

Professional Electronics
for Automotive and Motorsport

6 Repton Close | Basildon
Essex | SS13 1LE | United Kingdom
+44 (0) 1268 904124
info@liferacing.com
www.liferacing.com



LifeView User Manual

Document revision:
V2.1

Document Release Date:
2019-06-19

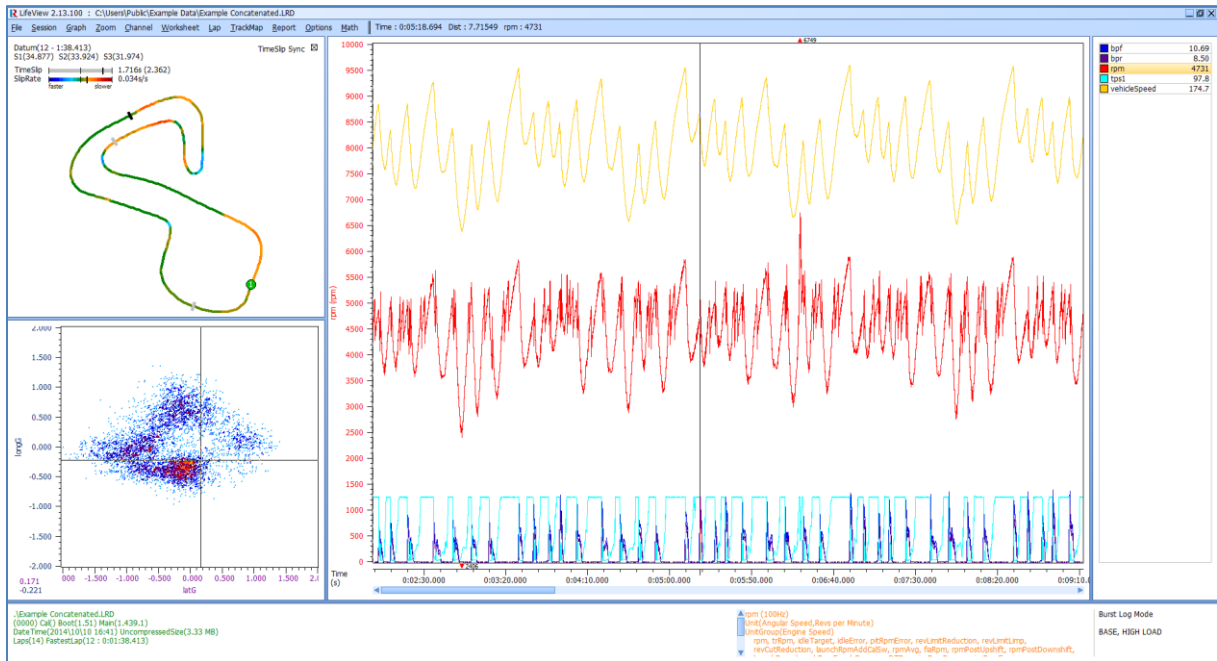
Document Author:
MH

Contents

1 INTRODUCTION.....	2
2 FILES	3
2.1 LOAD/IMPORT.....	3
2.2 SAVE/EXPORT	5
2.3 WORKING DIRECTORY.....	6
3 GRAPH.....	10
3.1 NAVIGATION	11
3.2 CHANNELS	12
3.3 MATH.....	14
3.4 LAP MODE	16
3.5 LAYERS AND MULTIPLE FILES	16
4 WORKSHEET	17
4.1 WORKBOOKS	17
4.2 GRAPHS	18
4.3 REPORTS	18
4.3.1 Lap/Stats Report	19
4.3.2 XY Plot	20
4.3.3 Traces	21
4.3.4 Histogram.....	22
4.3.5 2D Histogram	22
4.3.6 Sector Report	23
4.4 TRACK MAP.....	24
4.5 FLOATING WINDOWS	26
5 OPTIONS.....	27
5.1 SESSION	27
5.2 TOGGLE OPTIONS.....	28
5.3 CURSOR OPTIONS	29
5.4 CONCATENATED FILE OPTIONS	30
5.5 GLOBAL OPTIONS.....	30
6 DOCUMENT REVISION HISTORY.....	31

1 Introduction

LifeView is a data viewing application. Downloaded .LRD files can be analysed here with the use of intelligent visual representation.



Due to continuous development, some features may change and this manual will update periodically. Please ensure you have the latest version dated on the cover page of this document.

Information Panel

The Information Panel is displayed at the bottom of the screen and can be toggled with the <F1> key. It displays:

File location, name, time stamp and size
ECU serial number, Calibration and code levels
No of laps and fastest lap
Saved comments

Highlighted channel name, frequency, unit and unit group

Highlighted channel burst logging state

Menu Shortcuts

Life Racing applications are intended for quick operation without the use of a mouse for improved usability in the pit lane. All menu buttons can therefore be reached using keyboard shortcuts. Each option has an underlined letter, identifying its shortcut key or the shortcut displayed to the left. Dialogue boxes can be navigated with the arrow keys. The <Spacebar> can be used to select while <Enter> and <Esc> are used as OK and CANCEL respectively.

2 Files

2.1 Load/Import

.LRD

To load data, select *File, Load* and locate the chosen file. File name and size is displayed as well as a time bar that shows the timing in comparison to other files in the same folder. Time bars will alternate in colour for different sessions determined by the time difference between them. Highlight a file to display further details including device details, lap details and any comments.

Multiple files can be opened at once and stitched together (concatenated) in the software with or without time gaps. This is done using the <Shift> key to select consecutive files. A dashed line in the graphical display indicates the beginning of a new data set.

Select *File, Load another* to overlay multiple files on the same display to allow comparisons. Overlaid files can also be concatenated.

	1	Example Concatenated.LRD		2.57 MB
	2	Example E.LRD		1.79 MB
	3	Example D.LRD		485 KB
	4	Example C.LRD		280 KB
	5	Example B.LRD		299 KB
	6	Example A.LRD		466 KB
	7	Example 3.LRD		372 KB
	8	Example 2.LRD		1.26 MB
	9	Example 1.LRD		1.50 MB
	.	..		
	\	DESKTOP		
	/	WORKING DIRECTORY		
	C	Local Disk (C:)		
	D	DVD RW Drive (D:)		

.CSV

LifeView can be used to view data from other sources by importing a comma separated .csv file. This can be useful in instances such as comparing real data to imported simulation.

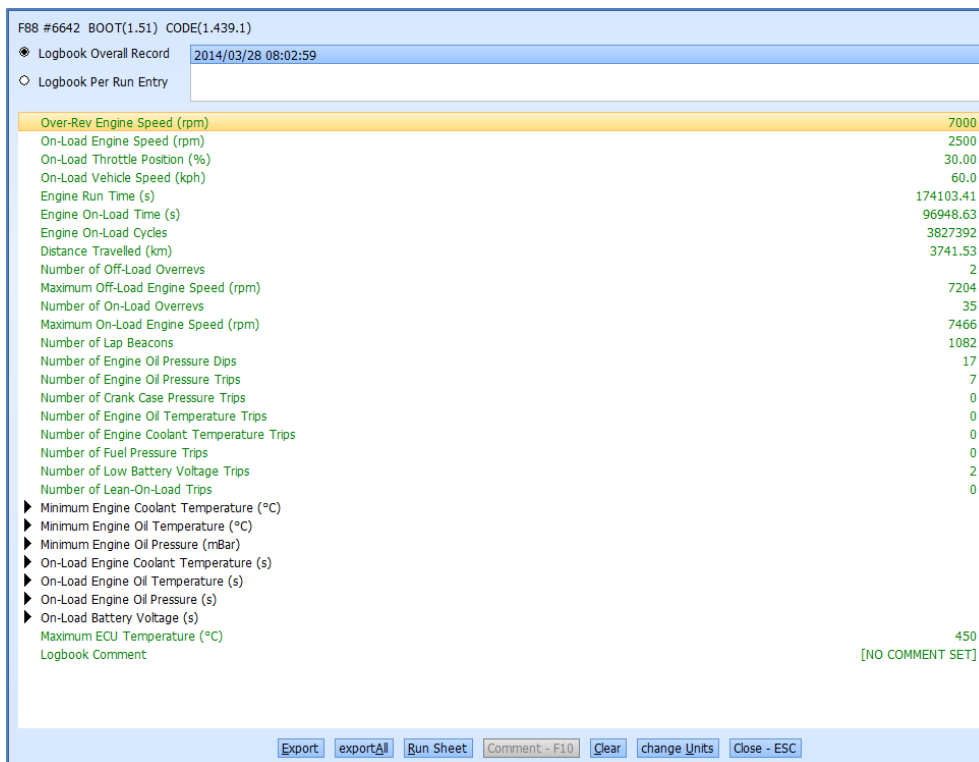
This is done under *File, Import CSV*. Select the file and define the 'time' field as well as all fields that are to be imported. Imported files must have a time field to use as an x-axis reference. Files are imported alongside currently open files to allow overlays.

There is some limited functionality as special channels cannot be configured outside of an LRD file. Channels can however still make full use of math functions and graphical representation.

.LB

LifeView can also be used to view and export .LB logbook files. To view these select *File, Load logbook* and select the individual file or SELECT ALL when in the correct folder location. These can be viewed as an overall record or as a per run entry.

The Comment option is unavailable in LifeView as logbook comments cannot be edited once the .LB has been downloaded. Comments can only be added to a logbook whilst it remains in an ECU. This can only be done when connected in LifeCal or LifeData.



