



WinTAX4

Data Acquisition & Analysis

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Introduction

WinTAX is a professional Motorsport software used to display and analyze telemetry data of racing vehicles.

Minimum Computer Requirements

Hardware

- PC Pentium 4 Min Clock: 2 GHz
- Ethernet TCP/IP network interface 10/100/1000 MB
- RAM: 1GB
- 1 GB available on hard drive
- Compatible with dual & quad core processor.

Operating System

Any of the following versions are supported: Windows 2000, Windows XP 32/64 bit, Windows Vista 32/64 bit, Windows 7 32/64 bit, Windows 8 32/64 bit.

End User Licence Agreement and Software Warranty

DEFINITIONS. "Software" means WinTAX4 (and its components) and related software products (WTS, TelDataX, TelDSTClient, MPS, WinMeteo, etc.). "MMM" means Magneti Marelli S.p.A. "User" means the Software customer or end user.

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APPENDIX TO END USER LICENCE AGREEMENT

NUMBER OF INSTALLATIONS. Number of workstations on which the Software may be installed on Wintax4, TelDataX, TelDSTClient: a finite number of installations defined by User at order placement.

IMPORTANT NOTE: this covers only installations of MMM proprietary software. Any licence fees for third party software (e.g. Microsoft VBA "per seat" licences) are not included in the MMM licence fee.

SERVICES. For one year from the order of a new licence or renewal of an existing one the User is entitled to receive the following services: Wintax4, TelDataX, TelDSTClient: (i) supply of latest Wintax4 software release at the time of new licence purchase or renewal; (ii) User is entitled to request, under payment, customization of Wintax4 software; (iii) supply of upgraded features (at the sole discretion of MMM) and debugged Wintax4 software releases, if any, during a valid licence period;

Installation & Registration

Before Installation: User Account

To install WinTAX you must have administrator rights. Make sure you have the correct permissions to perform the installation. If you have questions about this, ask your system administrator.

Installation

First time installation

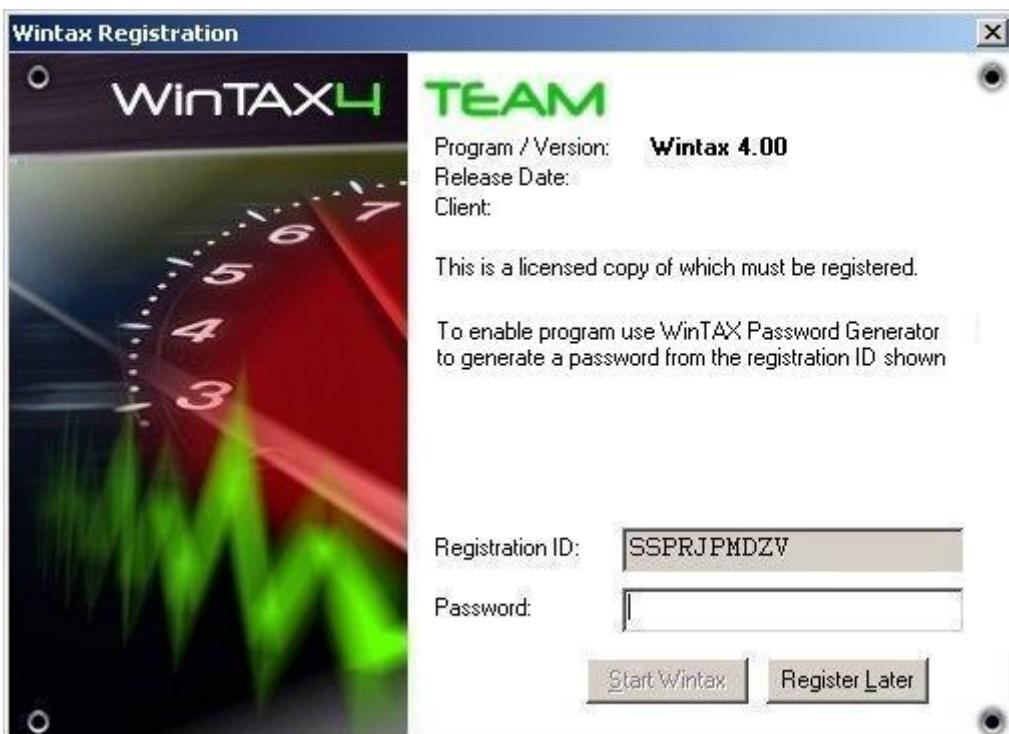
1. Run setup.exe from the installer package
2. Choose the install path where to install WinTAX



3. After completion, run WinTAX

Registration

1. Run WinTAX
2. At first run, an authentication dialog will be presented with a Registration ID and prompting for a password

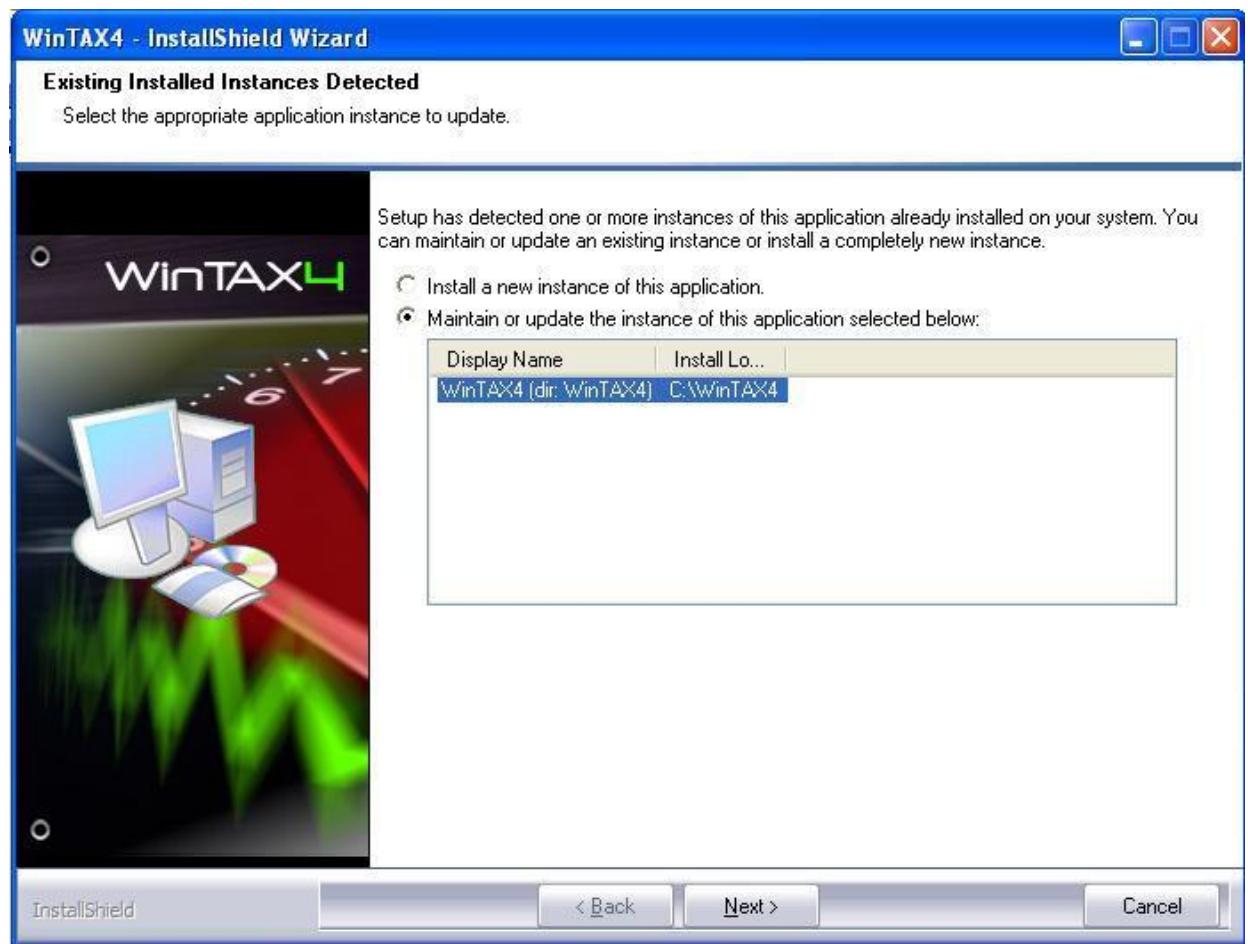


The password is generated from the Registration ID by **WinTAX Password Generator**, a separate tool which is supplied with a protection dongle as part of the WinTAX licence. The protection dongle authorizes WinTAX Password Generator to issue a fixed number of passwords

3. Enter password and press Start WinTAX
4. Upon restart, WinTAX will start without asking any password.

Subsequent installation

1. Close WinTAX4
2. Run setup.exe from the installer package
3. Installer package allows at users to install more than one instances of WinTAX: user can select between "**Install a new instance of this application**" and "**Maintain or update the instance of this application selected below**"



4. Install a new instance of this application:

1. Return to Step2 of first time installation.

5. Maintain or update the instance of this application selected below:

1. Select an instance of WinTAX to maintain.
2. Select Update/Repair then continue

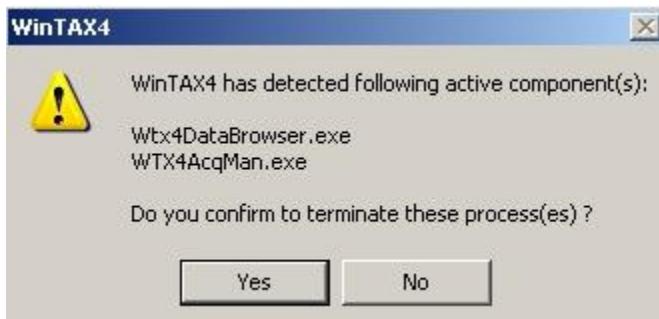
6. If at the end of the installation a reboot of the PC is prompted, please carry it out otherwise some components will not be installed correctly.

To avoid this situation, please carry out the following procedure before installation

- Open Task Manager and check if any WinTAX process ("Wtx...") is still running.
- Close these processes.

Check and Kill Active Processes

If WinTAX is turned off irregularly, any processes could be still running. When starting WinTAX a warning is displayed if one or more processes are still running, asking to kill the instances or to start WinTAX keeping alive the processes already in execution.



Yes (recommended), kill the old instances. No, keep alive the processes already in execution.

Central configuration

The *central_configuration.xml* file allows you to define certain default configurations during the installation. It is intended to be used by the person in charge of the management and distribution of WinTAX to the users of a team. It is an uncompressed xml file which if present in the installation kit during the installation, gets copied to *Wintax4\System* and is subsequently used by WinTAX.

Auto update section

You can define the Auto Update path and settings using the following XML keys. See also Auto Update.

- **Path** element is used to define path of Setup.exe.
- **EnableStartUp** element: 1 Enables to check new versions on start up; 0 checks new versions only on request.
- **VerToUpdate** element is used to toggle the check logic between new version (value 1) or different version (value 0).

Sample of auto update section:

```
<Central_Configuration>
  <Autoupdate>
    <Path>E:\software\wintax4\installer\</Path>
    <EnableStartUp>1</EnableStartUp>
    <VerToUpdate>0</VerToUpdate>
  </Autoupdate>
</Central_Configuration>
```

E-mail server section

The *EmailData* key is used to define the parameters of an e-mail server and e-mail address used by WinTAX when creating an error dump output. The user can choose to send the dump file in an e-mail together with his comments. See also System Dump. Sample of email server section:

```
<Central_Configuration>
  <EmailData>
    <SmtpServer>MySmtpSvr</SmtpServer>
    <FromDomain>RacingTeam.com</FromDomain>
    <To>joe.bloggs@RacingTeam.com</To>
  </EmailData>
</Central_Configuration>
```

Auto Update

Auto Update is a function enabling to update WinTAX to the latest version or anyhow to another version. The updates can be both automatically or manually searched on demand. The configuration of the Auto Update is in the central_configuration.xml file in the directory *WinTAX4\System*.

To make the system work, it's necessary to have a server containing in a certain Path the WinTAX Setup provided with the Version.xml file on which the ID of the version is available. This path must be written in the central_configuration.xml file.

Updates can be automatic or manual and in both cases there are two possibilities:

- The **VerToUpdate** parameter is 0: in this case the updating is carried out no matter which the version is found.
- The **VerToUpdate** parameter is 1: in this case the updating is carried out only if the version found is newer compared to the installed one.

Automatic updates

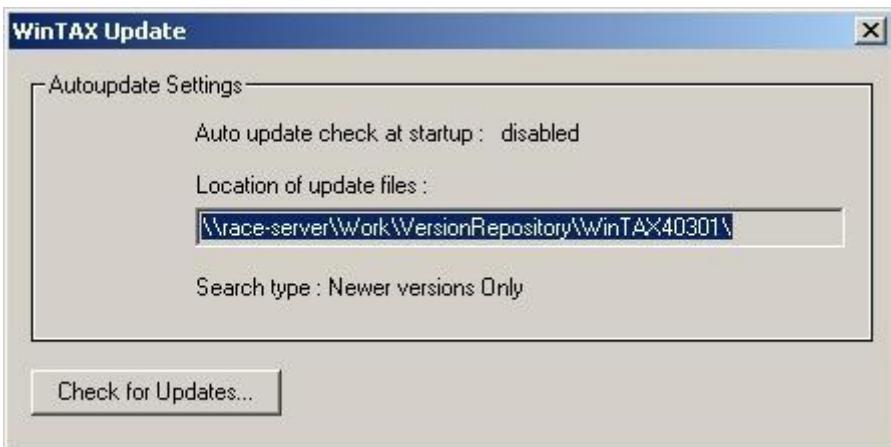
The central_configuration.xml file must have set to 1 the **EnableStartUp** element. The update window is displayed immediately after the splash screen asking whether to continue to update. The following window is displayed



By clicking on OK, WinTAX is closed and the Setup is launched; by clicking on Cancel the update is cancelled.

Manual updates

The manual update can be run from the *Help/Update menu*; the following window is displayed listing the central_configuration.xml parameters.



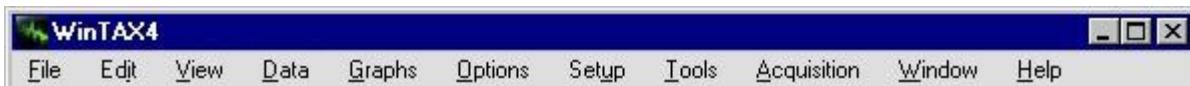
Clicking on Check for Updates a control similar to the one of the automatic startup is carried out and the updates window is displayed (Fig. 1)

If the central_configuration.xml file is missing from the system, when the manual update is requested the following message is displayed:



In this case updates are not possible because there is no configured path.

Menu



In the main window of WinTAX4 the following menus are available:

<u>File</u>	Commands to load data to manage the layouts, the print, the loading and the saving of single windows.
<u>Edit</u>	Standard commands for Undo/Redo, Cut, Copy, Paste.
<u>View</u>	Commands to display the Toolbars, the working windows, management of Finish Line, Track Section and Split Time.
<u>Data</u>	Commands to manage the loaded data.
<u>Graphs</u>	Commands to display and load the analysis windows.
<u>Options</u>	Commands to select the analysis window.
<u>Setup</u>	Commands to configure the WinTAX4 environment.
<u>Tools</u>	Commands to access to working instruments of WinTAX4
<u>Acquisition</u>	Commands to manage the acquisition.
<u>Window</u>	Commands to display the windows.
<u>Help</u>	Commands to display the Info of WinTAX4, access to Help, WinTAX Update and VBA Registration.

Many commands are also available with Keyboard Shortcuts.

File



COMMAND	SHORTCUT	DESCRIPTION
Open Data...	F3	Link to DataBrowser.
Load Layout...	Alt + Y	Loads a Layout (collection of Windows) from the disk.
Layout Wizard		Opens the layout wizard window which creates custom layouts.
Save Layout	Y	Saves the current Layout on the disk.
Save Layout As...		Saves As of the current Layout.
Load Window...		Loads a Window of the same type of the focused one. It requires at least one open window.
Save Window	Ctrl + S	Saves the current window. It requires at least one open window.
Save Window As...		Saves As of the current window. It requires at least one open window.
Save All Windows	Ctrl + Shift + S	Saves all open windows.
Print Setup...		Link to Print setup.
Print Window		Prints the current Window. It requires at least one open window.
Print Layout	Shift + P	Prints the current Layout. It requires at least one open window.
Exit		Exit from WinTAX. With or without confirmation, depending on the status of the flag: Setup/General/Application/Ask confirm....

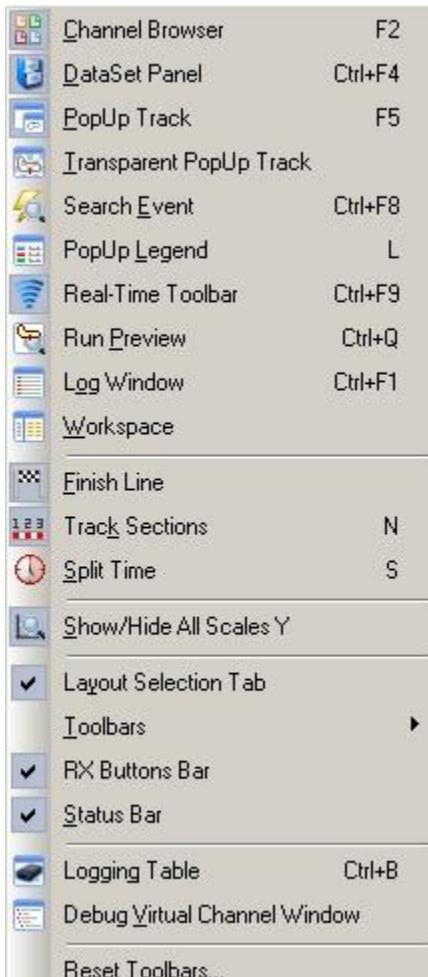
Edit



COMMAND	SHORTCUT	DESCRIPTION
Undo	Ctrl + Z	Undo: available for each operation carried out in the windows except zoom.
Redo	Ctrl + Y	Redo: available for each operation carried out in the windows except zoom.
Cut	Ctrl + X	Cuts channels from windows. Select multiple channels via CTRL.
Copy	Ctrl + C	Copies channels from windows. Select multiple channels via CTRL. Copies alphanumeric characters from configuration pages (e.g. Virtual Channel Editor, Windows Setup, Lookups Editor, Scripts Editor etc.) Note that if you try to paste in another application (e.g. Excel, Notepad etc), the Copy command retrieves the XML configuration of the current selection.
Copy Data to Clipboard	Ctrl + Shift + C	Copies the values of the channels or of the cells (e.g. Lap Report) for external applications (Excel, Notepad etc.)
Paste	Ctrl + V	Pastes channels from windows.

View

The list of commands in Menu View depends on license. In the picture below there is a sample of View menu; in other licenses may be different menu commands.



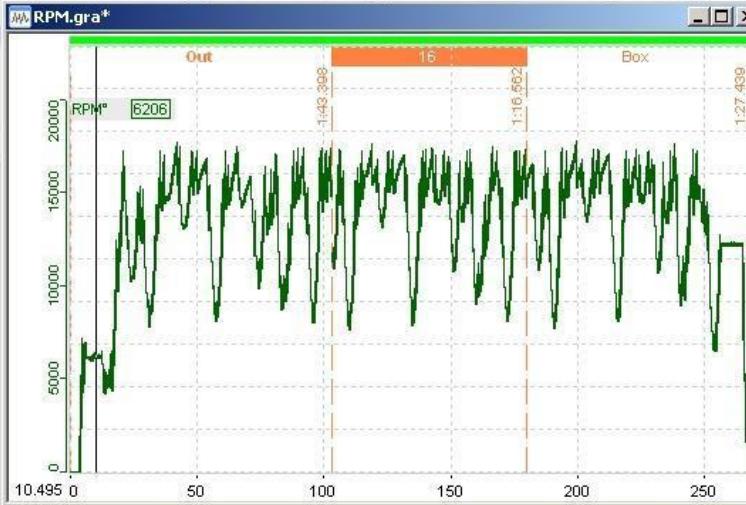
Dockable Objects

COMMAND	SHORTCUT	DESCRIPTION
Channel Browser	F2	Opens the channels list.
DataSet Panel	Ctrl + F4	Opens the Dataset control Panel.
WDS Car Toolbar		Available only if WDS is enabled. Open the Car Toolbar.
PopUp Track	F5	Pop-Up circuit.
Transparent PopUp Track		Transparent property of the PopUp Track. In transparent Mode, the trajectory can be placed anywhere

<p>In order to move the Transparent PopUp Track, click again the Transparent PopUp Track button (in order to turn off the transparency) and then move the track.</p>		
Search Event	Ctrl + F8	Opens the Search Event Window
PopUp Legend	L	Opens the PopUp Legend
Real-Time Toolbar	Ctrl + F9	It opens Real-Time Toolbar
Run Preview	Ctrl + Q	It opens Run Preview
Log Window	Ctrl + F1	WinTAX debug window. <i>Clear</i> and <i>Save As</i> commands by right clicking with mouse
Workspace		Workspace and History of the configuration files used

Lap divisions objects

COMMAND	SHORTCUT	DESCRIPTION
Finish Line		<p>When this flag is enabled, in case of more laps loaded (Append) the finish line is shown for each lap. For each lap the text refers to the Lap Marker (if available) or to the info Lap; the Lap Time is placed vertically along the divisions lines. The finish line can be transparent on the graphic area or outside the graphic area. The mode can be configured in Setup/General.</p> <p>The status Show/Hide of finish line is automatically saved by WinTAX and restored at the next opening.</p>

		
Track Sections	N	Global Track Sections on/off
Split Time	S	Partial time of each sector defined in Track Editor

Scale Y

COMMAND	DESCRIPTION
Show/Hide All Scale Y	Shows / hides all the Y scales

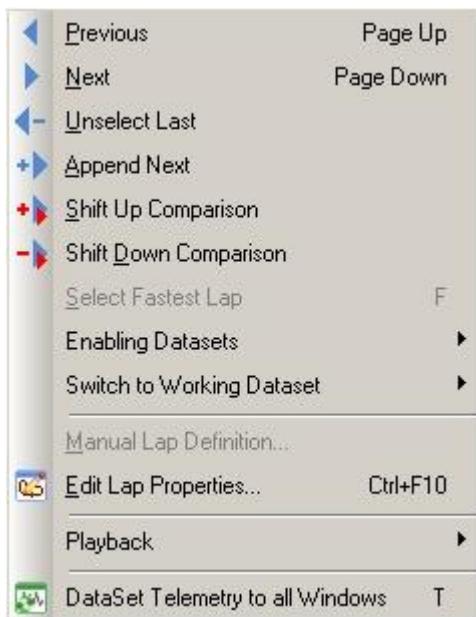
Toolbars

COMMAND	DESCRIPTION
Layout Selection Tab	List, "palette" style, of layouts of the current User
Toolbars	Allows to customize the current WinTAX toolbars
Rx Buttons Bar	Rx Buttons, the toolbar can contain: Auto Rx + Auto Rx Remote + Auto Rx Import Lap, depending on the Rx tasks set in the Acquisition Manager. The local status is intended only as pause.
Status Bar	WinTAX status bar shows information about WinTAX status (e.g. ready/not ready), CAP, NUM, SCRL
Reset Toolbars	Resets the original settings of the toolbars.

Single opening windows

COMMAND	SHORTCUT	DESCRIPTION
Logging Table	Ctrl + B	Acquisition table of the current open data
Debug VCH Window		Run time graphical parser of math channels

Data



COMMAND	SHORTCUT	DESCRIPTION
Previous	Page Up	Loads previous Lap (only for first DataSet).
Next	Page Down	Loads Next Lap (only for first DataSet).
Unselect Last		Unloads last (higher ABS) lap from append.
Append Next		Loads next (higher ABS) lap in append.
Shift Up Comparison		Shifts all comparison laps upwards (previous ABS in the archive).
Shift Down Comparison		Shifts all comparison laps downwards (the next ABS in the archive).
Select Reference Lap	R	Link to DataBrowser to load Reference Lap.
Remove Reference Lap		Unselect Reference Lap.
Select Fastest Lap	F	Chooses the fastest lap from the current selection. It requires more than one lap loaded in append mode.
Enabling Dataset	Ctrl + 1 Ctrl + 2 Ctrl + 3 Ctrl + 4 Ctrl + 5 Ctrl + 6 Ctrl + 7	Enable or disable the desired Dataset.

	Ctrl + 8 Ctrl + 9 Ctrl + 0	<table border="1"> <tbody> <tr><td>Disable DataSet Slot 1</td><td>Ctrl+1</td></tr> <tr><td>Disable DataSet Slot 2</td><td>Ctrl+2</td></tr> <tr><td>Disable DataSet Slot 3</td><td>Ctrl+3</td></tr> <tr><td>Enable DataSet Slot 4</td><td>Ctrl+4</td></tr> <tr><td>Enable DataSet Slot 5</td><td>Ctrl+5</td></tr> <tr><td>Enable DataSet Slot 6</td><td>Ctrl+6</td></tr> <tr><td>Enable DataSet Slot 7</td><td>Ctrl+7</td></tr> <tr><td>Enable DataSet Slot 8</td><td>Ctrl+8</td></tr> <tr><td>Enable DataSet Slot 9</td><td>Ctrl+9</td></tr> <tr><td>Enable DataSet Slot 10</td><td>Ctrl+0</td></tr> </tbody> </table>	Disable DataSet Slot 1	Ctrl+1	Disable DataSet Slot 2	Ctrl+2	Disable DataSet Slot 3	Ctrl+3	Enable DataSet Slot 4	Ctrl+4	Enable DataSet Slot 5	Ctrl+5	Enable DataSet Slot 6	Ctrl+6	Enable DataSet Slot 7	Ctrl+7	Enable DataSet Slot 8	Ctrl+8	Enable DataSet Slot 9	Ctrl+9	Enable DataSet Slot 10	Ctrl+0	
Disable DataSet Slot 1	Ctrl+1																						
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Enable DataSet Slot 8	Ctrl+8																						
Enable DataSet Slot 9	Ctrl+9																						
Enable DataSet Slot 10	Ctrl+0																						
Switch to Working Dataset	Alt + 1 Alt + 2 Alt + 3 Alt + 4 Alt + 5 Alt + 6 Alt + 7 Alt + 8 Alt + 9 Alt + 0	Move the desired Dataset in the first slot (for this reason always grayed)	<table border="1"> <tbody> <tr><td>DataSet Slot 1</td><td>Alt+1</td></tr> <tr><td>DataSet Slot 2</td><td>Alt+2</td></tr> <tr><td>DataSet Slot 3</td><td>Alt+3</td></tr> <tr><td>DataSet Slot 4</td><td>Alt+4</td></tr> <tr><td>DataSet Slot 5</td><td>Alt+5</td></tr> <tr><td>DataSet Slot 6</td><td>Alt+6</td></tr> <tr><td>DataSet Slot 7</td><td>Alt+7</td></tr> <tr><td>DataSet Slot 8</td><td>Alt+8</td></tr> <tr><td>DataSet Slot 9</td><td>Alt+9</td></tr> <tr><td>DataSet Slot 10</td><td>Alt+0</td></tr> </tbody> </table>	DataSet Slot 1	Alt+1	DataSet Slot 2	Alt+2	DataSet Slot 3	Alt+3	DataSet Slot 4	Alt+4	DataSet Slot 5	Alt+5	DataSet Slot 6	Alt+6	DataSet Slot 7	Alt+7	DataSet Slot 8	Alt+8	DataSet Slot 9	Alt+9	DataSet Slot 10	Alt+0
DataSet Slot 1	Alt+1																						
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DataSet Slot 8	Alt+8																						
DataSet Slot 9	Alt+9																						
DataSet Slot 10	Alt+0																						
Manual Lap Definition		Splits the Lap in two or more parts. The split operation works on the archive Enter : confirm the splits Esc : abort split operation																					
Edit Lap Properties...	Ctrl + F10	Allows to change the context information of the lap (e.g. constants, user records, driver name, abs etc.)																					
Setup Editor	Ctrl + F10	Depending on each specific license, Setup Editor command could replace Edit Lap Properties... command.  Setup Editor... Ctrl+F10 <p>Opens Setup Editor environment.</p>																					

Playback		<p>The playback feature allows the Real-Time simulation with Post Processing data.</p>  <table border="1"> <thead> <tr> <th>COMMAND</th><th>SHORTCUT</th><th>DESCRIPTION</th></tr> </thead> <tbody> <tr> <td>Start Play / Stop Play</td><td>F6</td><td>Start and stop the playback function</td></tr> <tr> <td>Play Speed</td><td></td><td>Set the playback speed: x/32, x1/16, x1/8, x1/4, x1/2, x1, x2, x4, x8, x16, x32.</td></tr> <tr> <td>Rewind</td><td></td><td>Set the cursor to zero and restart the function of reproduction if already in play.</td></tr> <tr> <td>Loop</td><td></td><td>If loop is activated, playback restarts from zero when the simulation ends.</td></tr> </tbody> </table>	COMMAND	SHORTCUT	DESCRIPTION	Start Play / Stop Play	F6	Start and stop the playback function	Play Speed		Set the playback speed: x/32, x1/16, x1/8, x1/4, x1/2, x1, x2, x4, x8, x16, x32.	Rewind		Set the cursor to zero and restart the function of reproduction if already in play.	Loop		If loop is activated, playback restarts from zero when the simulation ends.
COMMAND	SHORTCUT	DESCRIPTION															
Start Play / Stop Play	F6	Start and stop the playback function															
Play Speed		Set the playback speed: x/32, x1/16, x1/8, x1/4, x1/2, x1, x2, x4, x8, x16, x32.															
Rewind		Set the cursor to zero and restart the function of reproduction if already in play.															
Loop		If loop is activated, playback restarts from zero when the simulation ends.															
DataSet Telemetry to all Windows	T	Allows to switch from the Post-Processing mode to the Telemetry mode and vice versa all the windows in a layout;															

Graphs



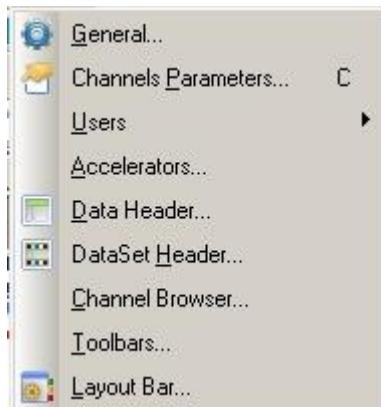
COMMAND	DESCRIPTION
Graph Window...	Opens the Graphs Window
XY Window...	Opens the XY Window
XYZ Window...	Opens the XYZ Window
Histogram Window...	Opens the Histogram Window
Channels Window...	Opens the Channels Window
Numeric Table Window...	Opens the Numeric Table Window

Diagnostics Window...	Opens the Diagnostics Window														
Bargraph Window...	Opens the Bargraph Window														
Gauge Window...	Opens the Gauge Window														
Track Window...	Opens the Track Window														
Video Window...	Opens the Video Window														
Object Control Window...	Opens the Object Control Window														
G-G Diagram Window...	Opens the G-G Diagram Window														
Steering Wheel Window...	Opens the Steering Wheel Window														
Bitmap Window...	Opens the Bitmap Window														
Condition Light Window...	Opens the Condition Light Window														
Display Value Window...	Opens the Display Value Window														
Reports	<p>Shows a pop-up menu to select the type of Report window to be loaded</p> <table border="1"> <tr> <td> Lap Report Window...</td> </tr> <tr> <td> Sections Time Report Window</td> </tr> <tr> <td> Events Report Window...</td> </tr> <tr> <td> Diagnostics Report Window...</td> </tr> </table> <table border="1"> <thead> <tr> <th>COMMAND</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>Lap Report Window...</td> <td>Opens the Lap Report Window</td> </tr> <tr> <td>Sections Time Report Window</td> <td>Opens the Section Time Report Window</td> </tr> <tr> <td>Events Report Window...</td> <td>Opens the Events Report Window</td> </tr> <tr> <td>Diagnostics Report Window...</td> <td>Opens the Diagnostic Report Window</td> </tr> </tbody> </table>	Lap Report Window...	Sections Time Report Window	Events Report Window...	Diagnostics Report Window...	COMMAND	DESCRIPTION	Lap Report Window...	Opens the Lap Report Window	Sections Time Report Window	Opens the Section Time Report Window	Events Report Window...	Opens the Events Report Window	Diagnostics Report Window...	Opens the Diagnostic Report Window
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Diagnostics Report Window...	Opens the Diagnostic Report Window														
Trend Window...	Opens the Trend Window														
Alarms Window...	Opens the Alarms Window														
Map Histogram Window...	Opens the Map Histogram Window														
FFT Analysis Window...	Opens the FFT Analysis Window														
Edit Graphs...	Opens any window you like.														

Options

Contextual menu, it depends on the currently selected Window. If nothing is open, the menu is empty. See Analysis Windows for details.

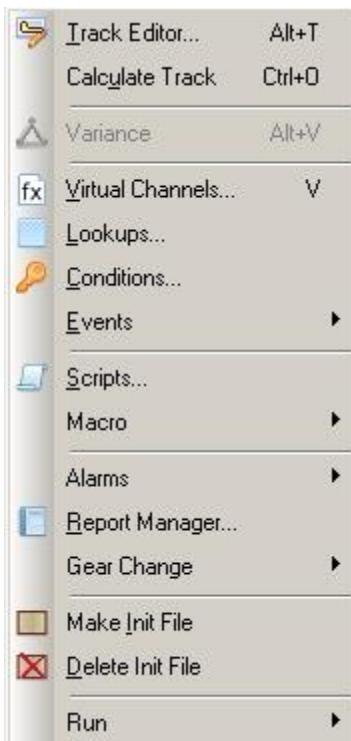
Setup



COMMAND	SHORTCUT	DESCRIPTION												
General...		Link to General Setup options												
Channel Parameters	C	Link to Channel Parameters editor												
Users		<table border="1"><thead><tr><th>COMMAND</th><th>SHORTCUT</th><th>DESCRIPTION</th></tr></thead><tbody><tr><td>Configure Users</td><td></td><td>Allows to create or to modify an User</td></tr><tr><td>Change User...</td><td>CTRL + U</td><td>Allows to change the current User</td></tr><tr><td>Export User Snapshot...</td><td></td><td>Saves zss file on disk exporting system and current user setups. For further details see Export Snapshot.</td></tr></tbody></table>	COMMAND	SHORTCUT	DESCRIPTION	Configure Users		Allows to create or to modify an User	Change User...	CTRL + U	Allows to change the current User	Export User Snapshot...		Saves zss file on disk exporting system and current user setups. For further details see Export Snapshot.
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Change User...	CTRL + U	Allows to change the current User												
Export User Snapshot...		Saves zss file on disk exporting system and current user setups. For further details see Export Snapshot.												

		Import User Snapshot...		Opens a .zss file in order to import system configurations. For further details see Import Snapshot.
Accelerators...		WinTAX shortcuts		
Data Header...		Data Header configuration page		
DataSet Header...		DataSet Header configuration page		
Channel Browser...		Channel Browse configuration page		
Toolbars...		Toolbars configuration page		
Layout Bar...		Layout configuration page		

Tools



COMMAND	SHORTCUT	DESCRIPTION
Track Editor	Alt + T	Link to Track Editor environment
Calculate Track	Ctrl + O	Carries out the Generate Track command in track configuration on Track Editor environment
Variance	Alt + V	Enables the Variance channel
Virtual Channels	V	Link to Virtual channels editor
Lookups		Link to Lookups editor
Conditions		Link to Conditions editor
Events		Open Events Menu



COMMAND	SHORTCUT	DESCRIPTION
Configure...		Link to Event editor
Default Settings...		Opens the configuration window of the default graphic settings and of the <i>Search Event</i>
Global Show Events	Ctrl + E	Enables to display the events in all the windows.
Show Events	Alt + Ctrl + E	Enables to display the events in the active window.
Jump to Auto Event	Alt + J	Shifts the cursor of the Graphs window to the first occurrence of the event configured as <i>Search Event</i>
First Occurrence	Alt + Up	Moves the cursor of the Graphs window to the first occurrence of the <i>Hot Event</i>
Last Occurrence	Alt + Down	Moves the cursor of the Graphs window to the last occurrence of the <i>Hot Event</i>
Previous Occurrence	Alt + P	Moves the cursor of the Graphs window to the first occurrence of the previous <i>Hot Event</i>

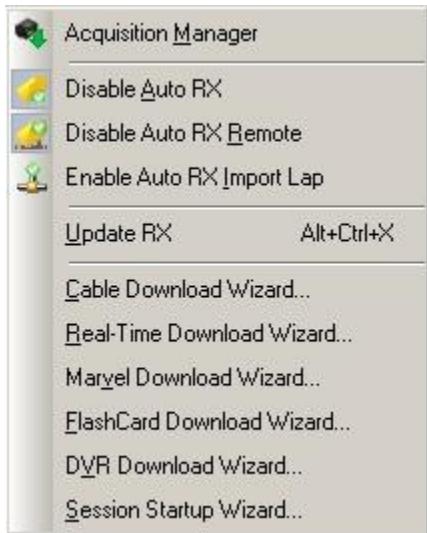
		<table border="1"> <tr> <td>Next Occurrence</td><td>Alt + N</td><td>Moves the cursor of the Graphs window to the first occurrence of the next <i>Hot Event</i></td></tr> <tr> <td>Move Left to Previous</td><td>Alt + Ctrl + P</td><td>Moves the cursor of the Graphs window to the first occurrence of the previous</td></tr> <tr> <td>Move Right to Next</td><td>Alt + Ctrl + N</td><td>moves the cursor of the Graphs window to the first occurrence of the next</td></tr> <tr> <td>Next HotEvent</td><td>Ctrl + N</td><td>Sets as <i>HotEvent</i> the next event in the list <i>Events</i> of the <i>Channel Browser</i></td></tr> <tr> <td>Previous HotEvent</td><td>Ctrl + P</td><td>Sets as <i>HotEvent</i> the previous event in the list <i>Events</i> of the <i>Channel Browser</i></td></tr> </table>	Next Occurrence	Alt + N	Moves the cursor of the Graphs window to the first occurrence of the next <i>Hot Event</i>	Move Left to Previous	Alt + Ctrl + P	Moves the cursor of the Graphs window to the first occurrence of the previous	Move Right to Next	Alt + Ctrl + N	moves the cursor of the Graphs window to the first occurrence of the next	Next HotEvent	Ctrl + N	Sets as <i>HotEvent</i> the next event in the list <i>Events</i> of the <i>Channel Browser</i>	Previous HotEvent	Ctrl + P	Sets as <i>HotEvent</i> the previous event in the list <i>Events</i> of the <i>Channel Browser</i>
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Scripts		Link to Scripts editor															
Macro		<p>Link to VBA Engine if registered.</p> <table border="1"> <thead> <tr> <th>COMMAND</th> <th>SHORTCUT</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>Visual Basic Editor</td> <td>Alt + F11</td> <td>Link to Visual Basic editor</td> </tr> <tr> <td>Visual Macro</td> <td></td> <td>Link to macros list</td> </tr> <tr> <td>Configure Accelerators</td> <td></td> <td>Link to configure accelerators for VBA macros</td> </tr> </tbody> </table>	COMMAND	SHORTCUT	DESCRIPTION	Visual Basic Editor	Alt + F11	Link to Visual Basic editor	Visual Macro		Link to macros list	Configure Accelerators		Link to configure accelerators for VBA macros			
COMMAND	SHORTCUT	DESCRIPTION															
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Configure Accelerators		Link to configure accelerators for VBA macros															
Alarms		<p>Auto search alarms setup for post processing and real time analysis.</p> <div style="text-align: center; margin-top: 20px;"> Edit... View Ctrl+W </div>															

COMMAND	DESCRIPTION
Edit	<p>Opens Auto Search Alarms dialog.</p> 
	<p>Post Processing section Enables automatic search of alarms whenever a new lap is loaded. The Alarm window is displayed every time a channel exceeds the alarm configured thresholds.</p> <p>Alarms = OFF and Invalid Values = OFF Automatic alarm search disabled.</p> <p>Alarms = ON and Invalid Values = OFF Searches current lap for alarm conditions and shows only channels in alarm condition.</p> <p>Alarms = ON and Invalid Values = ON Searches current lap for alarm conditions and shows all configured alarm channels.</p> <p>Real time section Enables automatic search alarms during real time analysis, showing them through a popup or into the Event Report window basing of channel parameter setup.</p> <p>Logic of check boxes is identical to the Post Processing one.</p>
View (Ctrl + W)	Real time Alarms view options.

Report Manager		Open the Report Manager environment															
Gear Change		<p>This feature allows User to search for Gear Changes occurrences into Graph windows.</p> <p>Gear Change Event needs to configure Gear channel in General Setup\Special Channels before using it</p> <table border="1"> <thead> <tr> <th>COMMAND</th> <th>SHORTCUT</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>Next Gear Change</td> <td>Alt + Ctrl + Right</td> <td>Move the cursor from the current position to the nearest next gear occurrence</td> </tr> <tr> <td>Previous Gear Change</td> <td>Alt + Ctrl + Left</td> <td>Move the cursor from the current position to the nearest previous gear occurrence</td> </tr> <tr> <td>First Gear Change</td> <td>Alt + Ctrl + Up</td> <td>Move the cursor to the first gear occurrence</td> </tr> <tr> <td>Last Gear Change</td> <td>Alt + Ctrl + Down</td> <td>Move the cursor to the last gear occurrence</td> </tr> </tbody> </table>	COMMAND	SHORTCUT	DESCRIPTION	Next Gear Change	Alt + Ctrl + Right	Move the cursor from the current position to the nearest next gear occurrence	Previous Gear Change	Alt + Ctrl + Left	Move the cursor from the current position to the nearest previous gear occurrence	First Gear Change	Alt + Ctrl + Up	Move the cursor to the first gear occurrence	Last Gear Change	Alt + Ctrl + Down	Move the cursor to the last gear occurrence
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Make Init File		<p>Allows generating a startup init configuration containing settings of General Setup, Acquisition Setup and RxTasks. <i>WTXIniFile.xml</i> file is generated into <i>Wintax\System</i> directory.</p> <p>At the startup, WinTAX automatically checks for the <i>WTXIniFile.xml</i>, <u>each time</u>; if it is found, WinTAX starts using the setup read from file. Every modification made by User will be saved with standard logic (in system xml files) when closing the application.</p>															
Delete Init File		<p>Deletes <i>WTXIniFile.xml</i> file.</p> <p>After the first startup using file, user should delete it, in order to avoid undesired effects due to automatic searching of Init file at every WinTAX startup.</p>															

Run	<p>This feature allows to execute some external application from WinTAX.</p> <table border="1"> <tbody> <tr> <td></td><td>Calculator</td><td>Shift+A</td></tr> <tr> <td></td><td>Notepad</td><td>Shift+O</td></tr> <tr> <td></td><td>Excel</td><td>Shift+E</td></tr> <tr> <td></td><td>Generic application ...</td><td>Shift+G</td></tr> </tbody> </table> <table border="1"> <thead> <tr> <th>COMMAND</th><th>SHORTCUT</th><th>DESCRIPTION</th></tr> </thead> <tbody> <tr> <td>Calculator</td><td>Shift + A</td><td>Execute windows calculator</td></tr> <tr> <td>Notepad</td><td>Shift + O</td><td>Execute notepad editor</td></tr> <tr> <td>Excel</td><td>Shift + E</td><td>Execute Microsoft Office Excel</td></tr> <tr> <td>Generic application</td><td>Shift + G</td><td>Open an application browser to select and execute the desired application.</td></tr> </tbody> </table>		Calculator	Shift+A		Notepad	Shift+O		Excel	Shift+E		Generic application ...	Shift+G	COMMAND	SHORTCUT	DESCRIPTION	Calculator	Shift + A	Execute windows calculator	Notepad	Shift + O	Execute notepad editor	Excel	Shift + E	Execute Microsoft Office Excel	Generic application	Shift + G	Open an application browser to select and execute the desired application.
	Calculator	Shift+A																										
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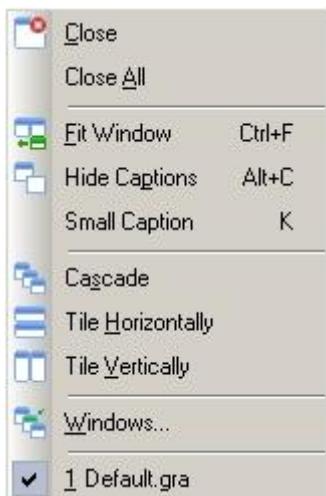
Acquisition



COMMAND	SHORTCUT	DESCRIPTION
Acquisition Manager		Link to Acquisition manager component
Enable/Disable Auto Rx		Pause of <i>Auto Rx</i> functions. To disable the <i>Auto Rx</i> , please go to AcqManager and uncheck <i>Auto Rx</i> in Rx Task menu
Enable/Disable Auto Rx Remote		Pause of <i>Auto Rx on Remote</i> functions. To disable the <i>Auto Rx on Remote</i> , please go to AcqManager and uncheck <i>Auto Rx on Remote</i> in Rx Task menu
Enable/Disable Auto Rx Import Lap		Pause of <i>Auto Rx on Import Lap</i> functions. To disable the <i>Auto Rx on Import Lap</i> , please go to AcqManager and uncheck <i>Auto Rx on Import Lap</i> in Rx Task menu
Update Rx	Alt + Ctrl + X	Manual Update RX
Cable Download Wizard...		Cable Download Wizard
Real-Time Download Wizard...		Real-Time Download Wizard

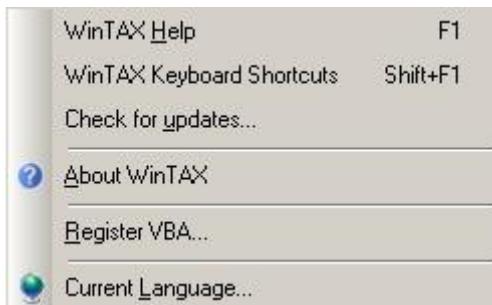
Marvel Download Wizard...		Marvel Download Wizard
FlashCard Download Wizard...		Flash Card Download Wizard
DVR Download Wizard...		Data Video Recorder Download Wizard
Session Startup Wizard...		Session Startup Wizard

Window



COMMAND	SHORTCUT	DESCRIPTION
Close		Closes the window active in the workspace.
Close All		Closes all windows open in the workspace.
Fit Window	Ctrl + F	Reduces the active window so that it does not overlap to other windows.
Hide Captions	Alt + C	Hides the title bar of all windows.
Small Caption Standard Caption	K	Small caption allows to reduce the size of windows caption. Standard Caption resume the original mode. The command is global and affects all open windows. 
Cascade		Arranges the windows in cascade.
Tile Horizontally		Reduces all windows so to horizontally optimize the space.
Tile Vertically		Reduces all windows so to vertically optimize the space.
Windows...		Opens a list containing all windows available.
[Wnd1] [Wnd2]		List of the open windows; a check mark indicates the active one.

Help

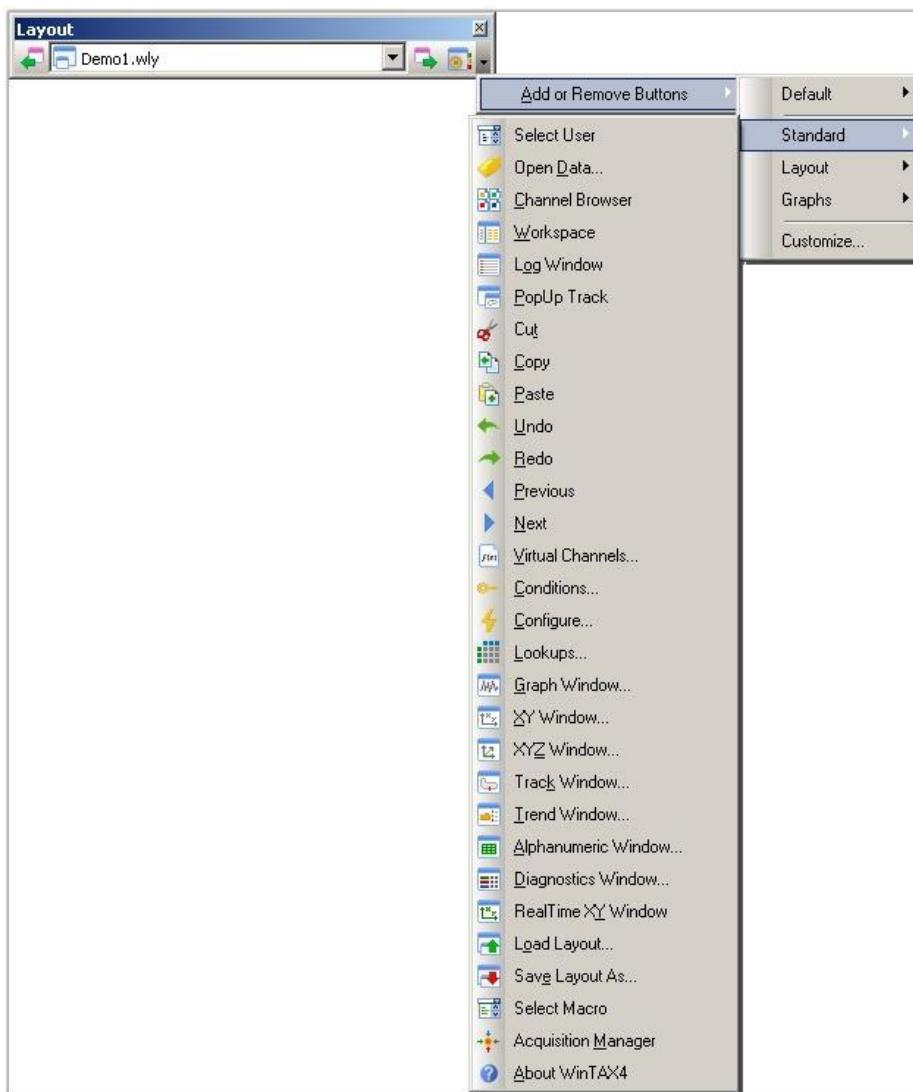


COMMAND	SHORTCUT	DESCRIPTION
WinTAX Help	F1	Link to WinTAX User Guide
WinTAX Keyboard Shortcuts	Shift + F1	Link to WinTAX keyboard shortcut User Guide
Update		Auto Update Function shows the path where WinTAX will search for latest or different versions. The path must contain a single unzipped instance of the WinTAX installer.
About WinTAX4		About WinTAX4
Register VBA...		It opens an interface window that allows registering VBA.
Current Language...		It opens an interface for selecting a different Language.

Toolbars

WinTAX has some default toolbars that are displayed or that can be displayed when the program is launched for the first time. The toolbar called Main can be modified, so buttons can be added or removed; all other default toolbars cannot be modified. It is anyhow not possible to create new toolbars that can be modified at will. To view the toolbars, use the main menu View/Toolbars and select or deselect the requested toolbars. The same operation can be carried out by clicking with the right button on the toolbars area. Each toolbar can be kept floating or docked to the main window; some toolbar can be docked on each of the four sides of the window, some others can be docked only up or down. To dock a toolbar, drag it on the area of the window to be blocked to or double click on the bar of the title. In this latter case the toolbar will be placed on the last area where it had been docked. Vice versa to make a docked toolbar floating, double click on the external border of the toolbar or drag it with the mouse outside the dock area.

The configurable toolbars have a downwards arrow on their right. This arrow corresponds to a button that opens a menu through which some predefined commands can be added or removed from the toolbar.



Some commands are grouped on the basis of their use or of the frequency of use and they can be found in the Standard, Layout and Graph groups. Using the Configure menu (that is equal to the command of the Setup/Toolbars main menu) the configuration window of the toolbars can be opened, through this window all commands on WinTAX can be added or removed.

The **Default** menu is available only in the predefined configurable toolbars of WinTAX (Main and Layout) and it allows to add or remove predefined commands or, through the **Reset** command, to restore the default situation of that toolbar.

The main menu View/Toolbars has a **Reset Toolbars** command that restores the situation of the toolbars to the WinTAX default both as to commands and as to position. All possible toolbars created subsequently are then removed. The command is carried out only if confirmed by the user.

The default toolbars available in WinTAX are as follows

- **Real time Toolbar**
- **Data Header**
- **Graph Toolbar**
- **Data Selection Bar**
- **Main**
- **Layout**

Real-Time Toolbar

The Real-Time Toolbar is a predefined toolbar that cannot be configured. Buttons cannot be manually neither added nor removed.

The display of the Graph Toolbar can be enabled/disabled through the **View/Real-Time Toolbar** command of the main menu or with the shortcut CTRL+F9.



This window is used to give a quick access to the functions of the Real-Time acquisition. Double click on a device enables/disables the Real-Time acquisition process. Depending on the status of the process, icon can be colored as listed in the table.

Status Description

Green Process activated and connection with the device visible in the combo

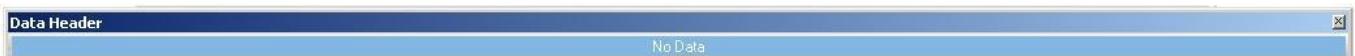
Red Process activated and connection failed

Cyan Process not activated

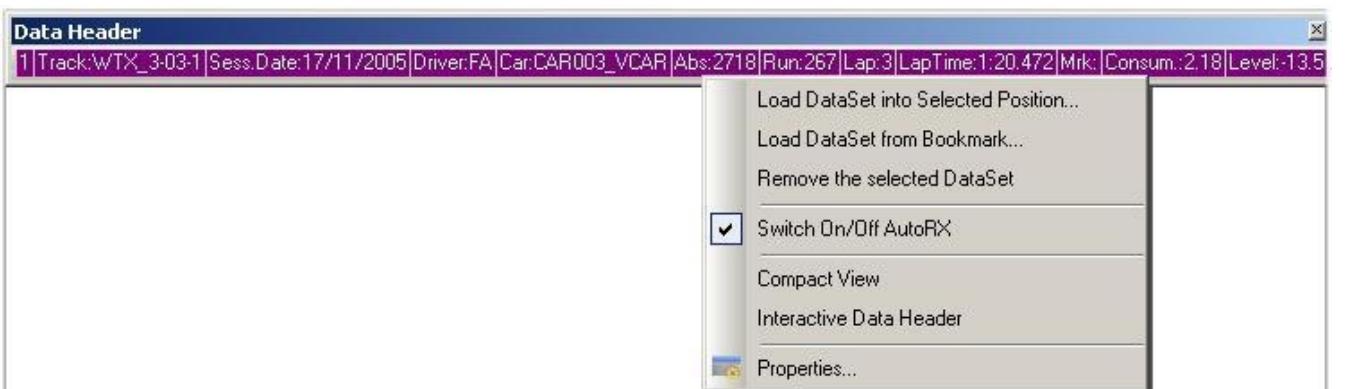
To more details about the commands, please refer to Real-Time section in Acquisition Manager.

Data Header

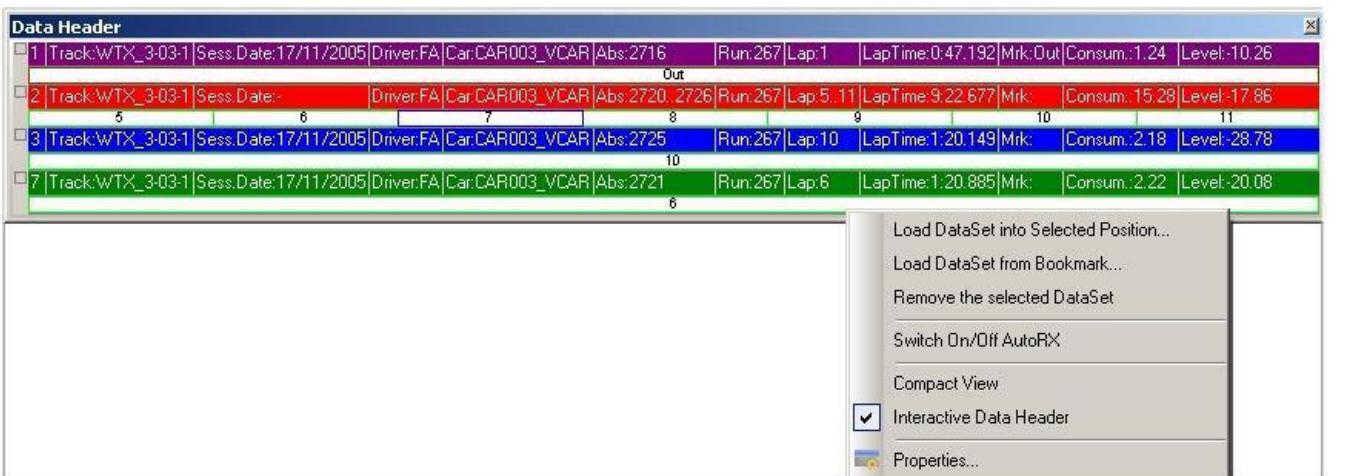
The display of the Data Header Toolbar can be enabled/disabled through the **View/Toolbars/Data Header** command of the main menu or through the right click on the area of the toolbars. Data Header is a toolbar that can be configured but no commands can be added. The main function of the Data Header is to show information to the laps loaded; when the datasets are enabled, it becomes interactive as it works also as a control to manage the data on WinTAX. If no lap is loaded, the toolbar is displayed as shown in the figure.



When a lap is loaded, the toolbar shows the information about the lap and depending on its configuration, it can become similar to the one shown in the figure where the pop-up menu is highlighted and can be opened by clicking with the right button on the Data Header.



If an append of a lap is loaded, a single row is anyhow displayed showing the information that vary from lap to lap (for example Abs) and that are presented one after the other separated by a comma, if consecutive, or as a range separated by a colon, if not. The information LapTime, LapDistance, CronoTime and FuelConsumption are related to the currently displayed lap. If a comparison of laps is loaded, all lap information configured are displayed. In the following figure the interactive option is set.



Each lap is marked by a number identifying its position in the Dataset (slot)

The shortcuts ALT+N (N = [1,10]) allow switching the N Dataset in the first slot.

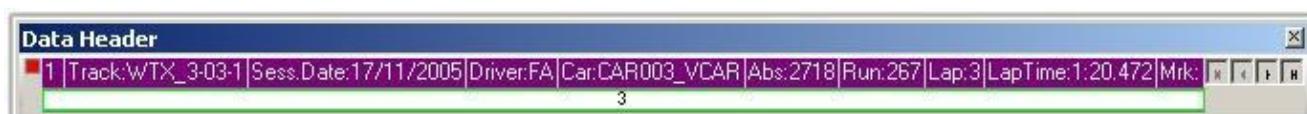
The commands of the menu are as follows:

- **Load DataSet into Selected Position** Opens the Data Browser and allows to replace the lap in the slot identified by the position of the mouse with a new lap or with a lap append.
- **Load DataSet from Bookmark** Opens the list of favourite laps available in the DataSet allowing a quick insert in the slot identified by the mouse.
- **Add DataSet...** allows user to select a dataset from Data Browser and stores it in the first available slot.
- **Switch to Working DataSet:** selected dataset replaces the working one.
- **Remove the selected DataSet** Removes the DataSet selected by the system
- **Switch On/Off AutoRx** Enables the slot of the DataSet where the lap of AutoRx must be loaded during the acquisition.
- **Compact View** In case of a comparison of lap, the toolbar is zipped showing just one lap; there is however the possibility to show all laps through the arrow keys displayed on the left.



- **Interactive Data Header** When this option is set, to each row a bar is added where the laps belonging to that DataSet are highlighted. Clicking with the mouse on one of these laps, the lap is loaded on WinTAX. Moreover a red square is added on the left allowing enable/disable the DataSet on the active window. It has the same functions of the commands CTRL+RETURN and CTRL+BACKSPACE on one slot of the DataSet. When the square is red, it means that the selected window has that DataSet active.
- **Properties** Opens the configuration window of the Data Header.

If a toolbar requires more space than that allowed by the window, the exceeding length is cut and navigation buttons are added on the right to allow moving on all information of the Data Header, as shown in the next figure.



Toolbar Graph

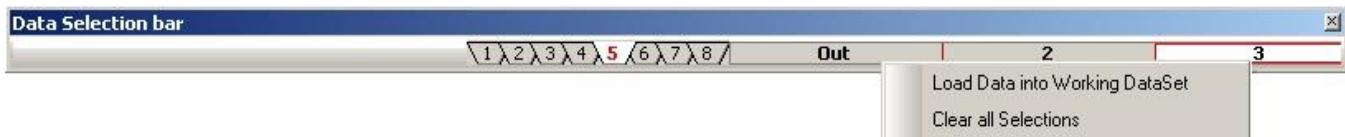
The Toolbar Graph is a predefined toolbar that can be configured according to the selected window. Buttons cannot be manually added or removed. To see how the toolbar appears for each window, go to the help of the commands for each analysis window. The display of the Graph Toolbar can be enable/disable through the **View/Toolbars/Graph Toolbar** command of the main menu or by clicking with the right button on the area of the toolbars.

Data Selection Bar

It is a toolbar divided into two parts showing the information about the runs and laps of the current session. It is predefined and it cannot be configured. The display of the Layout Toolbar can be enabled/disabled through the **View/Toolbars/Data Selection bar** command of the main menu or by clicking with the right button on the area of the toolbars. It was introduced to simplify the loading of data and that can be seen as a compact representation of the Working DataSet. It is empty before the first loading of a DataSet.



The toolbar has a series of tabs on the left representing the session loaded. Various sections correspond to each tab where the laps of the run are displayed through the marker, if available, or the number of the lap. Clicking on a tab, the laps corresponding to the displayed Track Run are shown. One or more tabs or one or more sections of a tab can be selected using the CTRL key. The border of the selected session becomes green with the exception of those corresponding to the laps loaded that become red. By double clicking on one of the sections selected or using the **Load Data into Working DataSet** command, the laps selected in the Working Dataset are loaded. This command is available in the pop-up menu that can be opened with the right button on the lap area of the toolbar. The **Clear all Selections** command removes the selection to the laps of the toolbar. By double clicking on a Run, the whole Run is loaded.



As displayed in the previous figure, when the space required by the run area exceeds a limit, some navigation buttons are added.

 A Load operation made on the *Data Selection bar* means actually loading data from the archive (from the local disk or from the network), it is not the same as the operations made on *Interactive Data Header* where the data are already in memory.

Main

This toolbar is predefined but can also be configured. It offers a quick access to the most frequently used commands in WinTAX. The display of the toolbar can be enabled/disabled through the **View/Toolbars/Main** command of the main menu or by clicking with the right button on the area of the toolbars.



For a description of each command, please read the corresponding menus.

Layout Toolbar

This is a predefined toolbar and it can also be configured. It offers a quick access to the management of a Layout. The display of the Layout Toolbar can be enabled/disabled through the **View/Toolbars/Layout** command of the main menu or with the right button on the area of the toolbars.



The default commands proposed are necessary to manage the layout. The user can then decide to remove or add further commands using the **Add or Remove Buttons**.

The default commands for the layouts proposed by the toolbar are as follows.

- **Select previous layout:** opens the layout that is in the list shown by the combo previous to the one currently loaded.
- **Combo Select Layout:** allows opening any layout available in the list.
- **Select Next Layout:** opens the layout that is in the list shown by the combo is next to the one currently loaded.
- **Layout Bar...:** opens the configuration window for the Layout Toolbar.

Users

WinTAX allows creating customized analysis environments for different users. A dedicated setup directory is created for each user under *WintAX4\Users*. These can be copied from one PC to another and loaded into the list of users.

Local user configurations

In general, the configurations which are local to the user are those which are related to the WinTAX and Data Browser screen layouts and presentation, e.g. layouts, windows, toolbars, channel browser, parameters etc.

The selection of virtual channels libraries used is also user-specific.

Creating users

1. Select **Setup/Users/Configure Users**
2. Select *Edit/Add user*
3. Type the user name to be added
4. Select a level (Beginner, Normal, Super)

User permissions

	Archive edit	Acquisition manager/Real time
Beginner	None	Cannot publish context info
Normal	Only gain + offset	Cannot publish context info
Super	All	All

Importing users

1. Copy a user directory from another PC to *Wintax4\Users*
2. Select **Setup/Users/Configure users**
3. Press F5 or select *Edit refresh*
4. The users list will be refreshed to include all the subdirectories under *Wintax4\Users*
5. All the users will now be visible in the user drop down list on the toolbar.

Setup

This section describes the WinTAX configuration. The different configurations with the exception of Print Setup that is in the File menu, are grouped in the Setup menu and deal with the following issues:

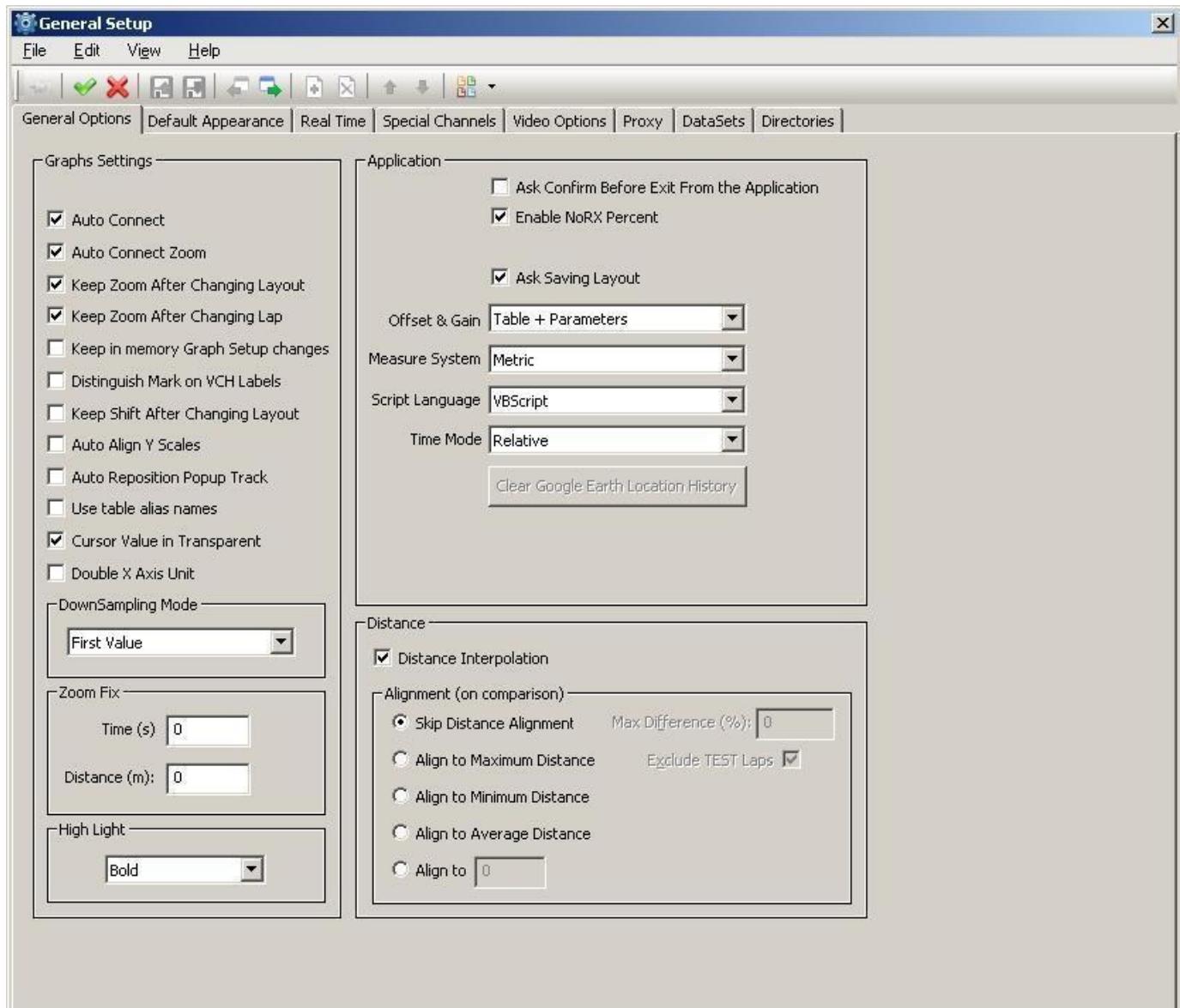
- **General Setup**
- **Channels Parameters**
- **Configure Users**
- **Accelerators**
- **Data Header**
- **DataSet Header**
- **Channel Browser**
- **Toolbars**
- **Layout Bar**
- **Print Setup**

General

The **General Setup** window allows to configure the general aspects of the **WinTAX environment** and the settings used by default to display and manage the windows. The window is formed by the following pages: General Options, Default Appearance, Real Time, Special Channels, Video Options, Proxy, DataSets and Directories. The window has also an integrated menu and a toolbar that ease the access to the configuration and management commands of the window itself.

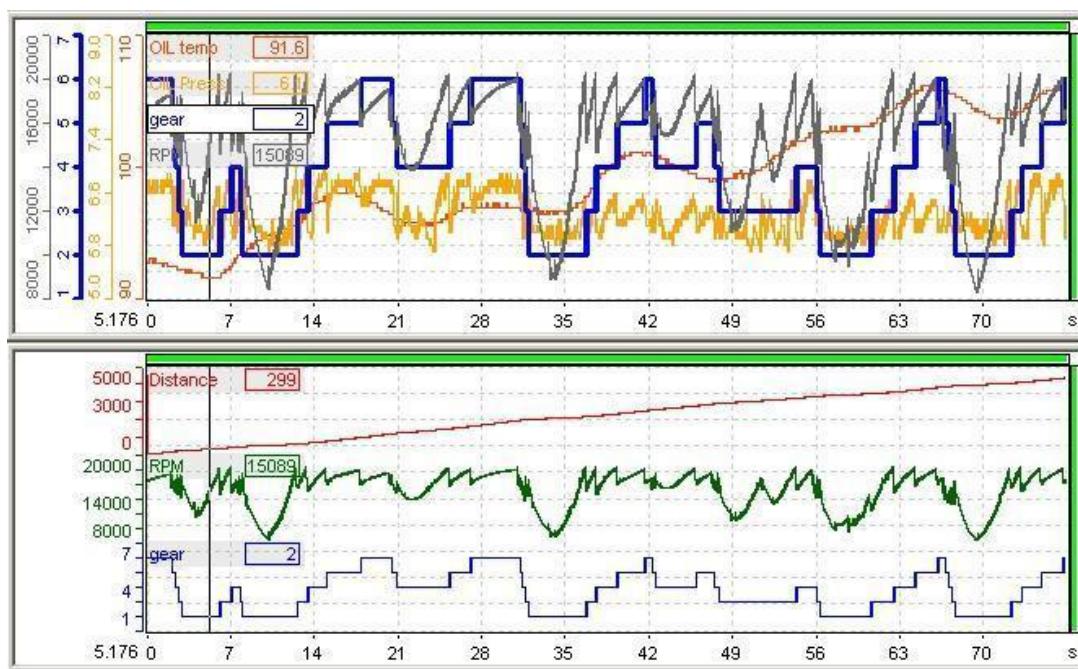
General Options page

The **General Options** page allows configuring the general aspects of the display and the functioning of the graphic windows, the behavior and the setting of the application, the calculation method for the Distance channel used to measure the distances covered.



Graphs Settings

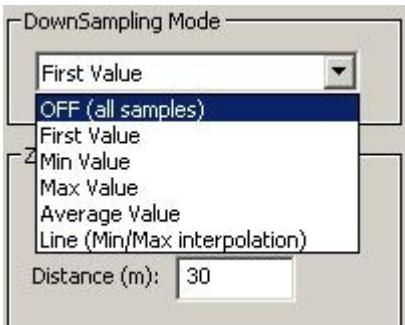
- **Auto Connect:** Enables automatic connection between the graphic cursors of all active graph windows. Once this function is active, all window cursors will be simultaneously displayed in the same position (time and space). Moving the cursor in the current window will also move the cursors in all other active windows.
- **Auto Connect Zoom:** Automatically zooms all windows to the same amount.
- **Keep Zoom After Changing Layout:** if it is enabled, it keeps unchanged the zoom level for the Analysis windows displayed, changing the Layout [... see *Layout functions*] loaded. If it is disabled, when the loaded Layout is [... see *the Layout functions*] changed, the Analysis windows will be displayed with the default zoom level (100%).
- **Keep Zoom After Changing Lap:** if it is enabled, it keeps unchanged the zoom level for the Analysis windows displayed, changing the Laps [... see *Laps management*] loaded. If it is disabled, when the Laps loaded are changed [... see *Laps management*], the Analysis windows will be displayed with the default zoom level (100%). If enabled, it keeps unchanged also cursor position.
- **Keep in memory Graph Setup changes:** Disable this flag if you don't want to be prompted to save a (changed) graph setup each time you change layout..
- **Distinguish Mark on VCH Labels:** Marks math channel labels in graphs with.
- **Keep Shift After Changing Layout:** Maintain current shift when changing window layout.
- **Auto Align Y Scales:** Aligns left-hand edges of graph windows. When horizontally tiled, all time-axes occupy the same space and the cursors in each window line up. This is useful for layouts which have graphs in Overlay mode.



- **Auto Reposition Popup Track:** When enabled the Popup circuit will move when the cursor approaches.
- **Use table alias name:** WinTAX uses aliases configured in the table instead of the real channel names.
- **Cursor Value in Transparent:** If it is checked, the Graph Window shows the cursor value inside the graph area.
- **Double X Axis Unit:** If it is checked, and Cursor Value in Transparent is checked too, the Graph Window shows time cursor value and space cursor value both.

DownSampling mode

DownSampling: Graphical downsampling in graph windows. It's useful to graph high frequency channels in the whole race. All math expressions are calculated with the max precision.



- **OFF** Disable downsampling and paint all samples in graphs
- **First Value** Enable downsampling: use the first sample in the neighborhood of the step of the channel.
- **Min Value** Enable downsampling: use the sample corresponding to the minimum value in the neighborhood of the step of the channel.
- **Max Value** Enable downsampling: use the sample corresponding to the maximum value in the neighborhood of the step of the channel.
- **Average Value** Enable downsampling: use the sample corresponding to the average value in the neighborhood of the step of the channel.
- **Line (Min/Max interpolation)** Enable downsampling: use both the samples corresponding to the minimum and the maximum value in the neighborhood of the step of the channel.

Zoom Fix

- **Time:** sets the width (in seconds) of the horizontal zoom interval, used by the **Zoom Fix Range** function of the **Graph** windows, when the X axis is set in **Time** mode.
- **Distance:** sets the width (in meters) of the horizontal zoom interval, used by the **Zoom Fix Range** function of the **Graph** windows, when the X axis is set in **Distance** mode.

High Light

It sets the mode in which the selected channels are highlighted in the Analysis windows. Two modes are available:

- **Blink:** for each selected channel, the graphic elements (curves, markers, scales) and the corresponding text boxes are displayed with a blinking effect.
- **Bold:** for each selected channel, the graphic elements (curves, markers, scales) are drawn with bold depth, the corresponding text boxes are highlighted by inverting the background and the text colors.

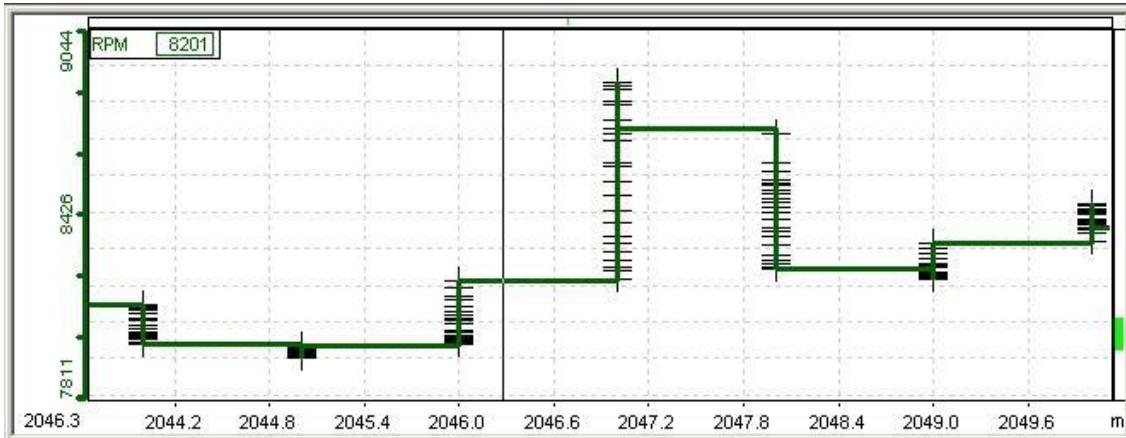
Application

- **Ask Confirm Before Exit From the Application:** If it is enabled, when the application closes, the user is asked for a confirmation through a window.
- **Enable NoRX Percent:** it enables the calculation of the NoRX percentage on the loaded data.
- **Single Channel List** This option allows to group channels into a single list in Channel Browser.
- **Ask Saving Layout** If it is enabled, when the application closes or when the layout changes, the user is prompted to save changes to the layout..
- **Offset & Gain:** selection of the source where the offset and gain values can be extracted
 - **OFF:** No offset and gain values are used
 - **FileTable:** Uses only the offset and gain values set in the context information.
 - **Parameters Settings:** Uses Only the offset and gain values set in the Channel Parameters.
 - **Table+Parameters:** Uses both parameters; the offsets are summed and the gains multiplied.
- **Measure System:** enables to set the metrical measurement system adopted in the application.
 - **Metric**, standard metrical measurement system
 - **British**, British metrical measurement system
- **Script Language:** enables to set the programming language used for the script
 - **VBScript**
 - **JScript**.
- **Time Mode:** default of the display mode of the time instant in the application:
 - **relative**, the beginning of the lap is 0 seconds
 - **absolute**, the beginning of the lap is the hour of acquisition
- **Clear Google Earth Location History** Clears the cache memory of Google Earth.

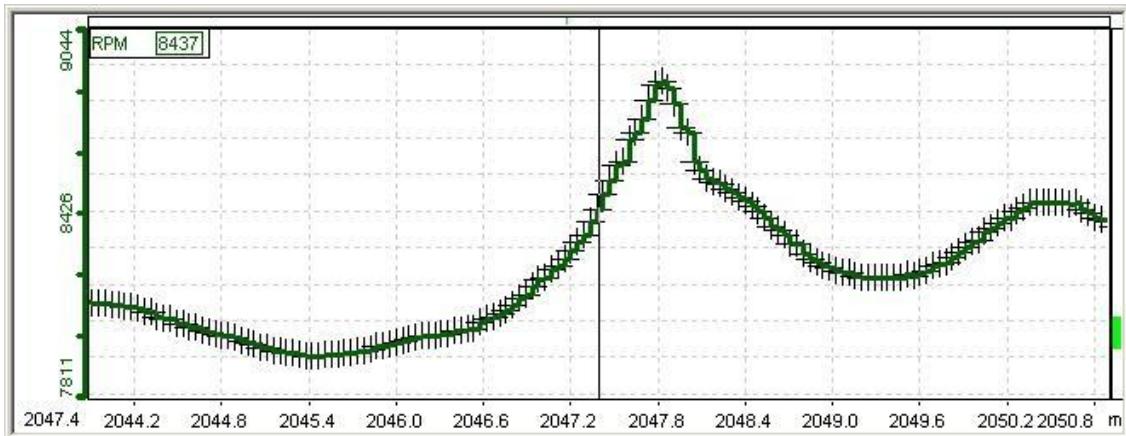
Distance

- **Distance Interpolation:** when enabled, this option displays the data in distance mode by performing a linear interpolation of channel values between the real measured distance channel. This is useful for channels which are logged at a higher rate than the distance channel. If the option is not enabled, channel values will be plotted all together only at the measured distance points. The effect is most noticeable at low speeds where the distance changes relatively little in a given time period.
 - **Alignment (on comparison):** this options is used when comparing laps in distance mode. It normalises all laps in the comparison to the same lap length.
 - **Skip Distance Alignment:** don't align
 - **Align to Maximum Distance:** align (stretch) all laps to the longest in the selection
 - **Align to Minimum Distance:** align (compress) all laps to the shortest in the selection
 - **Align to Average Distance:** align to the mean lap length of the selection
 - **Align to 0:** align to a nominal lap length
- Depending on the choices made in the previous list, it's possible to edit:
- **Max difference (%)**
 - **Exclude TEST laps**

Without distance interpolation

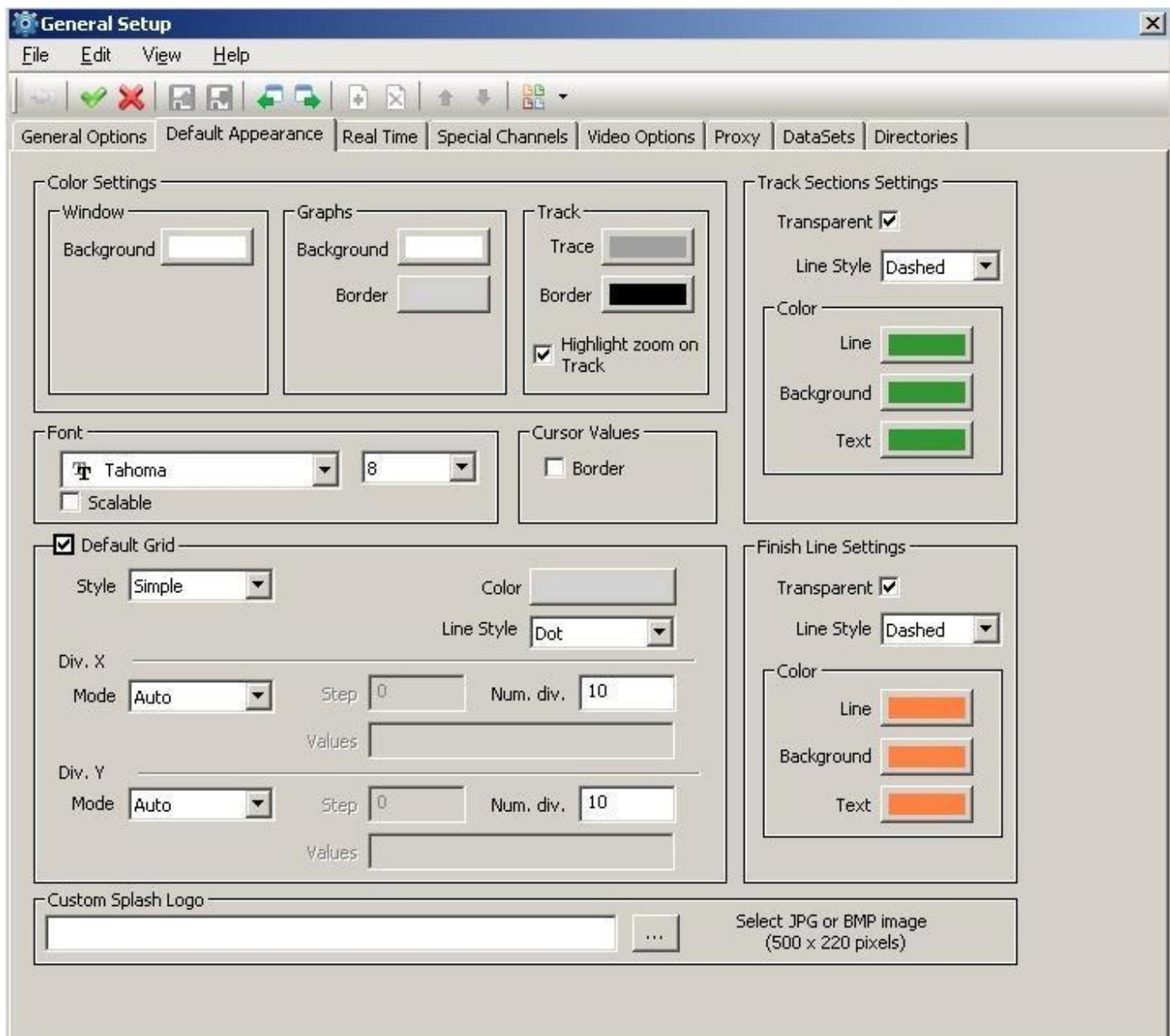


With distance interpolation



Default Appearance page

The **Default Appearance** page allows to configure the default settings for the graphic aspect of the windows and of the application (colors of the graphic elements, fonts, grids), used when the customized settings are not used by the single windows.



Color Settings

It shows and allows setting the colors used by default in the Analysis windows where the customized colors are not set.

Window

- **Background:** background color of the window.

Graphs

- **Background:** background color of the graphic area of the window.
- **Border:** border color of the graphic area of the window.

Track

- **Trace:** color of the track used by default in the Track windows where no customized colors are set.
- **Border:** border color of the track used by default in the Track windows where no customized colors are set.
- **Highlight zoom on track:** enable the visualization of the zoom in track trace.

Font

It displays and enables to set the characteristics and the behavior of the font by default, used in the Analysis windows where no customized font is set.

- **Family Font:** sets the type of font.
- **Font Dimension:** sets the size of the font.
- **Scalable:** sets the adaptation of the size of the font in relation to the size of the window.

Cursor Values

This section allows to configure layout for items that display cursor values.

- **Border:** set the default state of visualization of the cursor value border for new channels added in the graph windows.

Default Grid

It displays and enables to set the default characteristics of the grid displayed in the graphic area of the Analysis windows. These settings are valid when the customized grid of the window is not enabled.

- **Default Grid:** enables/disables the display of the grid.
- **Style:** sets the style of the grid
- **Color:** color of the grid
- **Line style:** sets the style of the line of the grid (valid if Style Simple is set)
- **X Div. Section**

- **Mode:** calculation mode of the horizontal divisions
- **Step:** fixed step to calculate the horizontal divisions (a division for each Step), valid with Mode set to Step
- **Num. div.:** the number of horizontal divisions to be displayed, valid with Mode set at Auto or Fixed
- **Value:** list of values on X axis corresponding to the divisions, valid with Mode set at Custom. The list of values can be added directly in the text box, using as division the character ';'.
- **Y Div. Section**
- **Mode:** calculation mode of the vertical divisions
- **Step:** it cannot be configured at this level
- **Num. div.:** the number of vertical divisions to be displayed, valid with Mode set at Auto or Fixed
- **Values:** it cannot be configured at this level

Track Settings

Configuration of the display mode of the map section on the Graphs window.

- **Transparent:** if it is checked, it displays the sections in transparent mode on the graphs; if FALSE they are displayed on a bar external to the graphic area.
- **Line Style:** configuration of the type of division line between the different sections (dashed or continuous)

Color

configurable colors

- **Line:** color of the division line
- **Background:** background color of the boxes
- **Text:** text color of the boxes

Finish Line Settings

Configuration of the display of the laps divisions in comparisons on the Graphs window.

- **Transparent:** if it is checked, it displays the sections in transparent mode on the graphs; if FALSE they are displayed on a bar external to the graphic area.
- **Line Style:** configuration of the type of division line between the different sections (dashed or continuous)

Color

configurable colors

- **Line:** color of the division line

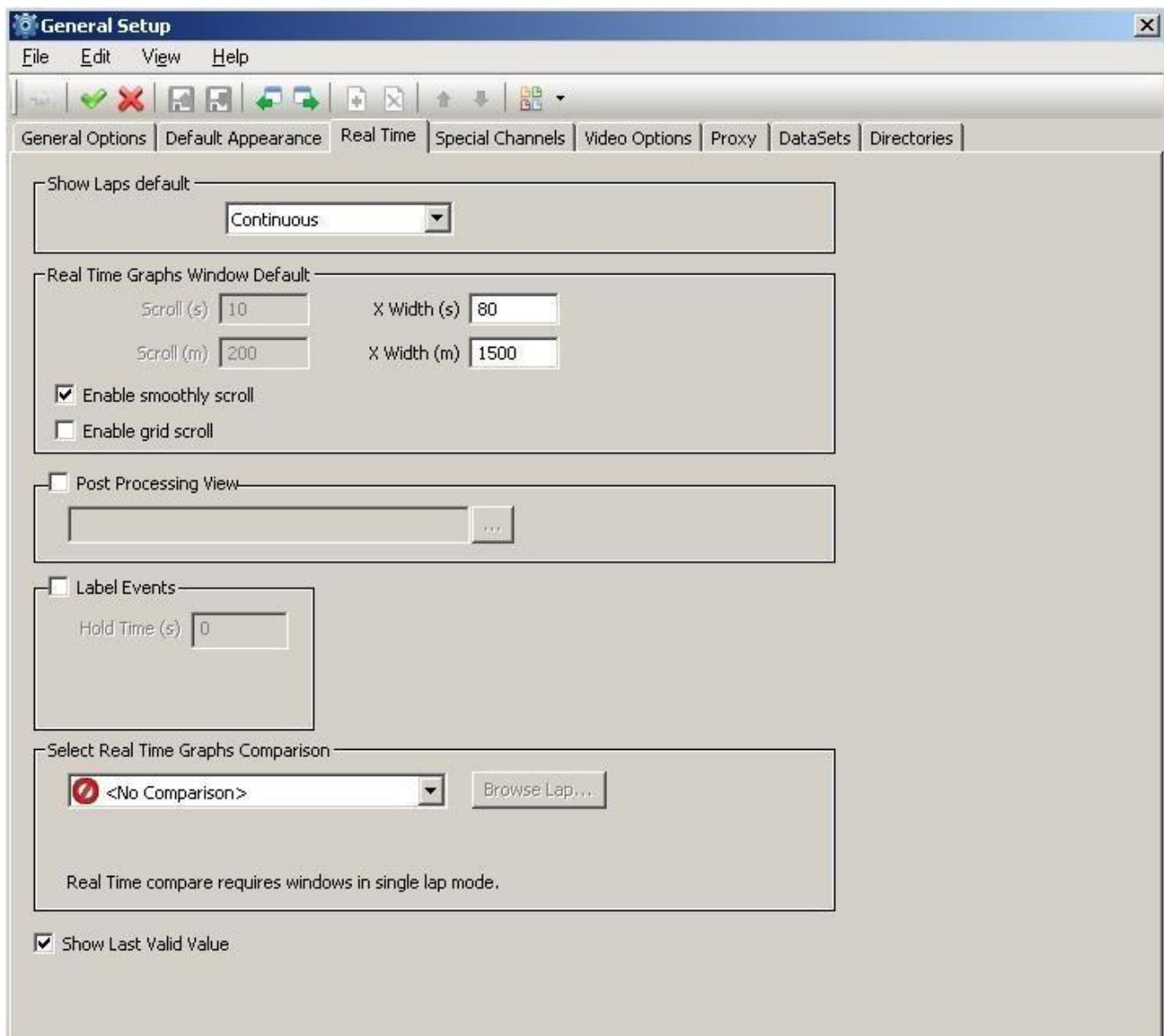
- **Background:** background color of the boxes
- **Text:** Text color of the boxes

Custom Splash Logo

It displays the path of the file used as image in presentation window (Splash) when the application starts. The button enables to open a browser window to select another file. If the path is empty, a default image is used.

Real Time Page

The **Real Time** page enables to configure the default settings used when the customized settings are not enabled.



Show Laps default

It sets the display mode of the Laps in the Real Time (RT) windows.

- **Continuous:** Track marker beacon event is shown as a vertical line in the RT graph window; new lap is shown as a continuation of the previous one.
- **Single Lap:** Track marker event causes data traces to be reset to left-hand edge of RT graph window; only the current lap is shown

Real Time Graphs Window default

It sets the values to handle the scroll and the width of the X scale in the Real Time graphs.

- **Scroll(s):** Default setting for RT windows. Data traces are scrolled in steps defined by this field.
- **Scroll(m):** value in meters of the scroll on the Real Time windows.
- **X Width (s):** Default setting for RT windows. Data traces are scrolled in steps defined by this field.
- **X Width (m):** Default x-axis extents for RT graph windows.
- **Enable smoothly scroll:** Enables scroll with a rate that ensure more fluidity.
- **Enable grid Scroll:** Enables grid scrolling together with graphics. When this check is disabled, only X axis will scroll together with graphics, while grid will remain static on background and will not be aligned to X axis.

Post Processing View

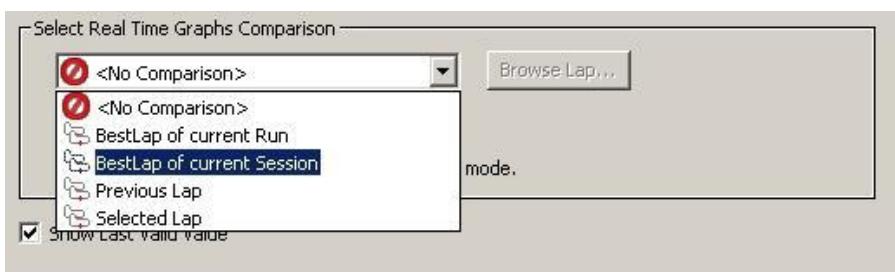
- **Post Processing View:** enables the customized selection of the Graph configuration to be used in the Post Processing View
- **Text box:** path of the Graph configuration to be used in the Post Processing View

Label Events

- **Label Events:** display of a label with the name of the event beside the marker of the occurrence
- **Hold Time (s):** duration of the display of the label before changing it

Select Real Time Graphs Comparison

Selection of a lap to be used as a reference for the comparison during the Real Time acquisition.

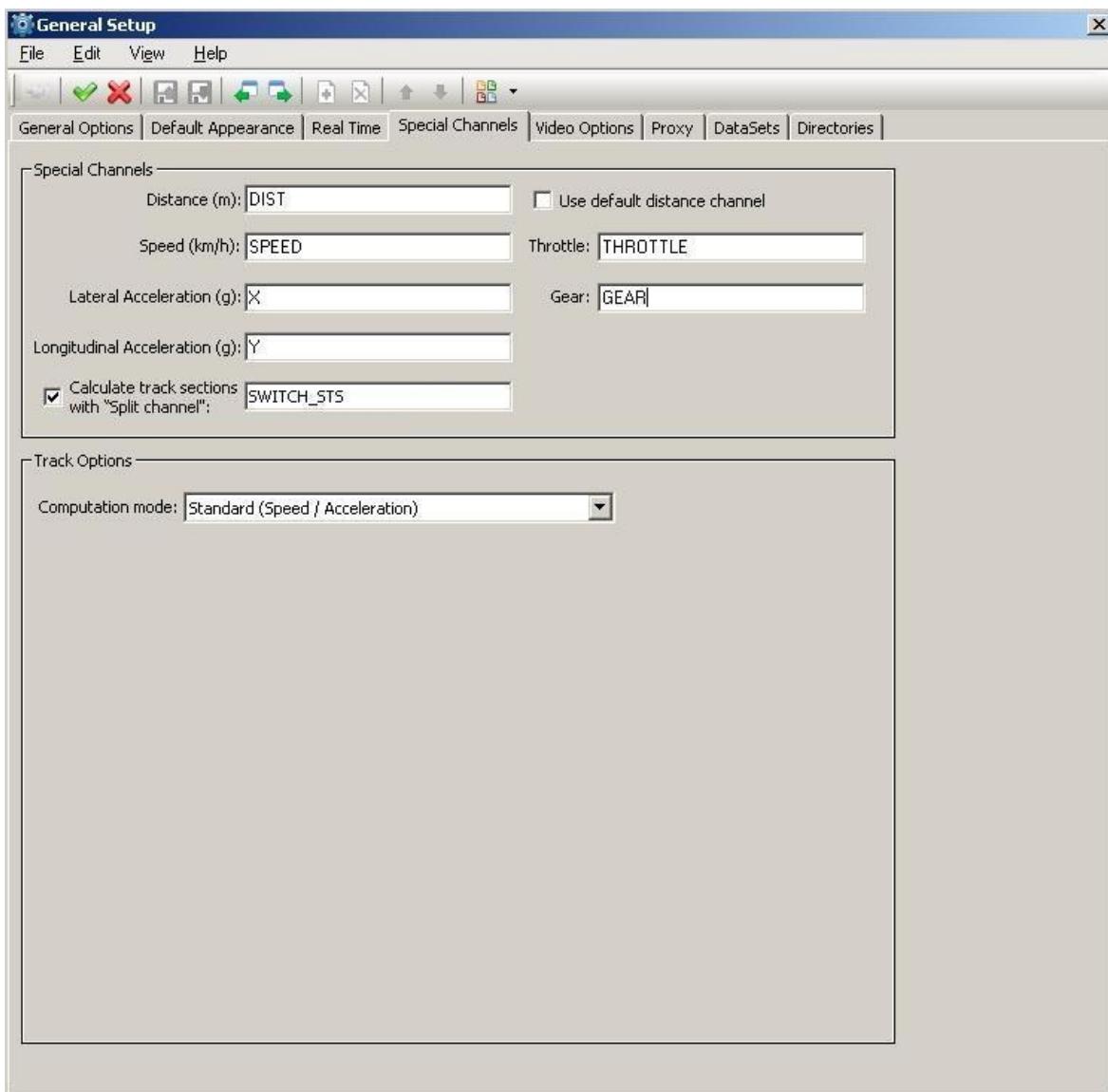


- No comparison
- Best Lap of current Run
- Best Lap of current Session
- Previous Lap
- Selected Lap

The **Show Last Valid** check enables visualization of last valid value: to be used especially within TAG310 real-time streams

Special Channels Page

The **Special Channels** page enables to configure the settings of the channels that measure the distance covered, the speed, the lateral acceleration and the opening of the throttle of the engine.



