measurement folder
- o <RaceDir>   Race program data

7.2 Naming element placeholders

To create a systematic name for the export, there are different naming element placeholders available. This enables you to create different names without changing the settings.

- o <EventName>   name of event
- o <MesName>   name of measurement
- o <LapNr>   number of current lap
- o <HED=section.ident>   entry of the SpecSheet, for example: <HED=BIKE.Chassis>

With the last naming element (<HED=section.ident>) you can call every information stored inside the SpecSheet.

Examples:

1) You want to do an Excel export of the data of a min/max table and you defined the name to export as "MM-<EventName>-<MesName>".
Your event is named "Aragon.16" and the corresponding measurement is named "Test-VK48-05". Your Excel export file will be named as MM-Aragon.16-Test-VK48-05.xlsx.
If you use the same export setting with a measurement named "Race-NA31-01" of event "Assen.15", then the export file will be named MM-Assen.15-Race-NA31-01.xlsx.

2) You want to export the data of the fastest lap into CSV format and you defined the name to export as "<EventName>-<MesName>-<HED=Info.Driver>-Lap_<LapNr>".
Your event is named "N24h.16", the measurement´s name is "Race-4711L-01", your SpecSheet has the entry Driver=KRO in group "Info" and the fastest lap is lap 36. Your CSV export will then be named N24h.16-Race-4711L-01-KRO-Lap_36.csv.
If you use the same export setting and your event is named "Hockenheim.16", the measurement´s name is "QP-B1-#99-03", the SpecSheet has the group "Info" with the entry Driver=DC and the fastest lap is lap 3, then the created CSV export file will be named Hockenheim.16-QP-B1-#99-03-DC-Lap_3.csv.