F88 #6642 BOOT(1.51) CODE(1.439.1)	
<input checked="" type="radio"/> Logbook Overall Record	2014/03/28 08:02:59
<input type="radio"/> Logbook Per Run Entry	
Over-Rev Engine Speed (rpm)	7000
On-Load Engine Speed (rpm)	2500
On-Load Throttle Position (%)	30.00
On-Load Vehicle Speed (kph)	60.0
Engine Run Time (s)	174103.41
Engine On-Load Time (s)	96948.63
Engine On-Load Cycles	3827392
Distance Travelled (km)	3741.53
Number of Off-Load Overrevs	2
Maximum Off-Load Engine Speed (rpm)	7204
Number of On-Load Overrevs	35
Maximum On-Load Engine Speed (rpm)	7466
Number of Lap Beacons	1082
Number of Engine Oil Pressure Dips	17
Number of Engine Oil Pressure Trips	7
Number of Crank Case Pressure Trips	0
Number of Engine Oil Temperature Trips	0
Number of Engine Coolant Temperature Trips	0
Number of Fuel Pressure Trips	0
Number of Low Battery Voltage Trips	2
Number of Lean-On-Load Trips	0
▶ Minimum Engine Coolant Temperature (°C)	
▶ Minimum Engine Oil Temperature (°C)	
▶ Minimum Engine Oil Pressure (mBar)	
▶ On-Load Engine Coolant Temperature (s)	
▶ On-Load Engine Oil Temperature (s)	
▶ On-Load Engine Oil Pressure (s)	
▶ On-Load Battery Voltage (s)	
Maximum ECU Temperature (°C)	450
Logbook Comment	[NO COMMENT SET]

Select *Export* to save a text file containing the currently displayed information, whether it is the overall record or an individual run.

Select *exportAll* for a text file including all runs and the overall record.

Select *Run Sheet* for a tab delimited text file containing every run. This is the easiest exportation for loading in another program.

Selecting *change Units* will change the units of the entire unit group. Note that this change will also affect normal LifeView channels.

2.2 Save/Export

Save

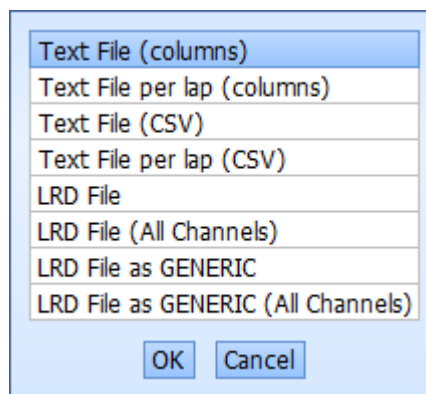
Saving a file will allow concatenated files to be permanently saved as a single file and any annotations or comments stored. To save, select *File, Save*, then *CREATE* for a new folder in the current location or *SELECT* to confirm the current folder as the desired location and then enter a new filename.

Select *Rename* to overwrite the current file with a new name. Default filename contains date and time at engine start, plus time to beginning of logging, ECU serial number and working directory stamp.

Select *save as Logging conFig* to retrieve an .LRL file with the original logging configuration. This is useful when the original file is lost or unavailable.

Export

Exporting a file will only export the selected channels in the visible time frame. Use *zoom to Selection* to select this time frame. Select *File, export To*, to export data as a text file (.txt or .csv) or as an LRD file under the same security as the original file or as an unprotected generic file.

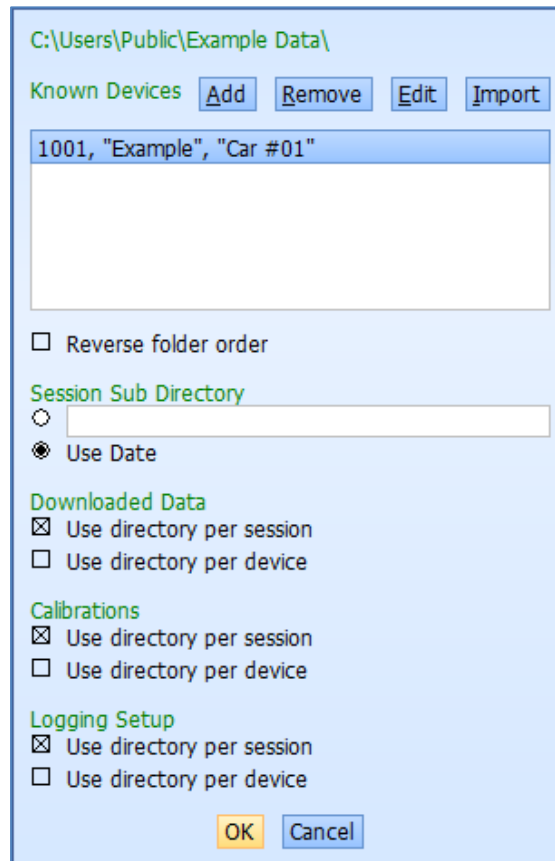


Print

Select *File Print* to print the current display including cursor location and values.

2.3 Working Directory

The working directory is maintained across all Life Racing applications and can be edited in LifeCal, LifeCfg, LifeData, LifeView and PduSetup. To change the current working directory select *Working directory* under *File*. Use *CREATE* to create a new folder in the current location. Use *SELECT* to select the current location as the new working directory. If the location has not been used before, a .CFG file will be created. Selecting *Working Dir Behaviour* allows editing of the .CFG file.



C:\Users\Public\Example Data\

Known Devices

1001, "Example", "Car #01"

Reverse folder order

Session Sub Directory

Use Date

Downloaded Data

Use directory per session

Use directory per device

Calibrations

Use directory per session

Use directory per device

Logging Setup

Use directory per session

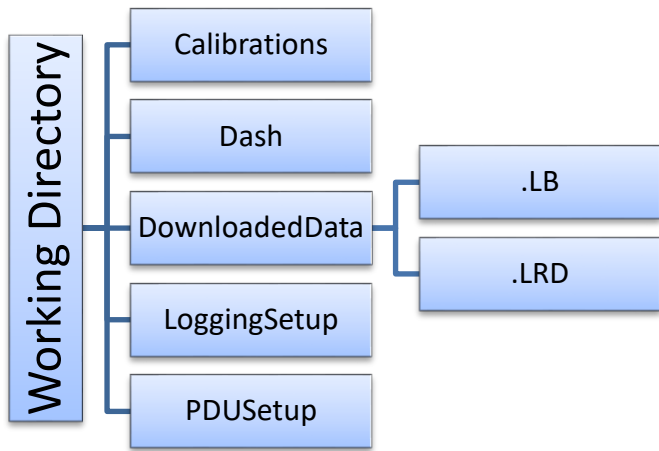
Use directory per device

Devices that have been previously connected to are automatically added to the known devices list. They can also be manually added or imported from another working directory with the appropriate buttons. The ECU name will be used as a folder name if device directory is used. The suffix is included in file names.

Directories can be altered individually for calibrations, downloaded data and logging setup files. Tick use directory per device to separate files by ECU. Tick Use directory per session to use either the Date sub directory or a custom sub directory. A Date sub directory will automatically update and add folders when new data is downloaded.