Special Channels

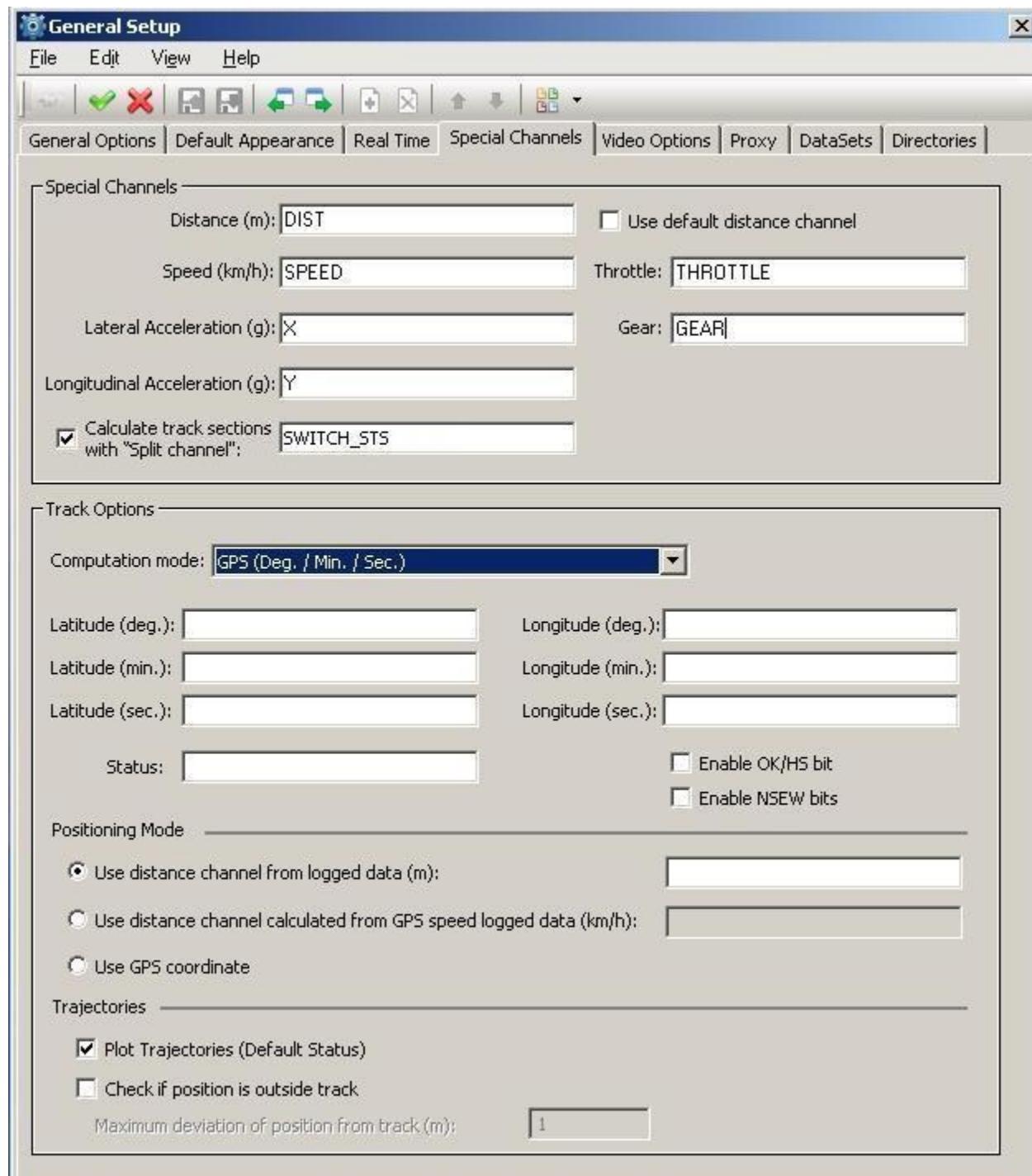
- **Distance (m):** the channel which is defined here is used by WinTAX for distance-based analysis (distance graphs, calculating the circuit, circuit map sections etc.). Use this if you wish to specify another channel than the one defined in the logging table.
- **Speed (km/h):** the channel which is defined here is used by WinTAX to create the trajectory of the Track (see Track editor).
- **Lateral Acceleration (g's):** the channel which is defined here is used by WinTAX to automatically create the Track Sections (see Track editor) and configure the GG window.
- **Longitudinal Acceleration (g's):** the channel which is defined here is used by WinTAX to automatically configure the GG window.
- **Throttle (%):** the channel which is defined here is used by WinTAX to automatically create the Track Sections (see Track editor) and for Tn event search.
- **Gear:** Label of the channel Gear used for *Gear Change* management.

- **Calculate Track Section with "Split channel":** With this check enabled, global map is calculated using the special "split time" channel defined here.

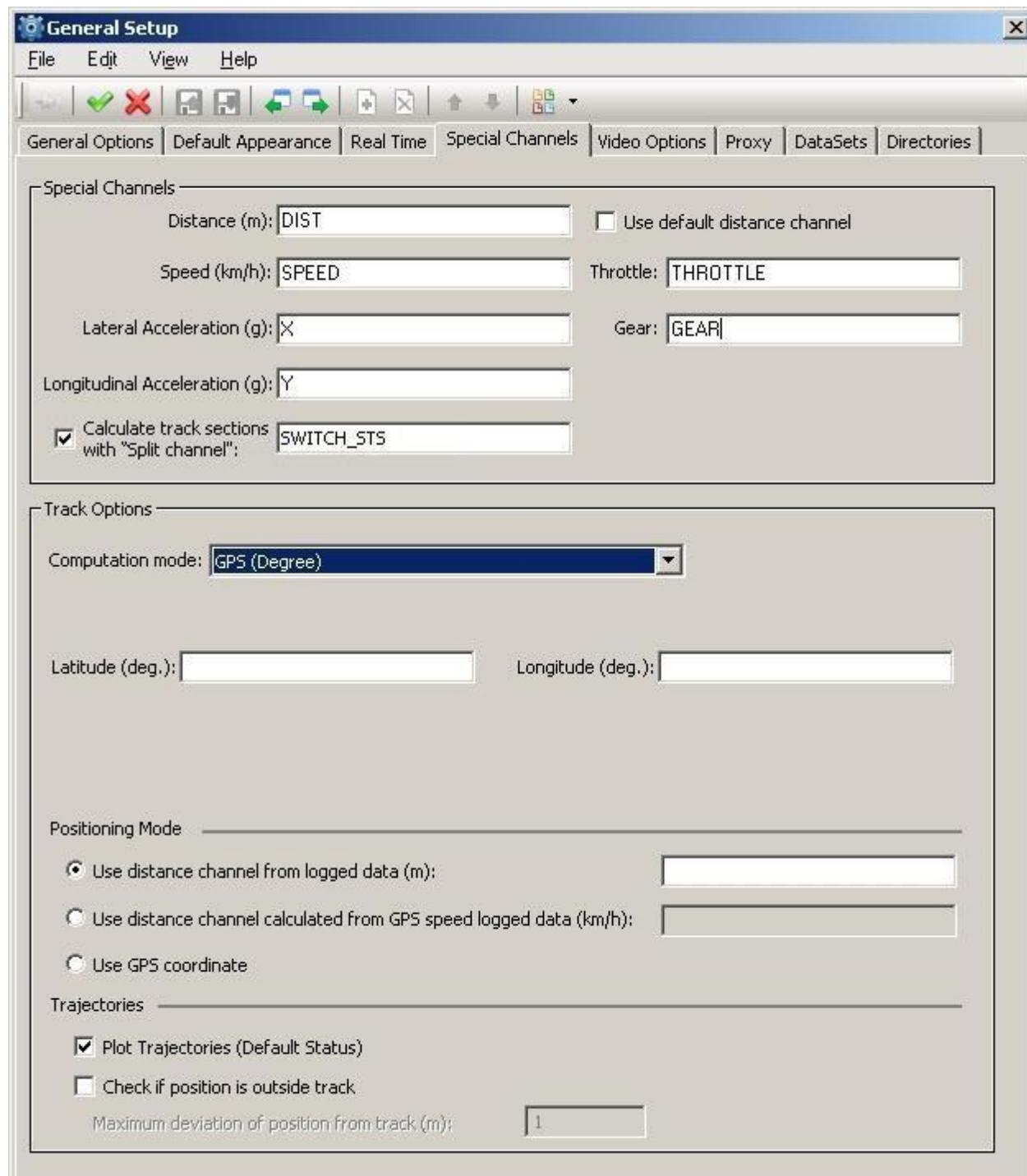
Track Options

- **Computation Mode:** sets the computation mode of the circuit: standard, GPS (Deg. / Min. / Sec.), GPS(Degree). When **Computation Mode** is **GPS (Deg. / Min. / Sec.)** or **GPS (Degree)**, further controls are displayed, for settings parameters used in circuit computation.

GPS (Deg. / Min. / Sec.)



GPS (Degree)



- **Latitude (deg./min./sec.)**: latitude coordinate (degrees, minutes, seconds).
- **Longitude (deg./min./sec.)**: longitude coordinate (degrees, minutes, seconds).
- **Status**: sets the channel of GPS status.
- **Enable OK/HS bit**: enables check of bit status.
- **Enable NSEW bits**: enables check of the bits direction (north, south, east, west).

Positioning Mode

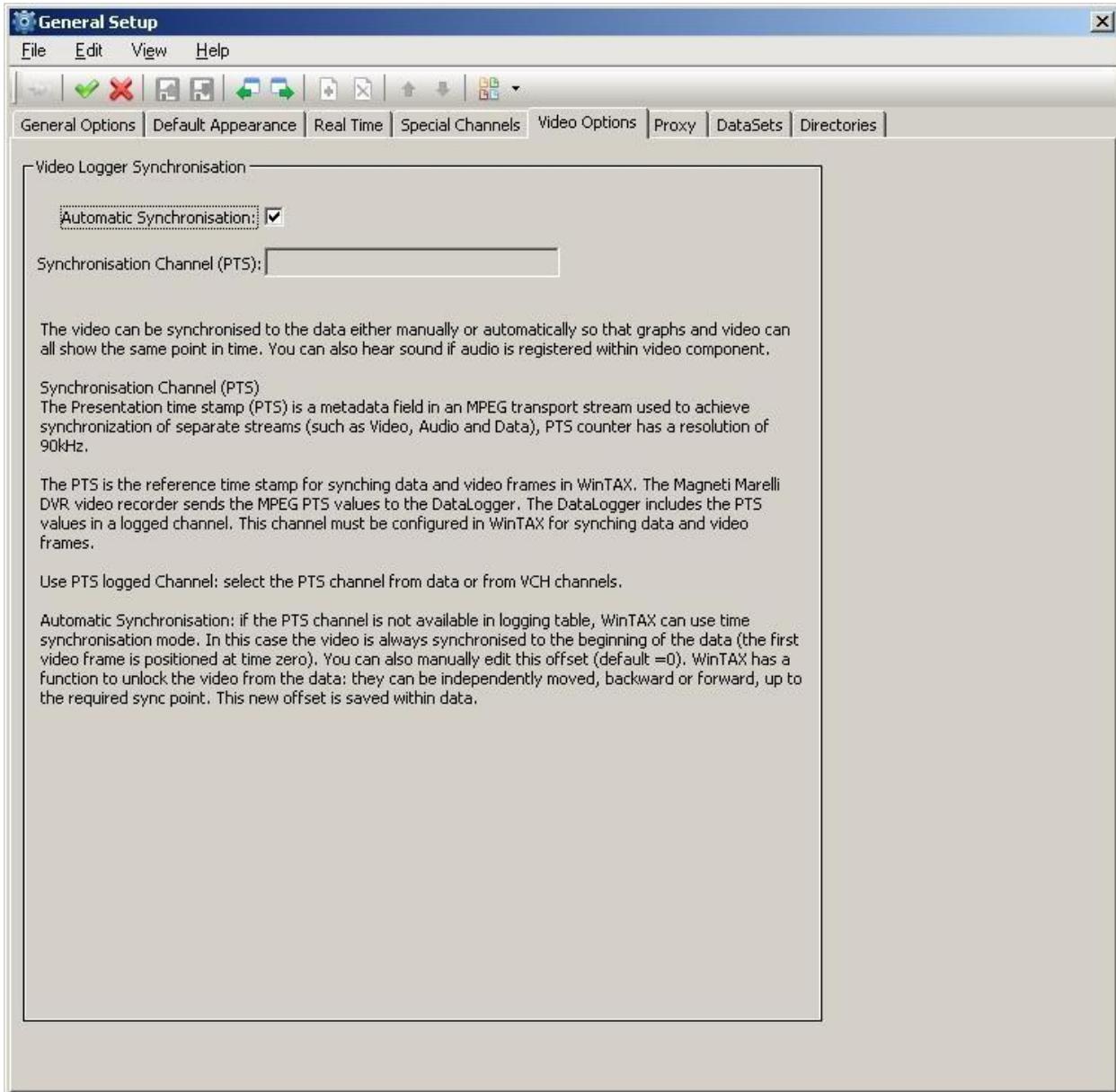
- **Use distance channel from logged data**: sets the name of the distance channel.
- **Use distance channel calculated from GPS speed logged data (km/h)**: sets the name of the speed channel to calculate distance and connect the car on track window.
- **Use GPS coordinate**: car is displayed on the track window using GPS coordinates: longitude and latitude.

Trajectories

- **Plot Trajectories**: draws car trajectory.
- **Check if position is outside track**: verifies if the car position is into track. If car goes out of the track, its symbol is as circle with question mark inside.
- **Maximum deviation of position from track(m)**: distance limit to consider car out of the track.

Video Options

The **Video Options** page enables to configure the video synchronization channel..



Video Logger Synchronization

The video can be synchronized to the data either manually or automatically so that graphs and video can all show the same point in time. You can also hear sound if audio is registered within video component.

Synchronization Channel (PTS)

The Presentation time stamp (PTS) is a metadata field in an MPEG transport stream used to achieve synchronization of separate streams (such as Video, Audio and Data), PTS counter has a resolution of 90kHz.

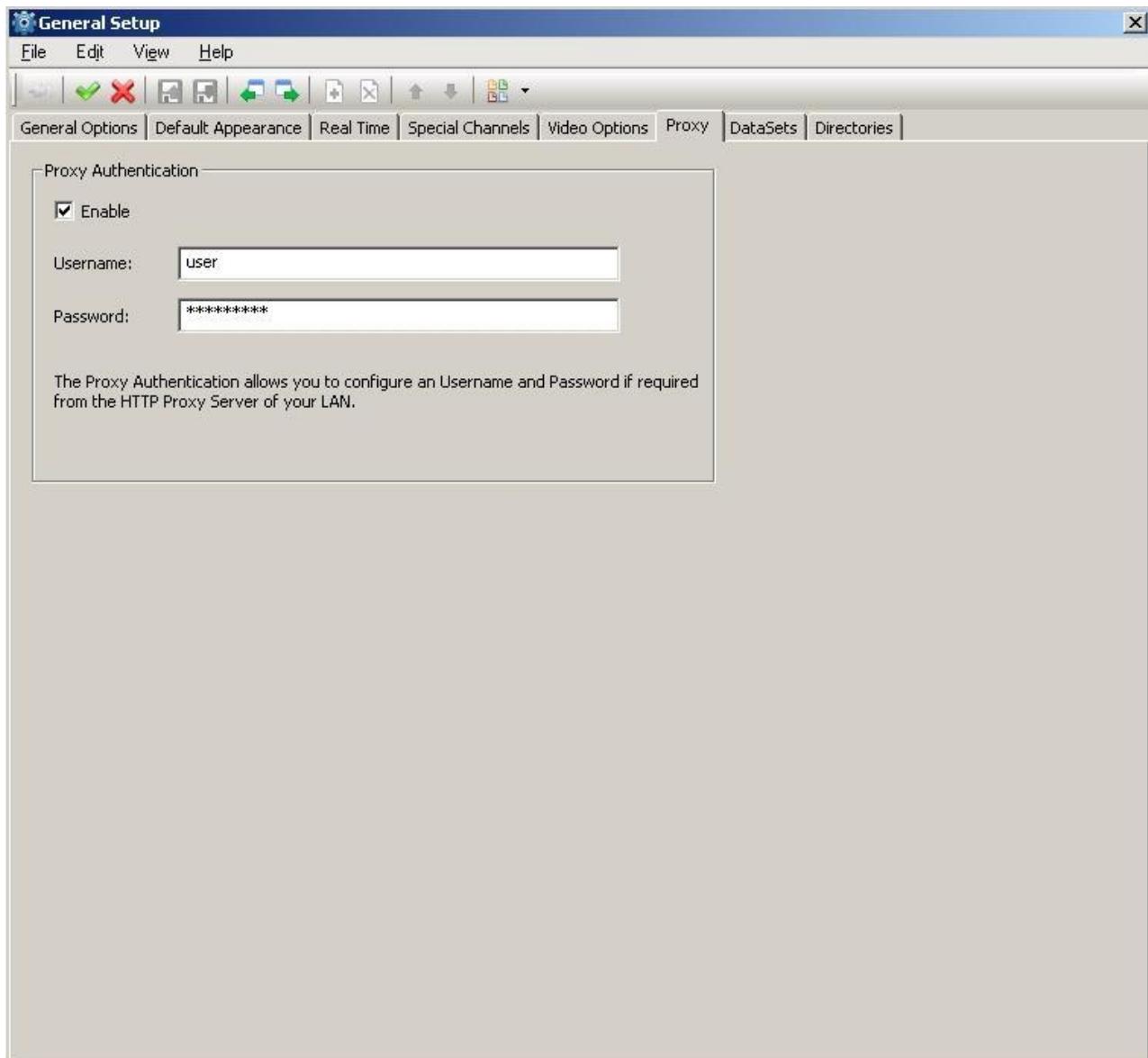
The PTS is the reference time stamp for synching data and video frames in WinTAX. The Magneti Marelli DVR video recorder sends the MPEG PTS values to the DataLogger. The DataLogger includes the PTS values in a logged channel. This channel must be configured in WinTAX for synching data and video frames.

Use PTS logged Channel: select the PTS channel from data or from VCH channels.

Automatic Synchronization: if the PTS channel is not available in logging table, WinTAX can use time synchronization mode. In this case the video is always synchronized to the beginning of the data (the first video frame is positioned at time zero). You can also manually edit this offset (default =0). WinTAX has a function to unlock the video from the data: they can be independently moved, backward or forward, up to the required sync point. This new offset is saved within data."

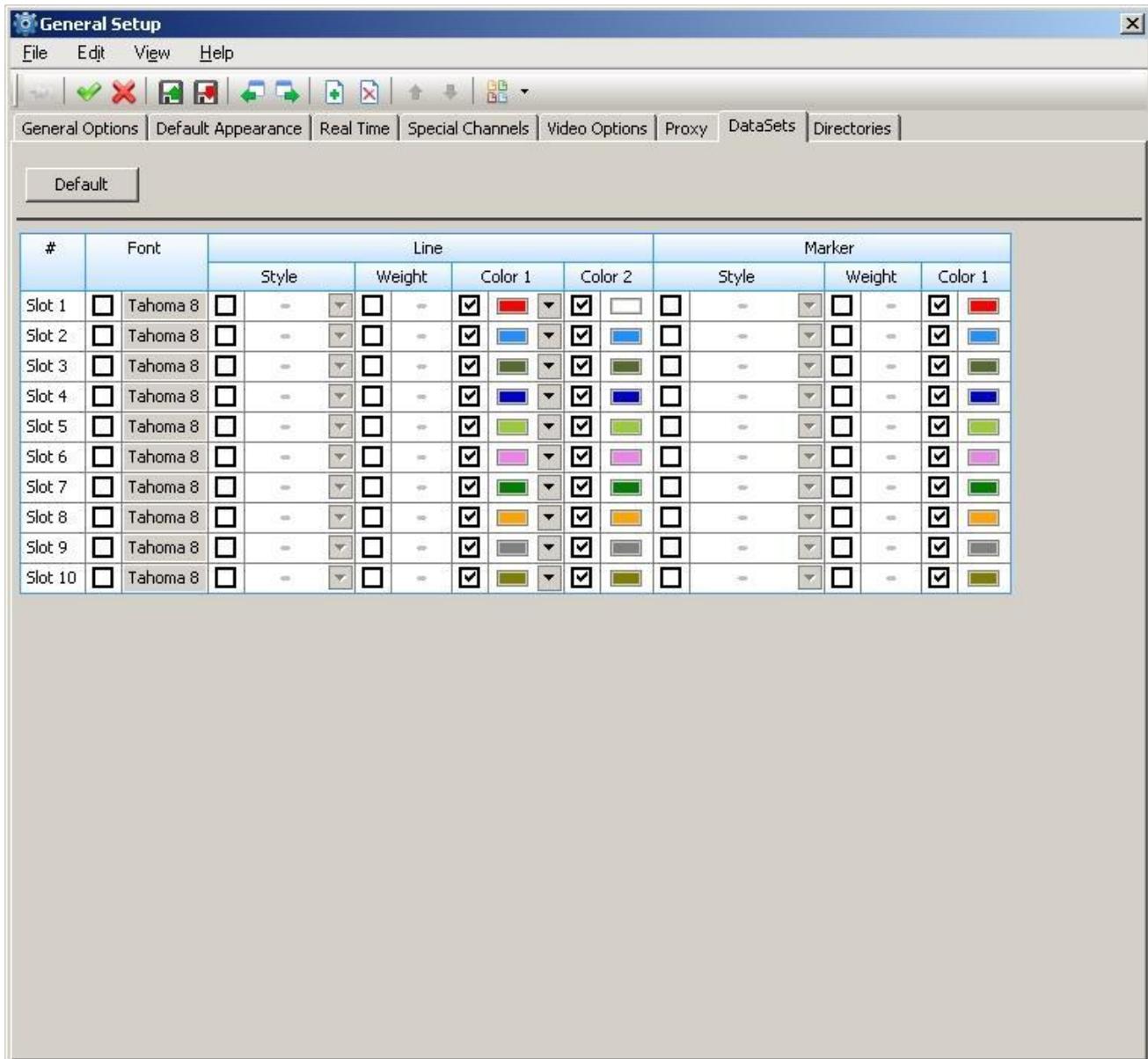
Proxy

The **Proxy Authentication** page enables to configure an Username and Password if required from the HTTP Proxy Server of your LAN.



DataSets Page

The **DataSets** page enables to configure the settings of the font sand of the graphic elements (lines of the curves and markers) used in the **Analysis windows** and in the other elements of the application when the Compare Laps function is enabled [see *Compare Laps function*].



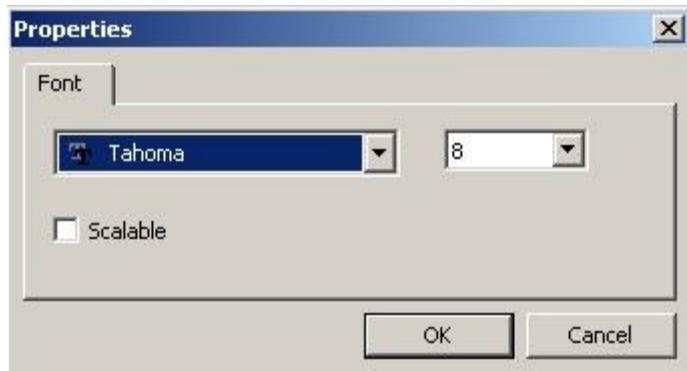
The **Default** button allows to reset the default values of the application.

In the list, the column identifies the configurable fields, while rows correspond to the settings of the fields linked to the Laps loaded in Compare.

For each field it's possible to enable/disable the use of the configured settings, selecting/deselecting. The check box placed beside the control configuration the fields. When the

setting of a field is disabled, the aspect of the corresponding graphic element is handled according to the settings to the configuration of the Analysis window.

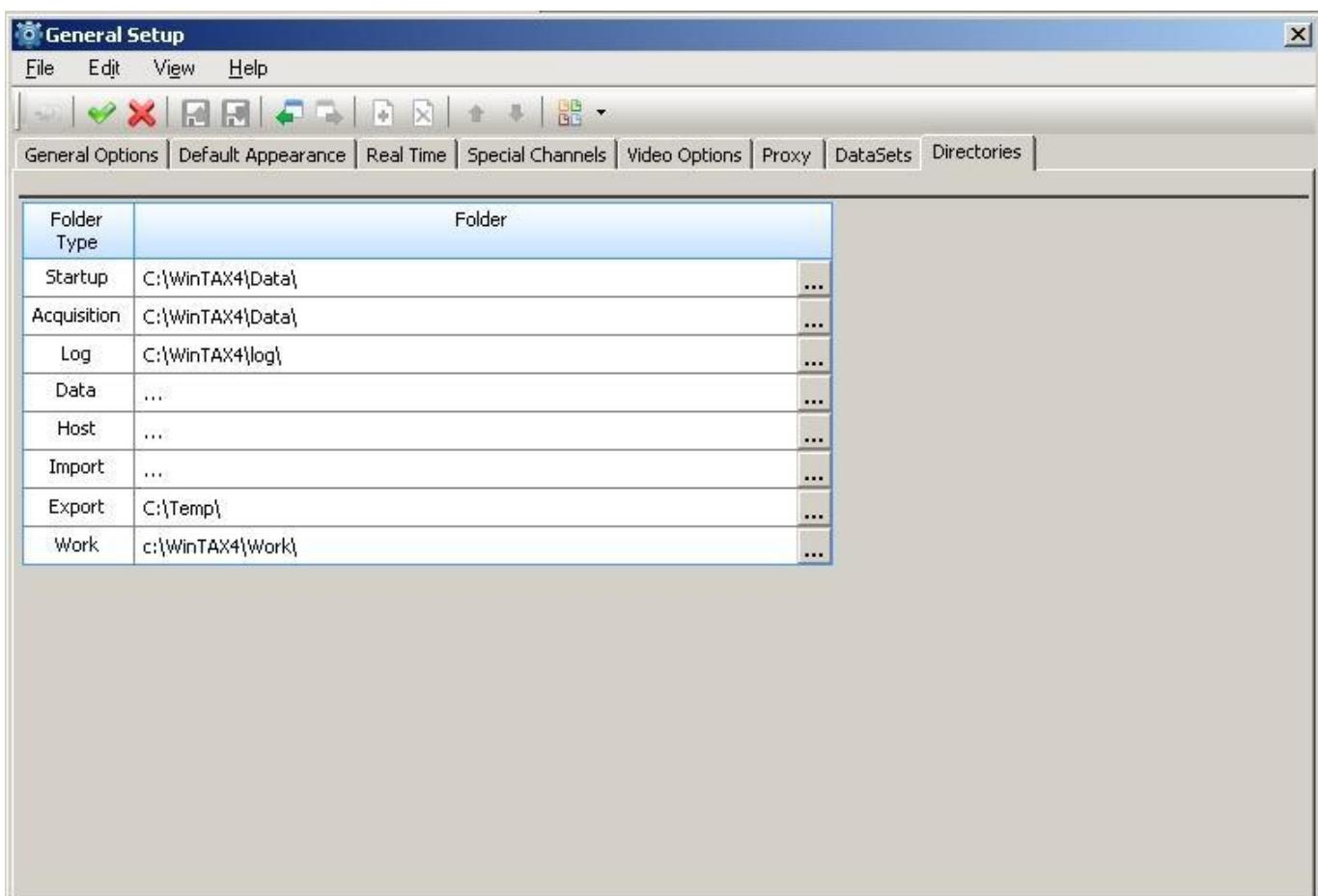
- **Slot #:** reference slot (max 10). If the licence enables the Reference Lap the first row is dedicated to the configuration
- **Font:** shows the setting of the characteristics of the font used in the info text box of the Data Header toolbar and in the graphic windows.



- **Family Font:** sets the type of font.
- **Font Dimension:** sets the size of the font.
- **Scalable:** enables the size adapting of the font in proportion to the size of the window.
- **Line**
 - **Style:** sets the style of the line of the graphs
 - **Weight:** sets depth of the line in pixel.
 - **Color 1:** sets the color of the line.
 - **Color 2:** color of the border of the line
- **Marker**
 - **Style:** Style of the markers, graphic elements used to display the marker.
 - **Weight:** size(depth) of the markers in pixel.
 - **Color 1:** color of the markers.

Directories Page

The **Directories** page enables to configure the paths of the working directories. In the displayed list the first column shows the type of directory of reference (Folder Type), the second shows the complete path of the directory (Folder)set.



In each line of the list, the path of the Folder column can be modified directly in the text box opened by double clicking with the left button of the mouse or with the SPACE bar of the keyboard, or by opening a browser by clicking on the button [*button icon...*]. For some types of Folders (Data, Host, Import), it's possible to specify more than a reference directory. Folder Types configurable:

- **Startup:** sets the default directory used by the Data Browser
- **Acquisition:** this is the directory where WinTAX saves downloaded files (Cable or Real time)
- **Log:** where WinTAX saves log files (if enabled in the WinTAX4\system\LogFile.xml)
- **Data:** defines the list of paths displayed in the Data Browser drop-down menu.
- **Host:** the list of paths which can be enabled to be used by the AutoCopyToHost Rx Task.
- **Import:** this is the path used by the AutoImport Rx Task
- **Export:** Default directory for export functions
- **Work:** where WinTAX saves temporary working files - **do not change (Read Only path)**

Menu

The menu of the **General Setup** window enables the access to the following commands, divided into sub menus:

File

COMMAND	DESCRIPTION
Apply	Applies the current settings and closes the window
Cancel	Closes the window without applying the current settings
Load	Opens a dialog window to select a configuration file Extended Comparison Settings (.ecs) to be loaded; it is enabled when the DataSets page is active
Save As	Opens a dialog window to select a configuration file Extended Comparison Settings (.ecs) on which the current settings for DataSets can be saved; it is enabled when the DataSets page is active

Edit

COMMAND	DESCRIPTION
Add Item	It is enabled when the DataSets page or the Directories page are active; it adds a new item to the configuration list of the compared DataSets, or in the directories list for the folders where the multiple directories can be configured.
Remove Item	It is enabled when the DataSets page or the Directories page are active; it removes from configuration list of the colors for compared DataSets the selected items, or the directories selected in the list of the folders where multiple directories can be configured.
Move Up	It is enabled when the Directories page is active; it moves upwards by one position the directories selected in the list of the folders where the multiple directories can be selected.
Move Down	It is enabled when the Directories page is active; it moves downwards by one position the directories selected in the list of the folders where the multiple directories can be selected.

View

COMMAND	DESCRIPTION
Previous Page	It enables the page of the window previous to the one currently in use.
Next Page	It enables the page of the window next to the one currently in use.

Help

COMMAND	DESCRIPTION
Help	It shows the setup general help.

Toolbar



The toolbar of the **General Setup** window enables the access to the following commands:

COMMAND	DESCRIPTION
Keep Visible	Not available in this window
Cancel	Closes the window without applying the current settings (similar to the Cancel command of the File menu)
Apply	Applies the current settings and closes the window (similar to the Apply command of the File menu)
Load	Opens a dialog window to select a configuration file Extended Comparison Settings (.ecs) to be loaded; it is enabled when the DataSets page is active (similar to the Load command of the File menu)
Save As	Opens a dialog window to select a configuration file Extended Comparison Settings (.ecs), on which the current settings for DataSets can be saved; it is enabled when the DataSets page is active (similar to the Save As command of the File menu)

Previous Page	It enables the page of the window previous to the one currently in use (similar to the Previous Page command of the View menu)
Next Page	It enables the page of the window next to the one currently in use (similar to the Next Page command of the View menu)
Add Item	Similar to the Add Item command of the Edit menu
Remove Item	Similar to the Remove Item command of the Edit menu
Move Up	Similar to the Move Up command of the Edit menu
Move Down	Similar to the Move Down command of the Edit menu
Channel Browser	Shows the pop-up to select the page in the Channel Browser window 

Channels Parameters

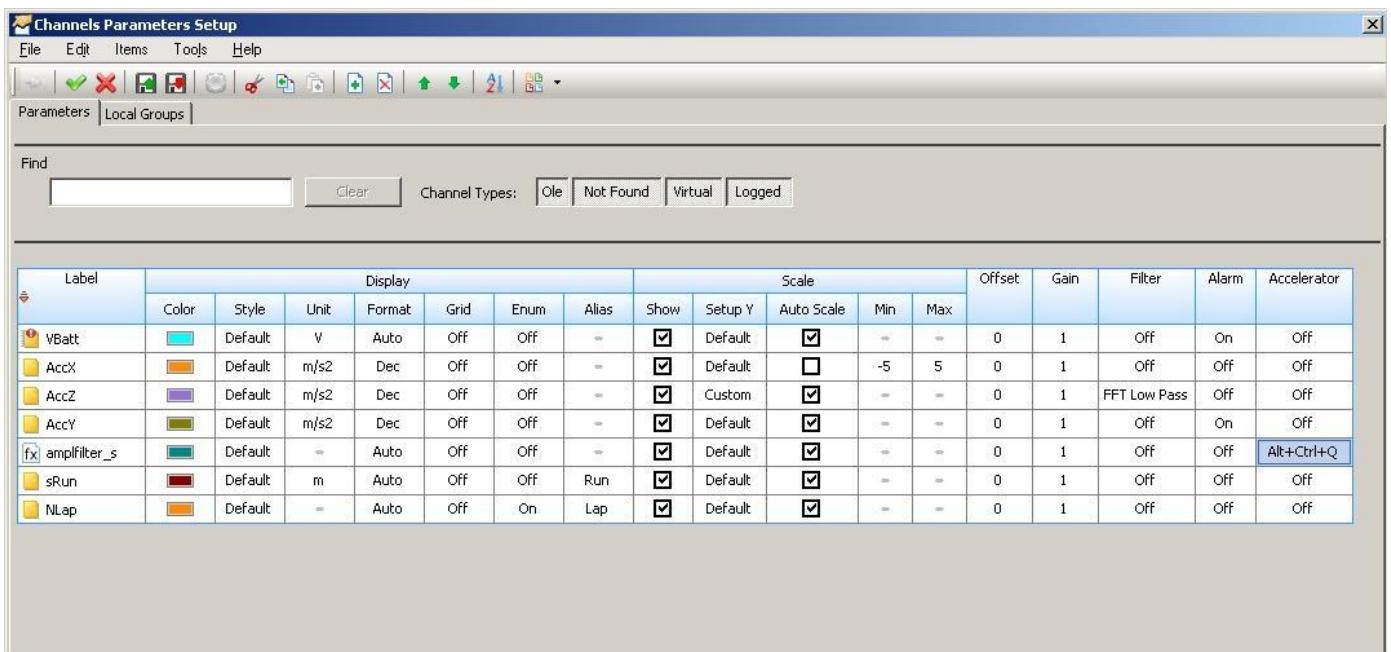
The *Setup / Channels Parameters* menu is used to set up display parameters for individual logged, virtual channels and OLE channels (temporary data used by internal scripts or by external applications). The *Parameters* define some values as the default color axis extents, a scale factor and offset together with smoothing filters and a label for the units of the channel value. The resultant channel values are used in all graphical representations, virtual channels, circuit etc.

Parameters page

The Parameters configuration is intended only as *Global*, so that the same channel parameters are applied for all WinTAX Users on the current machine.

The first part of the dialog is the **Find** function and its filter options. Write in the box the name of the channel, WinTAX automatically filters the list with the matching names. Uses *XXX to find all channels which contains (not only starts) XXX string.

Then the dialog contains the tabular list of the channels.



The information that can be associated to a channel are:

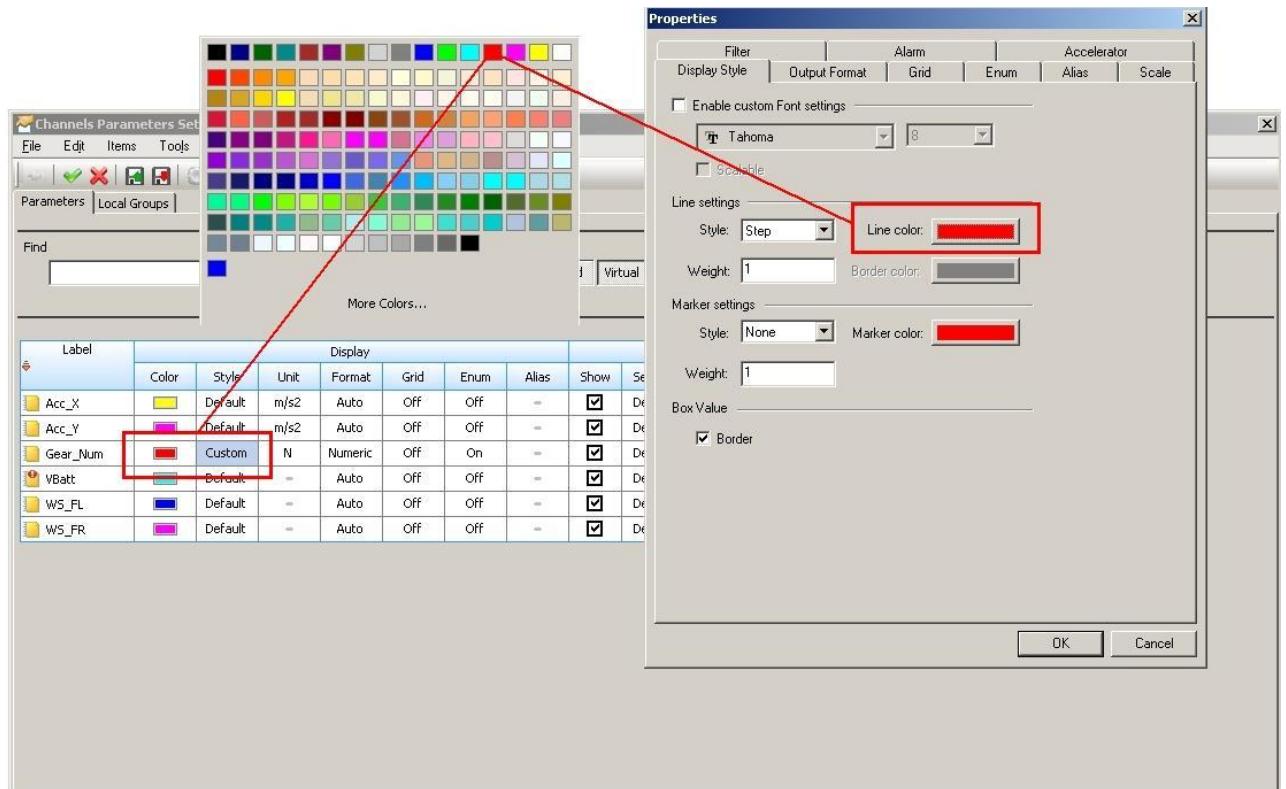
Label

Displays the name of the channel. A click on the header of the column permits to alphabetically sort the channels.

Display

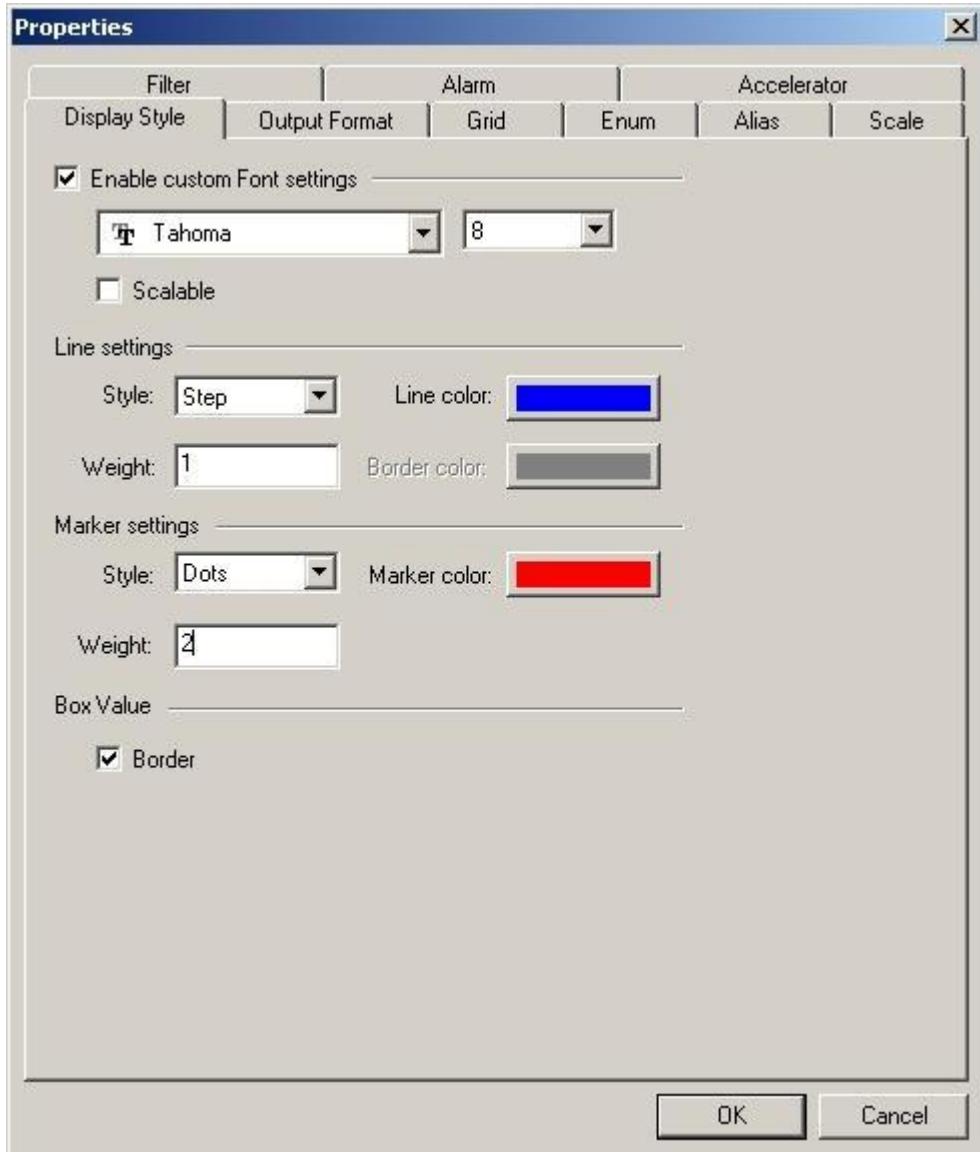
Color

Quickly configure the line color in Display Style



Style

The style field allows to change some trace properties like the weight of the line, the style and the weight of the marker, the color of the line/marker, the font of the current channel etc. In order to modify this setting, open the *Display Style* window on *Channel Properties page*.



Enable Custom Font settings: enables the local font configuration for the selected channels.

- **Family font:** sets the font.
- **Font dimension:** sets the font size.
- **Scalable:** enables the adapting of the font size in relations to the window size.

Line Settings

- **Style:** sets the style of the graphs line
 - **None:** no line is drawn
 - **Line:** continuous line
 - **Step:** stepped line
 - **Fill Down:** continuous line with colored bottom area
 - **Fill Up:** continuous line with colored upper area
 - **Bordered:** continuous line with border
- **Weight:** sets the depth of the line in pixel.
- **Line color:** sets the line color.
- **Border color:** sets the border line color

Marker Settings

- **Style:** style of the markers, graphic elements used to represent the marker.
 - **None:** No markers are drawn
 - **Dots:** dot
 - **Cross:** cross
 - **Rhomboid:** rhomboid
 - **Square:** square
 - **Arrow Down:** arrow downwards
 - **Arrow Up:** arrow upwards
 - **Vert Line:** vertical line
 - **Horz Line:** horizontal line
- **Weight:** size (depth) of the markers in pixel.
- **Marker color:** color of the markers.

Box Value

- **Border:** enables the outline border of cursor value.

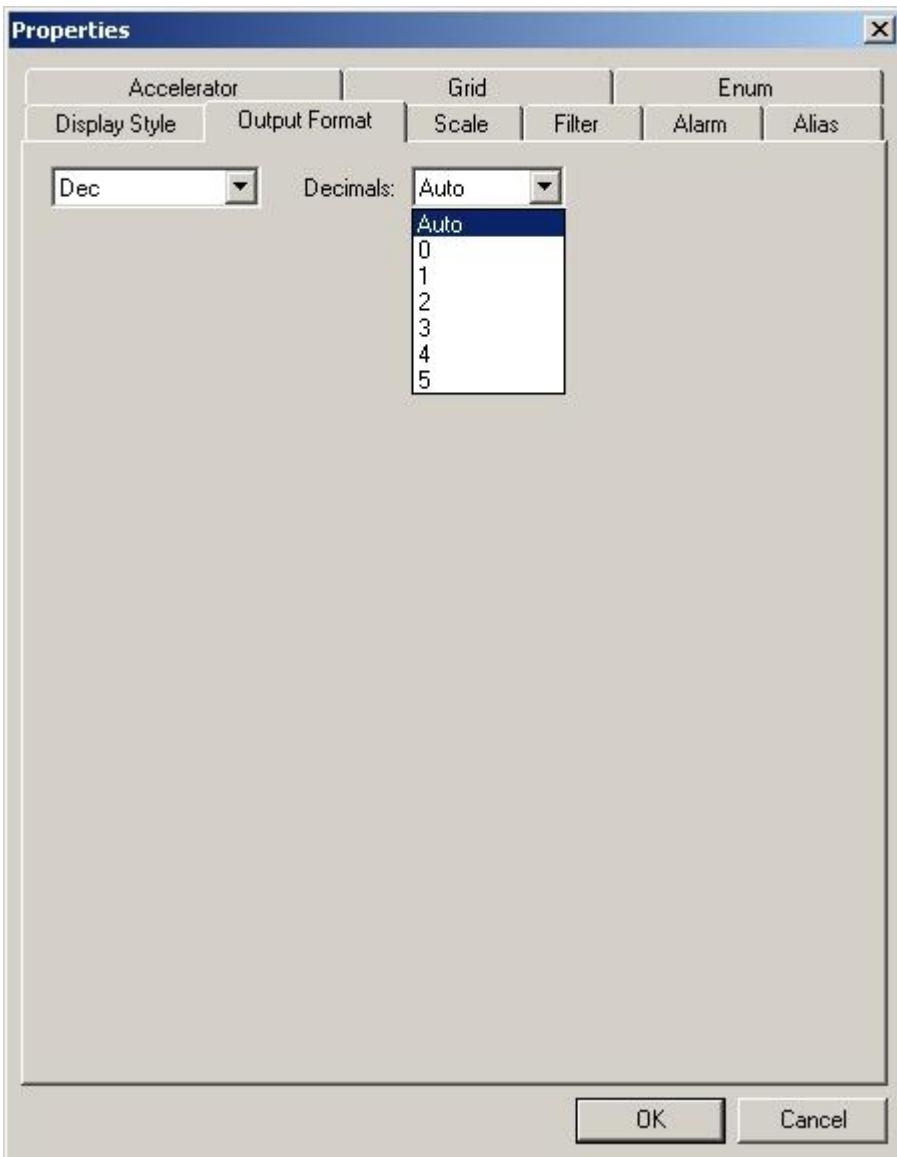
Unit

Label for engineering units to be displayed beyond the channel value in graph windows.

Format

For numeric representation it is possible to choose the format of the numerical datum.

In order to modify this setting, open the *Output Format page in Properties window*.



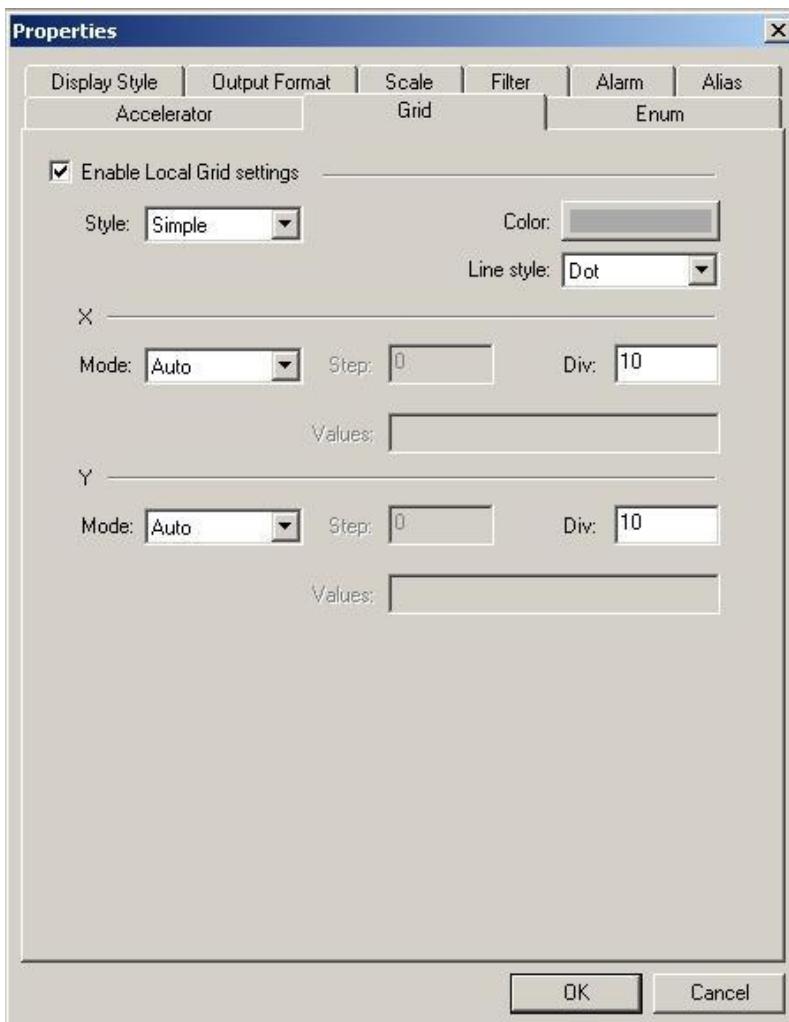
Select the numeric format in the combo on the left, and select the number of decimals in the combo on the right. The list of allowed formats is:

- **Auto:** the format is kept unchanged
- **Dec:** the decimal format allows max 5 digits after the comma
- **Numeric:** the numeric format allows max 15 digits after the comma

- **Scientific:** the scientific format allows max 15 digits after the comma; the result is written in exponential form
- **Hex:** hexadecimal format; the decimals cannot be configured
- **Bin:** binary format; the decimals cannot be configured.
- **ASCII:** text format; the decimals cannot be configured

Grid

Shows grid lines in the graph windows. Grid means Channel Grid, otherwise in *Setup/General* the User can set a default Window's Grid. In order to modify this setting, open the *Properties* window on *Grid* page.



Enable Local Grid settings

Enables the visualization of the grid with the customized settings.

- **Style:** sets the style of the grid
 - **Simple:** the grid is formed by continuous lines.

- **Cross**: the grid is formed by crosses indicating the intersection of the vertical and horizontal divisions.
- **Color**: color of the grid
- **Line style**: sets the style of the line of the grid (valid if Style Simple is set)
 - **Solid**: continuous line
 - **Dash**: dashed line
 - **Dot**: dotted line
 - **DashDot**: dashed line alternated to 1 dot
 - **DashDotDot**: dashed line alternated to 2 dots

X

- **Mode**: calculation mode of the horizontal divisions
 - **Auto**, displays an automatic number of equidistant divisions.
 - **Off**, no division is displayed
 - **Fixed**, displays a fixed number of equidistant divisions
 - **Step**, displays the divisions at fixed intervals equal to the Step value.
 - **Custom**, displays the divisions in correspondence with the values on the X axis set by the user in the text box. **Values**.
- **Step**: fixed step to calculate the horizontal divisions (a division for each Step), valid if Mode is set
- **Div.**: number of horizontal divisions to be displayed, valid if Mode is set at Auto or Fixed
- **Values**: list of values on the X axis corresponding to the divisions, valid if Mode is set at Custom. The list of values can be added directly in the text box, using as division the character ';'.

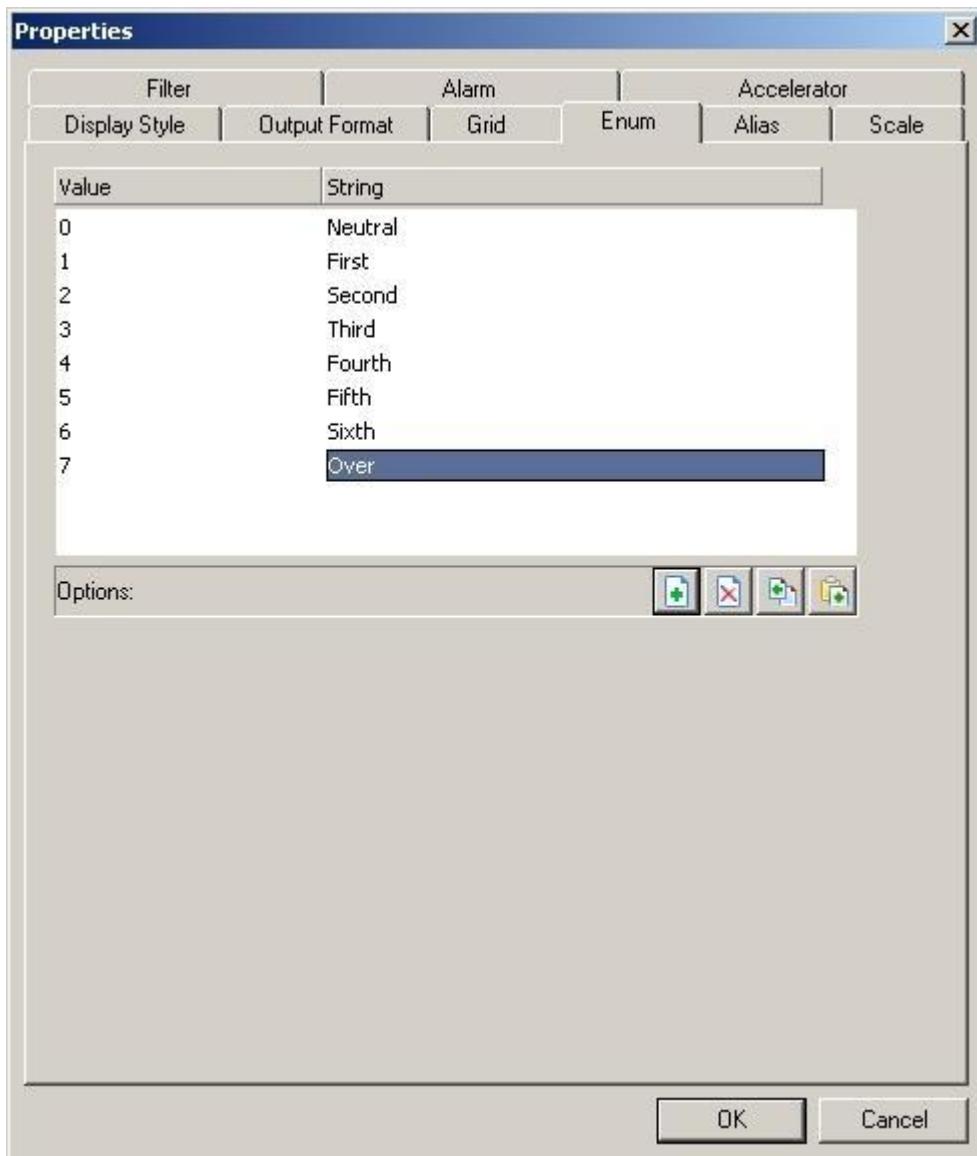
Y

- **Mode**: calculation mode of the vertical divisions
 - **Auto**, displays an automatic number of equidistant divisions.
 - **Off**, no division is displayed
 - **Fixed**, displays a fixed number of equidistant divisions
 - **Step**, displays the divisions at fixed intervals equal to the Step value.
 - **Custom**, displays the divisions in correspondence with the values on the Y axis set by the user in the text box. **Values**.
- **Step**: fixed step to calculate the vertical divisions (a division for each Step), valid if Mode is set

- **Div:** number of vertical divisions to be displayed, valid if Mode is set at Auto or Fixed
- **Values:** list of values on the Y axis corresponding to the divisions, valid if Mode is set at Custom. The list of values can be added directly in the text box, using as division the character ','

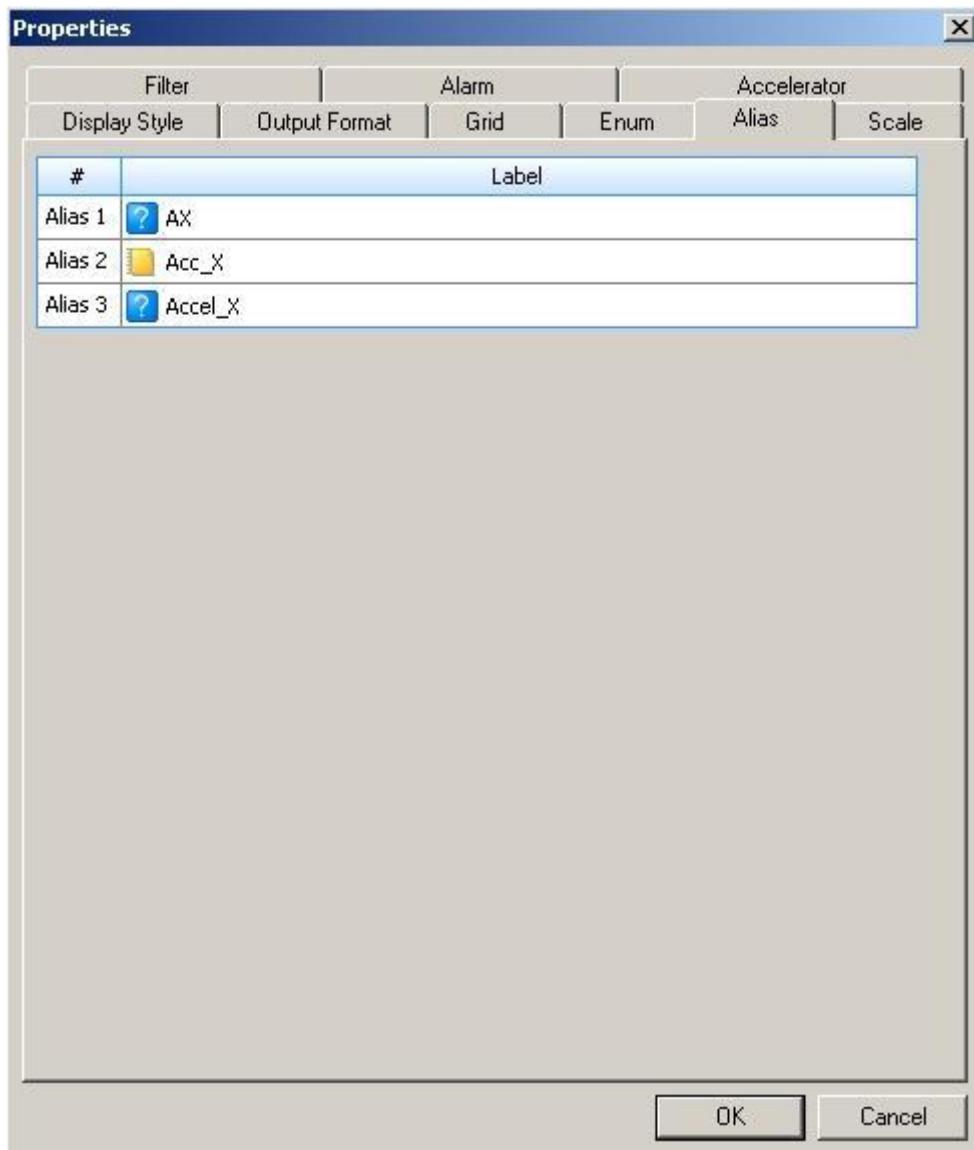
Enum

This function allows to add, remove or edit sets of values and associated text for individual channels. In Graph windows the text corresponding to the channel values is displayed to its place. In order to modify this setting, open the *Properties* window on *Enum Page*.



Alias

It associates an alias name to the channel, up to three labels for one channel. In order to modify this setting, open the *Properties* window on *Alias* page.



This function enables to associate different names to a channel; in this way using tables where channels have been renamed, on the graphic windows the references to this channels are stored, thus avoiding to manually reconfigure them.

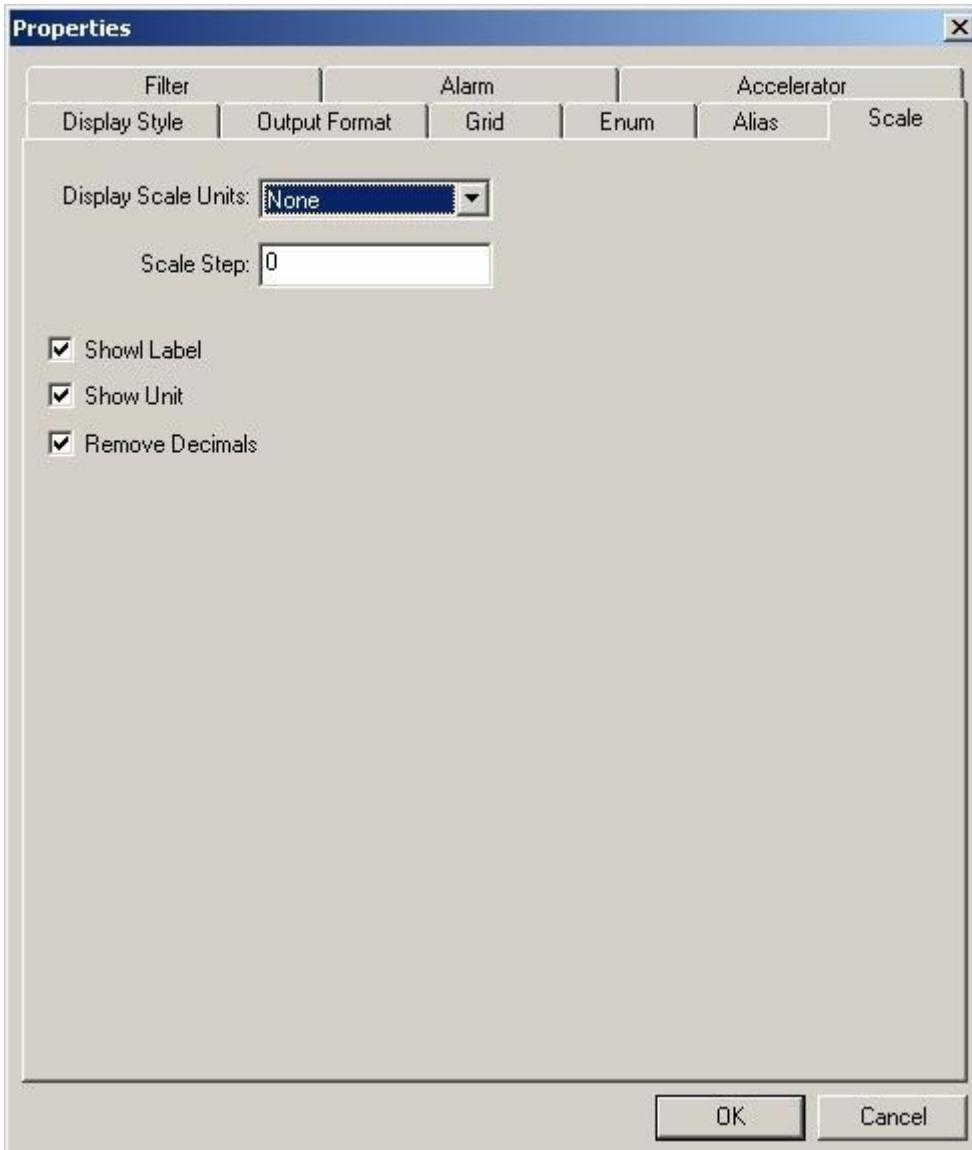
Scale

Show

Global flag to show/not show as default the Y scale on the graphs. Used only on the graph windows in Overlay/Manual mode.

Setup Y

Setup of the Y scale. In order to modify this setting, open the *Properties* window on *Scale* page.



User can set the following parameters:

- **Display Scale Units:** The values of the scale are divided for the selected value. A marker indicates the division factor: 10e2 (Hundred), 10e3 (Thousand), etc.

- **Scale Step:** Range among the divisions of the Y scale, enabled only in manual scale
- **Show Label:** Enabled only in Overlay/Manual mode; if checked, the scale shows the name of the label inside the ticks.
- **Show Unit:** Enabled only in Overlay/Manual mode; if checked, the scale shows the measure unit inside the ticks.
- **Remove Decimals:** If checked, the number of decimal of the values of the Y scale is setting to 0.

Auto Scale

if it is selected, the outer limits of the Y scale of the channel are automatically calculated.

Min

Minimum of the Y scale in manual scale mode; before editing this fields, change Setup Y the Auto Scale property

Max

Maximum of the Y scale in manual scale mode; before editing this fields, change Setup Y the Auto Scale property

Offset

Offsets for each channel. The parameter values may be used in addition to the offsets of the table (configured by Axon), independently or they may be ignored. This selection is made in the *Setup/General*.

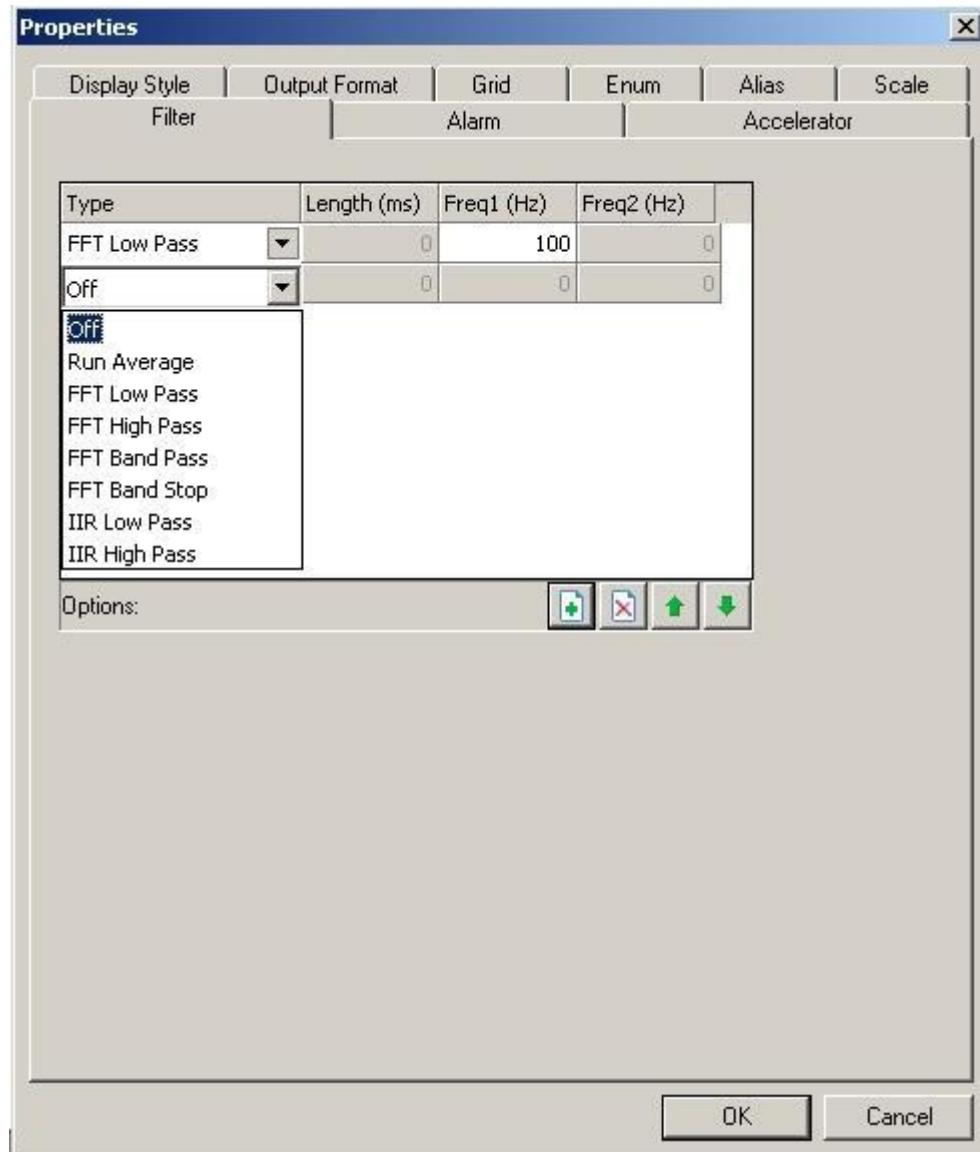
Gain

Gains for each channel. The parameter values may be used in addition to the gains of the table (configured by Axon), independently or they may be ignored. This selection is made in the *Setup/General*.

Filter

Smoothing filters are used to remove unwanted noise or frequency content in a logged channel. When a filter is applied to a channel, the resulting values are used by the display and analysis functions (graphs, virtual channels, export and circuit map).

In order to modify this setting, open the *Properties* window on *Filter page*.



The filtering options are as follows:

- **Off:** channel values are displayed as logged.
- **Run Average:** applies a moving average filter to the channel. Filter length is defined in seconds. If set to zero, the filter is not calculated.

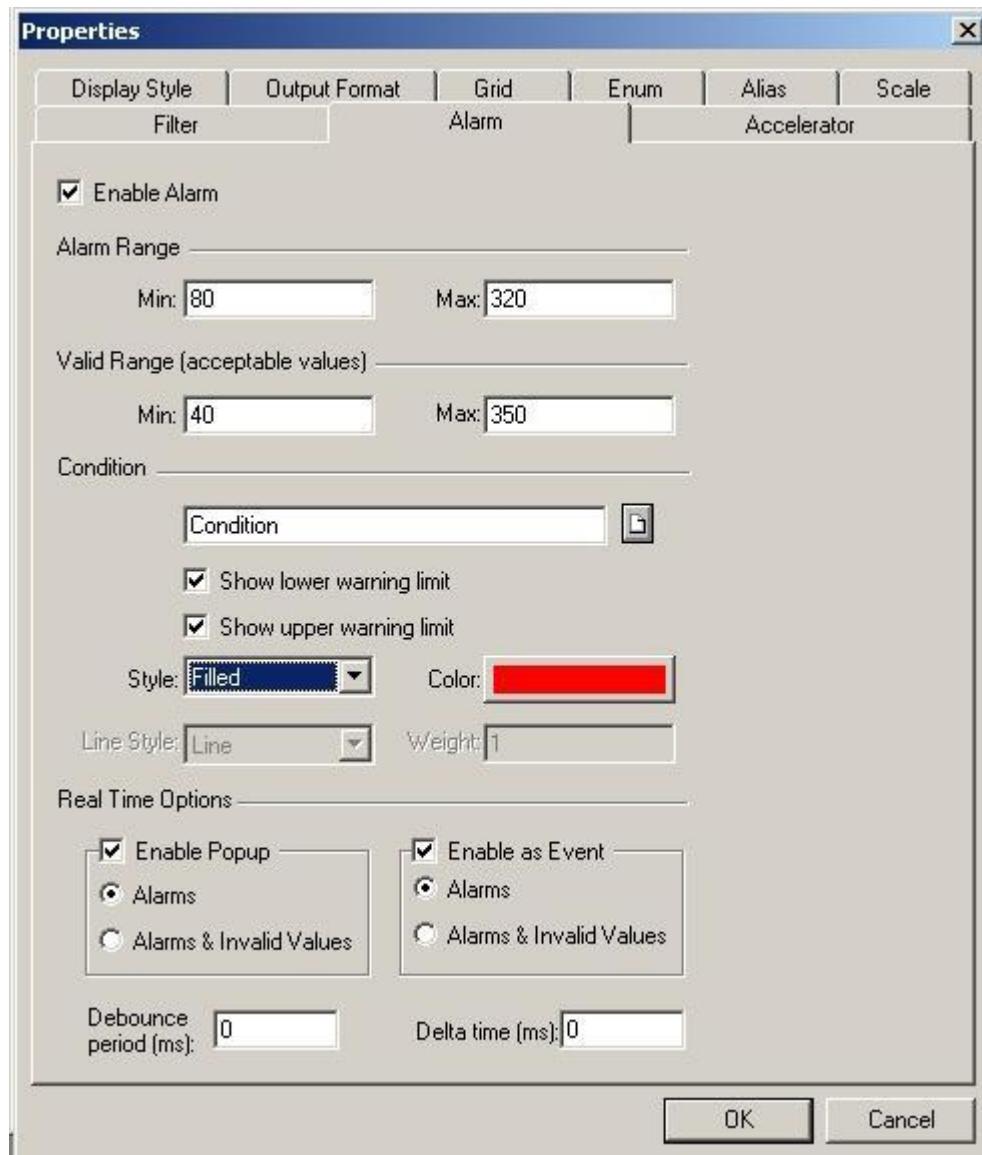
- **FFT:** applies a combination of frequency domain filters to the channel. The frequency content of the signal in the range(s) defined by the cutoff frequency is set to zero and the data is reconstructed in the time-domain. The four types available are:
 - *Low Pass* - maintains frequency content below the cutoff freq. Freq1
 - *High Pass* - maintains frequency content above the cutoff freq. Freq1
 - *Band Pass* - maintains frequency content in the range $\text{Freq1} < \text{frequency} < \text{Freq2}$
 - *Band Stop* - eliminates frequency content in the range $\text{Freq1} < \text{frequency} < \text{Freq2}$
- **IIR:** Infinite Impulsive Response filter of the channel. The two types available are:
 - *Low Pass* - Infinite Impulsive Response Low Pass filter is a recursive filter that maintains frequency content below the cut-off freq. Freq1
 - *High Pass* - Infinite Impulsive Response Low Pass filter is a recursive filter that maintains frequency content above the cut-off freq. Freq1

Alarm

The Alarms function is used to search for anomalous conditions on any channel in the current lap. The function is most useful for runtime analysis on data received via telemetry while the race car is out on the track.

Alarms are defined by specifying the acceptable operating range of the channel together with a second (larger) range which defines the range of valid values (this should be used to filter out noise spikes or failed sensor conditions).

In order to modify this setting, open the *Properties* window on *Alarm* page.



Enable Alarm: enables/disables the calculation of the alarm status of a channel.

Alarm Range

- **Min:** minimum value of the acceptance range of the values.
- **Max:** maximum value of the acceptance range of the values.

Valid Range (acceptable values)

- **Min:** minimum value of the validity range. As well as numerical values, you can also enter strings corresponding to the Constants, also using drag&drop.
- **Max:** maximum values of the validity range. As well as numerical values, you can also enter strings corresponding to the Constants, also using drag&drop.

Condition

- **Condition:** Sets a condition which allows to trigger on/off the alarm.
- **Show lower warning limit:** allows to display lower limit of the alarm.
- **Show upper warning limit:** allows to display upper limit of the alarm.
- **Style:** style of Alarms limits: *Line* or *Filled*.
- **Line Style:** needs *Line* as Style: *Line* or *Dashed Line*.
- **Color:** color of Alarms limits.
- **Weight:** needs *Line* as Style and *Line* as Line Style: weight of lines.

Real Time Options

- **Enable Popup:** enables alarms warning during real time analysis as a popup messages.
 - **Alarms** Warning popup message will be displayed only in alarm condition.
 - **Alarms & Invalid Values** Warning popup message will be displayed in alarm and not valid condition.
- **Enable as Event:** alarms condition are displayed into Event Report window as events.
 - **Alarms** Warning popup message will be displayed only in alarm condition.
 - **Alarms & Invalid Values** Warning popup message will be displayed in alarm and not valid condition.
- **Debounce period:** Minimum time (in milliseconds) between two consecutive alarms occurrences.
- **Delta time:** Minimum time (in milliseconds) to validate the condition as an alarm.

For further information about the Alarms and their use, see Alarms Window.

Accelerator

Shortcut used to insert a channel (or a group of channels) on the graphs windows. In order to modify this setting, open the *Properties* window on *Accelerator* page.

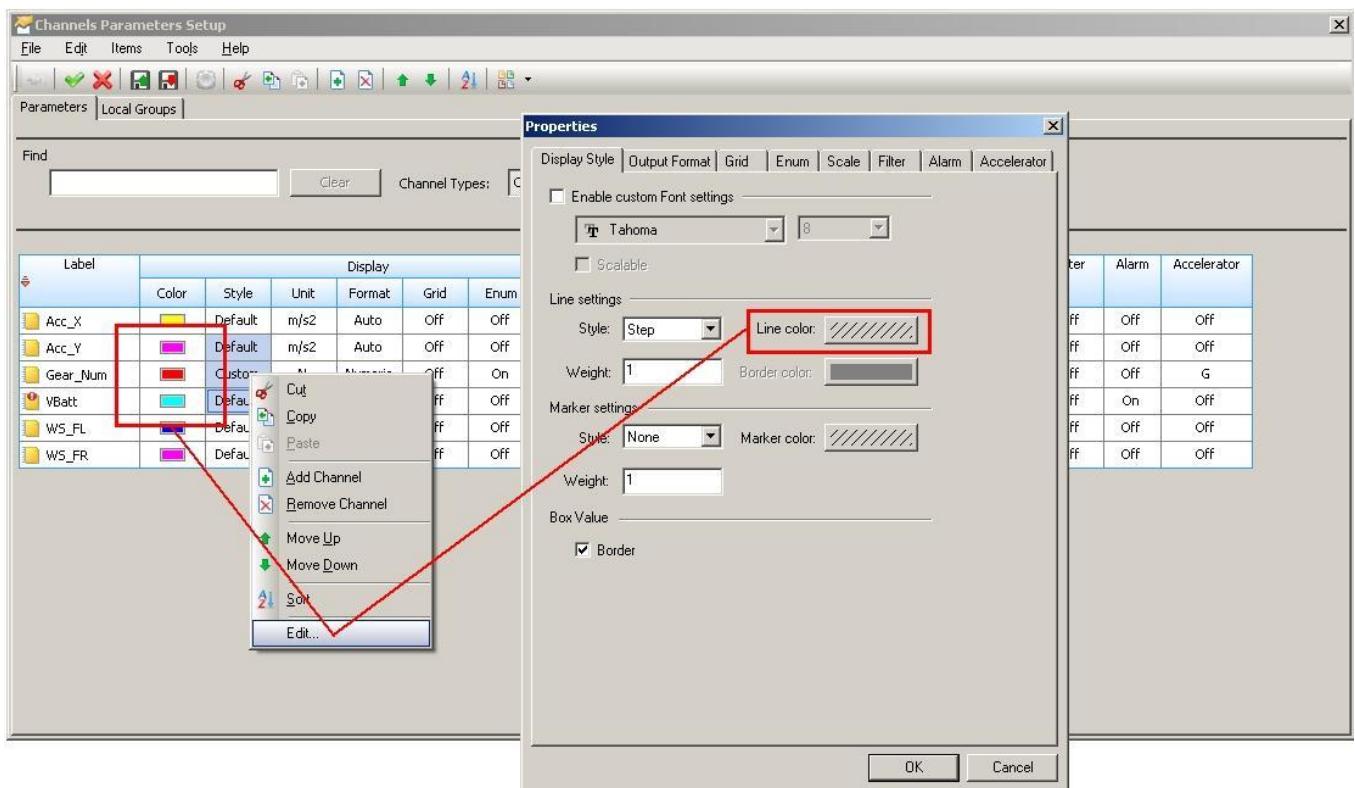


Multiple Selection

The Multi selection is available by mouse right click or shortcut space

For example the color of 3 channels can be changed in this way:

- Select 3 channels with the standard key (mouse + ctrl, shift + arrow up etc.)
- Use mouse right click (or Space Bar, or Edit command) to open the color dialog in multi selection mode
- Change the color
- Exit from the Color pop-up with OK



List Sorting Options

The whole list can be organized in the following columns:

Label, Color, Style, Format, Show, Setup, Min, Max, Offset, Gain, Filter, Alarm, Alias, Hot Key, Unit, Grid, Enum.



Sort by Label in alphabetic order A -> Z

Menu



The menu of the **Channels Parameters Setup** window allows the access to the following commands, divided into sub menu:

File Menu

COMMAND	DESCRIPTION
Apply	Applies the current settings of the window
Cancel	Closes the window without applying the current settings
Load	Opens a dialog window to select a Channels Parameters configuration file to be loaded.
Save As	Opens a dialog window to select a Channels Parameters configuration file (.xml), on which the current settings can be saved

Edit Menu

COMMAND	SHORTCUT	DESCRIPTION
Cut	Ctrl + X	Copies to clipboard the configurations of the channels selected and removes them from the list.

Copy	Ctrl + C	Copies to clipboard the configurations of the channels selected from the list
Paste	Ctrl + V	Pastes the configurations of the channels available in clipboard adding them to the list

Channels Menu

COMMAND	DESCRIPTION
Add Channel	Adds a new element to the list
Remove Channel	Removes from the list the selected channels
Move Up	Moves up by one position the elements selected in the list
Move Down	Moves down by one position the elements selected in the list

Tools Menu

COMMAND	DESCRIPTION
Sort	See List Sorting Options
Import from CLL....	See Import from CLL
Import from Data	See Import from Data
Import from VCH	See Import from VCH
Reset all Windows to Default	Restores in all configurations the current settings of the parameters. See Reset All Windows to Default

Help Menu

COMMAND	SHORTCUT	DESCRIPTION
Help	F1	It shows the setup channel parameters help.

Toolbar



The toolbar of the **Channels Parameters Setup** window allows the access to the following commands:

COMMAND	DESCRIPTION
Keep Visible	Button not enabled in this window
Apply	Similar to the Apply command of the File menu
Cancel	Similar to the Cancel command of the File menu
Load	Similar to the Load command of the File menu
Save As	Similar to the Save As command of the File menu
Import from CLL...	See Import from CLL
Cut	Similar to the Cut command of the Edit menu
Copy	Similar to the Copy command of the Edit menu
Paste	Similar to the Paste command of the Edit menu
Add Channel	Similar to the Add Channel command of the Channels menu
Remove Channel	Similar to the Remove Channel command of the Channels menu
Move Up	Similar to the Move Up command of the Channels menu
Move Down	Similar to the Move Down command of the Channels menu
Sort	See List Sorting Options

Channel Browser	<p>Displays the pop-up menu to select the page in the Channel Browser window</p> 
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Pop-up Menu

The pop-up menu of the **Channels Parameters Setup** window can be displayed by clicking on an item with the right button of the mouse.



The pop-up menu of the **Channels Parameters Setup** window allows the access to the following commands:

COMMAND	DESCRIPTION
Cut	Similar to the Cut command of the Edit menu
Copy	Similar to the Copy command of the Edit menu
Paste	Similar to the Paste command of the Edit menu
Add Channel	Similar to the Add Channel command of the Channels menu
Remove Channel	Similar to the Remove Channel command of the Channels menu
Move Up	Similar to the Move Up command of the Channels menu
Move Down	Similar to the Move Down command of the Channels menu
Sort	See List Sorting Options
Edit	Enables to modify the selected box

Using Parameters

The WinTAX3 files can be easily imported in WinTAX4. The Global WinTAX3 parameters (`\WinTAX3\System\Parameters.xml`) configuration are automatically (if copied in `\WinTAX4\system`) recognized by WinTAX4. The WinTAX3 Alias settings (`\WinTAX3\System\Parameters.xml`) are automatically (if copied in `\WinTAX4\system`) recognized by WinTAX4. Since WinTAX4 allows only a global level of Alarm setting, the old WinTAX3 Alarm setting must be imported by the User using the command `Tools\Import from Alarm`.

Import modes

Import from CLL

Some channel parameters can be imported directly from the CLL file which is used by Axon and Sysfiles to define the channels in the logging table. Parameters* which can be imported are

- Units label
- Color

* the parameters available in the CLL also depend on whether they are supported by the version of Sysfiles - see related release notes

Import from Data

All channel parameters can be imported directly from the logged Data.

Import from VCH

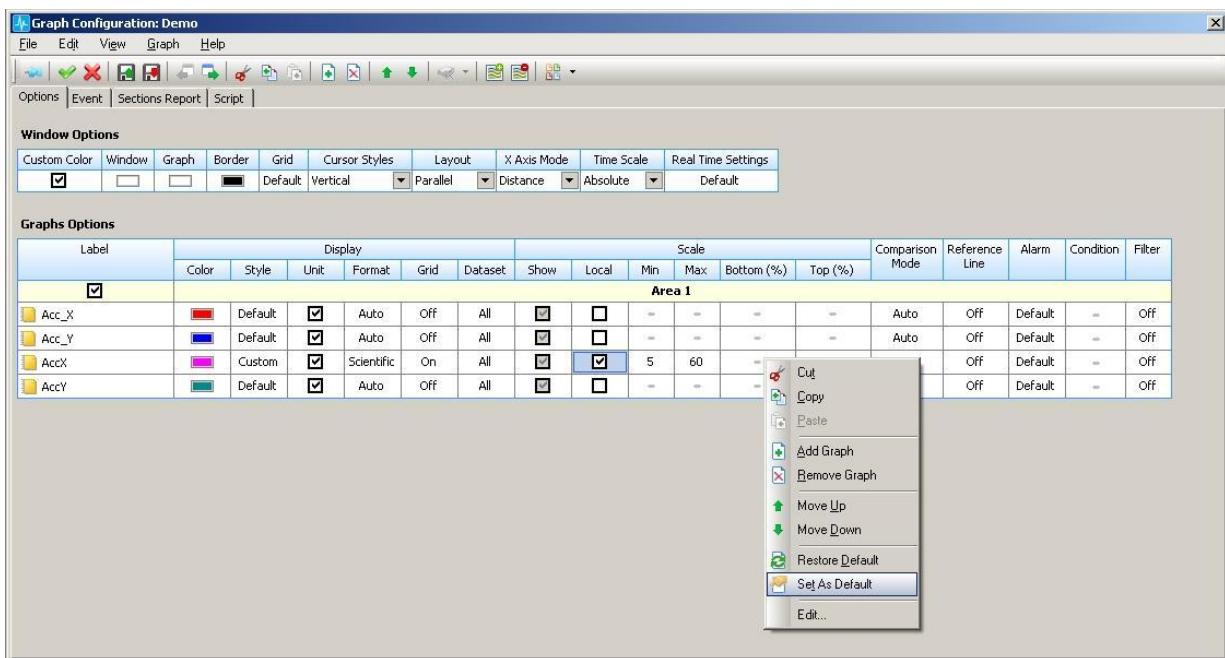
All Virtual channel parameters can be imported directly from the Global libraries.

Reset All Windows to Default

This command allows to constrain all current configurations to use the default view set in parameters. A pop-up message asks the User to select a *WinTAX4's User* or to use all *Users*



Vice versa it's possible to use a local window setting as default for all other configurations. This options is available on the Windows setup page:

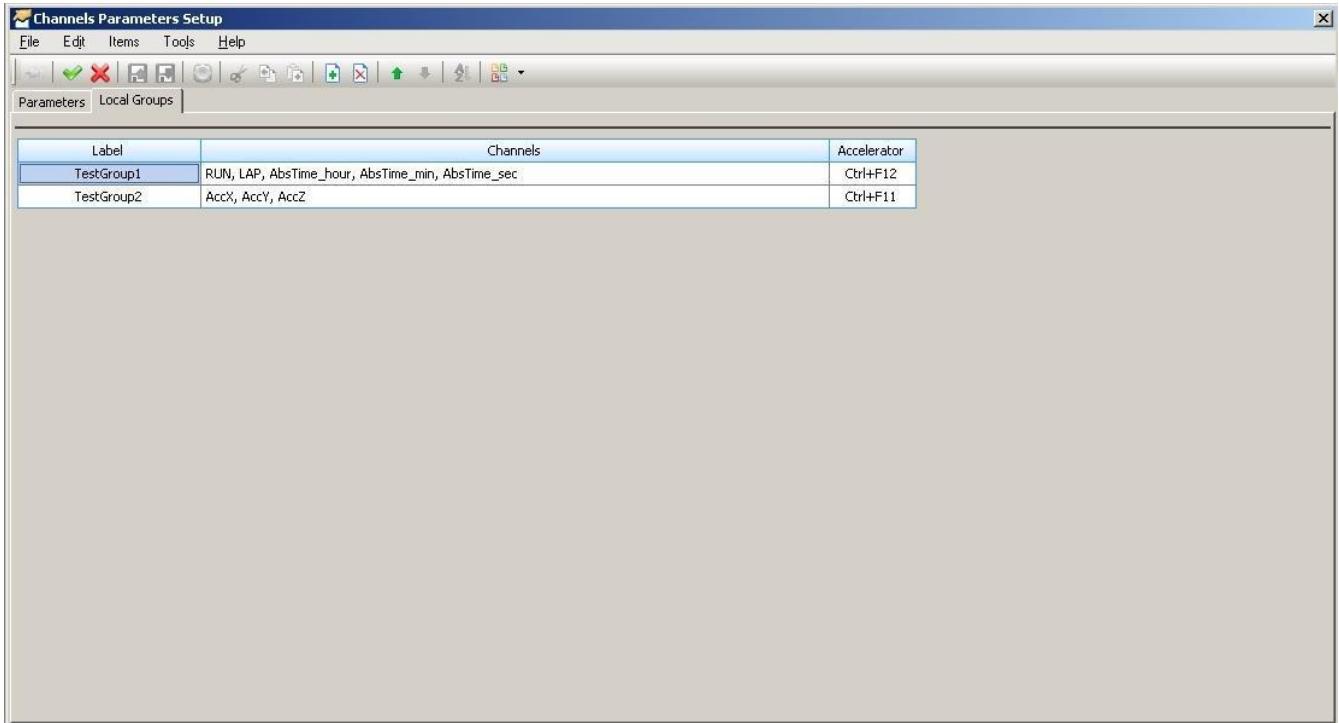


The figure shows the *Set As Default* command starting from a XY setup page.

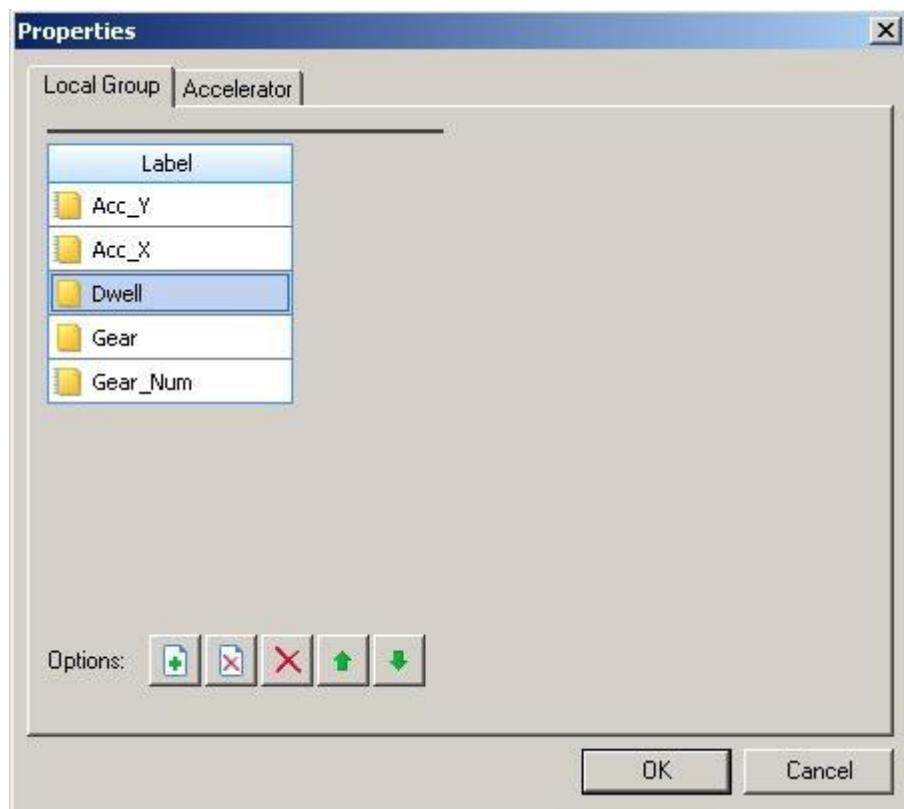
Local Groups

In some licenses there is the possibility to configure Local Groups. With this feature you can organize channels in custom logical containers. For every group the user can define name, list of channels and shortcuts. The Local Groups are listed in Channel Browser as a new TAB. The Local Groups can be used in Graph windows, just for post processing mode. When the user adds a group in a Graph windows, all the channels of group are automatically displayed. To adding a group, simply drag the label from the Channel Browser list or push the shortcut you defined before.

In configuration Local Group appears as a new tab as shown in picture below; each element of the grid can be edited by double clicking with the mouse or by pressing the space bar.

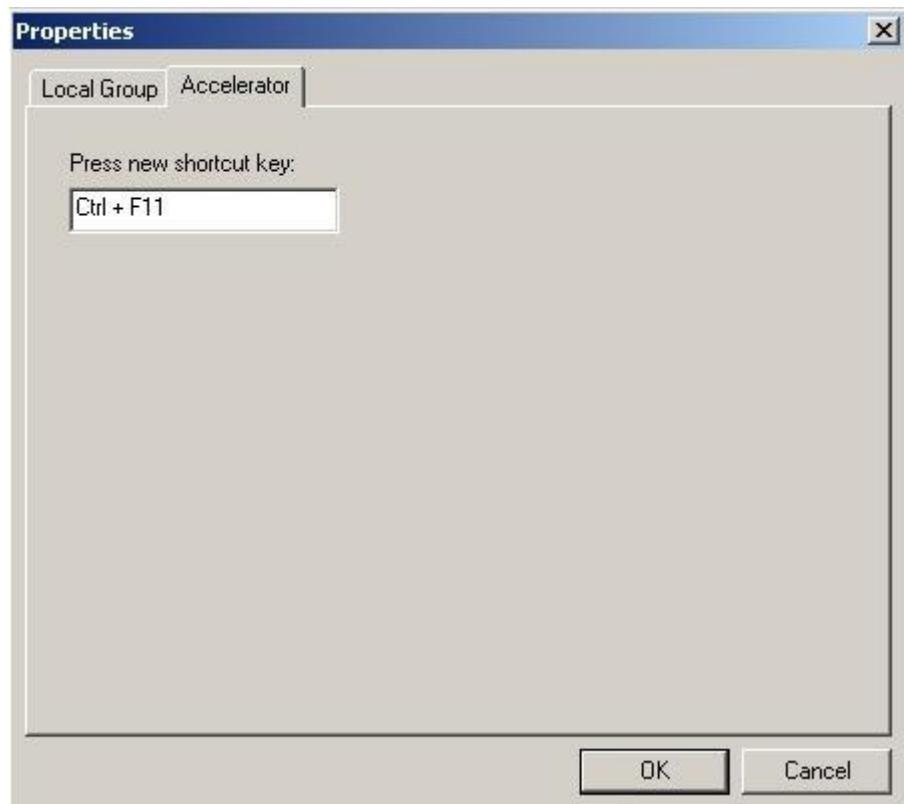


- **Label:** shows the name of the local group.
- **Channels:** it is the list of the channels belonging to the group. In order to modify this list, drag channels from Channel Browser or open the *Properties* window on *Local Group* page

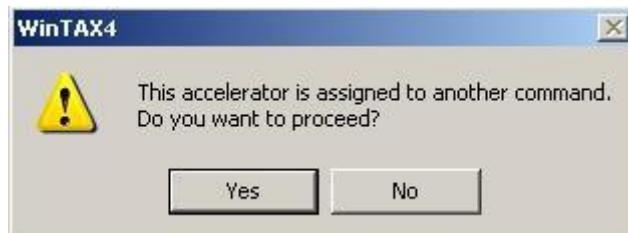


Option buttons allow to add, delete and move channels in the list.

- **Accelerator:** allows to configure the shortcut to have a quick access to the Local Group



- **Press new shortcut key:** enables to configure a new shortcut to be associated with the Local Group; to assign a new shortcut, focus on the text box and enter the new hot key. If the new shortcut has already been assigned to some other command, an alert message appears below the text box when confirm with OK button:



To cancel a shortcut without adding new ones, just use the Delete key or the Backspace key.