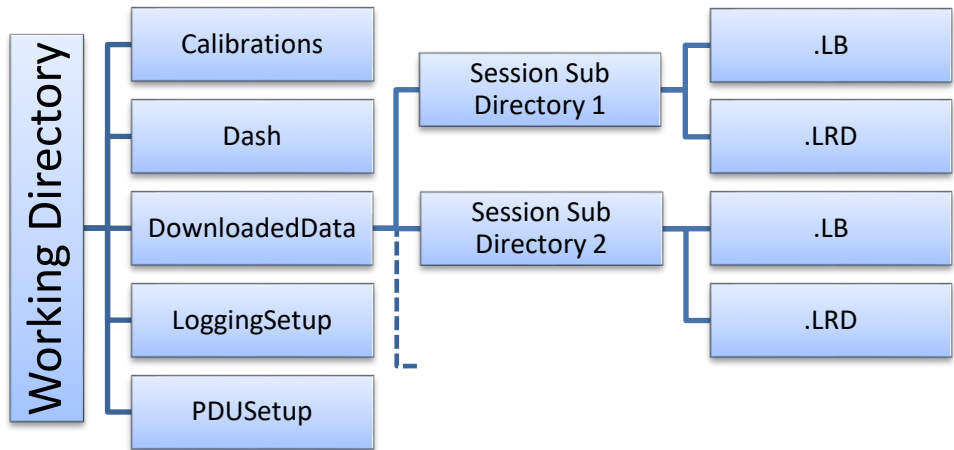
Downloaded Data

- Use directory per session
- Use directory per device



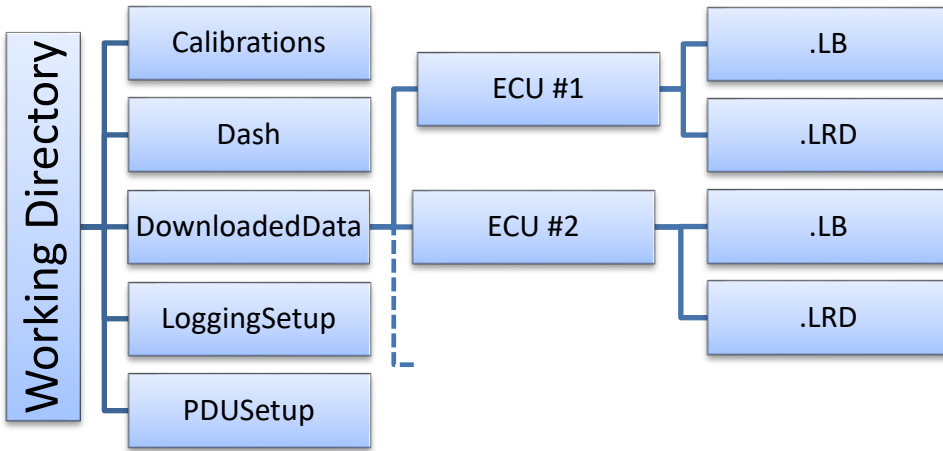
Downloaded Data

- Use directory per session
- Use directory per device



Downloaded Data

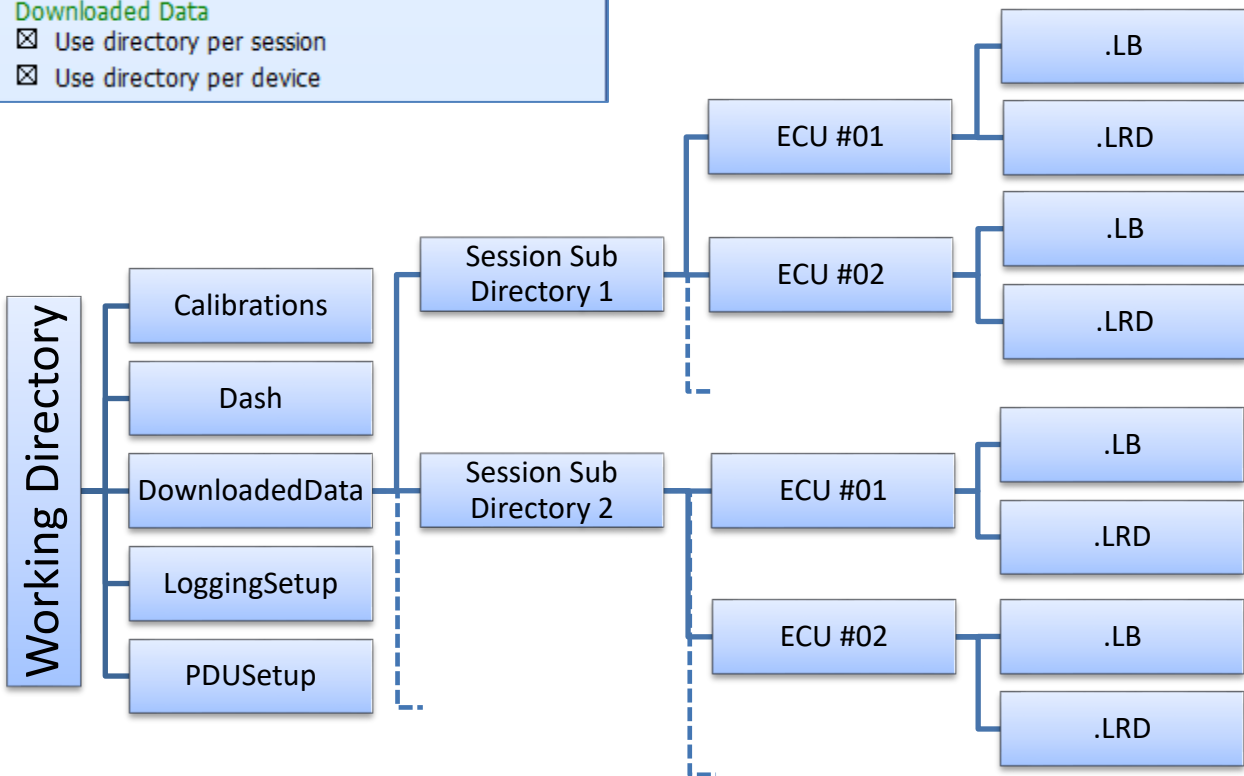
- Use directory per session
- Use directory per device

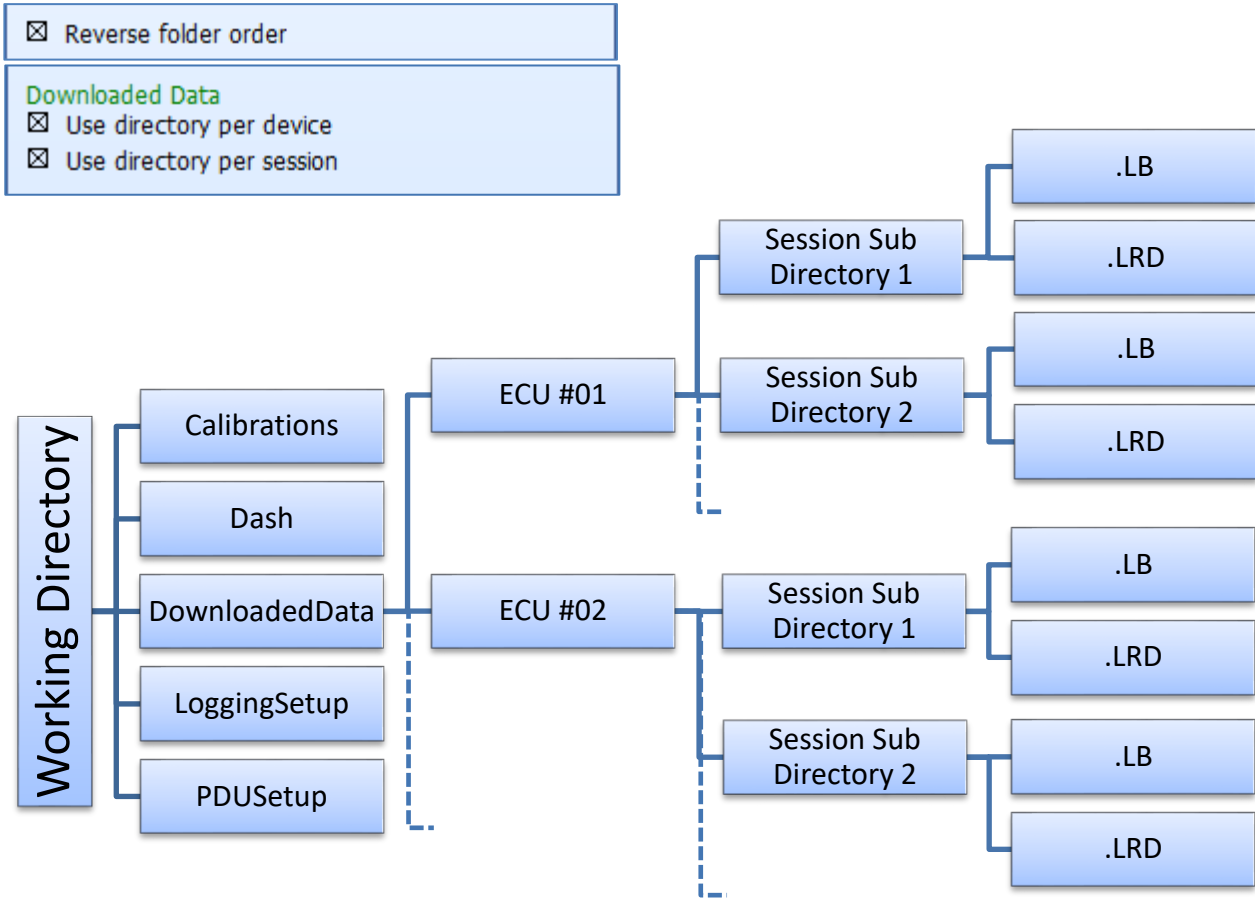


Reverse folder order

Downloaded Data

- Use directory per session
- Use directory per device





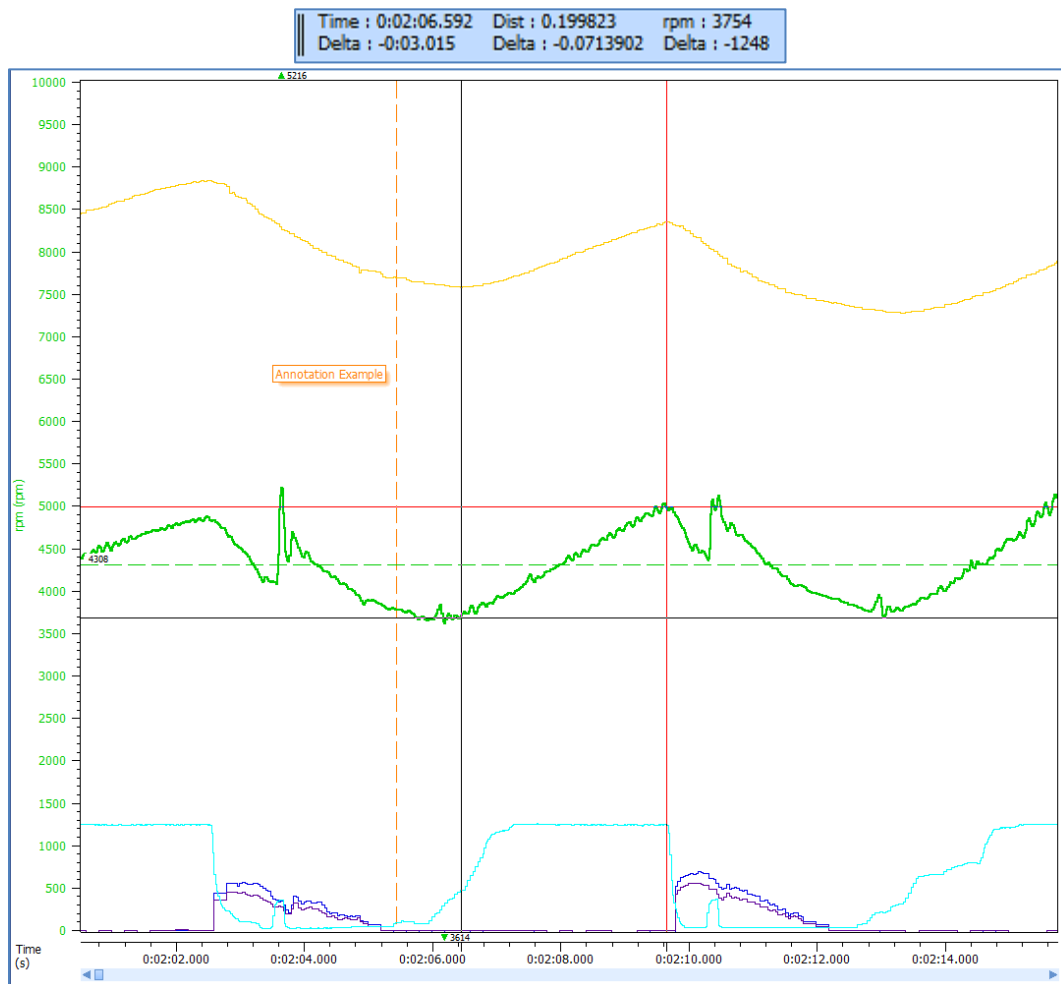
3 Graph

The graph is the primary display tool. It plots selected channels across the duration of the session by either distance or time (Toggled in the *Options* menu).

A cursor is used to navigate the data. Above the graph, numerical values at the current cursor location are given for time, distance and the selected channel. Placing a marker will also give delta values between the marker and cursor locations.

Optional visual aids include a crosshair at the highlighted channel data point, an average value or the minimum and maximum values for the visible data and more. These can be toggled in the *Options* menu.

Annotations will appear as dashed vertical lines at the selected sample location. Hover the mouse over these to display the text.



3.1 Navigation

The graphical area is designed to allow quick and easy navigation of potentially large amounts of data. Both the keyboard and mouse can be used individually or together to achieve this.

Mouse

Left Click	Place cursor
Right Click	Place marker
Left Drag	Move cursor
Right Drag	Zoom to selection
Scroll	Zoom X-axis
Ctrl Scroll	Zoom Y-axis
Double Click	Add/edit annotation
Drag Y-Axis	Move axis maximum
Ctrl Drag Y-Axis	Move axis minimum
Shift Drag Y-Axis	Move entire axis

Keyboard

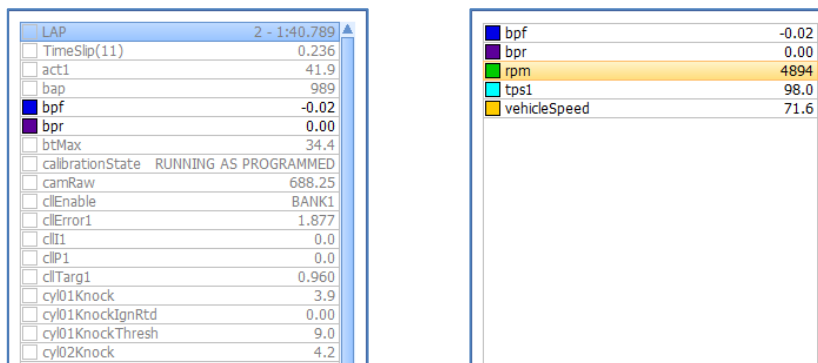
<Left>	Move accelerating cursor to left
<Right>	Move accelerating cursor to right
[Move cursor left to previous different value
]	Move cursor right to next different value
<	Move cursor to previous alarm position
>	Move cursor to next alarm position
<F6>	Move cursor to minimum visible value
<F7>	Move cursor to maximum visible value
<Ctrl> + <Left>	Move cursor to left by 10% of screen
<Ctrl> + <Right>	Move cursor to right by 10% of screen
<Shift> + <Left>	Accelerating scroll to left
<Shift> + <Right>	Accelerating scroll to right
<Plus>	Zoom in X-axis
<Minus>	Zoom out X-axis
<Ctrl> + <Plus>	Zoom in Y-axis
<Ctrl> + <Minus>	Zoom out Y-axis
<Tab>	Toggle graph focus when multiple graphs are open
<Space>	Place marker
<Backspace>	Remove marker

The *Zoom* menu can also be utilised with its shortcuts to *Zoom To Selection*, *Zoom Previous* or *Zoom Right Out*.

The cursor can be temporarily hidden for ease of viewing under *Graph, Clear Cursors*. Certain options such as cursor acceleration and right click zooming can be toggled, depending on user preference when navigating.

3.2 Channels

Channels include all monitoring items and added math functions. These are displayed in the 'Key', to the right of the graphical display. The Key has two modes of operation, selectable in the options menu. The normal mode shows all the channels in a data file. It gives the value of each channel at the current cursor position. Channels that are shown in one of the graphs also have a colour tab to show their respective trace colours. The alternative mode only shows those channels displayed in the graphical display area. If more than one graph is displayed, there will be separated lists for each. When in the reduced view, all active traces can be toggled in the *Graph* menu. The information panel will display which file the highlighted channel is from.



Channel	Value
LAP	2 - 1:40.789
<input type="checkbox"/> TimeSlip(11)	0.236
<input type="checkbox"/> act1	41.9
<input type="checkbox"/> bap	989
<input checked="" type="checkbox"/> bpf	-0.02
<input checked="" type="checkbox"/> bpr	0.00
<input type="checkbox"/> btMax	34.4
<input type="checkbox"/> calibrationState	RUNNING AS PROGRAMMED
<input type="checkbox"/> camRaw	688.25
<input type="checkbox"/> clEnable	BANK1
<input type="checkbox"/> clError1	1.877
<input type="checkbox"/> clI1	0.0
<input type="checkbox"/> clP1	0.0
<input type="checkbox"/> clTarg1	0.960
<input type="checkbox"/> cyl01Knock	3.9
<input type="checkbox"/> cyl01KnockIgnRtd	0.00
<input type="checkbox"/> cyl01KnockThresh	9.0
<input type="checkbox"/> cyl02Knock	4.2

<input checked="" type="checkbox"/> bpf	-0.02
<input checked="" type="checkbox"/> bpr	0.00
<input checked="" type="checkbox"/> rpm	4894
<input checked="" type="checkbox"/> tps1	98.0
<input checked="" type="checkbox"/> vehicleSpeed	71.6

Key navigation uses a different set of shortcuts to graph navigation, allowing simultaneous use.

<Up>	Up one channel
<Down>	Down one channel
<Page Up>	Up page of channels
<Page Down>	Down page of channels
<Return>	Add/Remove channel on focus graph
<Right Shift>	Toggle between data files when more than one loaded
<Delete>	Remove math channel
<F2>	Toggle Key visibility

The *Channel* menu displays the same options as right clicking a channel in the key:

Add

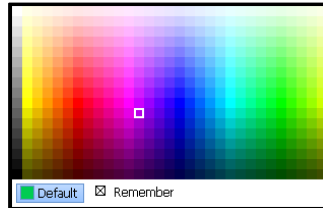
Add a channel to the active graph. Select from the list or begin typing the name of the desired channel to shorten the list.

Remove

Remove the highlighted channel from the active graph.

Colour

Change the colour of the channels data trace. Tick remember to use the selected colour as default for all files.



Scale

Auto scale sets the minimum and maximum scale values to the minimum and maximum found in the data.

Set scale allows custom minimum and maximum values. Tick the remember box to set the new scale as default. *Remember current scale* can also be used.

The Scale can also be edited by right clicking the y-axis in the graph area.

Filter

Add a new trace containing the filtered values of the highlighted channel. This will not be available for channels logged at 1Hz.

AlarMs

Set thresholds for the selected channel. Thresholds will be displayed as dashed lines at the set values. When these values are exceeded, the channel in the key and the sample point in the graph will flash. Alarms are only monitored in the visible time frame. If using an expression alarm, ensure any reference to a maths channel is enclosed in "quotes".

Set "ect1" Alarms

Enable

High Threshold

Low Threshold

Expression

Remember as default

If "Remember as default" is checked, these alarm values will be used whenever the channel is visible, including in trace reports. If it is left unchecked, the alarm will only be used in the current instance but can be stored within the worksheet.

Sample Average Limits

Set the upper and lower limits of values to be used in Averaged Samples Mode calculations.

Change Units

Change the display unit of all items in unit group. If a single unit change is desired, a math channel can be used to achieve this. Note that units are universal across files and applications.

Edit Math

Open the math window for the selected math item.

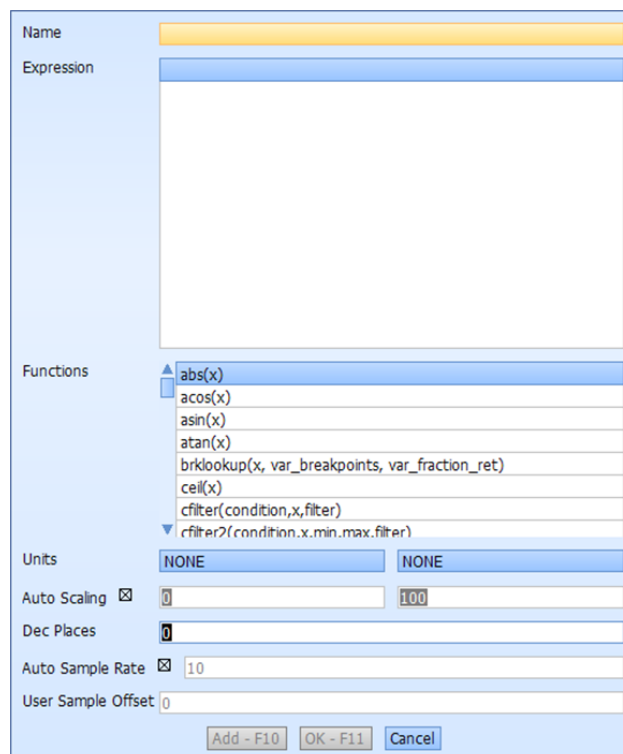
Delete Math

Remove the math channel from the display and key.

3.3 Math

Math can provide a wide range of further data manipulation varying from simple scaling to complex, multi-function expressions. Choose a new or existing maths expression from the *Math* menu to open the Math Window. The list of maths can be filtered by worksheet or workbook depending on where they are used. Currently active maths channels will always be visible. Maths channels that will not successfully run with the open data will be highlighted in red. Maths can be exported and imported from the same menu. Use <CTRL> and <SHIFT> to select multiple channels. Remove a maths channel by selecting *Delete* and selecting from the list or by highlighting and selecting the <delete> key.

The Math window enables the adding and editing of math channels. Once added, the math channels behave the same as data channels with the additional right click options of editing and removing.



The screenshot shows the 'Math Window' dialog box. It has a 'Name' field at the top, followed by an 'Expression' text area. Below that is a 'Functions' list with a scroll bar, containing the following items: `abs(x)`, `acos(x)`, `asin(x)`, `atan(x)`, `brklookup(x, var_breakpoints, var_fraction_ret)`, `ceil(x)`, `cfilter(condition,x,filter)`, and `rfilter?(condition.x.min.max.filter)`. Under the list are two 'Units' buttons, both set to 'NONE'. Below that are 'Auto Scaling' (checkbox checked, range 0-100), 'Dec Places' (input 0), 'Auto Sample Rate' (checkbox checked, input 10), and 'User Sample Offset' (input 0). At the bottom are three buttons: 'Add - F10', 'OK - F11', and 'Cancel'.