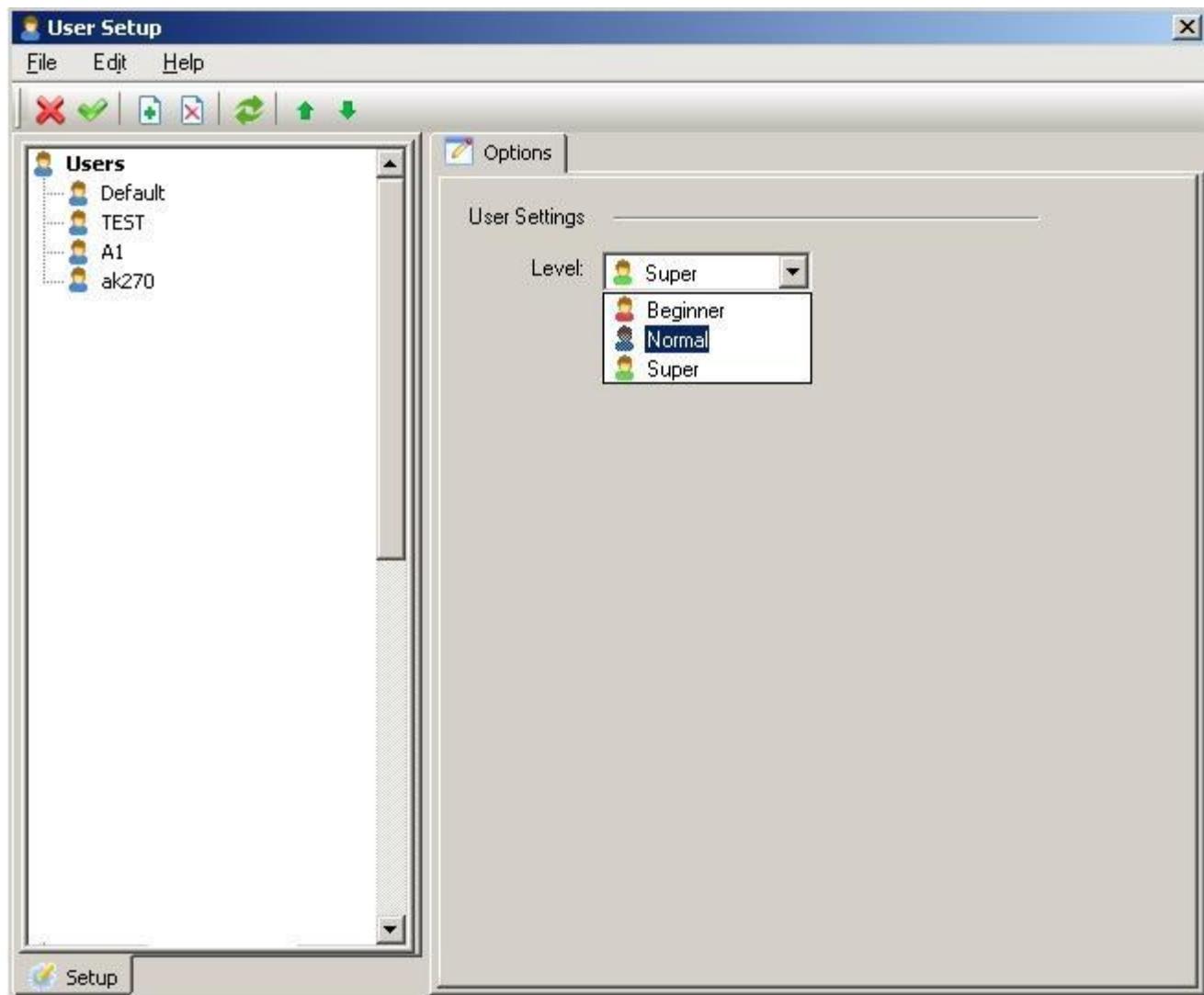
If more than one local group has the same shortcut, all channels belonging to those groups are loaded in the graph window using that shortcut (logical OR).

User

The **User Setup** window is formed by the **Options** page. The window has also an integrated menu and a toolbar that ease the access to configuration and management commands of the window itself. Thanks to this page additional users can be created and the permission levels of the existing users can be modified.

Options Page

The **Options** page allows setting permission level of a user.



Menu

The menu of the **User Setup** window allows the access to the following commands, divided into sub-menus:

File

COMMAND	DESCRIPTION
Apply	Applies the current settings of the window.
Cancel	Closes the window without applying the current settings.

Edit

COMMAND	DESCRIPTION
Add User	Adds a new user profile element.
Remove User	Removes the selected user profile.
Refresh	Up-dates the list of the users including all the sub folders in <i>WinTAX4/Users</i>
Move Up	Moves up by one position the user profile selected.
Move Down	Moves down by one position the user profile selected.
Reset Default user libraries	Removes from the libraries list the virtual channels to be added by default to a new user.

Help

COMMAND	SHORTCUT	DESCRIPTION
Help	F1	Launch the WinTAX4 help, if available.

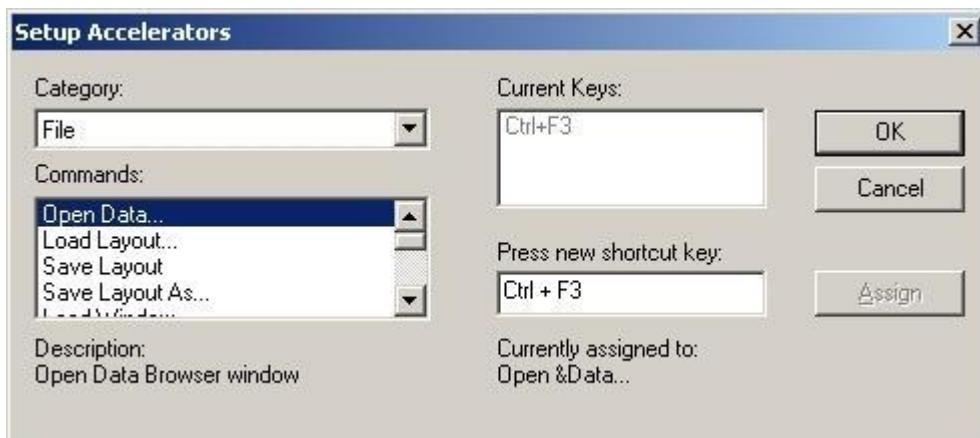
Toolbar

The toolbar of the **User Setup** window allows the access to the following commands:

COMMAND	DESCRIPTION
Cancel	Similar to the Cancel command of the File menu
Apply	Similar to the Apply command of the File menu
Add User	Similar to the Add User command of the Edit menu
Remove User	Similar to the Remove User command of the Edit menu
Refresh	Similar to the Refresh command of the Edit menu
Move Up	Similar to the Move Up command of the Edit menu
Move Down	Similar to the Move Down command of the Edit menu

Accelerators

The **Setup Accelerators** window allows to configure the shortcuts allowing to have a quick access to the commands of the WinTAX environment.



- **Category:** enables to select the item from the main menu of WinTAX4, so to filter the list of the commands available in the **Commands** list.
- **Commands:** shows the list of commands that can be associated to an accelerator or a short-cut.
- **Current Keys:** shows the key currently associated with the selected command in the **Commands** list.
- **Press new shortcut key:** enables to configure a new shortcut to be associated with the command selected in the **Commands** list.
- **Assign:** associates the shortcut configured in the **Press new shortcut key** field to the command selected in the **Commands** list.

To assign a new shortcut, proceed as follows. First of all select with Category and Commands the command to be associated to a new shortcut. Current Keys shows if a shortcut already exists for this command or not.

Then focus on the "Press new shortcut key" text box and enter the new shortcut.

If the new shortcut has already been assigned to some other command, an alert message appears below the text box and the Assign button is disabled.

If the new shortcut has not been used, the Assign button is enabled and it must be pressed to confirm the assignment.

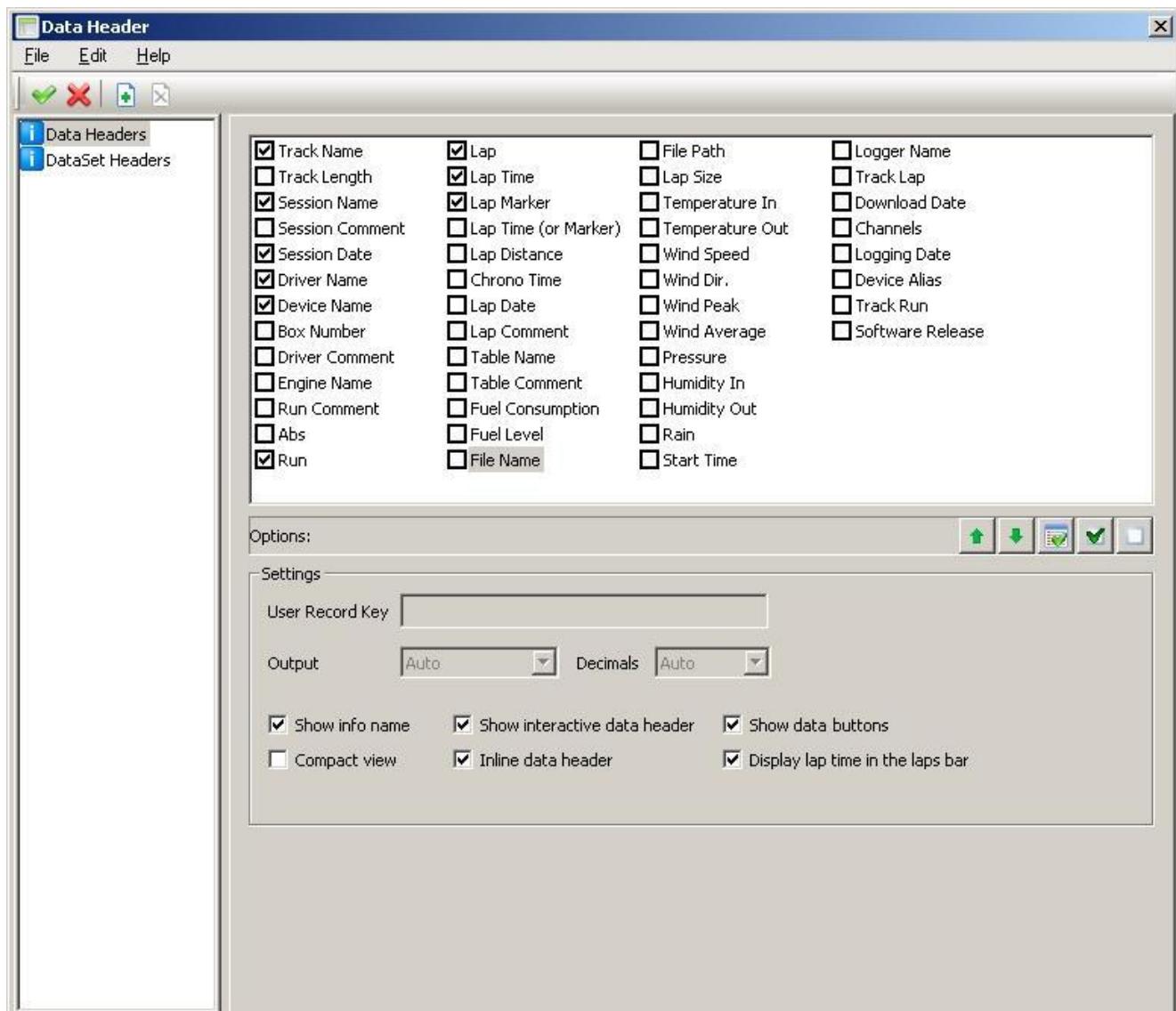
To cancel a shortcut without adding new ones, just use the Delete key or the Backspace key and then confirm with Assign. The choice must be confirmed with OK for the changes to become effective.

Data Header

The **Data Header** window is divided into two sections: the section on the left shows the list of the configurable Headers (Data Headers and Dataset Headers), while the section on the right allows to configure the elements selected in the Headers list. Depending on the licence, the setup of the Dataset Header might be missing. The window has also an integrated menu and a toolbar that ease the access to the configuration and management commands of the window itself.

Data Header

This section configures the header of the data of WinTAX



In the list it's possible to select which information must be displayed on the Data Header bar and in which order they must be presented. The **Options** buttons allow to change the order of the list, to select all information, to deselect them and to select the default configuration.

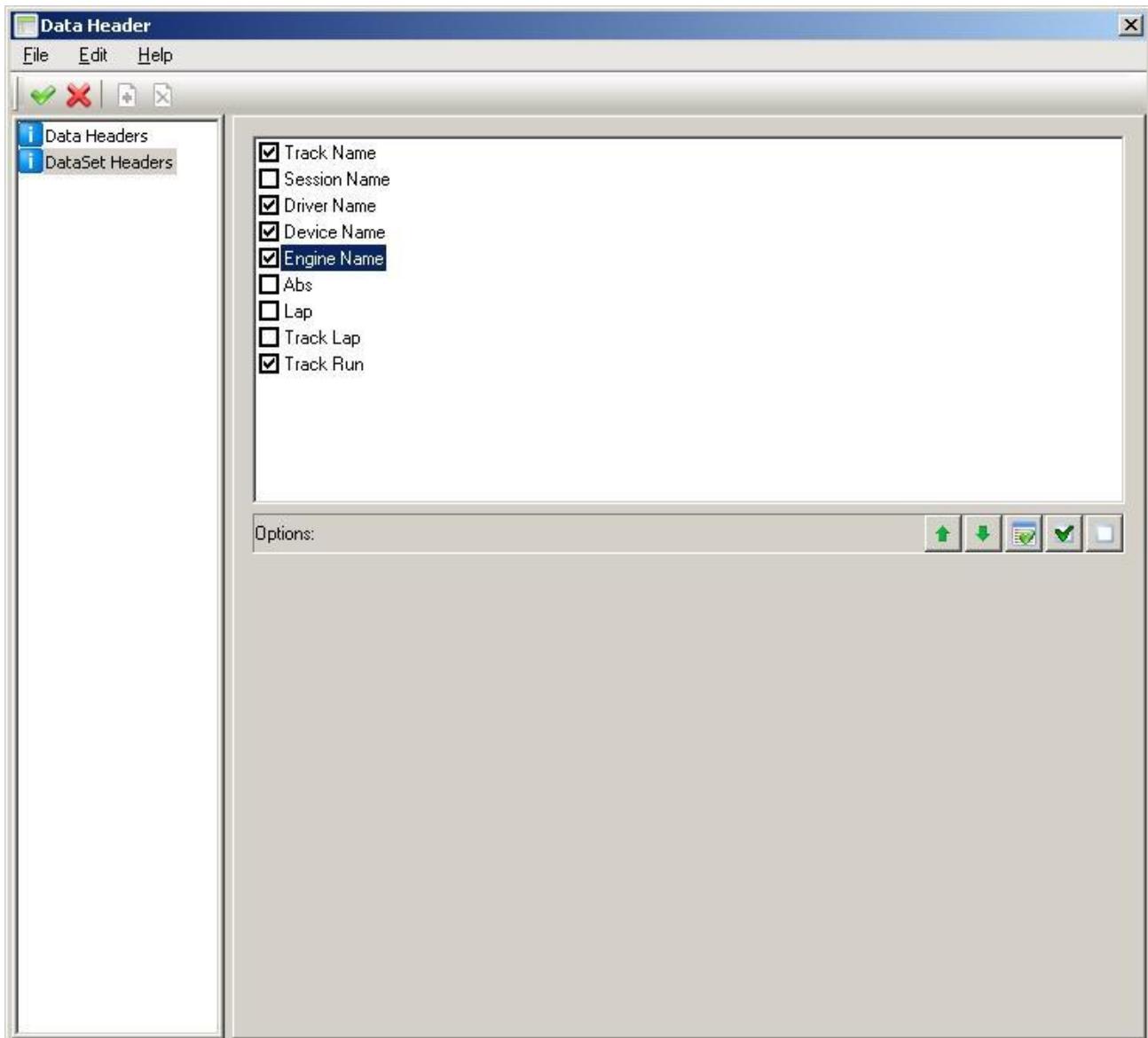
Through the Add Item command further items in addition to the ones already available are added. These elements, marked by the prefix USER: are useful to view on the Data Header also the user records. By entering in fact in the **Key/Expression** field the name of the user record, the Data Header will show a corresponding value. The user records can be selected and moved; moreover they can also be cancelled from the list with the Remove Item command.

If a numeric information is selected, then it's possible to set the numeric format and the number of decimals through the **Output Format** combo and the **Decimals** combo

- The **Show info name** check adds the name of the information before the value corresponding to the Data Header
- The **Compact view** check enables the mode that allows to the Data Header to occupy the space of one single lap when there is a comparison. In this situation the arrows are display so to switch among the laps compared.
- The **Show interactive data header** check, adds to the Data Header the bar that shows the lap or the append used for that Data Header and that allows to enable / disable the DataSet and also to select one of the laps of the append.
- The **Inline data header** check places the info and the interactive data header on a single line but only if there is enough space to do it, otherwise they are on two lines.
- The **Show data buttons** check adds to the Data Header bar the "+" and "-" buttons; these commands allow to load next or previous lap.

DataSet Header

In this section the header of the DataSet Panel is configured



In the list it's possible to select which information must be displayed on the Data Header bar and in which order they must be presented. The **Options** buttons allow to change the order of the list, to select all information, to deselect them and to select the default configuration. The User Record can neither be added, nor its format or the aspect of the header can be configured

Menu

The menu of the **Data Header** window allows the access to the following commands, divided into sub menus:

File

COMMAND	DESCRIPTION
Apply	Applies the current settings of the window.
Cancel	Closes the window without applying the current settings.

Edit

COMMAND	DESCRIPTION
Add Item	Adds a new item to the list. Used only for the Data Header.
Remove Item	Removes the selected items. Used only for the Data Header.

Help

COMMAND	SHORTCUT	DESCRIPTION
Help	F1	Launch the WinTAX4 help, if available.

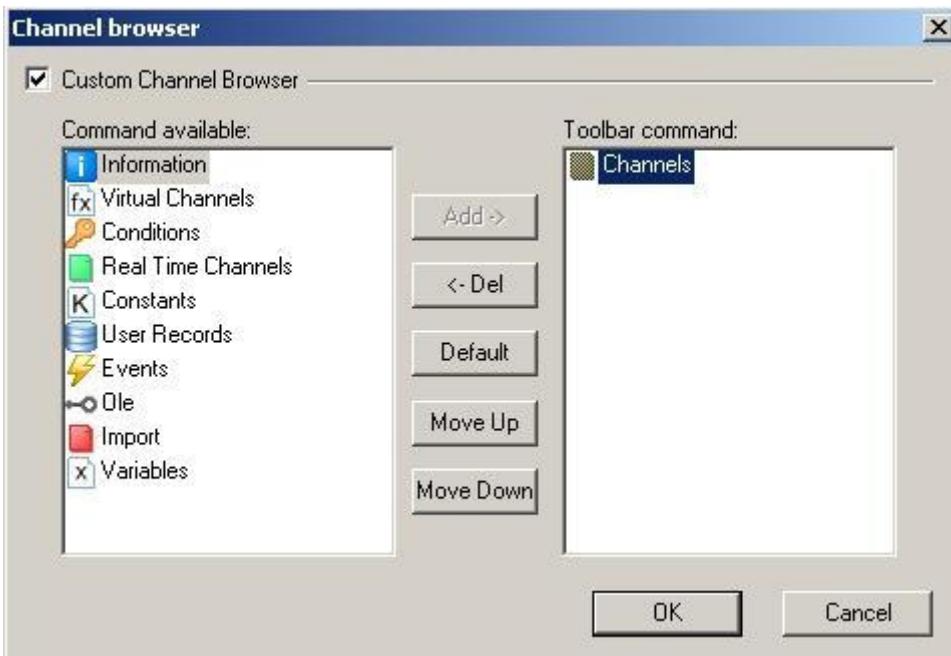
Toolbar

The toolbar of the **Data Header** window enables the access to the following commands:

COMMAND	DESCRIPTION
Cancel	Closes the configuration window without applying the settings.
Apply	Applies the current settings to the configuration and closes the window.
Add Item	Adds a new item to the list. Used only for the Data Header.
Remove Item	Removes the selected items. Used only for the Data Header.

Channel Browser

The **Channel Browser** window allows to configure which channels will be grouped in the custom page of the Channel Browser. The column on the left displays all types of channels that can be added in the Custom page, the column on the right displays all channels that will be added in that page and in the same order. The central column shows the manipulation commands of the list

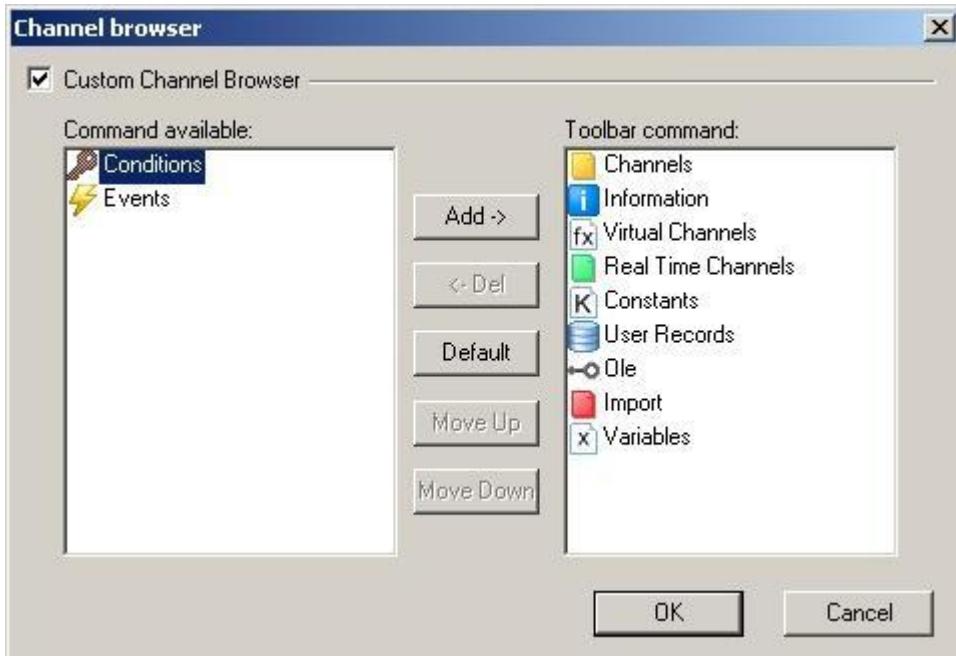


- **Add:** Adds a type of channel in the right column.
- **Del:** Cancels a type of channel in the right column.
- **Default:** Configures the default channels in the list on the right: Real time Channels, Channels, Virtual Channels.
- **Move Up:** Moves up by one position an element of the right column.
- **Move Down:** Moves down by one position an element of the right column.

Pressing OK the settings chosen are confirmed, pressing Cancel they are deleted.

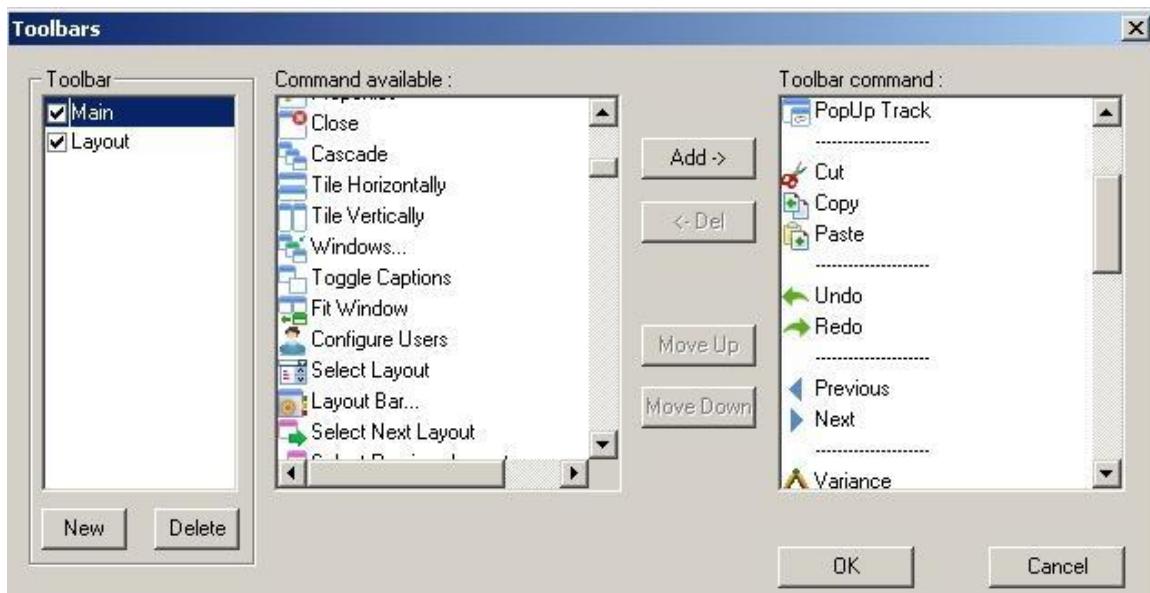
If at least one type of channel is configured in the right column, the channel browser shows a new folder called custom, gathering in the order here configured, all channels available in the right column. Therefore the folders associated to them will be deleted.

Following an example of Custom configuration is shown and of how consequently the Channel Browser appears.



Toolbars

The **Toolbars** window allows to configure the toolbars in WinTAX environment.



Toolbar List

The list shows the currently configured toolbars; the display of each toolbar can be enabled / disabled through the corresponding control box. The **New** button opens a window to add a new toolbar. The **Delete** button cancels the toolbar selected in the list.

Command available

It shows the list of the commands available that can be added to the selected toolbar.

Toolbar command

It shows the list of the commands configured for the selected toolbar.

Buttons

They allow to configure the commands available in the selected toolbar.

Add: adds the commands selected in the **Command available** list in the toolbar

Delete: cancels from the toolbar the commands selected in the **Toolbar command** list.

Move Up / Move Down: move the commands selected in the **Toolbar command** list either upwards or downwards inside the toolbar.

OK: confirms changes. **Cancel:** quits without changes.

Layout Bar

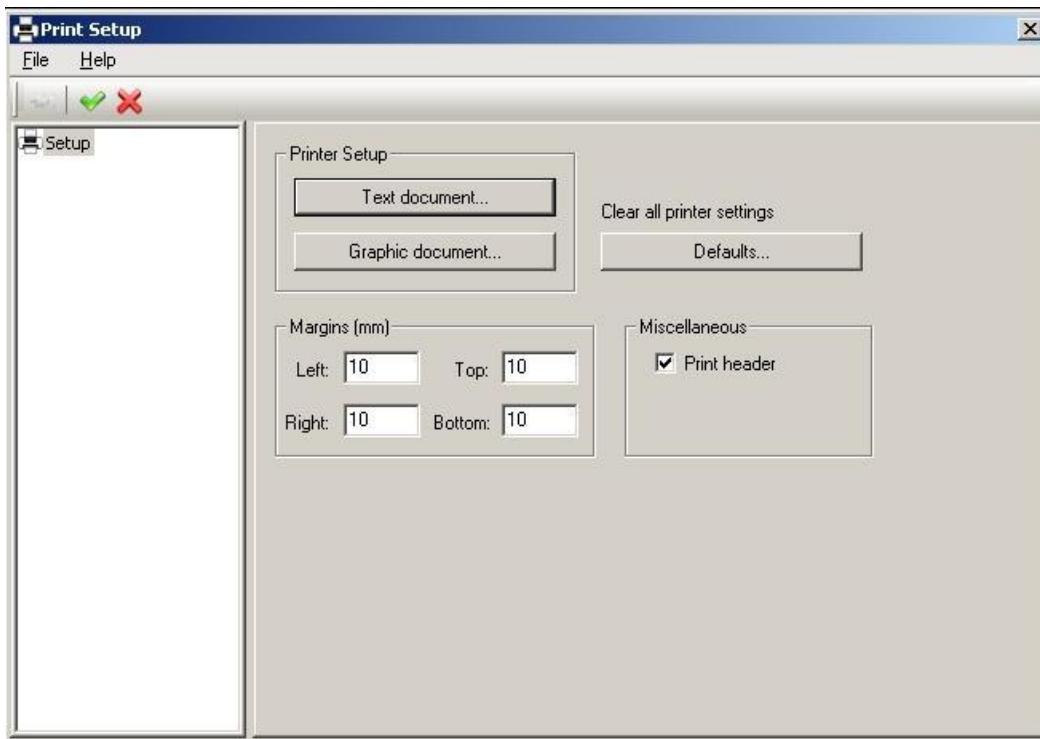
In this window the User can create a list of favourite layouts taking them from the User directory of the current user. The position of each element of the list can be modified through the up and down arrow keys. When an element is cancelled from the list, it is not removed from the disk. Use the Options buttons to carry out these operations. The list will be then viewed by the Select Layout combo.

The list can be formed also by single windows (gra, xy, rep, ...) and not only by layouts.



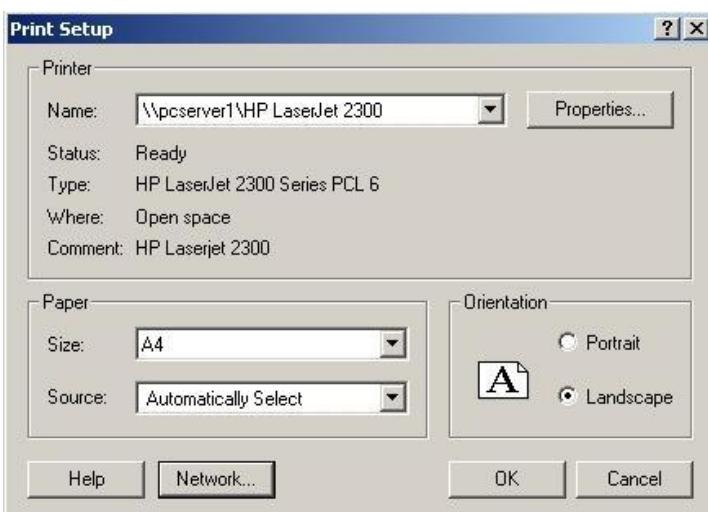
Print

The Print Setup window allows to configure the print settings. It is also provided with an integrated menu and a toolbar.



Printer Setup Section

The **Text Document** and **Graphic document** buttons display a standard printer configuration window of Windows to configure the print of a text document or a graphic window, like for instance the following one. It is recommended to print the Text windows like the reports in Portrait mode and the graphic windows in Landscape mode. This allows to get a better print result.



Clear All Printer Settings Section

The button **Defaults ...** allows to restore the default printer settings.

Margins (mm) Section

It allows to set the margins of the printing sheet acting on the text boxes: Left, Right, Top and Bottom.

Miscellaneous Section

The **Print header** control allows to enable / disable the printing of the Header.

Menu

The menu of the **Print Setup** window allows the access to the following commands, divided into sub menus:

File Menu

COMMAND	DESCRIPTION
Apply	Applies all settings of a window to configure the print.
Cancel	Closes the window without applying the print settings.

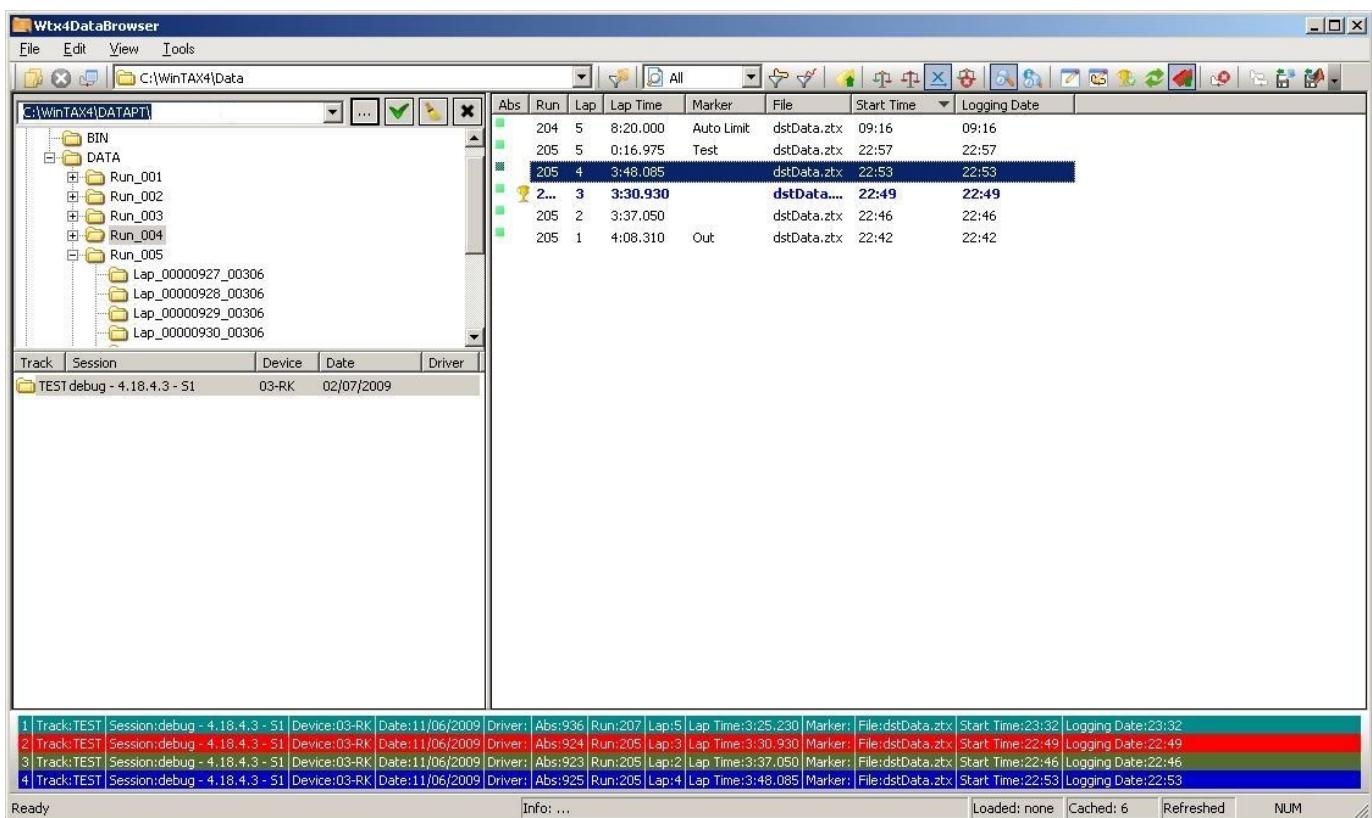
Toolbar

The toolbar of the **Print Setup** page allows the access to the following commands:

COMMAND	DESCRIPTION
Keep visible	Command not enabled in this window.
Apply	Applies all settings of a window to configure the print.
Cancel	Closes the window without applying the print settings.

Data Browser

The data browser is a tool which allows to manage archives of WinTAX data files recorded during acquisition sessions. As the name implies, the data browser is mainly used to view the contents of data archives and to select single laps or groups of laps for display and analysis. Other functions are related to the management of the files in the archive and include editing lap header data, and logging session records. In order to understand the functions of the data browser it is useful to understand the underlying structure of the data archive and its constituent files. The interface of the Data Browser is formed by the following parts:



- **Sessions List** List of the sessions available in the *Wintax4/Data* directory
- **Lap List** List of the Runs and of the Laps available in a session
- **Select Archive Combo** Selection of the basic directory to be scanned to view the possible sessions.
- **Menu (Files, Edit, View, Tools)** Commands for all operations to be carried out on the Data Browser
- **Toolbar** Commands for all operations to be carried out on the Data Browser
- **Header Laps** Contains all information about the loaded lap
- **Status Bar** Contains some information about the status of the window. In case of long operations, there is a progress bar displaying the advancing of the operations.

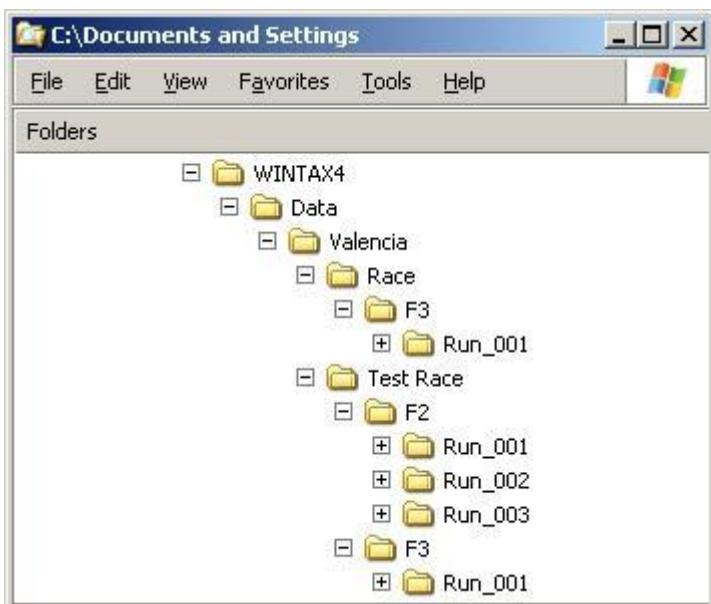
Session List and Lap List

The Data Browser window is mainly dedicated to the two lists that identify the single laps or the groups of laps: on the left there is the Session list and on the right there is the lap list. The first one shows all sessions available in the *WinTAX4/Data* directory, the second contains the details of the Runs and of the Laps included in the selected session. Strictly connected to the list of session there is the Select Archive combo that defines the directory to be scanned to search for the sessions. The session is intended as a data structure compatible with the format of WinTAX data.

Session List

The Session List displays the Track, Session and Car levels creating a line for each of these combinations, but only if they contain valid laps. So if in the Data directory the *Track* directory is available and in its turn it includes two sessions directories: *Session1* and *Session2*, containing two Car directories each, the session list will display 4 lines, i.e. 4 sessions identified by *Track/Session1/Car1*, *Track/Session1/Car2*, *Track/Session2/Car1* and *Track/Session2/Car2* but only if they contain valid laps.

For instance the directories organized as in the following figure, create a sessions list that is visualized in the DataBrowser below.



The screenshot shows the Wtx4DataBrowser interface. On the left, there is a tree view of sessions: Valencia Race (F3, Ascari), Valencia TestRace (F2, Ascari), and Valencia TestRace (F3, Nuvolari). The right side displays a detailed lap list for the selected session. The lap list includes columns for TR, Run, Abs, Lap, LapTime, Mrk, and FileName. A specific lap is highlighted with a yellow background and bolded values: Run 1, Lap 4, LapTime 1:33.695. The file name for this lap is cableData.ztx.

Track	Session	Car	Driver	TR	Run	Abs	Lap	LapTime	Mrk	FileName
Valencia	Race	F3	Ascari		1	1	3	3	1:33.707	cableData.ztx
Valencia	TestRace	F2	Ascari		1	1	4	4	1:33.695	cableData.ztx
Valencia	TestRace	F3	Nuvolari		1	1	5	5	1:34.124	cableData.ztx
					1	1	6	6	1:33.999	cableData.ztx
					1	1	7	7	1:33.911	cableData.ztx
					1	1	8	8	1:33.986	cableData.ztx
					1	1	9	9	1:33.814	cableData.ztx
					1	1	10	10	1:33.703	cableData.ztx
					1	1	11	11	1:34.088	cableData.ztx
					1	1	12	12	1:33.894	cableData.ztx
					1	1	13	13	1:33.907	cableData.ztx
					1	1	14	14	1:33.901	cableData.ztx
					1	1	15	15	1:34.007	cableData.ztx
					1	1	16	16	1:34.156	cableData.ztx
					1	1	17	17	1:36.044	cableData.ztx
					1	1	18	18	2:04.130	Box

The Sessions list is also provided with a header specifying the kind of information in the columns. The information in the list can be configured in the Menu by the View/Data Header command that opens the Data Header window. The header is interactive and allows to arrange the list alphabetically or following an increasing or decreasing arrangement, on the basis of the elements of the selected column.

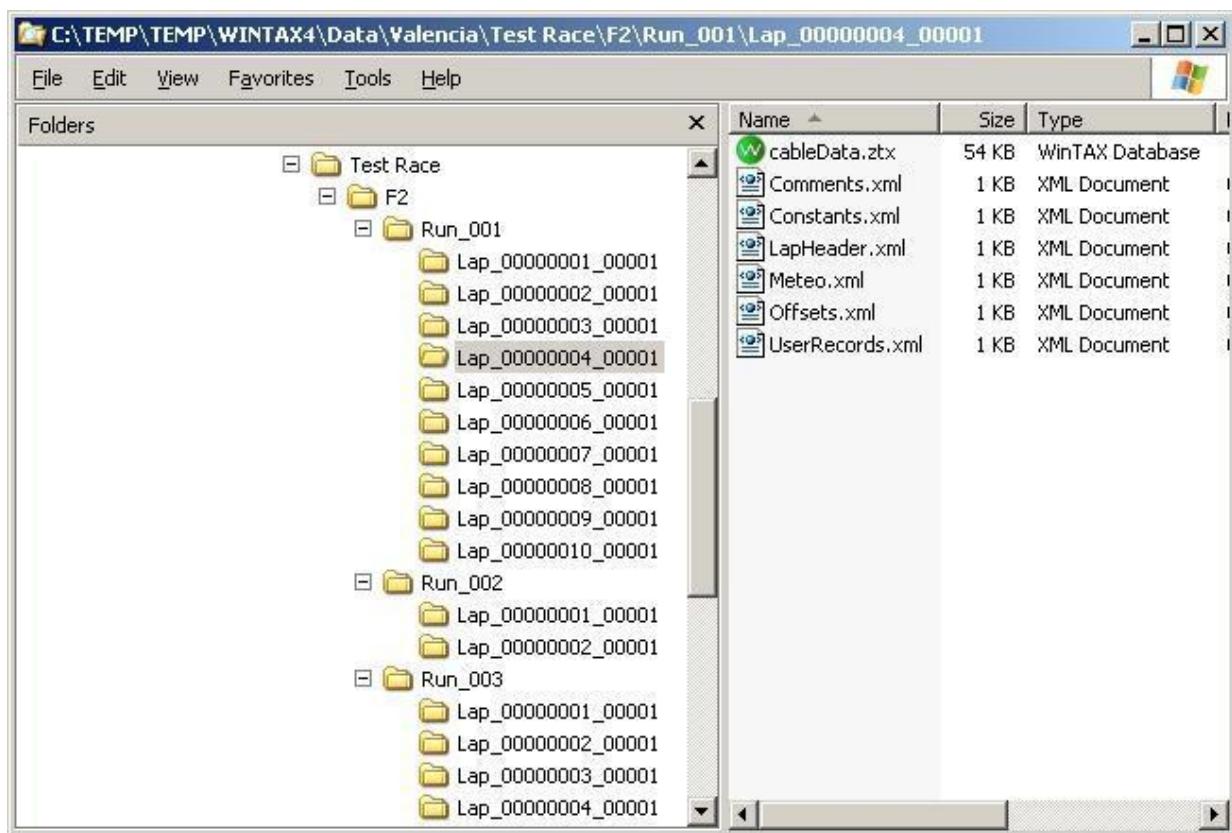
The first column always displays an icon that changes according to the selected level. For Track Session and Car level the icon is always the one shown in the previous figure; for lower levels the icon changes. In the Sessions list no multiple selections are possible. By clicking with the right button on the list a pop-up menu is displayed recalling some commands from different Menus. To see their detailed description, please read the Commands paragraph.

If the licence includes the Directory Tree, the list on the left can be divided into two parts thus introducing a new and more detailed possibility to select the laps going beyond the selection on the Select Archive combo.

Lap List

The lap list views all laps included in the Track/Session/Car directory divided into Run. The Runs are groups of laps separated among them by horizontal lines.

Using the same example of the Sessions list, the user can view the correspondence between the directories and what is displayed by the DataBrowser. The session is formed by three Runs (Run_001, Run_002, Run_003) that 10,2,4 laps respectively.



The screenshot shows the Wtx4DataBrowser application window. The main area displays a table of lap data. The columns are labeled: Track, Session, Car, Driver, TR, Run, Abs, Lap, LapTime, Mrk, and FileName. The data shows multiple runs for the Valencia TestRace session in F3 car, driven by Nuvolari. The first run has three laps (Abs 1, 2, 3) with times 5:15.166, 1:35.199, and 1:33.707 respectively. The second run has four laps (Abs 1-4) with times 1:33.695, 1:34.124, 1:33.999, 1:33.911, 1:33.986, 1:33.814, 1:33.703, and 1:33.695. The third run has three laps (Abs 1-3) with times 5:15.166, 1:35.199, and 1:33.707 respectively. The fourth run has four laps (Abs 1-4) with times 1:33.695, 1:34.124, 1:33.999, 1:33.911, 1:33.986, 1:33.814, 1:33.703, and 1:33.695. The bottom status bar indicates 'No Data'.

Track	Session	Car	Driver	TR	Run	Abs	Lap	LapTime	Mrk	FileName
Valencia	TestRace	F3	Nuvolari		1	1	1	5:15.166	Out	cableData.ztx
Valencia	Race	F3	Ascari		1	1	2	1:35.199		cableData.ztx
Valencia	TestRace	F2	Ascari		1	1	3	1:33.707		cableData.ztx
					1	1	4	1:33.695		cableData.ztx
					1	1	5	1:34.124		cableData.ztx
					1	1	6	1:33.999		cableData.ztx
					1	1	7	1:33.911		cableData.ztx
					1	1	8	1:33.986		cableData.ztx
					1	1	9	1:33.814		cableData.ztx
					1	1	10	1:33.703		cableData.ztx
					1	1	1	5:15.166	Out	cableData.ztx
					1	1	2	1:35.199		cableData.ztx
					1	1	1	5:15.166	Out	cableData.ztx
					1	1	2	1:35.199		cableData.ztx
					1	1	3	1:33.707		cableData.ztx
					1	1	4	1:33.695		cableData.ztx

The Lap list is also provided with a header specifying the kind of information in the columns. The information in the list can be configured in the Menu by using the View/Data Header command that opens the Data Header window. The header is not interactive and does not allow arrangements that would affect the division Runs of the Laps.

The first column always displays an icon that on the basis of the color gives information about the type of lap available in the directory. For instance if there is a yellow square, it means that the directory contains a **cableData.ztx** file. A green square means a **dstData.ztx** file while a light blue square means a **nbtData.ztx** file. If in the same directory all three types of laps are available, the display gives priority to the cableData.ztx, followed by the dstData.ztx and then by the nbtData.ztx; the square indicates that the directory includes also other types of laps.

The icon beside the squares in a single lap refers to the fastest lap, the **best lap**.

The list of laps is interactive and can be sorted based on Abs, Lap, Run, FilePath (default sorting method), on LapDate and on StartTime. Simply click on the column header to sort the list in incremental or decremental manner. An arrow in the header box indicates the sorting direction. To restore the standard sorting method of WinTAX, select sort by “FilePath”.

By clicking with the right button on the list, a pop-up menu is displayed, it recalls various commands from the different Menus. To see their detailed descriptions, read the Commands paragraph.

Selection and Loading of a lap

Single lap or set of laps (append)

To load and display the data on WinTAX, select the session to be analyzed in sessions list then switch to lap list and here select the lap or laps to be analyzed. The groups of laps must not necessarily be contiguous. A group of laps can be selected as follows:

- Left click and drag to select a set of contiguous laps
- Shift+click to select a set of contiguous laps
- Ctrl-click to select a set of non contiguous laps
- R to select a whole Run (it is available also the Select Run command on the Popup menu of the lap list)

Single laps or groups of laps can be loaded .

- Double clicking to load and view a single lap. If the flag **Lap Comparison** is set, the double click adds the lap to the comparison list.
- Press **Enter** or the *File/Open* command to load and display a single lap or a group of laps (append).
- The lap downloading process can be interrupted using the ESC key

Lap comparison

The lap comparison is one of the basic characteristics WinTAX because it enables to compare various laps so to evaluate the performances of the car and of the driver in different situations. The lap to be compared can be chosen through the DataBrowser, and through the DataSet. Not only single laps but also groups of laps, the 'appends' can be compared. A special type of comparison is the Reference Lap. As to the DataBrowser, the laps for the comparisons can be selected as follows:

- Ctrl+Return to add gradually to the DataSet the lap or the selected laps.
- Ctrl+ N to add to the Nth element of the DataSet the lap or the laps selected. Max 10 DataSet can be added; Ctrl+0 adds the dataset number 10.
- If the **Lap Comparison** flag is set, the lap can be added to the comparison list by double clicking.

Once the comparison list has been created, it can be loaded by pressing **Enter** or the *File/Open command*

For more information about DataSet, see related chapter.

Multisession mode

Allows to load all laps of more than one session.

In the *Sessions List* user can select two or more sessions through standard Windows multi selection controls (ctrl, shift), then confirm the selection by clicking Enter.

The Data thus loaded are *only* usable in Lap Report windows of current layout.

Previous loaded Datasets are not removed. All other windows (e.g. Graph, XY) are not affected.

To restore the standard behavior user has to select again a single session from Data Browser.

Lap Info Bar

The Lap Info is placed below the Session and Lap lists and displays the information about the selected laps.

If no lap is loaded, the writing No Data appears on light blue background. Loading a lap, the information about the lap are displayed, as configured in the Session and Lap parts of the Header Configurations page.

If an append of lap is loaded, a single line is displayed where the information varying from lap to lap (for instance Abs) are presented in sequence, separated by a comma if they are consecutive, or if not as a range separated by colon.

1 Track:Valencia Session:Race Car:F3 Driver:Ascar TR:1 Run:1 Abs:3..8,11..12,14,16 TL:3..8,11..12,14,16 Lap:3..8,11..12,14,16 Mrk: LapTime:15.39.461	[navigation icons]
--	--------------------

If a comparison of laps is loaded, all configured information about each lap or lap append are displayed, as shown in the following figure.

1 Track:Valencia Session:Race Car:F3 Driver:Ascar TR:1 Run:1 Abs:2 TL:2 Lap:2 Mrk: LapTime:1:35.199	[navigation icons]
2 Track:Valencia Session:Race Car:F3 Driver:Ascar TR:1 Run:1 Abs:6..8,10..13,15 TL:6..8,10..13,15 Lap:6..8,10..13,15 Mrk: LapTime:7:49.602	[navigation icons]
3 Track:Valencia Session:Race Car:F3 Driver:Ascar TR:1 Run:1 Abs:2..5 TL:2..5 Lap:2..5 Mrk: LapTime:6:16.725	[navigation icons]
4 Track:Valencia Session:Race Car:F3 Driver:Ascar TR:1 Run:1 Abs:6..18 TL:6..18 Lap:6..18 Mrk: LapTime:3:38.129	[navigation icons]
5 Track:Valencia Session:Race Car:F3 Driver:Ascar TR:1 Run:1 Abs:4 TL:4 Lap:4 Mrk: LapTime:1:33.695	[navigation icons]

If the toolbar takes more space than allowed by the window, the exceeding length is cut and navigation buttons are added on the right so that they allow to view all information about the Data Header as shown in the previous figure.

Data Header Configuration

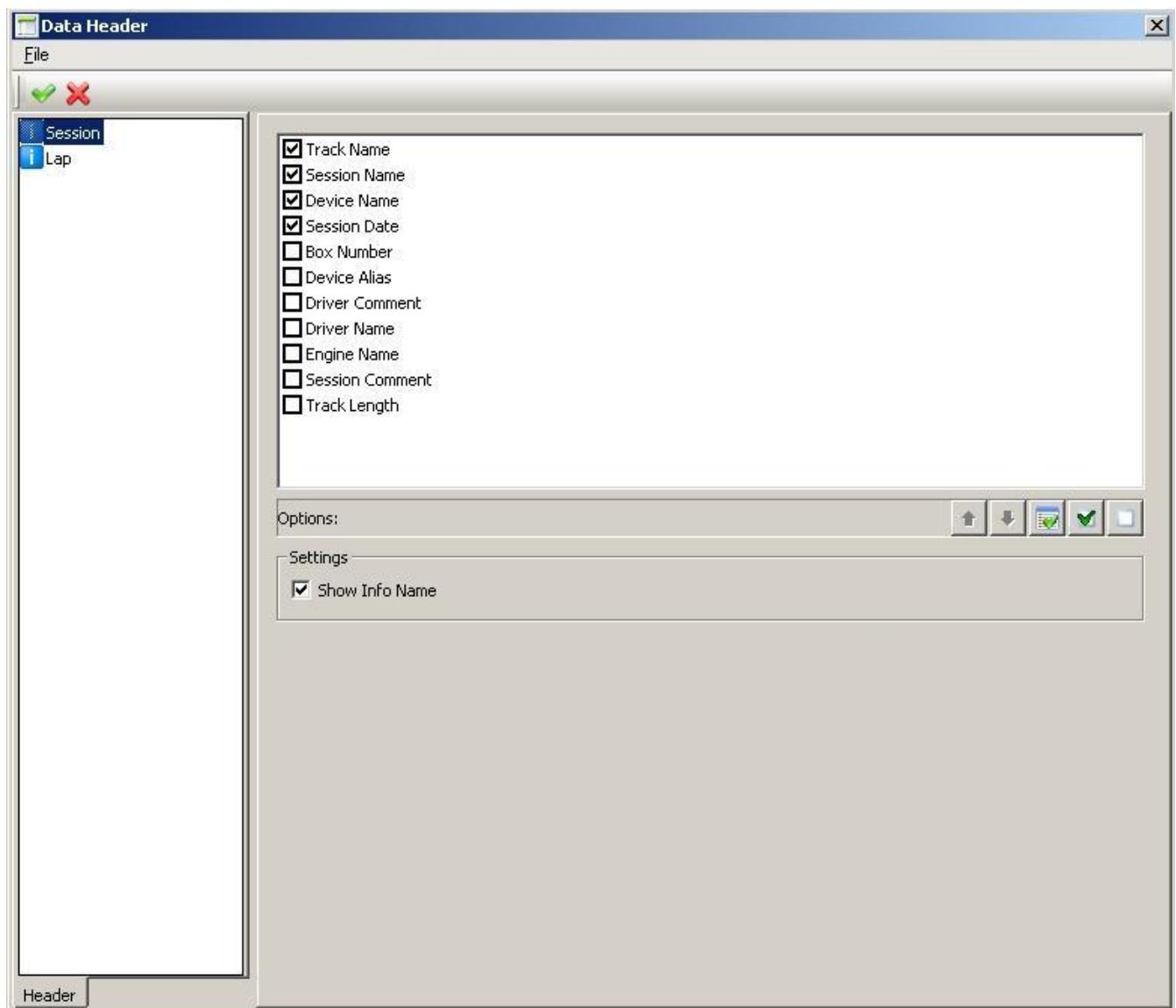
The **Data Header** window configures the headers to be displayed in the lap list and in the session list; it configures also the Header Lap; the bar summarizing all configured information.

The window is divided into two sections: the section on the left shows the groups of configurable headers (Session and Lap), while the section on the right allows to configure the desired information.

The window moreover has a menu and a toolbar integrated that ease the access to the configuration and management commands of the window itself.

Session

This section configures the header of the Session list.

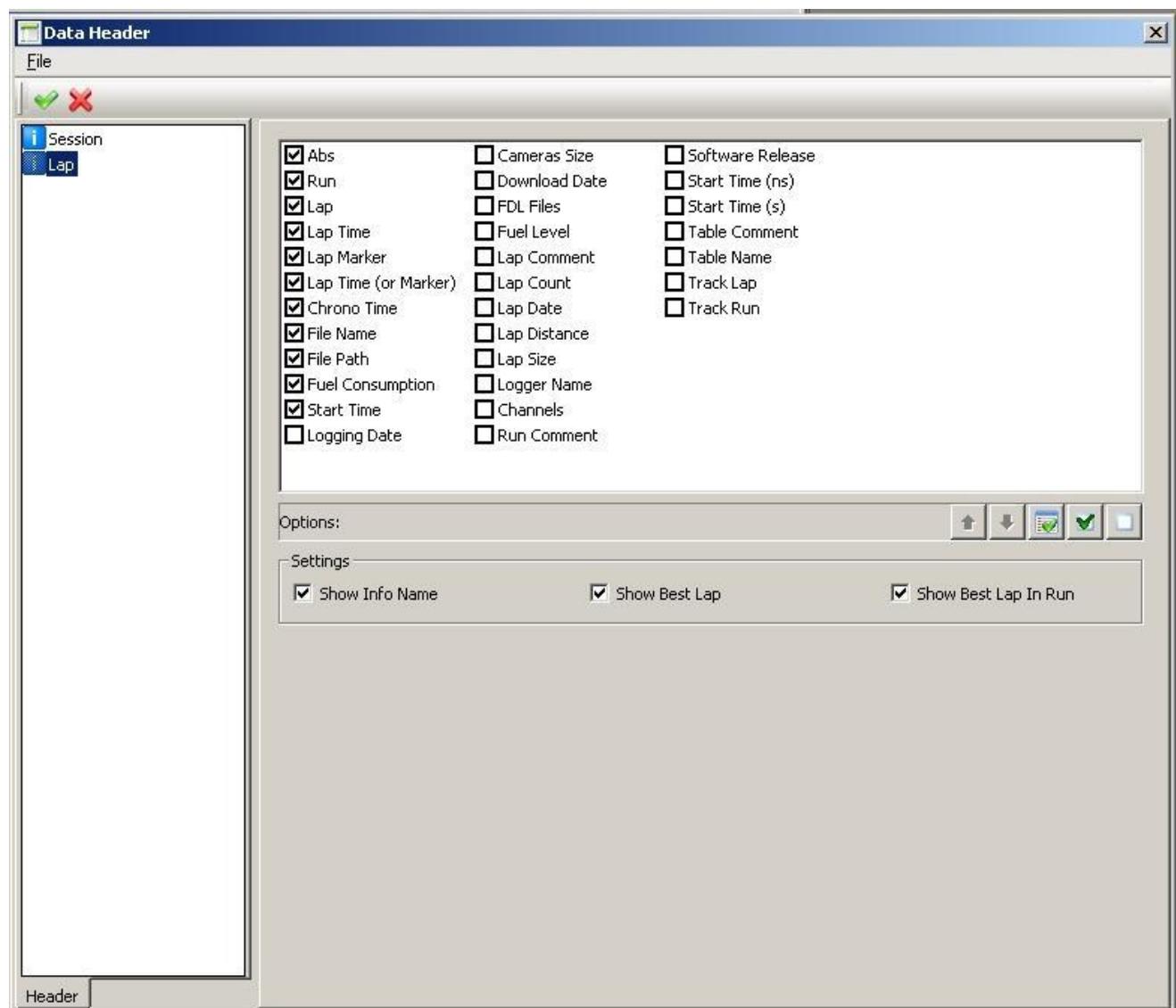


In the list is possible to select the information to be displayed in the session list and their presentation order. Through the **Options** buttons the order of the list can be changed, all information can be selected, deleted and the default configuration can be restored (Track Name, Session Name, Car Name).

The **Show Info Name** check allows to visualize the name of the information before the value in the Lap Info Bar ; it has no effects on the visualization of the session list.

Lap

In this section the header of the Lap list will be configured.



In the list is possible to select the information to be displayed in the lap list and their presentation order. Through the **Options** buttons the order of the list can be changed, all information can be selected, deleted and the default configuration can be restored (Abs, Run, Lap, Lap Marker, Lap Time).

The **Show Info Name** check adds the name of the info before the value in the Lap Info Bar; it has no effects on the session list.

The **Show Best Lap** check allows to view through an icon in the lap list, the fastest lap of the session.

The **Show Best Lap In Run** check allows to view through an icon in the lap list, the fastest lap of each run.

Menu

The window menu allows the access to the following commands divided into sub menus:

File Menu

COMMAND	SHORTCUT	DESCRIPTION
Apply	Enter	Applies the current settings of the window.
Cancel	Esc	Closes the window without applying the current settings.

Toolbar

The toolbar of the window enables the same menu commands:

Commands

Menu

The Data Browser includes the Files, Edit, View, Tools menus and a toolbar by default. Here is a description of the commands.

Files Menu



COMMAND	SHORTCUT	DESCRIPTION
Open	Enter	It opens the lap or the combination of the selected laps loading them either in WinTAX, or on the DataSet Panel or on the Bookmark according to the request. Read Selection and loading of laps to see how to select them.
Open in temp mode		It opens the lap or the selected laps with a new type of the TaxView display
Load Best Lap	Ctrl + B	Loads on WinTAX the Best Lap, i.e. the lap identified by the Data Browser as the fastest one. Not all laps can be selected to be the fastest one, but only those identified by the following Lap Marker: N or Marker, Lap, Best Lap.
Delete Lap	Delete	It deletes the selected laps. The file on disk is cancelled therefore a confirmation is required. The cancellation is extended to the directories and xml files associated to the lap. If all laps of the session are cancelled, the session itself will no longer be displayed in the list of sessions.
Remove Run	Ctrl Delete +	Removes all laps of the selected run. The file on disk are cancelled therefore a confirmation is required. The cancellation is extended to the directories and xml files associated to the laps. If all laps of the session are cancelled, the session itself will no longer be displayed in the list of sessions.
Rename Run		Change the Run Name of selected run.
Append Laps		This command enables to link two or more laps so that a single lap is obtained. It works only if the laps are contiguous. A confirmation is required to carry out the operation. The resultant lap will have the Lap Time equal to the sum of the linked laps. If laps have different frequencies, all channels will be converted to higher frequency of the two tables with lowest common multiple logic.
Append Automatic Laps		This command appends all laps consecutive of the same kind in a unique lap, until a change frequency. A confirmation is required to carry out the operation. The resultant lap will have the Lap Time equal to the

		sum of the linked laps.
Run Selection Mode	Ctrl + R	Enables/Disable run selection. The Run Selection mode permits to load the entire run in append even if only one lap is selected.
Enable Merge Import Data		Permits to merge import data from ASCII.
Enable Video Loading		Enables/Disables loading of video.
Browse Directory		It opens a browser to select the main directory where sessions can be searched and displayed. The selected directory becomes the directory selected also in the Select Archive combo and it is the one from which the Session list will display the sessions, if available.
Clear Browse Directory		It cancels all paths of the Select Archive combo with the exception of those configured on WinTAX in Setup/General/Directories/Data.
Add to Comparison	Ctrl + Num Enter	It adds the selected laps to the existing list of comparisons displayed in the Lap Info Bar
Lap Comparison		When this check is selected, the double click on a lap adds the lap to the comparison list displayed in the Lap Info Bar; if it is not selected, the double click loads the lap on WinTAX.
Clear Comparison		It removes all laps from the Lap Info Bar removing them also from WinTAX and from DataSet panel when available.
Auto Clear Laps Comparison		When checked, cancel the old laps comparison before a new lap selection. If unchecked, the new laps selection are added at the old laps comparison.
Add to Bookmark		It adds a lap to the Bookmark list of the DataSet panel
Add to Average Comparison	Alt + Num Enter	Add the selected lap to the current average comparison

Distance comparison mode	avg	Select the distance mode to calculate average.
Add to DataSet #N	Ctrl + 1 Ctrl + 2 Ctrl + 3 Ctrl + 4 Ctrl + 5 Ctrl + 6 Ctrl + 7 Ctrl + 8 Ctrl + 9 Ctrl + 0	It adds the selected laps to the comparison list displayed in the Lap Info Bar but in the slot identified by the number chosen dataset.
Load comparison to average Dataset	Alt + 1 Alt + 2 Alt + 3 Alt + 4 Alt + 5 Alt + 6 Alt + 7 Alt + 8 Alt + 9 Alt + 0	Load the selected Dataset to average Comparison
Faster Archives		<ul style="list-style-type: none"> Enable Faster Archives Enabling to the quick search of the scans if xml archives have been created. Make Faster Archives It creates a xml file that contains the basic information about the sessions viewed and that allows a quicker display of the sessions if the Enable Faster Archives command is enabled. If the scanned directory is WinTAX4/WtxData, the WtxData.xml file is created in the directory itself. If the scanned directory is WinTAX4/ or higher, the WtxData.xml file is also created in WinTAX4/WtxData directory. in fact the multi level search allows creating the caches of all major sub-directories. <p>When the data path is selected, the sessions will be loaded by the xml file; the icon in data combo associated to the path changes indicates the different loading. The xml file is updated with the modifications of the data structure.</p> <ul style="list-style-type: none"> The Esc command blocks the creation of Faster Archives; it's useful when the creation takes a long time.

Set Reference Lap		It sets the Reference Lap to make comparisons with a fixed reference lap.
Remove Reference Lap		It removes the Reference Lap
Stop Scanning	Esc	<p>It blocks the scanning that the Data Browser carries out on the directory set to search the scans; it's useful when the scanning last for a long time. For further details see Directory Tree.</p> <p>The command Esc is also used to stop the creation of Faster Archives.</p>
Exit		It closes the Data Browser without loading the data in WinTAX

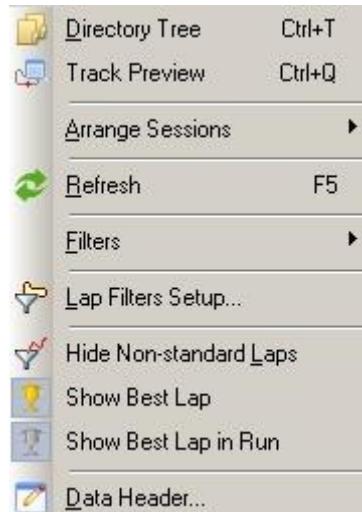
Edit Menu



COMMAND	SHORTCUT	DESCRIPTION
Header		It opens Edit Lap Information on the Header page. See the paragraph: Edit Context Information
Session		It opens Edit Lap Information on the Session page. See the paragraph: Edit Context Information

Driver		It opens the Lap Information on the Driver page. See the paragraph: Edit Context Information
Constants		It opens the Edit Lap Information on the Constants page. See the paragraph: Edit Context Information
Offset+Gain		It opens the Edit Lap Information on the Offset+Gain page. See the paragraph: Edit Context Information
User Record		It opens the Edit Lap Information on the User Record page. See the paragraph: Edit Context Information
Meteo		It opens the Edit Lap Information on the Meteo page. See the paragraph: Edit Context Information
Edit Lap Properties		It opens the editor of context information the lap. See the paragraph: Edit Context Information
Setup Editor	Ctrl+F10	It opens the editor of context information the lap. See the paragraph: Setup Editor
ClearLock		This command is available only for users with Super level; it forces the removal of a lock from a file left. For further information about the locks see the paragraph: File Locking

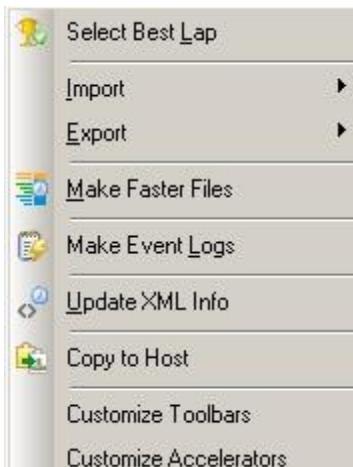
View Menu



COMMAND	SHORTCUT	DESCRIPTION
Directory Tree	Ctrl + T	It displays the Directory Tree for the selection mode of the main directory alternated to the combo. For further information about the locks see Directory Tree.
Track Preview	Ctrl + Q	Shows/Hides track preview window.
Arrange Session		<ul style="list-style-type: none"> • By ... It allows to alphabetically arrangement of the sessions according to the information configured in the Header Session. • Auto Arrange predefined arrangement of the sessions. The alphabetical arrangement is set according to the first column of the Header Session. • Advanced Sort The following window opens where a customized arrangement can be set 
Refresh	F5	It scans the sessions
Filters		<ul style="list-style-type: none"> • Session Filters Setup it opens or closes the panel to configure the session filters.

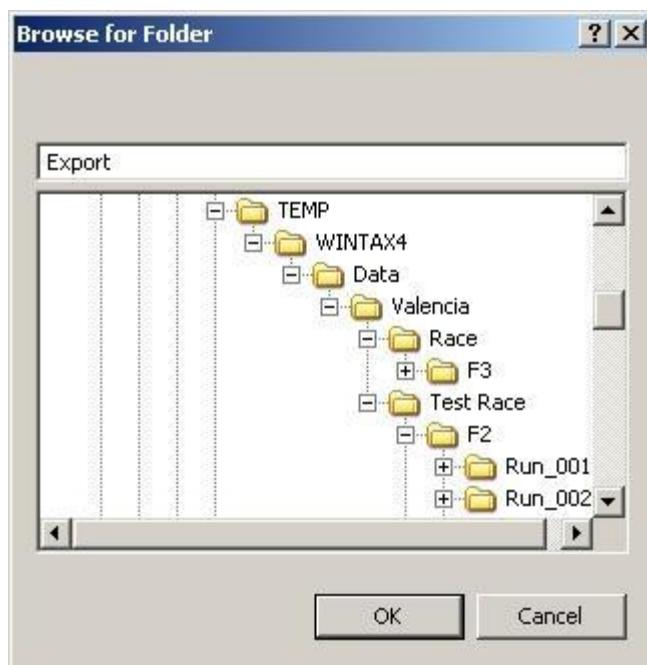
		<ul style="list-style-type: none"> Clear All Filters All filters of the session are reset For further details on the session filters see the paragraph: Configuration of the Session Filters.
Lap Filters Setup		It opens the configuration page of the Lap Filters.
Hide Non-standard Laps		Hides spurious archive laps: duplicated (~), auto limit (@), trigger out (#). Hidden laps are not used at all in WinTAX
Show Best Lap		Shows fastest lap of the whole session marking it with a “golden cup” icon
Show Best Lap in Run		Shows fastest lap of each run of the session marking them with a “silver cup” icon
Data Header		It opens the configuration page of the Header.

Tools Menu



COMMAND	DESCRIPTION
Select Best Lap	It selects the best lap without loading it on WinTAX.
Import	<ul style="list-style-type: none"> Import From Exp It allows to select an EXP file and to unfold it in the directory chosen by the user. For further details see the page:

	<p>Import from EXP.</p> <ul style="list-style-type: none"> • Import From ASCII The import from ASCII function is used to convert general text files into WinTAX data structures (therefore in native ZTX format). For further details see the page: Import from ASCII • Import From MatLab WinTAX is able to import files from Matlab. For further details see the page: Import from MatLab • Import From Video It allows importing file video into RUN. For further details see the page: Import from Video
Export	<ul style="list-style-type: none"> • Export to BIN It creates a BIN file containing all the channels selected. For further details see the page: Export • Export to ASCII It creates an ASCII file (tab separated values, *.prn) containing all values of selected channels. For further details see the page: Export • Export to CSV It creates a CSV file (comma separated values), containing all values of selected channels. For further details see the page: Export • Export to XLS It creates a XLS file (Excel sheet) containing the values of the selected channels. For further details see the page: Export • Export to ZTX It opens a directory selection window where the directory of the selected lap will be copied with all its content. • Export Channels to ZTX It creates a BIN file containing all the channels selected. For further details see the page: Export



	<ul style="list-style-type: none"> • Export to EXP It opens a path selection window of the file where it can be indicated where the EXP file will be created. The EXP file is a file compressed which contains not only all data of the lap, but also the path needed to recreate it in the structure Track / Session / Car / Run / Lap. • Export Channels to EXP It creates an EXP file containing all the channels selected. For further details see the page: Export • Export to Matlab It creates a MatLab file containing all the channels selected. For further details see the page: Export
Make Faster Files	It creates for each selected channel a Faster File for each channel of the lap and it includes the .ZTX file of the lap. A Faster File contains all the samples of a single channel. The unzipping of the Faster File allows a quicker access to the data instead of a bigger .ZTX file.
Make Event Logs	It creates an Event Log in XML format based on the libraries of Events currently loaded in WinTAX. The log file created can be processed by external applications.
Update XML Info	This command that can take a few minutes to be carried out, up-dates the information in the lap headers. The lap headers currently contain information about start time that the previous versions did not include; this command adds the missing information. As the whole archive is checked, this operation might last for a few minutes.
Copy to Host	Copy to Host is one of the instruments that allows using WinTAX in network; the command enables to data downloaded via cable on a PC master, to be copied on other stations. In this way all stations are updated with the latest data. To configure the hosts where the files must be copied, go to WinTAX in <i>Setup/General/Directories</i> and configure at least one directory in host.
Customize Toolbars	It opens the configuration window of the toolbars
Customize Accelerators	It opens the configuration window of the accelerators; for the functioning, see the configuration window of the accelerators of WinTAX.

Toolbars

The Data Browser has by default just one toolbar with some predefined buttons, the **Main** toolbar. The Main toolbar can be modified, so buttons can be added or removed. New toolbars can also be created that will be customized. To view the toolbars just click with the right button on the toolbars area and select which toolbar must be shown or hidden.

Each toolbar can be floating or docked to the main window; the toolbars can be docked on each of the four sides of the window. To dock a toolbar, drag it on the desired area of the window or double click on the header bar. In this latter case the toolbar will be placed on the last docked zone. Vice versa to make a docked toolbar floating, double click on the outer borders of the toolbar or drag it with the mouse outside the dock area.

The configurable toolbars have a downwards arrow on the right side. This arrow corresponds to a button that opens a menu through which some predefined commands can be added or removed from the toolbar.

Using the Customize menu from the right button on the toolbar (which is just like the command of the main menu Tools/Customize Toolbars) it's possible to open the configuration window of the toolbars through which all commands available on Data Browser can be added or removed from the toolbars.

For further information about the description of the functions of the single commands of the toolbar, please read the corresponding menus.

Two combos can be displayed only on the toolbars, the archives selection combo **Select Archive** and lap filter selection, **Select Lap Filter**.

Keyboard Shortcut

To see the complete list of shortcuts available for the Data Browser, see related chapter.

Below are listed those shortcuts that do not appear in any of the commands and of the toolbar buttons described before. These commands can be executed only from keyboard. All these commands are not customizable.

SHORTCUT	DESCRIPTION
F1	Display Data Browser Help
R	Select all the laps of a run

Select Archive

The combo is the basis to create the list of the sessions. The directory selected here is scanned to search for possible sessions available. The combo contains some path predefined in WinTAX in Setup/General/Directories/Data, to which up to 10 paths can be added and that were selected while using the **Browse Directory** command; they are automatically saved and stored.



The scan starts as soon as the directory is selected. The functioning of the combo is the same even if the Directories Tree is used thanks to the Directory Tree.

Select Lap Filter

The combo enables on the selected session one of the filter predefined by WinTAX or of those configured in the configuration page of the Lap Filters where the Lap Filters are further described. To avoid any filter on the session lap, select the *All* filter.



Pop-up Menu

Both the Sessions List and the Laps List allow the access to a pop-up menu with the right button of the mouse. All commands of the menu have already been described in the main Menus.

The only command not available in the menu is the **Select Run** menu on the lap list that allows to select the whole run of the selected lap.

Track	Session	Car
Valencia	Race	F3
Valencia	TestRace	F3
Vale	Session Filters Setup...	F2
	Clear All Filters	
	Advanced Sort	

TR	Run	Abs	TL	Lap	Mrk	LapTime	FileName	StartTime_ms
■	1	1	1	1	1	Out		08:51:39.000
■	1	1	2	2	2			08:56:54.165
■	1	1	3	3	3			08:58:29.348
■	1	1	4	4	4			09:00:03.007
■	1	1	5	5	5			09:01:36.694
■	1	1	6	6	6			09:03:10.773
■	1	1	7	7	7			09:04:44.749
■	1	1	8	8	8			09:06:18.611
■	1	1	9	9	9			09:07:52.585
■	1	1	10	10	10			09:09:26.364
■	1	1	11	11	11			09:11:00.053
■	1	1	12	12	12			09:12:34.137
■	1	1	13	13	13			09:14:07.993
■	1	1	14	14	14			09:15:41.857
■	1	1	15	15	15			09:17:15.751
■	1	1	16	16	16			09:18:49.757
■	1	1	17	17	17			09:20:23.905
■	1	1	18	18	18	Box		08:51:39.000

Context menu for the last row (Box):

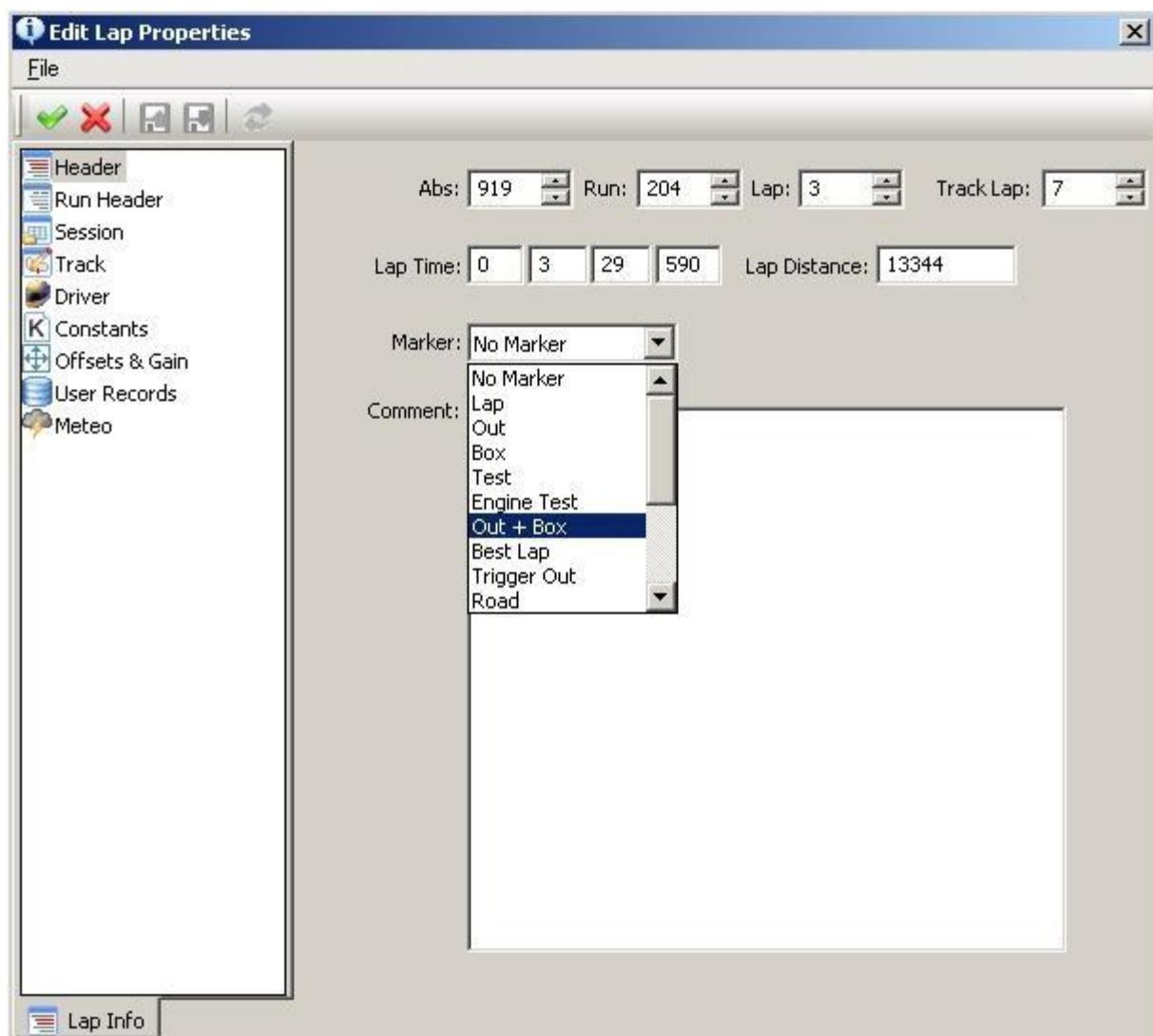
- Open
- Open in temp mode
- Load Best Lap Ctrl+B
- Select Run R
- Enable Merge Import Data
- Delete Lap Delete
- Append Laps
- Add to comparison Ctrl+Num Enter
- Lap Comparison
- Clear comparison
- Add to Bookmark
- Add to average comparison Alt+Num Enter
- Distance avg comparison mode
- Add to DataSet ▶
- Load Comparison to Average DataSet ▶
- Edit Header...
- Edit Run Header...
- Edit Session...
- Edit Track...
- Edit Driver...
- Edit Constants...
- Edit Offsets+Gain...
- Edit User Record...
- Edit Meteo...
- Export... ▶
- Show Best Lap
- Show Best Lap in Run
- Data Header...

Edit Context Information

The *Context information* refer to the constants, weather data, user record, offsets, gain etc.. those are associated to the ZTX files. These information can be displayed or edited though the Edit Lap Properties window opened by the commands of the *Edit* menu of the Data Browser and *Edit Lap* of WinTAX.

- If it is opened by *Edit* of the Data Browser, the information of the lap/laps selected are edited; if more laps are selected the possible changes are applied to all laps.
- If it is opened by *Edit* of the Data Browser *Edit Lap* of WinTAX the loaded lap/laps are edited. If there are appends, the changes are applied only to the first lap.

The XML files containing the context information are automatically created during the acquisition and are linked both to race parameters and to the settings available in the Acquisition Manager. Their manual change must be carried out carefully because information on the lap structure are modified, even if sometimes it's better to redefine some values for instance the progressive number of laps. The window of Edit Lap is represented in the following figure available in the Lap Header page.



The window is formed by the tree Lap Info gathering all the issues relating to the Context Information. The selection of one of the elements of the tree shows on the right of the window, the page of the issue chosen. In the figure the page selected is the Header.

Header

The Header page displays and changes the Abs, Run, Lap, TrackLap, LapTime and Lap Distance values. In addition a marker can be selected to be associated to one of the laps proposed by the combo. Some markers are automatically assigned to the data acquisition, however it can be better for analysis purposes to add some more markers.

The marker proposed by the combo varies according to the license; the most important ones are:

- **No Marker** No marker
- **Lap** Lap on track
- **Out** Out lap (first in a run)
- **Box** In lap (last in a run)
- **Test** Test lap (car stationary in pits)
- **EngineTest** Engine test
- **Out + Box** Out followed by In
- **Best Lap** Best (fastest) lap
- **Trigger OUT** Available only for telemetry data

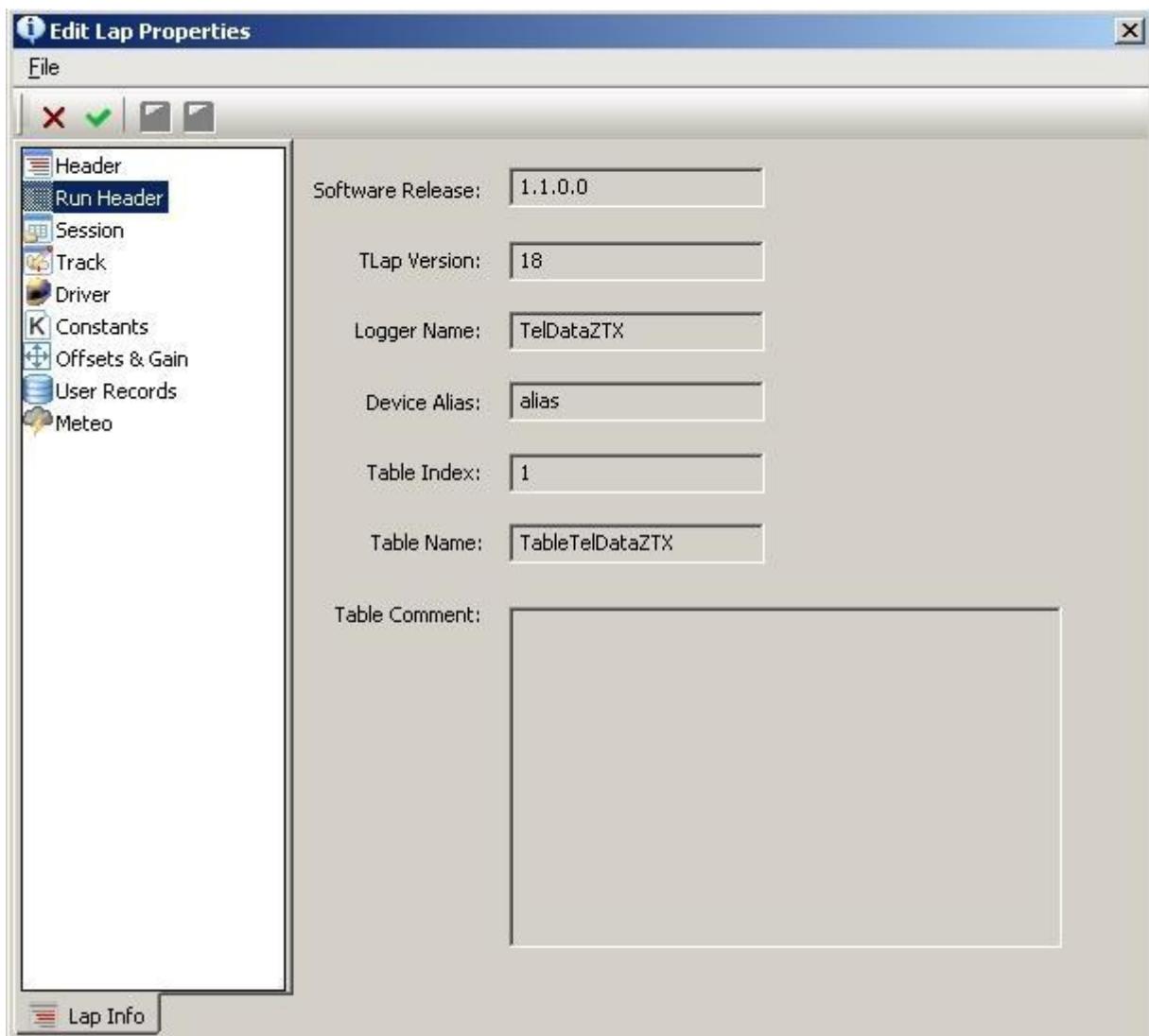
Other markers:

- **Road**
- **Special**
- **Warm Up**
- **Stop**
- **Abort Out**
- **Manual Trigger**
- **Reset**
- **Auto Limit**

A comment can be added or modified.

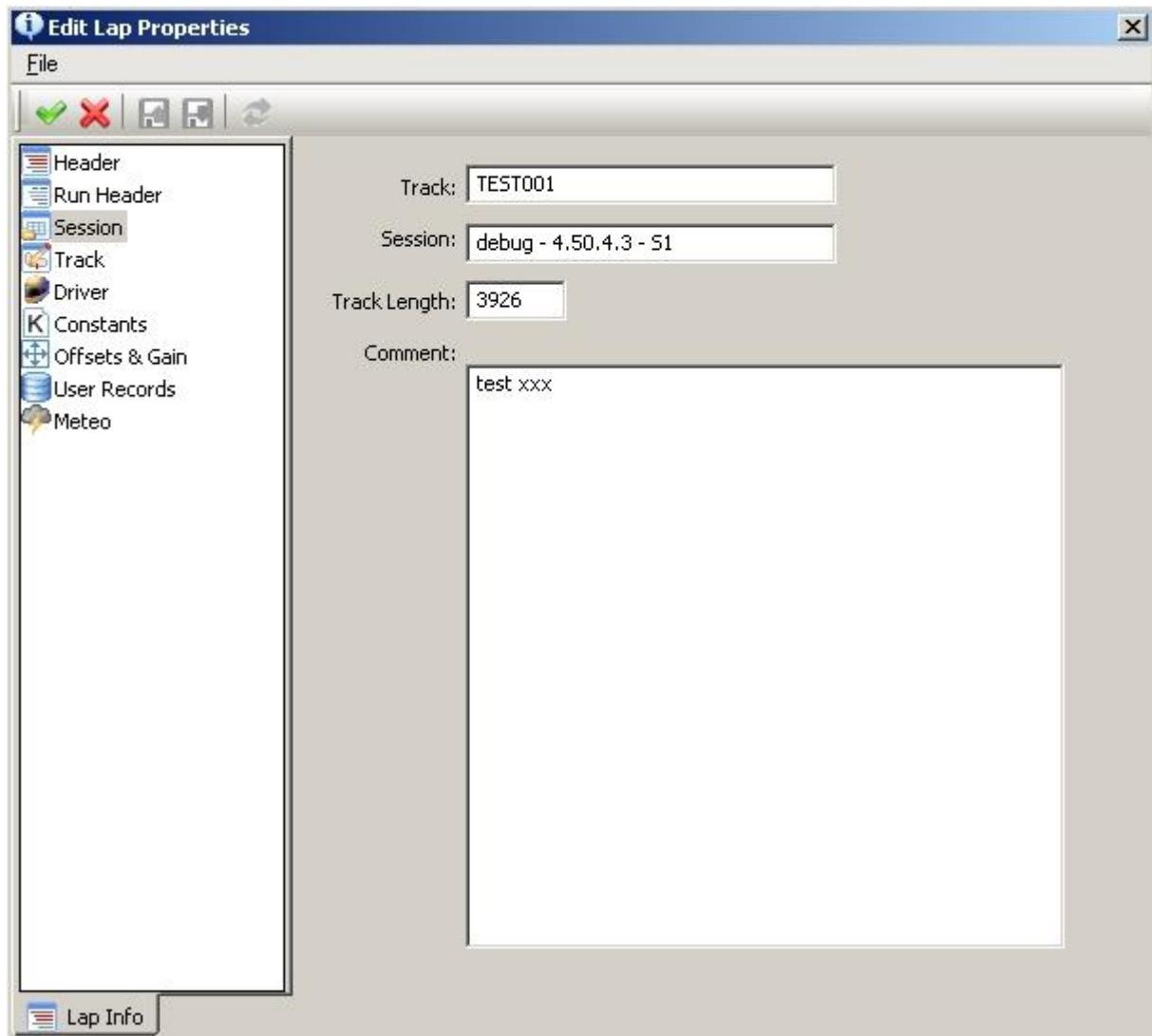
Run Header

In the Run Header page, the Header information is added at Run level. It is Read Only information.



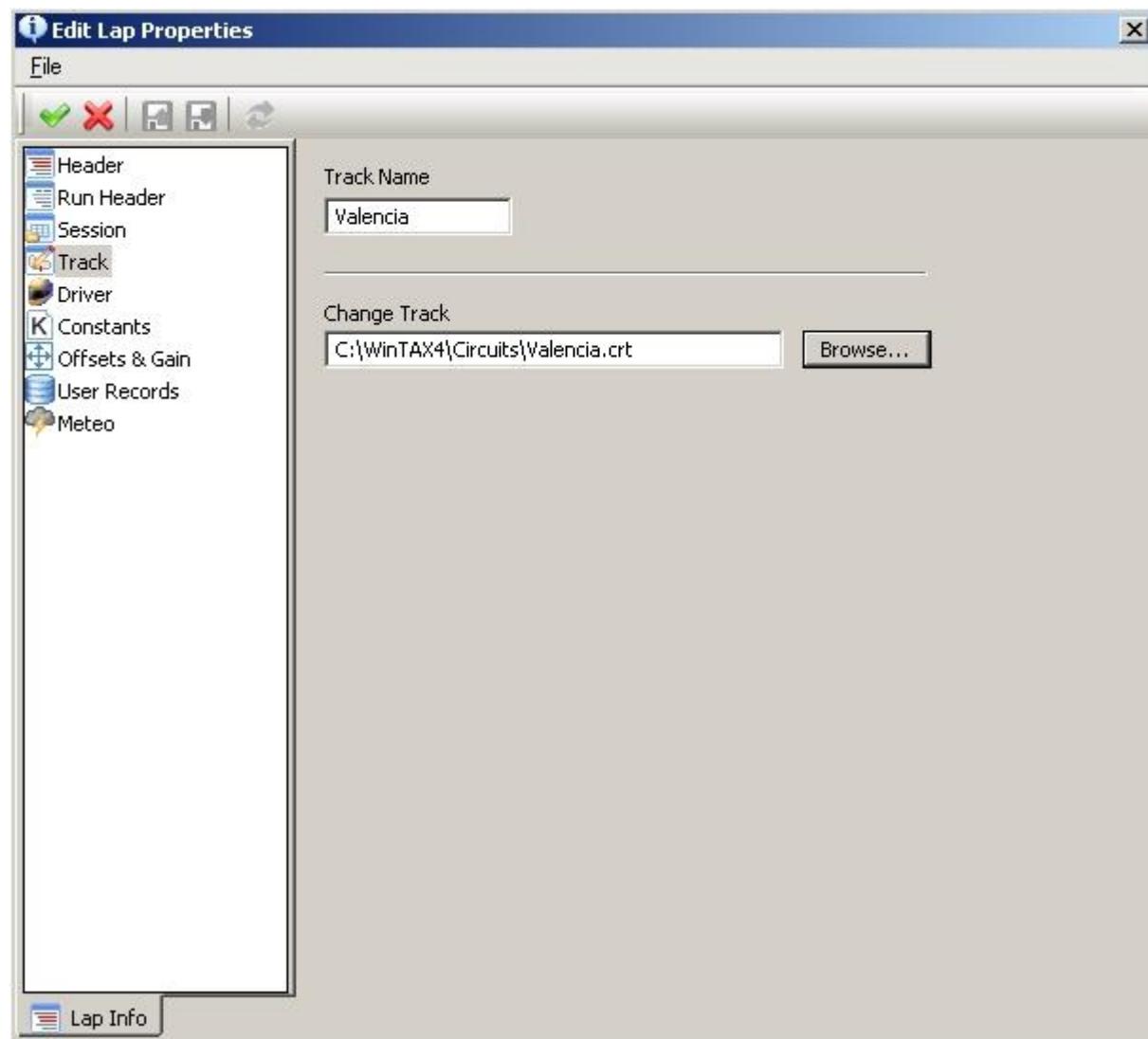
Session

The Session page displays and changes the basic information of the Session, i.e. Track, Session and Track Length. A comment can be added or modified.



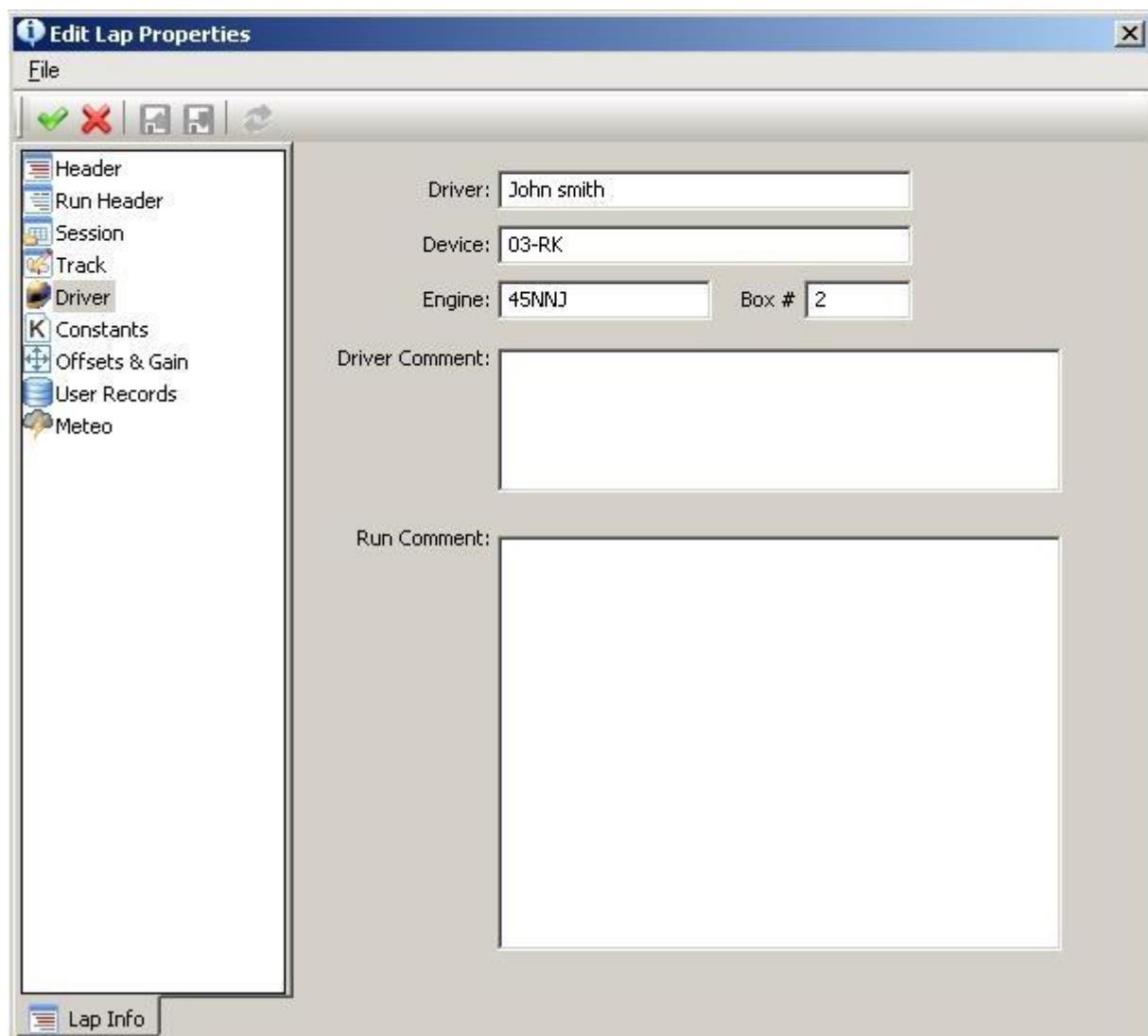
Track

The Track page displays and changes the information of the track, i.e. Name and CRT related.