Name

Create a channel name for your maths channel. Must not contain these characters:

Full Stop	.	Less than	<
Forward slash	/	More than	>
Back slash	\	Vertical bar	
Colon	:	Quotation marks	"

Expression

Type your maths expression here. Expressions can include any monitoring item or other maths channel. Take care when adding channels as they are case sensitive. Suggested functions or variables will be displayed as you type. Use the <Enter> key to select the highlighted suggestion. When a function is selected, it will automatically be highlighted in the functions list below so the format it expects is visible. Error hints will appear when the expression is invalid. Right click this box to cut, copy or paste.

Functions

This list contains all functions available in alphabetical order. Highlighting a function will display an explanation. Double clicking or using the <Space> bar will paste the function into your expression.

The full list of functions and details on how they are used can be found in the Math Manual, available for download from www.liferacing.com under Downloads, Manuals, Software.

Units

Select the unit group and unit that the result will be outputted in. This will display on the y axis label.

Auto Scaling

Tick box to enable auto scaling or type custom min max values for y axis. Auto scale will use the max and min values of results as the scale max and min.

Dec Places

Type the number of decimal places to be displayed in results. This is a visual option only and does not affect calculation accuracy.

Auto Sample Rate

Tick box for automatic sample rate. This will use the highest sample rate of the items used in the expression. It will also follow burst logging rates. For custom sample rate, type in the box how many times a sample should be taken in a second.

User Sample Offset

Maths channels can create delays when referencing multiple points. Sample offset allows the shifting of data by the typed number of samples. Number of samples must be less than sample rate.

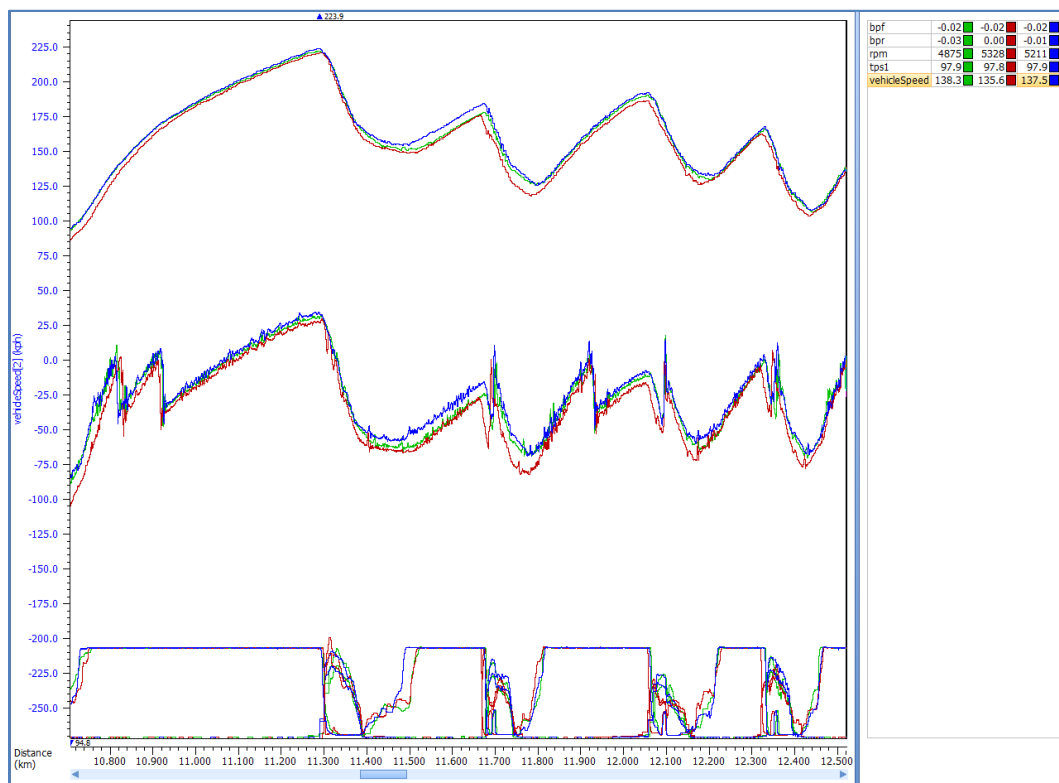
3.4 Lap Mode

Lap mode causes the program to treat the selected lap as an entire file and will temporarily display only the selected lap. Select any lap from the Lap menu to enter lap mode. From the same menu, any other lap can be displayed or lap mode switched off. This is most useful when multiple layers are open. If properly overlaid, a laps can be independently selected from each dataset, allowing easy lap comparisons.

3.5 Layers and Multiple Files

The *load anOther* option in the File menu allows multiple sets of data to be compared on the same display. Selecting Add Layer in the Layer menu will allow overlaying of the same dataset to compare different areas. The Layer menu will show details of all currently open layers and files. Layers can be removed in this menu with the <Delete> key.

The key will display each data set in separate columns with a differing colour assigned to all of its items by default (Can be switched off in Options). Tap the right <Shift> to toggle the active layer. Hold the left <Shift> key and drag on the graphical display to offset an added file. Return any additional open files to their original positions by selecting Session, Reset Offsets. Multiple files are easier to compare in distance mode rather than time to account for the differing lap times.



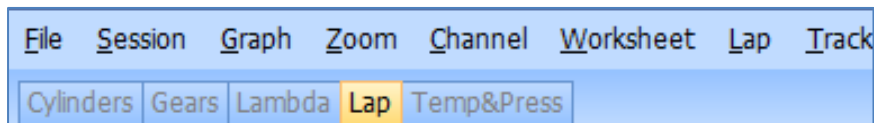
4 Worksheet

A worksheet is a saved layout design including graphs, track maps, reports and active channels. These can then be used with any future set of data. Worksheets are saved and opened in the *Worksheet* menu. Save a new worksheet with *Save* and type a name, or an existing worksheet with *Overwrite*. Worksheets can be renamed with *Rename worksheet* and deleted with the <Delete> key. The worksheet set as default will be automatically used when a file is opened and is marked with an asterisk (*). Others can be selected in the same menu with its numerical shortcut.

4.1 Workbooks

Workbooks allow worksheets to be grouped together. By default, a single workbook named “default” is created. To create a new workbook, set a new default, rename or delete an existing workbook use the corresponding menu options in the same way as worksheets. Workbooks are saved automatically. Worksheets can be copied from one workbook to another with *Add worksheet to workbook*.

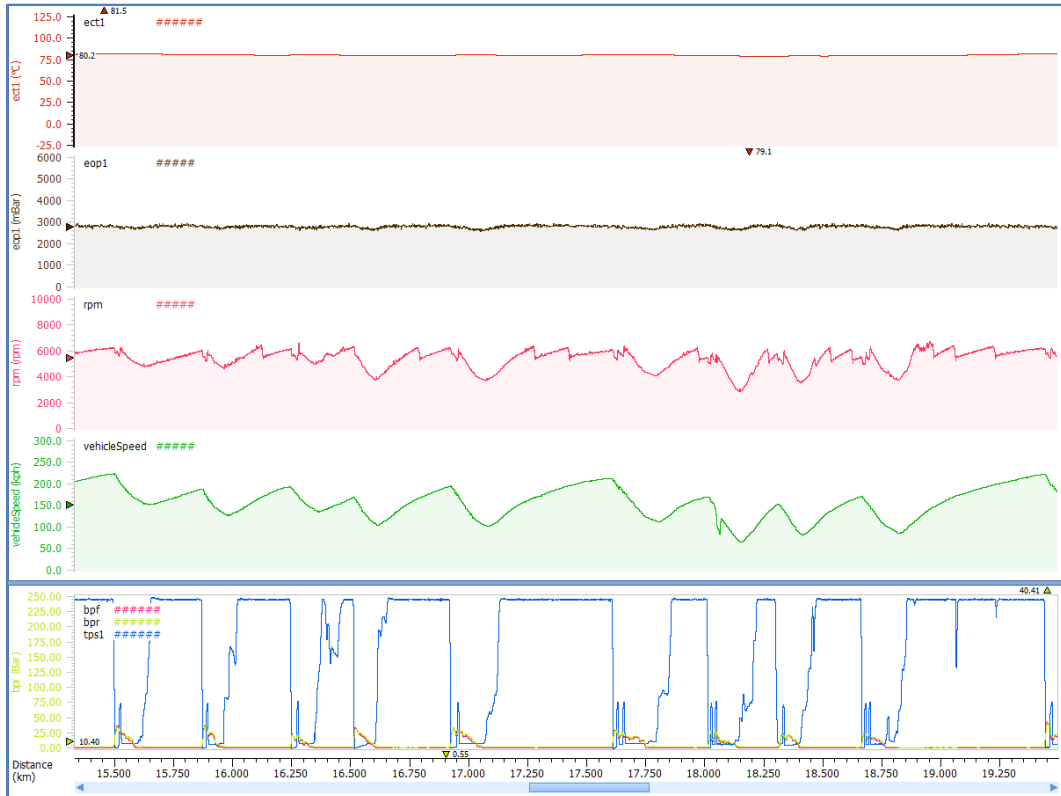
A workbook will display all of the worksheets contained as tabs. These can be toggled with *enable/disable Tabbed worksheet*. This allows quick transition between pages by selecting the relevant tab.



Workbooks can be imported and exported to allow the transfer of worksheets to other computers. Select *Worksheet, Export Workbook* to create a file in a chosen destination. This file can then be transferred and imported by another user with *Import Workbook*.

4.2 Graphs

Additional graphs can be added to worksheets under the Graph menu. Multiple graphs are displayed vertically so they can share the same x-axis. Graphs can be resized but as they share an x-axis will remain equal width. Selecting Graph, Tile will evenly distribute allocated height. The active graph and channel in the active key (alternative key style) will be highlighted and can be switched between with the <TAB> key. Selecting Graph, toggle Stack traces will stack each active trace in the selected graph on top of one another on separate axis rather than overlaying. Stacks can be toggled for each graph individually.



4.3 Reports

Reports are added from the Report menu. A separate window will be opened where the report can be edited. From here, reports can be printed, exported or docked in the worksheet.