Driver

The Driver page displays and changes the information of the device, i.e. Driver, Device, Engine and Box Number. Comments linked to the driver or to the Run can be added or modified.



Constants

The Constants page displays, adds and modifies the values associated to constants that can be then used in post processing by WinTAX and displayed in the Channel Browser.

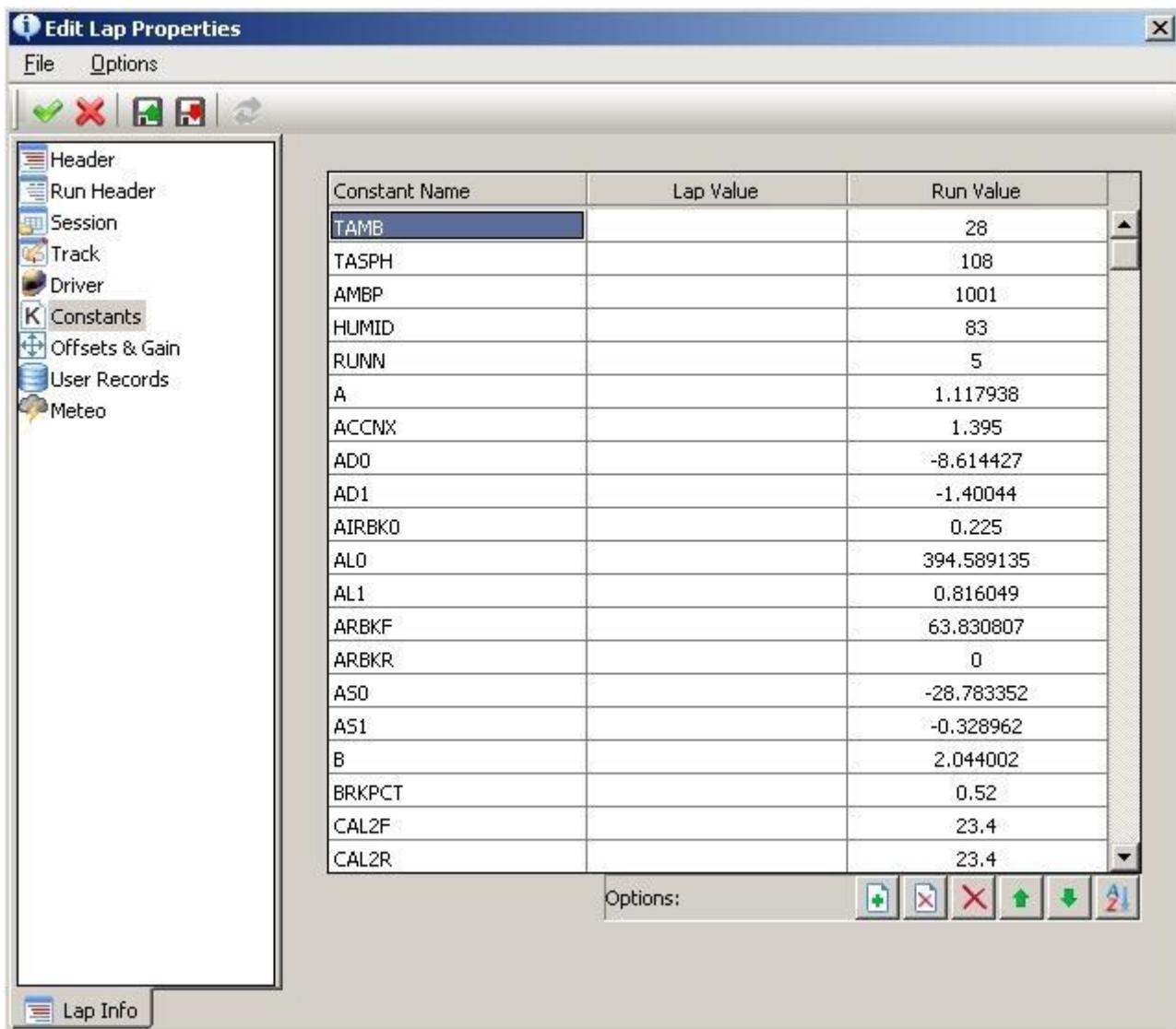
Two levels of constants are available in WinTAX:

- **Lap Level:** the constants of a lap are saved in the Constants.xml files available inside a lap directory.

- **Run Level:** the constants of a run are saved in the RunConstants.xml, file available inside a run directory.

The constants can then be associated both to a lap and to a run. If a lap has the same constants in both levels, the constant defined in the lap is taken as a reference.

The figure shows the editor page of the constants



The editor is formed by a three column list and by a series of commands that can be recalled from the toolbar options, the main menu and keyboard. In the list the first column contains the names of the constants, the second the Lap values and the third the Run values. According to the type of licence, the column of the Run values might be missing.

When the editor opens, the constants appear in alphabetical order, but the first to appear are the Lap levels and then there are the Run levels.

Each cell can be selected by clicking with the mouse or moving with the arrow keys on the keyboard.

Each cell can be modified by double clicking with the mouse or SPACE BAR on the selected cell. The user can exit from the edit of the cell through the ESC key (if no cell is edited, the ESC key allows to exit from the editor) or selecting with the mouse another area of the window or moving with the arrow keys on the keyboard.

The Options menu and the Options toolbar have the following commands

- **Add Item** Adds a constant at the end of the list (also the **Insert** key on the keyboard can be used)
- **Remove Selected Item** Removes the selected constant. The **Delete** key on the keyboard is used for the same purpose; however if the constant is not selected, but the lap value or the run value are selected, the **Delete** key does not remove the constant but eliminates the selected value.
- **Remove All Items** Removes all constants from the list.
- **Move up** Moves upwards in the list by one position the selected element. The position is not saved.
- **Move down** Moves downwards in the list by one position the selected element. The position is not saved.
- **Sort by Name** Sorts alphabetically all constants.

The constants can be brought from lap to run level and vice versa or to both levels by adding or removing a value in the corresponding cell of the list. When editing a lap a constant at run level is removed, this change is valid for all laps of the run.

Offset+Gain

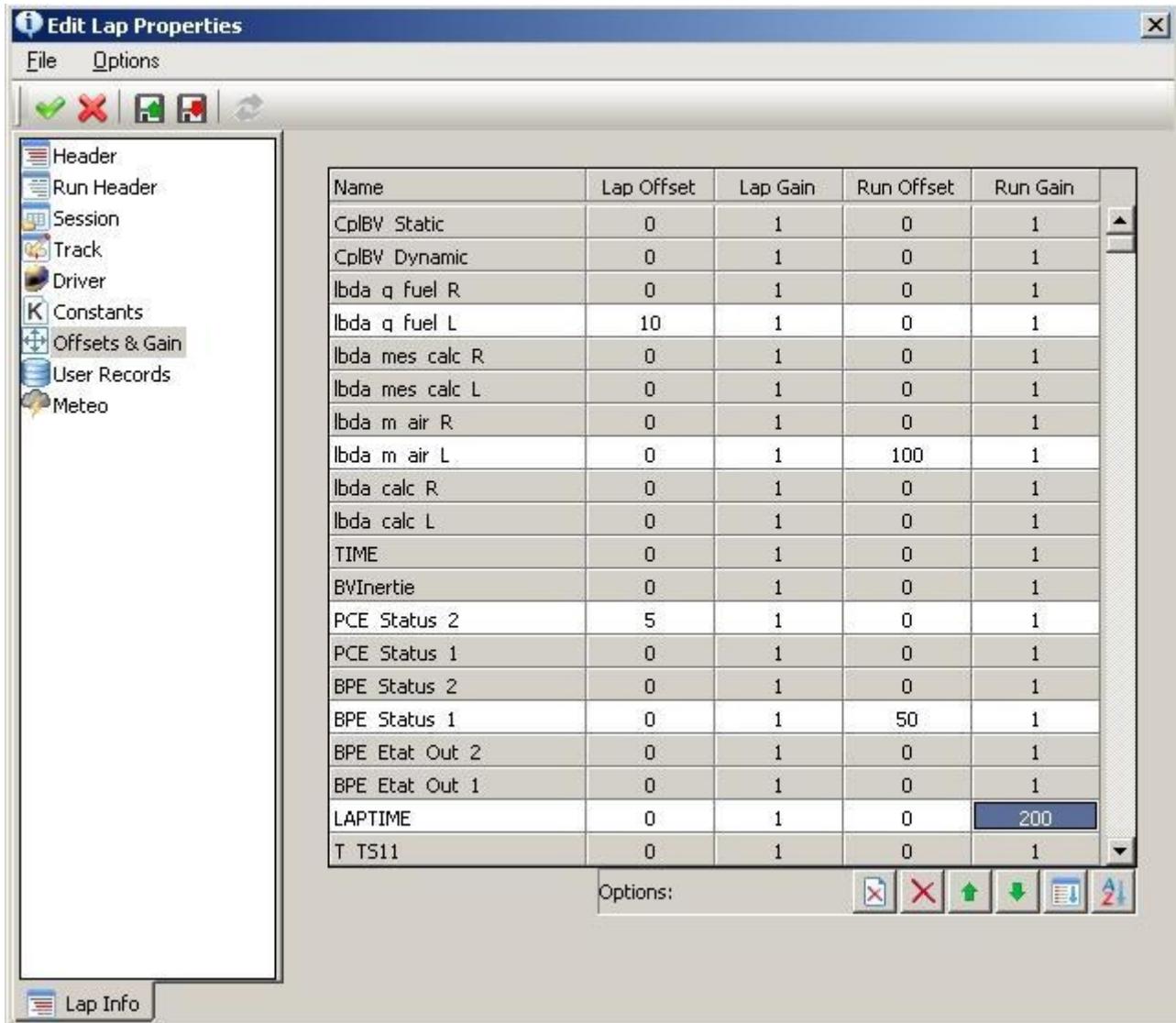
The Offset+Gain page displays and modifies the offset and gain values associated to the channels and that are introduced to make a pre-elaboration of the channel values. The offset values are algebraically summed to the channel values; the gain values are multiplied to the channel itself. When a channel has

According to the configuration of Setup/General the offset gain applied to a channel can be the same as in context info, those configured in Channel Parameters or both. The principle is that offsets are always values that must be algebraically summed while gain values are multiplication factors.

As for constants, WinTAX manages two level of Offset+Gain: **Lap Level** and **Run Level**.

Offset and gain of a lap are saved on Offsets.xml files available in a lap directory and on the RunOffsets.xml file available in the Run. Offset and gain can therefore be associated both at lap and run levels. If a lap has offset and gain defined at both levels, the ones defined at lap level are used.

The figure shows editor page of the offset gain



The editor is formed by a five column list and by a series of commands that can be recalled from the options toolbar, the main menu and the keyboard.

The list includes all channels of the lap; the channel can be neither added nor cancelled; when a channel has no Offset & Gain, i.e. when offset is 0 and gain is 1, the list shows the channel in grey; when the offset is not 0 or gain not 1, the background of the channel is in white.

When the editor opens, the channel are sorted as in the Logging Table ; the cells with the names of the channels cannot be edited.

Each cell can be selected by clicking with the mouse or moving with the arrow keys on the keyboard.

Each cell, excluded those with the names of the channels, can be modified by double clicking with the mouse or with the SPACE BAR on the selected cell. The user can exit from the edit of the cell

with the ESC key (if no cell is edited, the ESC key allows to exit from the editor) or selecting with the mouse another area of the window or moving with the arrow key on the keyboard.

The Options menu and the Options toolbar have the following commands

- **Remove Selected Item** Removes the offset and gain from the selected channel by setting the default values of offset = 0, gain = 1. The **Delete** key on the keyboard is used for the same purpose; if however just one value and not the name of the channel is selected, the Delete key adds the default value only in the selected cell.
- **Remove All Items** Removes all constants from the list.
- **Move up** Moves upwards in the list by one position the selected element. The position is not saved.
- **Move down** Moves downwards in the list by one position the selected element. The position is not saved.
- **Sort by Name** Sorts alphabetically all channels.
- **Sort by Configured** Sorts alphabetically all channels dividing them into two groups: first those with offset and gain different from default than all the others.

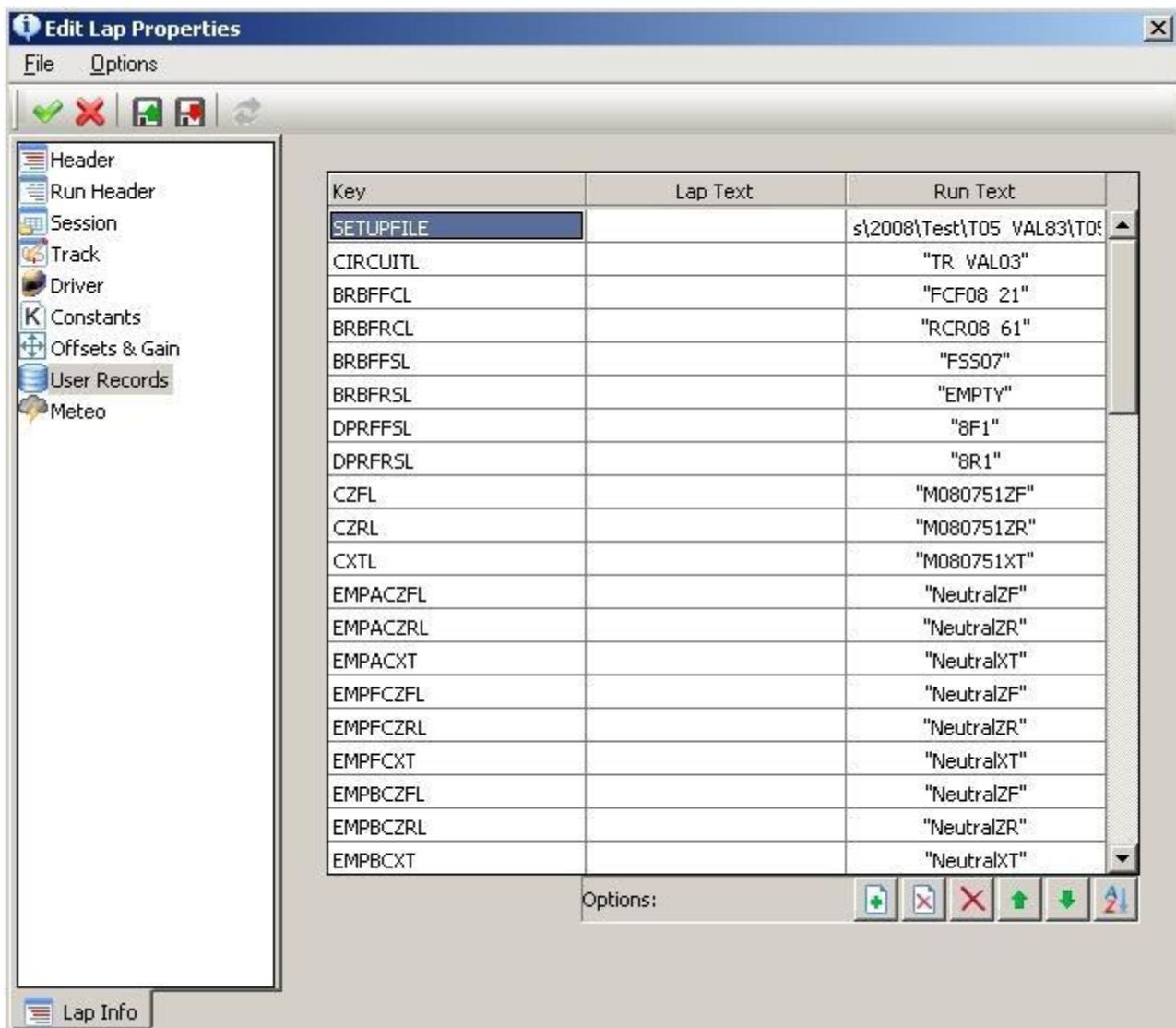
User Record

The User Record page shows, adds and modifies values associated to alphanumeric constants that can be later used in post processing by WinTAX, for instance in the Data Header.

As for constants and Offset+Gain, WinTAX manages two level of User Record: **Lap Level** and **Run Level**.

The user records associated to a lap are saved on the UserRecords.xml files available in a lap directory and on a RunUserRecords.xml file available at Run level. The user records can then be associated both at lap and at run level. If a lap has the same user record defined at both levels, the user record defined at lap level is used.

The figure shows the editor page of the user record.



The editor is formed by a three column list and by a series of commands that can be recalled by the options toolbar, the main menu and the keyboard.

When the editor opens, the user records appear in alphabetical order, but the first to appear are the Lap levels and then there are the Run levels

Each cell can be selected by clicking with the mouse or moving with the arrow keys on the keyboard.

Each cell can be modified by double clicking with the mouse or with the SPACE BAR on the selected cell. The user can exit from the edit of the cell through the ESC key (if no cell is edited, the ESC key allows to exit from the editor) or selecting with the mouse another area of the window or moving with the arrow keys on the keyboard.

The Options menu and the Options toolbar have the following commands

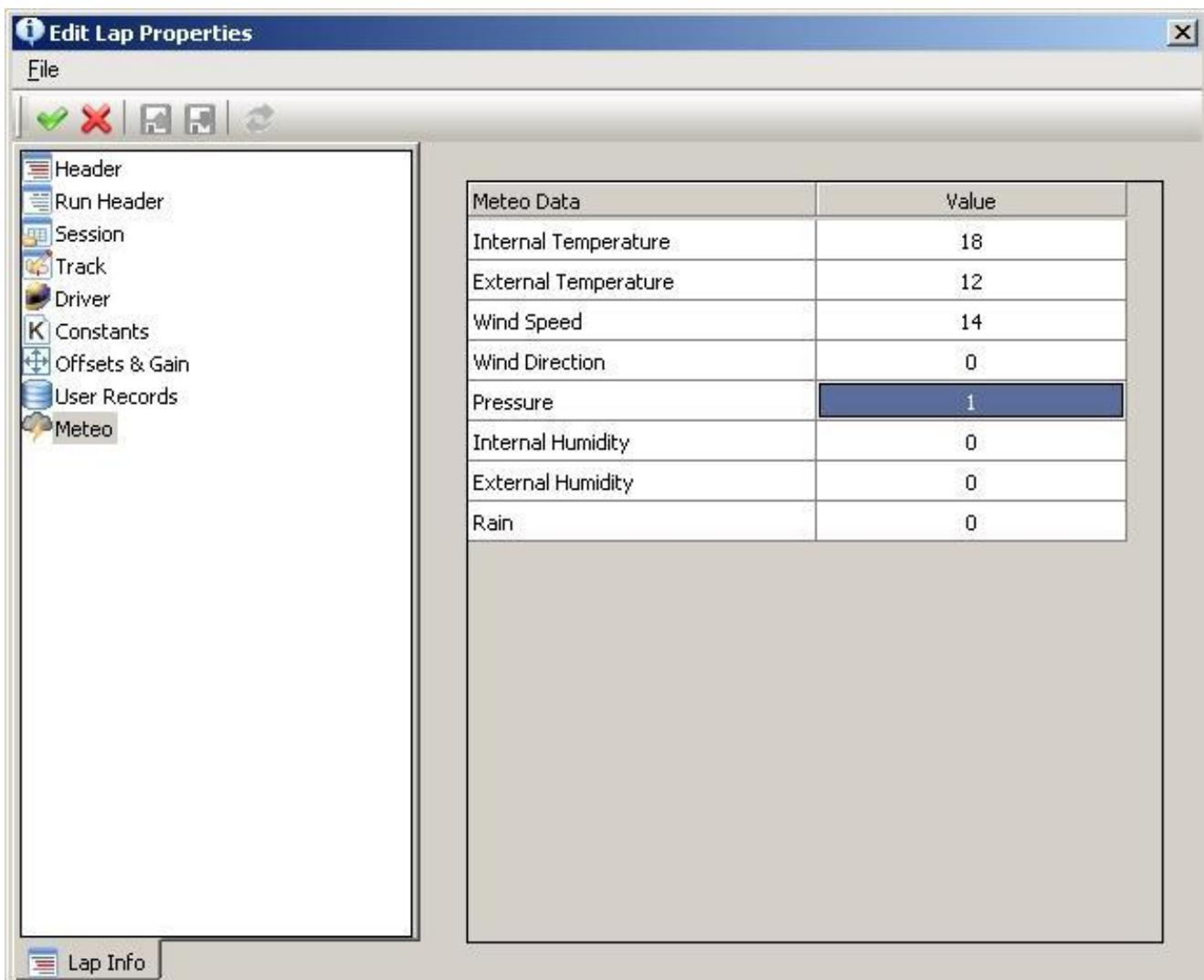
- **Add Item** Adds a user record at the end of the list (also the **Insert** key on the keyboard can be used)

- **Remove Selected Item** Removes the user record selected. The **Delete** key on the keyboard is used for the same purpose; however if the user record is not selected, but the lap value or the run value are selected, the Delete key does not remove the constant but eliminates the selected value.
- **Remove All Items** Removes all user records from the list.
- **Move up** Moves upwards in the list by one position the selected element. The position is not saved.
- **Move down** Moves downwards in the list by one position the selected element. The position is not saved.
- **Sort by Name** Sorts alphabetically all user records.

The user records can be brought from lap to run level or vice versa or to both levels by adding or removing a value from the corresponding cell of the list. When editing a lap, a user record is removed at run level, this change is valid for all the laps of the run. Examples: User Record In VCH; User Record In Lookups

Weather

The Weather page shows and changes the weather data that can later be used in post processing by WinTAX because they belong to the Info list of the Channel Browser. The weather data are saved on the Meteo.xml files available in the directories containing the laps. The figure shows the editor page of the weather data.



The editor is formed by a two column list where the first column contains the names of the weather data while the second contains the values.

Each cell can be selected by clicking with the mouse or moving with the arrow key on the keyboard.

Each cell can be modified by double clicking with the mouse or SPACE BAR on the selected cell. The user can exit from the edit of the cell through the ESC key (if no cell is edited, the ESC key allows to exit from the editor) or selecting with the mouse another area of the window or moving with the arrow keys on the keyboard. The names of the weather data cannot be modified.

Menu

The menu of the window allows the access to the following commands, divided into sub menus:

File Menu

COMMAND	SHORTCUT	DESCRIPTION
Apply	Enter	Applies the current settings of the window.
Cancel	Esc	Closes the window without applying the current settings.
Load		Enabled with Constants, Offset+Gain and User Record. It allows to open and load a xml file containing the previously saved values of constants, offset+gain and user record. As the xml file does not include information about the lap or run levels, before loading it, a dialog window opens asking at which level the information must be added.  A screenshot of a Windows-style dialog box titled "Context Information Level". The main text inside the box says "Please select information Level". There is a question mark icon in the center. At the bottom right, there are two buttons labeled "Lap" and "Run".
Save		Enabled with Constants, Offset+Gain and User Record. It allows to save on a xml file the data available in the list.
Update Lock		Manual Refresh of the lock state in case the editor opened in read-only mode due to simultaneous editing of the same information. When simultaneous editing is no longer available, the window is removed from the read-only mode.

Toolbar

The toolbar of the window allows the access to the same commands of menu.



File locking window

If the editor window is opened on context information that are currently locked, a warning message is displayed informing about the locking application and user name.



The operator is prompted either to continue in read-only mode or to exit the editor. In read-only mode, it is possible to manually refresh the locking status via the *File/Update Lock* command.

In case of deadlock problems caused by crashed applications, locked files can be freed by selecting the command *Edit/Clear Lock* in the DataBrowser. This command forces a removal of the lock file in selected run, and it is available only for users with **Super** level.

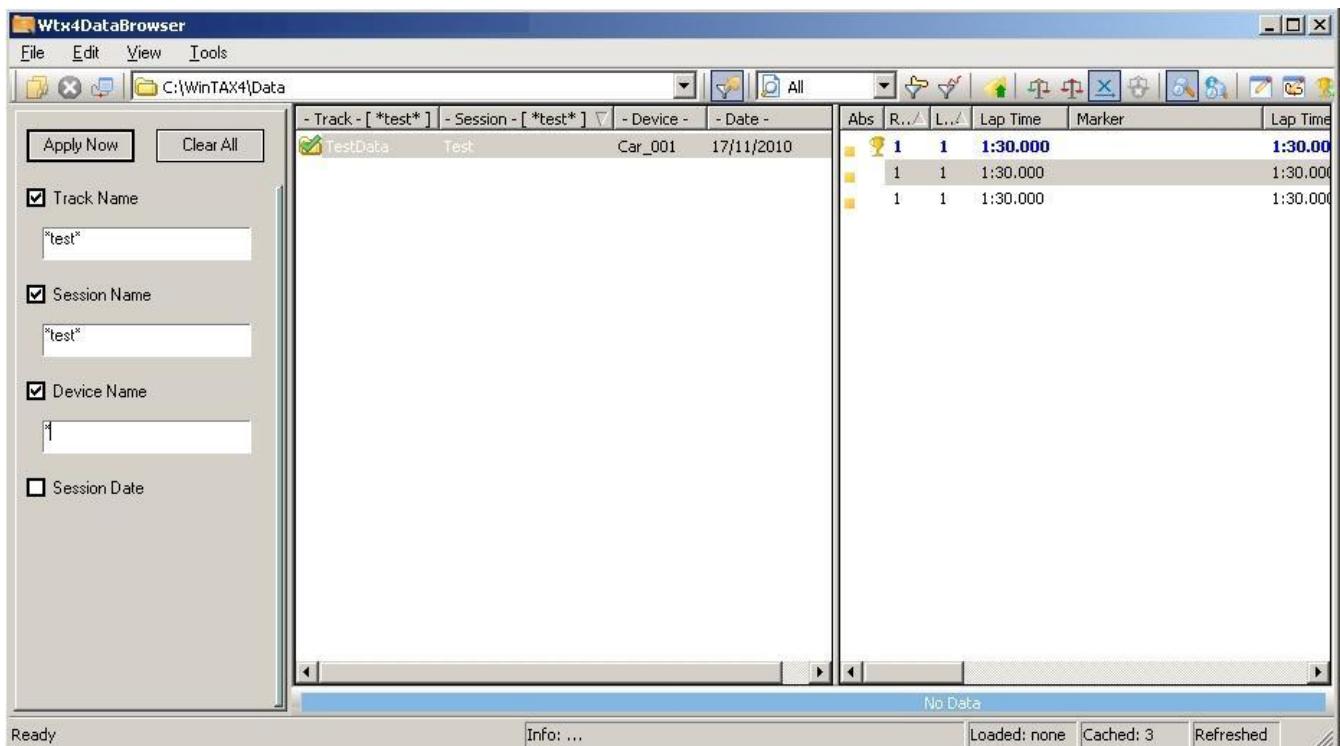
TelDataX also manages Context Information Locking: please refer to the reference document for further details.

Filters

On the DataBrowser two levels of filter are available, the first at session level and the second at lap level. Both are aimed at limiting the number of sessions and laps only to those to be analyzed.

Session Filter

The selection of the *View/Filters/Session Filters Setup* command opens the configuration panel of the Session Filters on the left of the window. The filter is dynamic, i.e. the fields to be filtered are the same that are displayed in the sessions list and that are configured in the Header Configuration page.



The filter is enabled on the text available in the corresponding columns of the list and can be integrated by using the jolly character * that indicate that the string is complete. The filter is enabled by selecting the check box of the information to be filtered and modified, possibly using the jolly characters, the text to be filtered. The non selected check box hides the text box of the filter but it does not cancel the possible content. To apply the filter, click on **Apply Filter** or press **Enter**. The header of the sessions columns indicate which filter is enabled on the column. To remove all session filter, click on **Clear All** or select the *View/Filters/Clear All Filters* command.

The *View/Filters/Session Filters Setup* command that opens the filters panel is also used to hide the panel itself; the filters are enabled also when the panel is hidden.

Lap Filter

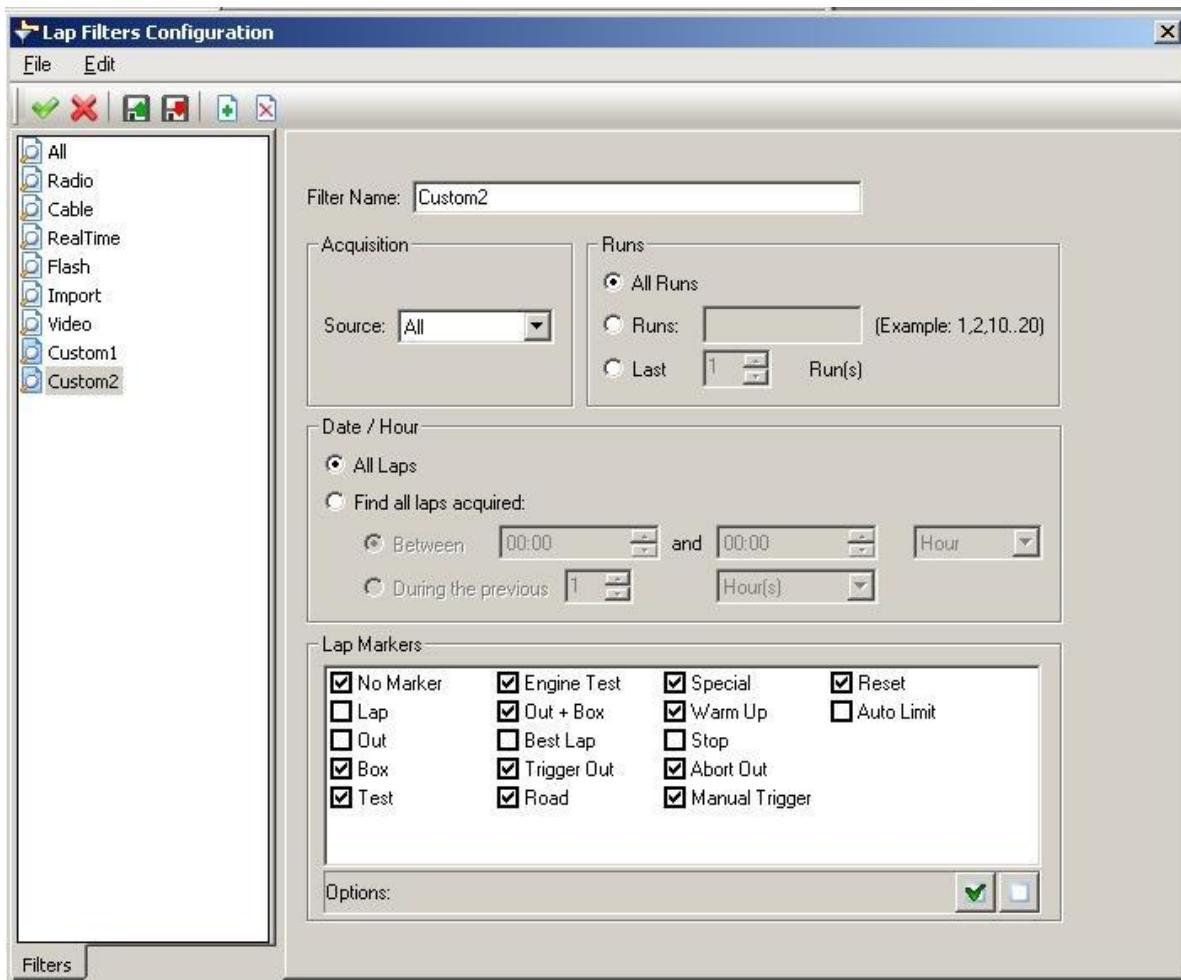
The lap filters work only on the lap list and reduce the number of laps displayed compared to those really available in the scanned session; the filters are applied by using the combo of the lap filter available in the Main toolbar. There are some predefined filters as shown in the next figure



the predefined filters are as follows

- **All** No filter is applied and it shows all scanned laps
- **Radio** It shows the Radio data; it is a filter linked to the data saved on *.dtx file and it is compatible with WinTAX2 and WinTAX3.
- **Cable** It shows only the cable data, i.e. the laps identified by the cableData.ztx file
- **Real Time** It shows only the real time data, i.e. the laps identified by dstData.ztx and nbtData.ztx files using to display the priority rules as described in the laps list.
- **Flash** It shows only the Flash Card data, i.e. the laps identified by the flashData.ztx files
- **Import** It shows only the imported data, i.e. the laps identified by the importData.ztx files
- **Video** It shows only the video data.

To the above mentioned filters, custom filters can be added created with the following configuration page:



- **Filter Name:** sets the name of the filter
- **Acquisition**
 - **Source:** the laps are filtered on the basis of the source of the data: **All** no filter is applied, **Radio** type is compatible with WinTAX2 and WinTAX3 files and it is linked to *.dtx files, **Cable** filters taking into account only the cable data (files cableData.ztx), **Real time** filters taking into account only the data acquired in real time (files dstData.ztx and nbtData.ztx), **Flash** filters only the flash data (files flashData.ztx), **Video** filters only the video data and **Import** filters only importData.ztx.
- **Runs**
 - **All Runs:** selects all runs
 - **Runs:** filters so to keep all runs specified in the list of the text folder. The comma is used to list more runs or a double dot to define an interval (Example: 1,2,3,10..12)
 - **Last:** select the last runs
- **Date / Hour**
 - **All Laps:** it's by default and selects all laps of the run

- **Find all laps acquired:**
 - **Between:** filters only the laps acquired during the set time range
 - **During the previous:** filters only the laps acquired during the last set hours.
- **Lap Markers:**

The filter is applied according to the selected Markers. By default everything is selected. The Lap Markers are information contained in each lap and define the type of Lap. The two buttons on the options bar enable to select all markers or to deselect them all.

Menu

The menu of the window enables the access to the following commands, divided into sub menus:

File Menu

COMMAND	SHORTCUT	DESCRIPTION
Apply	Enter	Applies the current settings of the window.
Cancel	Esc	Closes the window without applying the current settings.
Load		Opens and loads an xml file with .lff extension containing custom filters. Possible further filters already available in the window will be cancelled when the loading a new series of filters.
Save		Saves the settings of the custom filters on a xml file with .lff extension.

Edit Menu

COMMAND	DESCRIPTION
Add Filter	Adds a new custom filter.
Remove Filter	Removes the custom filter selected. Predefined filters cannot be removed.

Toolbar

The toolbar of the window enable the access to the same commands available in the menus.

Reference Lap

The Reference Lap identifies a lap and it is used to compare the data currently loaded. When it is configured, it is loaded until it is not removed. All the analysis carried out with the enabled Reference Lap, will show this type of lap as the first lap of any comparison. The reference lap is used to compare more laps with the same reference lap without loading it each time. It is for instance useful when the user wishes to compare the various laps of a race with the fastest lap.

The Reference Lap can identify a single lap but can also identify a lap append; it's possible to select more laps that if set as a reference, they are linked the one to the other so to form a single reference lap.

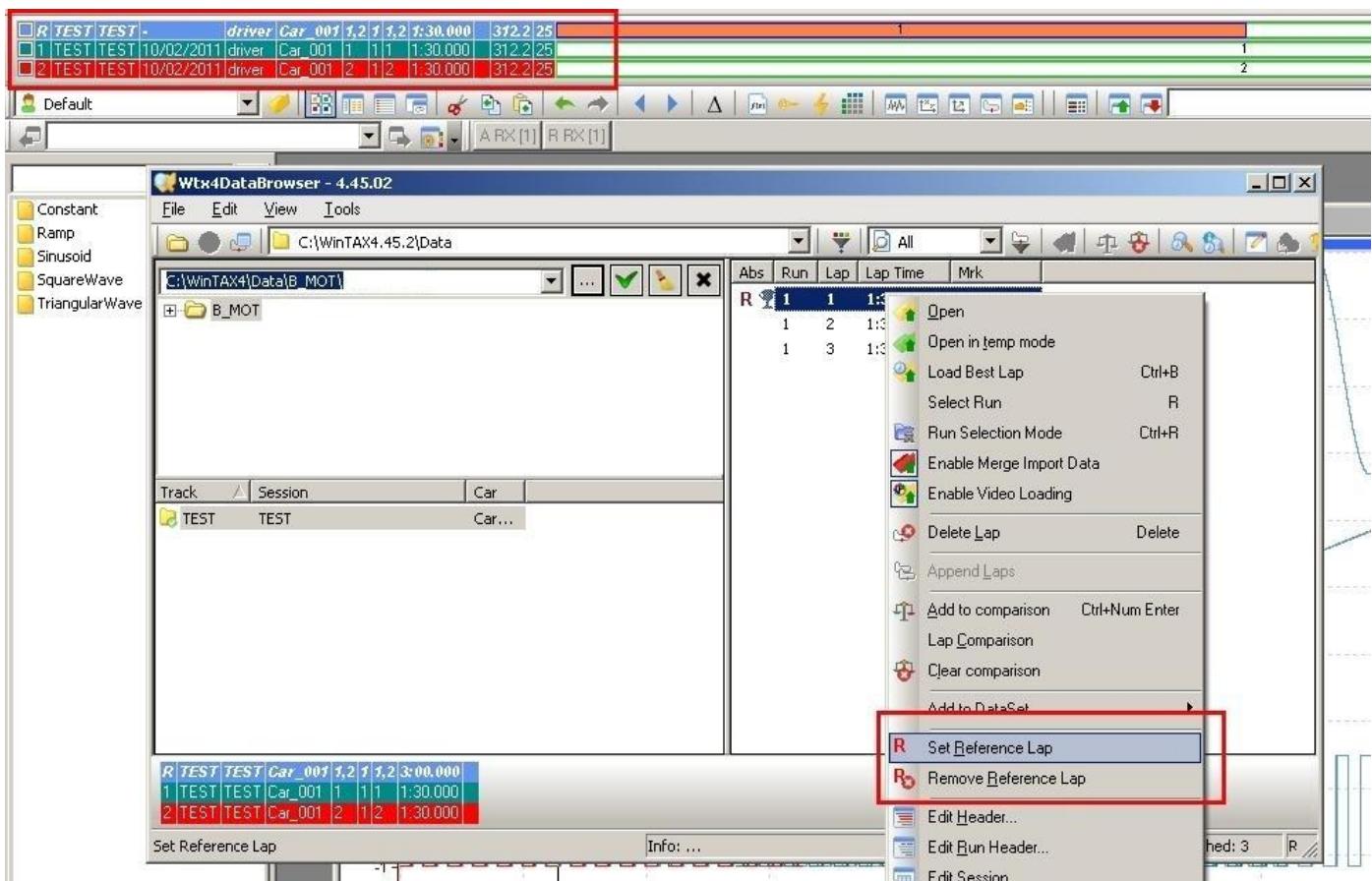
The Reference Lap can be loaded as follows:

- from WinTAX through the *Data>Select Reference Lap* menu; this command opens the Data Browser in reduced mode where the Reference Lap can be selected.
- From Data Browser through the *File/Set Reference Lap* command. The command sets the laps selected as reference.
- From Data Browser one or more laps can be selected and *Set Reference Lap* command is chosen using the menu displayed with the right button.

The Reference Lap can be cancelled as follows:

- From Data Browser through the *File/Remove Reference Lap command*.
- From Data Browser through the right button on the lap list through the *Remove Reference Lap* command.

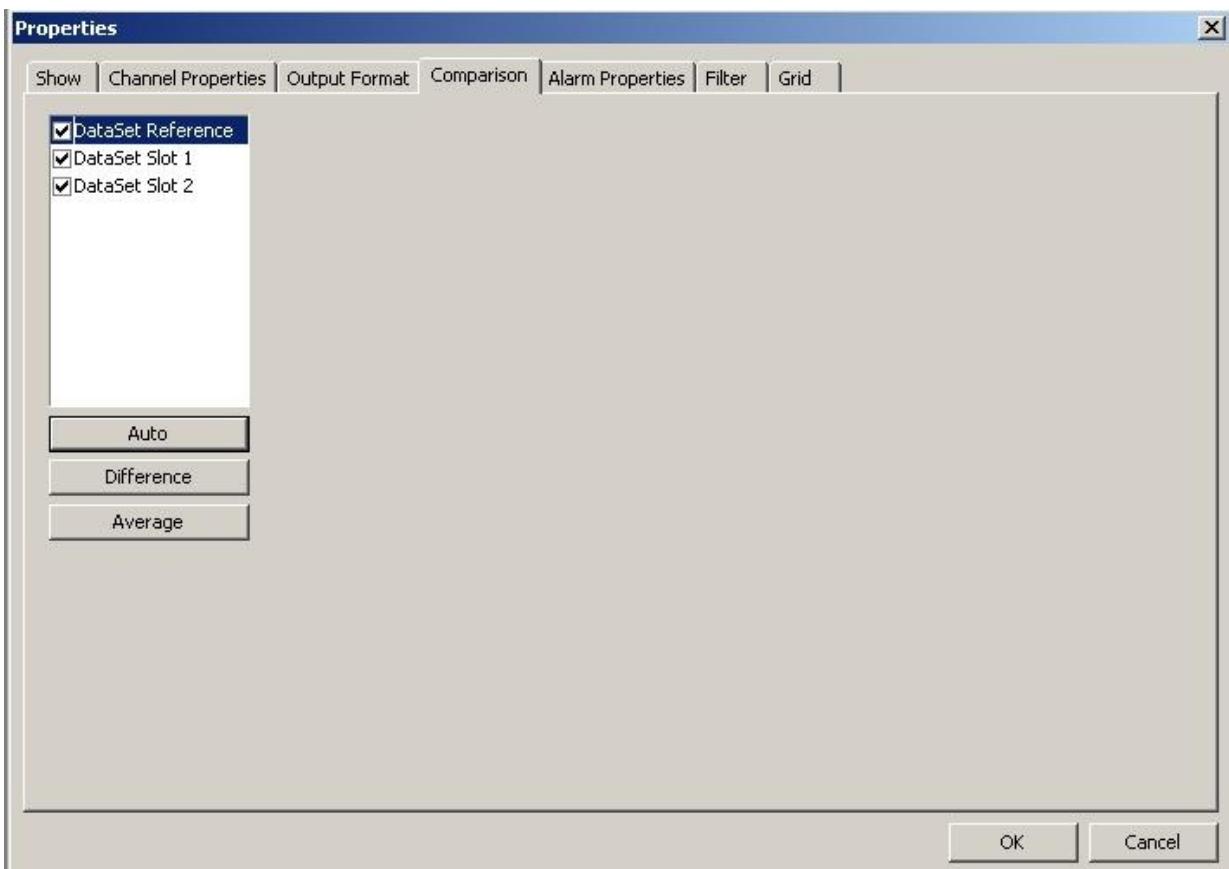
The Reference Lap is displayed as first line of Data Header both of the Data Browser and of WinTAX as shown in the figure where also the Set and Remove commands are highlighted; the reference slot is indicated by the letter R.



The next 10 comparisons will be displayed as usual with number from 1 to 10.

Note: The Lap+ and Lap- command do not affect the Reference Lap so not to move the reference. In this way the laps can be quickly compared to the Reference Lap without loading the comparison lap each time.

In the configuration windows of the Graph window, in the Comparison tab, the first slot is dedicated to the Reference Lap to allowing carrying out the difference on compare in relation to it.



In case of Auto Difference option, the difference is automatically calculated by default between the Reference Lap and the other laps.

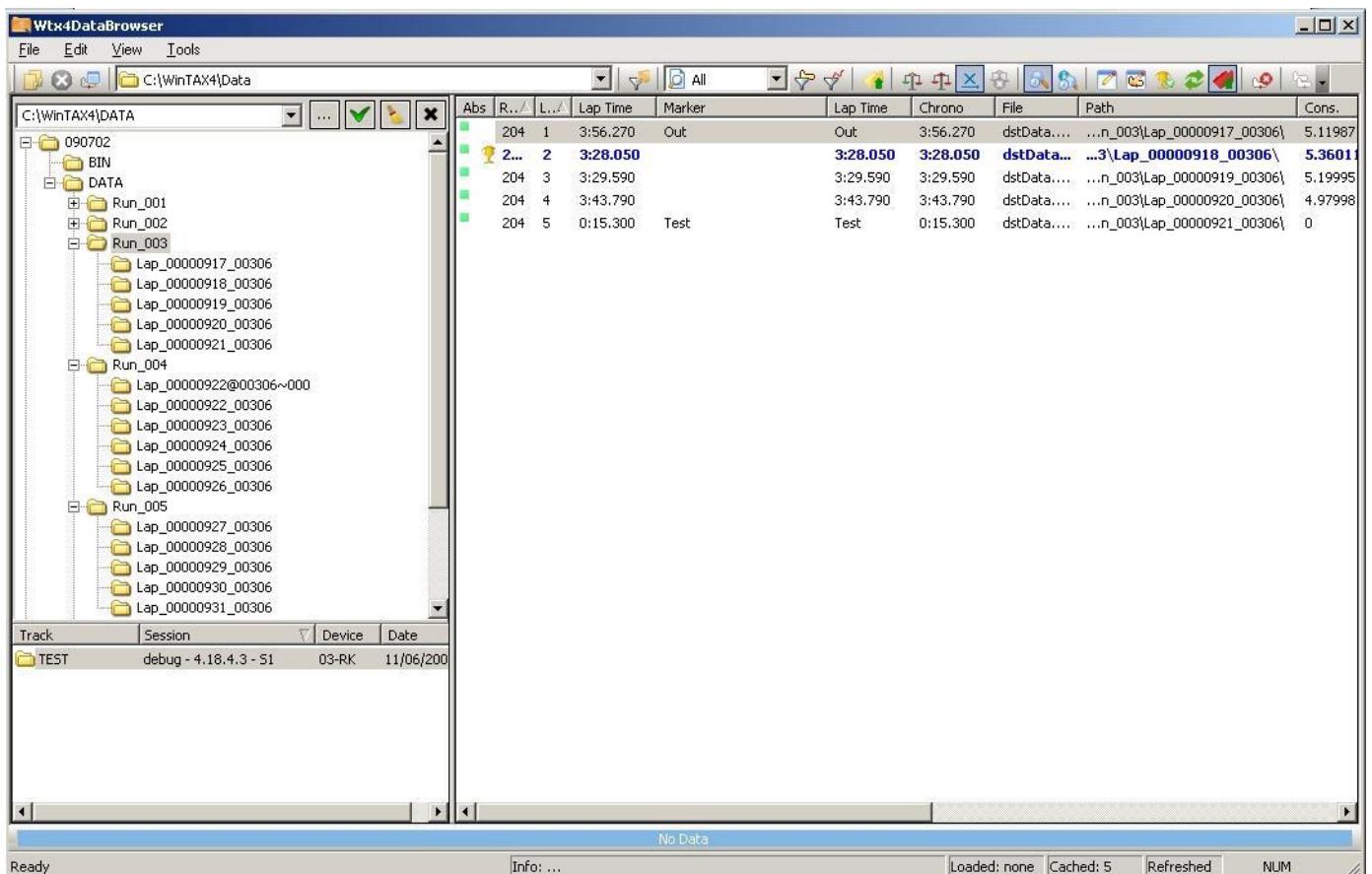
Directory Tree

The Directory Tree is a new browsing strategy for WinTAX to let the user decide at which level of the archive should point the browser; this will help to speed up data browsing in case of massive archives linked or poor network connections. The command View->Directory Tree allows to show / hide a tree window pane on the left hand side. This tree window allows to show the archive structure and the content run based without the need to be linked at the track level. It should be stressed the fact that to better understand the subject, the drop down list Select Archives and the new function "Directory Tree" represent two different ways to select data and they are not linked the one to the other. The new and the old functions work in the same way on the list of sessions and on the list of laps, they just differ in how they have access to the lists. Both functions have been expanded so that they enable the selection without being constrained at track level, but enabling the access also to lower levels, even to the single lap. On the basis of the selection chosen, the Session and Lap lists will be up-dated accordingly. The dropdown list is not up-dated following to a selection on the tree.

So in case of linked folders containing data from a single session the left hand session selection field will show all the information about this session independently to the archive level linked.

The selection can be made by simply clicking with the mouse on the tree or scrolling it with the arrow keys; the list will be automatically up-dated without requiring a confirmation.

By clicking with the right button on a folder it will be possible to add the selected path to favourites available to the left top drop down list menu.



Above the tree panels, a small header contains:

- One text input field where it is possible to manually enter a root path which saves the history of browsed paths (up to twenty entries).
- A browse directory button that opens the current directory and fills the previous text box enabling to select directory not manually edited.
- An ok button confirms the root path and then up-dates the tree content. Pressing the Enter key in the text input field performs the same action.
- A clear buttons that erases the combo history.
- A close button that hides the tree pane (see command View->Directory Tree).

Any selection change in the tree pane does not change the content of the Select Archives drop down list and vice versa.

Session fields on the left panel will be shown in the following conditions of selection in the directory tree:

- An archive folder is selected, then the Session List contains sessions found in the Track, Session, Car levels.
- A Track, Session or Car folder is selected, then the Session List contains sessions found in the following folders.
- Track folder is selected, then the Session List contains one (or more) session found in the following folders: one Session List for each Car. The Lap List contains all the Laps for each Run.
- Session folder is selected, then the Session List contains one (or more) session found in the following folders: one Session List for each Car. The Lap List contains all the Laps for each Run.
- Car folder is selected, then the Session List contains only one Session. The Lap List contains all the Laps for each Run.
- A Run folder is selected, then the Session List contains a single Session. The Lap List is filtered to show only the laps in the selected Run. In this case the Run selection will be filtered also in analysis windows (Previous Lap, Next Lap, Lap Reports, etc).
- A Lap folder is selected the Session List contains a single Session. The Lap List is filtered to show only the lap selected. In this case the Lap selection will be filtered also in analysis windows. Lap Reports will work based only of one lap. Previous Lap, Next Lap are disabled.

The Session List does not contain sessions when the selection on the Directory Tree is on a folder upper to an archive level.

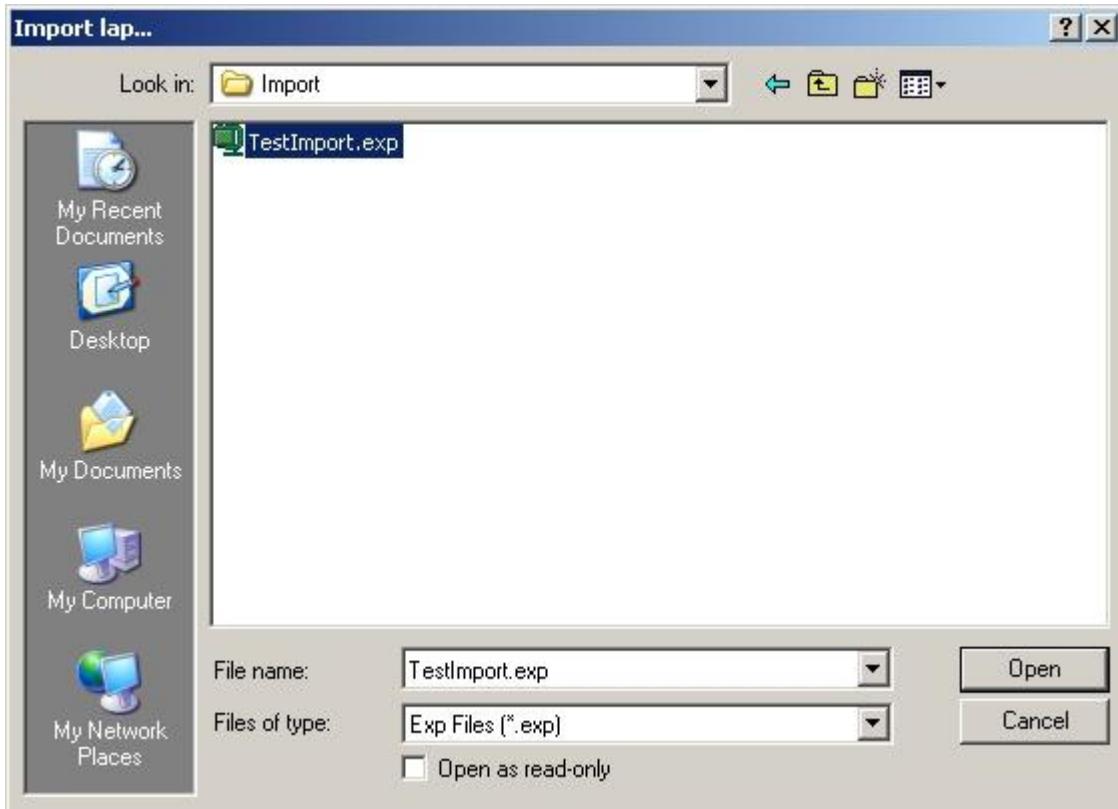
Stop Browsing Option

It's possible to stop the data browsing in case of problems opening an archive; to this aim a button on the DB toolbar will be added and also a shortcut (**Esc**). In menu File this command is called "Stop Scanning". The stop operation will require to be confirmed by the user.

Import

Import from EXP

It allows to select an EXP file and to unfold it in the directory chosen by the user.



The EXP file expands the xml and ztx files in the complete structure Track / Session / Car / Run / Lap. The EXP file is a compressed file which contains also all information about the data structure.

Import from ASCII

The import from ASCII function is used to convert general text files into data structures type WinTAX (therefore in native ZTX format).

WinTAX is able to manage files of different formats and accepts input files, both text type, with various extensions and excel type. Conversion is performed through an assisted procedure (Wizard). Each single file is converted into a lap within a certain run. The file generated at the end of the Import phase is called ImportData.ztx.

It has the same properties as the standard files of WinTAX, in other words files acquired by a Data Logger by Magneti Marelli (cableData.ztx in the case of “cable” data or dstData.ztx in the case of data acquired with “real-time” telemetry). In other words, the data imported are really processed as data in native format, with obvious benefits in terms of performance, reliability and security (the data converted apply the same encrypting logics as standard data).

Finally, the import function allows you to import the data in a new database and also to link the data imported to pre-existent databases. The first function proves useful when, for example, you have to convert old archives generated in a format that is not compatible with WinTAX. It is consequently extremely useful, for example, for a new customer of the Magneti Marelli system. Using the Import ASCII function, you can convert data generated over past years with HW and SW of third parties. The import ASCII function allows you to convert data starting from a single file or from a generic directory, therefore it automates the conversion process of many files. The link function on the other hand is useful, for example, when you want to enrich the database of data generated in the car (or motorbike) with data produced by emulators.

Data Browser

At the end of the import phase, the data processing logic is the same that you would use for any WinTAX datum. Just browse with the Databrowser until you reach the directory level required.

Import data are consequently visible and selectable as separate laps and can be filtered just like you would do for other types of data.

A new type of filter allows you to modify the display of the Databrowser to see either just Import data or Standard data plus Import data.

The Import filter shows and loads just the Import data, while if you select any one of the other filters (i.e. Cable) the data deriving from the link between Cable and Import are shown and loaded.

The “Intelligent Dataloading” function enables the display, in the ABS field, of a red square by Import type laps.

WinTAX

WinTAX therefore has two separate operating modes, based on the type of selection made on the Databrowser:

- 1) Import filter: just Import data are loaded in WinTAX, the names of the channels available are shown within the Channel Browser in the “Channels” list (TAB).
- 2) Any other filters (ALL, Cable, etc.): both the standard channels and the Import data are loaded; the Import data, pointed out with a red icon, are shown within the Channel Browser in the “Import” list (TAB).

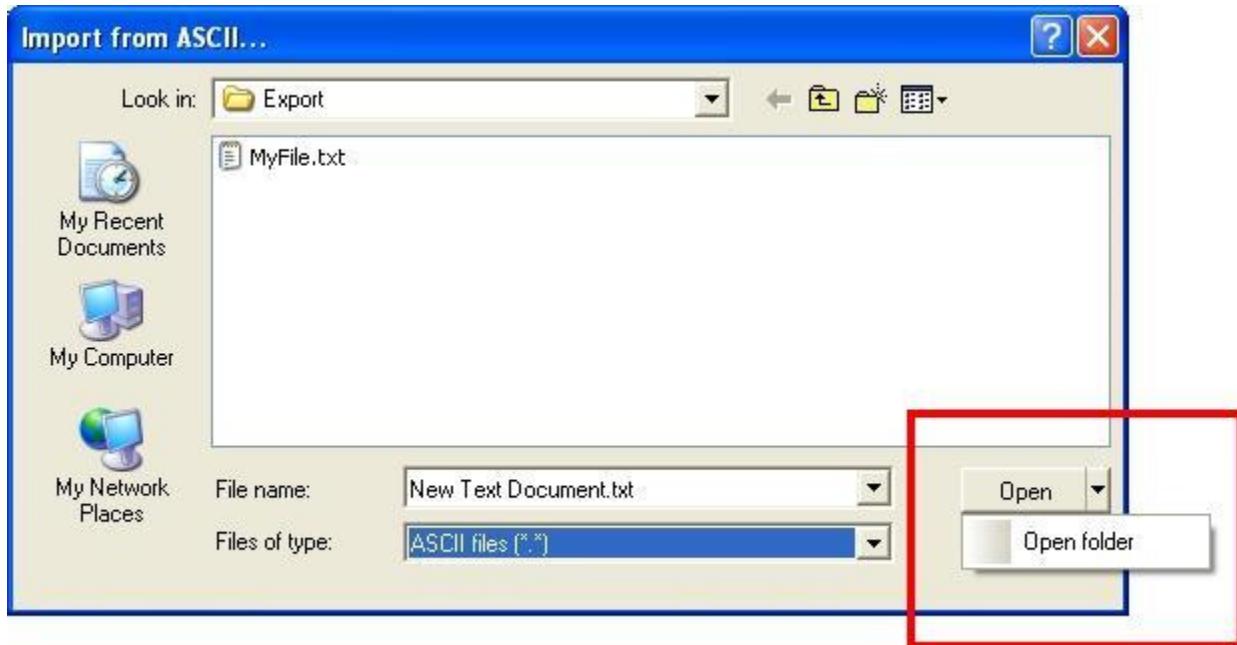
If the channels have the same name (case 2) priority is given to the standard data. If, for example, the “RPM” channel is available in both the standard data and in the Import data, WinTAX will always and only use standard “RPM”. It is up to the user, in the import phase, to check if any of the names are the same and consequently if there could be any subsequent priority problems.

Import data are really processed as standard data and can be used within WinTAX in every point of the program (e.g. VCH, analysis windows etc.)

Importing and converting

Once you have selected the Import from ASCII command from the Tools menu of the DataBrowser, first you will see a windows dialog to select the files, which offers, as possible extensions: *.* in the case of text files or *.xls in the case of excel files.

The default path, when the dialog is opened initially, is that set in Setup General – Directories – Import; if it has not been set, the default path of Export to ASCII is used. When you open again subsequently, the last directory used will always be indicated; the path is indeed saved in an xml configuration file, together with other data. Using the selection window you can select a single file, a group of files or a whole directory.



If you choose to select a whole path, a configuration page will appear with the preview on the first file of the folder selected; if you choose N files, the preview will be on the first one selected; in the case of a single choice, the preview is obviously that file.

The preview page, split-up into three steps, allows you to configure the import settings based on the structure of the file displayed. The settings are saved in an xml file and suggested again when you open the import tool later. The preview page is used to set the parameters used to interpret the file, for example, the choice of the line delimiter, the temporal column, the decimal separator. The choice of the settings is assisted by a list that refreshes automatically as the parameters change.

Import from ASCII: Default.ias - Step 1 of 3

This screen lets you set the delimiters your data contains. You can see how your text is affected in the preview below.

Delimiters

Tab Treat consecutive delimiters as one
 Semicolon
 Comma
 Space
 Other:

Select rows

Data Start at Row:
 Channels Label Row:
 Measure Unit Row:

Decimal separator

Data Preview

Preview of file: C:\WinTAX4\Import\01-PerformanceTest.txt

	TIME (Value)	Engine speed (Value)	Pressure (Value)	Torque (Value)	Pedal (Value)	T_disk int (Value)	T_disk ext °C	T_pad CO °C	T_pad SO °C	T_Fluid int °C	T_Fluid est °C	T7 °C	T8 °C	T12 °C	Fan mc/h
1															
2															
3	TIME	Engine speed	Pressure	Torque	Pedal	T_disk int	T_disk ext	T_pad CO	T_pad SO	T_Fluid int	T_Fluid est	T7	T8	T12	Fan
4	sec	km/h	bar	daN*m	mm	°C	°C	°C	°C	°C	°C	°C	°C	°C	mc/h
5	0.000000	220.0	-0.0	-0.6	0.0	284.0	21.1	205.3	242.8	35.5	41.1	1278.1	21.7	1223.5	269.87
6	0.020000	219.8	-0.0	-0.5	0.0	284.0	21.1	205.4	242.8	35.5	41.1	1278.3	21.7	1223.6	268.79
7	0.040000	220.2	-0.0	-0.5	0.0	284.0	21.1	205.4	242.8	35.5	41.1	1278.3	21.7	1223.6	267.62
8	0.060000	220.0	-0.0	-0.6	0.0	284.0	21.1	205.3	242.7	35.6	41.1	1278.2	21.7	1223.5	266.29
9	0.080000	219.8	0.7	-0.5	0.3	284.0	21.1	205.3	242.7	35.6	41.1	1278.0	21.7	1223.5	266.08
10	0.100000	220.3	2.3	-0.5	0.8	283.9	21.2	205.3	242.7	35.6	41.1	1277.8	21.7	1223.5	266.33
11	0.120000	220.0	6.8	-0.1	1.5	283.9	21.1	205.3	242.7	35.6	41.1	1277.7	21.6	1223.5	266.75
12	0.140000	220.1	8.0	1.1	2.4	283.8	21.1	205.3	242.7	35.6	41.1	1277.7	21.6	1223.5	267.50
13	0.160000	220.0	11.0	3.7	3.4	283.8	21.1	205.3	242.7	35.6	41.1	1277.9	21.6	1223.5	267.95
14	0.180000	219.9	14.2	11.7	4.5	283.7	21.1	205.4	242.7	35.5	41.1	1278.2	21.6	1223.5	268.20
15	0.200000	219.9	21.1	30.4	5.6	283.7	21.1	205.4	242.7	35.5	41.0	1278.4	21.6	1223.5	268.54
16	0.220000	219.8	26.7	49.1	6.6	283.7	21.1	205.4	242.6	35.5	41.0	1278.6	21.6	1223.5	268.83
17	0.240000	219.4	31.6	65.3	7.3	283.6	21.1	205.4	242.6	35.5	41.0	1278.5	21.6	1223.5	269.25
18	0.260000	219.3	36.2	81.6	7.8	283.6	21.1	205.4	242.6	35.6	41.0	1278.3	21.7	1223.5	270.20
19	0.280000	218.7	39.1	89.3	8.1	283.6	21.1	205.4	242.6	35.6	41.0	1278.0	21.7	1223.5	271.75
20	0.300000	218.1	41.7	100.6	8.4	283.6	21.1	205.4	242.6	35.6	41.0	1277.7	21.7	1223.5	274.00
21	0.320000	217.7	44.8	110.6	8.7	283.6	21.1	205.4	242.6	35.6	41.0	1277.5	21.7	1223.5	277.04
22	◀														▶

Load Setup... < Back Next > Finish Cancel

The parameters of the page have the following meaning:

Delimiters

Tab, semicolon, comma, space, other

As for the delimiters, you should remember that they are the same as those used by Excel. Delimiters can also be used simultaneously.

Treat consecutive delimiters as one.

With this setting, two consecutive delimiters without any digit in-between are considered as just one delimiter.

Select rows

Data Start at Row.

It indicates the line from which the data are imported; the lines before are ignored, which proves useful, for example, when you have to eliminate the general headers of files (many analysis tools often save the headers with information on the track, on the driver, etc.)

Channels Label Row.

It indicates the number of the line from where the converter has to extract the names of the channels. This line is highlighted in yellow and is used just if the relevant check box is selected.

If this check box is not selected, the name of the channels will be given the default settings: Channel1, Channel2, Channel3, etc. With a double click, or pressing space bar on the name of the channel, it's possible to set a custom name.

This screen lets you set the delimiters your data contains. You can see how your text is affected in the preview below.

Delimiters	Select rows	Decimal separator
<input type="checkbox"/> Tab <input type="checkbox"/> Treat consecutive delimiters as one <input checked="" type="checkbox"/> Semicolon <input type="checkbox"/> Comma <input type="checkbox"/> Space <input type="checkbox"/> Other: <input type="text"/>	Select rows Data Start at Row: <input type="text" value="5"/> <input type="checkbox"/> Channels Label Row: <input type="text" value="3"/> <input checked="" type="checkbox"/> Measure Unit Row: <input type="text" value="4"/>	Decimal separator <input type="text" value="."/>

Data Preview

Preview of file: C:\WinTAX4\Import\01-PerformanceTest.txt

	Channel1 (Time)	CustomName (Value)	Channel3 (Value)	Channel4 (Value)	Channel5 (Value)	Channel6 (Value)	Channel7 (Value)	Channel8 (Value)	Channel9 (Value)	Channel10 (Value)	Channel11 (Value)
1											
2											
3	TIME sec	Engine speed km/h	Pressure bar	Torque daN*m	Pedal mm	T_disk int °C	T_disk ext °C	T_pad CO °C	T_pad SO °C	T_Fluid int °C	T_Fluid est °C
4											
5	0.000000	220.0	-0.0	-0.6	0.0	284.0	21.1	205.3	242.8	35.5	41.1
6	0.020000	219.8	-0.0	-0.5	0.0	284.0	21.1	205.4	242.8	35.5	41.1
7	0.040000	220.2	-0.0	-0.5	0.0	284.0	21.1	205.4	242.8	35.5	41.1
8	0.060000	220.0	-0.0	-0.6	0.0	284.0	21.1	205.3	242.7	35.6	41.1

Measure Unit Row.

It indicates the number of the line from where the converter has to extract the measure unit of the channels, if present. The text in this line is highlighted in blue and is used only if the check box is selected.

Decimal Separator

Make sure the decimal separator, full stop or comma, matches what is used in the data and above all make sure it is not the same used to separate the columns, otherwise it will be impossible to import correctly.

Data Preview

The path of the file is previewed and the consequential table is based on the settings made in the configuration file or that have been edited on the window.

Commands

- a. **Load Setup...:** used to load a configuration saved previously.
- b. **Back:** grey, because it is the first step.

c. Next: moves onto the next step.

d. Finish: closes the import window, confirming all the options selected in this and in the next pages.

e. Cancel: cancels the import process.

If you select Next, you will move onto the next configuration page that will appear with the settings inherited from the previous conversion process.

Import from ASCII: Default.ias - Step 2 of 3

This screen lets you select file sampling mode and configure each columns and its data format.

File Sampling Mode

<input type="radio"/> Fixed frequency	10 Hz	<input checked="" type="radio"/> Timestamp	Format: SS:mmm
		Output Frequency:	
		<input type="radio"/> Auto	
		<input checked="" type="radio"/> Frequency	1 Hz

The time is developed considering all values in the Time column formatted as SS:mmm (Seconds:milliseconds). For example the value 73:819 corresponds to the value of 73 seconds and 819 milliseconds.

Column Data Format

Selected column: 6 Time Value Skip column

Data Preview

Preview of file: C:\WinTAX4\Import\01-PerformanceTest.txt

	TIME (Time)	Engine speed (Value)	Pressure (Value)	Torque (Value)	Pedal (Value)	T_disk int (Value)	T_disk ext (Value)	T_pad CO (Value)	T_pad SO (Value)	T_Fluid int (Value)	T_Fluid est (Value)	T7 (Value)	T8 (Value)	T12 (Value)	Fan (Value)
1															
2															
3	TIME sec	Engine speed km/h	Pressure bar	Torque daN*m	Pedal mm	T_disk int °C	T_disk ext %	T_pad CO °C	T_pad SO °C	T_Fluid int °C	T_Fluid est °C	T7 °C	T8 °C	T12 °C	Fan mc/h
4															
5	0.000000	220.0	-0.0	-0.6	0.0	284.0	24.1	205.3	242.8	35.5	41.1	1278.1	21.7	1223.5	269.87
6	0.020000	219.8	-0.0	-0.5	0.0	284.0	24.1	205.4	242.8	35.5	41.1	1278.3	21.7	1223.6	268.79
7	0.040000	220.2	-0.0	-0.5	0.0	284.0	24.1	205.4	242.8	35.5	41.1	1278.3	21.7	1223.6	267.62
8	0.060000	220.0	-0.0	-0.6	0.0	284.0	24.1	205.3	242.7	35.6	41.1	1278.2	21.7	1223.5	266.29
9	0.080000	219.8	0.7	-0.5	0.3	284.0	24.1	205.3	242.7	35.6	41.1	1278.0	21.7	1223.5	266.08
10	0.100000	220.3	2.3	-0.5	0.8	283.9	24.2	205.3	242.7	35.6	41.1	1277.8	21.7	1223.5	266.33
11	0.120000	220.0	6.8	-0.1	1.5	283.9	24.1	205.3	242.7	35.6	41.1	1277.7	21.6	1223.5	266.75
12	0.140000	220.1	8.0	1.1	2.4	283.8	24.1	205.3	242.7	35.6	41.1	1277.7	21.6	1223.5	267.50
13	0.160000	220.0	11.0	3.7	3.4	283.8	24.1	205.3	242.7	35.6	41.1	1277.9	21.6	1223.5	267.95
14	0.180000	219.9	14.2	11.7	4.5	283.7	24.1	205.4	242.7	35.5	41.1	1278.2	21.6	1223.5	268.20
15	0.200000	219.9	21.1	30.4	5.6	283.7	24.1	205.4	242.7	35.5	41.0	1278.4	21.6	1223.5	268.54
16	0.220000	219.8	26.7	49.1	6.6	283.7	24.1	205.4	242.6	35.5	41.0	1278.6	21.6	1223.5	268.83
17	0.240000	219.4	31.6	65.3	7.3	283.6	24.1	205.4	242.6	35.5	41.0	1278.5	21.6	1223.5	269.25
18	0.260000	219.3	36.2	81.6	7.8	283.6	24.1	205.4	242.6	35.6	41.0	1278.3	21.7	1223.5	270.20
19	0.280000	218.7	39.1	89.3	8.1	283.6	24.1	205.4	242.6	35.6	41.0	1278.0	21.7	1223.5	271.75
20	0.300000	218.1	41.7	100.6	8.4	283.6	24.1	205.4	242.6	35.6	41.0	1277.7	21.7	1223.5	274.00
21	0.320000	217.7	44.8	110.6	8.7	283.6	24.1	205.4	242.6	35.6	41.0	1277.5	21.7	1223.5	277.04
22	◀														▶

< Back Next > Finish Cancel

This second page acts further in detail to make it easier to recognize and extract the data.

File Sampling Mode

The channel frequency can be selected in one of the following ways.

a. Fixed Frequency (default)

With this option, you select one of the frequencies suggested in the combo box, which are exactly those admitted by WinTAX (1, 2, 5, 10, 20, 100, 200, 500, 1k, 2k, 4k, 10k hertz). The

default value when used for the first time is 10Hz. In this case, the samples in the first line of the file are considered at instant 0 and those following are inserted after an interval calculated based on the frequency defined by the user.

b. Timestamp

Timestamp uses the “Time column” as timeline. The values of this channel must be positive and strictly increasing. The output frequency depends on choosing Auto or Custom. Using the combo box, you can choose the format in which the values of the “time column” are formatted. The formats are SS:mmm, H:M:S.mmm, seconds, milliseconds. A brief explanation of formats will appear near the combo box.

- **Auto**

In this case, the frequency is obtained from the column that the user identifies as “Time column” calculating the time that lapse between samples. The frequencies admitted by WinTAX are: 1, 2, 5, 10, 20, 100, 200, 500, 1k, 2k, 4k, 10k hertz. Therefore, if the frequency calculation does not produce a result that is compatible with the frequencies admitted by WinTAX, you will set the higher frequency nearest the value calculated with the time column as the frequency. The time lapse could be different between samples; in this case the output frequency will be the higher compatible frequency calculated.

- **Frequency**

In this case, the frequency is selected from a combo box; the values are: 1, 2, 5, 10, 20, 100, 200, 500, 1k, 2k, 4k, 10k hertz

When the frequency is not consistent with the time intervals between the samples of the Time column, the converter proceeds with dynamic oversampling or undersampling. Under no circumstances are made interpolations.

Column Data Format

These choices are applied to establish how each column is to react during conversion. After selecting each column with the mouse, you can make the following choice. The columns selected are pointed out by the fact that the text and background colours are inverted. Each choice is pointed out immediately on the preview. Each column header shows the type of choice made for it.

a. Time

It is possible to have just one “time column” per conversion process. If the File Sampling Mode is Fixed Frequency, there is no need to set it. It becomes obligatory on the other hand if you have chosen to calculate it from the data of the file (Timestamp).

b. Value

It is default value for each column and it simply means that the elements of this column will be treated as data.

c. Skip

If a column is marked “Skip”, it is not considered in the conversion process; in the preview, this fact is pointed out with grey background and text crossed out.

Data Preview

The path of the file is previewed and the consequential table is based on the settings made in the configuration file or that have been edited on the window.

Commands

- a. Back:** moves back to the previous step.
- b. Next:** moves onto the next step.
- c. Finish:** closes the import window, confirming all the options selected in this and in the next pages.
- d. Cancel:** cancels the import process.

Select Next to go to the next configuration page, which will appear with the settings inherited from previous conversions.

Import from ASCII: Default.ias - Step 3 of 3

Select Import Destination

Import into existing data
 Import in a folder

Destination Path: C:\WinTAX4\Import\01-PerformanceTest.txt

Track: Tracksample Session: Session Device: Device

Data Preview

Preview of file: C:\WinTAX4\Import\01-PerformanceTest.txt

	TIME (Time)	Engine speed (Value)	Pressure (Value)	Torque (Value)	Pedal (Value)	T_disk int (Value)	T_disk ext (Value)	T_pad CO (Value)	T_pad SO (Value)	T_Fluid int (Value)	T_Fluid est (Value)	T7 (Value)	T8 (Value)	T12 (Value)	Fan (Value)
1															
2															
3	TIME	Engine speed km/h	Pressure bar	Torque daN*m	Pedal mm	T_disk int °C	T_disk ext °C	T_pad CO °C	T_pad SO °C	T_Fluid int °C	T_Fluid est °C	T7 °C	T8 °C	T12 °C	Fan mcf/h
4	sec														
5	0.000000	220.0	-0.0	-0.6	0.0	284.0	214	205.3	242.8	35.5	41.1	1278.1	21.7	1223.5	269.87
6	0.020000	219.8	-0.0	-0.5	0.0	284.0	214	205.4	242.8	35.5	41.1	1278.3	21.7	1223.6	268.79
7	0.040000	220.2	-0.0	-0.5	0.0	284.0	214	205.4	242.8	35.5	41.1	1278.3	21.7	1223.6	267.62
8	0.060000	220.0	-0.0	-0.6	0.0	284.0	214	205.3	242.7	35.6	41.1	1278.2	21.7	1223.5	266.29
9	0.080000	219.8	0.7	-0.5	0.3	284.0	214	205.3	242.7	35.6	41.1	1278.0	21.7	1223.5	266.08
10	0.100000	220.3	2.3	-0.5	0.8	283.9	212	205.3	242.7	35.6	41.1	1277.8	21.7	1223.5	266.33
11	0.120000	220.0	6.8	-0.1	1.5	283.9	214	205.3	242.7	35.6	41.1	1277.7	21.6	1223.5	266.75
12	0.140000	220.1	8.0	1.1	2.4	283.8	214	205.3	242.7	35.6	41.1	1277.7	21.6	1223.5	267.50
13	0.160000	220.0	11.0	3.7	3.4	283.8	214	205.3	242.7	35.6	41.1	1277.9	21.6	1223.5	267.95
14	0.180000	219.9	14.2	11.7	4.5	283.7	214	205.4	242.7	35.5	41.1	1278.2	21.6	1223.5	268.20
15	0.200000	219.9	21.1	30.4	5.6	283.7	214	205.4	242.7	35.5	41.0	1278.4	21.6	1223.5	268.54
16	0.220000	219.8	26.7	49.1	6.6	283.7	214	205.4	242.6	35.5	41.0	1278.6	21.6	1223.5	268.83
17	0.240000	219.4	31.6	65.3	7.3	283.6	214	205.4	242.6	35.5	41.0	1278.5	21.6	1223.5	269.25
18	0.260000	219.3	36.2	81.6	7.8	283.6	214	205.4	242.6	35.6	41.0	1278.3	21.7	1223.5	270.20
19	0.280000	218.7	39.1	89.3	8.1	283.6	214	205.4	242.6	35.6	41.0	1278.0	21.7	1223.5	271.75
20	0.300000	218.1	41.7	100.6	8.4	283.6	214	205.4	242.6	35.6	41.0	1277.7	21.7	1223.5	274.00
21	0.320000	217.7	44.8	110.6	8.7	283.6	214	205.4	242.6	35.6	41.0	1277.5	21.7	1223.5	277.04
22															

Save Setup... < Back Next > Finish Cancel

In this page you set the coordinates of the output Import file. The rule used by the conversion process is that for each ASCII file selected upon opening, a lap called ImportData.ztx is created.

Select Import Destination

a. Import into existing data

If this is the choice made, when you press Finish, the Data Browser opens automatically in special mode. In this case the Data Browser has limited functions and is used just to "Explore" the archives where the data are to be imported (linked).

The Data Browser consequently appears on a blue background to point out that it is in explore mode.

The user shall select the lap in which the ImportData.ztx file is to be added and confirm (execution of the import function) by double clicking the mouse on the lap line selected.

If a number of files have been imported, the next laps will be automatically added to the laps with incremental Abs within the same run; if the existent laps are not suffice, new laps will be added, again with incremental Abs.

b. Import in a folder

In this case the user will select a directory where the data are to be imported (i.e. C:\WinTAX4\Data) and manually set the names of the Track, Session and Car, which will then be used to create the full path of the archive.

The values set in the last conversion process are saved and suggested again in the next one.

Data Preview

The path of the file is previewed and the consequential table is based on the settings made in the configuration file or that have been edited on the window.

Commands

a. Save Setup...: used to save the current configuration.

b. Back: moves back to the previous step

c. Next: grey, because it is the last step

d. Finish: closes the import window, confirming all the options selected in this and the previous pages.

e. Cancel: it cancels the import process

Select Finish to end the operation and the ImportData.ztx file is created, which is subsequently saved in the path selected previously.

Import from MatLab

Import from MatLab is a function used to convert files originating from MatLab. They are imported via Ole Automation, therefore MatLab must be installed, otherwise it is impossible to import them. Conversion is performed through an assisted procedure (Wizard). Each single file is converted into a lap within a certain run. The file generated at the end of the Import phase is called ImportData.ztx, the same as that used for the Import ASCII function.

It has the same properties as the standard files of WinTAX, in other words files acquired by a Data Logger by Magneti Marelli (cableData.ztx in the case of “cable” data or dstData.ztx in the case of data acquired with “real-time” telemetry).

In other words, the data imported are really processed as data in native format, with obvious benefits in terms of performance, reliability and security (the data converted apply the same encrypting logics as standard data).

Databrowser

At the end of the import phase, the data processing logic is the same that you would use for any WinTAX datum. Just browse with the Databrowser until you reach the directory level required.

Import data are consequently visible and selectable as separate laps and can be filtered just like you would do for other types of data.

A new type of filter allows you to filter the display of the Databrowser to be able to see Import data or standard data plus Import data.

The Import filter shows and loads just the Import data, while if you select any one of the other filters (i.e. Cable) the data deriving from the link between Cable and Import are shown and loaded.

The “Intelligent Dataloading” function enables the display, in the ABS field, of a red square by Import type laps.

WinTAX

WinTAX has two separate operating modes based on the type of selection made on the Databrowser:

- 1) Import Filter: just Import data are loaded in WinTAX, the names of the channels available are shown within the Channel Browser in the “Channels” list (TAB).
- 2) Any other filter (ALL, Cable, etc.): both standard data and Import data are loaded simultaneously; the Import channels are shown within the Channel Browser in the “Import” list (TAB) and Import channels are pointed out by a red icon.

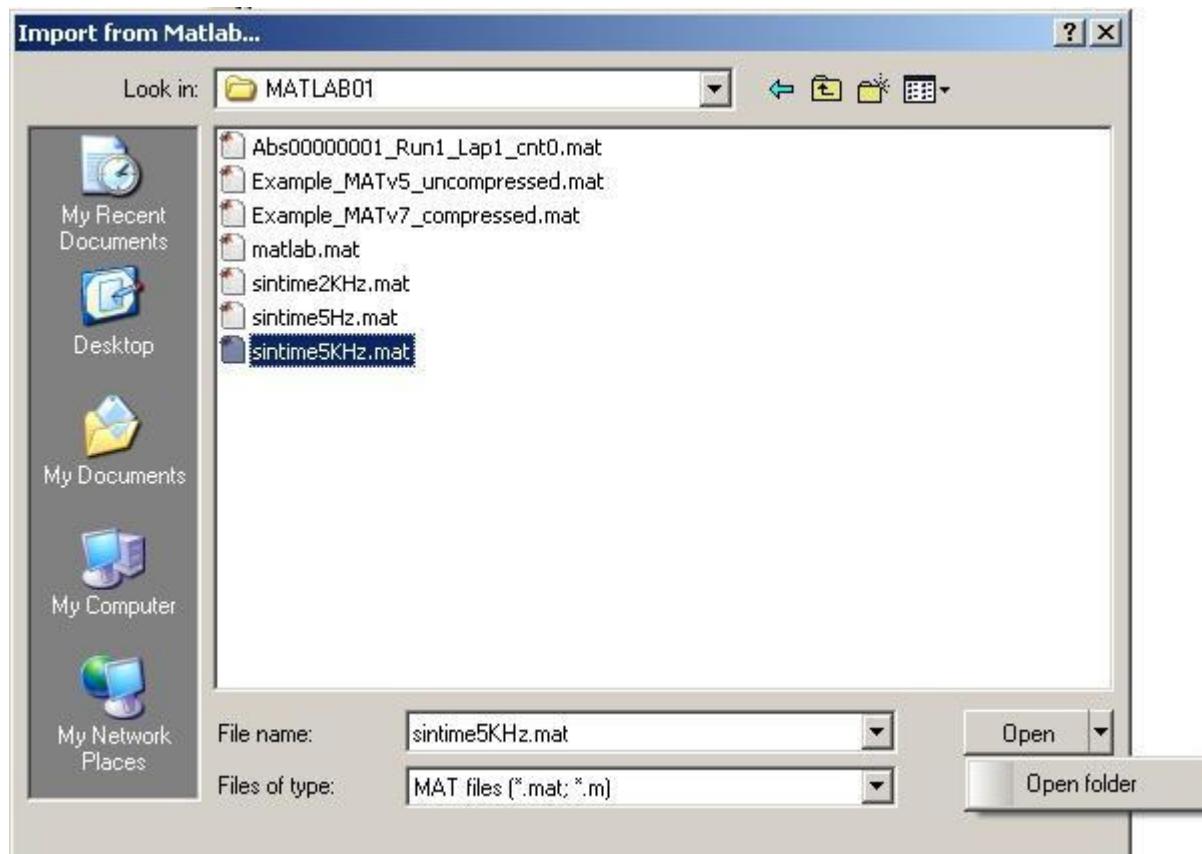
If the channels have the same name (case 2) priority is given to the standard data. If, for example, the “RPM” channel is available in both the standard data and in the Import data, WinTAX will always and only use standard “RPM”. It is up to the user, in the import phase, to check if any of the names are the same and consequently if there could be any subsequent priority problems.

Import data are really processed as standard data and can be used within WinTAX in every point of the program (e.g. VCH, analysis windows etc.).

Importing and converting

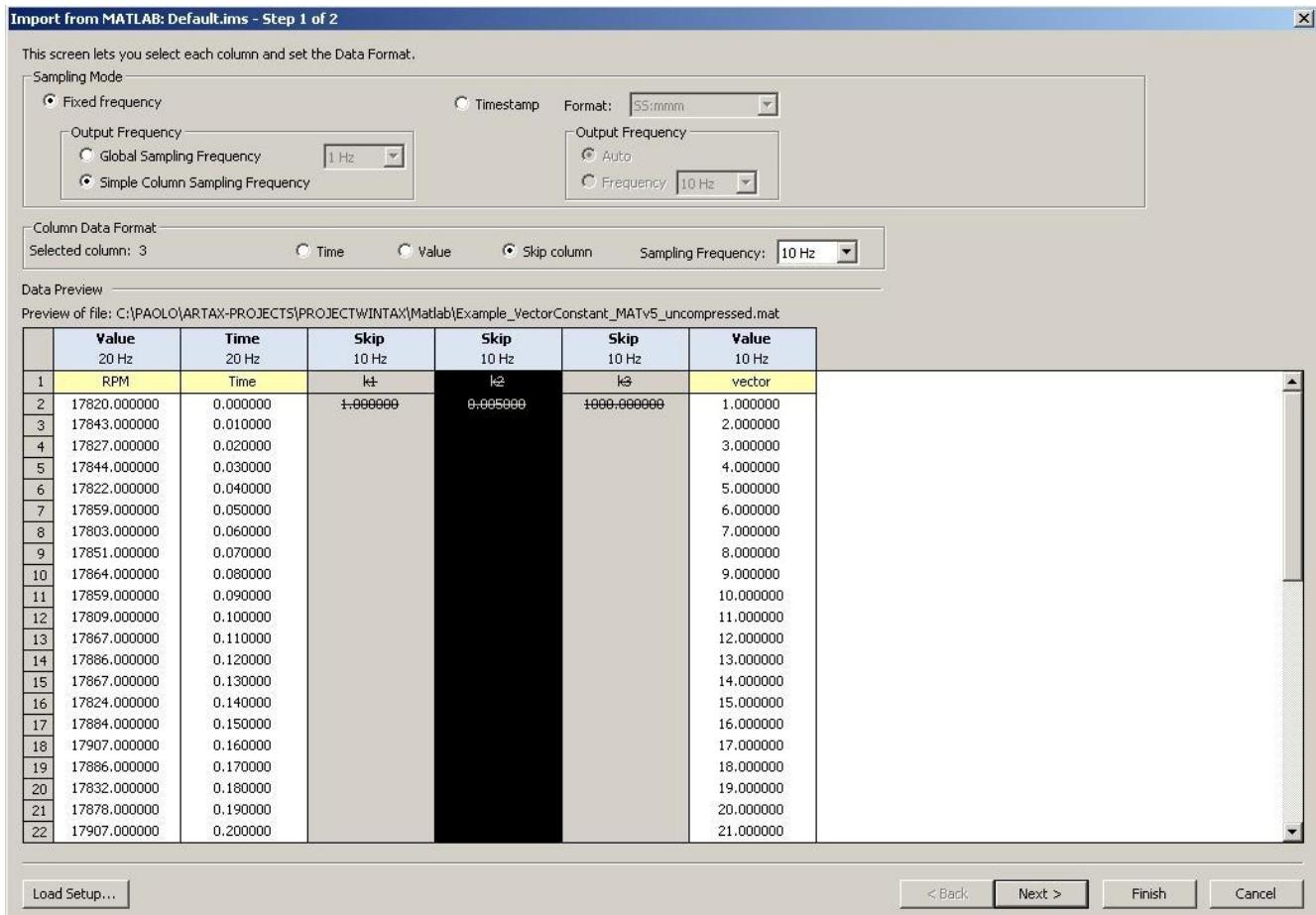
Once you have selected the Import from MatLab command from the Tools menu of the Data Browser, first you will see a windows dialog to select the files, which offers the choice between files type *.m and *.mat, both extensions associated with the file of MatLab.

The default path, when the dialog is opened initially, is that set in Setup General – Directories – Import; if it has not been set, the default Export path is set. When you open again subsequently, the last directory used will always be indicated; the path is saved in an xml configuration file, together with other data. Using the selection window you can select a single file, a group of files or a whole directory.



If you choose to select a whole path, a configuration page will appear with the preview on the first file of the folder selected; if you choose N files, the preview will be on the first one selected; in the case of a single choice, the preview is obviously that file.

The preview page, split-up into two steps, allows you to configure some parameters. The settings are saved in an xml file and suggested again when you open the import tool later.



The parameters of the page have the following meaning:

Sampling Mode

The channel frequency can be selected in one of the following ways.

a. Fixed Frequency (default)

- **Global Sampling Frequency**

With this option, you select one of the frequencies suggested in the combo box, which are exactly those admitted by WinTAX (1, 2, 5, 10, 20, 100, 200, 500, 1k, 2k, 4k, 10k hertz). The default value when used for the first time is 10Hz. In this case, the samples in the first line of the file are considered at instant 0 and those following are inserted after an interval calculated based on the frequency defined by the user.

This values is used by all channels.

- **Simple Column Sampling Frequency**

The frequency can be selected for single channel using the combo in Column Data Format when one or more columns are selected. The frequencies suggested by combo are exactly those admitted by WinTAX (1, 2, 5, 10, 20, 100, 200, 500, 1k, 2k, 4k, 10k hertz). The default value when used for the first time is 10Hz. Also in this case, the samples in the first line of the file are considered at instant 0 and those following are inserted after an interval calculated based on the frequency defined by the user.

b. Timestamp

Timestamp uses the “Time column” as timeline. The values of this channel must be positive and strictly increasing. The output frequency depends on choosing Auto or Custom. Using the combo box, you can choose the format in which the values of the “time column” are formatted. The formats are SS:mmm, H:M:S.mmm, seconds, milliseconds.

- **Auto**

In this case, the frequency is obtained from the column that the user identifies as “Time column” calculating the time that lapse between samples. The frequencies admitted by WinTAX are: 1, 2, 5, 10, 20, 100, 200, 500, 1k, 2k, 4k, 10k hertz. Therefore, if the frequency calculation does not produce a result that is compatible with the frequencies admitted by WinTAX, you will set the higher frequency nearest the value calculated with the time column as the frequency. The time lapse could be different between samples; in this case the output frequency will be the higher compatible frequency calculated.

- **Frequency**

In this case, the frequency is selected from a combo box; the values are: 1, 2, 5, 10, 20, 100, 200, 500, 1k, 2k, 4k, 10k hertz

When the frequency is not consistent with the time intervals between the samples of the Time column, the converter proceeds with dynamic oversampling or undersampling. Under no circumstances are made interpolations.

Column Data Format

These choices are applied to establish how each column is to react during conversion. After selecting each column with the mouse, you can make the following choice. The columns selected are pointed out by the fact that the text and background colours are inverted. Each choice is pointed out immediately on the preview. Each column header shows the type of choice made for it.

a. Time

It is possible to have just one “time column” per conversion process. If the File Sampling Mode is Fixed Frequency, there is no need to set it. It becomes obligatory on the other hand if you have chosen to calculate it from the data of the file (Timestamp).

b. Value

It is default value for each column and it simply means that the elements of this column will be treated as data.

c. Skip

If a column is marked “Skip”, it is not considered in the conversion process; in the preview, this fact is pointed out with grey background and text crossed out.

Data Preview

The path of the file is previewed and the consequential table is based on the settings made in the configuration file or that have been edited on the window.

- **Commands**

- a. **Load Setup:** used to load a configuration saved previously.

- b. **Back:** grey, because it is the first step.

- c. **Next:** moves onto the next step.

- d. **Finish:** closes the import window, confirming all the options selected in this and in the next pages.

- e. **Cancel:** cancels the import process.

Select Next to go to the next configuration page, which will appear with the settings inherited from previous conversions.

	Value 20 Hz	Time 20 Hz	Skip 10 Hz	Skip 10 Hz	Skip 10 Hz	Value 10 Hz
1	RPM	Time	k1	k2	k3	vector
2	17820.000000	0.000000	±0.000000	0.005000	±000.000000	1.000000
3	17843.000000	0.010000				2.000000
4	17827.000000	0.020000				3.000000
5	17844.000000	0.030000				4.000000
6	17822.000000	0.040000				5.000000
7	17859.000000	0.050000				6.000000
8	17803.000000	0.060000				7.000000
9	17851.000000	0.070000				8.000000
10	17864.000000	0.080000				9.000000
11	17859.000000	0.090000				10.000000
12	17809.000000	0.100000				11.000000
13	17867.000000	0.110000				12.000000
14	17886.000000	0.120000				13.000000
15	17867.000000	0.130000				14.000000
16	17824.000000	0.140000				15.000000
17	17884.000000	0.150000				16.000000
18	17907.000000	0.160000				17.000000
19	17886.000000	0.170000				18.000000
20	17832.000000	0.180000				19.000000
21	17878.000000	0.190000				20.000000
22	17907.000000	0.200000				21.000000

In this page you set the coordinates of the output Import file. The rule used by the conversion process is that for each Matlab file selected upon opening, a lap called ImportData.ztx is created.

Select Import Destination

a. Import into existing data

If this is the choice made, when you press Finish, the Data Browser opens automatically in special mode. In this case the Data Browser has limited functions and is used just to "Explore" the archives where the data are to be imported (linked).

The Data Browser consequently appears on a blue background to point out that it is in explore mode.

The user shall select the lap in which the ImportData.ztx file is to be added and confirm (execution of the import function) by double clicking the mouse on the lap line selected.

If a number of files have been imported, the next laps will be automatically added to the laps with incremental Abs within the same run; if the existent laps are not suffice, new laps will be added, again with incremental Abs.

b. Import in a folder

In this case the user will select a directory where the data are to be imported (i.e. C:\WinTAX4\Data) and manually set the names of the Track, Session and Car, which will then be used to create the full path of the archive.

The values set in the last conversion process are saved and suggested again in the next one.

Data Preview

The path of the file is previewed and the consequential table is based on the settings made in the configuration file or that have been edited on the window.

- **Commands**

a. Save Setup...: used to save the current configuration.

b. Back: moves back to the previous step

c. Next: grey, because this is the last step

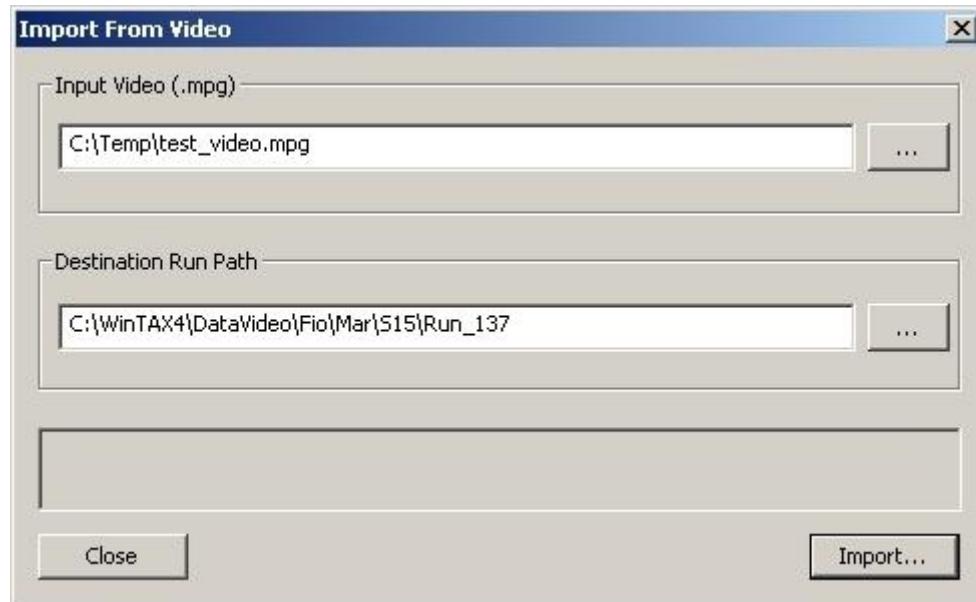
d. Finish: closes the import window, confirming all the options selected in this and the previous pages.

e. Cancel: it cancels the import process

Select Finish to end the operation and the ImportData.ztx file is created, which is subsequently saved in the path selected previously.

Import from Video

Import From Video It allows importing file video into RUN. The input file is a mpg video; the video will be converted in AVI format and stored in VIDEO directory at run level in the selected path. The conversion is required because WinTAX cannot load mpg video.



Export

WinTAX data archives can be exported to open formats like BIN, ASCII, CSV, XLS, to ZTX and to MATLAB file; open formats may be used for reading logged data with other applications. The export functions are available from the Data Browser *Tools/Export* menu and can be used for one or more selected laps.



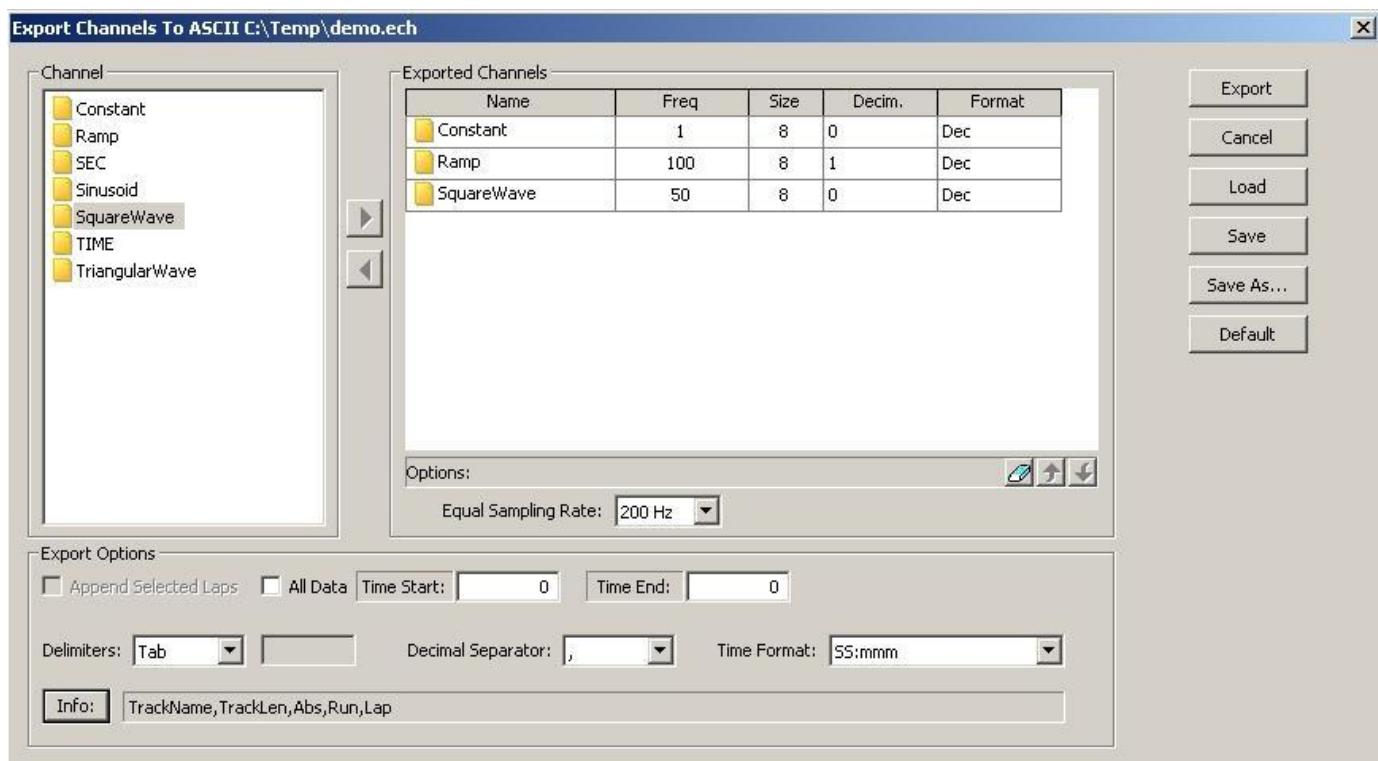
The export functions use an *.ech configuration file to define which channels are to be exported. Frequency, number of decimal, formats, time range and other features can be configurable by the user. The *.ech file is saved in the User directory by default.

If a single lap is selected the export create only one file .bin; if more than one lap is selected the export can create one file .bin for each lap selected or a single file .bin with laps appended.

Note: when data are exported, any filters, gains or offsets which have been defined in the Parameters setup environment will be applied to the exported data.

Export to ASCII

ASCII is a tab separated values format.



Channel

List that contains all the channels of the lap selected.

Exported Channel

List that contains the channels to be exported. The elements on the list are added and removed using the two buttons with arrow or by double clicking on the name of the channel. Using the Options button you can change the arrangement of the channels or remove them from the list of exported channels.

The configurable items in Export ASCII are:

- **Sampling Rate.** All output channels assume the same frequency configured in the Equal Sampling Rate combo.
- **The number of decimals.** The value can be any integer between 0 and 15 and the default is the number of decimal of the selected channel.
- **Number Format.** This is a list of the possible output formats:
 - **Dec, Numeric:** the numeric format.

- **Scientific format:** the scientific format.
- **Hex:** hexadecimal format. The number of decimal has no effect with this format.
- **Bin:** binary format. The number of decimal has no effect with this format.
- **ASCII:** text format. The number of decimal has no effect with this format.

Export Options

- When **All Data** is selected, all the linked laps are exported; when it is not selected, just a part of the linked laps are exported, namely that defined in the Time Start, Time End interval, which can be set by the user.
- **Append Selected Laps** This check box appears if you choose to export more than one lap. If it is not checked, one file for each lap will be produced in input. If on the other hand it is checked, a file will be exported that is obtained from linking the laps selected.

Exporting in ASCII format presents some additional configurations; these settings are saved in files type *.ech but will be ignored by types of export processes which don't use it.

- **Delimiters** You can choose the delimiter with which the output data will be separated. As for the delimiters, you should remember that they are the same as those used by Excel, namely Tab, comma, semicolon, space; you can also choose a generic delimiter by selecting the Custom option and writing the wording required in the box at the side; the length is always of just one digit.
- **Decimal Separator** You can choose the separator used to separate decimal figures. You can choose between comma and full stop.
- **Time Format** You can set the format of the Time column, created in the export function based on the set frequency. You can choose between SS:mmm and H:M:S.mmm
- **Info** It selects information that will be used to compose the name of the output file as shown in picture below.



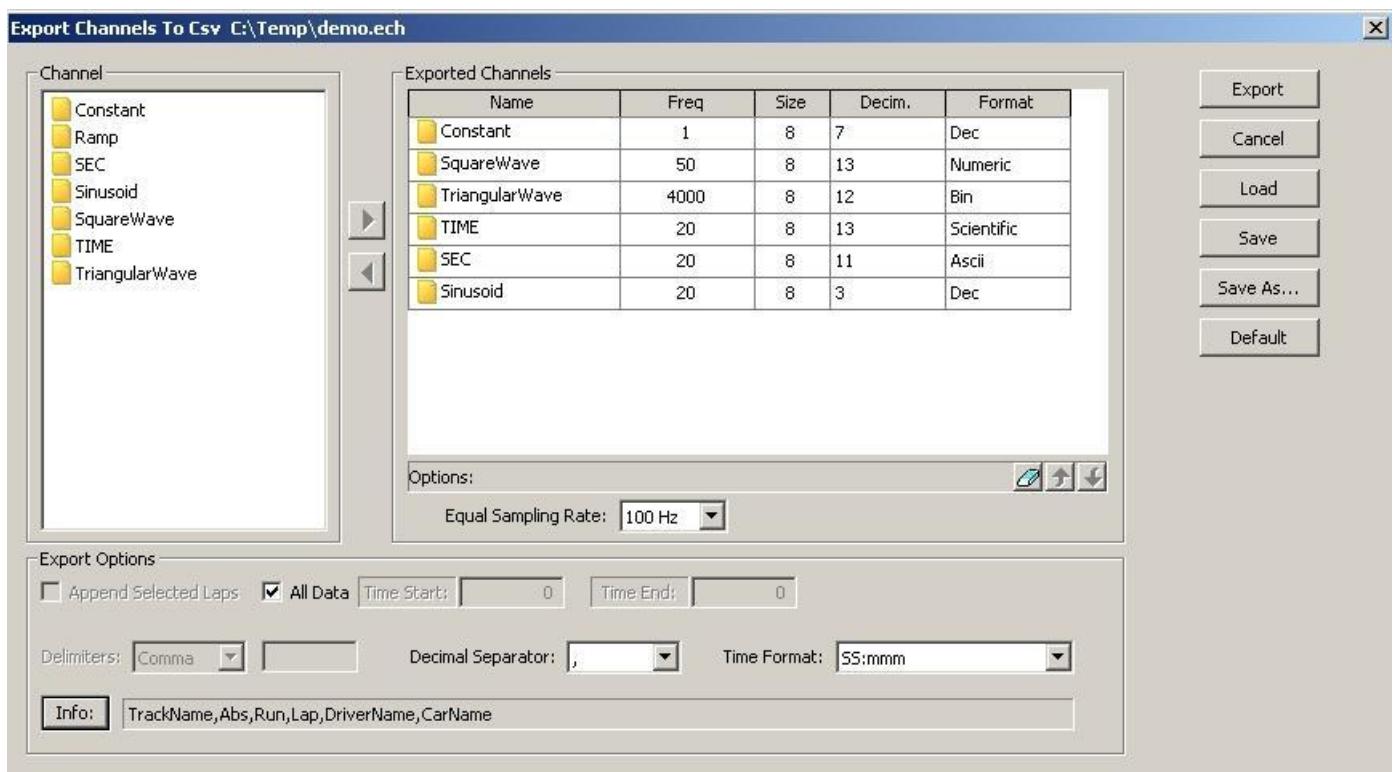
Buttons

On the right of the export window there are six buttons:

- **Export:** This button performs the conversion. After clicking this button a message appears asking to save the changes (if it is not done before with the save button) then, at the browser prompt, enter a path and a name for the target export file. Press Save to proceed and ok to complete operation. The default directory is *WinTAX4\Export*. If more than one lap has been selected and you have chosen not to append them, a message appears asking you to choose whether you wish to write the names of the files manually or automatically. When you write the file names manually, you are requested to enter the name for each file selected, otherwise you are just requested to select the directory in which all the files are to be created.
- **Cancel:** It cancels the current operation.
- **Load:** Choose a .ech export file.
- **Save:** Save changes in current .ech file.
- **Save As...:** Save changes in a selected or new .ech file.
- **Default:** Set the default values of decimals and format.

Export to CSV

CSV is a comma separated values format.



Channel

List that contains all the channels of the lap selected.

Exported Channel

List that contains the channels to be exported. The elements on the list are added and removed using the two buttons with arrow or by double clicking on the name of the channel. Using the Options button you can change the arrangement of the channels or remove them from the list of exported channels.

The configurable items in Export CSV are:

- **Sampling Rate.** All output channels assume the same frequency configured in the Equal Sampling Rate combo.
- The **number of decimals.** The value can be any integer between 0 and 15 and the default is the number of decimal of the selected channel.
- **Number Format.** This is a list of the possible output formats:
 - **Dec, Numeric:** the numeric format.

- **Scientific:** the scientific format.
- **Hex:** hexadecimal format. The number of decimal has no effect with this format.
- **Bin:** binary format. The number of decimal has no effect with this format.
- **ASCII:** text format. The number of decimal has no effect with this format.

Export Options

- When **All Data** is selected, all the linked laps are exported; when it is not selected, just a part of the linked laps are exported, namely that defined in the Time Start, Time End interval, which can be set by the user.
- **Append Selected Laps** This check box appears if you choose to export more than one lap. If it is not checked, one file for each lap will be produced in input. If on the other hand it is checked, a file will be exported that is obtained from linking the laps selected.

Exporting in CSV format presents some additional configurations. These settings are saved in files type *.ech but will be ignored by types of export processes which don't use it.

- **Decimal Separator:** You can choose the separator used to separate decimal figures. You can choose between comma and full stop.
- **Time Format:** You can set the format of the Time column, created in the export function based on the set frequency. You can choose between SS:mmm and H:M:S.mmm
- **Info:** It selects information that will be used to compose the name of the output file as shown in picture below.



Buttons

On the right of the export window there are six buttons:

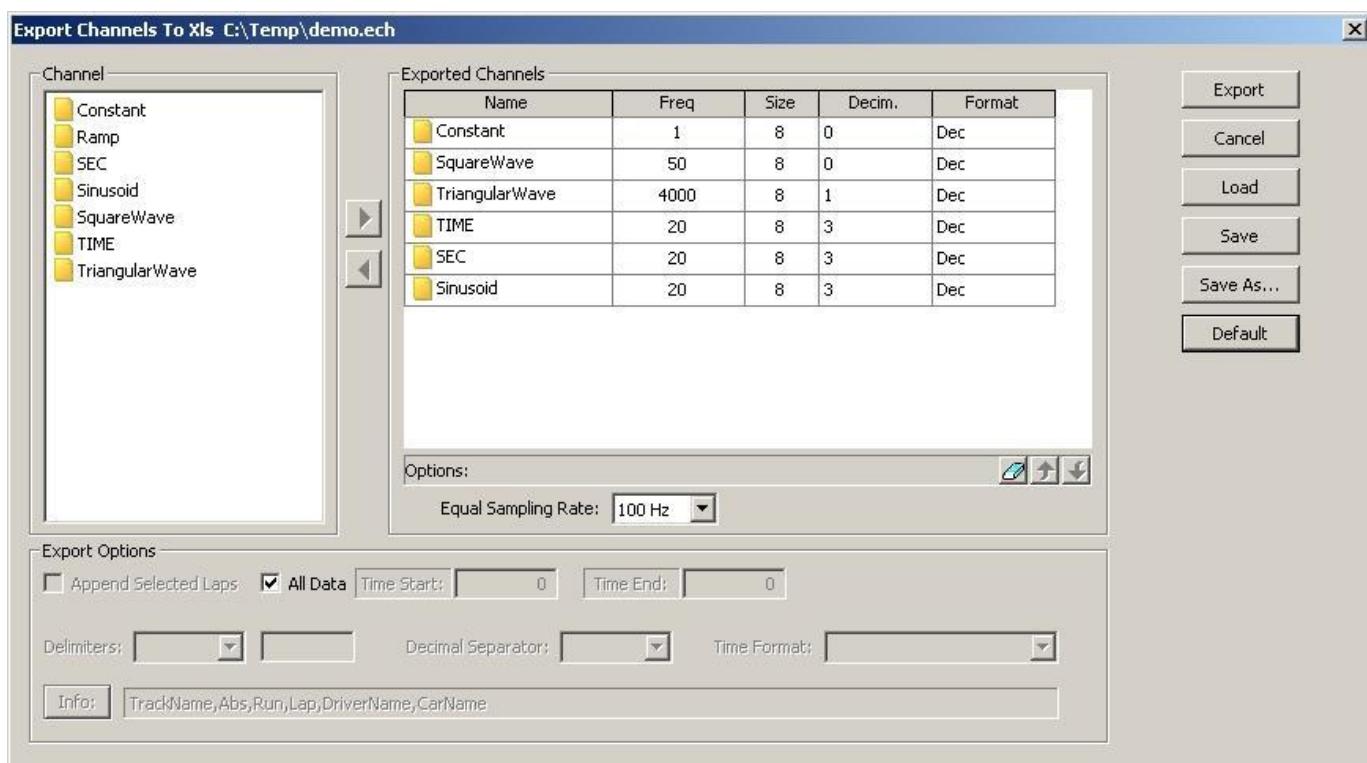
- **Export:** This button performs the conversion. After clicking this button a message appears asking to save the changes (if it is not done before with the save button) then, at the browser prompt, enter a path and a name for the target export file. Press Save to proceed and ok to complete operation. The default directory is *WinTAX4\Export*. If more than one lap has been selected and you have chosen not to append them, a message appears asking you to choose whether you wish to write the names of the files manually or automatically. When you write the file names manually, you are requested to enter the

name for each file selected, otherwise you are just requested to select the directory in which all the files are to be created.

- **Cancel:** Quit the export window.
- **Load:** Choose a .ech export file.
- **Save:** Save changes in current .ech file.
- **Save As...:** Save changes in a selected or new .ech file.
- **Default:** Set the default values of decimals and format.

Export to XLS

XLS is a comma separated values format.



Channel

List that contains all the channels of the lap selected.

Exported Channel

List that contains the channels to be exported. The elements on the list are added and removed using the two buttons with arrow or by double clicking on the name of the channel. Using the Options button you can change the arrangement of the channels or remove them from the list of exported channels.

The configurable items in Export CSV are:

- **Sampling Rate.** All output channels assume the same frequency configured in the Equal Sampling Rate combo.
- The **number of decimals.** The value can be any integer between 0 and 15 and the default is the number of decimal of the selected channel.
- **Number format** that will be written in the header of each channel. This is a list of the possible formats:
 - **Dec. Numeric:** the numeric format.

- **Scientific format:** the scientific format.
- **Hex:** hexadecimal format. The number of decimal has no effect with this format.
- **Bin:** binary format. The number of decimal has no effect with this format.
- **ASCII:** text format. The number of decimal has no effect with this format.

Export Options

- When **All Data** is selected, all the linked laps are exported; when it is not selected, just a part of the linked laps are exported, namely that defined in the Time Start, Time End interval, which can be set by the user.
- **Append Selected Laps** This check box appears if you choose to export more than one lap. If it is not checked, one file for each lap will be produced in input. If on the other hand it is checked, a file will be exported that is obtained from linking the laps selected.

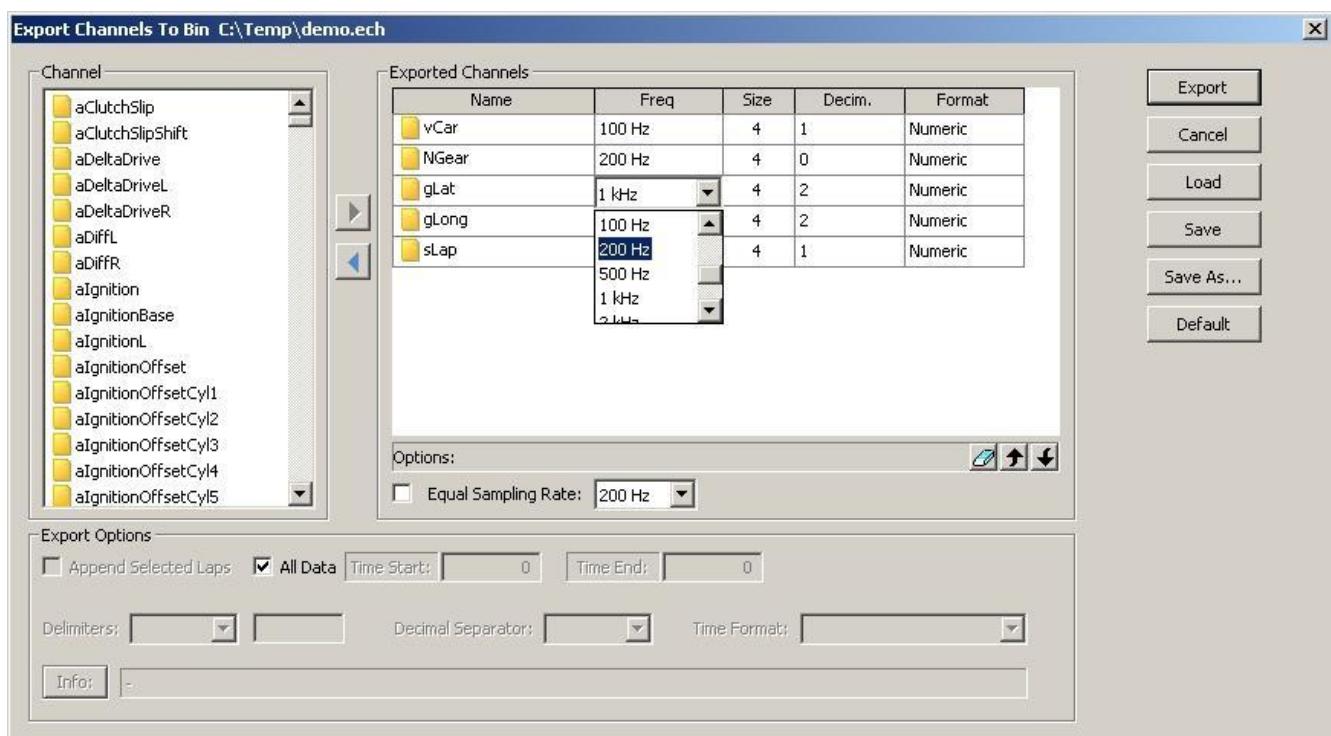
Buttons

On the right of the export window there are six buttons:

- **Export:** This button performs the conversion. After clicking this button a message appears asking to save the changes (if it is not done before with the save button) then, at the browser prompt, enter a path and a name for the target export file. Press Save to proceed and ok to complete operation. The default directory is *WinTAX4\Export*. If more than one lap has been selected and you have chosen not to append them, a message appears asking you to choose whether you wish to write the names of the files manually or automatically. When you write the file names manually, you are requested to enter the name for each file selected, otherwise you are just requested to select the directory in which all the files are to be created.
- **Cancel:** It cancels the current operation..
- **Load:** Choose a .ech export file.
- **Save:** Save changes in current .ech file.
- **Save As...:** Save changes in a selected or new .ech file.
- **Default:** Set the default values of decimals and format.

Export to BIN

BIN is a compact (interleaved) format. For further details, see WinTAX .bin format



Channel

List that contains all the channels of the lap selected.

Exported Channel

List that contains the channels to be exported. The elements on the list are added and removed using the two buttons with arrow or by double clicking on the name of the channel. Using the Options button you can change the arrangement of the channels or remove them from the list of exported channels.

The configurable items in Export Bin are:

- **Frequency.** If *Equal Sampling Rate* is checked, all channels assume the same frequency, otherwise you can configure on the list the frequency of each channel. The maximum frequency allowed is 2Khz. The default, when a channel is included in the exported channels list, is the frequency of the channel.
- **The number of decimals.** The value can be any integer between 0 and 7 and the default is the number of decimal of the selected channel. The combo has a range that varies from 0 to 15; in the case exceeded the limit of 7, the number of decimal is displayed in brackets.

- **Number format** that will be written in the header of each channel. This is a list of the possible formats:
 - **Dec, Numeric, Scientific:** the numeric format.
 - **Hex:** hexadecimal format.
 - **Bin:** binary format.
 - **ASCII:** text format.

Export Options

- When **All Data** is selected, all the linked laps are exported; when it is not selected, just a part of the linked laps are exported, namely that defined in the Time Start, Time End interval, which can be set by the user.
- **Append Selected Laps** This check box appears if you choose to export more than one lap. If it is not checked, one file for each lap will be produced in input. If on the other hand it is checked, a file will be exported that is obtained from linking the laps selected.

Buttons

On the right of the export window there are six buttons:

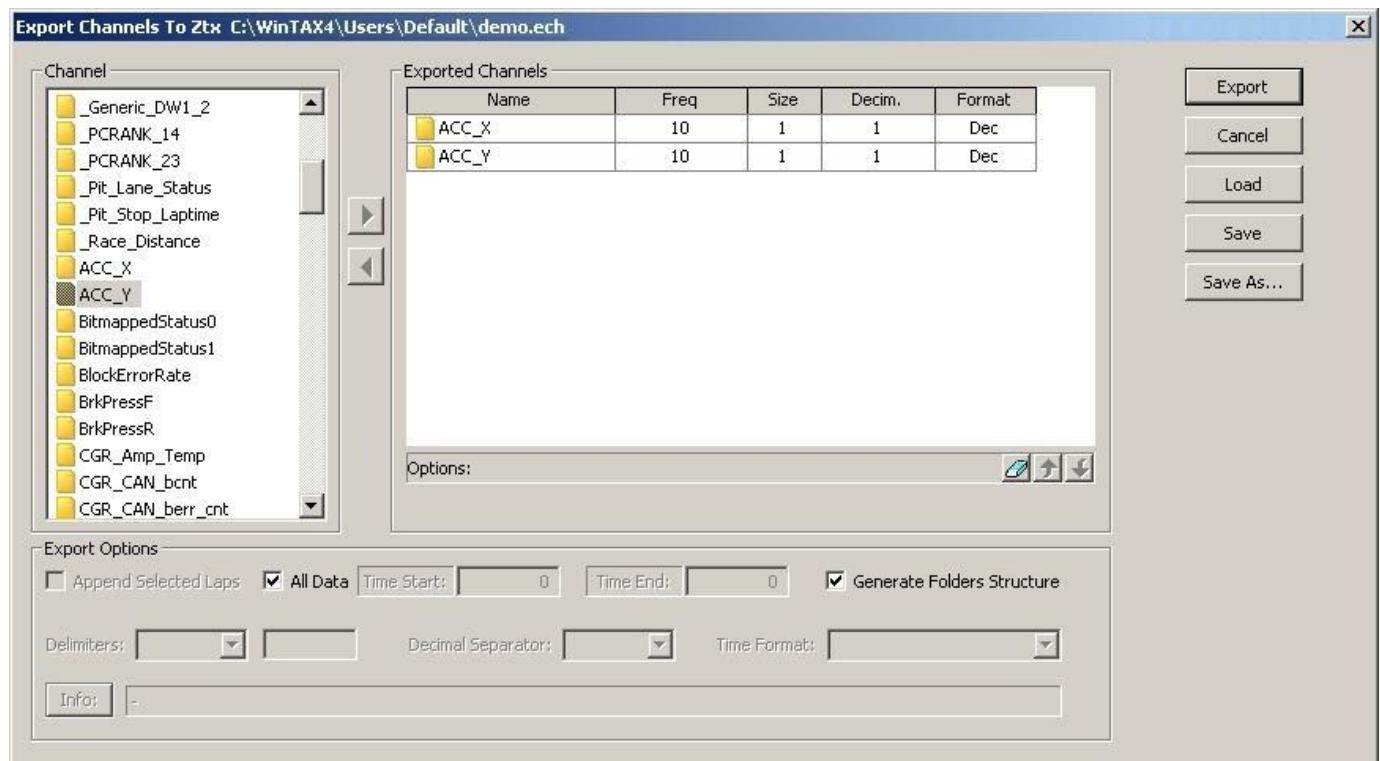
- **Export:** This button performs the conversion. After clicking this button a message appears asking to save the changes (if it is not done before with the save button) then, at the browser prompt, enter a path and a name for the target export file. Press Save to proceed and ok to complete operation. The default directory is *WinTAX4\Export*. If more than one lap has been selected and you have chosen not to append them, a message appears asking you to choose whether you wish to write the names of the files manually or automatically. When you write the file names manually, you are requested to enter the name for each file selected, otherwise you are just requested to select the directory in which all the files are to be created.
- **Cancel:** It cancels the current operation.
- **Load:** Choose a .ech export file.
- **Save:** Save changes in current .ech file.
- **Save As...:** Save changes in a selected or new .ech file.
- **Default:** Set the default values of frequency, decimals and format.

Export to ZTX

Export to ZTX simply copies the selected laps to the path indicated. It replicates the levels of the ZTX archive.

Export Channels to ZTX

In many situations it can be necessary to extract individual data files or groups of data files from a WinTAX archive. Channels to ZTX creates new ZTX files containing only the selected channels.



Channel

List that contains all the channels of the lap selected.

Exported Channel

List that contains the channels to be exported. The elements on the list are added and removed using the two buttons with arrow or by double clicking on the name of the channel. Using the Options button you can change the arrangement of the channels or remove them from the list of exported channels.

Export Options

The configurable items in Export CSV are:

- When **All Data** is selected, all the linked laps are exported; when it is not selected, just a part of the linked laps are exported, namely that defined in the Time Start, Time End interval, which can be set by the user.
- **Append Selected Laps** This check box appears if you choose to export more than one lap. If it is not checked, one file for each lap will be produced in input. If on the other hand it is checked, a file will be exported that is obtained from linking the laps selected.
- **Generate Folder Structure:** If checked, replicates the levels of the ZTX archive; if unchecked creates only the lap level directory.

Buttons

On the right of the export window there are five buttons:

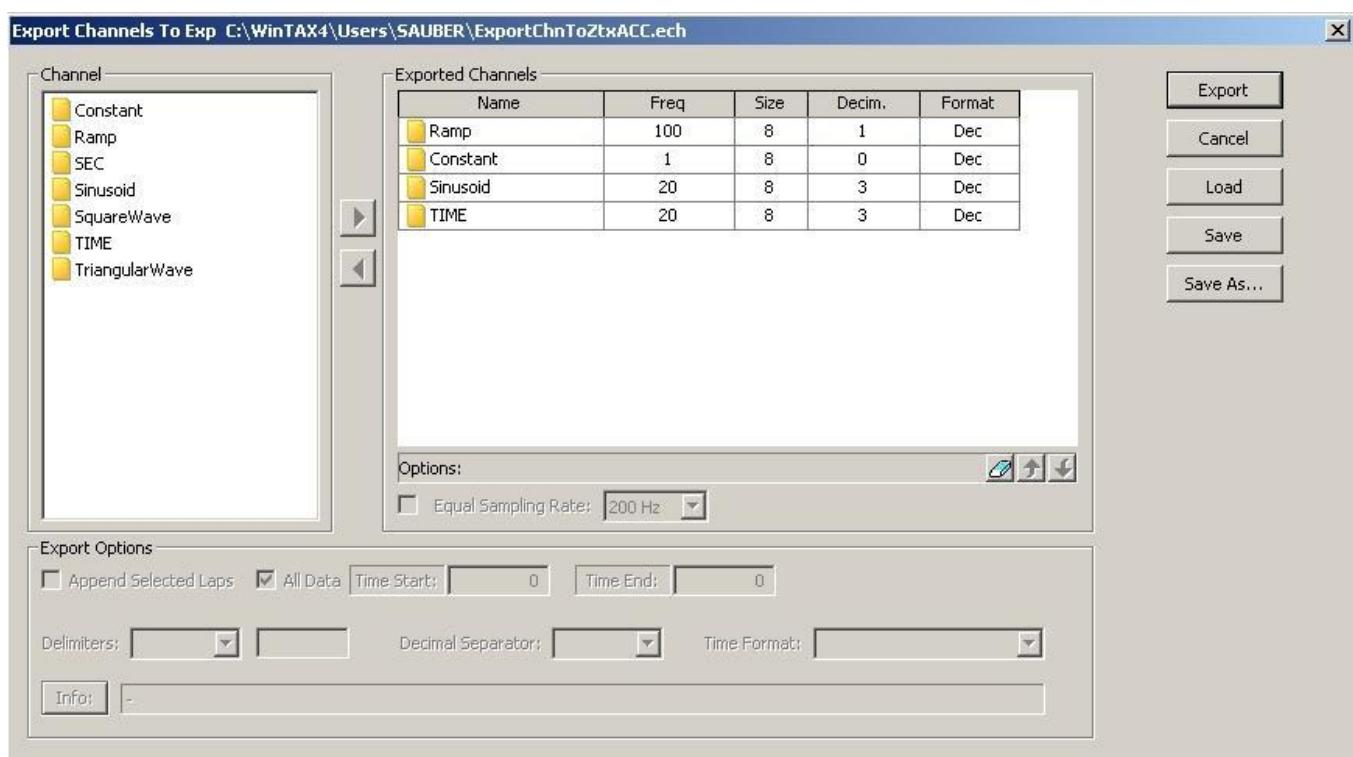
- **Export:** This button performs the conversion. After clicking this button a message appears asking to save the changes (if it is not done before with the save button) then, at the browser prompt, enter a path and a name for the target export file. Press Save to proceed and ok to complete operation. The default directory is *WinTAX4\Export*. If more than one lap has been selected and you have chosen not to append them, a message appears asking you to choose whether you wish to write the names of the files manually or automatically. When you write the file names manually, you are requested to enter the name for each file selected, otherwise you are just requested to select the directory in which all the files are to be created.
- **Cancel:** Quit the export window.
- **Load:** Choose a .ech export file.
- **Save:** Save changes in current .ech file.
- **Save As...:** Save changes in a selected or new .ech file.

Export to EXP

Export to ZTX creates a zip file (with extension EXP) containing the selected laps and together with the full archive path and files which are above them. This is useful to copy a section of an archive from one PC to another.

Export Channels to EXP

Export to ZTX creates a zip file (with extension EXP) containing only the selected channels of the selected laps and together with the full archive path and files which are above them. This is useful to copy a section of an archive from one PC to another.



Channel

List that contains all the channels of the lap selected.

Exported Channel

List that contains the channels to be exported. The elements on the list are added and removed using the two buttons with arrow or by double clicking on the name of the channel. Using the Options button you can change the arrangement of the channels or remove them from the list of exported channels.

Buttons

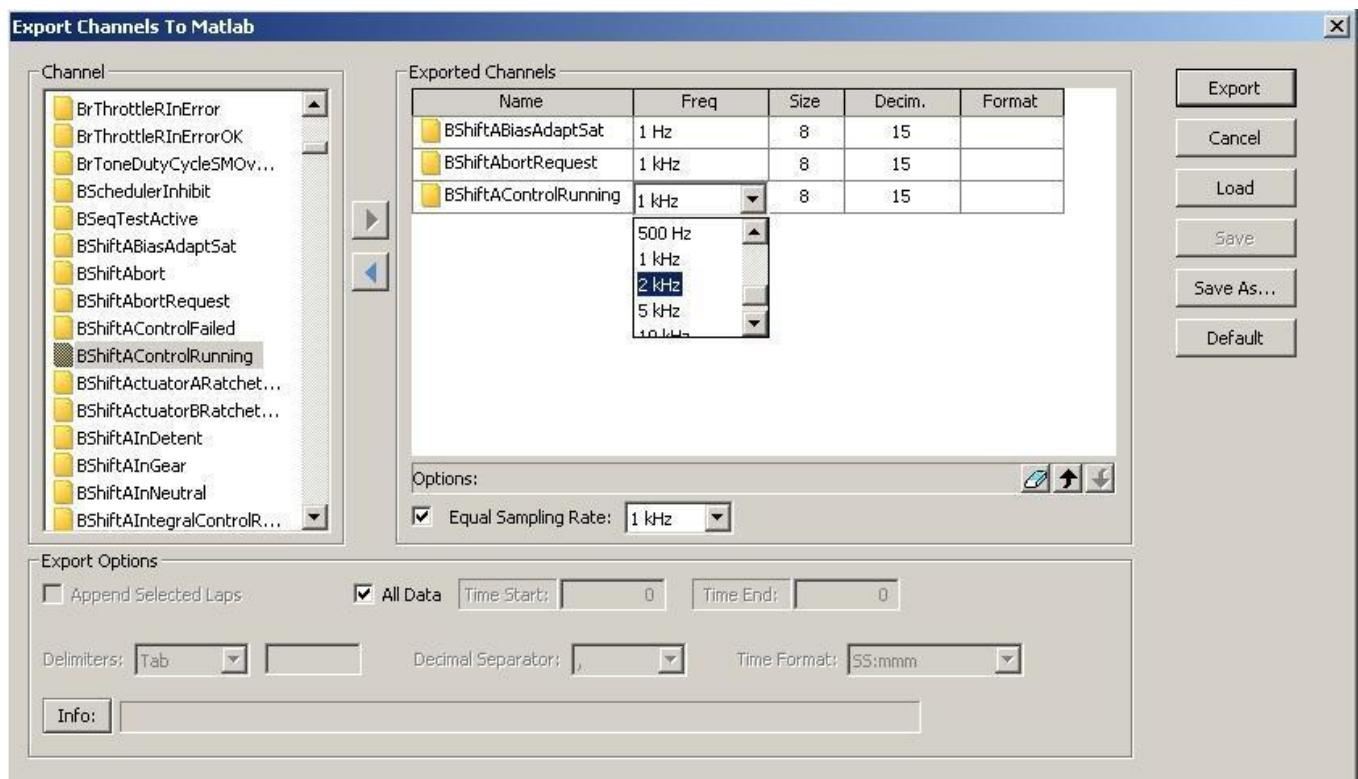
On the right of the export window there are five buttons:

- **Export:** This button performs the conversion. After clicking this button a message appears asking to save the changes (if it is not done before with the save button) then, at the browser prompt, enter a path and a name for the target export file. Press Save to proceed and ok to complete operation. The default directory is *WinTAX4\Export*. If more than one lap has been selected and you have chosen not to append them, a message appears asking you to choose whether you wish to write the names of the files manually or automatically. When you write the file names manually, you are requested to enter the name for each file selected, otherwise you are just requested to select the directory in which all the files are to be created.
- **Cancel:** It cancels the current operation.
- **Load:** Choose a .ech export file.
- **Save:** Save changes in current .ech file.
- **Save As...:** Save changes in a selected or new .ech file.

Export to MatLab

Exporting is based on a binary format, where the file consists of a header, a channel header and the samples area. The channels exported are one dimensional arrays of doubles containing the values of the samples. Seeing as the format is binary, there is no need to have MatLab installed to be able to export.

To export towards Matlab, you need to select one or more laps and start the Export to Matlab command from the Tools menu of the Data Browser. With this command, a window opens where you can select the channels to be exported.



Channel

List that contains all the channels of the lap selected.

Exported Channel

List that contains the laps to be exported. The elements on the list are added and removed using the two buttons with arrow or by double clicking on the name of the channel. On this list, the only parameter that can be edited is the frequency because the values exported will always and in any event be arrays of doubles. Using the Options button you can change the arrangement of the channels or remove them from the list of exported channels.

Equal sampling rate

When the check box is selected, the value in the combo box will be the frequency used for all the channels.

Export Options

Append Selected Laps

This check box appears if you choose to export more than one lap. If it is not selected, one file for each lap will be produced in input. If on the other hand it is selected, a file will be exported that is obtained from linking the laps selected. In this second case, another check box is also enabled, namely All Data. When it is selected, all the linked laps are exported; when it is not selected, just a part of the linked laps are exported, namely that defined in the TimeStart, TimeEnd interval, which can be set by the user.

Info

It selects information that will be used to compose the name of the output file as shown in picture below.



Buttons

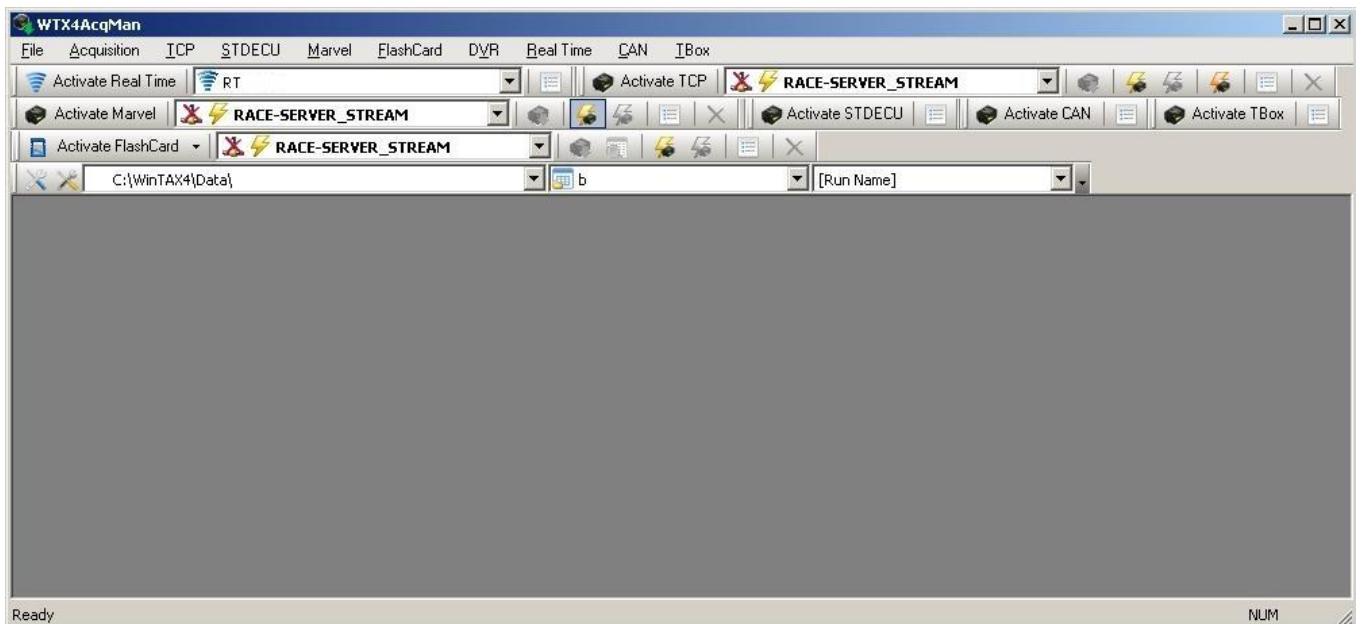
On the right of the export window there are six buttons:

- **Export:** This button performs the conversion. After clicking this button a message appears asking to save the changes (if it is not done before with the save button) then, at the browser prompt, enter a path and a name for the target export file. Press Save to proceed and ok to complete operation. The default directory is *WinTAX4\Export*. If more than one lap has been selected and you have chosen not to append them, a message appears asking you to choose whether you wish to write the names of the files manually or automatically. When you write the file names manually, you are requested to enter the name for each file selected, otherwise you are just requested to select the directory in which all the files are to be created.
- **Cancel:** It cancels the current operation.
- **Load:** Choose a .ech export file.
- **Save:** Save changes in current .ech file.
- **Save As...:** Save changes in a selected or new .ech file.
- **Default:** Set the default values of decimals and format.

Acquisition manager

WTX4AcqMan, called Acquisition Manager, is a WinTAX component used to acquire data (Cable and Real Time) from an external source and save them on pc.

The main window can be like in the following picture.



Acquisition Manager manages some automatic processes, called Rx Tasks, started when new data (Cable and Real Time) are acquired. In order to download data from the logger, configure the network settings of the Ethernet adapter. See here for instructions.

Setup Acquisition and Rx Tasks

Before starting to download you will need to define the session and device setups and the select some options for the acquisition processes.

In the toolbar there are two buttons used to open the Setup Acquisition and the Rx Tasks. The same commands are in Acquisition menu.

In the toolbar, in same licenses, could be also three combo box that are used for quickly defining.



- a. Path for data acquisition (the default is taken from WinTAX general setup, e.g. \WinTAX4\Data)

- b. Session Name: the combo proposes the session name defined in Setup Acquisition and entries history.
- c. Run Name: the combo proposes the run name defined in Setup Acquisition and entries history.

In the Session Name combo and in the Run Name combo is possible to delete entries history. To remove history the user must open combo box and presses Delete key. A dialog box will appear:



By choosing yes, the combo will be empty.

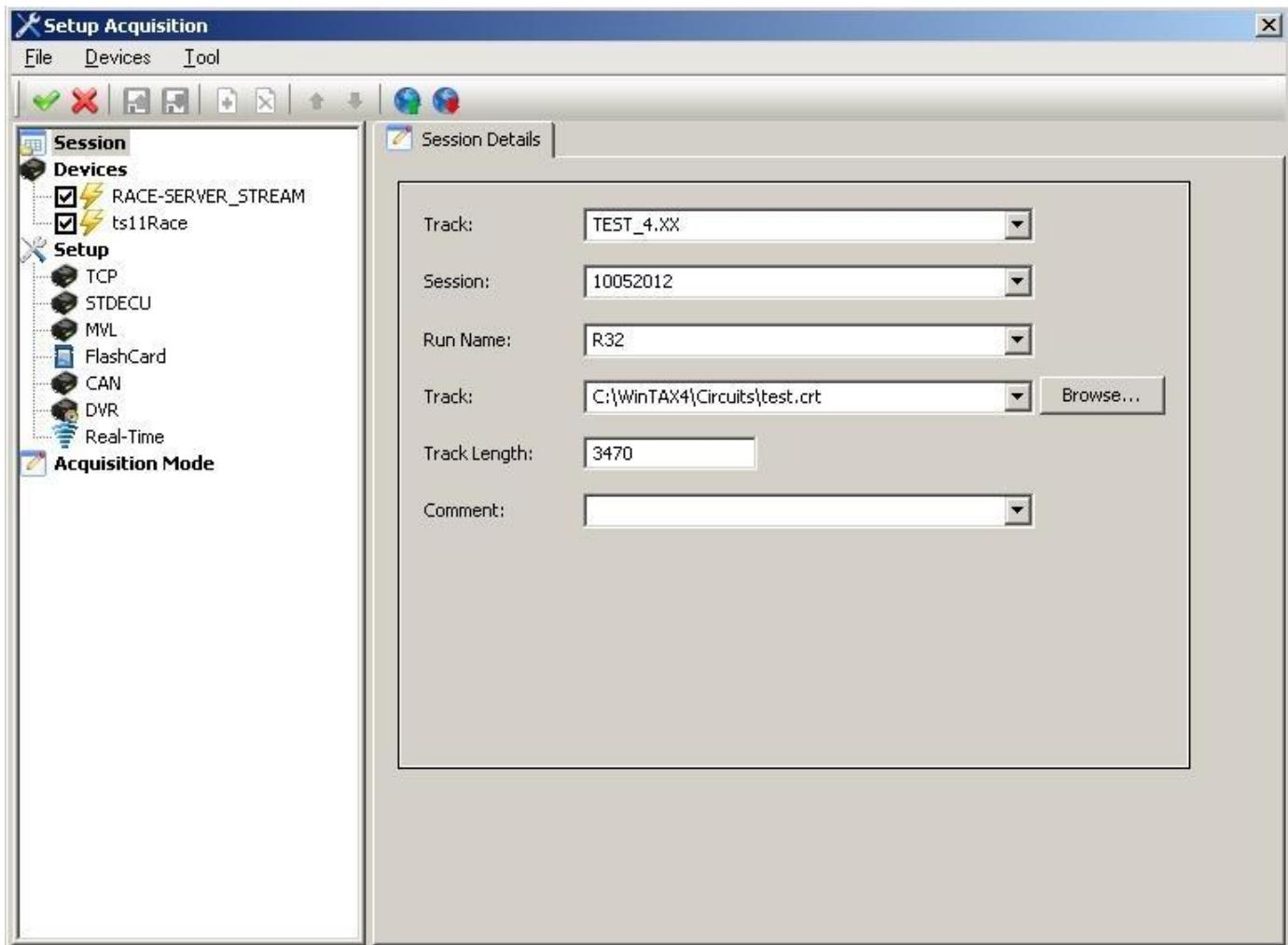
Devices

In the main window there are some toolbar; each of them collects the commands of a given acquisition device.

Setup Acquisition

Before starting a working session, define the parameters used by WinTAX to organize in the archive the data acquired.

These settings are defined the **Setup Acquisition** environment, that can be reached from the *Acquisition/Setup* menu or from the *Setup Acquisition* button on the toolbar.

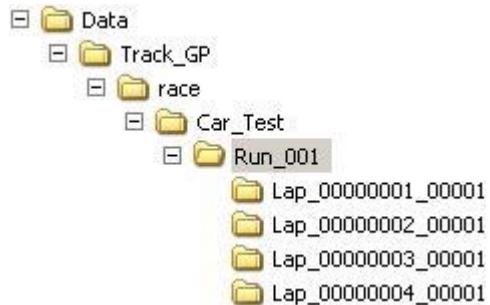


Commands

COMMAND	DESCRIPTION
Apply	Exit from Acquisition Manager Setup confirming the changes
Cancel	Exit from Acquisition Manager Setup aborting the changes
Load	Loading of context data (constant, user record, offset and gain) of a device
Save As	Saving of context data (constant, user record, offset and gain) of a device.
Add Device	Adds a new slot device to the configuration
Remove Device	Cancels of the slot device selecting
Move Up	Moves upwards by one position the slot device selected
Move Down	Moves downwards by one position the slot device selected
Publish All Session & Device Setup	Publishes on the WTS server the configurations of Session and Devices
Retrieve All Session & Device Setup	Reading from the WTS server the Session and Devices configurations

Session

These settings are used to create the data archive; in particular the **Event** and **Session** information are the names of the root directories where data are saved. In the example below **Event** is set as *Track_GP*, while **Session** is set as *race*

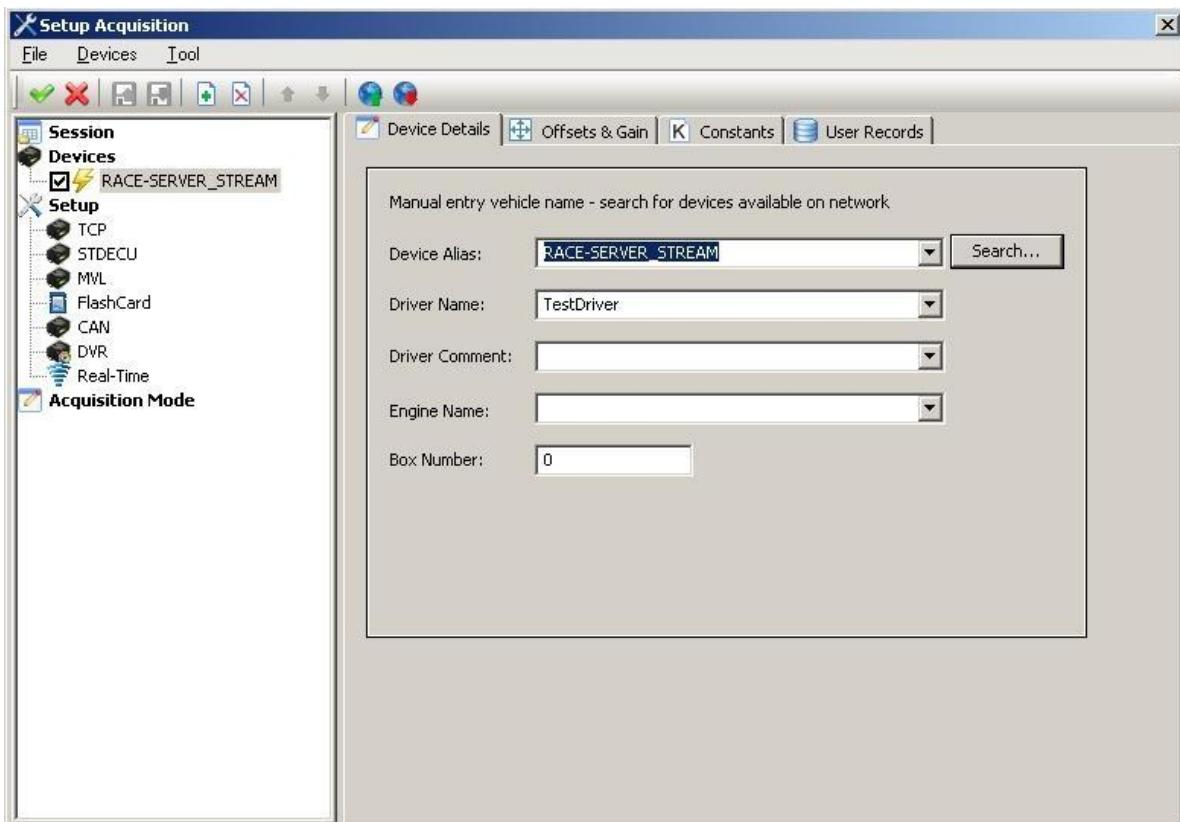


The information **Track Length** and **Comment** are saved on the *Session.xml* file available in the *Run* directory and can be viewed in the list of the session of the Data Browser and in the Data Header of WinTAX.

The **Publish All Session & Device Setup** and the **Retrieve All Session & Device Setup** commands are enabled only when the **Devices acquisition interface** in the **Options** page is set as **WTS**.

Devices

The Devices configuration determines like for the Session section, where the data are saved in the archive.



To enable the *Device Recognition*, the **Device Alias** will have to be the same as the Alias sent to the Data Logger through Axon.

The *Device Recognition* is an automatism of the acquisition process that allows to save the data downloaded in the directory corresponding to the Alias of the device the user is working on.

If no correspondence is found, the saving is forced in the first device (position inside the tree) of the list.

 If the device is connected to the network, the **Device Name** can be automatically configured through the *Browse* command; by pressing this button, WinTAX offers a list containing the Alias of the devices currently connected to the network: selecting one of them the field **Device Name** is automatically updated with its Alias. This function helps to avoid possible mistakes of car naming the might cause the saving of the data in unexpected positions.

Driver Name, Driver Comment, Engine Name and **Box Number** are other context information.

In the **Offset Gain, Constant, User Record** pages is possible to manually set (or loading the configuration from files) the context data of the device that will be saved on the *Lap_xx...xxxx_xx...xxxx* directory and that are available to the user during the post processing analysis.

In the tree list of the devices, the area and the icon on the left of the name of the alias indicate if the device is enabled for an ADL (automatic acquisition session: area checked and yellow icon) or if it is enabled only for the DLM (manual acquisition: area not checked and grey icon).

Setup Devices

The tree list shows the data acquisition processes available. You will find some of them in the list below..

- **TCP**
- **MVL**
- **FlashCard**
- **DVR**
- **Real-Time**
- **WDS**
- **CAN**

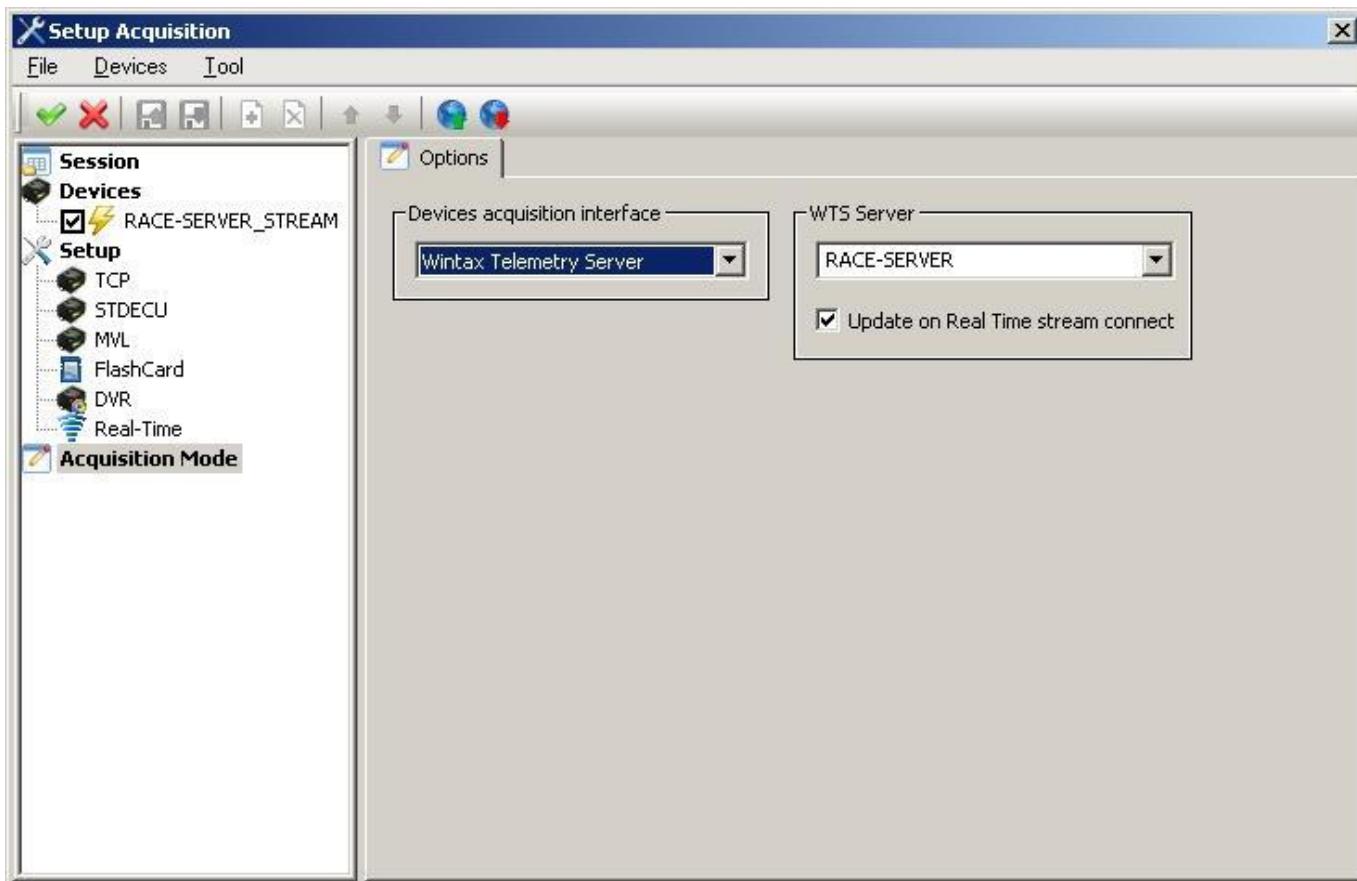
For further details about the configurations, see the manual about each process.

Acquisition Mode

The **Devices acquisition interface** can be:

DEVICE	DESCRIPTION
Standard	The connection (point-point) is made directly with the device (GRX or PBE) receiver through the FindDevs
WinTAX Telemetry Server	It allows to receive the data distributed through WTS
Flash Card	The connection is made with an external memory

WinTAX Telemetry Server needs to configure the WTS Server.



Rx Tasks

Rx Tasks are automatic processes which are carried out by Acquisition Manager when new data are acquired either directly from the logger when downloading cable data or via telemetry.

For each task, select if the process is applied to cable or telemetry data or both.

In PRO versions, tasks are carried out in an order, which is configurable by the user, however the order should be set up with care as it may affect the resulting output (e.g. setting the Import Meteo task after the AutoRx causes a displaying data in WinTAX without meteo information).

In these versions, the order of the task is fixed, the user can only enable/disable a required task.

Only AutoRx is available.

Auto RX: Automatic loading of data after saving lap

It updates graph windows whenever a lap is downloaded. The Auto Rx process only detects new data in the WinTAX Data path as defined in *General/Setup/Directories/Acquisition*

This option may slow down the downloading process especially if the active windows contain many channels or complicated math channels speed up downloading. Disable this option and use Update Rx command to refresh the screen with the latest lap at the end of downloading.

Auto Rx Remote: Automatic loading of data from remote path after saving lap

It is similar to Auto Rx, when this task is active WinTAX will load and refresh the screen with data from a remote path.

Note: with Auto Rx Remote the data are not copied from the remote location to the local PC.

Auto Copy To Host: Automatic copying of downloaded files to remote path

It automatically copies acquired data to a series of user-defined paths. This is useful when data must be downloaded to a local path on one PC before copying them to a more generally accessible central archive on the network.

To allow the copy to host of Fast Data Logging files (FDL), enable the flag **Make also for FDL data**.

Note. The Copy To Host of the FDL data is subordinated to the copy to host of the ztx data, therefore it cannot be enabled separately.

Auto Import Lap: Automatic copying and loading of data from remote path

This is the opposite process of Auto Copy To Host, it copies new data, which for instance are detected on a network path to the local PC in the Import directory.

If combined with Auto Rx Remote, this task allows to import new data onto a path on the local PC and then load them. This can be useful, for example to display telemetry data lap-by-lap on the local PC without activating a telemetry acquisition session.

Export To Exp: Export laps to EXP Format files

It automatically exports the downloaded laps. The EXP file contains the archive information needed to easily import these laps. The Data Browser can later be configured to display these data just by manually pointing the unzipping directory of the EXP file or by using the Data Browser functions *Import From Exp* that automatically unzips the data in the path indicated by the user.

The filters:

- **Real time**
- **TCP**
- **MVL**
- **NBT**
- **FlashCard**
- **SEC**

allow to export only the corresponding type of data. The Laps are exported to the directory *Export* defined in General Setup/Directories. For each exported Lap, an EXP file will be created.

Export Channels To Exp: Export channels to Exp Format files

It has the same logic as **Export To Exp**, it allows to export only a group of channels defined by the user.

The list of the channels is read by the configuration file *.ECH that must be configured by the user in the **Browse ech file** field.

The *.ECH file can be created only by Data Browser in the manual functions of *Export Channels to ZTX or to EXP*.

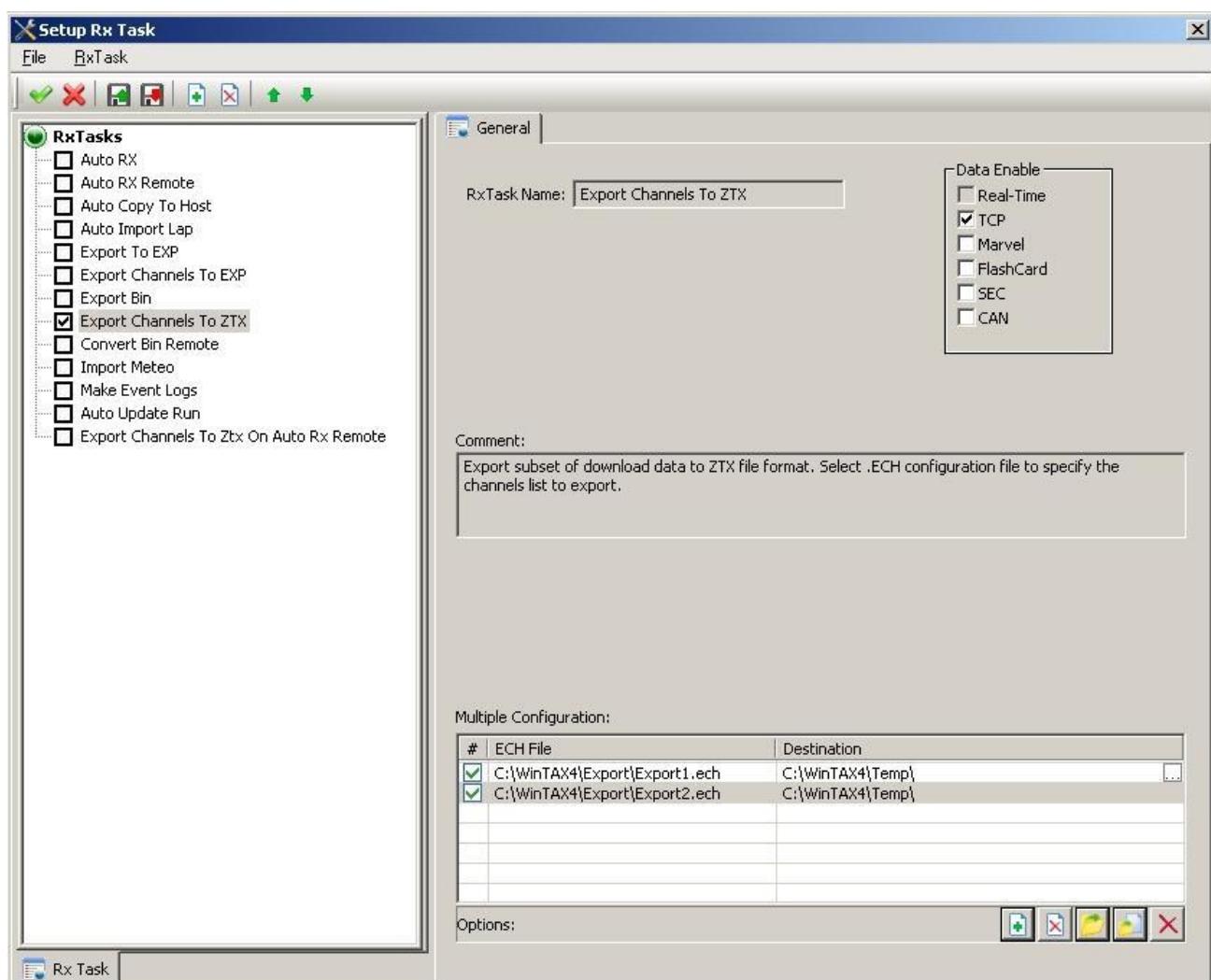
Export Bin: Export laps to BIN Format files

It automatically exports in BIN format any new laps found in the Acquisition directory to the *WinTAX/Export* directory. It specifies an *.ECH configuration file, which determines the channels to be exported and their related frequencies together with a time range.

Export Channels To ZTX: Export channels to ZTX files

It is similar to **Export Channels To Exp**, the format of the exported file is different. A copy of the Lap acquired is created in the directory */Export*. The copy created will be a directory (unzipped) as it contains only the data of the Lap. Further information of Run/Car/Session are not exported. To display the Lap from Data Browser, manually reconstruct the directory level needed. (obsolete function, **Export Channels To Exp** perform the same function)

In some licenses, management of **Export Channels To Exp** is extended to include more entries in the same task (max. 5). Check related flag in order to enable the single export during acquisition. Repeat the same destination will cause the overwriting of data.



Convert Bin Remote: Convert remote laps to BIN format

It converts any new files from a selection of paths (typically network paths) and outputs data to another path defined by the user.

It can be used, for example, to automatically detect new data from different cars and export them in BIN format to any path.

Import Meteo: Import Meteorological data

Automatic task to associate meteo data from an external weather station with on-board data received.

The information available are:

Temperature In	Weather station internal temperature	°C
Temperature Out	Weather station external temperature	°C
Wind Speed	Weather station wind speed	km/h
Wind Direction	Weather station wind direction	180E -> 180W
Pressure	Weather station internal barometric pressure sensor	bar
Humidity In	Weather station internal humidity sensor	% rel hum
Humidity Out	Weather station external humidity sensor	% rel hum
Rain	Weather station rainfall sensor	mm

Make Event Logs: Generate event log after saving lap

It creates an Event Log file in XML format based on the libraries of Events currently loaded in WinTAX. The log file created can be processed by external applications.

The filters:

- **Real time**
- **TCP**
- **NBT**
- **MVL**
- **FlashCard**
- **SEC**

allow to create the Event Log only on the type of data configured.

Auto Update Run: Automatic loading of data after closing run

It automatically replaces the current Real Time data with the "best" data.

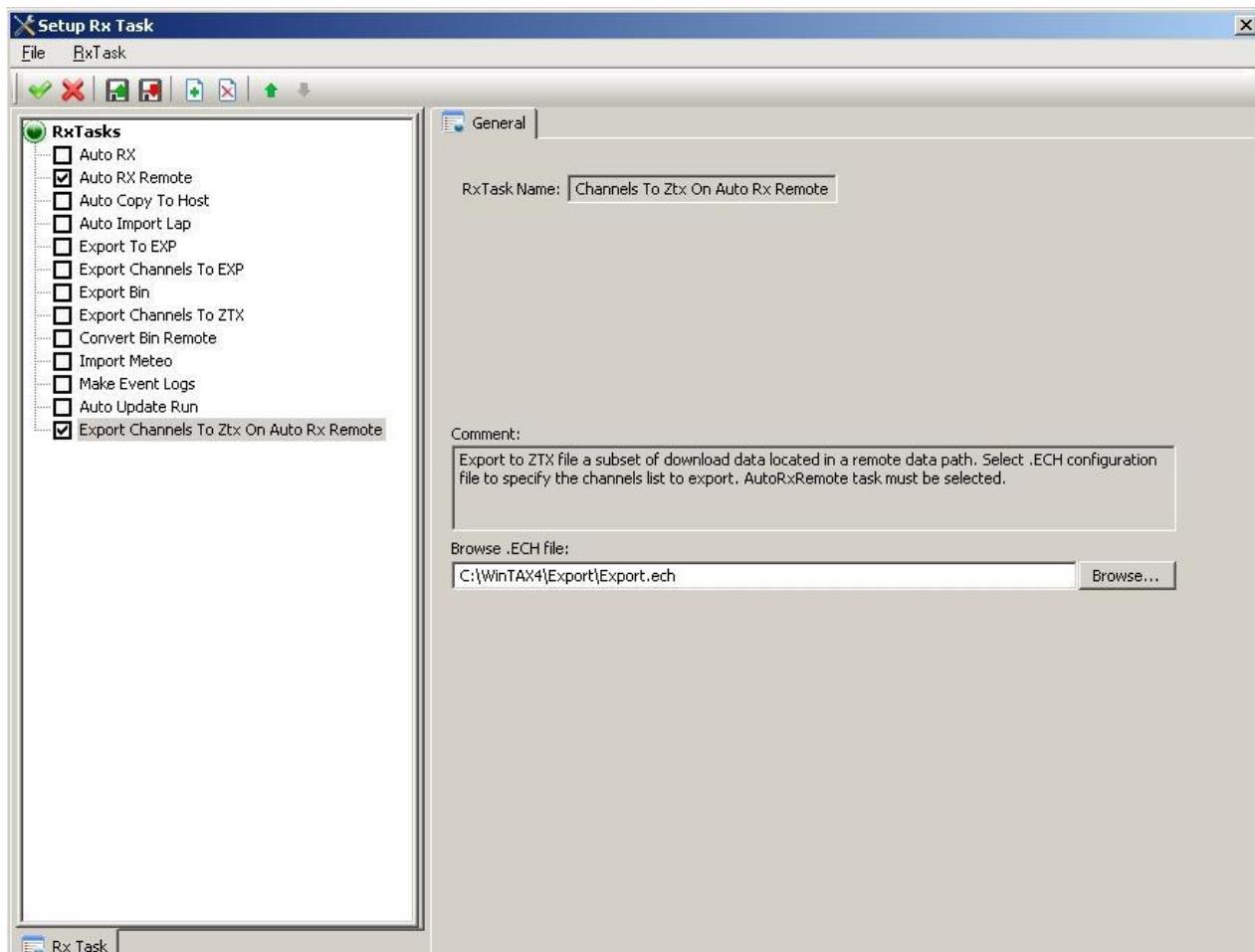
"Best" data are those logged at the highest rate; for it is supposed that Cable data are always at higher frequency than the Real Time data (Real time or Real time NBT)

This operation is transparent for the user that receives the highest rate when available.

See Intelligent Data Loading chapter for a detailed description of the functions.

Export Channels to ZTX files on Auto RX Remote

This Rx Task mixes **Auto Rx Remote** and **Export Channels To ZTX**. It's active only when Auto Rx Remote is checked and export channels from a selected .ech configurations after saving laps on autoload data from remote directory.



Make Faster File: Convert laps in Faster File format

Option to automatically convert downloaded files in Faster File format, which is optimized to speed the data loading from the archive.

This task should be run before Auto Copy To Host to ensure that files which are copied to a central archive path, for example, are already converted.

This task is present only in some licenses.

TCP Acquisition

Cable Data Acquisition through the TCP protocol from logger devices.

The data can be manually downloaded (DLM) or automatically downloaded through the Auto Download (ADL) function

All commands and their procedures to download data are described here.

Commands



TCP bar: list of the commands available

Activate TCP: Start/Stop of the acquisition process. The icon of the button is like a status indicator.

STATUS	DESCRIPTION
Green	Process enabled and connection with the device displayed in the combo
Red	Process enabled and connection failed
Grey	Process not active

Combo Symbols

STATUS	DESCRIPTION
ts11Race	Alias of the device connected
	Device connected
	Device not connected



Device enabled to download ADL (and DLM)



Device enabled to download only DLM (no ADL)

Logger

Alias configured in the Devices list: the device is displayed in bold

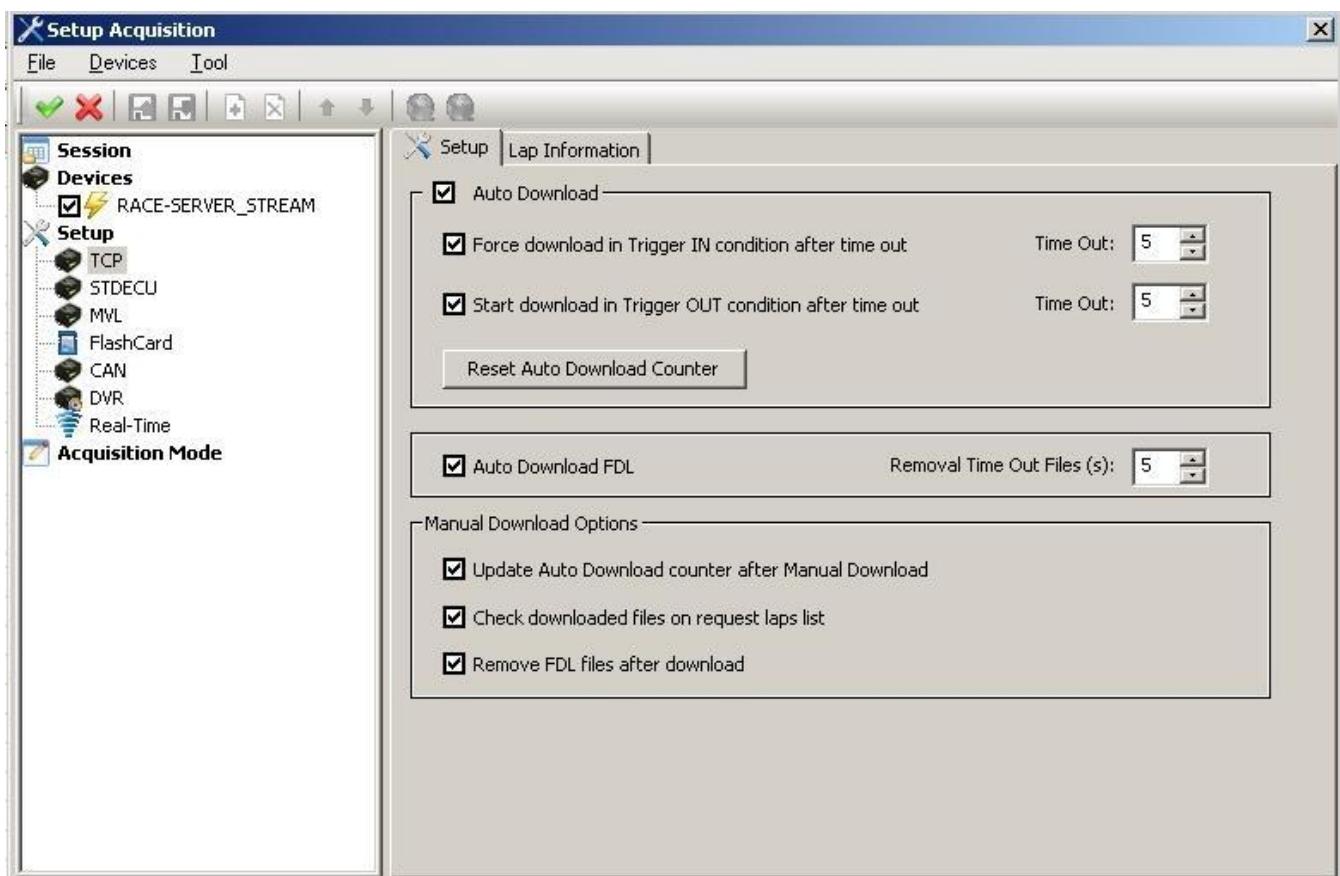
Logger

Alias not configured in the Devices list: the device is not displayed in bold

TCP Commands

COMMANDS	DESCRIPTION
Download data from data logger TCP	Command to receive TLap (DLM session)
Auto Download TCP	Enabling /Disabling of a session ADL
Auto Download latest data TCP	Similar at Auto Download TCP but after downloading all laps, automatically turns off.
Auto Download FDL	Enabling /Disabling of a session ADL of the Fast Data Logging (FDL). <i>(For further details about the FDL download, please see the corresponding chapter)</i>
Log Messages TCP	Shows/Hides the log window
Clear data TCP	Command to cancel data from the Logger.
Restart TCP	Command to restart the device (available only on menu)

Configuration



Auto Download

Auto Download: Enabling/Disabling of an ADL session

- **Force download in Trigger IN condition after time out:** this option allows WinTAX to interrupt the Data Logger when it is in Trigger IN. During the WinTAX sessions it verifies that a new ABS is available and it checks the status of the trigger, when the conditions are checked, a warning message is displayed with two possible choices:
 - Skip: to inhibit the download of the lap(s)
 - Proceed: to enable the data download. If the user makes no choice within the TimeOut (configurable in the field near to the flag [s]), WinTAX automatically proceeds with the ADL session.



This option may cause undesired stop-logging when used in the garage.

- **Force download in Trigger OUT condition after time out:** like for Trigger IN, the trigger status enabling the condition is **Trigger OUT**.
- **Reset auto download counter:** reset the ABS counter of downloaded laps.

FDL

- **Auto Download FDL:** Enabling/Disabling an ADL -FDL session
- **Removal Time Out files:** configuration of the timeout within which the user must answer before WinTAX automatically removes the FDL files. When an ADL-FDL session ends, if the "**Remove FDL files after download**" option is enabled, WinTAX displays a message asking the user whether to remove the downloaded files. If no answer is given before the timeout, WinTAX will automatically cancel the data and will continue the ADL session.

For further details about FDL, see FDL chapter.

Manual Download Options

- **Update auto download counter after Manual download:** with this option, after a manual download WinTAX will ask the user whether the previous operation should be considered as an ADL session. The answer "Yes" will force the following ADL session to restart the download from the last ABS counter downloaded in DLM.
- **Check downloaded file on request laps list:** If this option is enabled, allows to view if the lap has already been downloaded by the PC.
- **Remove FDL files after download:** if this option is enabled, WinTAX displays a message asking the user whether to remove the downloaded files. If no answer is given before the timeout, WinTAX will automatically cancel the data and will continue the ADL session.

Start of a data downloading session

To start a data acquisition session (both DLM and ADL), just press the **Activate TCP button**

The combo will be automatically updated with the list of the devices connected to the network and the list of the devices configured in the "**Setup Acquisition**" environment.

When the **Activate TCP** button becomes green, the link with the device is active. It is now possible to start an acquisition session on that device (displayed as first line of the **Combo Alias**). To modify the device to which the user is connected, just open the combo and select another one.

Manual Acquisition - DLM

To enable this type of download, the user first of all must manually select the lap(s) to be downloaded.

The list of the laps is viewed by pressing the **Request TLap** button: this command opens a window containing the complete list of all laps acquired until that moment by the central control unit.

Download Data

Laps List FDL

#	Abs	Track Run	Lap	Track Lap	Lap Time	Lap Distance	Table Name	Lap Date	Start Time	Lap Marker
69858	1	1	1	1	0:18.900	-1	TEST_DIVERSITY v.33	10/09/2012	16:51	ETest
69859	1	1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	16:52	ETest
69860	1	1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	16:53	ETest
69861	1	1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	16:54	ETest
69862	1	1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	16:55	ETest
69863	1	1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	16:56	ETest
69864	1	1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	16:57	ETest
69865	1	1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	16:58	ETest
69866	1	1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	16:59	ETest
69867	1	1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	17:00	ETest
69868	1	1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	17:01	ETest
69869	1	1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	17:02	ETest
69870	1	1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	17:03	ETest
69871	1	1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	17:04	ETest
69872	1	1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	17:05	ETest
69873	1	1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	17:06	ETest
69874	1	1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	17:07	ETest
69875	1	1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	17:08	ETest
69876	1	1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	17:09	ETest

Check Downloaded Files

OK Cancel

After selecting one or more laps (via mouse or keyboard) and pressing **OK**, the data will be downloaded and saved on the local pc.

Use mouse right click to open a popup menu; it contains two commands for selecting an entire run:

- Select RUN (shortcut key **R**)
- Select last RUN (shortcut key **L**)

Download Data

Laps List FDL

#	Abs	Track Run	Lap	Track Lap	Lap Time	Lap Distance	Table Name	Lap Date	Start Time	Lap Marker
70231	1	1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	12/09/2012	17:41	ETest
70232	1	1	1	1	0:40.600	0	TEST_DIVERSITY v.33	12/09/2012	17:42	
70233	1	1	1	1	0:47.200	-1	TEST_DIVERSITY v.33	26/09/2012	15:44	ETest
70234	1	1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	26/09/2012	15:45	ETest
70235	1	1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	26/09/2012	15:46	ETest
70236	1	1	1	1	0:32.650	-1	TEST_DIVERSITY v.33	26/09/2012	15:47	
70237	1	1	1	1	0:06.800	-1	TEST_DIVERSITY v.33	26/09/2012	15:47	ETest
70238	1	1	1	1	0:11.850	-1	TEST_DIVERSITY v.33	26/09/2012	15:48	
70239	1	1	1	1	0:23.850	-1	TEST_DIVERSITY v.33	26/09/2012	15:50	ETest
70240	Select Run R				0:52.000	-1	TEST_DIVERSITY v.33	26/09/2012	15:51	ETest
70241	Select Last Run L				0:52.000	-1	TEST_DIVERSITY v.33	26/09/2012	15:52	ETest
70242					0:52.000	-1	TEST_DIVERSITY v.33	26/09/2012	15:53	ETest
70243	1	1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	26/09/2012	15:54	ETest
70244	1	1	1	1	0:02.000	-1	TEST_DIVERSITY v.33	26/09/2012	15:55	
70245	1	1	1	1	0:49.100	-1	TEST_DIVERSITY v.33	26/09/2012	15:55	ETest
70246	1	1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	26/09/2012	15:56	ETest
70247	1	1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	26/09/2012	15:57	ETest
70248	1	1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	26/09/2012	15:58	ETest

Check Downloaded Files

OK Cancel

Check downloaded file on request laps list: If this option is enabled, allows to view if the lap has already been downloaded by the PC. The check is the same which is located in configuration options. In the figure the Laps already downloaded are checked in green. The download status is obtained by comparing the data available in the acquisition directory of the local pc and the data available on the acquirer.

Download Data

#	Abs	Track Run	Lap	Track Lap	Lap Time	Lap Distance	Table Name	Lap Date	Start Time	Lap Marker
70233		1	1	1	0:47.200	-1	TEST_DIVERSITY v.33	26/09/2012	15:44	ETest
70234		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	26/09/2012	15:45	ETest
70235		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	26/09/2012	15:46	ETest
70236		1	1	1	0:32.650	-1	TEST_DIVERSITY v.33	26/09/2012	15:47	
70237		1	1	1	0:06.800	-1	TEST_DIVERSITY v.33	26/09/2012	15:47	ETest
70238		1	1	1	0:11.850	-1	TEST_DIVERSITY v.33	26/09/2012	15:48	
70239		1	1	1	0:23.850	-1	TEST_DIVERSITY v.33	26/09/2012	15:50	ETest
70240		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	26/09/2012	15:51	ETest
70241		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	26/09/2012	15:52	ETest
70242		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	26/09/2012	15:53	ETest
70243		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	26/09/2012	15:54	ETest
70244		1	1	1	0:02.000	-1	TEST_DIVERSITY v.33	26/09/2012	15:55	
70245		1	1	1	0:49.100	-1	TEST_DIVERSITY v.33	26/09/2012	15:55	ETest
70246		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	26/09/2012	15:56	ETest
70247		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	26/09/2012	15:57	ETest
70248		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	26/09/2012	15:58	ETest
70249		1	1	1	0:51.500	-1	TEST_DIVERSITY v.33	26/09/2012	16:01	ETest
70250		1	1	1	0:47.000	-1	TEST_DIVERSITY v.33	26/09/2012	16:02	

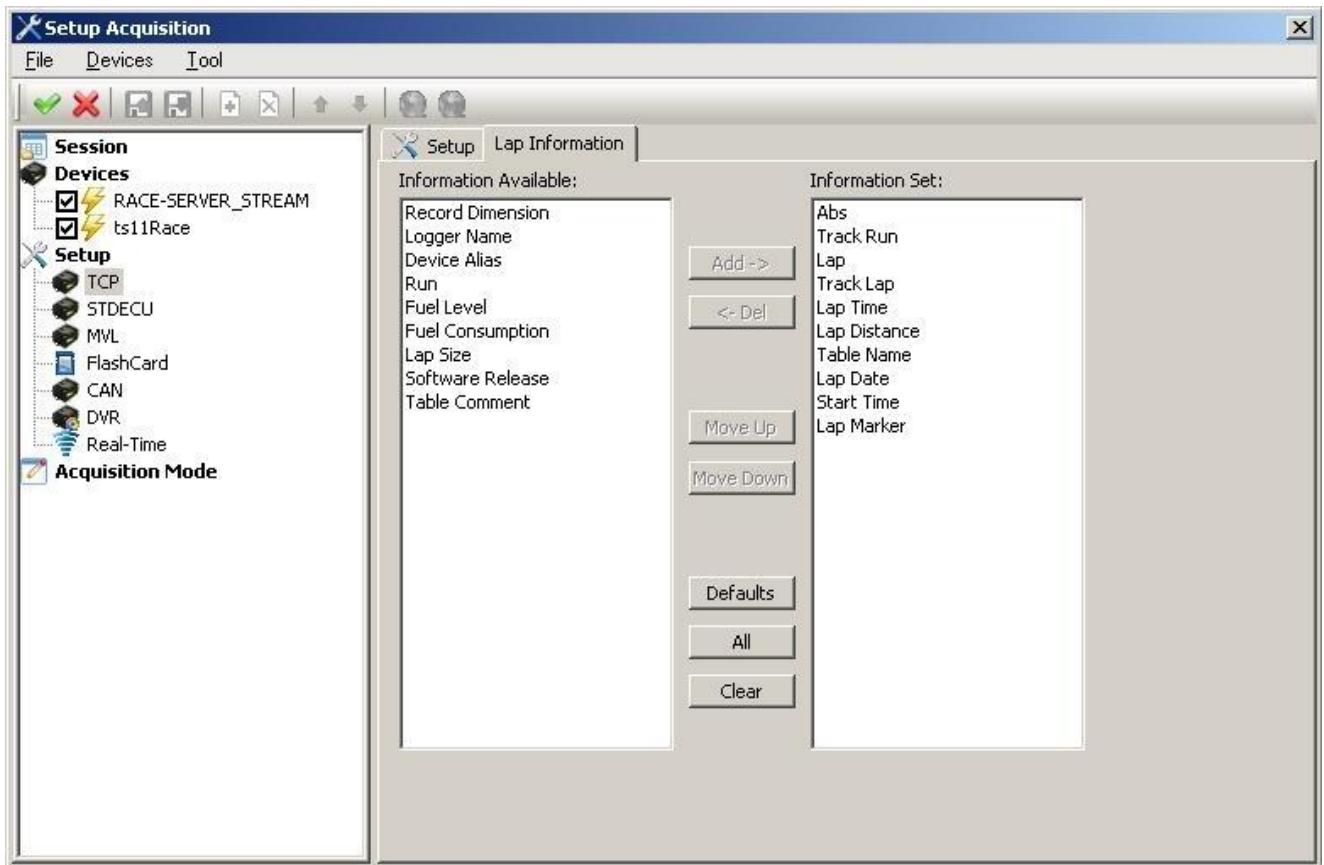
Check Downloaded Files

OK Cancel



It's not possible to cancel one by one or as a whole from the TLap window the laps. This operation is enabled only through the **Clear Data** command that cancels ALL data acquired.

The list of the information displayed in the header of the TLap window (columns of the TLap) can be configured as to number and position in the **Lap Selection** page of the Devices TCP



Automatic Acquisition - ADL

Enabling the **Auto Download** command, WinTAX starts the ADL session: in this type of download the application itself verifies if new data are available on the Data Logger, it checks the list of the laps and enables the download

Functioning of ADL:

- WinTAX waits until it detects the presence of a new lap (increase of the ABS counter).
- The download does not begin until the trigger condition is not verified (Trigger = Trigger Out or Trigger IN).

The standard configuration of ADL is:

- If the user manually downloads a lap, it is not registered as an ADL session. (**Update auto download counter after Manual download**: not checked)
- The Trigger condition is Trigger OUT (**Force download in Trigger IN condition after time out** not checked)

This standard behavior can be changed in **Configuration of the above mentioned Download options**.

WinTAX will issue a warning if an ADL session is trying to download a set of data already downloaded by any PC (local or remote) as is shown in the following image:



 Trigger is intended as the acquisition status of the Data Logger:

- Trigger IN: the Data Logger acquires and saves data on the inner disk.
 - Trigger OUT: the Data Logger acquires but does not save data on the inner disk.

The checking of the change of the ABS counter (acquisition of a new lap) and the trigger status of the acquirer are transmitted to WinTAX by the **FindDevs**. FindDevs reads the broadcast packets sent by all devices connected to the network. These packets contain the information about the ABS and the trigger status. **FindDevs** interprets these information and makes them available for all application of the PC that require them (first of all WinTAX). The information are also available in the log window to debug.

FindDevs is automatically activated by WinTAX at the start-up of the Acquisition Manager when needed.

Fast Data Logging (FDL)

Acquisition *FDL Data* through the FTP protocol from logger devices.

The data can be manually (DLM FDL) or automatically downloaded through the Auto Download (ADL FDL) function.

The data are stored by WinTAX in the archive (Run level) in a standard MATLAB format (*.mat)

All commands and their procedures to download data are described in this chapter.



TCP bar: list of the commands available

Activate TCP: Start/Stop of the acquisition process. The icon of the button is like a status indicator.

STATUS	DESCRIPTION
--------	-------------

Green Process enabled and connection to the device established

Red Process enabled and connection failed

Grey Process not active

Combo Alias

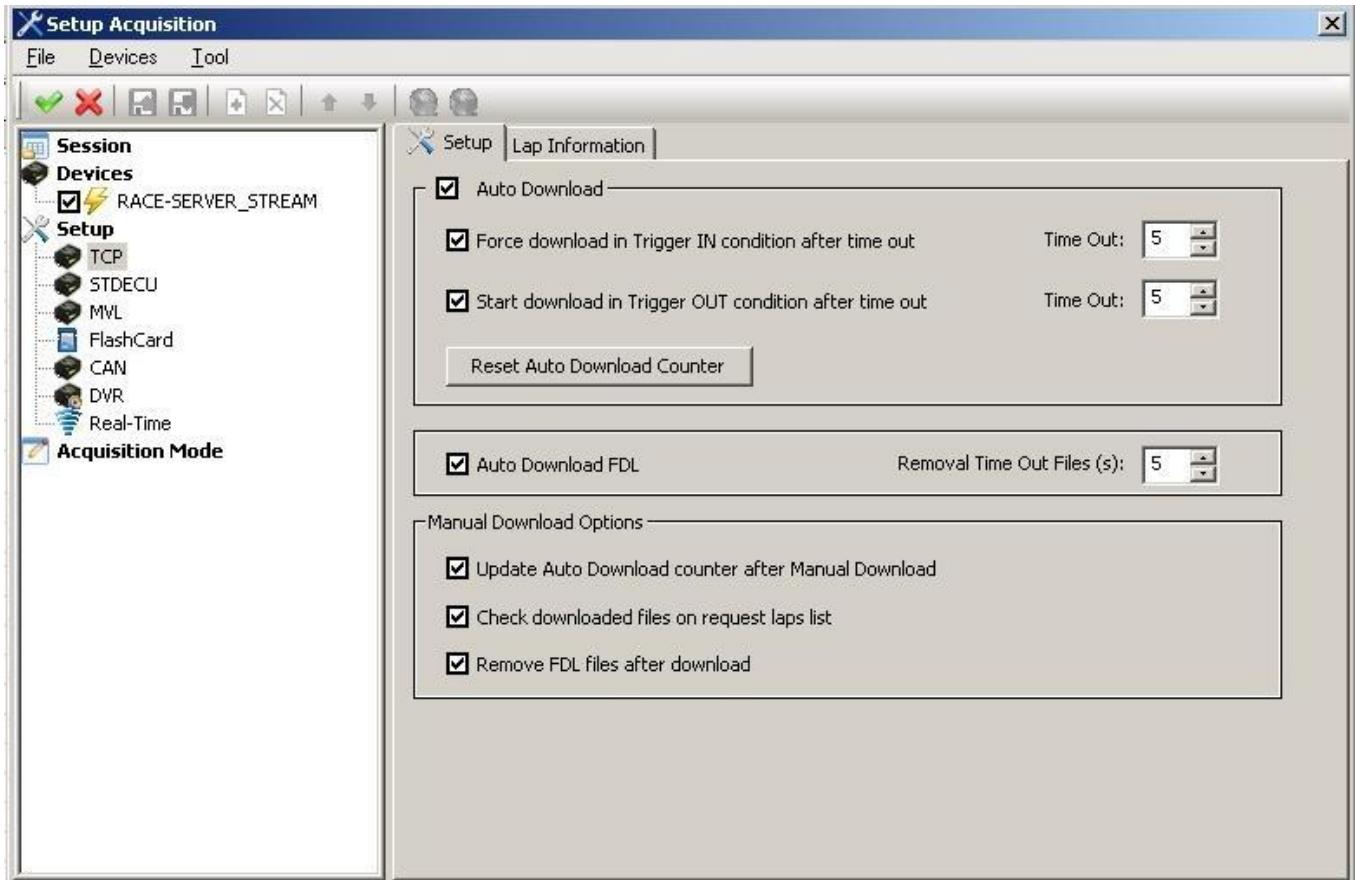
STATUS	DESCRIPTION
 ts11Race	Alias of the connected device
	Device connected
	Device not connected
	Device not enabled to download ADL (and DLM)
	Device enabled only to download DLM (no ADL)
Logger	Alias configured in the list of the Cars: the device is displayed in bold
Logger	Alias not configured: the device is not displayed in bold

FDL Commands

The commands are the same of TCP Acquisition

COMMANDS	DESCRIPTION
Download data from data logger TCP	Command to receive TLap (DLM session)
Auto Download latest data TCP	Similar at Auto Download TCP but after downloading all laps, automatically turns off.
Auto Download FDL	Enabling /Disabling of a session ADL of the Fast Data Logging (FDL).
Log Messages TCP	Shows/Hides the log window
Clear data TCP	Command to cancel data from the Logger.
Restart TCP	Command to restart the device (available only on menu)

Configuration of the Download options



Auto Download FDL

- **Auto Download FDL:** Enabling/Disabling an ADL -FDL session
- **Removal Time Out files:** configuration of the timeout within which the user must answer before WinTAX automatically removes the FDL files. When an ADL-FDL session ends, if the "Remove FDL files after download" option is enabled, WinTAX displays a message asking the user whether to remove the downloaded files. If no answer is given before the timeout, WinTAX will automatically cancel the data and will continue the ADL session.

Manual Download FDL

- **Update Auto Download counter after Manual Download:** If this option is enabled, when a session of manual download ends (DML FDL), WinTAX will ask to the user if the operation must be considered as an ADL FDL session and therefore it has to update its download status; answering "Yes" the next ADL session will begin to download the lap after the last lap of the DLM FDL session.
- **Remove FDL files after download:** If this option is enabled, when data are downloaded, WinTAX asks to the user whether to cancel the FDL file from the central control unit

Start a data downloading session

To start a data acquisition session (both DLM and ADL), press the button: **Activate TCP**

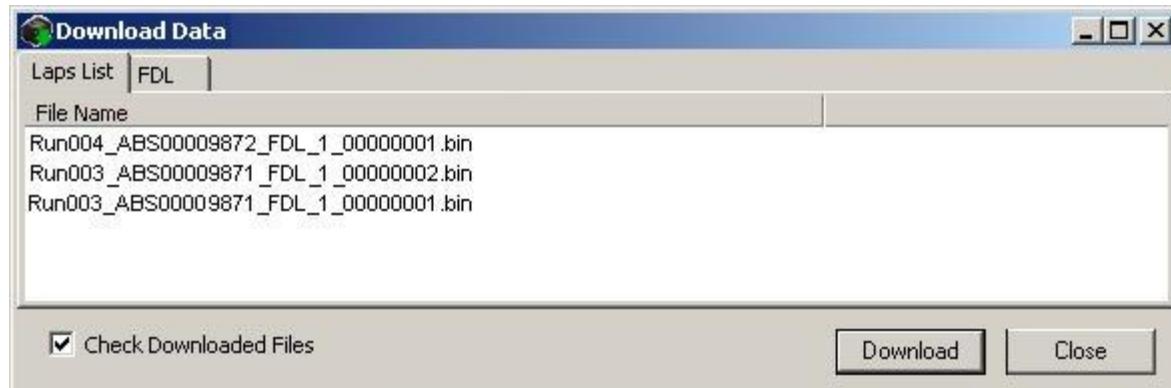
The combo will be automatically updated with the list of the devices available in the net and with the list of the cars configured in the "**Setup Acquisition**" environment.

When the **Activate TCP** button becomes green, the link with the device is active. An acquisition session can therefore be started on this device (displayed as first line of the **Combo Alias**). To modify the device to which the user is connected, just open the combo and select another one.

Manual Acquisition - DLM FDL

To enable this type of download, first of all the user must manually select the FDL lap (s) to be downloaded.

The list of the FDL laps is viewed by pressing the **Download data from data logger TCP** button and selecting the second tab of the window. The window proposed contains therefore the complete list of all FDL laps acquired until that moment by the central control unit.



The list shows the files available on the logger and their formatting. After selecting one or more files, press Download to begin the transfer of data; the.*.MAT files that are created, are saved in the archive in the RUN folder in a separate directory called **FDL**.

From the TLap-FDL page moreover the files can be directly removed from the logger through a menu available by right clicking or by pressing the Delete key of the keyboard.