Reports will only display information from the currently visible data so ensure the graph is zoomed to the data range desired. Once docked, the display will update to the visible data range.

4.3.1 Lap/Stats Report

The lap/stats report allows statistical data to be displayed in a grid for quick summary viewing. It can be based on lap, the current view or an entirely custom dataset based on a maths report. Select New to add either all channels, active channels or manually selected channels based on lap or view. If based on current view, this report will update when your view changes.

Additional channels may be added or removed manually with the Add and Remove buttons. When adding, it is possible to select exactly which statistics to show. This can also be modified with existing channels by selecting Edit. Minimum, Maximum, Average, Standard Deviation and Coefficient of Variance are all options.

Select New, Favourite to store the current report as a favourite. This may then be recalled at any time from the Favourites button. Also listed here will be any maths reports created. When a maths report is loaded, the Edit button will instead open the maths editor. For more information on creating maths reports, refer to the maths manual.

	bOf				rpm				tps1				vehicleSpeed							
	Min	Max	Avg	StdDev	Min	Max	Avg	StdDev	Min	Max	Avg	StdDev	Min	Max	Avg	StdDev	CoeffVar			
OutLap : 10:33.985	-10.05	55.13	1.33	5.48663	413.573	235	4609	1575	315.765	20.0548	6.0	37.6	7.9	2.64237	33.4643	0.0	39.9	1.0	5.2841	537.143
Lap 1 : 2:10.422	-8.96	52.00	5.15	9.79377	190.291	2634	7387	5863	858.052	14.6354	4.5	101.6	65.0	36.4019	56.0043	31.0	224.1	131.2	40.7478	31.058
Lap 2 : 2:01.422	-6.84	54.94	6.06	11.4406	188.776	3526	7357	5985	637.173	10.647	7.8	101.2	66.2	36.7525	55.5469	58.9	226.8	141.0	39.02	27.6755
Lap 3 : 2:02.721	-8.01	49.86	6.51	11.5718	177.859	3535	7949	5925	688.249	11.6163	9.1	101.0	67.2	36.6646	54.5219	57.5	225.9	139.3	39.8516	28.6017
Lap 4 : 2:02.032	-4.10	50.44	6.59	12.025	182.474	3468	7383	5932	661.7	11.3554	7.8	101.2	67.2	36.8684	54.8289	56.7	226.2	139.5	39.6946	28.4561
Lap 5 : 2:01.333	-8.49	49.86	6.30	11.5979	184.075	3413	7448	5976	652.456	10.9171	7.8	101.0	67.3	36.4019	54.0639	55.7	225.5	140.3	39.3847	28.0661
Lap 6 : 2:01.618	-9.43	48.30	6.18	11.2046	181.255	3510	7252	5982	639.765	10.6949	8.0	101.0	65.4	36.7494	56.1585	56.9	226.8	140.0	39.1679	27.9839
Lap 7 : 2:00.826	-9.58	51.61	6.37	12.1847	191.326	3498	7244	5949	664.725	11.1742	8.0	101.2	68.2	36.8215	53.9518	56.7	227.2	140.7	39.7645	28.2716
Lap 8 : 2:07.124	-8.80	53.37	6.28	11.1132	176.899	3370	7381	5770	765.936	13.2746	10.8	101.0	55.9	35.2065	62.9629	56.7	227.2	133.9	39.3776	29.4007
Lap 9 : 2:07.126	-10.21	39.88	4.83	8.6335	178.765	3407	7318	5845	627.708	10.7389	5.1	101.9	47.1	30.6276	64.9982	58.0	213.2	133.9	34.7681	25.9747
Lap 10 : 2:06.627	-9.58	32.66	4.52	7.55229	167.009	3367	7435	5829	668.534	11.4695	4.9	101.6	52.2	34.0724	65.3084	56.0	215.8	134.6	35.964	26.7249
Lap 11 : 2:03.728	-8.49	38.71	5.16	8.56899	166.22	3445	7356	5886	691.11	11.7406	10.8	101.7	58.2	36.6169	62.9638	56.2	222.8	137.6	37.5404	27.2745
InLap : 3:24.901	-8.80	42.43	3.85	6.16025	159.804	866	7425	4348	1253.99	28.8389	0.1	101.7	29.4	25.5632	86.97	0.0	199.2	83.3	38.7487	46.5108

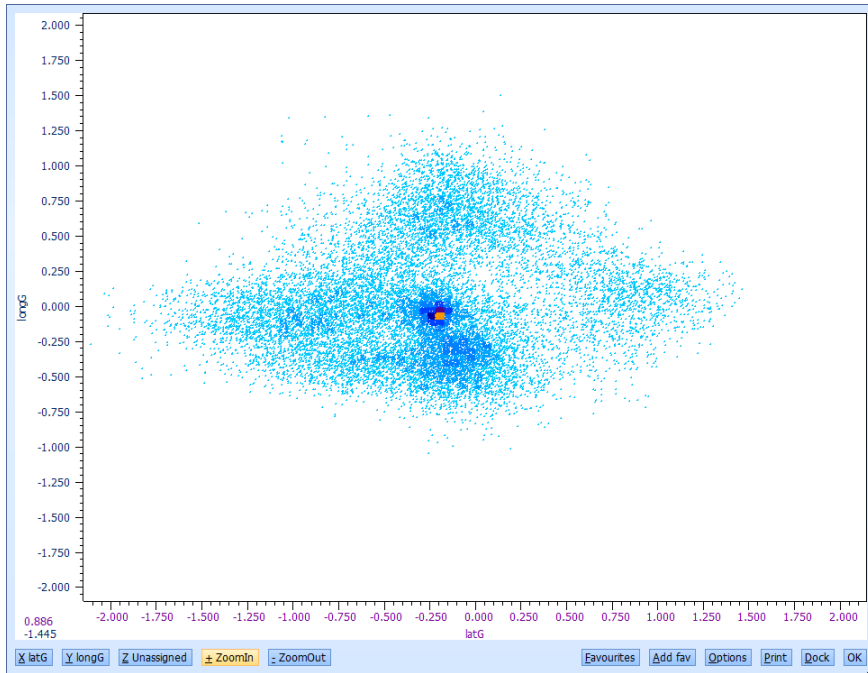
When viewing stats by lap, the minimum lap value will be highlighted blue, and the maximum red.

Cells can be selected and copied with the Copy button to paste into another program such as Excel for further analysis. Note that only the selected cell's values will be copied and the headings will not be included. Alternatively, Selecting Export will copy all of the data, including the headings into a text file in the working directory.

Select Dock or Float to add report to the worksheet and OK to close.

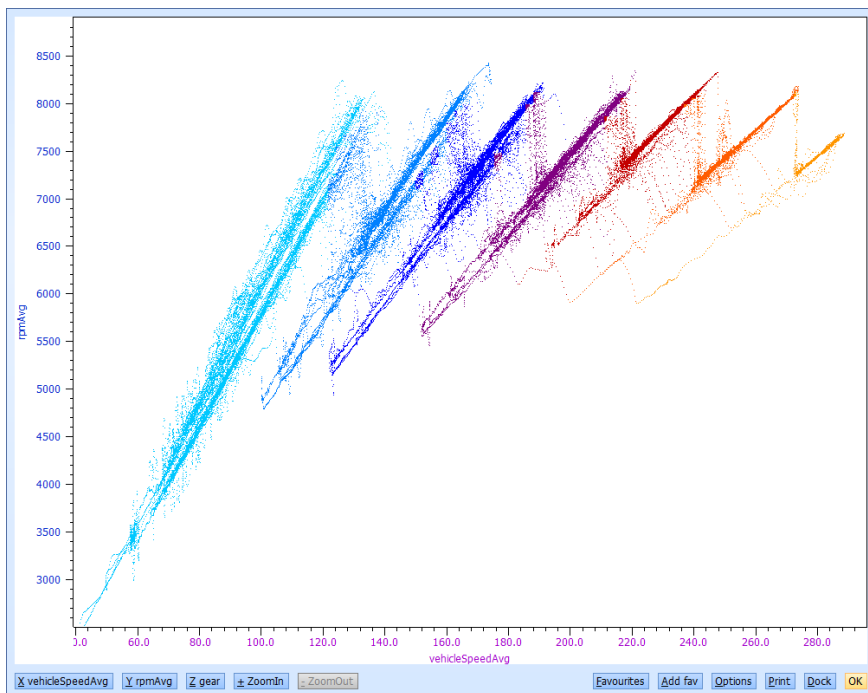
4.3.2 XY Plot

An XY plot allows any channel to be assigned to either axis to produce a scatter graph. Selecting Report, XY Plot will open a new window with a blank plot.



Assign each axis with the relevant button. The XY axes can be swapped under Options, Swap XY. Colours appear darker where data is more concentrated. Numerical values can be seen for each axis in the bottom left hand corner.

A second Y-axis or a Z-axis can also be added. The second Y-axis will use the same scale as the first but be displayed in a different colour. A Z-axis utilizes colour banding to display different values.



The same channels from different files can be overlaid under *Options, Toggle Overlay Mode*. Each file will display in a different colour. Select *Reverse Overlay Order* to change which file is viewed on top. Overlay mode only works for a single Y-axis and no Z-axis.

A line of best fit is added by default but can be toggled under *Options, Line of best fit*. This will automatically update for the currently viewable section of data and includes the equation of the line.

The plot can be resized by either zooming or moving the scales in the same way as the main graph. Right click the scales for more precise control. When data is highly magnified or when there are fewer data points it is recommended that intensity is increased for easier viewing under *Options, Intensity*. Colour can also be changed to greyscale with the Toggle Colour/Grey option. This cannot be toggled when overlay or multiple Y-axes are being used.

Save an XY plot layout as a favourite to quickly reload them when required.

Select *Print* to print report, *Dock* or *Float* to add report to the worksheet and *OK* to close.