Automatic Acquisition - ADL FDL

Enabling the **Auto Download FDL** command, WinTAX starts the ADL FDL session: in this type of download the application itself checks if new data are available on the logger, it checks the list of laps and enables the download.

The functioning of ADL FDL is the same as TCP, therefore:

- WinTAX waits until it checks if a new lap is available (increase of the ABS counter).
 - It does not download until the trigger condition is verified (Trigger = Trigger Out or Trigger).

Standard configuration to download ADL FDL:

- If the user manually downloads a lap, it is not registered as an ADL session. (**Update auto download counter after Manual download**: not checked)
 - The Trigger condition is Trigger OUT (**Force download in Trigger IN condition after time out** not checked)

The standard behavior can be modified in the configuration of the above mentioned **Download** options.

If the FDL autodownload is enabled simultaneously with the TCP one, the FDL download will follow the TCP one.



The concept of Trigger can be extended to the FDL acquisition:

- Trigger IN: the Data Logger acquires and saves data on the inner disk.
 - Trigger OUT: the Data Logger acquires but does not save data on the inner disk.

The checking of the change of the ABS counter (acquisition of a new lap) and the trigger status of the acquirer are transmitted to WinTAX by the **FindDevs** application. **FindDevs** reads the broadcast packets sent by all devices connected to the network. These packets contain the information about the ABS and the trigger status. **FindDevs** interprets these information and makes them available for all application of the PC that require them (first of all WinTAX). The information are also available in the log window to debug.

FindDevs is automatically activated by WinTAX at the start-up of the Acquisition Manager when needed.

MARVEL Acquisition

A *Cable Data Acquisition* from Marvel devices.

The data can be manually downloaded (DLM) or automatically downloaded through the AutoDownload (ADL) function.

All commands and their procedures to download data are described here.



Marvel bar: list of the commands available

The button **Activate Marvel** Start/Stop of the acquisition process

STATUS	DESCRIPTION
--------	-------------

Green Process enabled and connection with the device displayed in the combo

Red Process enabled and connection failed

Grey Process not active

Combo Alias

STATUS OF THE COMMANDS	DESCRIPTION
 ts11Race	Alias of the connected device
	Device connected



Device not connected



Device enabled to download ADL (and DLM)



Device enabled to download only DLM (no ADL)

Logger

Alias configured in the Devices list: the device is displayed in bold

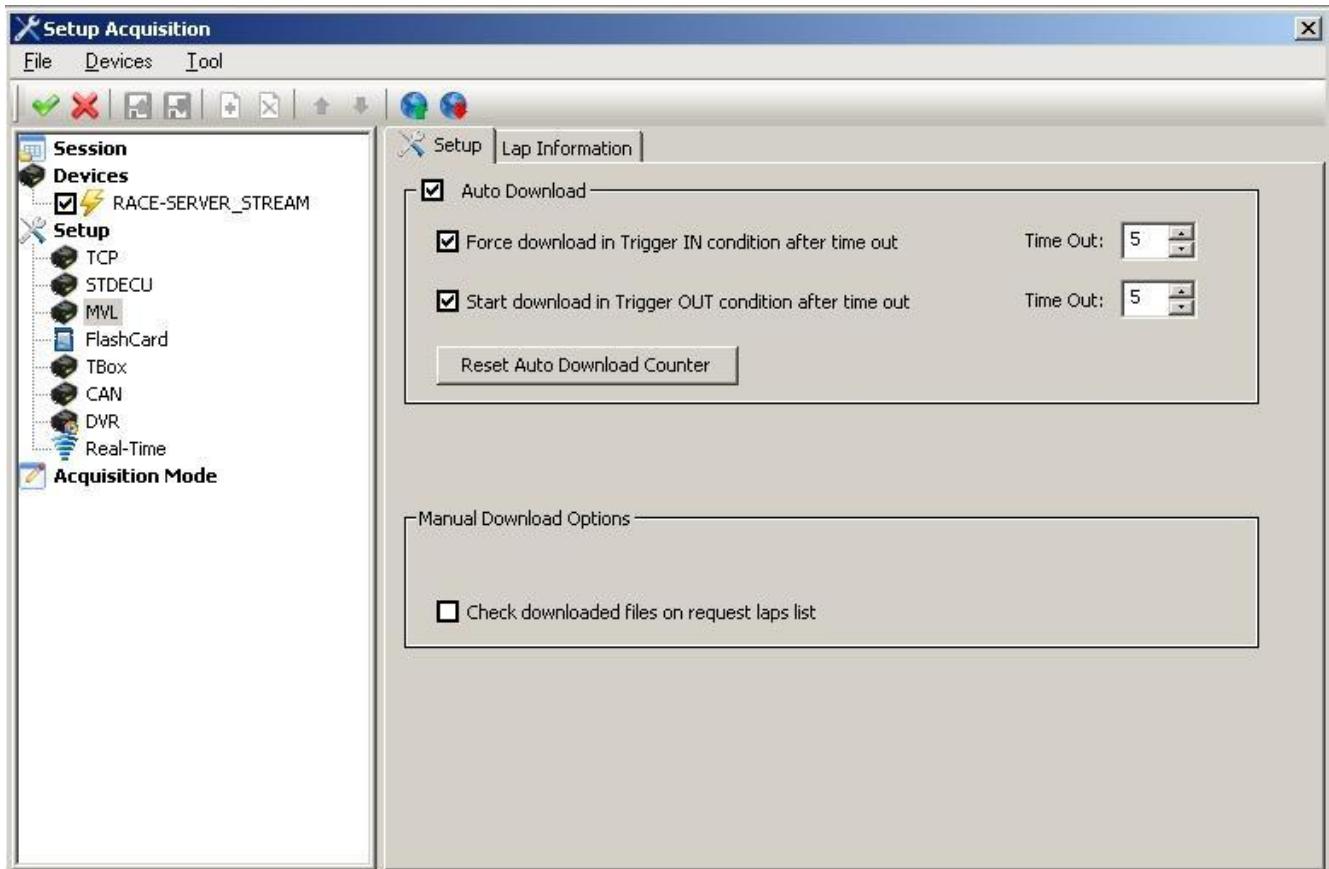
Logger

Alias not configured in the Devices list: the device is not displayed in bold

Marvel Commands

COMMANDS	DESCRIPTION
Download data from data logger Marvel	Command to receive TLap (DLM session)
Auto Download Marvel	Enabling /Disabling of a session ADL
Auto Download latest data Marvel	Similar at Auto Download Marvel but after downloading all laps, automatically turns off.
Log Messages Marvel	Shows/Hides the log window
Clear Data Marvel	Command to cancel data from the Logger.
Restart Marvel	Command to restart the device (available only on menu)

Configuration of the Download options



Auto Download: Enabling/Disabling of an ADL session

- **Force download in Trigger IN condition after time out:** this option allows WinTAX to interrupt the Data Logger when it is in Trigger IN. During the WinTAX sessions it verifies that a new ABS is available and it checks the status of the trigger, when the conditions are checked, a warning message is displayed with two possible choices:
 - Skip: to inhibit the download of the lap(s)
 - Proceed: to enable the data download. If the user makes no choice within the TimeOut (configurable in the field near to the flag [s]), WinTAX automatically proceeds with the ADL session.



This option may cause undesired stop-logging when used in the garage.

- **Force download in Trigger OUT condition after time out:** like for Trigger IN, the trigger status enabling the condition is **Trigger OUT**.
- **Reset auto download counter:** reset the ABS counter of downloaded laps.

Manual Download Options

- **Check downloaded file on request laps list:** If this option is enabled, allows to view if the lap has already been downloaded by the PC.

Start of a data downloading session

To start a data acquisition session (both DLM and ADL), just press the **Activate Marvel** button

The combo will be automatically up-dated with the list of the devices connected to the network and the list of the cars configured in the "**Setup Acquisition**" environment.

When the **Activate Marvel** button becomes green, the link with the device is active. It's now possible to start an acquisition session on that device (displayed as first line of the **Combo Alias**). To modify the device to which the user is connected, just open the combo and select another one.

Manual Acquisition - DLM

To enable this type of download, the user first of all must manually select the lap(s) to be downloaded.

The list of the laps is viewed by pressing the **Request TLap** button: this command opens a window containing the complete list of all laps acquired until that moment by the central control unit.

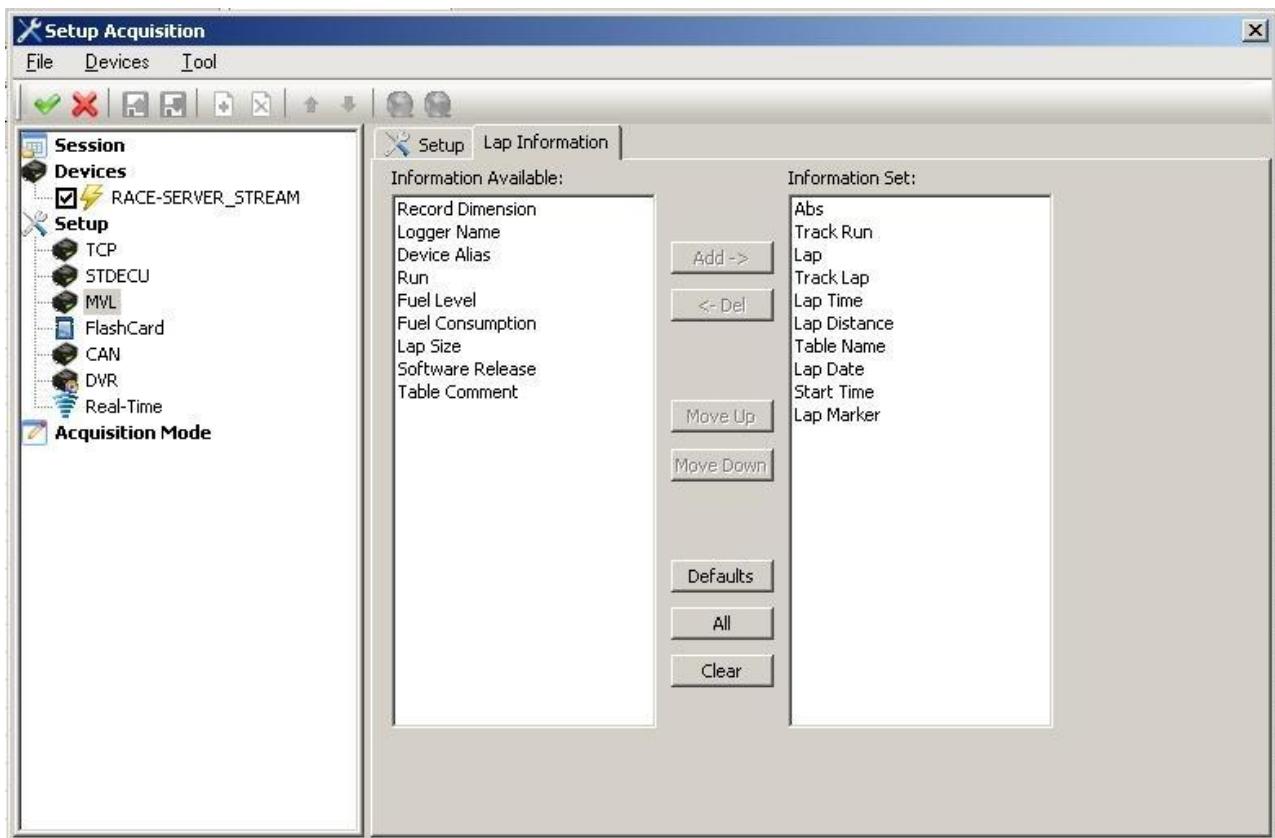
#	Abs	Track Run	Lap	Track Lap	Lap Time	Lap Distance	Table Name	Lap Date	Start Time	Lap Marker
69858		1	1	1	0:18.900	-1	TEST_DIVERSITY v.33	10/09/2012	16:51	ETest
69859		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	16:52	ETest
69860		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	16:53	ETest
69861		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	16:54	ETest
69862		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	16:55	ETest
69863		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	16:56	ETest
69864		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	16:57	ETest
69865		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	16:58	ETest
69866		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	16:59	ETest
69867		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	17:00	ETest
69868		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	17:01	ETest
69869		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	17:02	ETest
69870		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	17:03	ETest
69871		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	17:04	ETest
69872		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	17:05	ETest
69873		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	17:06	ETest
69874		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	17:07	ETest
69875		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	17:08	ETest
69876		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	17:09	ETest

Like the **Request TLap** command, the "Check Downloaded Files" command allows to download data in DLM.

After selecting one or more laps (via mouse or keyboard) and pressing **OK**, the data will be downloaded and saved on the local pc.

 *It's not possible to cancel one by one or as a whole from the TLap window the laps. This operation is enabled only through the **Clear Data** command that cancels ALL data acquired.*

The list of the information displayed in the header of the TLap window (columns of the TLap) can be configured as to number and position in the **Lap Selection** page of the Devices MVL.



The procedure to download DLM is the same as what described for the **Request TLap**

This command allows to view in the TLap window, if the lap has already been downloaded by the PC.

In the figure the Laps already downloaded are checked in green. The download status is obtained by comparing the data available in the acquisition directory of the local pc and the data available on the acquirer.

Download Data

Laps List

#	Abs	Track Run	Lap	Track Lap	Lap Time	Lap Distance	Table Name	Lap Date	Start Time	Lap Marker
70233	1	1	1	1	0:47.200	-1	TEST_DIVERSITY v.33	26/09/2012	15:44	ETest
70234	1	1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	26/09/2012	15:45	ETest
70235	1	1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	26/09/2012	15:46	ETest
70236	1	1	1	1	0:32.650	-1	TEST_DIVERSITY v.33	26/09/2012	15:47	ETest
70237	1	1	1	1	0:06.800	-1	TEST_DIVERSITY v.33	26/09/2012	15:47	ETest
70238	1	1	1	1	0:11.850	-1	TEST_DIVERSITY v.33	26/09/2012	15:48	
70239	1	1	1	1	0:23.850	-1	TEST_DIVERSITY v.33	26/09/2012	15:50	ETest
70240	1	1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	26/09/2012	15:51	ETest
70241	1	1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	26/09/2012	15:52	ETest
70242	1	1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	26/09/2012	15:53	ETest
70243	1	1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	26/09/2012	15:54	ETest
70244	1	1	1	1	0:02.000	-1	TEST_DIVERSITY v.33	26/09/2012	15:55	
70245	1	1	1	1	0:49.100	-1	TEST_DIVERSITY v.33	26/09/2012	15:55	ETest
70246	1	1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	26/09/2012	15:56	ETest
70247	1	1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	26/09/2012	15:57	ETest
70248	1	1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	26/09/2012	15:58	ETest
70249	1	1	1	1	0:51.500	-1	TEST_DIVERSITY v.33	26/09/2012	16:01	ETest
70250	1	1	1	1	0:47.000	-1	TEST_DIVERSITY v.33	26/09/2012	16:02	

Check Downloaded Files

OK Cancel

Automatic Acquisition - ADL

Enabling the **Auto Download** command, WinTAX starts the ADL session: in this type of download the application itself verifies if new data are available on the acquirer, it checks the list of the laps and enables the download.

Functioning of ADL:

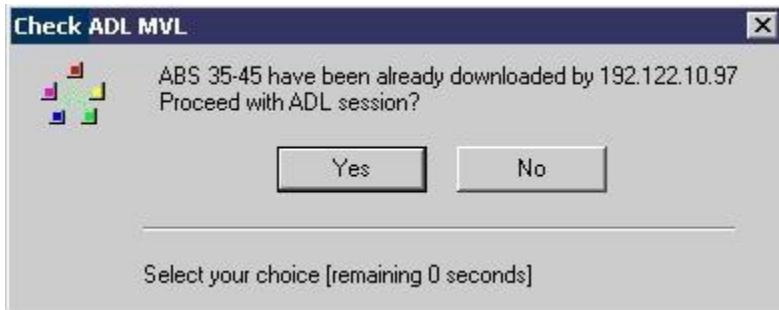
- WinTAX waits until it detects the presence of a new lap (increase of the ABS counter).
- The download does not begin trigger condition is not verified (Trigger = Trigger Out or Trigger IN).

The standard configuration to download ADL:

- The Trigger condition is Trigger OUT (**Trigger IN Warning not checked**)

This standard behavior can be modified in **Configuration of the above mentioned Download options**.

WinTAX will issue a warning if an ADL session is trying to download a set of data already downloaded by any PC (local or remote) as is shown in the following figure:



Trigger is intended as the acquisition status of the Data Logger:

- Trigger IN: the Data Logger acquires and saves data on the inner disk.
 - Trigger OUT: the Data Logger acquires but does not save data on the inner disk.

The checking of the change of the ABS counter (acquisition of a new lap) and the trigger status of the acquirer are transmitted to WinTAX by the **FindDevs**. FindDevs reads the broadcast packets sent by all devices connected to the network. These packets contain the information about the ABS and the trigger status. **FindDevs** interprets these information and makes them available for all application of the PC that require them (first of all WinTAX). The information are also available in the log window to debug.

FindDevs is automatically activated by WinTAX at the start-up of the Acquisition Manager when needed.

FLASH CARD

Process of data transfer from an external memory.

The data can be manually (DLM Flash Card) or automatically downloaded using the in AutoDownload function (ADL Flash Card).



The button Activate Flash Card Enabling/Disabling of the acquisition process. The button is provided with a menu where to select the FlashCard for the connection.

STATUS	DESCRIPTION
Green	Process enabled and connection to the device established
Red	Process enabled and connection failed
Grey	Process not enabled

Combo Alias

STATUS OF THE COMMAND	DESCRIPTION
	Alias of the Flash Card connected
	Flash Card connected
	Flash Card not connected
	Flash Card enabled to download ADL (and DLM)
	Flash Card enabled only to download DLM (no ADL)
Logger	Alias configured: the device is displayed in bold
Logger	Alias not configured: the device is not displayed in bold

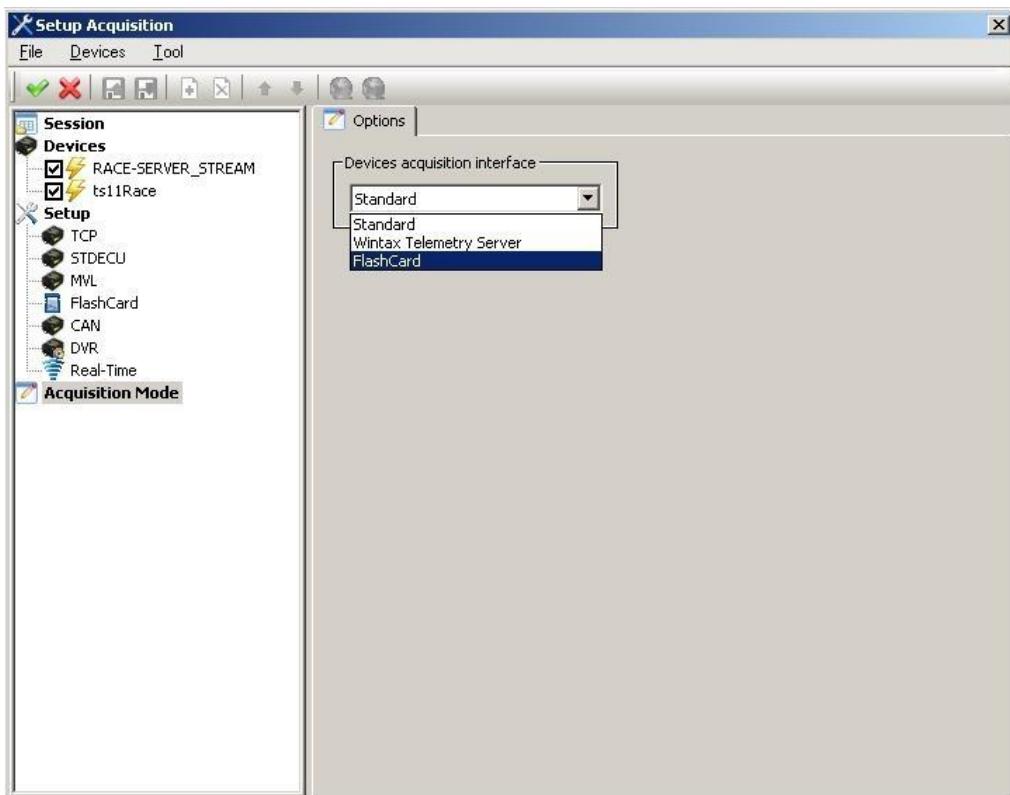
Flash Card Commands

COMMANDS	DESCRIPTION
Download data from data logger FlashCard	Command to ask for Flash Card TLap (DLM session)
Auto download FlashCard	Enabling/Disabling a session ADL Flash Card
Auto download latest data FlashCard	Similar at Auto Download FlashCard but after downloading all laps, automatically turns off.
Log Messages FlashCard	Shows/Hides the log window
Clear Data FlashCard	Command to cancel data from the Flash Card.

Configuration of the acquisition process

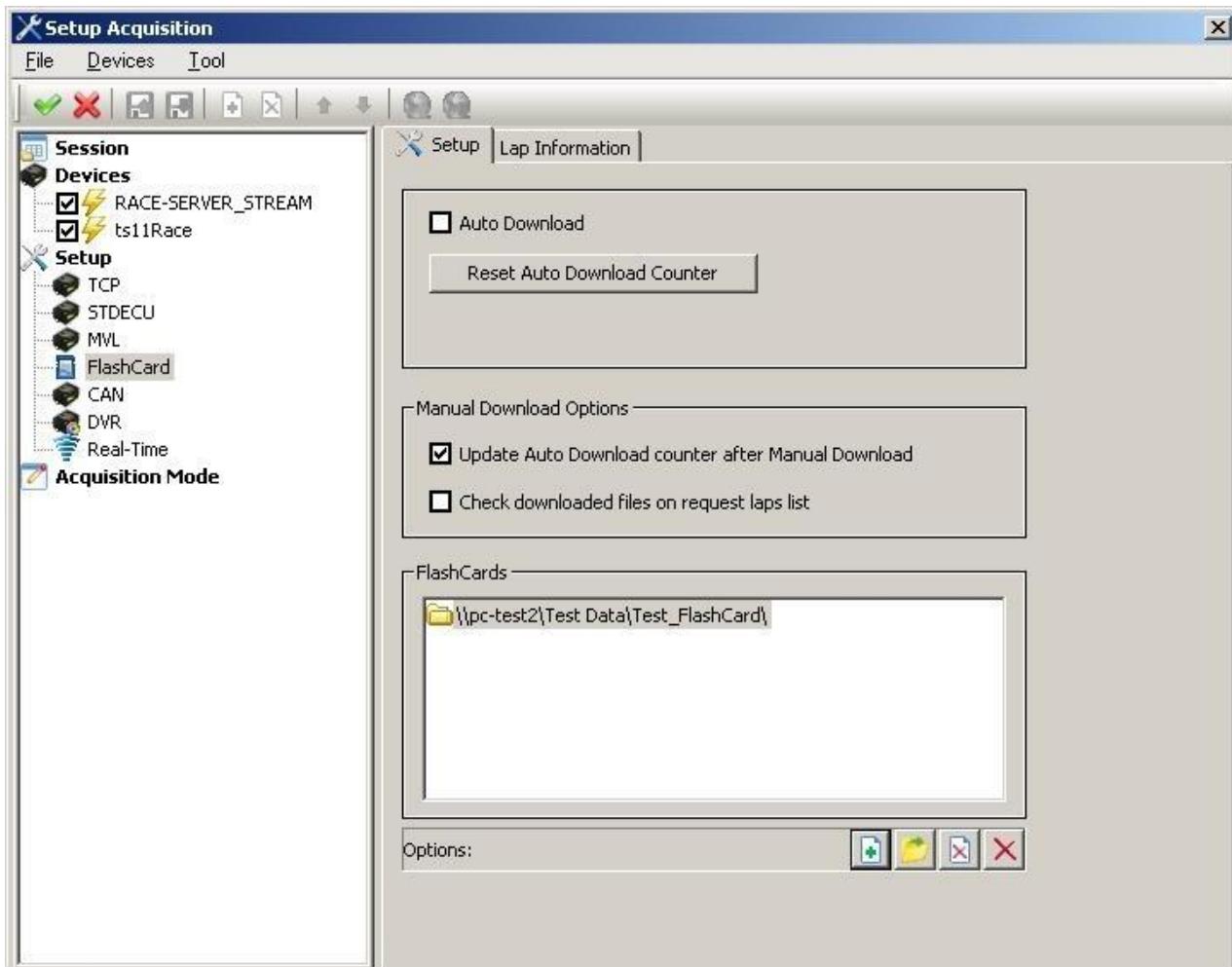
Acquisition Mode

The first thing to do is to configure the device acquisition interface. Concerning FlashCard there are two choices: **FlashCard** and **Standard**



- **Standard:** the connection with the devices is started through FindDevs.
- **Flash Card:** the connection with the devices is started on the external memory, enable this option to enable the download from a Flash Card.

Setup FlashCard



- **Auto Download:** Enabling/Disabling an ADL session
- **Reset auto download counter:** reset the ABS counter of downloaded laps.

Manual Download Options

- **Update auto download counter after Manual download:** with this option, after a manual download WinTAX will ask the user whether the previous operation should be considered as an ADL session. The answer "Yes" will force the following ADL session to restart the download from the last ABS counter downloaded in DLM.

- **Check downloaded file on request laps list:** If this option is enabled, allows to view if the lap has already been downloaded by the PC.

FlashCards

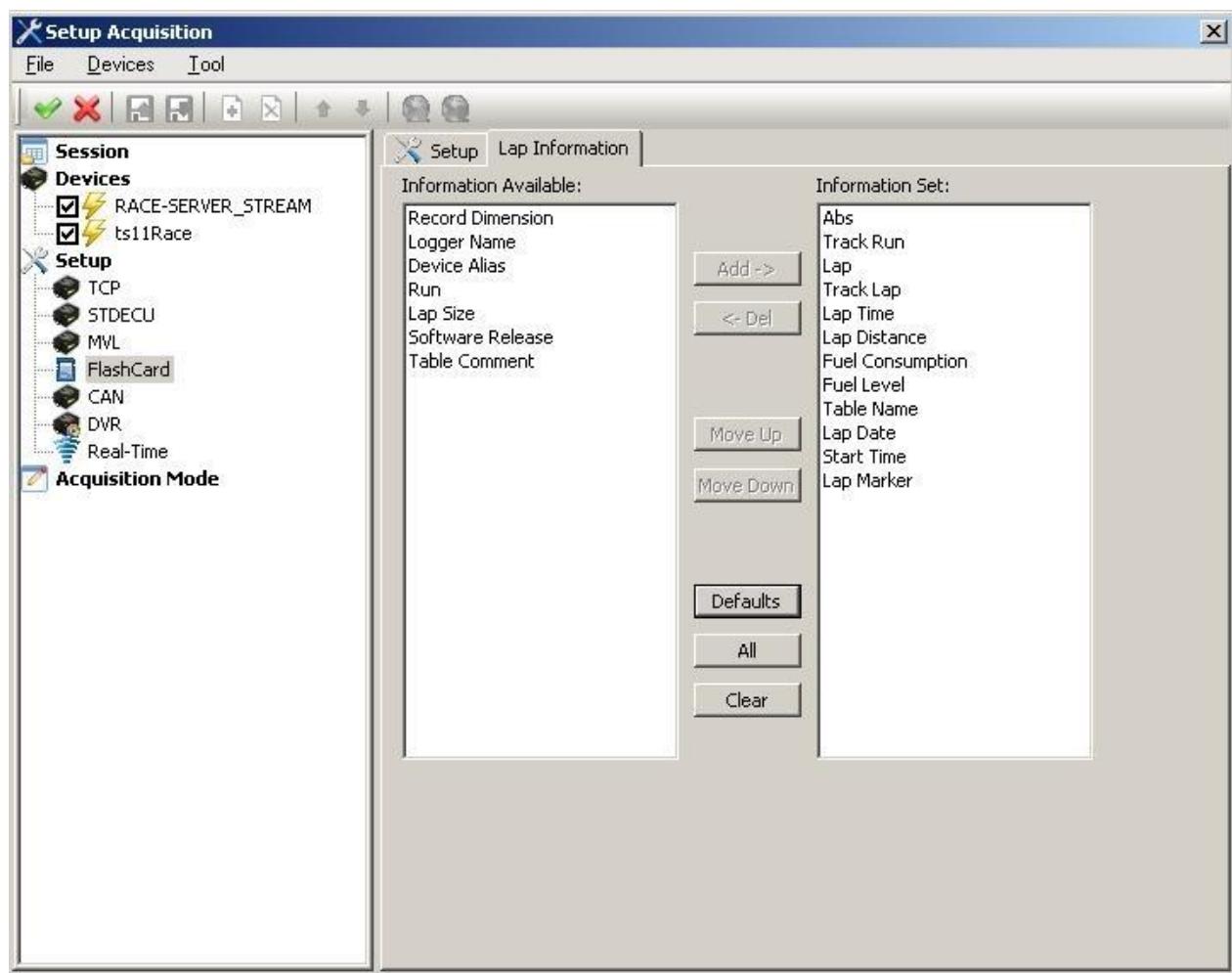
There is a list of the paths of the flashcard.

Options:

- **Add Path:** Open the browse selection to add a new path.
- **Change Path:** Open the browse selection to change current path.
- **Remove Path:** Remove the selected path.
- **Remove All:** Remove all paths.

Lap information

The list of information displayed in the header of the download window can be configured in the "Lap Information" page.



Start of the data download session

Set Device acquisition interface as Flash Card.

Enable the **Activate FlashCard** button. If in the above mentioned FlashCards list, only a path has been configured, the process will automatically connect to this FlashCard, otherwise a menu will open showing the list of the FlashCards configured on the PC and the user will choose the FlashCard to connect.

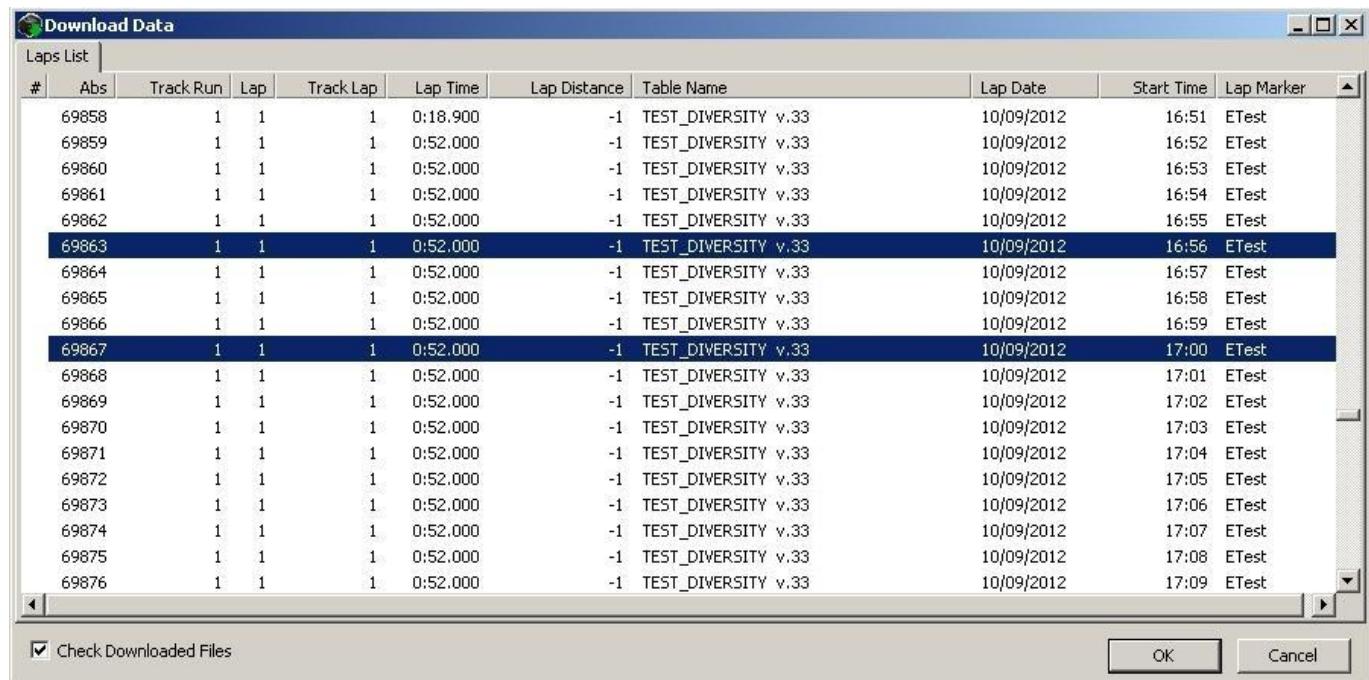
When the "Activate FlashCard" button becomes green, the process is active. It is therefore possible to start an acquisition session from the FlashCard displayed in the combo.

Through the combo, the FlashCard to which the user is currently connected can be modified.

Manual Acquisition - DLM Flash Card

To enable this type of download, the user must first of all manually select the lap(s) to be downloaded

The list of the laps is viewed by pressing the **Request TLap Flash Card** button: this command opens a window containing the complete list of all laps acquired up to that moment by the central control unit.



The screenshot shows a Windows-style dialog box titled "Download Data". The main area is a table titled "Laps List" with the following columns: #, Abs, Track Run, Lap, Track Lap, Lap Time, Lap Distance, Table Name, Lap Date, Start Time, and Lap Marker. The table contains 30 rows of data, each representing a lap record. The last three rows (69867, 69868, 69869) are highlighted with a blue background. At the bottom of the dialog, there is a checkbox labeled "Check Downloaded Files" and two buttons: "OK" and "Cancel".

#	Abs	Track Run	Lap	Track Lap	Lap Time	Lap Distance	Table Name	Lap Date	Start Time	Lap Marker
69858		1	1	1	0:18.900	-1	TEST_DIVERSITY v.33	10/09/2012	16:51	ETest
69859		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	16:52	ETest
69860		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	16:53	ETest
69861		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	16:54	ETest
69862		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	16:55	ETest
69863		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	16:56	ETest
69864		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	16:57	ETest
69865		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	16:58	ETest
69866		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	16:59	ETest
69867		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	17:00	ETest
69868		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	17:01	ETest
69869		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	17:02	ETest
69870		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	17:03	ETest
69871		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	17:04	ETest
69872		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	17:05	ETest
69873		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	17:06	ETest
69874		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	17:07	ETest
69875		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	17:08	ETest
69876		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	10/09/2012	17:09	ETest

After selecting one or more laps (via mouse or keyboard) and pressing the **OK** key, the data will be downloaded and saved on the local pc.



The laps cannot be removed, neither one by one nor as a whole, from the TLap window. This operation can be enabled only through the **Clear Data** command that removes ALL data acquired.

Like the **Request TLap Flash Card** command, the "Check Downloaded Files Flash Card" command allows to download the data in DLM. The procedure to download DLM is the same as what described for **Request TLap Flash Card**. This command allows to view in the TLap window, if the lap has already been downloaded from the PC.

In the figure the downloaded laps are checked in green. The download status is obtained by comparing the data available in the acquisition directory of the local pc and the data available on the Flash Card.

Download Data										
Laps List										
#	Abs	Track Run	Lap	Track Lap	Lap Time	Lap Distance	Table Name	Lap Date	Start Time	Lap Marker
70233		1	1	1	0:47.200	-1	TEST_DIVERSITY v.33	26/09/2012	15:44	ETest
70234		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	26/09/2012	15:45	ETest
70235		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	26/09/2012	15:46	ETest
70236		1	1	1	0:32.650	-1	TEST_DIVERSITY v.33	26/09/2012	15:47	
70237		1	1	1	0:06.800	-1	TEST_DIVERSITY v.33	26/09/2012	15:47	ETest
70238		1	1	1	0:11.850	-1	TEST_DIVERSITY v.33	26/09/2012	15:48	
70239		1	1	1	0:23.850	-1	TEST_DIVERSITY v.33	26/09/2012	15:50	ETest
70240		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	26/09/2012	15:51	ETest
70241		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	26/09/2012	15:52	ETest
70242		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	26/09/2012	15:53	ETest
70243		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	26/09/2012	15:54	ETest
70244		1	1	1	0:02.000	-1	TEST_DIVERSITY v.33	26/09/2012	15:55	
70245		1	1	1	0:49.100	-1	TEST_DIVERSITY v.33	26/09/2012	15:55	ETest
70246		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	26/09/2012	15:56	ETest
70247		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	26/09/2012	15:57	ETest
70248		1	1	1	0:52.000	-1	TEST_DIVERSITY v.33	26/09/2012	15:58	ETest
70249		1	1	1	0:51.500	-1	TEST_DIVERSITY v.33	26/09/2012	16:01	ETest
70250		1	1	1	0:47.000	-1	TEST_DIVERSITY v.33	26/09/2012	16:02	

Automatic Acquisition - ADL Flash Card

By enabling the **Auto Download** command, WinTAX starts the ADL session: in this type of download, the application itself verifies if new data are available on the Flash Card, it checks the list of laps and enables the download.

- WinTAX waits until it checks if a new lap is available.



If a new lap on the Flash Card is available, it is detected by a file whose functioning is similar to the FindDevs tool.

DVR

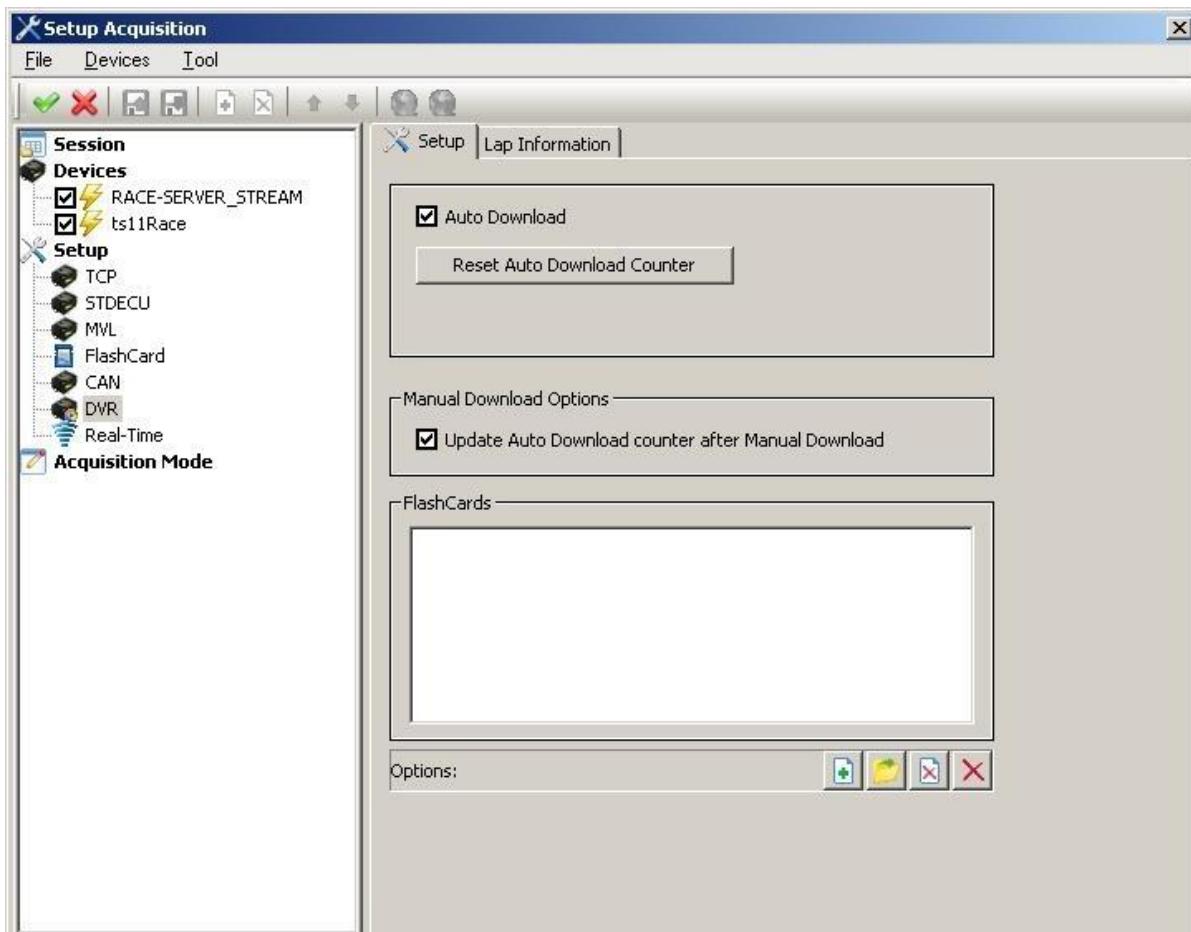
Process of data transfer from a Data video Recorder.

The data can be manually (DLM Flash Card) or automatically downloaded using the in AutoDownload function (ADL Flash Card).



Activate DVR: Enabling/Disabling of the acquisition process

Configuration of the acquisition process



Auto Download: Enabling/Disabling an ADL session.

Reset auto download counter: reset the ABS counter of downloaded laps.

Manual Download Options:

Update auto download counter after Manual download: with this option, after a manual download WinTAX will ask the user whether the previous operation should be considered as an ADL session. The answer "Yes" will force the following ADL session to restart the download from the last ABS counter downloaded in DLM.

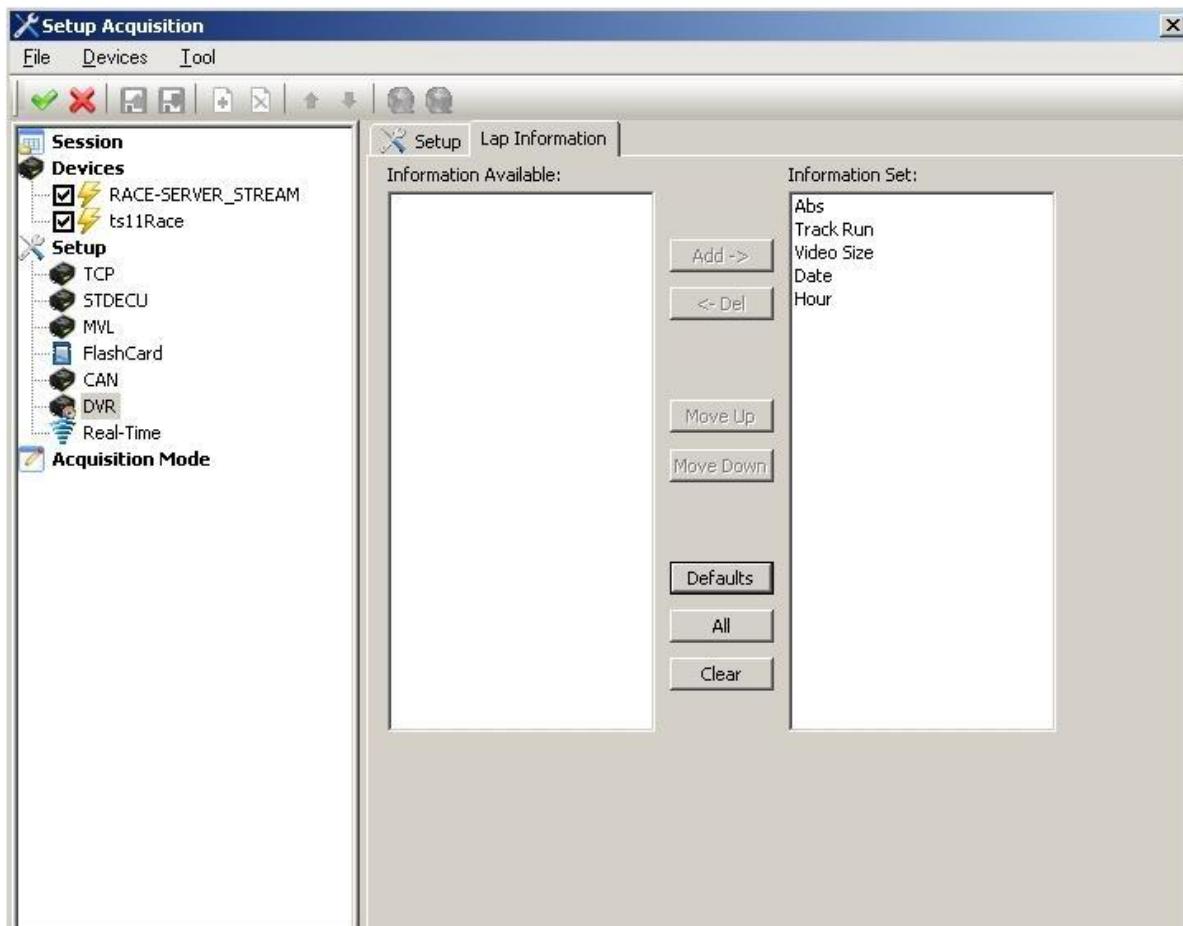
FlashCards: list of the paths of the flashcard

Options:

- **Add Path:** Open the browse selection to add a new path.
- **Change Path:** Open the browse selection to change current path.
- **Remove Path:** Remove the selected path.
- **Remove All:** Remove all paths.

Lap information

The list of information displayed in the header of the download window can be configured in the "Lap Information" page.



CAN

The mode of acquisition on line generic CAN allows to capture and save data received from a CAN generic without specific protocol. The channels definition obtainable on line CAN, can be made in manual mode, by defining the signal from dedicated environment or automatically, by importing a file format standard dbc (standard vector).

CAN Commands

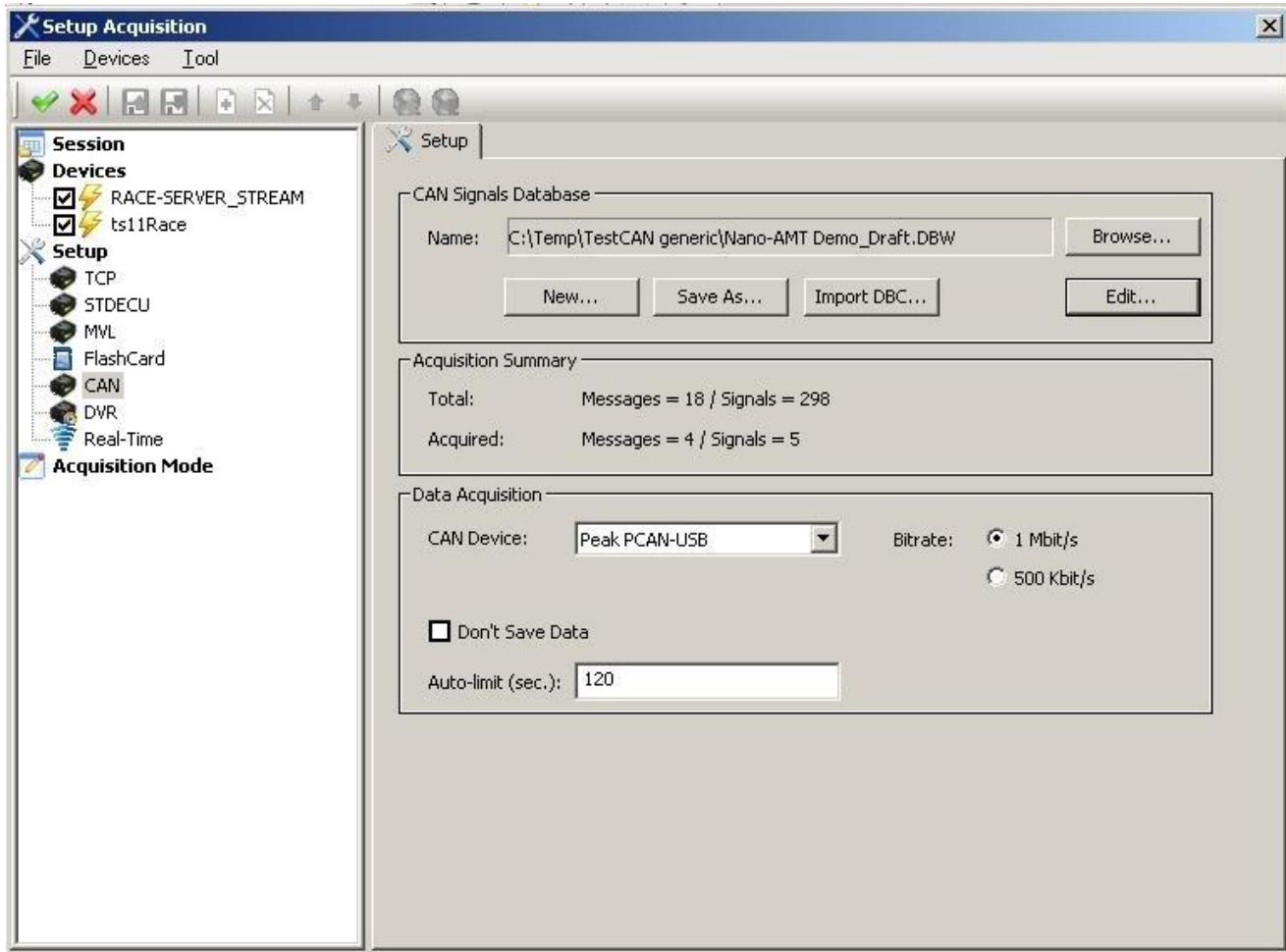
The Can commands are the same from toolbar and menu; in the picture below there is the CAN toolbar.



COMMANDS	DESCRIPTION
Activate CAN	Enabling/Disabling of the acquisition process. the button can assume one of the following status:
STATUS	DESCRIPTION
Green	Process enabled and connection to the device established
Red	Process enabled and connection failed
Grey	Process not enabled
Log Message CAN	Shows/Hides the log window
Enabling/Disabling of the acquisition process	

Configuration of the acquisition process

The configuration environment allows the definition of the channels map that can be acquired on the CAN line.

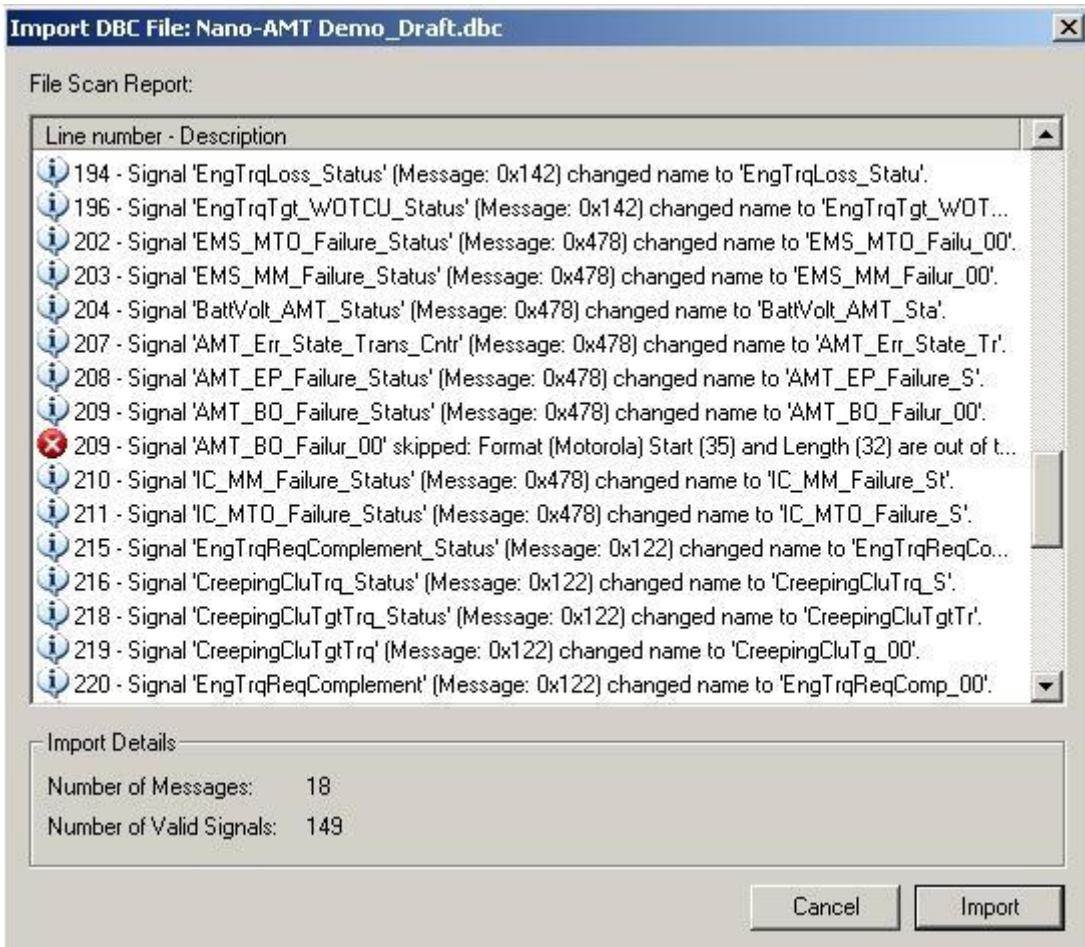


CAN Signals Database

The CAN channels map is composed by elements called signals; in this sections the user can configure the signals.

- **Name:** Path and name of the configuration file.
- **New:** Create a new file .dbw which contains the description of the geometry of the messages.
- **Save As:** Save a copy of the loaded configuration file.
- **Import DBC:** Imports a standard vector file (.dbc) and converts it in a .dbw file.

The Import DBC button opens a file browser; selecting and opening a file with the browser, the following window appears.



The window shows a report about import DBC process. In window are listed are all the valid signals (imported), the invalid signals (skipped) and the message where every signal comes from. Above the list there is a short report of import operations.

The Cancel button aborts import; the Import button complete the operations and convert all signals in a .dbw file.

- **Edit:**

The Edit button opens the CAN Signal Database Editor where signals are configured.

Acquisition Summary

- **Total:** This is an information message regarding the number of messages and signals contained in the map.
- **Acquired:** This is an information message regarding the number of messages and signals choose by the user for acquisition.

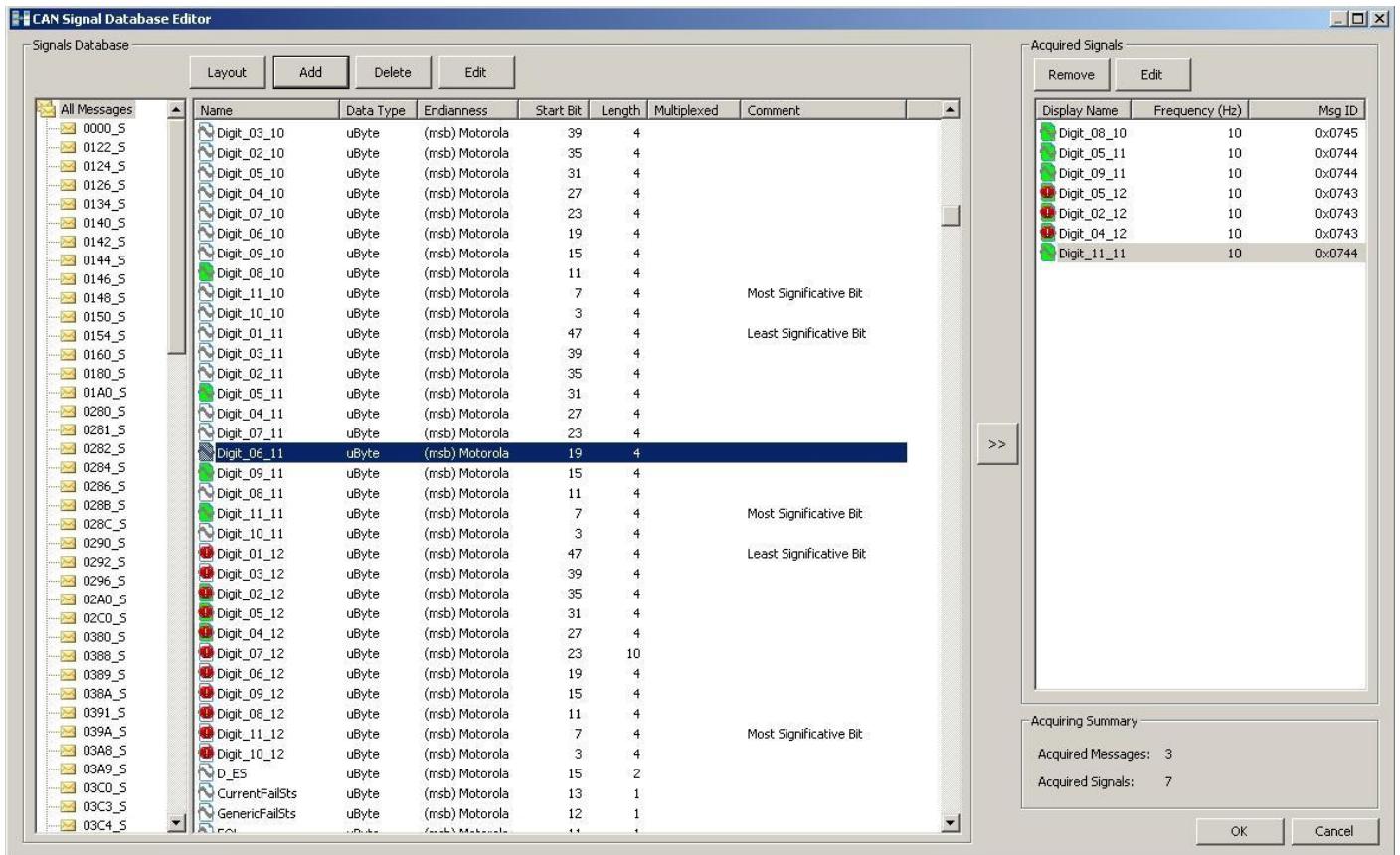
Data Acquisition

- **CAN Device:** refers to the adaptor models supported by WinTAX: **NetronicsCANdo, Peak PCAN-USB, Vector**.
- **Bitrate:** the two values admitted for bitrate are 1Mbit/s and 500Kbit/s

- **Don't save Data:** If this flag is ON, acquisition process will not save dstData.ztx file.
- **Auto-limit (sec.):** Defines the length in seconds of the lap; default is 120 seconds.

CAN Signal Database Editor

This environment permits to configure the acquired signals. this is the main editor page.



In the window there are two areas, the Signal Database and the Acquired Signals. In the Signal Database area all messages and signals in database are listed, while in the Acquired signals area the only listed signals are those selected for acquisition by user. The two areas are separated by a button with whom the signals are added to the list of acquisition.

Signal Database

All messages are listed in the left tree. Each message is a group of signals. It's possible to add a new message pushing **Add** button when the **All Messages** label is selected. The **Add** button usually add a new signals at selected message; if there are not selected message, a new message will be create. The signals members of the selected message are displayed in the central list. Signals with the white icons are not selected for the acquisition, those with the green icons, however, are selected for acquisition. If the icon is red, it means that there are overlapping bits on the map (see button layout to solve the problem).

In the central table are displayed the following information:

- **Name:** Name of the signal (64 characters)

- **Data Type:** The data type can be: uByte (unsigned byte), sByte (signed byte), uWord (unsigned word), sWord (signed word), uLong (unsigned long), sLong (signed long), Float, FloatX
- **Endianness:** Intel = little endian, Motorola = big endian
- **Start bit:** Offset in bits of the data sample from the packet start (from 0 to 63)
- **Length:** Length in bits of the data sample (from 1 to 32)
- **Multiplexed:** Signal multiplexor
- **Comment:** Signal notes

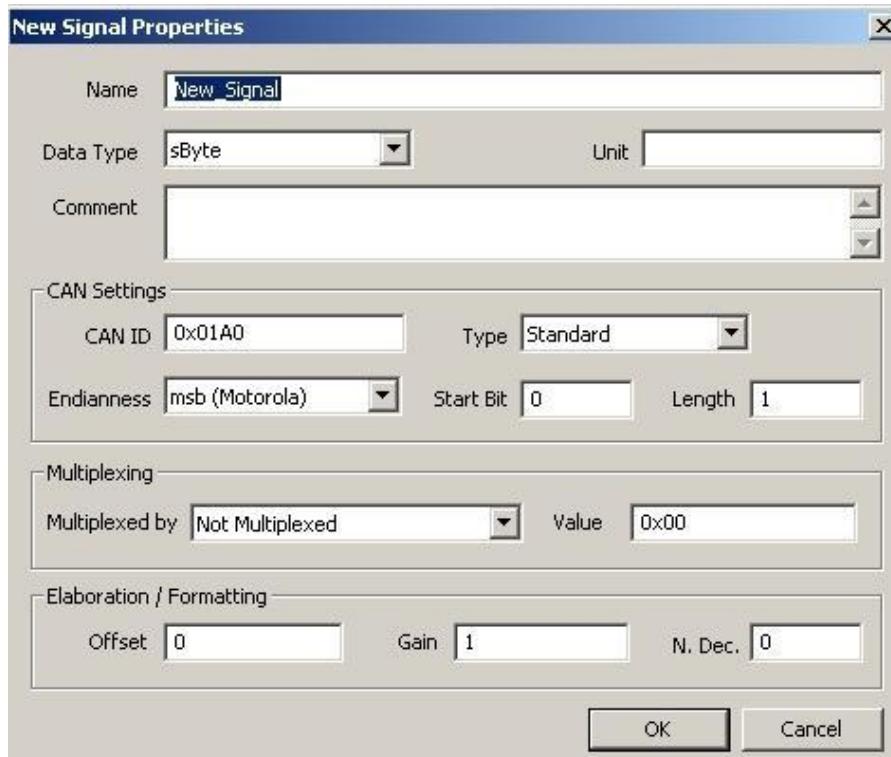
Above the signals table there are some buttons which performs the following commands:

- **Layout:**

See the CAN Message Layout window

- **Add**

The add button opens the following window dialog:



- **Name:** Name of the signal
- **Data Type:** The data type can be: uByte (unsigned byte), sByte (signed byte), uWord (unsigned word), sWord (signed word), uLong (unsigned long), sLong (signed long), Float, FloatX
- **Unit:** The measurement unit of the output signal
- **Comment:** signal notes

CAN Settings

- **CAN ID:** Message identifier.
- **Type:** Standard or Extended
- **Endianness:** Intel or Motorola
- **Start bit:** Offset in bits of the data sample from the packet start (from 0 to 63)
- **Length:** Length in bits of the data sample (from 1 to 32)

Multiplexing

- **Multiplexed by:** Name of the multiplexor signal
- **Value:** Multiplexing value

Elaboration / Formatting

- **Offset:** The offset values are algebraically summed to the channel values.
- **Gain:** The gain values are multiplied to the channel itself.
- **Decimals:** Number of decimals in channels values.

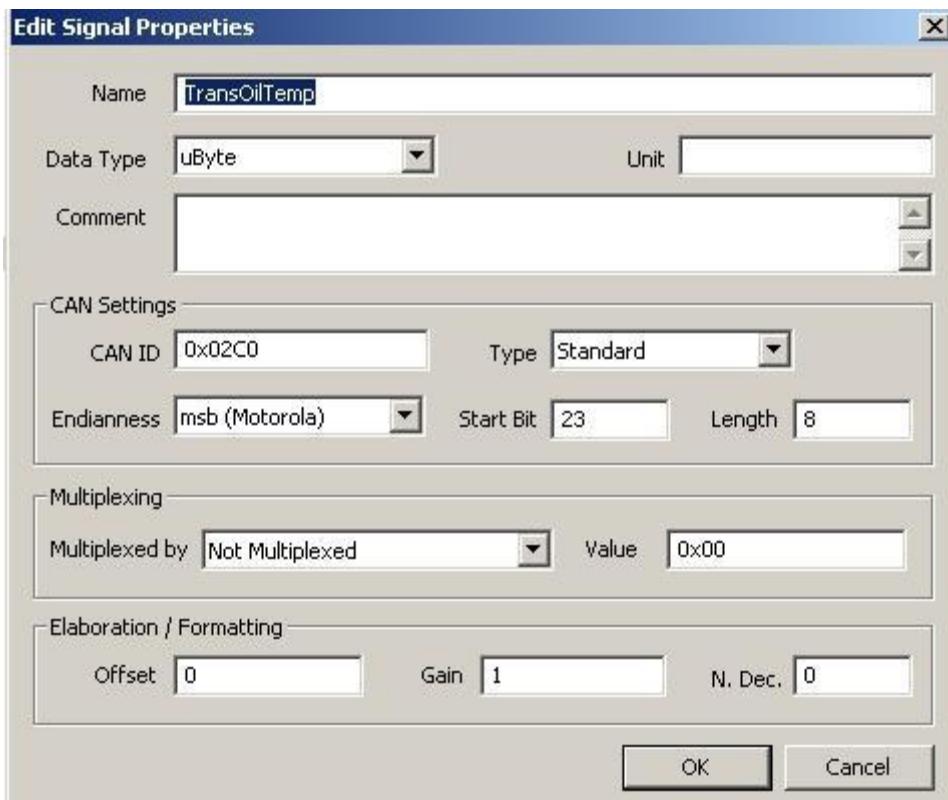
- **Delete**

The command delete the selected signals.



- **Edit:**

The command edit the properties of one or more selected signals.



CAN Message Layout

This button opens a new window which shows the graphical layout of the selected message and is used to configure the bits position of each signal.

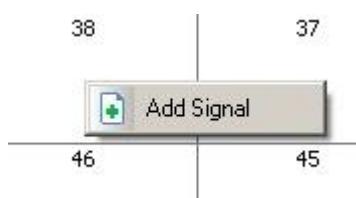


The grid has 64 cells with index from 0 to 63. Every cell represents a bit and a consecutive group of bits with the same color represents the bits of a signal. A signal can have one or more bits in the message layout. The grid is 8x8 so each row represents a byte and the bits order goes from right to left and from up to down. Each single bit or each group of bits with the same color contains the name of the signal it refers and the indication of lsb (less significant bit) and msb (most significant bit) and; the arrows indicate the correct direction of reading. The whole information regarding the symbols are listed in the following picture:

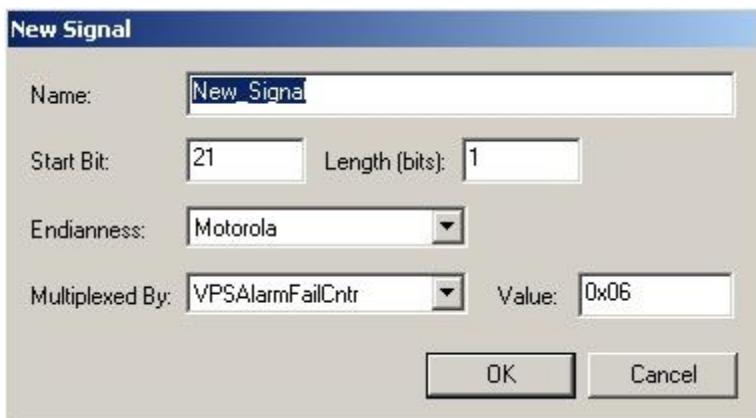
Each signal can be selected and the user can performs the following operation on selected or unselected cells:

- **Add signal**

It's possible to insert a new signal using the command **Add signal** on right-click popup menu on a white cell or the button **Add signal** at the right of the table.

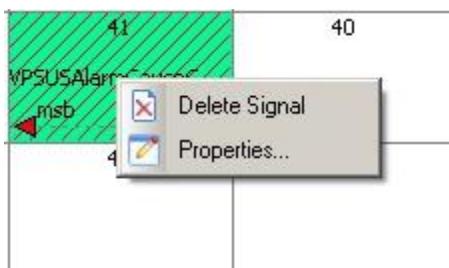


The command opens the following window:

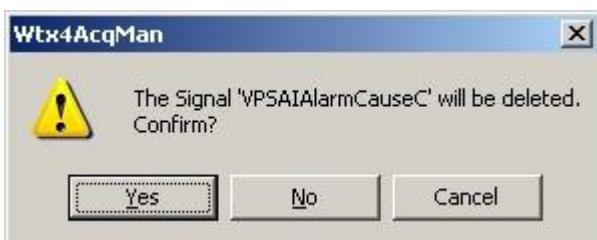


- **Name:** Name of the signal
 - **Start bit:** Offset in bits of the data sample from the packet start (from 0 to 63)
 - **Length:** Length in bits of the data sample (from 1 to 32)
 - **Endianness:** Intel = little endian, Motorola = big endian
 - **Multiplexed by:** Name of the multiplexor signal
 - **Value:** Multiplexing value
-
- **Delete signal**

When a signal is selected, you can delete it with **Delete** button on keyboard or using the command **Delete Signal** in the right-click popup menu.

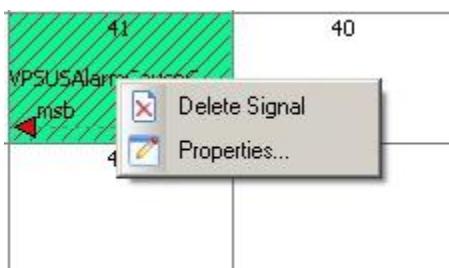


The command opens the following confirm message.



- **Edit signal**

When a signal is selected, you can modify it with the command **Properties**, in the right-click popup menu.



The command opens the following window:



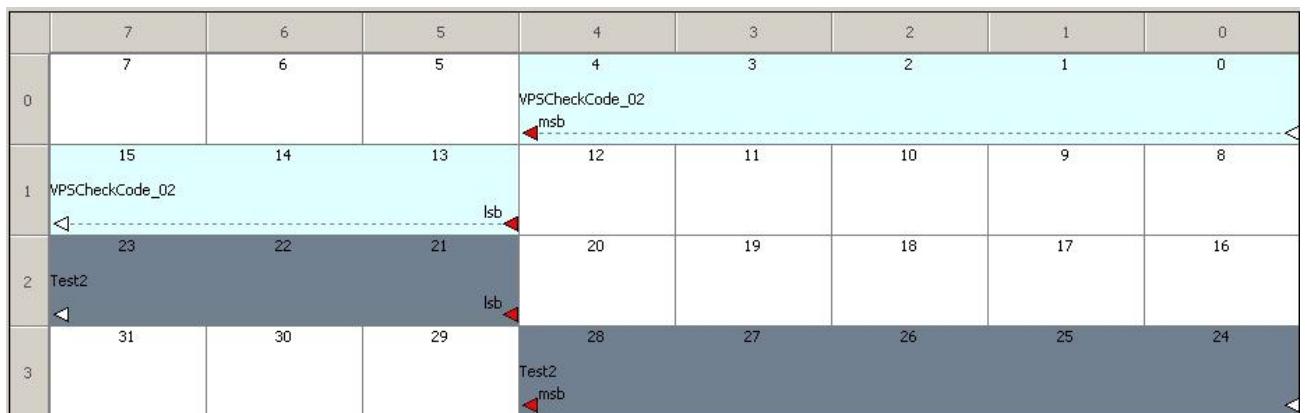
- **Name:** Name of the edited signal; you can't modify it.
- **Start bit:** Offset in bits of the data sample from the packet start (from 0 to 63)
- **Length:** Length in bits of the data sample (from 1 to 32)
- **Endianness:** Intel = little endian, Motorola = big endian
- **Multiplexed by:** Name of the multiplexor signal, if defined.
- **Value:** Multiplexing value

- **Move signal**

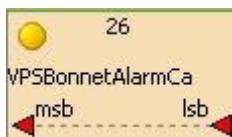
When a signal is selected, you can drag it with the mouse over another sequence of bits. If the bits of the two or more signals are overlapped, then a warning icon appears in each overlapped cell.



when you drag a signal with more than one bit, the behavior is different depending on the type of Endianness, as shown in the picture below where the signal VPSCheckCode_02 is Motorola and Test2 is Intel. In Motorola mode the bits decrease from lsb to msb and in the Intel mode the bits increase from lsb to msb where lsb means less significant bit and msb means most significant bit.



A signal can be configured as **Multiplexor**; in this case the signal is identified by a small yellow circle inside the first cell of the signal as in picture below:

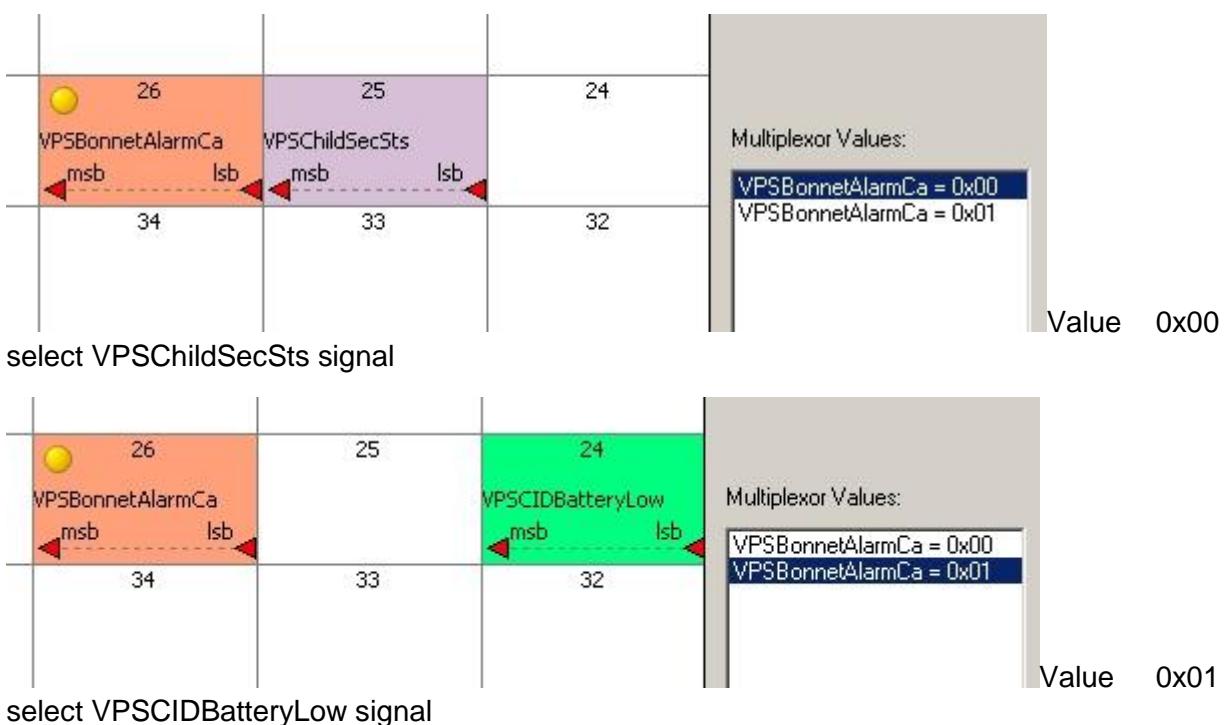


A Multiplexor is a signal which arrange the other signal depending on his values; the values are shown in the list at the right of the environment.

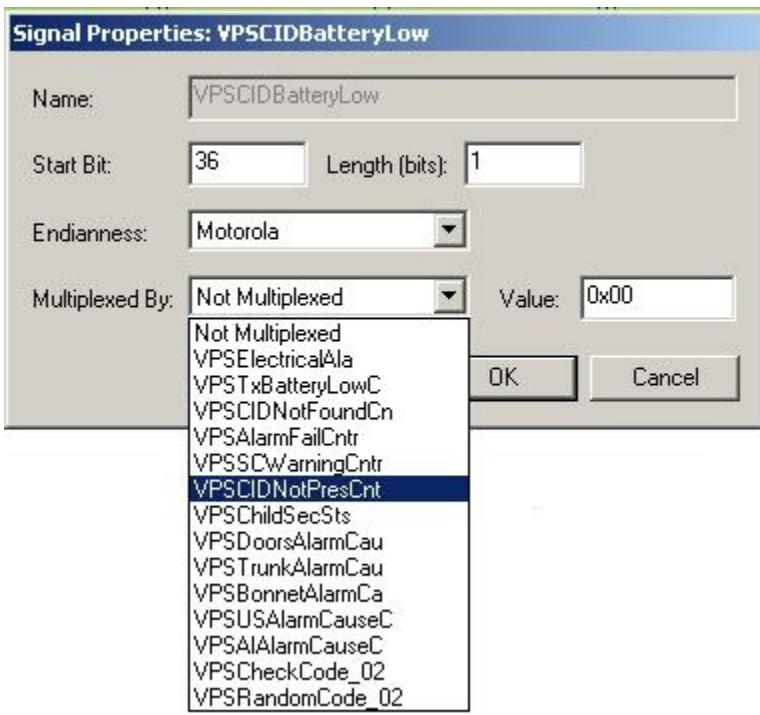
Multiplexor Values:

```
VPSBonnetAlarmCa = 0x00  
VPSBonnetAlarmCa = 0x01
```

When the signal assumes the value 0x00, one signal is selected, when assumes the value 0x01, another signal is selected, as shown in pictures below.



The Multiplexor signal is configured using the property of another signal from where you can choose his multiplexor, as shown here where `VPSCIDNoPresCnt` will be the multiplexor and `VPSCIDBatteryLow` one of the multiplexed (with value 0x00):



The button **Add Mux Value**, on the right of the window, adds a default value for multiplexed signals when a multiplexor is already defined.

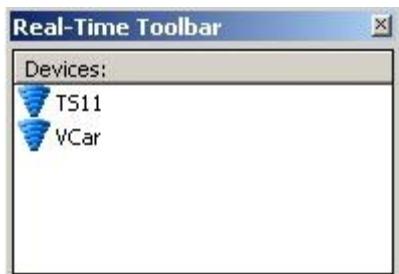


When you create a new signal, it will assume this Multiplexor Value.

Real time telemetry

Acquisition process of *Real Time Data*.

All commands and their procedures to acquire Real Time data are described here.

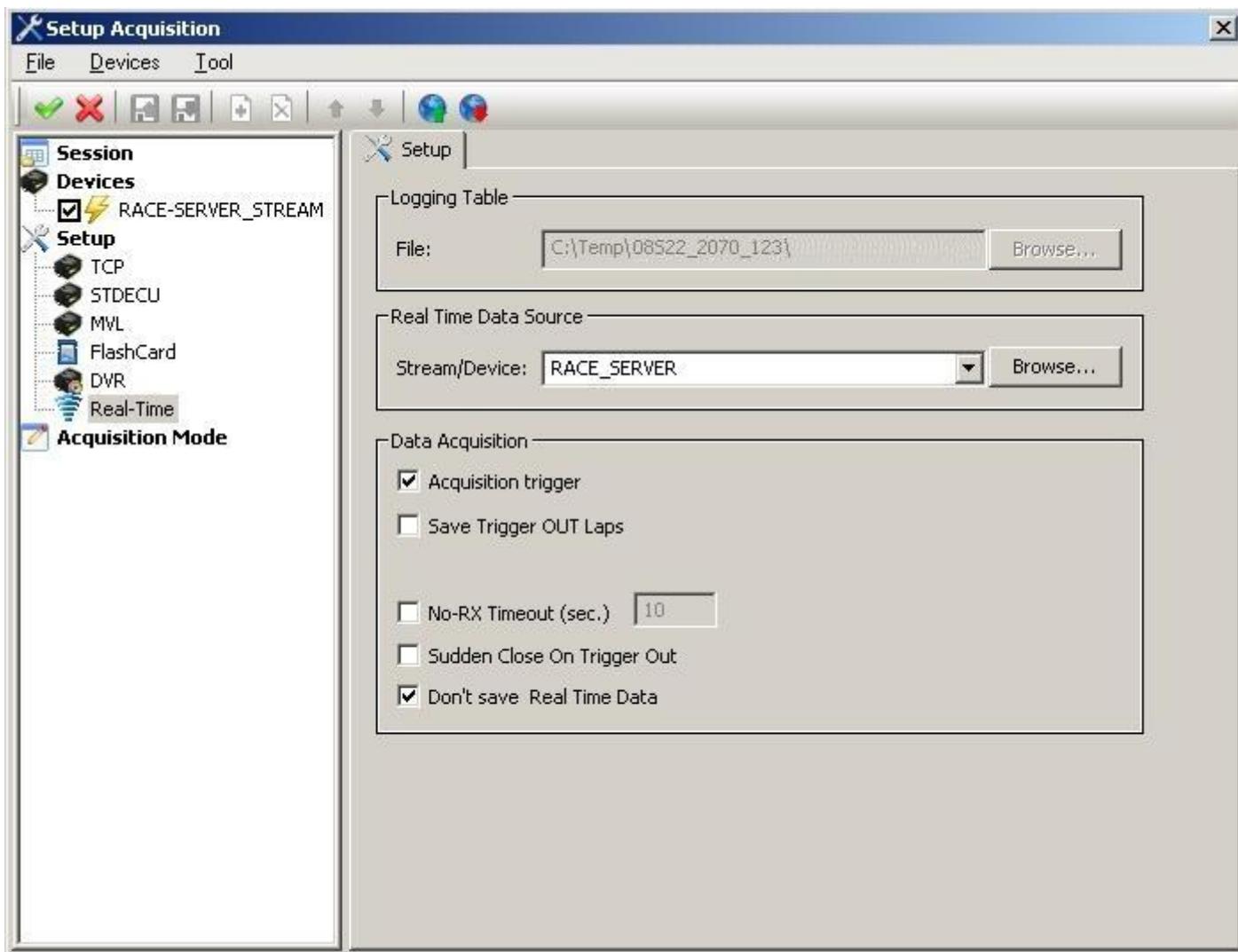


Real time bar: list of the devices available

Each device can be started or stopped with double click. The status colors are the following:

STATUS	DESCRIPTION
Green	Process enabled and connection with the device displayed in the combo
Red	Process enabled and connection failed
Blue	Process not active

Configuration of the acquisition process



Logging Table: points to the directory where WinTAX looks for the logging table (*.DLS) to be used with the Real time data stream; with WTS server it is not used.

Real Time Data Source: selects the Real time device or stream to receive data in local master mode. For WTS the **stream** is selected before the Real time process is activated.

Data Acquisition: options to enable detection of logging trigger (as defined in logging table).

Acquisition trigger

Enables detection of the trigger condition.
Always to be left enabled

Save trigger OUT laps	Enables WinTAX to save Real time data even when logger on device is not saving (out of trigger). This option should be left disabled except for debug purposes.
No-Rx Timeout (sec.)	Will close the current Real time lap if no data is received for a specified time This option is useful to ensure that data are captured when the device stops off track
Sudden Close On Trigger Out	Inhibits logging post-trigger time
Don't save Real Time Data	If this flag is ON, Real Time process will not save dstData.ztx file and nbtData.ztx files

Acquisition Mode

Select the method used by WinTAX to receive Real time data

Standard	Allows to connect directly to a PBE/GRX receiver
WinTAX Telemetry Server	Uses the WTS network distribution infrastructure. If enabled the user can optionally <ul style="list-style-type: none"> • configure the server used for context information • automatically switch to server when connect to stream

Real time telemetry (NBT)

NBT (Narrow Band Telemetry) is a telemetry system developed to extend radio coverage on circuits where the wide-band Real time system cannot guarantee continuity; the NBT real time stream works in parallel with the Real time system and can be used as a back-up to transmit the most critical data channels from the device in case of loss of Real time coverage.

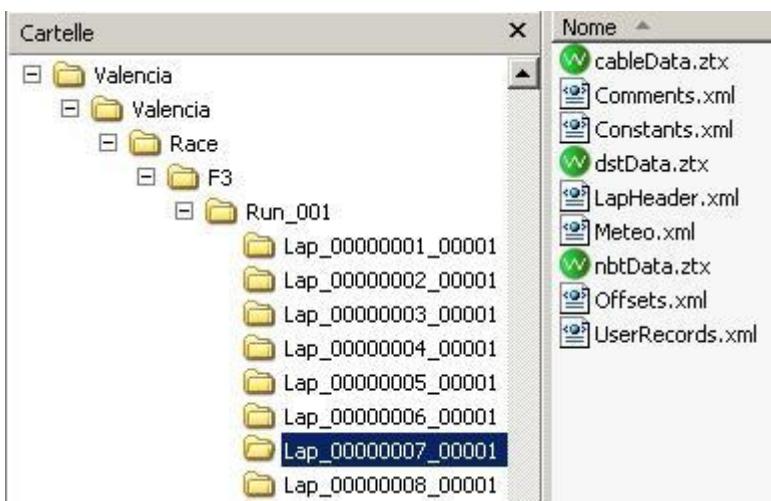
The NBT acquisition is automatically enabled together with the Real time one. The management of this acquisition depends on the firmware version of the logger and on the WinTAX enabling.

The management of the NBT telemetry is transparent for the user, this acquisition cannot be activated separately from Real time. The configuration is the same: see the corresponding chapter for further details on the options and on the Real time acquisition procedures.

Read here to find a general description of the functions, showing all points where WinTAX can (or must) make a distinction between the two acquisition processes.

WinTAX Archive

WinTAX stores NBT data on a separate file, *nbtData.ztx*, within the archive at the lap level.



Show table

The channels which make up the NBT suitable for the current data can be viewed by selecting Utility/View acquisition table and selecting the *NBT* tab .



Channel browser

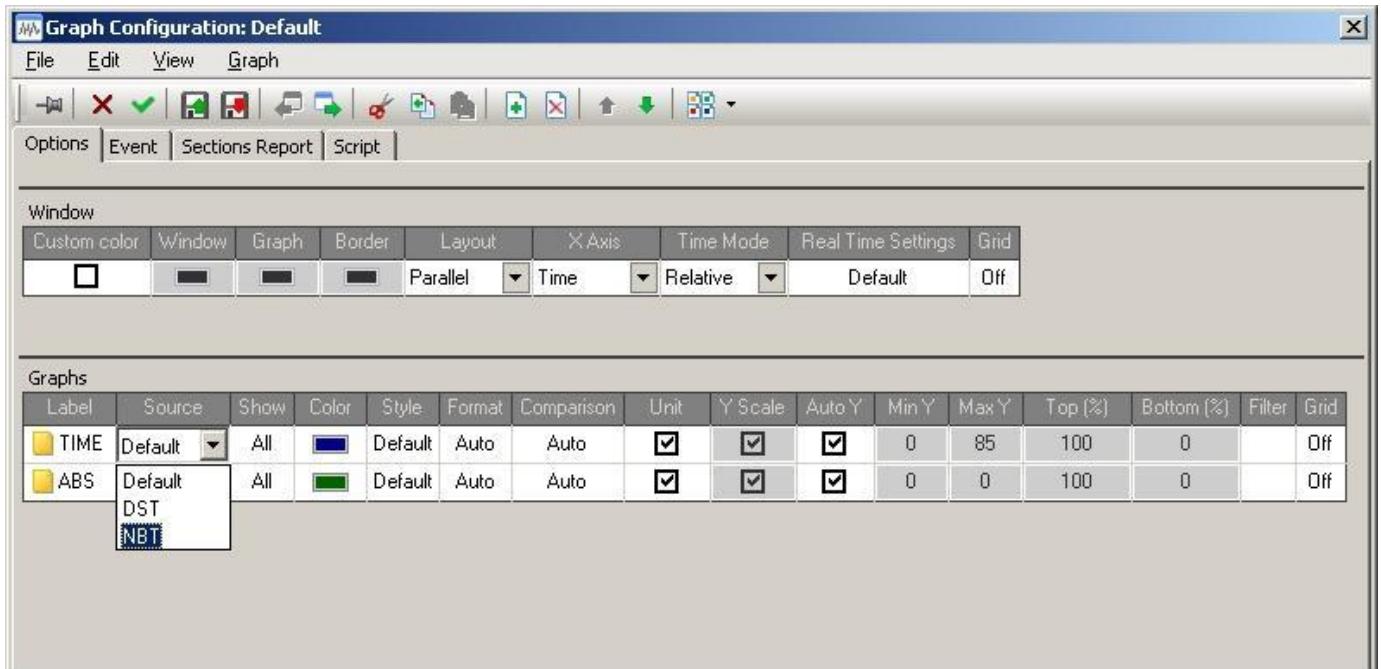
NBT channels in the *Channel Browser* are marked in dark green. If a channel is transmitted both via NBT and Real time it will be marked in green with a dark green background.



Channel configuration

On each graph and for each channel it is possible to select the source from which WTX has to load data.

Three sources are available



- Default (merge): for real time data the primary source is the Real time, if there is radio drop-out (No-Rx) on the Real time stream the channel values will be replaced with those coming from the NBT (if present), which will typically be sent at a lower rate. For post-processing the primary source will be Real time data, if the channel is not available it will be searched for in the NBT data.
- **NBT:** only values coming from NBT source will be plotted
- **Real time:** only values from Real time source will be plotted.

Data Browser

A special filter allows to view only NBT laps in the Data Browser; if the REAL TIME filter is active the data browser will show a marker when both Real time and NBT laps are available:

	2231	563	1	1:01.282	Out + Box
	2232	563	2	0:55.071	
	2233	563	3	0:40.561	
	2234	563	4	0:20.086	Test

Intelligent Data loading

A Rx-Task Auto Update Run is available in the Acquisition Manager (Fig1); the corresponding button to carry out and notify the process is available on the WinTAX Rx Buttons Bar toolbar (see Fig2, like Auto RX Task).

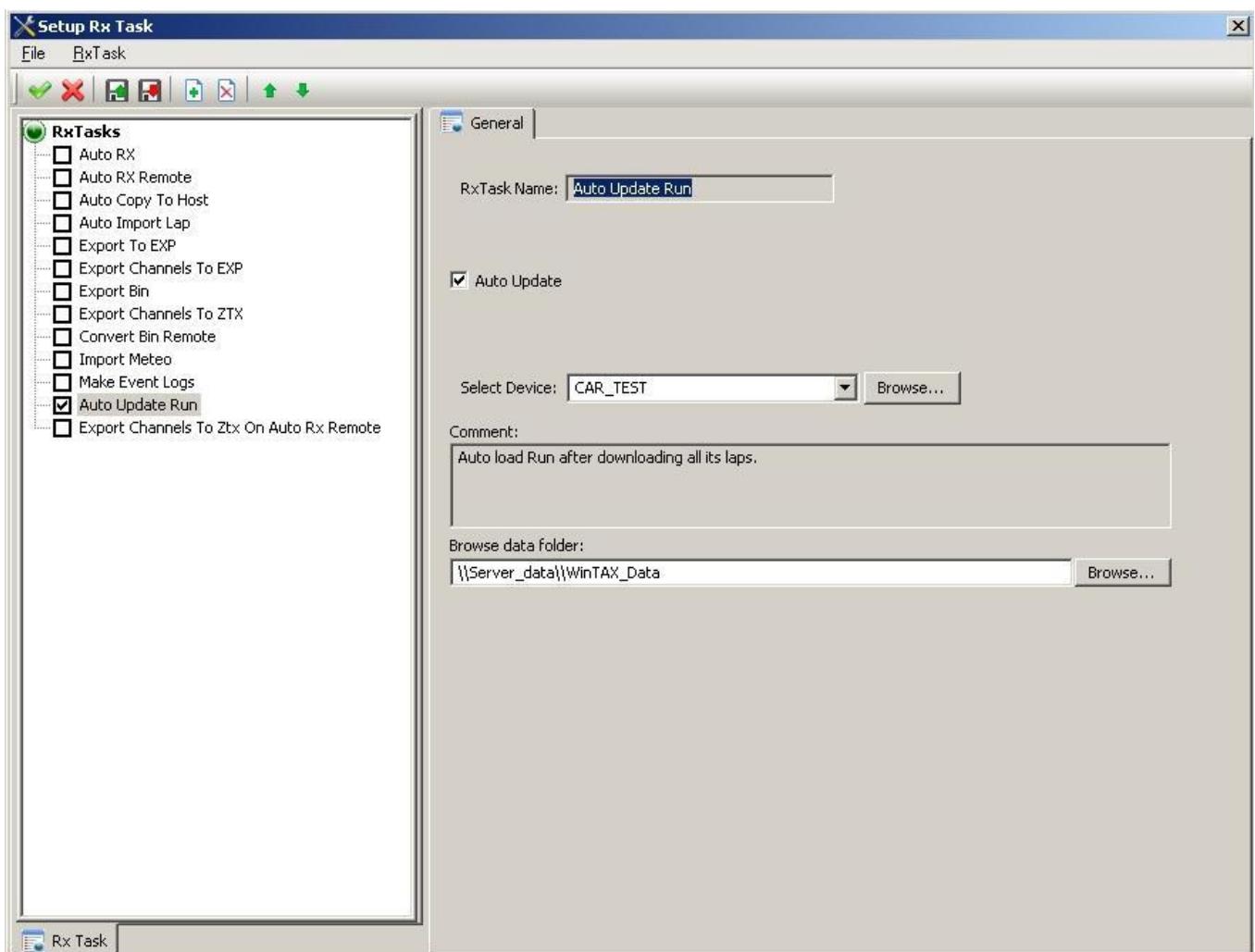


Fig1 Rx Task settings: Auto Update Run

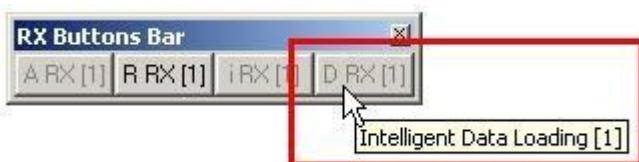


Fig2 WinTAX Rx Buttons Bar: Auto Update Run

This task has three options:

- Auto Update
- Select Device
- Browse data folder

The task does not require current PC to download laps, therefore the user can select a 'Search' folder in the same way as the Auto RX Remote task. The corresponding folder is independent from the path for the auto-rx on remote.

The search for the last Run works as follows: the Auto Update Run searches in the associated folder for new laps acquired. When it finds a new lap, the task does not send a notification to WinTAX until the Run is closed.

The 'Closed Run' information can be set only by WinTAX while downloading laps in ADL mode (the condition for a 'closed run' is the successful end of the ADL sequence or a change in the Run counter of downloaded lap. The 'Closed Run' information is saved as an additional element into the archive at Run level.

- If the Auto Update option is enabled, and in the Working Dataset Real Time laps corresponding to the same Run are currently loaded, when the download of a new run is completed WinTAX will replace the actual working data-set laps loaded (containing Real Time laps) with corresponding cable laps and the button will not flash. The replacement lap is applied even if the current selection is a single lap selection, a lap comparison with other Datasets or an append of laps within the Working Dataset. All analysis windows associated to Working Dataset are updated, but current zoom is kept.
- If the Auto Update option is enabled, in the Working Dataset Real Time laps from the same Run are not loaded, when the download of a new run is completed the button will flash for 10 seconds and by clicking on it WinTAX will load into the Working Dataset the last cable run downloaded in the append mode.
- If the Auto Update option is disabled the button will start flashing when the download of a new cable run is completed and by clicking on it WinTAX will load the last cable run downloaded into the Working Dataset in append mode.
- Uncheck the task flag on the root tree to interrupt the task

The Select Device option allows the user to decide from which single device WinTAX receives notifications for new RUNs available. The browse of the Device alias will be based on WTS or FindDevs depending on the acquisition interface used. Anyway the user can manually enter the name of the required Device.

Ethernet download interface

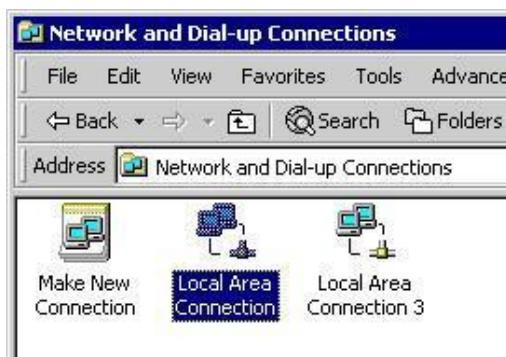
To download data via cable, connect the PC directly to the data logger using a standard Ethernet network adapter. For instructions about the interface adapter installation please refer to the instructions supplied with the hardware.

Configure the PC with a fixed IP address

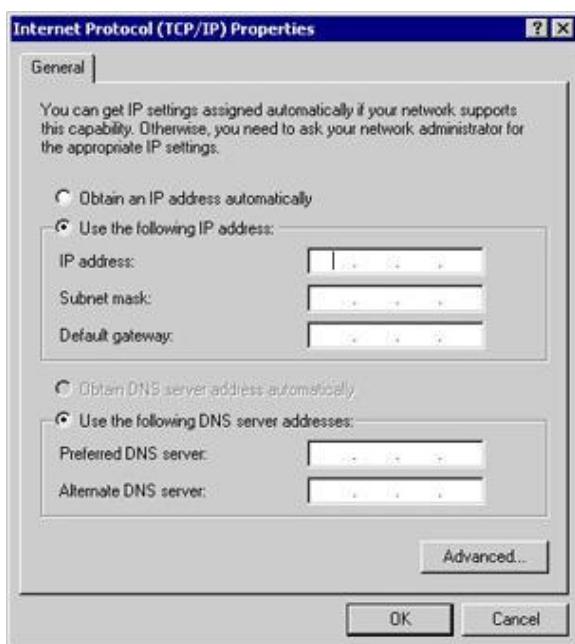
Instructions for Windows 2000/XP

The data logger is programmed with a fixed IP address. Unless the network is set up to assign the correct address to the PC via DHCP, define a fixed IP address for the PC to allow the two devices to communicate

1. Connect the PC to the data logger via Ethernet link. From the start menu select *Start/Settings/Control Panel* and double click on the *Network* icon.
2. Right click on the Network connection to be used to download (more than one may be available).



3. Click on *Properties* and then select *Internet Protocol (TCP/IP)* from the list of items.



4. Take note of the settings found here. Configure them later when the PC has to be connected back to the network.
 5. Choose an IP address on the same subnet as the data logger.
 6. Configure the IP address of the PC as follows, e.g.:
 - IP address: 192.168.1.xxx
 - Subnet mask: 255.255.255.0
 - Default gateway: none
 7. To check if the IP address change was successful, use the DOS command prompt (*Start/Run/cmd*) and enter the *ipconfig* command. Check if the new IP has been accepted. If not so, repeat the configuration steps.

Check the communication link with the Data Logger

1. Run the FindDevs program.
 2. A device identification message like the following one should be available:

NameLogger_SN/DeviceAlias/(ABS, No Table)

The labels in the identification string give information about the device and the current status of logging

SN = logger serial no.

ABS = absolute lap counter index

Alias = a label which the user programs in the device from Axon, typically the chassis number or device name

The logging status is as follows:

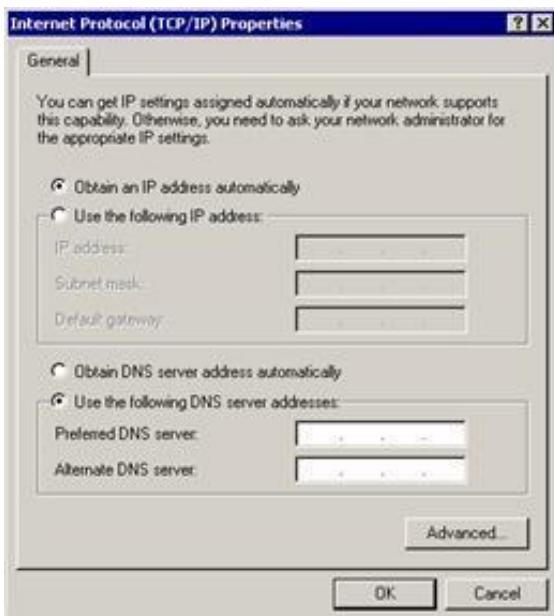
Status	Description	Caused by
No Table	Acquisition table is not loaded	First use, after format or clear data
TrigIn	Trigger In	When the logging trigger condition is true (i.e. logging active) or the trigger is not configured
TrigOut	Trigger Out	When the logging trigger condition is false (i.e. logging not active)

3. As an alternative open a prompt command and enter the *ping* command followed by a space and data logger IP address.

```
C:\WINNT\system32\cmd.exe
Microsoft Windows 2000 [Version 5.00.2195]
(C) Copyright 1985-2000 Microsoft Corp.

C:\>ping xxx.xxx.xxxx.xxxx
```

4. To work back on the network, select the appropriate settings from *Internet Protocol (TCP/IP) Properties* window.



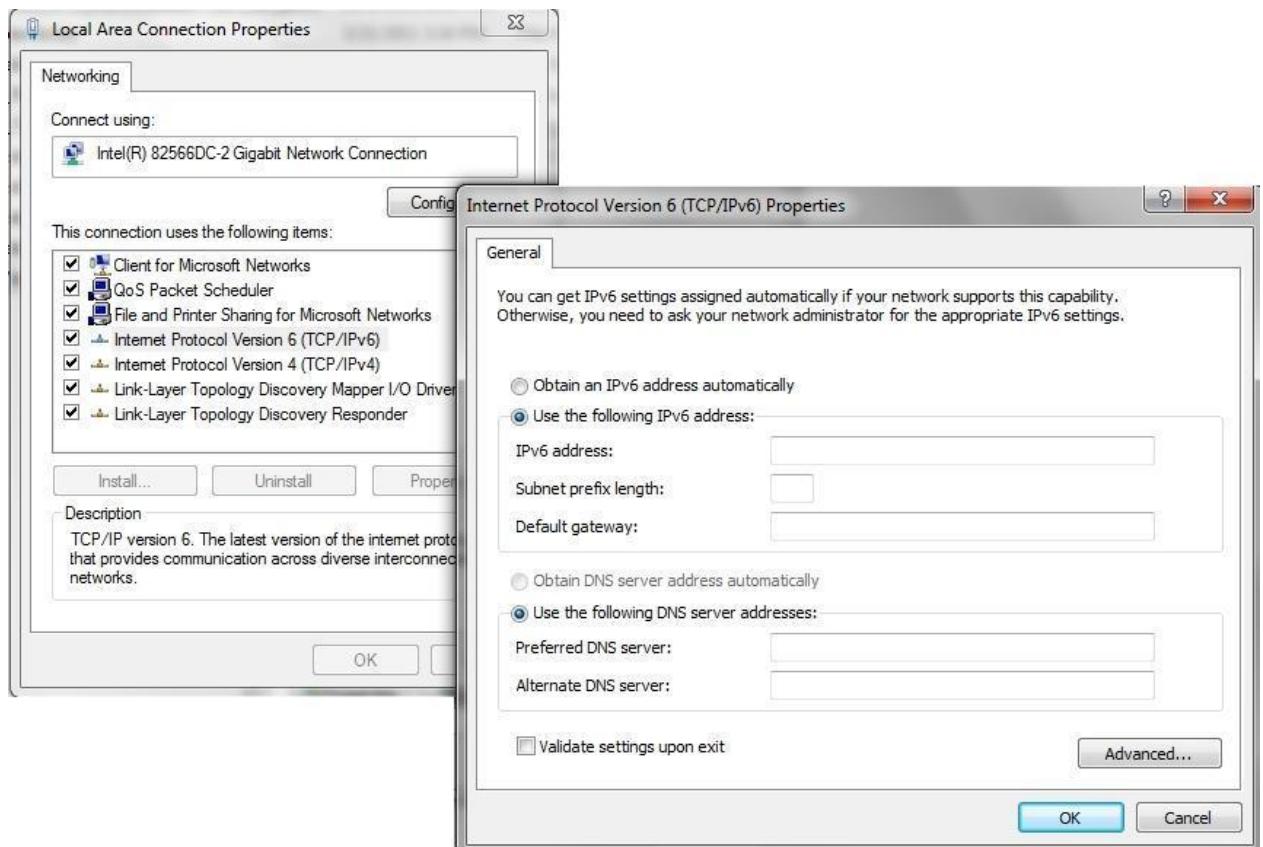
Instructions for Windows Vista/ Windows 7

The data logger is programmed with a fixed IP address. Unless the network is set up to assign the correct address to the PC via DHCP, define a fixed IP address for the PC to allow the two devices to communicate

1. Connect the PC to the data logger via Ethernet link. From the start menu select *Start/Settings/Control Panel*. Double click on the *Network and Sharing Center icon*.



2. Right click on the Network connection to be used to download (more than one may be available).
3. Click on *Properties* and then select *Internet Protocol (TCP/IP)* from the list of items.



4. Take note of the settings found here. Configure them later when the PC has to be connected back to the network.
5. Choose an IP address on the same subnet as the data logger.
6. Configure the IP address of the PC as follows, e.g.:
7. IP address: 192.168.1.xxx
Subnet mask: 255.255.255.0
Default gateway: none
8. To check if the IP address change was successful, use the DOS command prompt (*Start/Run/cmd*) and enter the *ipconfig* command. Check if the new IP has been accepted. If not so, repeat the configuration steps.

Check the communication link with the Data Logger

1. Run the FindDevs program.
2. A device identification message like the following one should be available:

NameLogger_SN/DeviceAlias/(ABS, No Table)

The labels in the identification string give information about the device and the current status of logging

SN = logger serial no.

ABS = absolute lap counter index

Alias = a label which the user programs in the device from Axon, typically the chassis number or device name

The logging status is as follows:

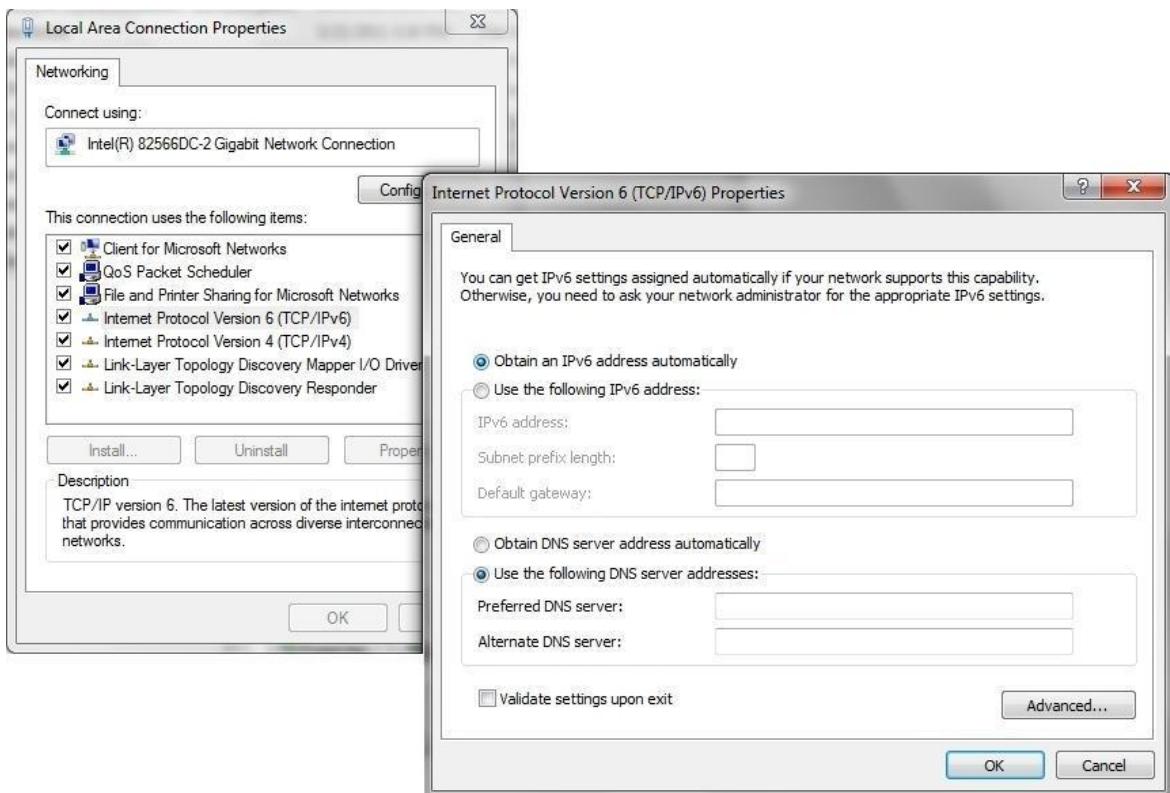
Status	Description	Caused by
No Table	Acquisition table is not loaded	First use, after format or clear data
TrigIn	Trigger In	When the logging trigger condition is true (i.e. logging active) or the trigger is not configured
TrigOut	Trigger Out	When the logging trigger condition is false (i.e. logging not active)

- As an alternative open a prompt command and enter the *ping* command followed by a space and data logger IP address.



A screenshot of a Windows 2000 Command Prompt window. The title bar says 'C:\WINNT\system32\cmd.exe'. The window shows the following text:
Microsoft Windows 2000 [Version 5.00.2195]
(C) Copyright 1985-2000 Microsoft Corp.
C:\>ping xxxx.xxxx.xxxx.xxxx

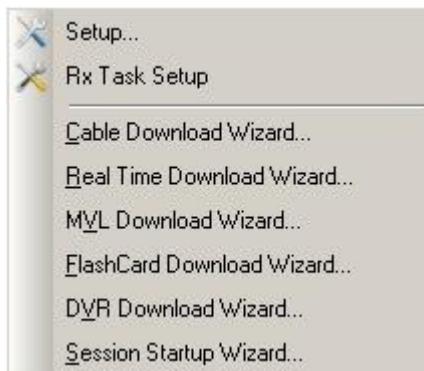
- To work back on the network, select the appropriate settings from *Internet Protocol (TCP/IP) Properties* window.



Wizard

The *Wizard* environment of the Acquisition Manager allows to configure and efficiently enabling the various acquisition processes through a guided sequence of operations that might result complex to an unskilled user if no guideline is provided.

The commands to use Wizard are in the *Acquisition menu*.



The Acquisition Manager offers various Wizards depending on the WinTAX license (in the figure Wizard of a Pro version):

- Session Startup Wizard
- TCP Download Acquisition
- MVL Download Wizard
- FlashCard Download Wizard
- Real time Download Wizard
- DVR Download Wizard

Session Startup Wizard

The **Session Startup Wizard** helps the user to configure the session parameters whenever an acquisition event starts.

It can be carried out both by WinTAX and by Acquisition Manager from the *Acquisition/Session Startup Wizard menu*.

Sequence of the pages of the procedure:

1. The guided configuration starts with a Welcome page that briefly explains the version of procedure. Click on 'Next' to go to the next page.
2. **Options Selection:** configuration of the Devices acquisition interface

3. **Session Configuration:** the Session configuration used to initialize the data archive can be modified
4. **Device Selection:** selection of the device to be configured.
5. **Device Configuration:** the settings and the context data of the Device can be modified

Click on 'Back' to go back to the previous page to correct the modifications

Click on 'Finish' to confirm and enable the modifications

TCP Acquisition Wizard

The **TCP Acquisition Wizard** helps the user to configure the session parameters and to enable the TCP acquisition.

It can be carried out both by WinTAX and by Acquisition Manager from the *Acquisition/TCP Download Wizard menu*.

Sequence of the procedure:

1. The guided configuration starts with a Welcome page that briefly explains the version of Wizard. Click on 'Next' to go to the next page
2. **Session Configuration:** the Session configuration used to initialize the data archive can be modified.
3. **Device Selection:** selection of the device to be configured.
4. **Device Configuration:** configuration of the device selected at 3.
5. **Acquisition Type Selection:** the type of acquisition to be enabled can be chosen, DLM or ADL.
6. **Acquisition Configuration:** enabled only with **Acquisition Type Selection = Auto Download** allows to configure the ADL options.

Click on 'Back' to go back to the previous page to correct the modifications.

Click on 'Finish' to confirm and enable the modification and start the TCP acquisition.

On each page the user can select the **Don't ask again** option that allows to save the choices made.

When Wizard is restarted, WinTAX does not show these pages.

The **Show All Pages** option available on the Welcome page of each Wizard, allows to cancel the memory of WinTAX on the pages indicated as **Don't ask again**. This option is effective on all pages of Wizard.

Marvel Wizard

The **Marvel Acquisition Wizard** helps the user to configure the session parameters and to enable the Marvel acquisition.

It can be carried out both by WinTAX and by Acquisition Manager from the *Acquisition/MVL Download Wizard menu*.

Sequence of the procedure:

1. The guided configuration starts with a Welcome page that briefly explains the version of Wizard. Click on 'Next' to go to the next page.
2. Check Network Settings: Check network adapter address settings.
3. **Session Configuration:** the Session configuration used to initialize the data archive can be modified.
4. **Device Selection:** selection of the device to be configured.
5. **Device Configuration:** configuration of the device selected at 3.
6. **Acquisition Type Selection:** the type of acquisition to be enabled can be chosen, DLM or ADL.
7. **Acquisition Configuration:** enabled only with **Acquisition Type Selection = Auto Download** allows to configure the ADL options.

Click on 'Back' to go back to the previous page to correct the modifications.

Click on 'Finish' to confirm and enable the modification and start the Marvel acquisition.

On each page the user can select the **Don't ask again** option that allows to save the choices made.

When Wizard is restarted, WinTAX does not show these pages.

The **Show All Pages** option available on the Welcome page of each Wizard, allows to cancel the memory of WinTAX on the pages indicated as **Don't ask again**. This option is effective on all pages of Wizard.

Flash Card Wizard

The **Flash Card Acquisition Wizard** helps the user to configure the session parameters and to enable the Flash Card acquisition.

It can be carried out both by WinTAX and by Acquisition Manager from the *Acquisition/FlashCard Download Wizard menu*.

Sequence of the pages of the procedure:

1. The guided configuration starts with a Welcome page that briefly explains the version of Wizard. Click on 'Next' to go to the next page.

2. **Session Configuration:** the Session configuration used to initialize the data archive can be modified.
3. **Device Selection:** selection of the device to be configured.
4. **Device Configuration:** configuration of the device selected at 3.
5. **Acquisition Type Selection:** the type of acquisition to be enabled can be chosen, DLM or ADL.
6. **Acquisition Configuration:** it allows to add/remove/modify the paths of the Flash Card available on PC

Click on 'Back' to go back to the previous page to correct the modifications.

Click on 'Finish' to confirm and enable the modification and enable the Flash Card acquisition.

On each page the user can select the **Don't ask again** option that allows to save the choices made.

When Wizard is restarted, WinTAX does not show these pages.

The **Show All Pages** option available on the Welcome page of each Wizard, allows to cancel the memory of WinTAX on the pages indicated as **Don't ask again**. This option is effective on all pages of Wizard.

Real time download wizard

The **Real time download wizard** helps the user to configure the session parameters and to enable the Real time acquisition.

It can be carried out both by WinTAX and by Acquisition Manager from the *Acquisition/ Real time download Wizard menu*.

Sequence of the pages of the procedure:

1. The guided configuration starts with a Welcome page that briefly explains the version of Wizard. Click on 'Next' to go to the next page.
2. **Options Selection:** configuration of the Devices acquisition interface
3. **Session Configuration:** the Session configuration used to initialize the data archive can be modified.
4. **Device Selection:** selection of the device to be configured.
5. **Device Configuration:** the settings and the context data of the Device can be modified
6. **Acquisition Configuration:** the parameters to acquire the Real time acquisition can be modified.

Click on 'Back' to go back to the previous page to correct the modifications.

Click on 'Finish' to confirm and enable the modification and start the Real time acquisition.

On each page the user can select the **Don't ask again** option that allows to save the choices made.

When Wizard is restarted, WinTAX does not show these pages.

The **Show All Pages** option available on the Welcome page of each Wizard, allows to cancel the memory of WinTAX on the pages indicated as **Don't ask again**. This option is effective on all pages of Wizard.

DVR Acquisition Wizard

The **Cable Acquisition Wizard** helps the user to configure the session parameters and to enable the TCP acquisition.

It can be carried out both by WinTAX and by Acquisition Manager from the *Acquisition/Cable Download Wizard menu*.

Sequence of the procedure:

1. The guided configuration starts with a Welcome page that briefly explains the version of Wizard. Click on 'Next' to go to the next page
2. **Acquisition Type Selection:** the type of acquisition to be enabled can be chosen, DLM or ADL.
3. **Acquisition Configuration:** allows to configure the ADL options.

Click on 'Back' to go back to the previous page to correct the modifications.

Click on 'Finish' to confirm and enable the modification and start the TCP acquisition.

On each page the user can select the **Don't ask again** option that allows to save the choices made.

When Wizard is restarted, WinTAX does not show these pages.

The **Show All Pages** option available on the Welcome page of each Wizard, allows to cancel the memory of WinTAX on the pages indicated as **Don't ask again**. This option is effective on all pages of Wizard.

Analysis windows

The Analysis windows allow to display and analyze the graphic elements available in each graph window. The user can carry out the basic functions of the window, have access to the specific commands and recall advanced functions that involve also other windows. Each type of window has specific commands that can be reached both from the main menu of the application, from the dedicated toolbars, keyboard shortcuts and from the pop-up menu. The look and the behavior of each window can be modified or customized through the configuration interfaces.

The Analysis windows in WinTAX are:

- **Graph Window**
- **XY Window**
- **XYZ Window**
- **Histogram Window**
- **Channels Window**
- **Numeric Table Window**
- **Diagnostics Window**
- **Bargraph Window**
- **Gauge Window**
- **Track Window**
- **Video Window**
- **Object Control Window**
- **G-G Diagram Window**
- **Steering Wheel Window**
- **Bitmap View Window**
- **Condition Light Window**
- **Display Values Window**
- **Vehicle Tracking Window**
- **Reports**
 - **Lap Reports**
 - **Section Time Report**
 - **Events Report**
 - **Diagnostics Reports Window**
- **Trend Window**
- **Alarms Window**
- **Map Histogram Window**
- **FFT Analysis Window**

Graph Window

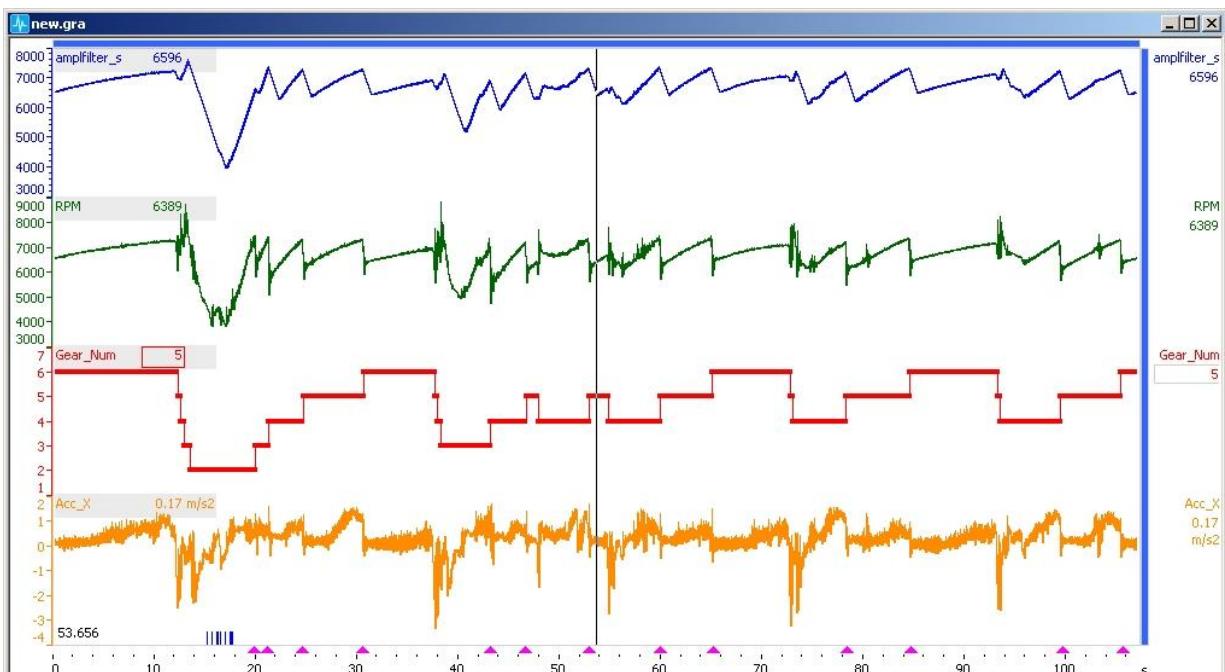
A **Graph** window shows on a Cartesian graph the series of sampled values of the channels according to the time of the distance covered.

Using the elements in the window, the user can display in details the values of the channels, analyze the data, compare the various laps, interact with other displayed windows.

The Graph window can be used both in post processing and in Real Time analysis, switching from one mode to the other directly during the analysis through the *Switch to Post Processing / Telemetry* command of the *Options menu*.

Elements of the window

The **Graph** window is divided into regions containing graphic elements (scales, graphs, information boxes, areas).



Graphic area

The graphic area shows the graphs of the configured channels, the cursor of the X axis, the grid of the window and the grids of each channel, the transparent cursors (name and value compared to the position of the cursor), the divisions of the maps and the divisions of the finish lap.

The graphs are arranged on the basis of the layout mode: in Parallel they are parallel and not overlapping, in Overlay they share the whole vertical area and the overlap, in Manual they are vertically arranged as set by the user and can be overlapping.

In some licenses the graphics area can be divided into two, three or four smaller horizontal strips. The areas are separated by a divider with which you can resize them. Each area can be hidden, but at least one is always visible.

Zoom Bars

Horizontal Zoom Bar: displays the percentage of horizontal zoom in the window, enables to move the horizontal zoom area.

Vertical Zoom Bar: displays the percentage of vertical zoom in the window, enables to move the vertical zoom area.

Y Scale

The Y Scale area shows the scales of values of the configured channels.

The vertical arrangement of the Y scales changes according to the configured layout mode.

X Scale

The X Scale area shows the scales of the times or of the distances covered according to the set a X-Axis mode.

Value of the X Cursor

The X Cursor area displays the current value of the cursor for the X axis.

Channels Information

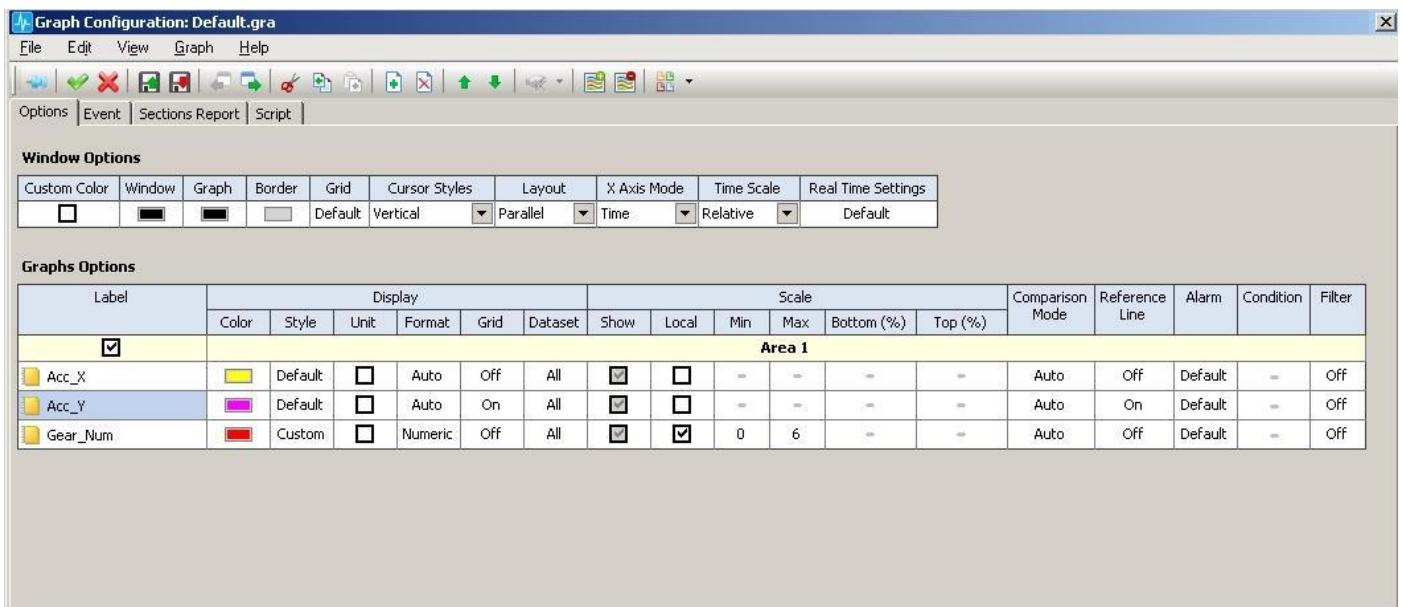
The Channels Information area shows in text boxes the information of the configured channels; name of the channel, value in relations to the current position of the cursor, minimum and maximum value since the beginning of the lap (available only in real time mode). The same information can be displayed also in the graphic area, on top right in the rectangle dedicated to each channel (Transparent Cursor Values).

Graph Configuration Window

The **Graph Configuration** window allows to configure the aspect of the **Graph windows**; it is divided into four pages, Options, Event, Sections Report, Script. The window has also a menu, a toolbar and an integrated pop-up menu that ease the access to the configuration and management of the window itself.

Options Page

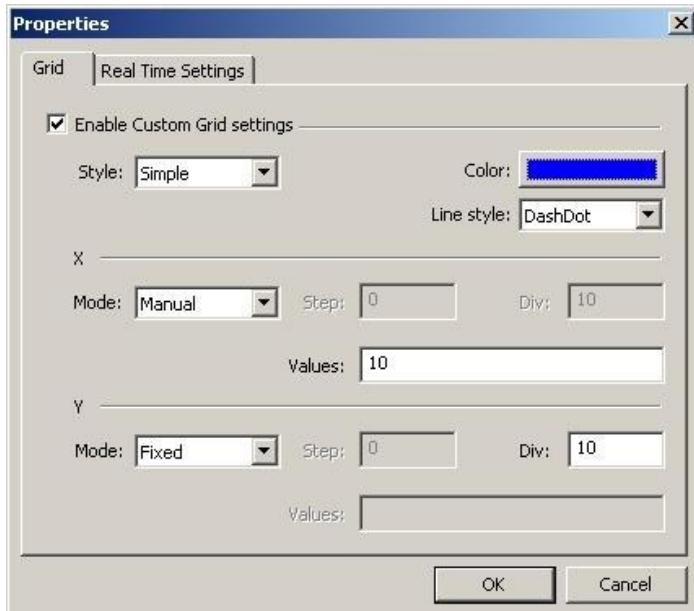
The **Options** page enables to configure the graphic aspect of the **Graph** windows and it is divided into two sections: Window Options and Graphs Options.



Window Options

It enables to configure the settings of the aspect of the window. Each element of the grid can be edited by double clicking with the mouse or by pressing the space bar.

- **Custom color:** enables the setting of the customized colors of the window. If it is enabled, the colors set in the **Window**, **Graph** and **Border** columns of this section are used for the background of the window, the background and the border of the graphic area. If it is disabled, the default colors are used that correspond to the settings of the **Color Settings** section, in the **Default Appearance** page of the **General Setup** window (General Settings, general configuration of the WinTAX4 environment).
- **Window:** sets background color of the window.
- **Graph:** sets the background color of the graphic area.
- **Border:** sets the color of the borders of the areas of the window.
- **Grid:** displays the setting to enable the grid common to all graphs of the channels, in the graphic area of the window. To modify the parameter, edit the associated configuration window.



- **Enable Custom Grid settings:** enables the display of the grid with the customized settings.
- **Style:** sets the style of the grid
 - **Simple:** the grid is formed by continuous lines.
 - **Cross:** the grid is formed by crosses indicating the intersection of the vertical and horizontal divisions.
- **Color:** color of the grid
- **Line style:** sets the style of the line of the grid (valid if the Style Simple is set)
 - **Solid:** continuous line
 - **Dash:** dashed line
 - **Dot:** dotted line
 - **DashDot:** dashed line alternated with 1 dot
 - **DashDotDot:** dashed line alternated with 2 dots
- **X**
 - **Mode:** calculation mode of the horizontal divisions
 - **Auto,** shows an automatic number of equidistant divisions.
 - **Off,** no division is displayed
 - **Fixed,** shows a fixed number of equidistant divisions
 - **Step,** shows the divisions at fixed intervals equal to the Step value.

- **Custom**, shows the divisions in correspondence with the values on the X axis set by the user in the text box **Values**.
 - **Step**: fixed step to calculate the horizontal divisions (a division each Step), valid if Mode is set to Step
 - **Div**: number of horizontal divisions to be displayed, valid if Mode is set to Auto or Fixed
 - **Values**: list of values on the X axis corresponding to the divisions, valid if Mode is set to Custom. The list of values can be directly added in the text box using as division the character ';'.
- **Y**
 - **Mode**: calculation mode of the vertical divisions
 - **Auto**, shows an automatic number of equidistant divisions.
 - **Off**, no division is displayed
 - **Fixed**, shows a fixed number of equidistant divisions
 - **Step**, shows the divisions at fixed intervals equal to the Step value.
 - **Custom**, shows the divisions in correspondence with the values on the Y axis set by the user in the text box **Values**.
 - **Step**: fixed step to calculate the vertical divisions (a division each Step), valid if Mode is set to Step
 - **Div**: number of vertical divisions to be displayed, valid if Mode is set to Auto or Fixed
 - **Values**: list of values on the Y axis corresponding to the divisions, valid if Mode is set to Custom. The list of values can be directly added in the text box using as division the character ';'.

If the window grid is disabled, the settings of the **Default Grid** in the **Default Appearance** of the **General Setup** window (General Settings, general configuration of the WinTAX environment) are valid.

- **Cursor Styles**: Graph cursor selection
 - **Vertical**: the window displays a vertical cursor.
 - **Horizontal**: the window displays a vertical cursor and an horizontal cursor for each channel,
 - **Intersection**: the window display a cross cursor for each channel in the window and a vertical cursor to connect all cross cursors.
 - **Multiple Cross**: the window displays a cross cursor for each channel in the window.
 - **Single Cross**: the window displays a cross cursor for the selected channel.
- **Layout**: enables to select the vertical arrangement mode of the channels graphs and of the corresponding Y scales. See also: **Layout** function.

- **Parallel**: the graphic area is divided into rectangles of the same height and the graphs of the channels are arranged in vertical sequence so that they do not overlap.
- **Overlay**: all graphs share the vertical area available in the graphic area and are overlapping.
- **Manual**: each graphs can be placed by the user in a portion of the vertical area; the graphs can be overlapping. The vertical coordinates of the rectangle reserved to the channel correspond to the settings of the **Top** and **Bottom** fields of the Graphs Options for each channel.
- **X Axis Mode**: sets the X axis in the time scale (Time) or in the distance scale (Distance). See also **X Scale** mode function.
 - **Time**: the X axis displays the time scale in seconds.
 - **Distance**: the X axis displays the distance scale in meters.
- **Time Scale**: sets the display Time mode for the X scale.
 - **Relative**: the time instant displayed in the values box of the X axis is a relative instant that depends on the length of the lap with initial instant equal to 0.
 - **Absolute**: absolute not only displays the value of the relative but also shows a box containing the absolute value of the instant of the lap, a value expressed in hh:mm:ss:mmm
- **Real Time Settings**: displays the Real Time for the window (Default or Custom). To modify the parameter, edit the associated configuration window.



- **Enable custom settings Real Time Options**: enables the customized Real Time settings.

- **X Width:** width of the range for the X scale, in seconds or meters.
- **X Scroll:** offset value for the X axis in seconds and meters.
- **Show Laps:** display mode of the Lap
 - **Continuous:** the graphs are displayed in continuous mode also when closing a lap.
 - **Single Lap:** when a finish line closes, the window resets and the channel starts back from 0.
- **Compare:**
 - **Real Time:** The comparison is updated in real time.
 - **Background:** the comparison lap is shown in background.

Graphs Options

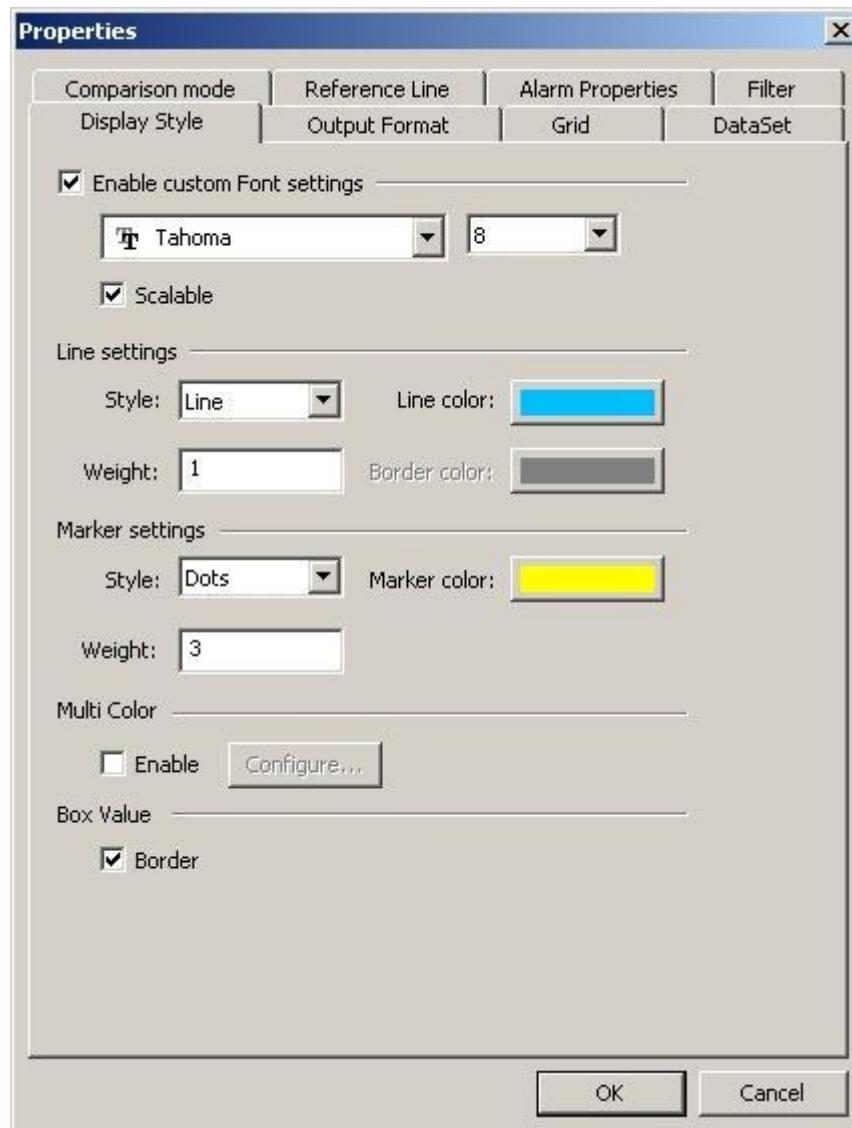
Enables to configure the settings specific for each channel of the window. Each line identifies a configured channel, while the columns identify the fields to be configured. Each element of the grid can be edited by double clicking with the mouse or by pressing the space bar. Multiple sections are possible through the CTRL and SHIFT keys.

Between the header and the channels list there is a line with a checkbox as shown in the picture below.

Graphs Options											
Label	Display						Scale				
	Color	Style	Unit	Format	Grid	Dataset	Show	Local	Min	Max	Bottom (%)
<input checked="" type="checkbox"/>	Area 1										
Acc_X	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					

In this line it's possible to enable or disable the area visualization. See Graph Areas for further details.

- **Label:** shows the name of the channel. The name of the channel can be edited and can become a math expression if the sign = comes first.
- **Display**
 - **Color:** shows the color of the channel or markers graph. To modify the setting, edit the channel by opening the Channel Properties window where fonts and styles can be configured.
 - **Style:** shows the style of the channel graph. To modify the setting, edit the channel by opening the Channel Properties page where fonts and styles can be configured.



Enable Custom Font settings: enables the local font configuration for the selected channels.

- **Family font:** sets the font.
- **Font dimension:** sets the font size.
- **Scalable:** enables the adapting of the font size in relations to the window size.

Line settings

- **Style:** sets the style of the graphs line
 - **None:** no line is drawn
 - **Line:** continuous line
 - **Step:** stepped line

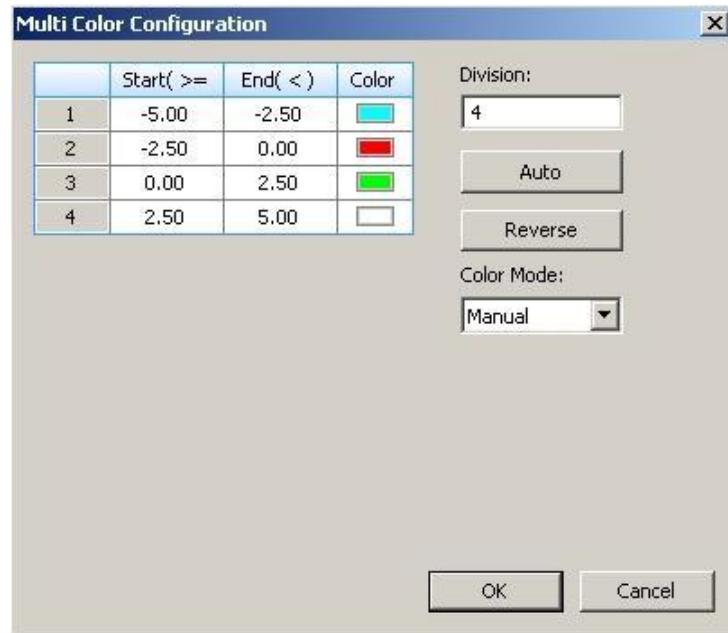
- **Fill Down:** continuous line with colored bottom area
- **Fill Up:** continuous line with colored top area
- **Bordered:** continuous line with border
- **Weight:** sets the depth of the line in pixel.
- **Line color:** sets the line color.
- **Border color:** color for the line border

Marker Settings section

- **Style:** style of the markers, graphic elements used to represent the marker.
 - **None:** no markers are drawn
 - **Dots:** dot
 - **Cross:** cross
 - **Rhomboid:** rhomboid
 - **Square:** square
 - **Arrow Down:** arrow downwards
 - **Arrow Up:** arrow upwards
 - **Vert Line:** vertical line
 - **Horz Line:** horizontal line
- **Weight:** size (depth) of the markers in pixel.
- **Marker color:** color of the markers.

Multi color section

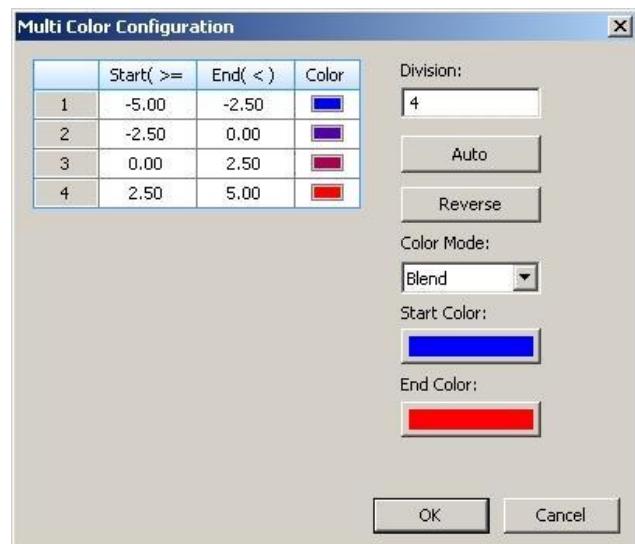
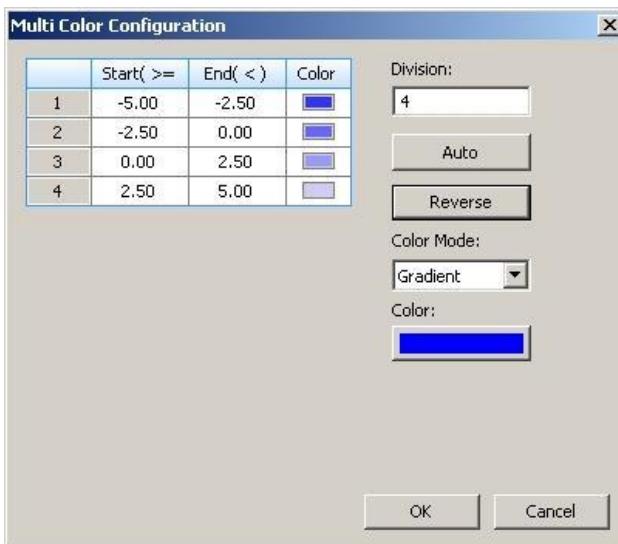
- **Enable:** enable multi color
- **Configure:** configure multi color channel; the button opens a window like shown in the picture below.



Division: number of colored bands. The value must be included between 1 and 4. Changing the value of steps, the start-end-color grid redraws the number of rows configured. In the rows it's possible manually configure the values and the colors.

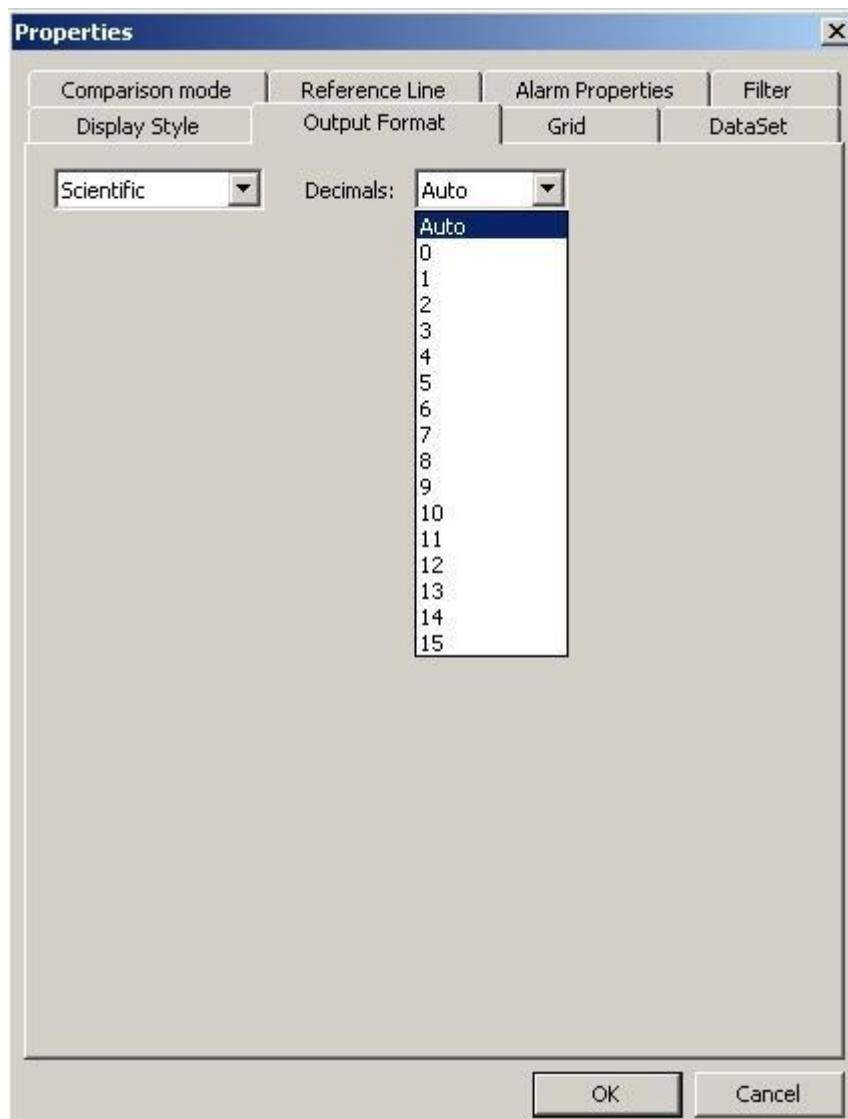
Auto: recalculate steps value using Start of the first row and End of the last row as fixed values.

Color Mode: In the rows of the start-end-color grid it's always possible to manually configure the colors. Otherwise color can be sets with color mode combo. If Custom is selected, the button generates a group of default colors. If Gradation is selected, the same button is used to choose the base color of gradation. If Blend is selected, the buttons Start color and End color are used to choose the start and the end colors of blend.



Box Value

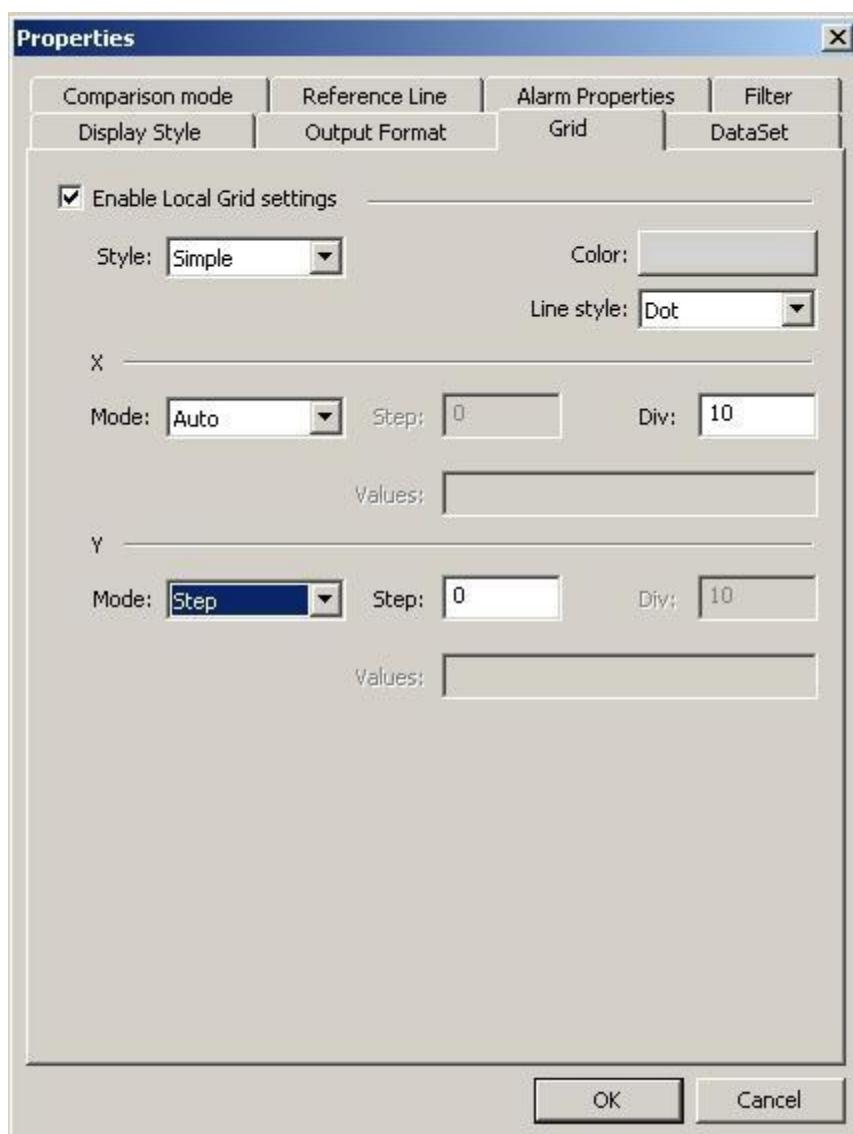
- **Border:** show the outline border of cursor value.
- **Unit:** Enables to display the measurement unit of the channel.
- **Format:** displays the style to show the current channel value. To modify the setting, open the configuration window that enables to configure the setting for the display format of the channel values.



In the combo on the left the numeric format is selected, in the combo on the right, the number of decimals is selected. Please find to follow the list of possible formats

- **Auto:** the format is kept unchanged

- **Dec**: the decimal format allows max 5 digits after the comma.
 - **Numeric**: the numeric format allows max 15 digits after the comma.
 - **Scientific**: the scientific format allows max 15 digits after the comma; the result is written in exponential form.
 - **Hex**: hexadecimal format; the decimals cannot be configured.
 - **Bin**: binary format; the decimals cannot be configured.
 - **Ascii**: text format; the decimals cannot be configured.
- **Grid**: displays the setting to enable the grid specific of the rectangle of the graphic area reserved to the channel. The window enabling the grid and the configuration of the parameters is the following:



- **Enable Local Grid settings:** enables to display the grid with the customized settings.
 - **Style:** sets the style of the grid
 - **Simple:** the grid is formed by continuous lines.
 - **Cross:** the grid is formed by crosses indicating the intersection of the vertical and horizontal divisions.
 - **Color:** color of the grid
 - **Line style:** sets the style of the grid line (valid if Style Simple is set)
 - **Solid:** continuous line
 - **Dash:** dashed line
 - **Dot:** dotted line
 - **DashDot:** dashed line alternated with 1 dot
 - **DashDotDot:** dashed line alternated with 2 dots

X

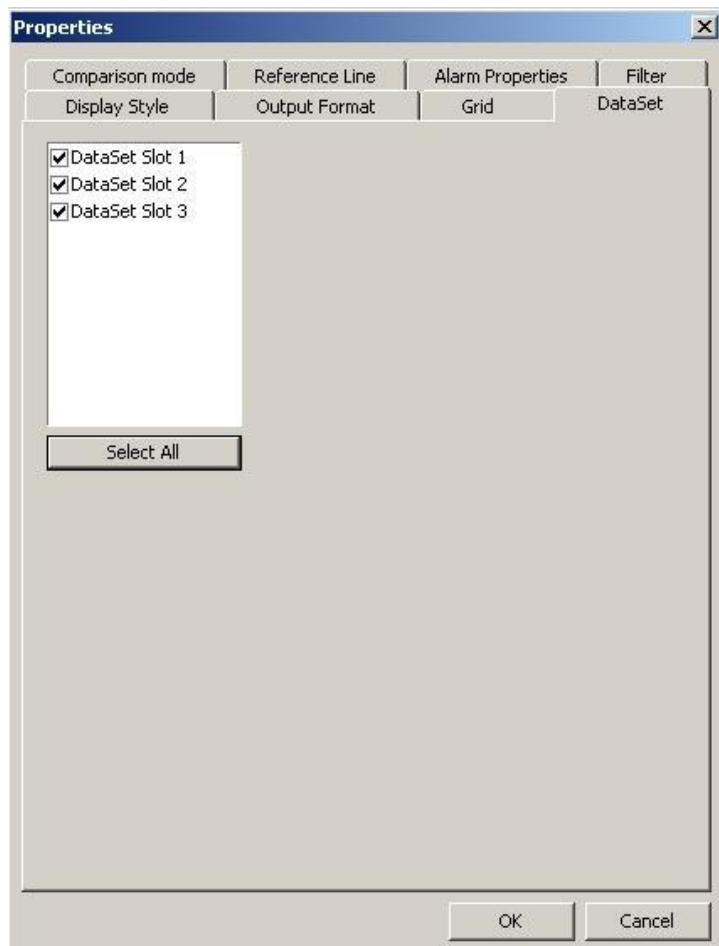
- **Mode:** calculation mode of the horizontal divisions
 - **Auto**, displays an automatic number of equidistant divisions.
 - **Off**, no division is displayed
 - **Fixed**, displays a fixed number of equidistant divisions
 - **Step**, displays the divisions at fixed intervals equal to the Step value.
 - **Custom**, displays the division in correspondence with the values on the X axis set by the user in the info box **Values**.
- **Step:** fixed step to calculate the horizontal divisions (a division for each Step), valid if Mode is set to Step
- **Div.:** number of horizontal divisions to be displayed, valid if Mode is set at Auto or Fixed
- **Values:** list of values on the X axis corresponding to the divisions, valid if Mode is set at Custom. The list of values can be added directly in the text box, using as division the character ','

Y

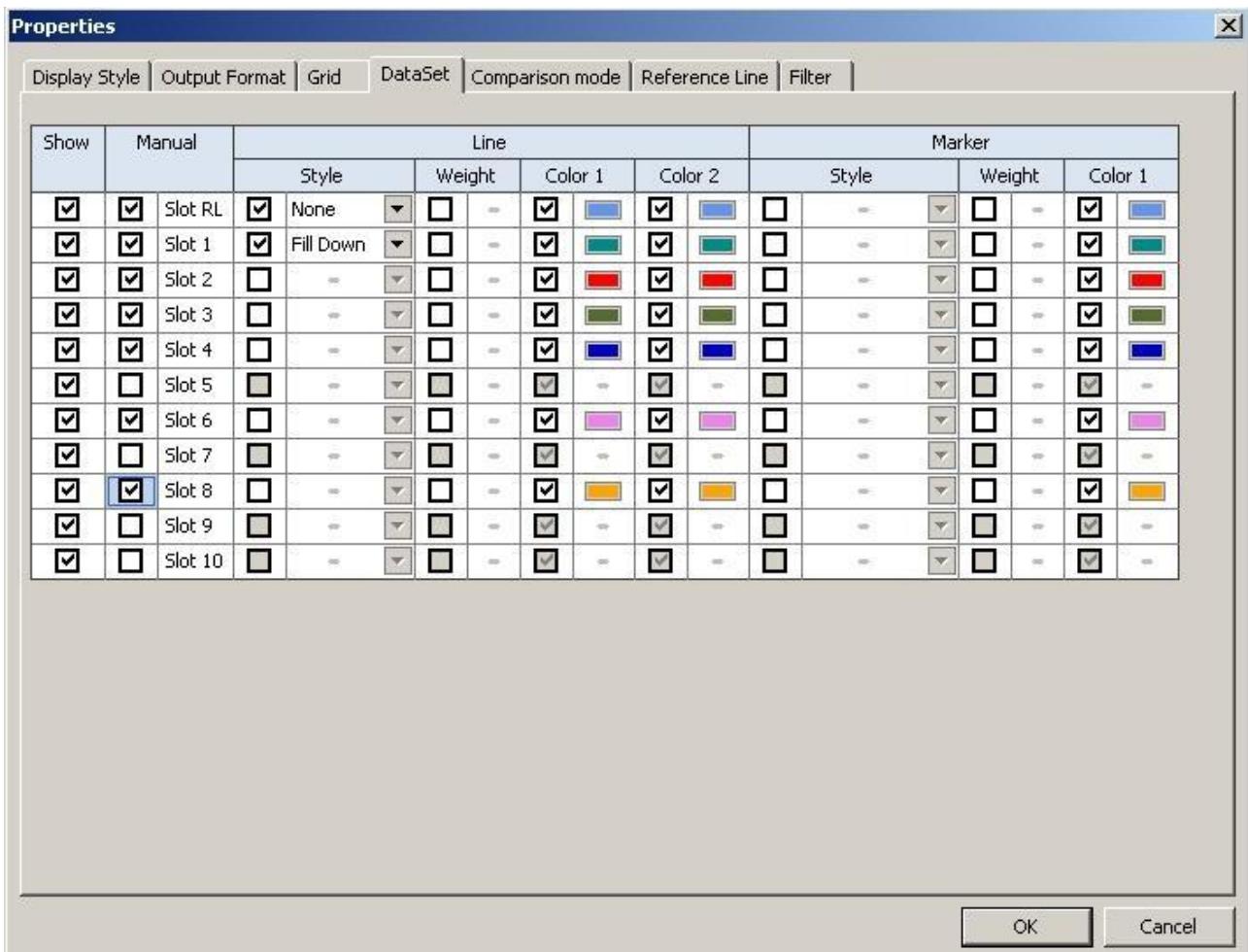
- **Mode:** calculation mode of the vertical divisions
 - **Auto**, displays an automatic number of equidistant divisions.
 - **Off**, no division is displayed

- **Fixed**, displays a fixed number of equidistant divisions
 - **Step**, displays the divisions at fixed intervals equal to the Step value.
 - **Custom**, displays the division in correspondence with the values on the Y axis set by the user in the info box **Values**
 - **Step**: fixed step to calculate the vertical divisions (a divisions for each Step), valid if Mode is set to Step
 - **Div**: the number of vertical divisions to be displayed, valid with Mode set at Auto or Fixed
 - **Values**: list of values on Y axis corresponding to the divisions, valid with Mode set at Custom. The list of values can be added directly in the text box, using as division the character ','.
- **DataSet**: displays the setting of the Dataset mode.

The setting shows All when the channel is displayed for all, otherwise it shows the list of the numbers corresponding to the selected Datasets. By default they can all be displayed; to modify the selection, edit the configuration by opening the following window. The configuration page depends on the license enabled. In the picture below there is an example of DataSet Page. You can simply choose from the various DataSet deciding which enable and which not.



Here is another example of how it can be structured page DataSet.



The list always shows the maximum number of available Datasets.

The user can enable or disable the corresponding Dataset to be displayed.

Comparison settings allowing the user to customize comparison settings of the General Setup further, but locally the single window; enabling Custom check, comparison settings of the corresponding slot will be replaced with the channel properties; every single property (line style, line weight...) can be modified enabling the related check and editing new value.

When new channel is added, this setup inherits the actual Dataset configuration in General Setup.

- **Scale**

- **Show:** show or hide the Y scale in Manual or Overlay mode; it is not active in Parallel mode.
- **Local:** enables the automatic display of the Y scale.
- **Min:** sets the minimum value of the channel if Local is checked.
- **Max:** sets the maximum value of the channel if Local is checked.
- **Bottom (%):** sets the vertical arrangement of the graphs in the vertical area (Bottom).

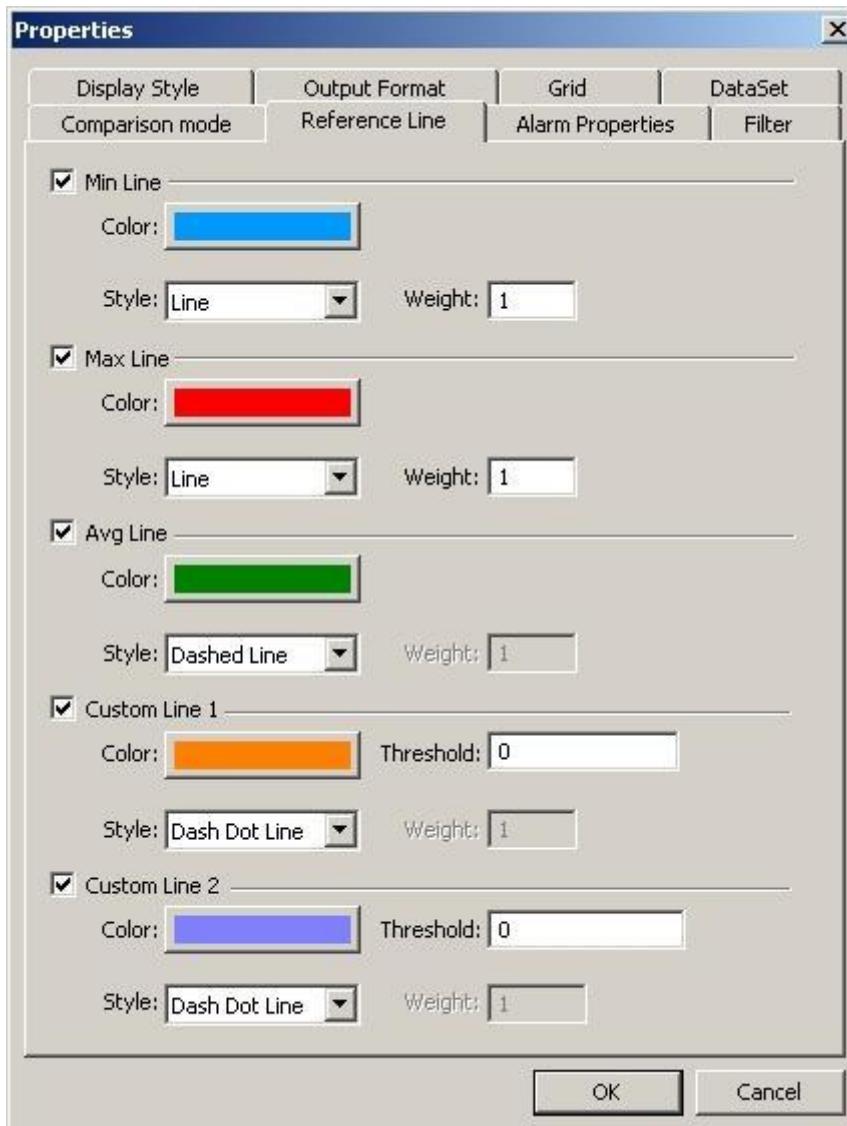
- **Top (%)**: sets the vertical arrangement of the graphs in the vertical area (Top).
- **Comparison mode**: shows the comparison options for the selected channel. This allows user to specify which DataSet from the active selection are to be displayed together for the particular channel.
 - **Auto**: this button selects all the DataSet
 - **Difference**: If the *Difference* button is set, the graph will show the difference between the data in DataSet 1 and each of the other DataSet selected.
 - **Average**: if the *Average* button is set, the graph will show the average between the data in selected DataSets.

If the number of enabled DataSets into Comparison dialog is less than the active ones, they are highlighted by # character and its index (e.g. RPM avg#BC).



Note: If the licence grants reference lap the first slot of the list will be the reference lap.

- **Reference Line:** configures an horizontal line at some special values: Minimum, Maximum, Average and custom values, configured by user configured by the user through the setting of a threshold.

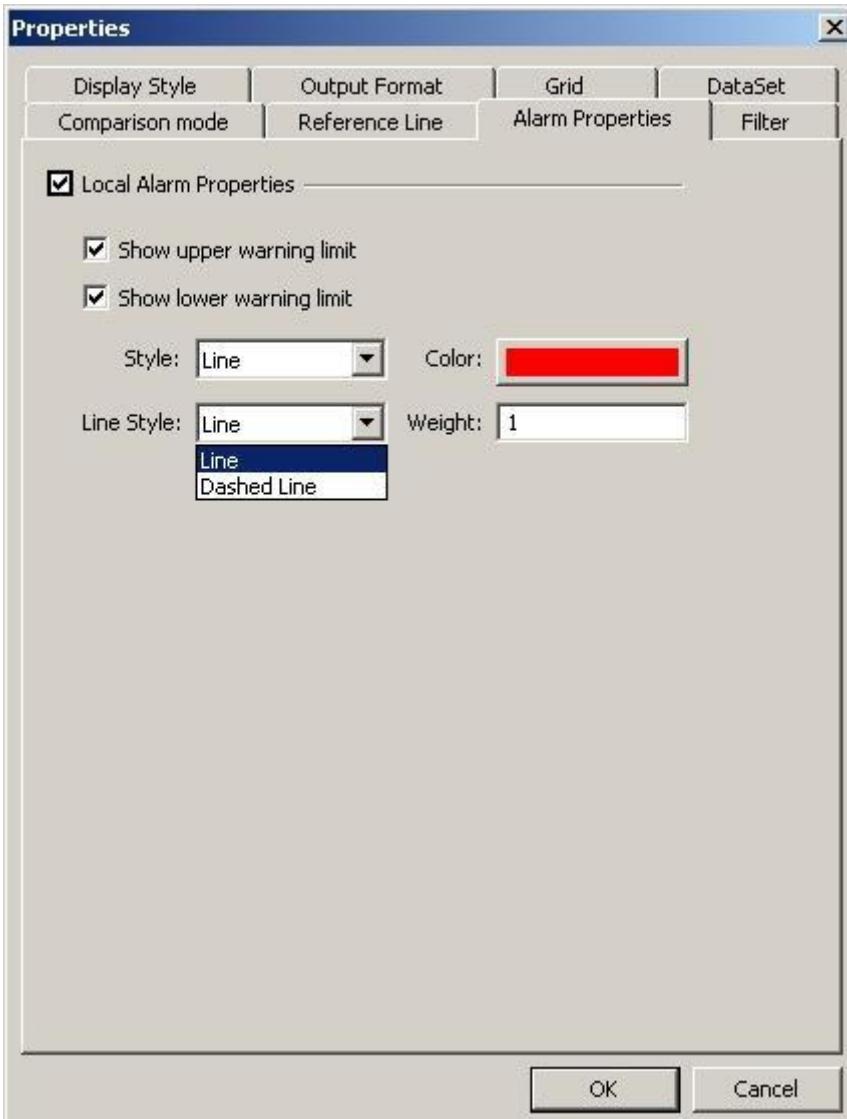


Each value can be enabled or disabled by a check box and has the following settings:

- **Color:** sets the line color.
- **Style:** sets the style of the graphs line
 - **Line:** continuous line
 - **Dashed Line:** dashed line
 - **Dot Line:** dotted line
 - **Dashed Dot Line:** dashed line alternated with 1 dot
- **Weight:** sets the depth of the line in pixel.

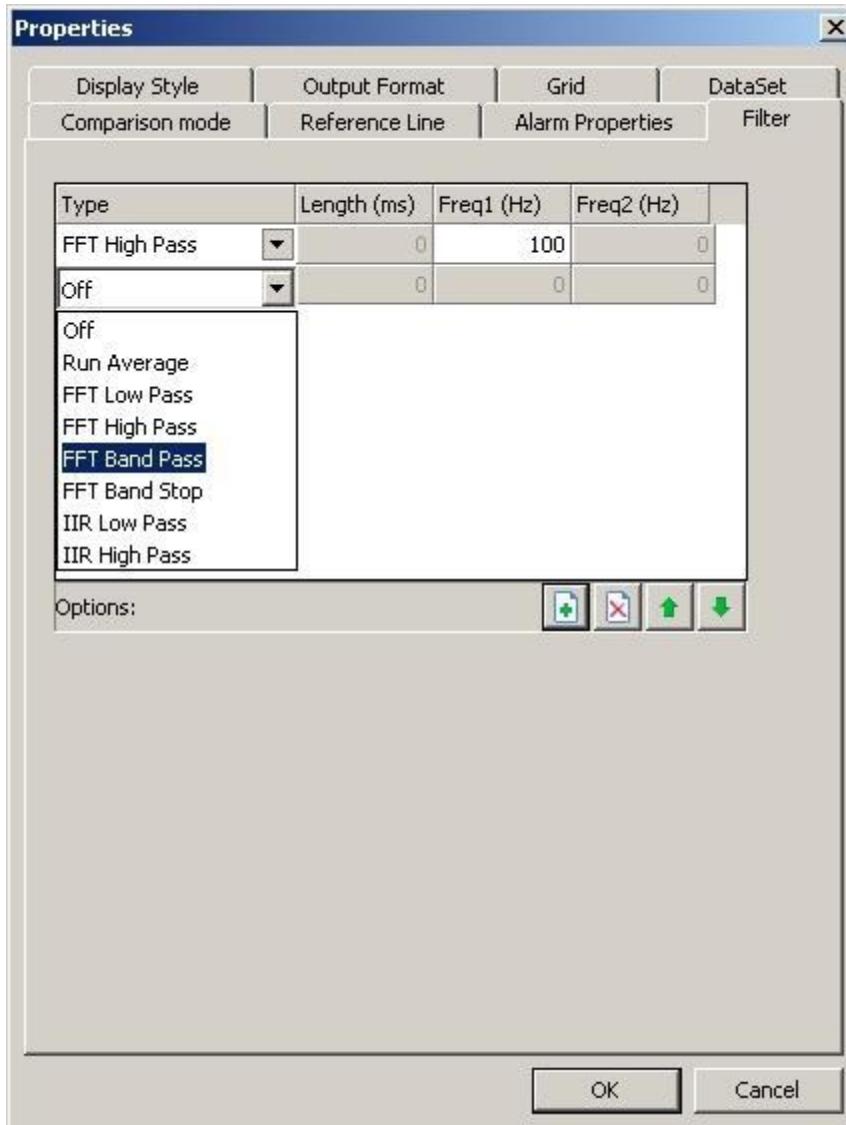
For custom value there are the following settings:

- **Threshold:** sets the reference value of the line
- **Alarm Properties:** configures the style of the alarms of this channels.



- **Local Alarm Properties:** enables the local configuration; if this option is set as off (e.g. when adding new channels), the configuration is taken from channel parameters.
 - **Show upper warning limit:** allows to display the upper limit of the alarm.
 - **Show lower warning limit:** allows to display the lower limit of the alarm.
 - **Style:** style of alarms limits: Line or Filled.
 - **Line Style:** needs *Line* as Style: Line or Dashed Line.
 - **Color:** color of Alarms limits.
 - **Weight:** weight of lines (needs *Line* as Style and *Line* as Line Style)

- **Condition:** The condition sets a channel that is used to limit the calculation of the graph values for those in which the condition is true.
- **Filter:** shows the configuration of filters to apply to the channels. To change the settings, open the configuration window.



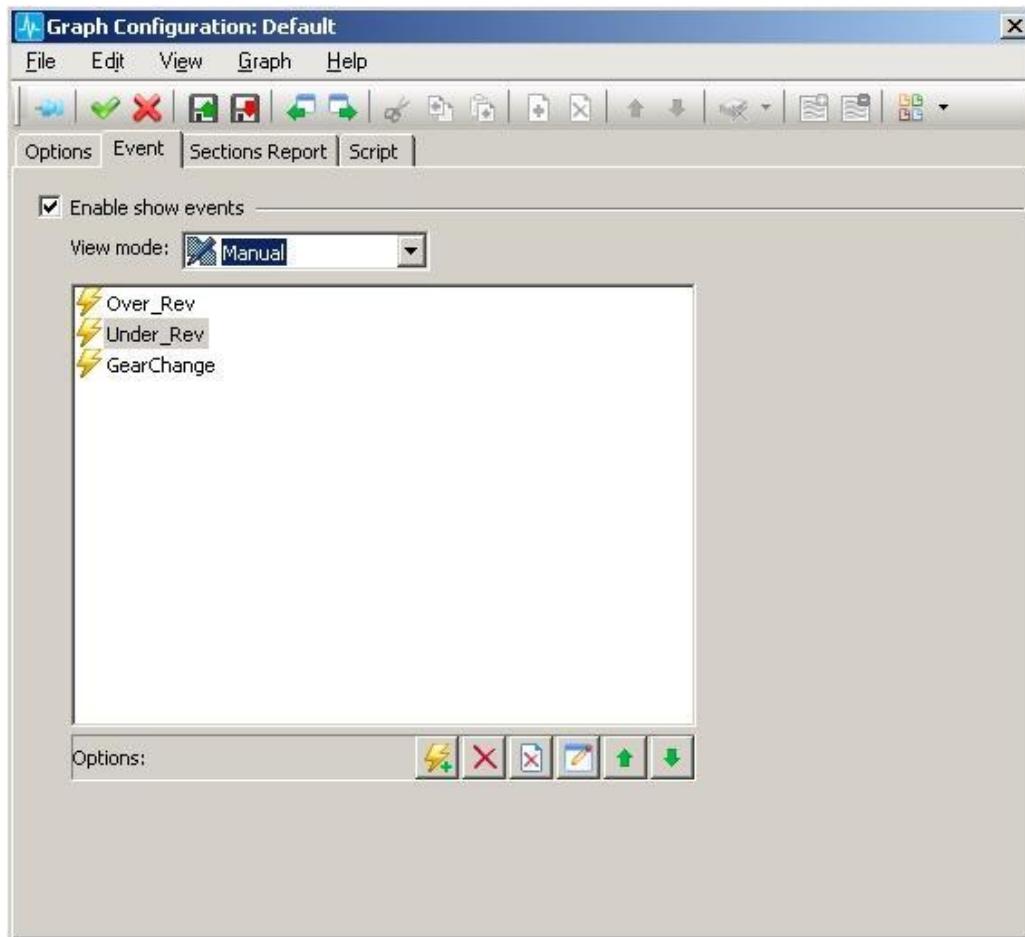
The filters can be added, removed or moved through the buttons on the **Options** buttons. The filters available are:

- **OFF:** Channel values are displayed as logged
- **Run Average:** Applies a moving average filter to the channel. Filter length is defined in milliseconds. If set to zero, the filter is not calculated.
- **FFT filters** applies a combination of frequency domain filters to the channel. The frequency content of the signal in the range(s) defined by the cut-off frequency is set to zero and the data is reconstructed in the time-domain. The four types available are:

- **FFT Low Pass:** maintains frequency content below the cut-off freq. Freq1
- **FFT High Pass:** maintains frequency content above the cut-off freq. Freq1
- **FFT Band Pass:** maintains frequency content in the range $\text{Freq1} < \text{frequency} < \text{Freq2}$
- **FFT Band Stop:** eliminates frequency content in the range $\text{Freq1} < \text{frequency} < \text{Freq2}$
- **IIR Low Pass:** Infinite Impulsive Response Low Pass filter is a recursive filter that maintains frequency content below the cut-off freq
- **IIR High Pass:** Infinite Impulsive Response High Pass filter is a recursive filter that maintains frequency content above the cut-off freq

Event Page

The **Event** page enables to configure the events of the **Graph** window.



- **Enable show events:** enables to display the events.
- **View Mode:** sets the display mode of the events.
 - **All:** all events are displayed.

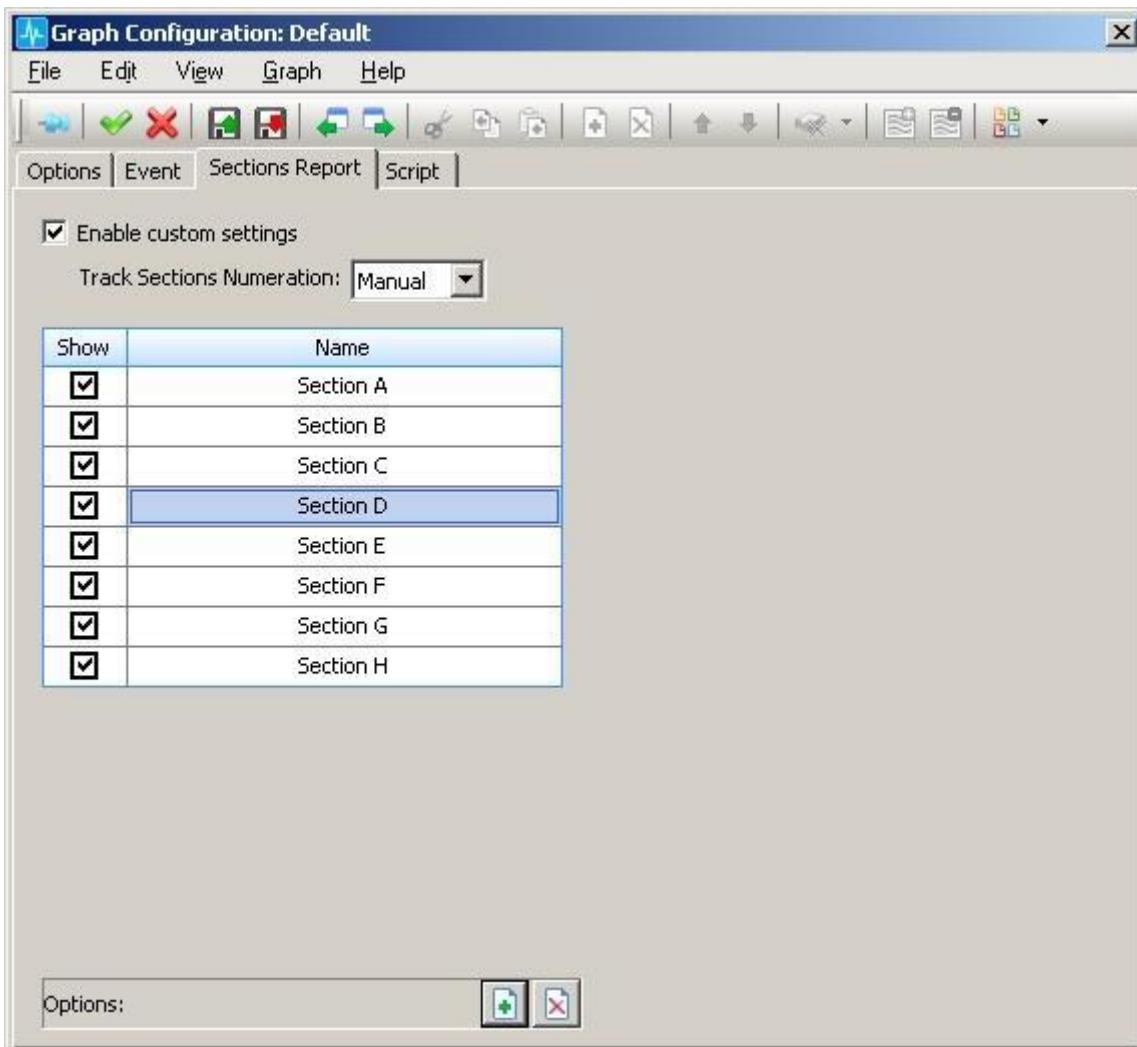
- **Custom:** only the events selected by the user are displayed.

The list shows the customized events configured by the user.

Each event can be configured using the buttons on the **Options** bar (to add, remove, modify and move the elements in the list).

Sections Report Page

The **Sections Report** page enables to configure the settings of the map.



- **Enable custom settings:** enables the customized settings.
- **Track Sections Numeration:** Setting linked to the possible display on the map according to the track editor. The All Setting shows all sectors, the Straight one shows only the

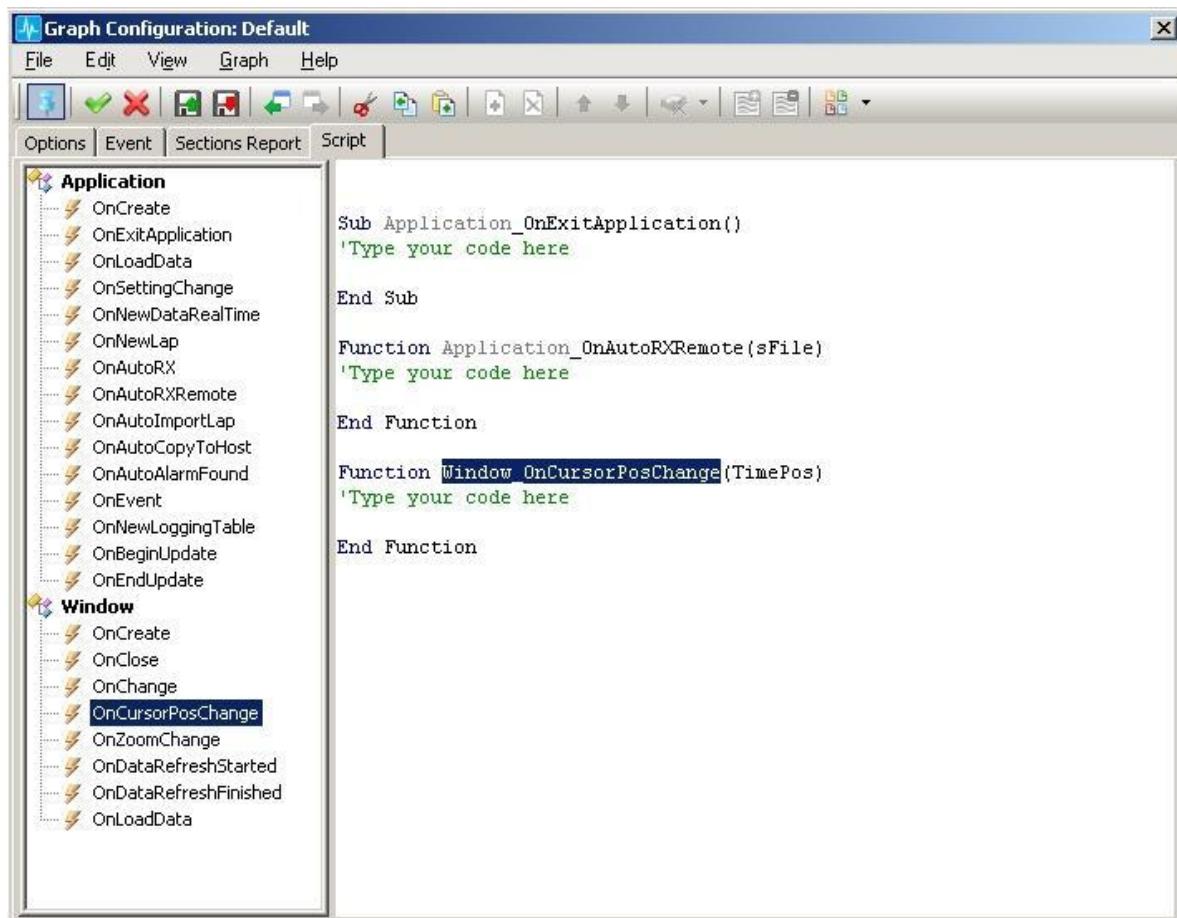
straights, the Corner one shows only corners and the Customs one shows only the sectors selected by the users.

- **All:** all events of the map are displayed,
- **Corner:** only corners are displayed
- **Straight:** only straights are displayed
- **Manual:** the list of the sections is displayed and each section can be visualized or not. Each section can also be customized for the label to be shown. Sections can be added or removed thanks to the Options commands. The Default Color button sets red and green alternated colours.

Elements can be added or removed from the list through the buttons of the Options bar.

Script Page

The **Script** page enables to configure scripts linked to the events of the **Graph** window or of the application, in VBScript or JScript.



The section on the left displays the list of the functions available, grouped for Application and Window

The section on the right displays the code of the set functions: in this section the custom code can be entered.

Menu

The menu of the **Graph Configuration** window allows the access to the following commands, divided in sub menus:

File Menu

COMMAND	SHORTCUT	DESCRIPTION
Apply	A	Applies the current settings of the graphic window
Cancel		Closes the window without applying the current settings to the configuration of the graphic window
Load		Opens a dialog window to select a configuration file for the Graphs (.gra) window to be loaded.
Save As		Opens a dialog window to select a configuration file for a Graphs (.gra) window to save the current settings.

Edit Menu

COMMAND	SHORTCUT	DESCRIPTION
Cut	Ctrl + X	Copies to clipboard the configurations of the channels selected in the list of the Graphs section and it removes them from the list of the Graphs section.
Copy	Ctrl + C	Copies to clipboard the configurations of the channels selected in the list of the Graphs section
Paste	Ctrl + V	Pastes the configurations of the channels available in clipboard adding them to the list of the Graphs section

View Menu

COMMAND	SHORTCUT	DESCRIPTION
Previous page	Ctrl + Shift + Tab	Enables the page of the window previous to the one currently in use
Next page	Ctrl + Tab	Enables the page of the window next to the one currently in use

Graph Menu

COMMAND	DESCRIPTION
Add Graph	Adds a new element to the Graphs list of channels configurations
Remove Graph	Removes from the Graphs list the configurations of the selected channels
Move Up	Moves up by one position the selected elements in the Graphs list. If Area title bar is selected, the command acts on the whole Area.
Move Down	Moves down by one position the selected elements in the Graphs list. If Area title bar is selected, the command acts on the whole Area.
Add Area	Adds a new Area. See graph area for further details.
Remove Area	Remove an existing Area. See graph area for further details.

Toolbar

The toolbar of the **Graph Configuration** window allows the access to the following commands:

DESCRIPTION	DESCRIPTION
Keep Visible	Enables the Keep Visible mode allowing to keep displayed the configuration window while the application window are in use
Cancel	Closes the configuration window without applying the settings (similar to the Cancel command of the File menu)
Apply	Applies the current settings to the configuration of the graphic window (similar to the Apply command of the File menu)
Load	Similar to the Load command of the File menu
Save As	Similar to the Save As command of the File menu
Previous page	Similar to the Previous page command of the View menu
Next page	Similar to the Next page command of the View menu
Cut	Similar to the Cut command of the Edit menu
Copy	Similar to the Copy command of the Edit menu
Paste	Similar to the Paste command of the Edit menu
Add	Similar to the Add Graph command of the Graph menu
Remove	Similar to the Remove Graph command of the Graph menu
Move Up	Similar to the Move Up command of the Graph menu
Move Down	Similar to the Move Down command of the Graph menu
Add Area	Similar to the Add Area command of the Graph menu

Remove Area	Similar to the Remove Area command of the Graph menu
Channel Browser	Displays the pop-up menu to select the page in the Channel Browser window 

Pop-up Menu

The pop-up menu of the **Graph Configuration** window can be displayed by clicking with the right button of the mouse on the Options page.

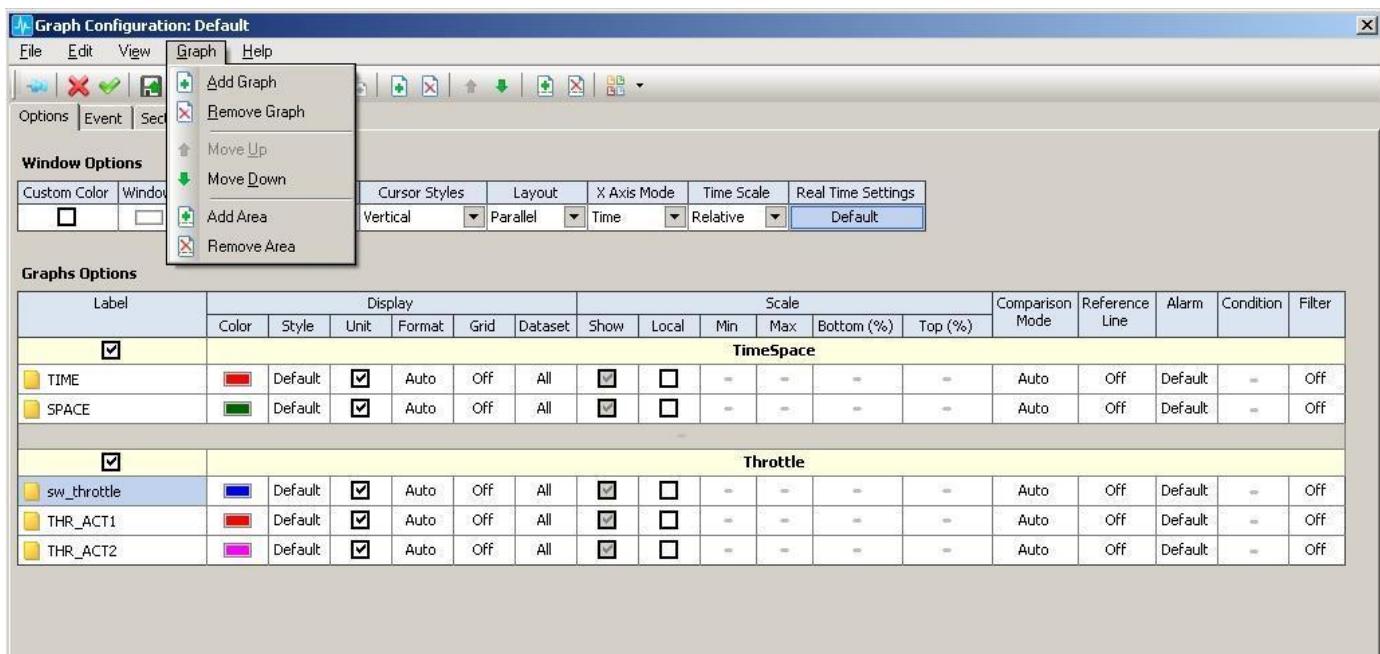
The pop-up menu of the **Graph Configuration** window allows the access to the following commands:

COMMAND	DESCRIPTION
Cut	Similar to the Cut command of the Edit menu
Copy	Similar to the Copy command of the Edit menu
Paste	Similar to the Paste command of the Edit menu
Add Graph	Similar to the Add Graph command of the Graph menu
Remove Graph	Similar to the Remove Graph command of the Graph menu
Move Up	Similar to the Move Up command of the Graph menu

Move Down	Similar to the Move Down command of the Graph menu
Restore Default	Sets in the channel the settings configured in the Channel Parameters
Set As Default	Configures the settings of the channel in the Channel Parameters

Graph Areas

The areas are a further possibility to group the channels. Each area has a defined space configured on the graphics window.



You can divide up to ten areas the graph window. Areas are added with *Add Area* and removed with *Remove Area*. To add a channel to the desired area, just drag it on the area you want.

The check box in the area's subtitle permits to show or hide the corresponding area. The name of the area can be edited by double clicking with the mouse or by pressing the space bar.

It is possible to change the order of areas in graph configuration via arrow keys (Move up and down). To use Move Up and Move down with areas, the header of one or more areas must be selected.

Functions

The **Graph** window has the following functions:

- Cursor
- Step
- Snap
- Datum
- Graph Cursor
- Popup
- Max & Min
- Max & Min Enhanced
- Max & Min on Graph
- Graph Information
- Layout
- Display of the elements
- Zoom
- Rectangles selection in the graphic area
- Channels selection
- Shift of the channels graphs
- Hide/Show Graphs
- X Scale Mode
- Multicolor Channel
- Graph Areas
- Variance

Functions available only in real time mode:

- Post Processing View
- Manual Range
- Real time Comparison
- Real time Analysis freeze

The **Graph** windows moreover have a series of functions that can be performed interacting with the other windows displayed:

- **Auto Connect:** the position of the cursor is automatically up-dated in all the displayed windows whenever the position of the cursor is in the current graphic window. Some windows are always connected, while other are connected only if in Setup/General the auto connect cursor flag is set. To connect two Graphs, this option must be set.
- **Auto Connect Zoom:** the position of the zoom is automatically up-dated in all the displayed windows whenever the position of the zoom in the current graphic window. The zoom is connected only if in Setup/General the auto connect zoom flag is set.

Cursor

The cursor is the vertical line displayed in the graphic area that enables to scroll all values in the range of the X-axis, updating the corresponding values of the channels in the info boxes.

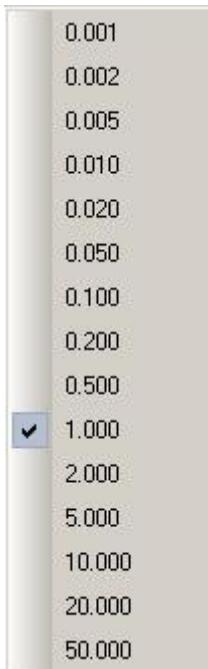
The cursor can be moved along the X-axis in one of following ways.

- Moving the mouse in the graphic area while the left button is pressed.
- through the arrow keys of the keyboard (right and left arrow key).
- Manually setting the value of the X-axis in the X-axis window that is viewed by pressing the INS key of the keyboard.



Step

The Step allows setting the fixes step at which the cursor can move, when the keyboard is used. The Step value can be set using the commands in Options menu and Graph toolbar and choosing from this values:

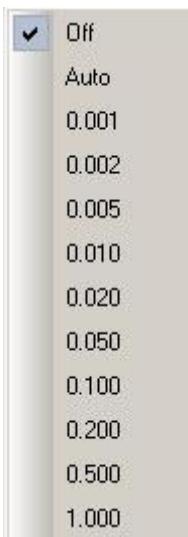


Snap

The snap allows to set the fixes step at which the cursor can move, when the mouse is used.

To set the snap value select the *snap button* of the Toolbar or the command in Options menu and select a value from the list. Selecting OFF the function is disabled.

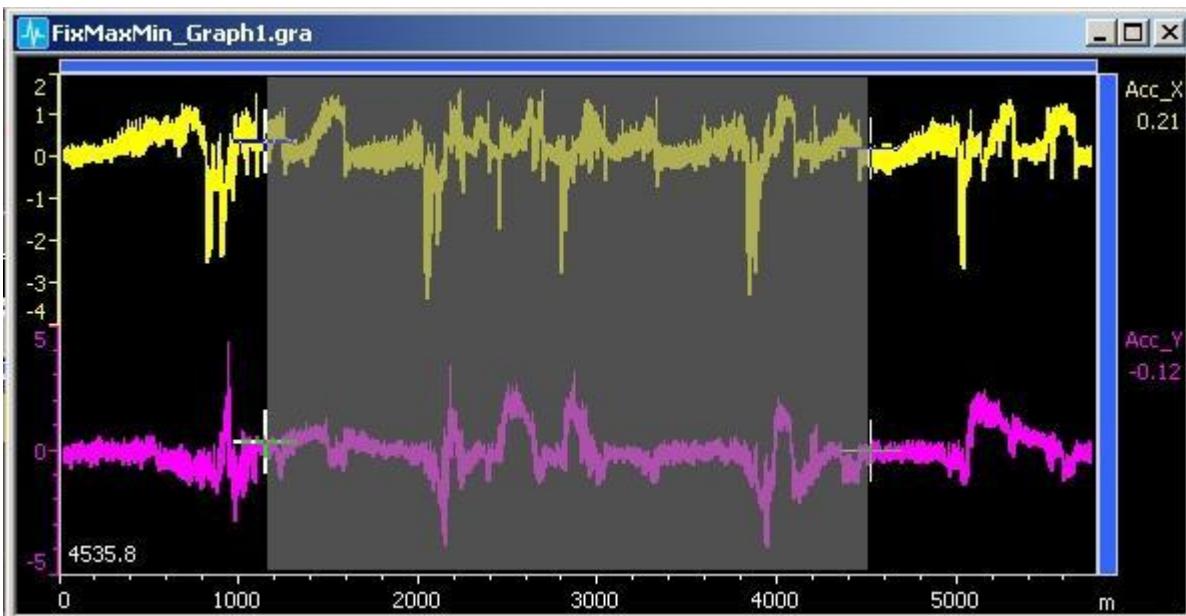
Selecting AUTO the value corresponds to the highest sampling frequency of all channels configured in the window.



Datum

The Datum cursor is used as a reference to calculate the information displayed in the Pop-Up Legend window. When Set Datum is active, the cursor identifies a grayed area whose ends are used in Legend window.

The function is enabled only when the Pop-Up Legend window is displayed.



Graph Cursor

The Graph Cursor can change the display of the cursor. The cursor has the following states:

1. **Vertical (default)**: the window displays a vertical cursor.
2. **Horizontal**: the window displays a vertical cursor and an horizontal cursor for each channel.
3. **Intersection**: the window display a cross cursor for each channel in the window and a vertical cursor to connect all cross cursors.
4. **Multiple Cross**: the window displays a cross cursor for each channel in the window.
5. **Single Cross**: the window displays a cross cursor for the selected channel.