4.3.3 Traces

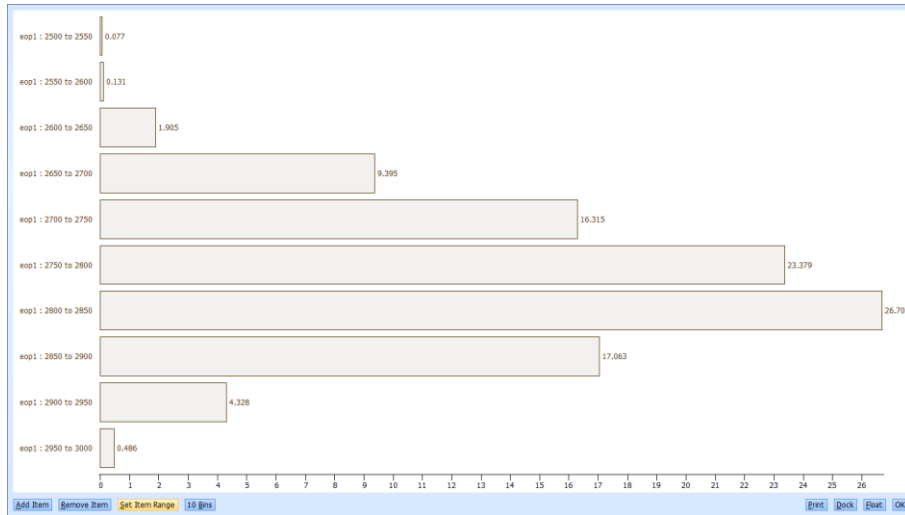
A trace report is very similar to the main graph but can be separated in the dock or floated like other reports. It has the same options such as stacked traces, alarms and colours but all options are independent of the main graph area. Zooming on the report will also zoom the main graph.



Select *Print* to print report, *Dock* or *Float* to add report to the worksheet and *OK* to close.

4.3.4 Histogram

A histogram shows the percentage of time an item is within certain value ranges. Added items will be displayed in the colour set in the Key. Item ranges and the number of ranges can be altered with the appropriate buttons. Select *Print* to print report, *Dock* or *Float* to add report to the worksheet and *OK* to close. Once docked, the active range at the cursor location will be highlighted.



4.3.5 2D Histogram

A 2D Histogram shows percentages like the normal histogram but measures two parameters. Each parameter can have its ranges individually altered by selecting that item. Save commonly used items and ranges as favourites to quickly reload them when required. Colours are graded for easier visualization. Select *Copy* to place the table values in the clipboard. This can then be pasted into another application such as Microsoft Excel. Select *Dock* or *Float* to add to worksheet or *OK* to close. When docked, the value at the current cursor position is highlighted.

	0.500	0.600	0.700	0.800	0.900	1.000	1.100	1.200	1.300	1.400
	0.600	0.700	0.800	0.900	1.000	1.100	1.200	1.300	1.400	1.500
0 - 700	0	0	0	0.077	0.066	3.398	0.031	0	0.097	6.323
700 - 1400	0	0	0	0.417	1.800	1.077	0.093	0.014	0	0
1400 - 2100	0	0	0.003	0.412	4.386	1.109	0.022	0.015	0.005	0
2100 - 2800	0	0	0.085	0.245	2.600	0.621	0.010	0.010	0.007	0.015
2800 - 3500	0	0	0.924	0.911	5.204	1.159	0.100	0.040	0.035	0.979
3500 - 4200	0	0.018	0.250	2.864	9.427	0.923	0.219	0.093	0.085	5.505
4200 - 4900	0	0	0.289	11.673	8.325	0.575	0.254	0.218	0.315	6.737
4900 - 5600	0	0	0.229	5.868	9.624	0.394	0.182	0.146	0.221	1.389
5600 - 6300	0	0	0.017	0.902	0.902	0.008	0.003	0.006	0.004	0.005
6300 - 7000	0	0	0	0.009	0.027	0	0	0	0	0

4.3.6 Sector Report

This report can only be used by a single file. With multiple files loaded, only the first file [0] is used.

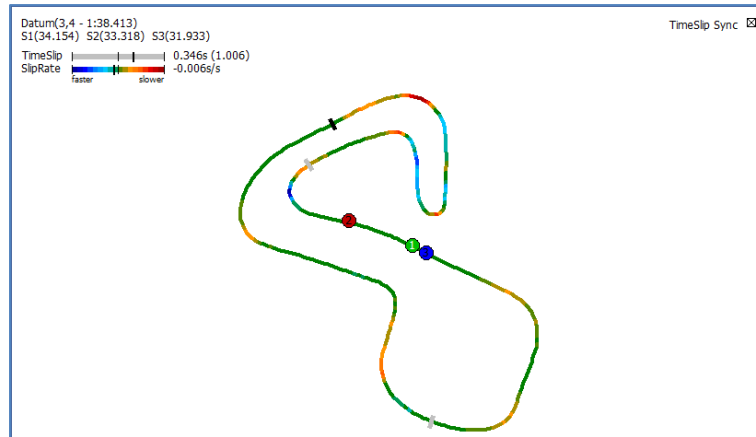
A Sector Report displays sector times throughout the session with the fastest sector and lap times displayed in green. The Optimum Lap Time displayed is the potential fastest lap using the total time of all the quickest sectors. When docked, the sector at the current cursor position is highlighted. The report can also be used to navigate through the session. Select a sector on the report to display just that sector on the main graph. Multiple consecutive sectors can also be selected.

	Sector 1	Sector 2	Sector 3
Lap 0 0:36.467	0.000	0.000	0.000
Lap 1 1:42.530	35.679	34.319	32.531
Lap 2 1:40.776	34.877	33.924	31.974
Lap 3 1:39.807	34.380	33.416	32.011
Lap 4 1:40.136	34.491	33.632	32.012
Lap 5 1:39.892	34.341	33.463	32.086
Lap 6 1:40.392	34.335	33.857	32.199
Lap 7 2:01.397	0.000	0.000	0.000

Optimum Lap Time : 1:39.725

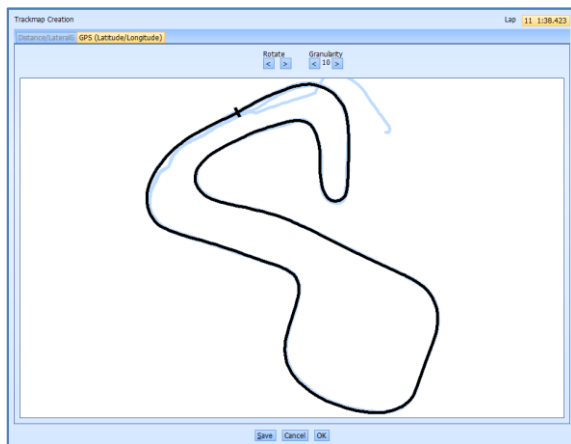
4.4 Track Map

A track map can be displayed to show the vehicle position throughout the data. The vehicle icon will follow the map as the cursor is moved on the graph. Alternatively, the same icon can be dragged around the map and the cursor will follow. The icon will change its appearance when the vehicle is off track such as in the pits.

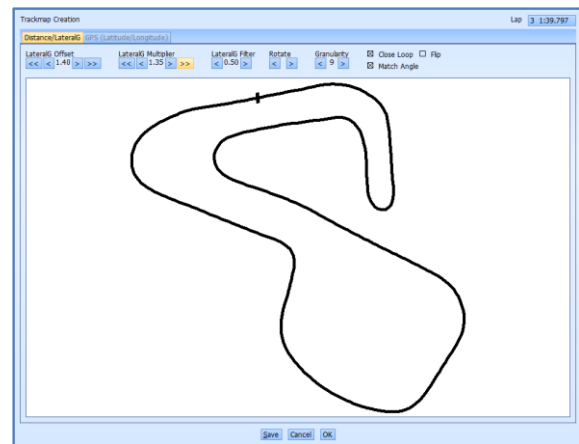


To add a track map to the worksheet, it can either be loaded or created under the TrackMap menu. Track maps can be created from GPS coordinates or calculated from distance and lateralG. Using the latter method will require some fine tuning of the various options. All recorded GPS positions will be displayed with the chosen lap emphasised. Calculated position will display the chosen lap only. By default, the fastest lap is used.

If a worksheet includes a trackmap, one will automatically be generated if GPS coordinates and beacons are logged.



GPS (Latitude/Longitude)



Distance/Lateral G

Right click on the screen to bring up beacon options. This allows additional beacons to be added for sector times or the adding of an END beacon for sprint routes. Beacons can be added by mouse line, lap distance or GPS coordinates. When adding by distance note that the second box is the total lap distance and therefore your maximum value. Once a track has been loaded it can be added to any other worksheet quickly using Add instead of load. Close the map by either selecting remove after right clicking or Close in the menu.

Select Save to store the created map. Saved track maps can be found in the main Life Racing folder (default location C:\Program Files (x86)\Life Racing\TrackMaps). Select OK to close and reload any existing trackmap areas. Select Dock to fix a trackmap to the left of the screen, select Float to add a floating window that can be moved anywhere on screen. The trackmap will be slightly transparent if overlaying the main graph area. Right click the map area to access display options or use the TrackMap menu.

Dynamic Remap (1)

Redraw the map for each lap, using the new data. GPS only.

Change Datum

Select the lap that time slip uses as its reference lap. Fastest lap is used by default.

Colour by TimeSlip

Colour by time slip from datum lap.

Colour by Item Value

Colour the map by any other item value.

TimeSlip Emphasis

Change the colour shift emphasis on the amount of time slip.

Rotate

Use the scroll bar or type an angle in degrees to rotate the map.

Print

Print an image of the track map as currently displayed, including car locations and applied colours.

Remove

Remove the trackmap. This does not close the active trackmap so selecting TrackMap, Add elsewhere will restore the map without having to reload or recreate it.

Move Up/Down

If docked, this allows the trackmap to move position in the dock area relative to other displayed reports.

Dock/Float

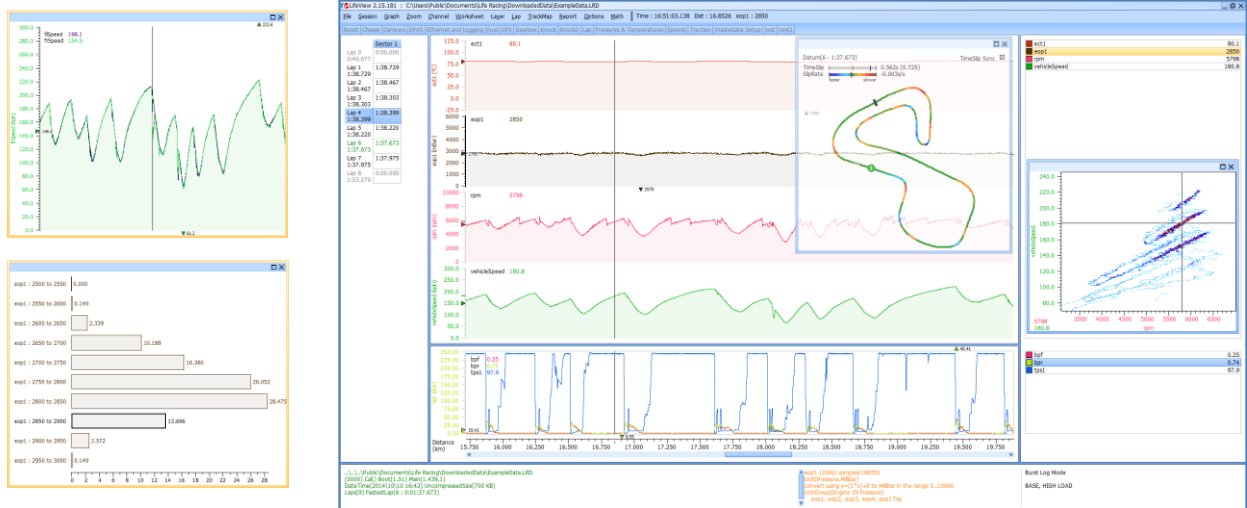
Toggle the trackmap between the fixed dock position and floating window.

TimeSlip Sync

With this box ticked, the TimeSlip item channel will be synchronised with the map time slip. When unchecked, a new datum for the map must be chosen as the channel and the map datum will now be independent. Channel datum can be changed in the Channel menu.

4.5 Floating Windows

Track maps and all dockable reports can be made 'floating' which will allow them to be moved around the screen or even onto a secondary screen. Floating windows can be named by right clicking and positions are remembered within saved worksheets. If a position is no longer available they will return to the default position.



Floating windows can be interacted with in the normal way unless the 'click through' option is enabled. This is accessible through the right click menu and will cause all mouse actions to be applied through to the main window underneath. The menu can still be accessed through the top ribbon.

Floating, Docked and maximised windows can all be removed independently from the *Report* menu. Selecting *Print floating reports* will print all active floating reports on a single page as they are laid out on screen.

5 Options

5.1 Session

The *Session* menu contains options for the current open files.

Open Windows Explorer

Open file location in windows explorer.

Comment

Edit the Logfile comment.

Reset Offsets

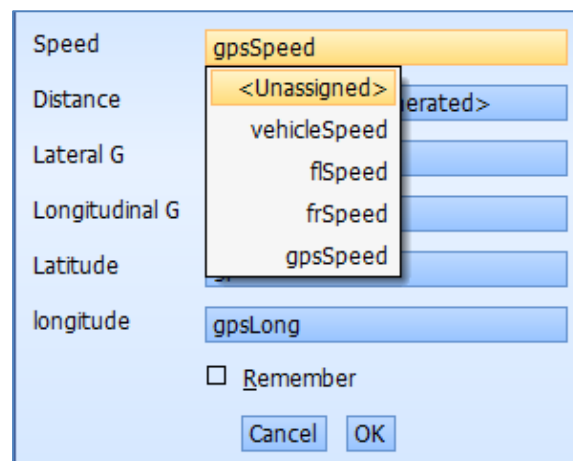
Return any offsets of overlaid files.

GPS Preferences

Alter GPS offset time and filter rate for either the open file only or as defaults for all files.

Special Channels

Choose what monitoring items will be used as special channels. It is these channels that are used to calculate vehicle position. Tick *Remember* to set as defaults.



Beacons

Select where to take beacon information from; the track map or data. When a track is created, it stores the beacon position from the data plus any beacon alterations done. It is these that are used by default.

File beacons can also be edited. They can be added, moved or removed completely with the appropriate menu options. Alternatively, select *make beacons persistent* to overwrite the file beacons with the map beacons.

copy Info to clipboard

Copy specific file information so that it can be pasted in another programme. If more than one file is open, the active file (shown in the information panel) is used. Calibration, file, session and item information can be individually copied from here or by right clicking the information bar.

5.2 Toggle Options

Toggle options are found under *Options, All Toggle Options*.

Time of day on X-axis

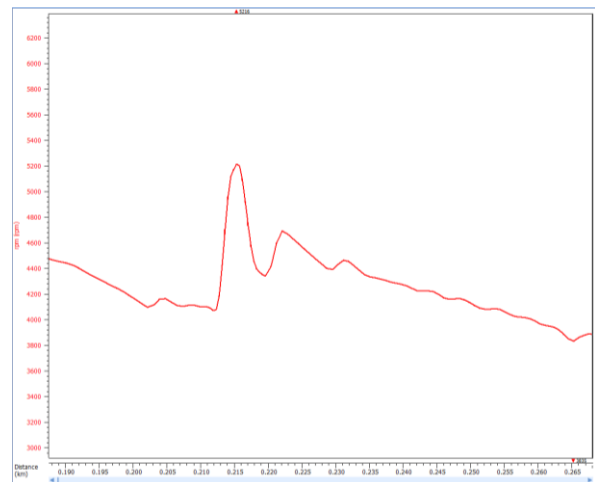
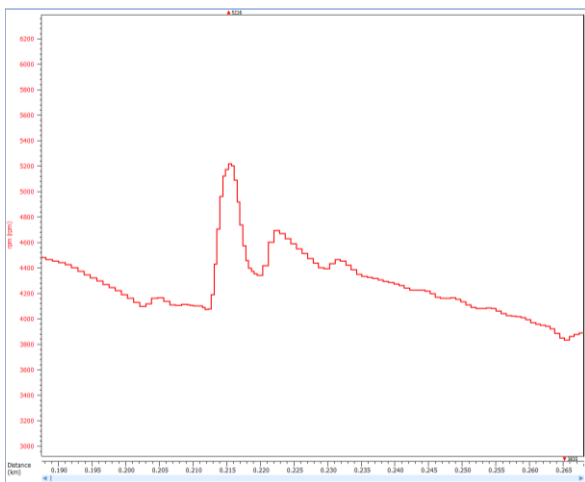
Display time of day or time into session.

Distance Mode

Toggle the X-axis between time and distance. Distance is often more useful when comparing multiple data sets.

Interpolate Mode

Toggle between displaying raw or interpolated data. Interpolation fills the space between data points with estimated values, creating a smoother look, particularly for low logging rates. However, as these values are estimated, they may not be an accurate representation.



Minimum Key Style Mode

Toggle between displaying all channels and displaying only active channels.

Show Item Names

Show active items in the top left corner of the graph display in their line colours.

All Min Max Mode

Toggle whether to show just the select channel max and min values or all active channels.

Bright Key

With bright key deactivated, any unused channels on display in the key will be dimmed.

Bold Focus Trace

The selected channel is always brought to the front of the display. This toggle will also cause the selected channel to have a bolder trace than the others for clearer viewing.

Fill Under Focus Trace

The selected channel is shaded between the bottom axis and the trace for clearer selection and highlighting changes.

Click Trace For Focus

Clicking on a trace in a graph will switch focus to the selected channel.

Shared channel colour per session

With this selected, whenever additional files are overlaid, each file will be assigned a single colour to all of its channels. If unselected, each file will display the same defaulted colours for each channel.

Average on Focus

Show the average of the selected channel in the visible period.

Averaged Samples Mode

Average samples mode will display only the average value for each channel in the visible area.

Show Annotation Lines

Toggle the visibility of vertical dashed annotation lines including user annotations, logging markers and concatenation information.

The most commonly used toggles are also available directly under the *Options* menu to allow quick key presses.

Time/Distance Toggle

Interpolate Toggle

Key Style Toggle

5.3 Cursor Options

Cursor options are found under *Options*, *Cursor Options*.

Enable Cursor Acceleration

Continuously speed up cursor movement the longer an arrow key is held.

Limit Cursor Acceleration

Limit the cursor to a finite speed chosen with the scroll bar.

Channel Info Tooltip

Display channel name and value at the point the mouse cursor is hovering over.

Right Mouse Zooming

Allow or disable selection zooming by dragging with the right mouse button.

Cursor Crosshair

Toggle the horizontal crosshair. This line will follow the value of the selected channel at the cursor time position.

Manual Cursor Crosshair

Crosshair follows mouse pointer rather than data values.

5.4 Concatenated File Options

Concatenated file options can be found under *Options, Concatenated File Options*.

Enable default concatenation actions

Enable to skip dialogue options during concatenation.

Preserve time gaps

Keep gaps between log files automatically.

Collapse time gaps

Eliminates gaps between log files automatically.

5.5 Global Options

Global options affect all applications and can be found under *File, Global Options*.

Black-on-White colour scheme

Toggle the colour scheme of all Life Racing applications between a white background and a black background. The best option will be dependent on screen quality, ambient lighting and user preference.

Colour Blind (yellow/green)

Changes fixed yellows to purple to aid with yellow/green confusion.

Reverse Folder Order (in file menu)

Folders are ordered alphabetically in the file menu. Tick this box to reverse this order.

Floating Mouse Focus (in dialogs)

Causes whatever the mouse pointer is hovering over to be highlighted as if it was selected with the keyboard.

6 Document Revision History

2015-07-21	MH V1.0	Initial public release
2015-10-08	MH V1.1	Added Sector Report Added Workbooks & Worksheet tabs
2015-12-22	MH V1.2	Updated Working Directory
2016-07-11	MH V1.3	Updated Math function prediction Added floating reports and track maps
2019-04-24	MH V2.0	Updated to new format Added Layers Added trace reports Maths management New toggle options Various minor additions
2019-06-19	MH V2.1	Lap Stats updated