Popup Legend

The Popup Legend function displays in a popup window the values of the channels available on the graph in the moment corresponding to the cursor; the difference between the values and the values available at Datum can also be displayed.

The function can be enabled through the Options menu, or the popup menus displayed by clicking with the mouse on the graphic area or on the channels Info area.

Max & Min

A window is opened to display the maximum and minimum values of the channel available on the graph in the time range taken into account.

The window takes into account the time and space intervals in the Time and Distance basic cases.

The right button on the Max & Min window enables the following commands

- **Print** Prints the table of the maximum and minimum values
- **Export** Exports the values in txt format
- **Copy Data to Clipboard** Copies to the clipboard of Windows the values of the window
- **Open in Excel** Opens an Excel file containing the Max & Min table
- **Go To: X value** This command appears only if the right click is on columns Min X and Max X (underlined values) and move the cursor values at the corresponding time. It also be possible to left click the cells to obtain the same effect.



On the Max & Min table the following values are displayed

- **Time Start (Distance Start)** It is the lower limit of the time (space) interval taken into account.
- **Time End (Distance End)** It is the upper limit of the time (space) interval taken into account.
- **Name** Name of the channel.
- **Min** Minimum value of X in the interval taken into account.
- **Min X** Time instant when X reaches its minimum value in the interval taken into account.
- **Max** Maximum value of X in the interval taken into account.
- **Max X** Time instant when X reaches its maximum value in the interval taken into account.
- **Avg** Average values of the channel in the interval taken into account.

- **Avg (abs)** Average of the absolute values of the channel in the interval taken into account.
- **StdDev** Standard Deviation of the channel.
- **Resolution** Minimum difference between the consecutive values of the channel samples.
- **Samples** Number of the samples valid in the interval taken into account.

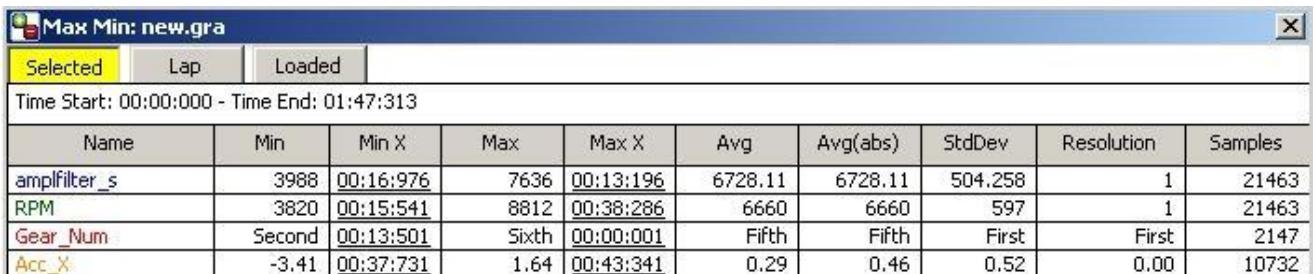
Max & Min Enhanced

In some licenses, the Max & Min Enhanced is enabled. There are two more features than the standard version, the buttons row and the configuration window.

Buttons row

The buttons row on the top of the window has three commands: Selected, Lap, Loaded.

- **Selected:** When the Selected button is pressed, the window has the same function as standard. When the windows has active zoom, the maximum and minimum values are calculated on active zoom.
- **Lap:** When the Lap button is pressed, the window shows maximum and minimum values on the entire lap (or append), even if there is an active zoom. If there are no zoom active, the window works such as Selected.
- **Loaded:** If there are not append lap, the window works such as Lap Button. In the case of append laps, the maximum and minimum values are calculated on the entire lap identified from cursor position.

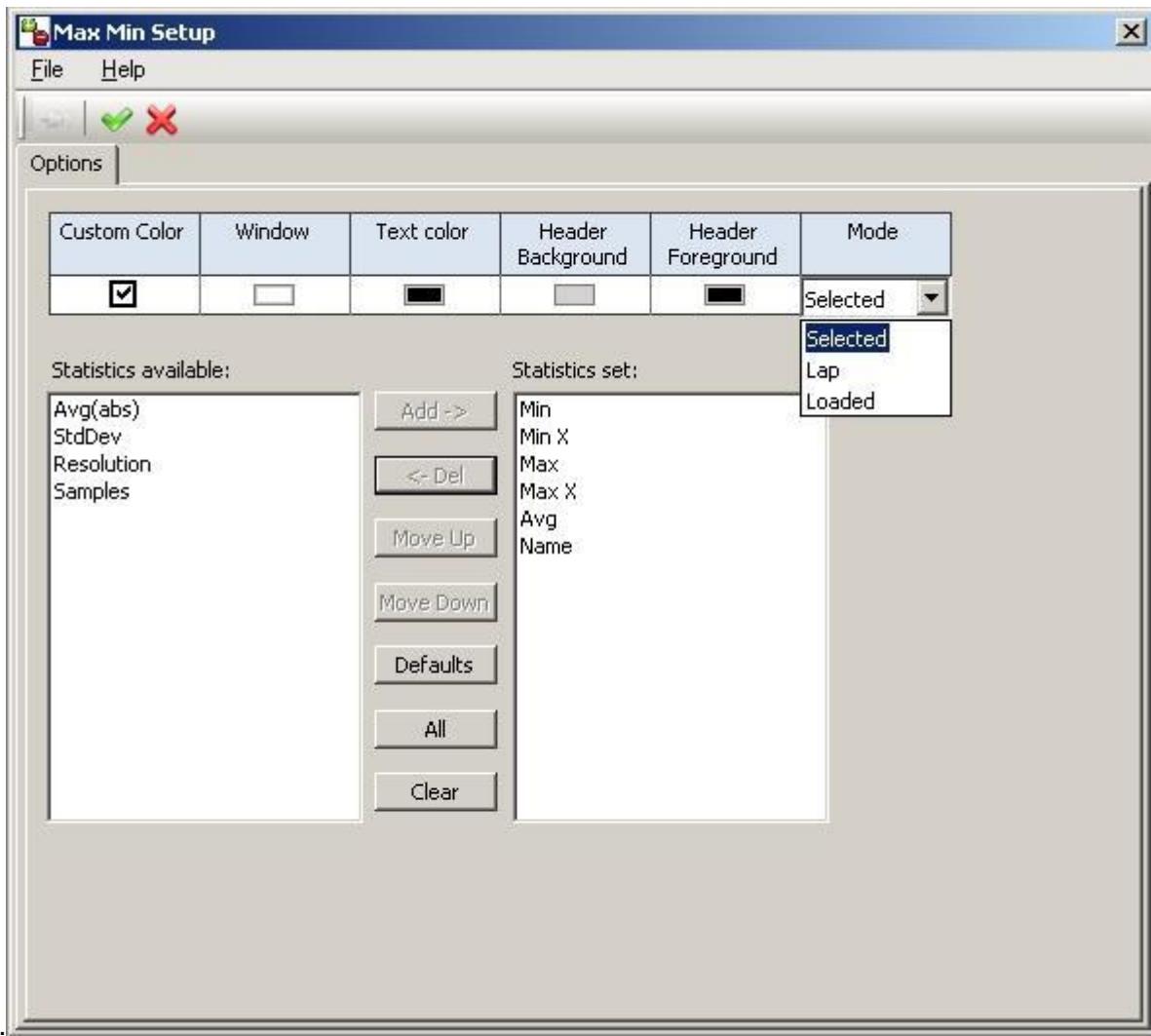


The screenshot shows a software window titled "Max Min: new.gra". At the top, there is a toolbar with three buttons: "Selected" (highlighted in yellow), "Lap", and "Loaded". Below the toolbar, a status bar displays "Time Start: 00:00:000 - Time End: 01:47:313". The main area is a data grid with the following columns: Name, Min, Min X, Max, Max X, Avg, Avg(abs), StdDev, Resolution, and Samples. The data rows are as follows:

Name	Min	Min X	Max	Max X	Avg	Avg(abs)	StdDev	Resolution	Samples
amplfilter_s	3988	00:16:976	7636	00:13:196	6728.11	6728.11	504.258	1	21463
RPM	3820	00:15:541	8812	00:38:286	6660	6660	597	1	21463
Gear_Num	Second	00:13:501	Sixth	00:00:001	Fifth	Fifth	First	First	2147
Acc_X	-3.41	00:37:731	1.64	00:43:341	0.29	0.46	0.52	0.00	10732

Max & Min configuration window

It enables to configure the settings of the aspect of the Max & Min window. Each element of the grid can be edited by double clicking with the mouse or by pressing the space bar. Statistics are configured using the buttons between lists



- **Custom color:** enables the setting of the customized colors of the window. If it is enabled, the colors set in the **Window**, **Text Color**, **Header Background** and **Header Foreground** columns of this section are used for the foreground and background of the header and of the window. If it is disabled, the default background, foreground and channels colors, are the same of those of graph window.
- **Window:** sets background color of the window.
- **Text Color:** sets the color of the text of all channels.
- **Header Foreground:** sets the color of the text of header.
- **Header Background:** sets background color of the header
- **Mode:** Configure the Selected, Lap or Loaded mode calculation.
- **Statistics:** The left list shows the available statistics. The right list shows the configured statistics. Using buttons, it is possible to add available statistics, remove available statistics, move up, move down, and other operations. Choosing default, the window looks like picture below

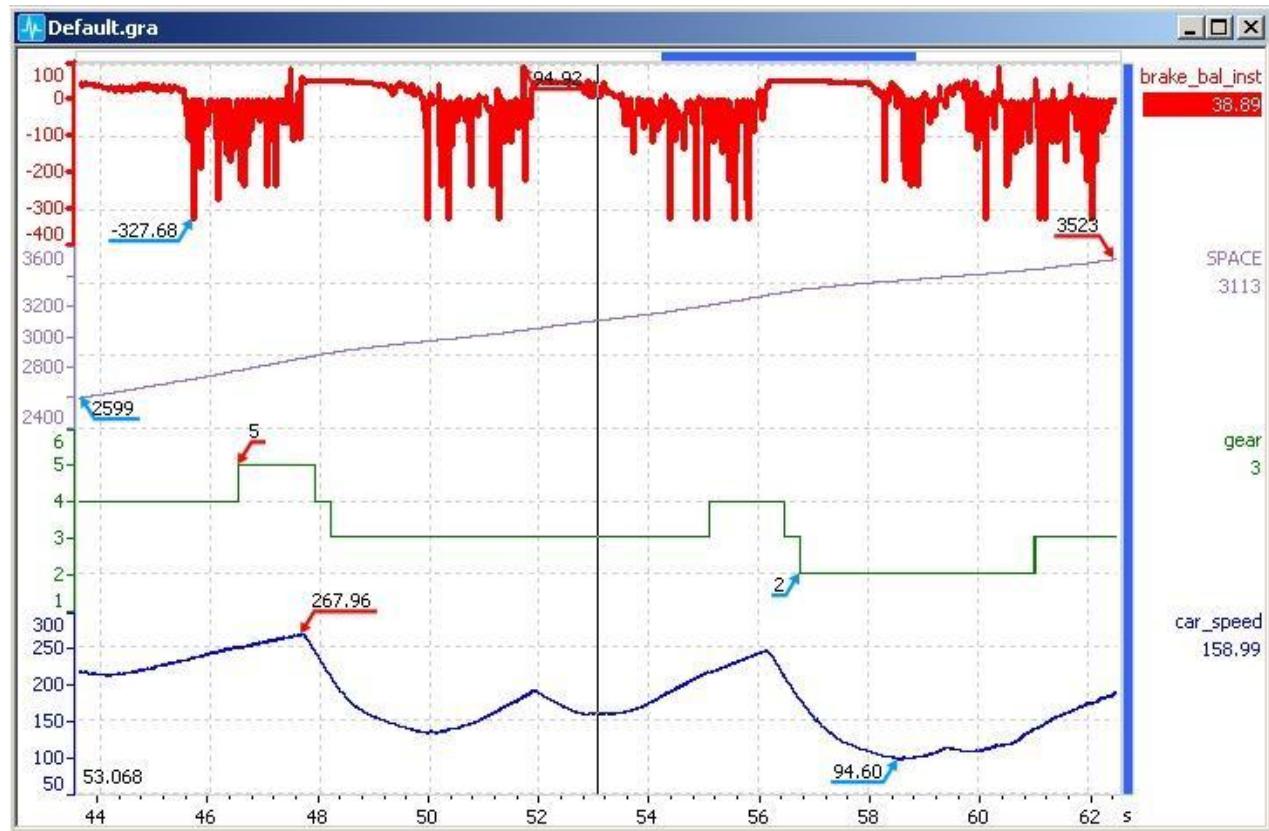
Max Min: new.gra

Selected	Lap	Loaded		
Time Start: 00:00:000 - Time End: 01:47:313				
Name	Min	Min X	Max	Max X
amplfilter_s	3988	00:16:976	7636	00:13:196
RPM	3820	00:15:541	8812	00:38:286
Gear_Num	Second	00:13:501	Sixth	00:00:001
Acc_X	-3.41	00:37:731	1.64	00:43:341

Max & Min on Graph

This feature displays minimum and maximum values on the graph windows. See the picture below.

This function can be reached through the Options menu, Toolbar Graph, shortcut or through the pop-up menu displayed by clicking with the mouse on the graphic area.



Graph Information

The Graph Information window displays in a window some information about the channel.

This function can be reached through the Options menu, the Toolbar Graph, or through the pop-up menu displayed by clicking with the mouse on the graphic area.

Graph Information						
T1: 10.2654 T2: 60.8679						
Name	Color	Min Box	Max Box	Offset	Gain	Shift (seconds)
RPM	red	6000	18000	0	1	19
Speed	forestgreen	100	700	0	1	27
gear	darkred	500	1500	1	10	0

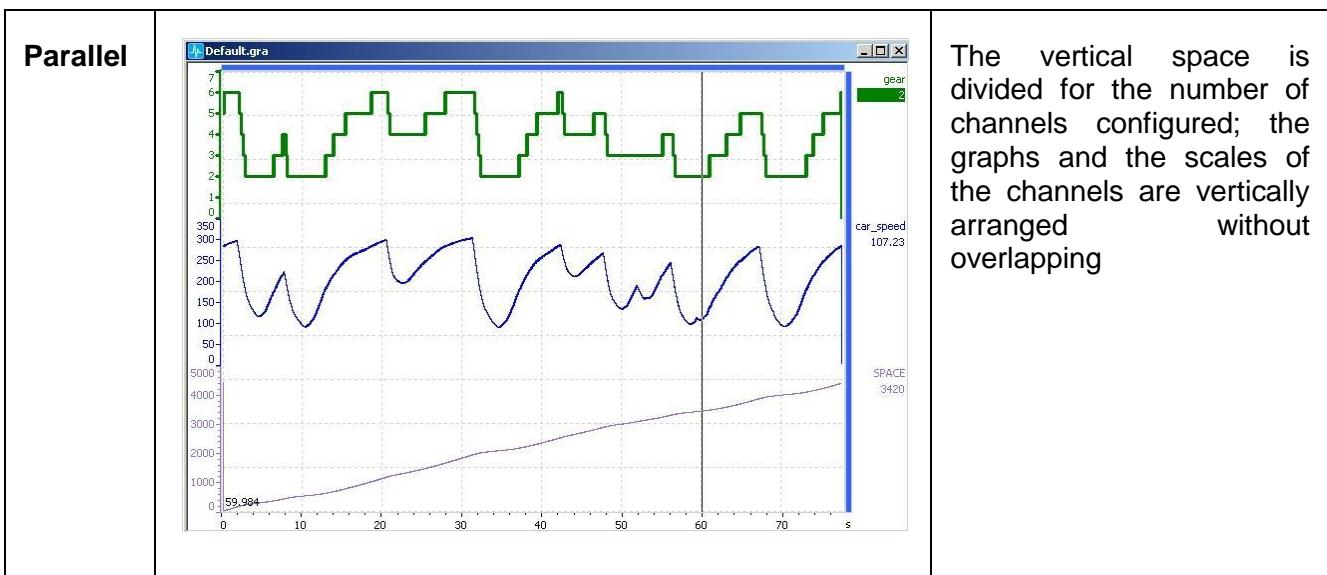
For each channel the following information are displayed

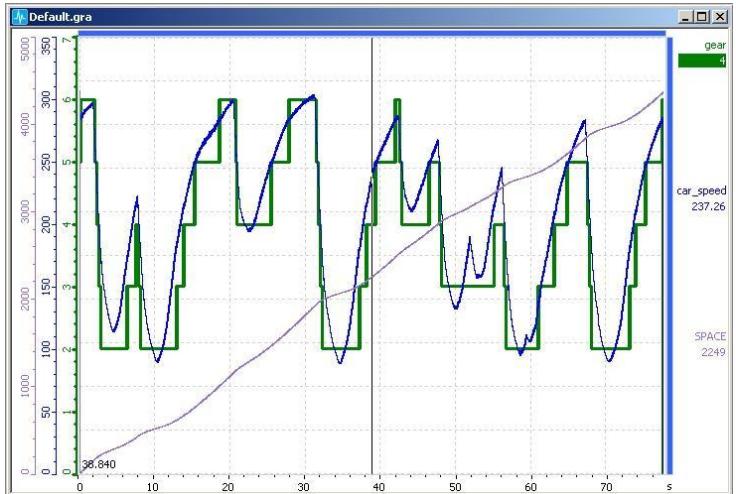
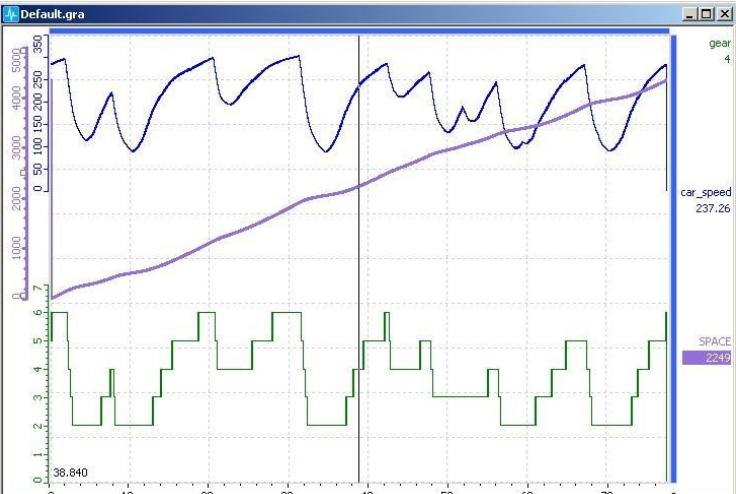
- **T1(D1) T2(D2)** Outer limits of the time (distance) interval taken into account
- **Name** Name of the channel
- **Color** Color of the graphs
- **Min Box** Minimum value of the channel in the interval taken into account
- **Max Box** Maximum value of the channel in the interval taken into account
- **Offset** Offset of the obtained value according to the configuration set in Setup/General
- **Gain** Gain of the channel obtained according to the configuration set in Setup/General
- **Shift (seconds/meters)** Value of the shift of the graphs, in seconds or in meters according to the Time or Distance values of the X-axis

Layout

The Layout function enables to change the aspect of the graphic window and especially the vertical arrangement of the graphs and of the Y scales.

It can be enabled through the Graph Layout command of the Options menu, of the pop-up menu and of the button on the toolbar, selecting one of the suggested modes:



Overlay 	<p>The configured channels share the vertical space; the Y scales are horizontally arranged side by side, the graphs overlay.</p>
Manual 	<p>The graphs and the Y scale corresponding to the channels are vertically arranged based on the settings of the user in the Top and Bottom fields that can be changed through the configuration window in the Graphs section. To quickly configure the graphs, just select with the mouse the channel to highlight the selection squares allowing to drag the graph along the vertical axis or allowing to enlarge or reduce the space covered.</p>

Display of the elements

The items of the window can be displayed or hidden by enabling the View command on the Options menu or on the pop-up menu.

Zoom

The zoom enlarges the graphic area displaying in higher or smaller details the channels graphs.

Two type of zooming are available:

- **Horizontal Zoom:** refers to an interval of the X-axis.
- **Zoom Box:** corresponds to a rectangle of the graphic area.

There are different ways to zoom and to move the area displayed in details

- **manual selection of a zoom rectangle in the graphic area.**

Select a rectangle of the graphic area with the mouse or the keyboard (function: Selection of rectangles in the graphic area).

Select Zoom in the Pop-up menu displayed by clicking with the right button of the mouse or by pressing SHIFT key as indicated in the figure.



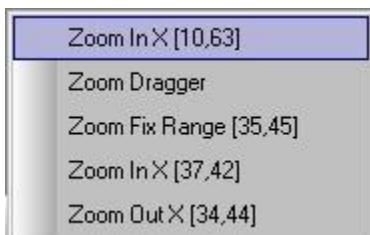
The square of the figure was obtained by keeping CTRL pressed during the selection; if CTRL is not pressed the rectangle zoom only along X and not along Y.

- **Zoom In, Zoom Out, Zoom Min, Zoom Max** commands (menu, toolbar, pop-up menu, mouse wheel + CTRL).

The Zoom In, Zoom Out, Zoom Min, Zoom Max commands can be enabled through the Options menu, the Toolbar Graph, the pop-up menu of the Graphs window. Zoom In and Zoom Out can be carried out also with the mouse using the wheel while pressing the CTRL key.

- **Zoom In:** Zooms horizontally the graphic area in relation to the X-axis; the interval around the current position of the cursor is also displayed.
- **Zoom Out:** Opposite operation compared to Zoom In, the graphic area is displayed in lower detail with reference to the interval of the X-axis around the current position of the cursor.
- **Zoom Min:** Zooms the graphic area in relation to the X-axis, in maximum details, with reference to the current position of the cursor.

- **Zoom Max:** The graphic area is displayed in comparison with the whole extent of the X-axis; it corresponds to the minimum details (100%) and it is the default setting when the graphic windows are opened to be displayed.
- **Zoom Fix Range:** The Zoom Fix Range can be enabled through the Toolbar Graph and the pop-up menu of the Zooms horizontally the graphic area, displaying the interval around the current position of the cursor for a fixed interval whose value set in the Zoom Fix field (Time to Distance according to the mode of the X scale) of the General Options of the General Setup window.
- **Zoom T1-T2** This function allows to zoom horizontally the graphic area indicating directly the outer limits of the reference interval of the X-axis. Enable the T1-T2 mode using the command on the Toolbar Graph. When the Zoom T1-T2 mode is active, the cursor of the mouse is displayed as a hand lens. In this situation, it is possible to select the zoom outer limits with the mouse, by clicking with the left button on the graphic area or manually setting the T1 and T2 values in the X-Axis window that can be displayed by pressing the INS key. To exit from the T1-T2 mode without zooming, press the ESC key.
- **Zoom Undo, Zoom Redo** When more zoom operations are carried out in sequence, it is possible to shift in the display sequence through the ZoomUndo and ZoomRedo commands available in the Toolbar Graph. The ZoomUndo icon displays in a pop-up menu the zoom operations carried out before the one in use while the ZoomRedo displays those coming after (if a previous zoom has been selected). In particular, see the following example.



The list in the pop-up menu shows that the following operations were carried out: Zoom In, shift of the zoom area, Zoom Fix, Zoom In, Zoom Out. Selecting the first "Zoom In X [11, 64]", the initial situation of the window (zoom at 100%) is displayed.

To shift the zooming area keeping the same level of detail, proceed as follows:

- **zoom bars**

drag the zoom bars with the mouse, pressing the left button

- **arrow keys of the keyboard**

use the arrow key of the keyboard, pressing the CTRL key

- **mouse**

use the mouse wheel (for horizontal scroll)

- **Pan**

The Pan mode allows to shift the displayed zoom area using the mouse or the keyboard.

Enable the Pan mode through the command available in the Toolbar Graph or in the pop-up menu. The cursor of the mouse is displayed as hand-shaped when it is moved in the graphic area of the window.

To shift the displayed zoom area, move the mouse pressing the left button, or use the arrow keys pressing the Ctrl key.

To exit the Pan mode, just release the left button of the mouse or press Esc.

Selection of rectangles in the graphic area

To select rectangles in the graphic area, proceed as follows:

- use the arrow key of the keyboard, (Right Arrow, Left Arrow) pressing the Shift key; the selection corresponds to an interval on the X-axis
- drag the mouse while pressing the right button and the Ctrl key

During this operation, the selected rectangle is highlighted and in a pop-up window, the information about the interval of the X-axis and about the zoom percentage on the Y-axis of the rectangle is displayed.

Selection of the channels

A channel can be selected (i.e. the Y scale, the graphs and the info boxes of a channel) by clicking with the left button of the mouse on the Y scale or on the info boxes of the channel. The channel is selected also clicking on the area of the transparent cursors. To multiple select channels, select the channels keeping the CTRL key pressed. As an alternative select in sequence just one channel using the TAB. The Y scale, the graphs and the info boxes of the selected channels are highlighted. To deselect a channel, click with the left button of the mouse on the Y scale or on the info boxes or deselect the Clear Selection command of the Options menu or of the pop-up menu.

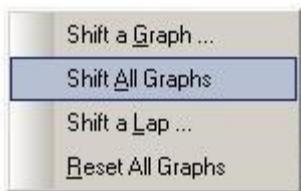
Clicking with the right button of the mouse on the Y scale or on the info boxes of the Info Channels area, the channel is automatically selected; if the channel was not selected, other already selected channels are deselected.

The selected channel has two display modes that can be configured in Setup/General. In the highlight combo, two modes can be chosen **Bold** that shows the channel in bold or the **Blink** mode shows the blinking channel.

Shift of the graphs and datasets

The horizontal direction of the graphs of the channels can be shifted.

This can be done on all the graphs of the window, on just one graph or on the graphs of a specific Lap loaded using the Shift command of the Toolbar Graph that shows the following menu.



- **Shift a Graph** Selecting this item, the following menu is displayed allowing to choose to which graph the shift should be applied.



Once the graphs are selected, the cursor is displayed as hand-shaped and the graph can be dragged in the desired position with mouse or left and right arrow keys. To complete the shift, press either **Enter**, or choose **Confirm Shift** from the pop-up menu or press the **shift** button on the toolbar. With **Esc**, the shift in use is cancelled.

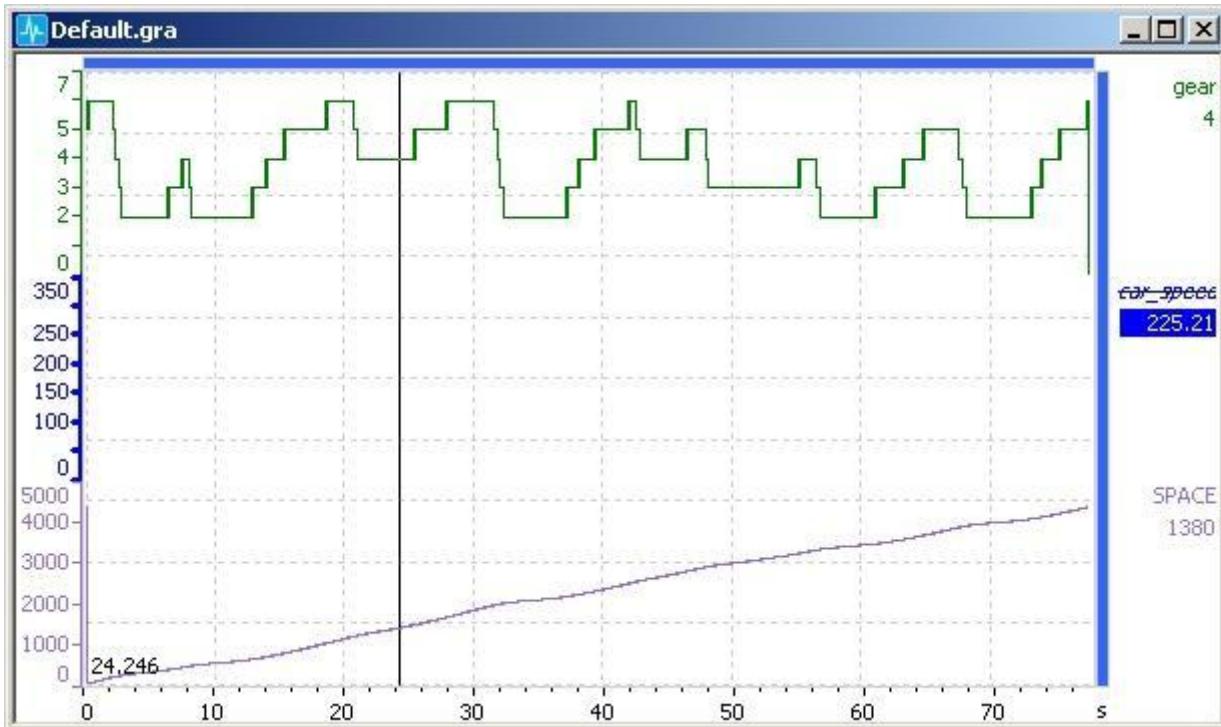
- **Shift All Graphs** Selecting this item the cursor is displayed as hand-shaped and the graphs can be dragged in the wished position with mouse or left and right arrow keys. To complete the shift, please press **Enter**, or choose **Confirm Shift** from pop-up menu or press the button of the **shift** on the toolbar. With **Esc**, the shift is cancelled.
- **Shift a Lap** Selecting this item the cursor is displayed as hand-shaped and the lap can be dragged in the wished position with mouse or left and right arrow keys. To complete the shift, please press **Enter**, or choose **Confirm Shift** from pop-up menu or press the button of the **shift** on the toolbar. With **Esc**, the shift is cancelled. This operation differs from Shift All Graphs because the lap and not the graphs are dragged. The difference can be noted if the window displays the events; in Shift Lap the events follow the channels; in Shift Graph the events are fixed.
- **Shift Comparison** The shift comparison function is applied on all the Graph and XY windows of the layout
- **Reset All Graph** Cancel all shift on the window

WinTAX keeps in memory the graph shift if a channel is hidden.

Hide/Show Graphs

The Hide/Show Graphs function enables to hide/show the corners and the graphs elements of the selected channels.

The name of the channels of which the graph is hidden, are barred in the text box of the Info area.



The function can be enabled through the popup menu displayed by clicking with the mouse on the channels Info area.

X Scale Mode

The **Time** mode displays on the X-axis the scale, the times of the Laps loaded. The **Distance** mode displays on the X-axis the scale of the distances covered of the Laps loaded. To apply the **Distance** mode, set the Distance channel in the **Special Channels** page of the **General Setup** window.

The mode of the X scale can be changed through the configuration, or through the X-Axis command of the Options menu, of the pop-up menu or of the toolbar.

Post Processing View

Enables to export on a Graph window in post processing mode the real time data displayed. The configuration used for the post processing window is the one of the starting real time Graph but it can be modified in the Real Time page of *Setup/General*.

Real time analysis freeze

Real time visualization can be temporarily set in pause mode allowing user to analyses data in post processing mode. Scroll command allows to navigate into frozen data up to 180 sec. back from the current time.

This function works for all real time windows currently displayed into layout.

Frozen data are not saved by WinTAX.

Command is available via *Options* menu and Graph Toolbar.

Manual Range

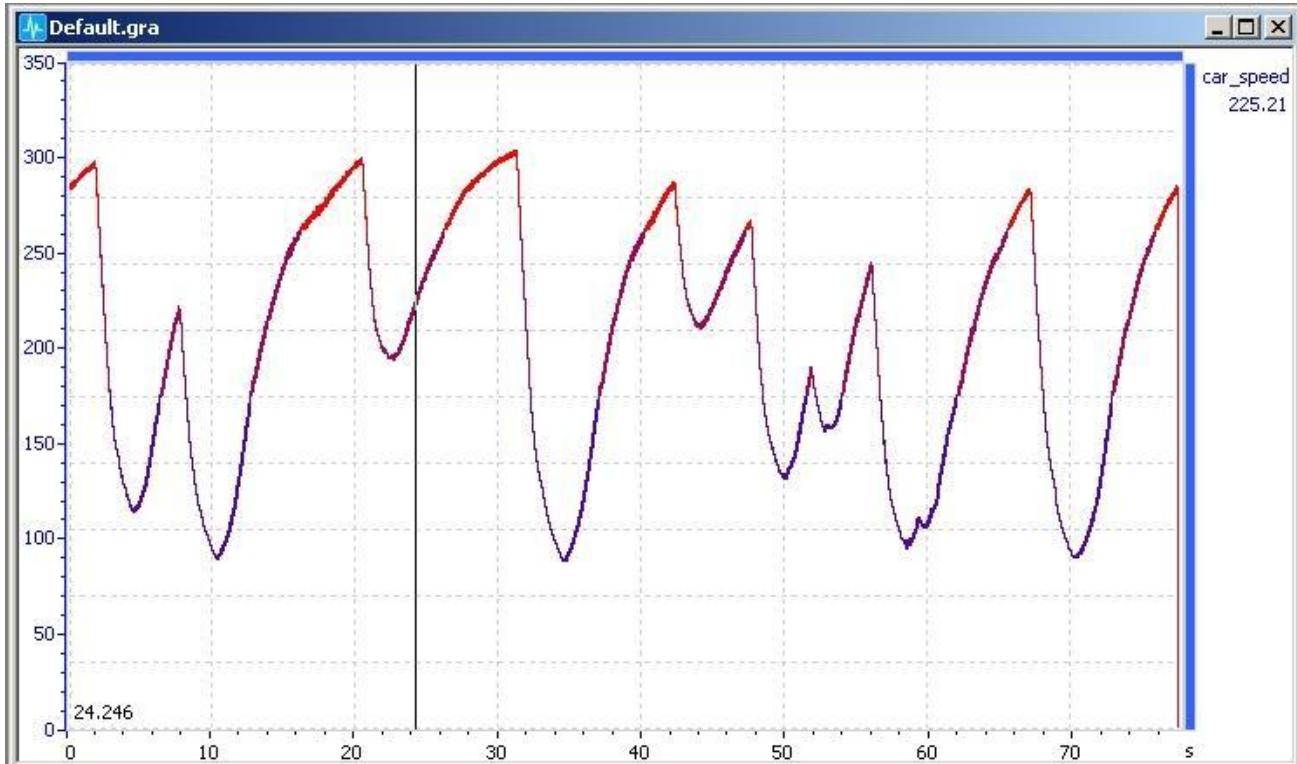
Automatically calculates the limits of the Y scale so that the channel is fully displayed and sets the manual mode of the Y scale (*Auto Y off*).

Real time Comparison

Function enabling to compare the real time flux of data with a reference lap.

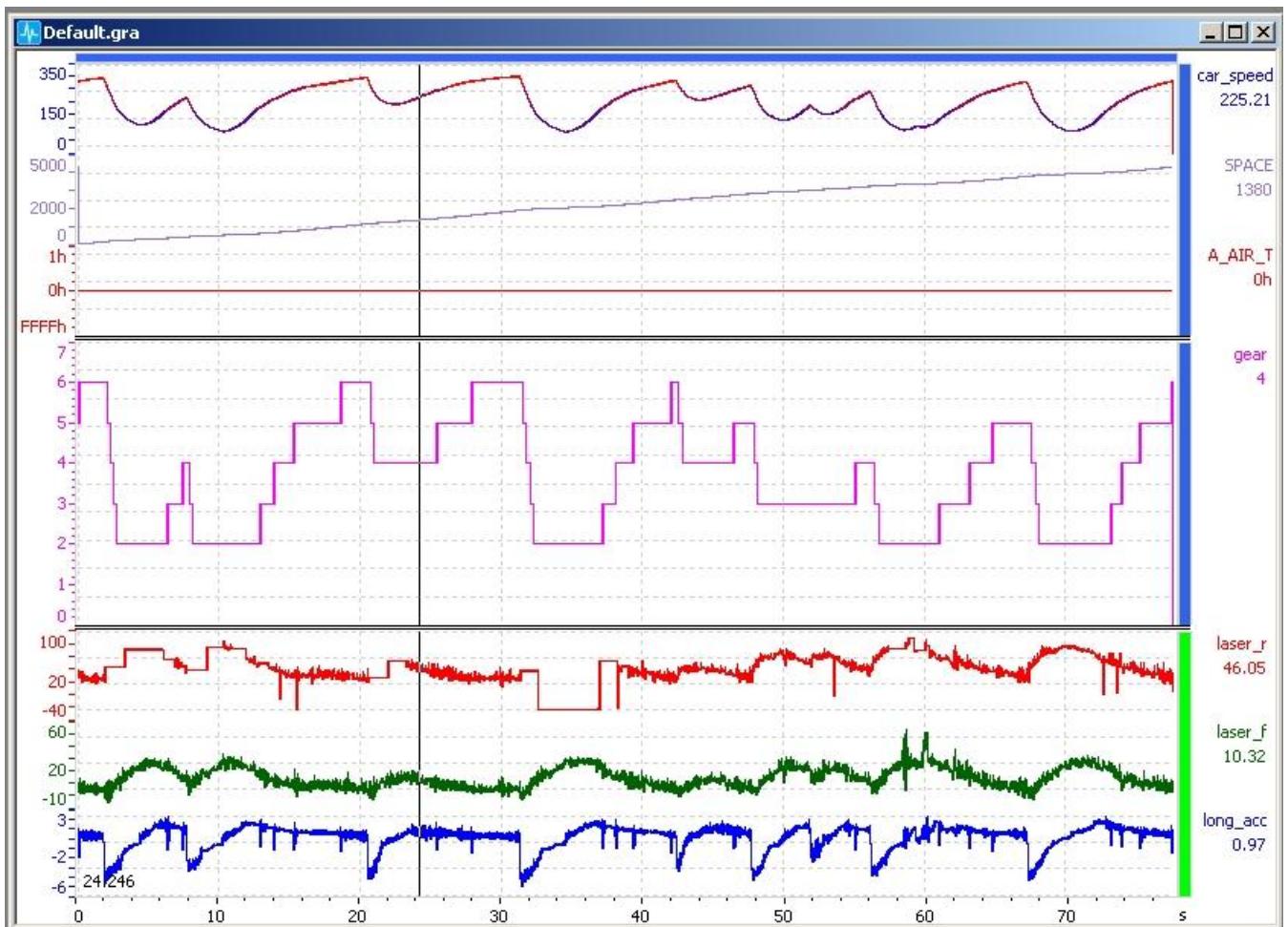
Multicolor channels

Opening the Channel Properties page in Graph Configuration, in some licenses, enabling the multi color check, you can configure channels to be plotted with different colored bands.



Graph Areas

Opening the Graph Configuration, you can find the Graph Area commands. The controls handle the graphics area which can be divided into smaller horizontal strips. The maximum number of configurable areas is 10. The areas are separated by a divider with which you can resize them. Each area can be hidden, but at least one is always visible.

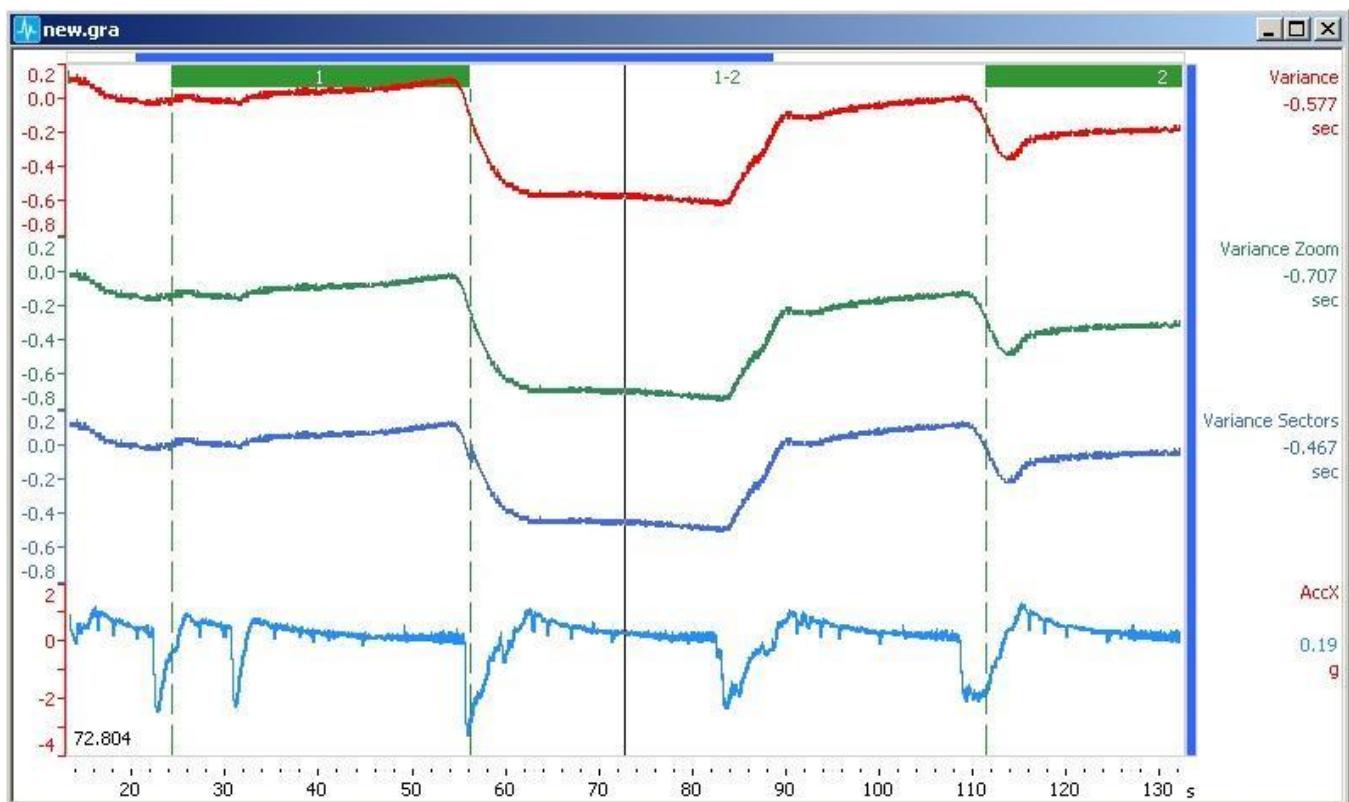


Variance

In comparison mode, the graph windows can display additional channels that show the trend of the difference in time between the first two DataSets enabled. The channels are called Variance, Variance Zoom and Variance Sectors. The channels are displayed on the window with the command Variance from Tools menu or via the shortcut Alt + V. The channels are displayed on the selected graph window or on the first graph window in the layout if an another type window is selected.

- **Variance** is the trend of the difference in time between the first two DataSets enabled calculated in the whole lap
- **Variance Zoom** is the same of Variance but calculated on the active zoom.
- **Variance Sectors** is the same of Variance but calculated sector by sector.

If the difference is positive it means that, at the same distance traveled, in the first lap the car is moving more slowly.



Commands

The main commands available in the **Graph** window can be enabled through the

- **Options** menu in the main menu of the application
- the buttons of the dedicated **Toolbar**,
- **Pop-up menu** that can be displayed by clicking with the right button of the mouse in the graphic area of the window, on the Info boxes or on the Y scales of the selected channels.
- **Keyboard shortcuts**

Options Menu

The pictures show two examples of menu options: the first refers to a window in Post Processing mode, the second to a window in Real Time mode.



The **Options** menu for the Graph and the Graph RT windows allows the access to the following commands:

COMMAND	SHORTCUT	DESCRIPTION
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Zoom

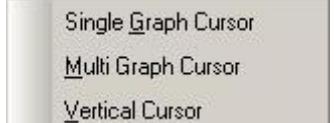
Displays the sub menu to work with zoom.

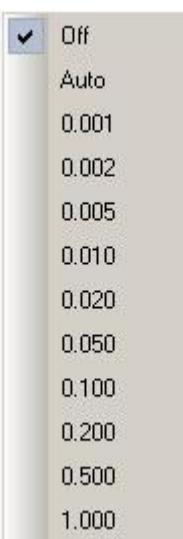


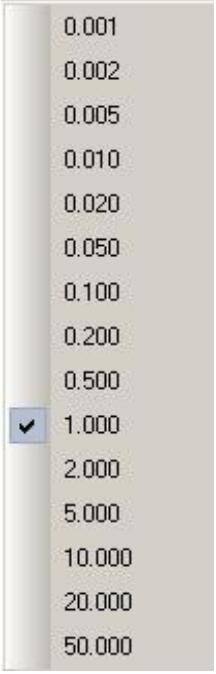
COMMAND	SHORTCUT	DESCRIPTION
Zoom In	+	Zooms the graphic area in respect to the X axis, displaying in better details the interval around the current position of the cursor (see also the Zoom functions)
Zoom Out	-	Operation opposite to the Zoom In on the graphic area of the window: it displays in smaller detail in respect to the X axis of the interval around the current position of the cursor (see also the Zoom functions).
Maximum Zoom	Ctrl + +	Displays the graphic area in respect to the whole interval of the X axis (see also the Zoom functions).
Minimum Zoom	Ctrl + -	Zooms at maximum details in respect to the X axis, showing in maximum details the interval around the current position of the cursor (see also the Zoom functions).

	Zoom Box		Enable the Zoom Box mode to select the part of the graphic area to be zoomed (see also the Zoom functions).
	Zoom T1-T2		Enable the T1-T2 mode to select the part of the graphic area to be zoomed in respect to the X axis (see also the Zoom functions).
	Zoom Fix Range		Displays the graphic area corresponding to a fixed interval of the X axis (see also the Zoom functions)
	Pan		The Pan mode allows shifting the displayed zoom area using the mouse or the keyboard (see also the Zoom functions).
	Zoom undo		Undo the last zoom operation.
	Zoom redo		Redo the last zoom operation.

Shift		Displays the sub menu to work with shifts.
COMMAND SHORTCUT	DESCRIPTION	
Shift a Dataset Alt + S 1 2 3 4 5 6 7 8 9 Shift+R Enter Esc	<p>Open the Dataset submenu.</p> <p>The first command, Activate shift mode, opens the shift operations. After selecting this command, the menu appears as shown below: Choosing Deactivate shift mode the shift session will be close. Otherwise, selecting any of the other commands, the corresponding Dataset will be activate for shift operations. To complete the shift, press Alt + S, or Enter, or choose Confirm Shift from pop-up menu or press the button of the shift on the toolbar, or choose Deactivate shift mode from options menu.</p> <p>Shift+R,1,2,3,4,5,6,7,8,9,0: shortcuts to choose datasets.</p> <p>Enter: shortcut to confirm shift</p> <p>Esc: shortcut to cancel shift operations</p>	
Shift Graphs	<p>Displays a pop-up menu</p> <ul style="list-style-type: none"> • Shift a Graph Displays in a pop-up menu the list of the channels configured in the window; the shift function will be applied to the channel selected from this list. If more Laps are loaded, select a specific Lap from the next pop-up menu displayed. • Shift All Graphs Enables the shift on all the channels configured in the window. 	
Reset All Shift Alt + X	Resets the shift for each channel configured in the window restoring the initial situation.	

PopUp Legend	L	Displays the PopUp Legend window						
Set Datum	D	Set the Datum cursor						
Close Datum	Ctrl + D	Close the Datum cursor						
Max & Min	Ctrl + M	Displays or closes the window describing the Max & Min values						
Show absolute Min/Max on Graphs	Shift + M	Displays Max & Min on Graph						
Search	Shift + - Shift + +	<p>Displays the sub menu to select the method to search the absolute Minimum and Maximum points in the curve of the graph of the selected channel. To use the commands, a channel must be selected; the Minimum will place the cursor on the absolute minimum point in the part displayed of the graphs, the Maximum will place the cursor on the maximum point.</p>  <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>Minimum</td> <td>Shift+-</td> </tr> <tr> <td>Maximum</td> <td>Shift++</td> </tr> </table>	Minimum	Shift+-	Maximum	Shift++		
Minimum	Shift+-							
Maximum	Shift++							
Graph Layout	P O M	<p>Displays the sub menu to select the vertical arrangement of the channels (Parallel, Overlay, Manual)</p>  <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td><input checked="" type="checkbox"/> Parallel</td> <td>P</td> </tr> <tr> <td>Overlay</td> <td>O</td> </tr> <tr> <td>Manual</td> <td>M</td> </tr> </table> <p>the mode selected is highlighted with a check mark</p>	<input checked="" type="checkbox"/> Parallel	P	Overlay	O	Manual	M
<input checked="" type="checkbox"/> Parallel	P							
Overlay	O							
Manual	M							
Graph Cursor		<p>Displays the sub menu to select the graph cursor (single, multiple, vertical)</p>  <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>Single Graph Cursor</td> </tr> <tr> <td>Multi Graph Cursor</td> </tr> <tr> <td>Vertical Cursor</td> </tr> </table> <ol style="list-style-type: none"> 1. <u>Single</u>. The window displays a cross cursor for the selected channel. 2. <u>Multiple</u>. The window displays a cross cursor for each 	Single Graph Cursor	Multi Graph Cursor	Vertical Cursor			
Single Graph Cursor								
Multi Graph Cursor								
Vertical Cursor								

		<p>channel in the window.</p> <p>3. <u>Vertical</u> (default). The window displays a vertical cursor.</p>
Cursor Snap		<p>Enables the Snap function to shift zooming area displayed. The snap allows to set the fixes step at which the cursor can move, when the mouse is used.</p>  <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Off Auto 0.001 0.002 0.005 0.010 0.020 0.050 0.100 0.200 0.500 1.000

Cursor Step	<p>The Step allows setting the fixes step at which the cursor can move, when the keyboard is used. Step values are in milliseconds.</p> 	
Move cursor to...	Insert	<p>Set cursor value position in the X-axis window. The value can be set in seconds or in meters depending if the Graph is in Time mode or Distance mode.</p> 

Graph		<p>Displays the following submenu</p> <table border="1"> <tr><td>Remove Graphs</td><td>Delete</td></tr> <tr><td colspan="2">Clear Selection</td></tr> <tr><td>Select Next Channel</td><td>Tab</td></tr> <tr><td>Select All Channels</td><td>Ctrl+A</td></tr> <tr><td>Show Graphs</td><td>Alt+Ctrl+S</td></tr> <tr><td>Hide Graphs</td><td>Alt+Ctrl+H</td></tr> </table>	Remove Graphs	Delete	Clear Selection		Select Next Channel	Tab	Select All Channels	Ctrl+A	Show Graphs	Alt+Ctrl+S	Hide Graphs	Alt+Ctrl+H
Remove Graphs	Delete													
Clear Selection														
Select Next Channel	Tab													
Select All Channels	Ctrl+A													
Show Graphs	Alt+Ctrl+S													
Hide Graphs	Alt+Ctrl+H													
COMMAND	SHORTCUT	DESCRIPTION												
Remove Graphs	Delete	Removes from the window the channels currently selected.												
Clear Selection		Clear channels selection in the current window.												
Select Next Channel	Tab	Selects the next channel in the current window.												
Select All Channels	Ctrl + A	Selects all channels in the current window.												
Show Graphs	Alt + Ctrl + S	Shows the graphs corresponding to the selected channels.												
Hide Graphs	Alt + Ctrl + H	Hides the graphs corresponding to the selected channels												

View		Displays the sub menu to select the graphic elements of the window that can be shown or hidden  <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Transparent Cursor Values <input checked="" type="checkbox"/> Cursor position <input checked="" type="checkbox"/> X Scale <input checked="" type="checkbox"/> Y Scales <input checked="" type="checkbox"/> Zoom Bar X <input checked="" type="checkbox"/> Zoom Bar Y <input checked="" type="checkbox"/> Cursor Values <input checked="" type="checkbox"/> X Scale Unit <input checked="" type="checkbox"/> Cursor Step <input checked="" type="checkbox"/> Shift Value <p>Show All</p> <p>Hide All</p>
View Information		Displays the Graph Information window which contains a summary of the current information about channels.
Time or Distance	X	Switch between Distance (space) mode and Time mode of the X scale

		<ul style="list-style-type: none"> Time: The X axis represents the time instants in seconds. Distance: The X axis represents the distances covered in meters. The Distance channel must be configured in the Special Channels (see the Special Channels page of the General Setup window).
Manual Section Definition	Alt + M	<p>Track Sections may be manually defined at any time using the Manual Sections definition commands from the graph window. In the graph, use the mouse to insert a series of section splits at points on a distance plot.</p> <p>End: shortcut to confirm manual splits</p> <p>Esc: shortcut to abort operations</p>
Show/Hide Area	A	<p>Displays the sub menu to select the Areas of the window that can be shown or hidden.</p>  <p>If the area is shown, the corresponding label is highlighted with a check mark.</p>
Move Previous	Alt + Left	If an append of laps is loaded, this command shifts the cursor in the corresponding position of the distance channel in the previous lap (homologous point). For example, if the position of the cursor is at 15 meters in a lap, the command moves the cursor 15 meters after the beginning of the previous lap.
Move Next	Alt + Right	If an append of laps is loaded, this command shifts the cursor in the corresponding position of the distance channel in the next lap (homologous point). For example, if the position of the cursor is 15 meters in a lap, the command moves the cursor 15 meters after the beginning of the next lap.
Switch to Telemetry/ Post Processing	Ctrl + T	Allows to switch from the Post-Processing mode to the Telemetry mode and vice versa.
DataSets		Shows in a sub menu the list of the Datasets loaded that can be displayed. Selecting the item Telemetry Dataset, the user can switch to the corresponding display mode

Show Events	Ctrl + Alt + E	Enables to show the events configured in the window.																								
Open in Excel	Shift + X	Opens an Excel sheet displaying the series of data of the channels configured in the window																								
Open Matlab	in	If you select a channel on a Graph window, you can launch the Open command in MatLab, using the right key or via the Options menu, which you will use to open a Workspace window of Matlab in which the required channel is loaded. On MatLab, the channel appears as an array of double values; with this array, you can carry out all the operations and analyses that MatLab allows you to use. If you repeat the Open in MatLab operation on a number of channels, they will be added to the list of channels in the workspace. <table border="1"> <thead> <tr> <th>Name</th> <th>Value</th> <th>Min</th> <th>Max</th> </tr> </thead> <tbody> <tr> <td>Acc_X</td> <td><21463x1 double></td> <td>-3.4071</td> <td>1.6407</td> </tr> <tr> <td>DISTANCE</td> <td><1074x1 double></td> <td>0</td> <td>5778.94</td> </tr> <tr> <td>Gear_Num</td> <td><21463x1 double></td> <td>2</td> <td>6</td> </tr> <tr> <td>RPM</td> <td><21463x1 double></td> <td>3820</td> <td>8812</td> </tr> <tr> <td>TIME</td> <td><21463x1 double></td> <td>0</td> <td>107.31</td> </tr> </tbody> </table>	Name	Value	Min	Max	Acc_X	<21463x1 double>	-3.4071	1.6407	DISTANCE	<1074x1 double>	0	5778.94	Gear_Num	<21463x1 double>	2	6	RPM	<21463x1 double>	3820	8812	TIME	<21463x1 double>	0	107.31
Name	Value	Min	Max																							
Acc_X	<21463x1 double>	-3.4071	1.6407																							
DISTANCE	<1074x1 double>	0	5778.94																							
Gear_Num	<21463x1 double>	2	6																							
RPM	<21463x1 double>	3820	8812																							
TIME	<21463x1 double>	0	107.31																							
Stop Operations	Esc	Interrupts some operations on graph, as Manual Section Definition, Shifts, Zoom T1-T2.																								

Reset Min and Max value		Reset the minimum and the maximum value of all channels in the window during the acquisition.
Post Processing View	Q	The command opens a new graph window, called Post Processing View, which displays a snapshot of the RT window in the instant of the execution of this command. The command is available only in Time mode, in Distance is not enable.
Freeze Real Time Graphs		Execute Freeze command (freeze / unfreeze displayed data).
Properties	E	Opens the interface to configure the Graph window

Toolbar Graph

The figure below shows an example of a toolbar; the toolbar is dynamic as it can be configured according to the license granted, but also according to the situation in which it is created; for example the Pan command is displayed only if there is a zoom active or the Clear Selection command is displayed only if at least one channel is selected.

Post processing toolbar



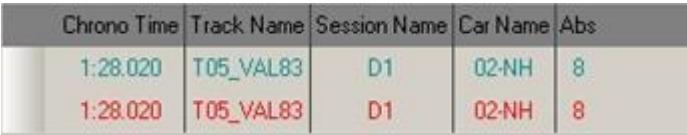
Real time toolbar

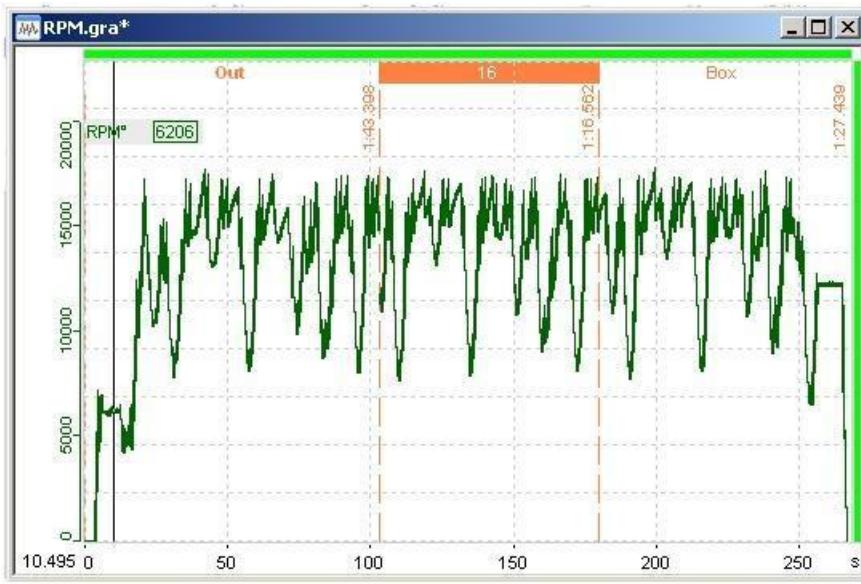


The toolbars of the Graph window allow the access to the following commands:

COMMAND	SHORTCUT	DESCRIPTION
Load		Opens a window to select a configuration file corresponding to a Graph window.
Save		Saves the current configuration of the window on a file.

Properties	E	Opens the interface to configure the Graph Window
Zoom In	+	See the description of the command in the Options Table.
Zoom Out	-	See the description of the command in the Options Table.
Zoom Min	Ctrl + -	See the description of the command in the Options Table.
Zoom Max	Ctrl + +	See the description of the command in the Options Table.
Zoom Box		See the description of the command in the Options Table.
Zoom T1-T2		See the description of the command in the Options Table.
Zoom Fix Range		See the description of the command in the Options Table.
Pan		Enables the Pan mode to shift the zoom area displayed (see also the Zoom functions)
Zoom Undo		Displays in a pop-up menu the list of the zooming operation carried out before the current display. Selecting an item from the list, the display of the window before the zooming is restored (see also the Zoom functions)
Zoom Redo		Displays in a pop-up menu the list of the zooming operation carried out after the current display. Selecting an item from the list, the display of the window after the zooming is restored (see also the Zoom functions).
Manual Section Definition	Alt + M	See the description of the command in the Options Table.
Show absolute Max & Min on Graph	Shift + M	See the description of the command in the Options Table.
Graph Layout	P, O, M	See the description of the command in the Options Table.

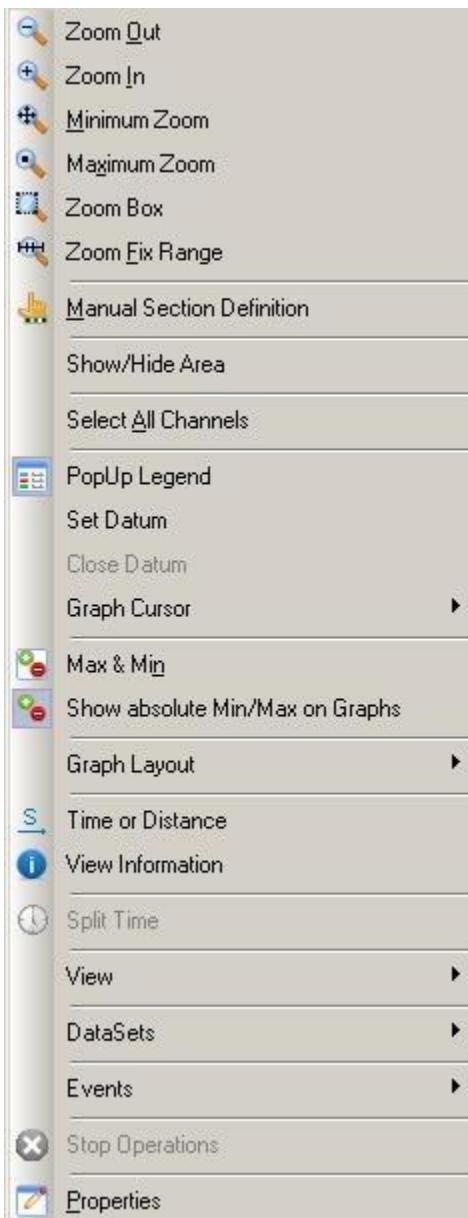
Time or Distance	X	See the description of the command in the Options Table.															
Cursor Snap		Enables the Snap function to shift zooming area displayed.															
Cursor Step		The Step allows setting the fixes step at which the cursor can move, when the keyboard is used. Step values are in milliseconds.															
Shift Graphs		<p>Enables the Shift Graphs function displaying the pop-up menu,</p>  <p>Shift a Graph Displays in a pop-up menu the list of the channels configured in the window; the shift function will be applied to the channel selected from this list. If more Laps are loaded, select a specific Lap from the next pop-up menu displayed.</p>  <p>Shift All Graphs Enables the shift on all the channels configured in the window.</p> <p>Shift a Dataset Displays in a pop-up menu the list of the Laps loaded; the shift function will be applied to the channel selected from this list.</p>  <table border="1"> <thead> <tr> <th>Chrono Time</th> <th>Track Name</th> <th>Session Name</th> <th>Car Name</th> <th>Abs</th> </tr> </thead> <tbody> <tr> <td>1:28.020</td> <td>T05_VAL83</td> <td>D1</td> <td>02-NH</td> <td>8</td> </tr> <tr> <td>1:28.020</td> <td>T05_VAL83</td> <td>D1</td> <td>02-NH</td> <td>8</td> </tr> </tbody> </table> <p>Reset All Shift Resets the shift for each channel configured in the window restoring the initial situation.</p>	Chrono Time	Track Name	Session Name	Car Name	Abs	1:28.020	T05_VAL83	D1	02-NH	8	1:28.020	T05_VAL83	D1	02-NH	8
Chrono Time	Track Name	Session Name	Car Name	Abs													
1:28.020	T05_VAL83	D1	02-NH	8													
1:28.020	T05_VAL83	D1	02-NH	8													
View		See the description of the command in the Options Table.															
Show/Hide Y Scales		Shows / hides all the Y scales															

View Information		See the description of the command in the Options Table.
Datasets		<p>Shows in a sub menu the list of the Datasets loaded that can be displayed. Selecting the item Telemetry Dataset, the user can switch to the corresponding display mode</p> 
Split Time		Shows the value of the split time in each sections, if sections are displayed.
Show Finish Line	Ctrl + End	<p>When this flag is enabled, in case of more laps loaded (Append) the finish line is shown for each lap. For each lap the text refers to the Lap Marker (if available) or to the info Lap; the Lap Time is placed vertically along the divisions lines. The finish line can be transparent on the graphic area or outside the graphic area. The mode can be configured in Setup/General.</p> <p>The status Show/Hide of finish line is automatically saved by WinTAX and restored at the next opening.</p> 
Show Events	Ctrl + Alt + E	Enables to show the events configured in the window.

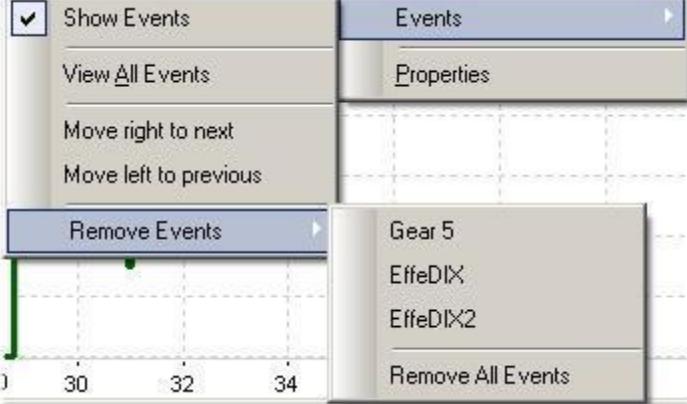
Next Event	Alt + Ctrl + N	Moves the cursor to the next event among the displayed ones.
Previous Event	Alt + Ctrl + P	Moves the cursor to the previous event among the displayed ones.
Post Processing View	Q	The command opens a new graph window, called Post Processing View, which displays a snapshot of the RT window in the instant of the execution of this command. The command is available only in Time mode, in Distance is not enable.
Freeze Real Time Graphs		See the description of the command in the Options Table.
Switch to Telemetry/Post Processing	Ctrl + T	See the description of the command in the Options Table.

Pop-up menu

By clicking with the right button of the mouse on the graphic area of the window, the following pop-up menu is displayed. The menu is dynamic as it can be configured according to the license granted, but also according to the situation in which it is created; for example the Pan command is displayed only if there is a zoom active or the Clear Selection command is displayed only if at least one channel is selected. In general all pop-up commands of the pop-up menu are the same as those on the toolbar, the Options menu or other WinTAX menus.



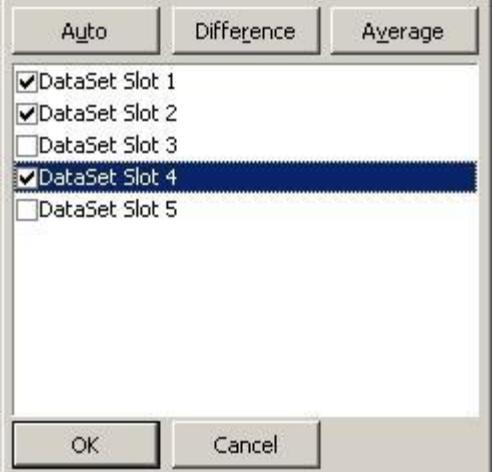
This section will describe only the commands that have not already been described previously.

COMMAND	DESCRIPTION
Events	<p>Shows all operations linked to the events;</p>  <p>The menu is dynamic and can be changed according to the situation. The example in the figure shows the following commands:</p> <ul style="list-style-type: none"> • Show Events Enables the display of the events on the window • View All Events (View Custom Events) Shows all events (only the events configured) on the window. • Move right to next Moves the cursor to the next occurrence of an event • Move left to previous Moves the cursor to the previous occurrence of an event • Remove Events Opens a sub menu to select the event to be removed; all events can be removed. The removing is connected to the display of the event on the window and not to the cancellation of the event.

By clicking with the right button of the mouse on an Info box or on the Y scale of the channel, the following pop-up menu is displayed. The menu is dynamic as it can be configured according to the license granted, but also according to the situation in which it is created. Most of all pop-up commands are the same as those on the toolbar, the Options menu or other.



This section will describe the commands that have not already been described previously.

COMMAND	SHORTCUT	DESCRIPTION
Copy Data to Clipboard	Ctrl + Shift + C	Copies to clipboard of Windows the series of data of the channels configured in the window
Set Comparison...		<p>It opens an interface window for selecting datasets to compare and comparison mode.</p>  <p>Click on each button to enable a comparison mode; the shortcuts are valid only if this window is open.</p>

		COMMAND	SHORTCUT	DESCRIPTION
		Auto	U	default comparison
		Difference	R	difference between selected data sets is calculated
		Average	V	the plotted trace of a Channel represent the average of samples of compared laps. Average is automatically calculated in distance or in time base depending by the setting of x-axis

Keyboard Shortcut

To see the complete list of shortcuts available for the graph window, see related chapter.

Below are listed those shortcuts that do not appear in any of the commands and of the toolbar buttons described before. These commands can be executed only from keyboard. All these commands are not customizable.

SHORTCUT	DESCRIPTION
Up	Increase cursor step in current window
Down	Decrease cursor step in current window
Left	Move the cursor left by one step
Right	Move the cursor right by one step
Ctrl + Left	Move the cursor left by step x 10
Ctrl + Right	Move the cursor right by step x 10
Ctrl + Left	Move current zoom left if there is a zoom active.
Ctrl + Right	Move current zoom right if there is a zoom active.
Shift + Left	Zoom Box selection left
Shift + Right	Zoom Box selection right
Ctrl + Up	Move Y Zoom up
Ctrl + Down	Move Y Zoom down

XY Window

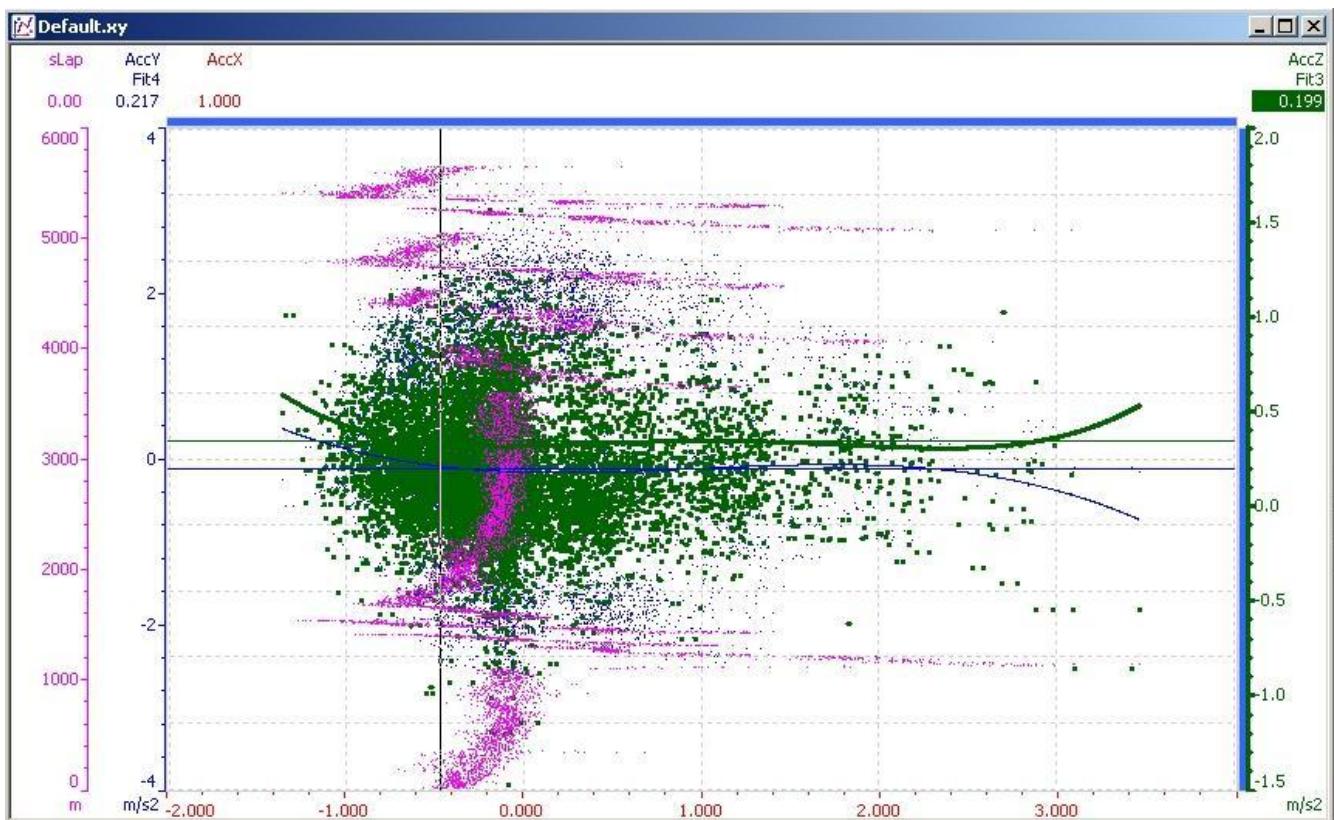
A **XY window** shows the distribution of the sampled values of one or more channels on the Y-axis in relation to the series of sampled values of a reference channel configured on the X-axis.

By setting the display mode, the distribution of the remarks can be displayed:

- as series of points (Graph mode)
- as a map (Smooth mode)
- as text values (Percent mode).

The data on Graphs mode can be analyzed in detail by zooming or interpolating them with Best Fit function; it's also possible to configure the graphic features of the elements of the window for more detailed visualization.

Elements of the window

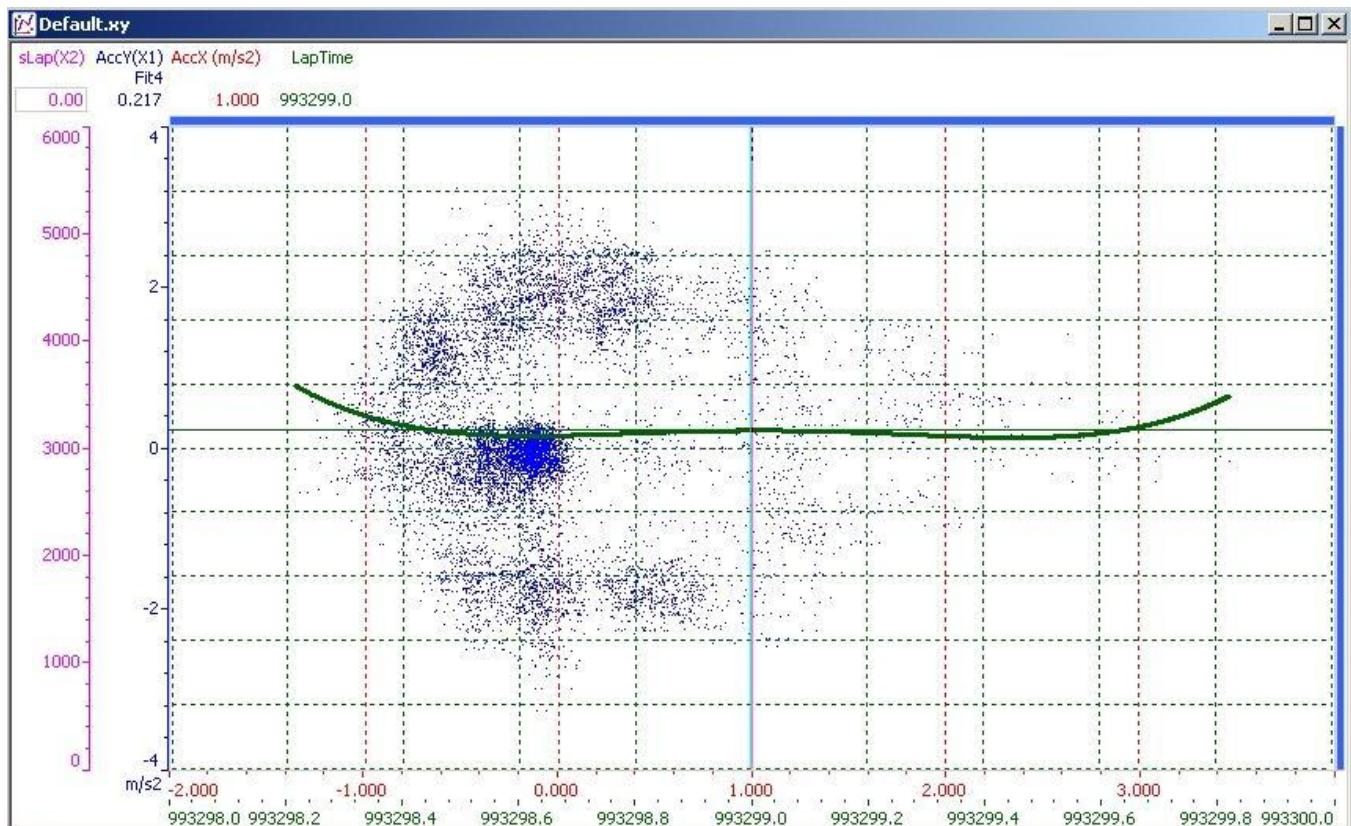


Graphic Area

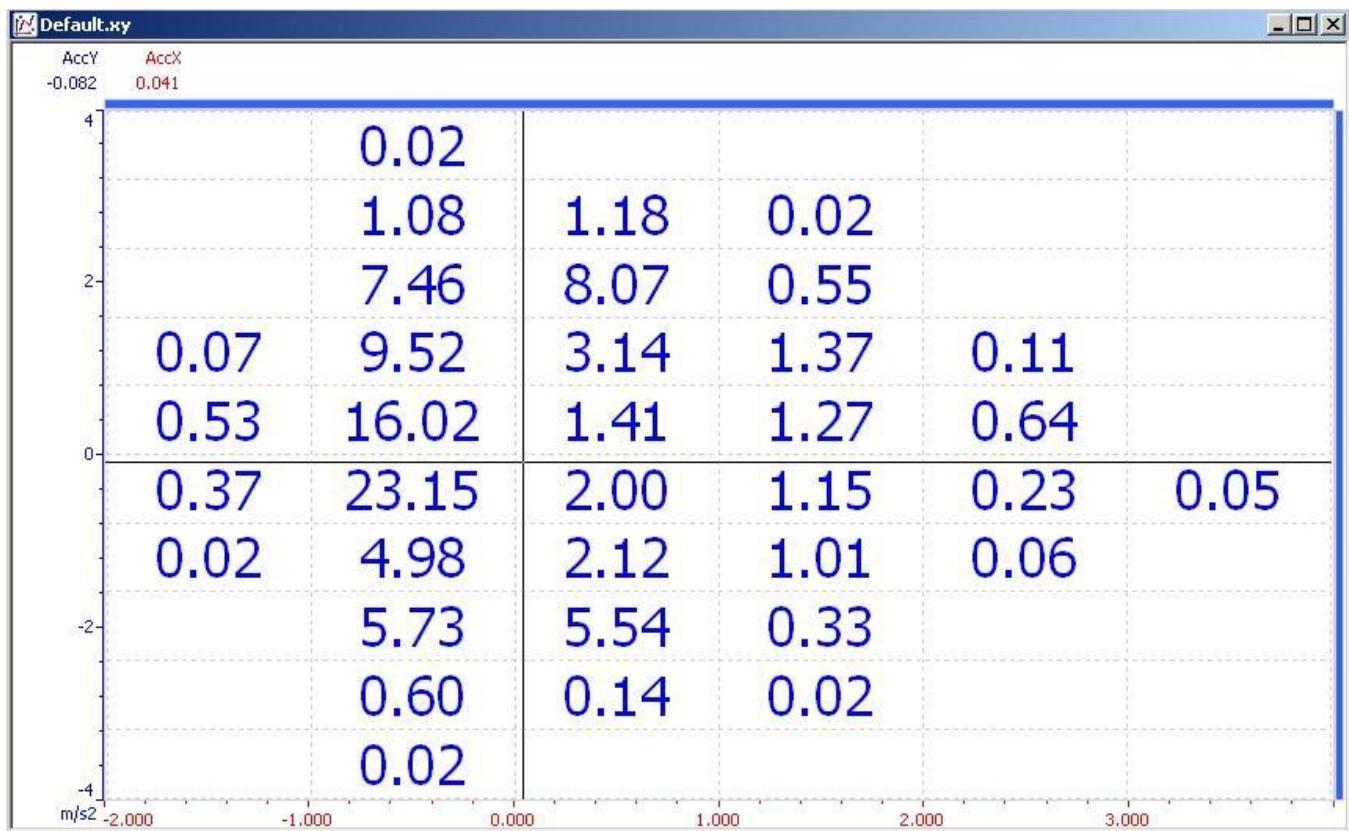
The graphic area displays the cursor and the grid of the windows, the graphic elements of the channels (grids, cursors, markers, corners and cursors of the Best Fit analysis).

Channel Area displays the names of the channels, the values corresponding to the present positions of the cursor, the additional information (ex.: Best Fit interpolation degree). The groups of info boxes of a channel are alternatively arranged on the right and on the left of the graphic area.

The Graph Area can also have more than one X axis, as you can see in XY configuration; the effect is shown in the picture below.



According to the configured graphic mode, the channels values (Graph Mode) or the frequency distribution of the channels remarks are displayed (Smooth Mode and Percent Mode). In the following picture you can see an XY window in Percent mode.



In Smooth and Percent mode only the first configured Y channel is managed; all other channels are ignored.

Info Channel Area

The Info Channel Area displays the names of the channels, the values corresponding to the present positions of the cursor, the additional information (ex.: Best Fit interpolation degree). The groups of info boxes of a channel are alternatively arranged on the right and on the left of the graphic area.

Y Scale Area

The Y Scale Area displays the Y scales of the channels. The Y scales are alternatively arranged on the right and on the left of the graphic area. At the bottom of Y scale could be displayed the measurement unit of the channel, if configured in Channel Parameters and in XY properties.

X Scale Area

The X Scale Area displays the X scale.

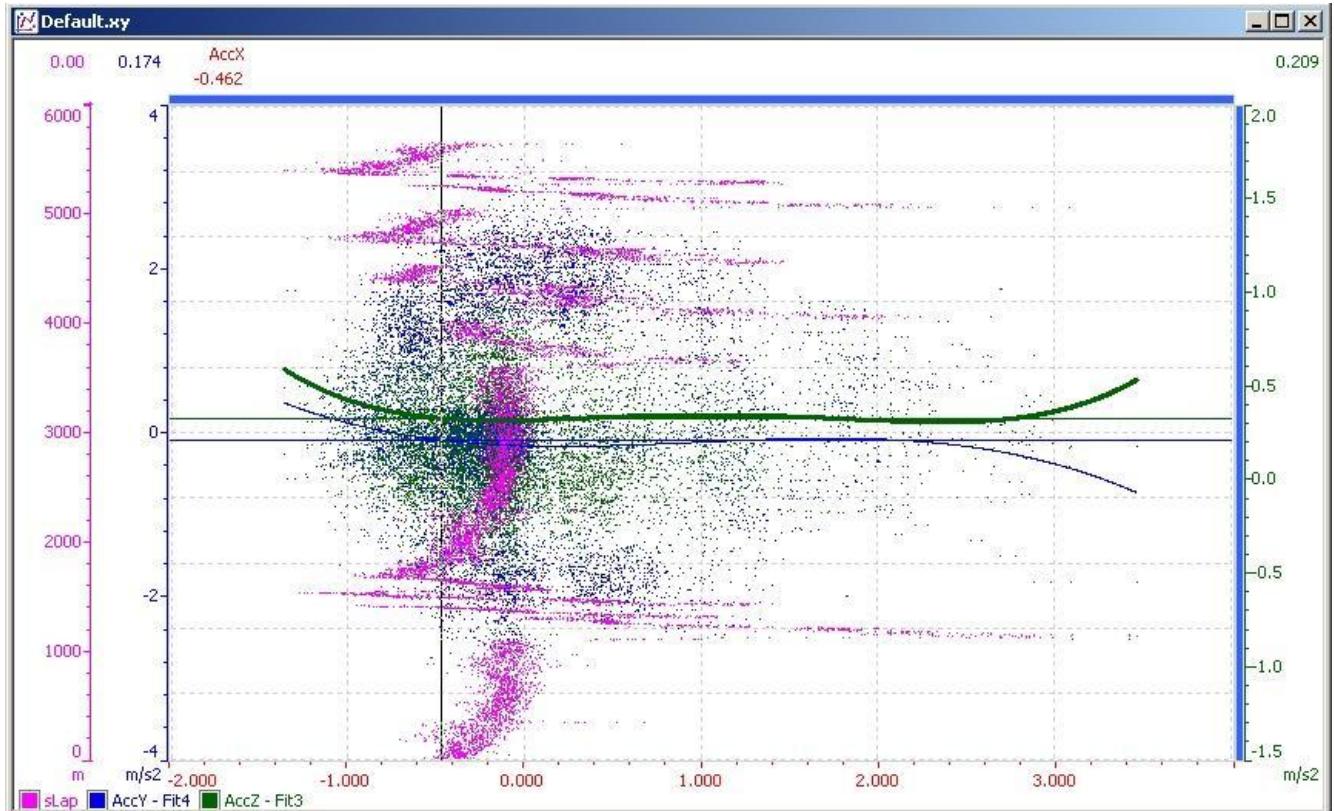
Zoom bars

Horizontal Zoom Bar: displays the percentage of horizontal zoom in the window, allows to move the horizontal zooming area.

Vertical Zoom Bar: displays the percentage of vertical zoom in the window, allows to move the vertical zooming area.

Legend bar

When Scale Mode is configured on Legend, a legend bar appears; it contains the name of the channels ordered by column.



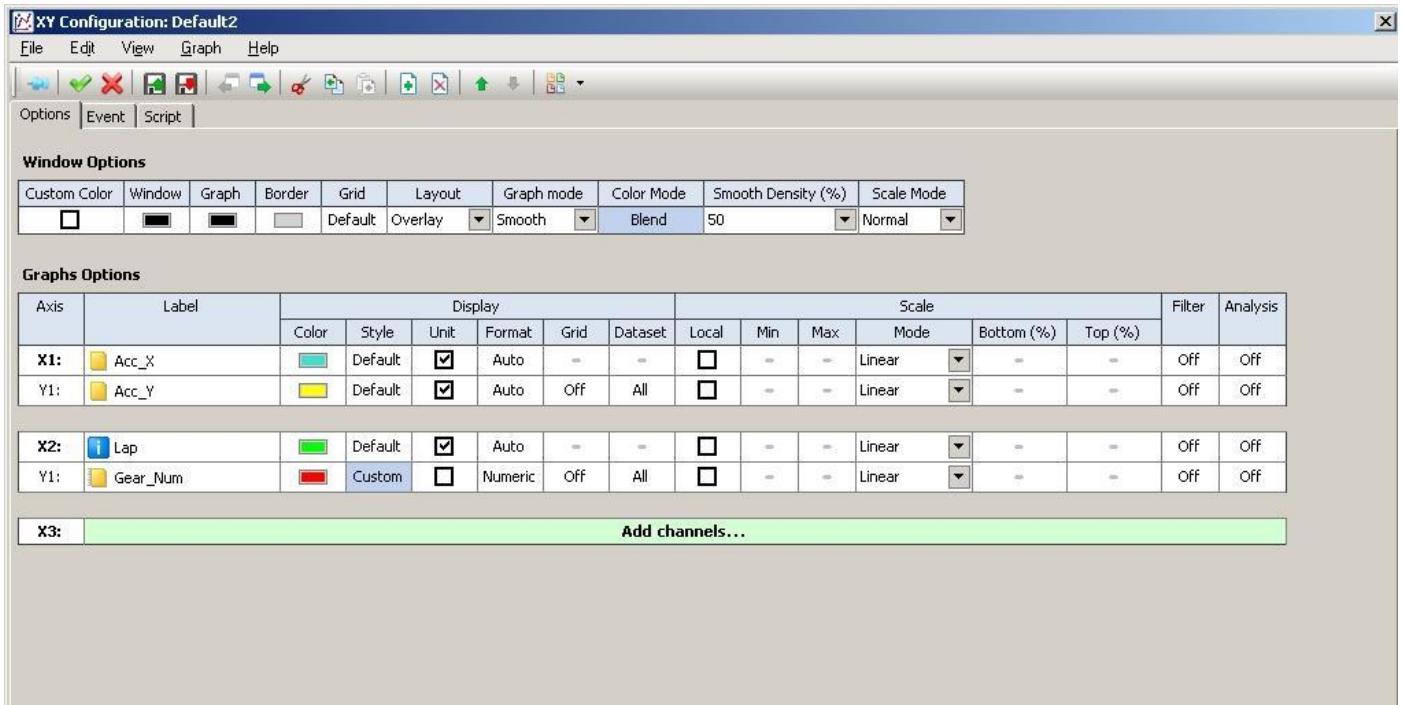
XY Configuration Window

The **XY Configuration** window enables to set the aspect of the graphic windows **XY**; displays the pages: **Options, Event, Script**.

The window has moreover a menu, a toolbar and a popup menu that ease the access to the configuration and management commands of the window itself.

Options

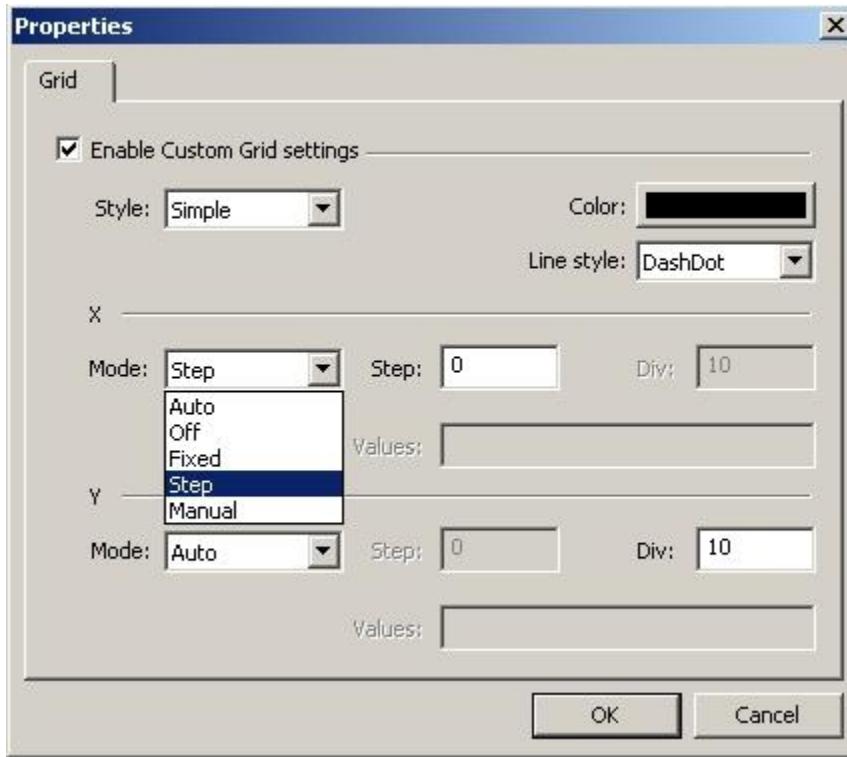
The **Options** page enables to configure the graphic aspect of the windows; the page is divided into two sections: Window and Graphs. Each configurable value can be edited by double clicking with the mouse or by pressing the space bar on the selected element.



Window Options

It enables to configure the general settings of the window.

- **Custom Color:** enables the setting of the window customized colors.
- **Window:** sets the window background color.
- **Graph:** sets the background color of the graphic area.
- **Border:** sets the borders color of the graphic areas of the window.
- **Grid:** displays the setting to enable the grid common to all channels graphs, in the graphic area of the window. To modify the parameter, edit the associated configuration window.



- **Enable Custom Grid settings:** enables the grid display with the customized settings.
 - **Style:** sets the style of the grid
 - **Simple:** the grid is formed by continuous lines.
 - **Cross:** the grid is formed by crosses indicating the intersection of the vertical and horizontal divisions.
 - **Color:** color of the grid
 - **Line style:** sets the style of the grid line (valid if the Style Simple is set)
 - **Solid:** continuous line
 - **Dash:** dashed line
 - **Dot:** dotted line
 - **DashDot:** dashed line alternated with 1 dot
 - **DashDotDot:** dashed line alternated with 2 dots
- **X**
 - **Mode:** calculation mode of the horizontal divisions
 - **Auto**, displays an automatic number of equidistant divisions.
 - **Off**, no division is displayed
 - **Fixed**, displays a fixed number of equidistant divisions

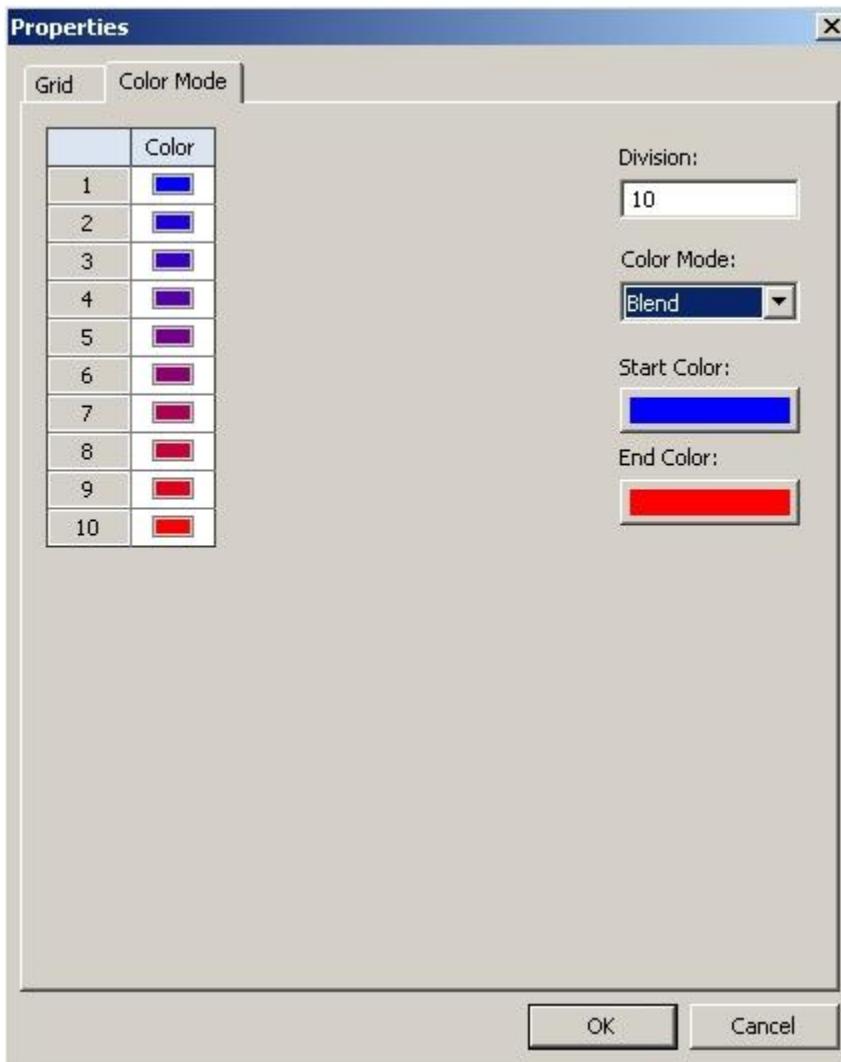
- **Step**, displays the divisions at fixed intervals equal to the Step value.
 - **Manual**, displays the divisions in correspondence with the values on the X axis set by the user in the text box Values.
- **Step:** at Step
- **Div:** the number of horizontal divisions to be displayed, valid with Mode set at Auto or Fixed
- **Values:** list of values on Z axis corresponding to the divisions, valid with Mode set at Custom. The list of values can be added directly in the text box, using as division the character ','.
- **Y**
 - **Mode:** calculation mode of the vertical divisions
 - **Auto**, displays an automatic number of equidistant divisions.
 - **Off**, no division is displayed
 - **Fixed**, displays a fixed number of equidistant divisions
 - **Step:** fixed step to calculate the horizontal divisions (a division for each Step), valid with Mode set at Step
 - **Div:** number of vertical divisions to be displayed, valid with Mode set at Auto or Fixed

If the window grid is disabled, the window uses the setting of the **Default Grid** section, in the **Default Appearance** page of the **General Setup** window.

- **Layout:** sets the vertical arrangement of the graphs; the effects of this choices are visible only in Graph Mode, since the other modes shows only one channel.
 - **Parallel:** the channels graphs are vertically arranged proportionally to the number of channels on the Y axis.
 - **Overlay:** the channels graphs share the whole graphic area and are overlapping.
 - **Manual:** the channels graphs are vertically arranged according to user's settings.
- **Graph Mode:** sets the display mode of the graphs.
 - **Graph:** This mode displays the channels in graphical representation as in Graph window.
 - **Smooth:** This mode displays the graph using the density of values in small grid rectangles showing them with a variable color scale depending on the density. Smooth uses only the X channel and the first Y channel.
 - **Percent:** This mode displays the graph using the density of values in small grid rectangles like Smooth, but shows the values instead of coloured rectangles. Percent uses only the X channel and the first Y channel.
- **Color Mode:** This option is active only in Smooth mode and is concerning to the coloring of the small rectangles.

- If **Manual** is selected, the window generate a group of default colors.
- If **Gradation** is selected, the button **Color** is used to choose the base color of gradation.
- If **Blend** is selected, the buttons **Start color** and **End color** are used to choose the start and the end colors of blend.

To modify the mode, edit the related configuration window.



Division: number of colored bands. The value must be included between 1 and 10. Changing the value of division, the color grid redraws the number of rows configured. In the rows it's possible manually configure the colors.

Color Mode: In the rows of the color grid it's always possible to manually configure the colors. Otherwise color can be sets with color mode combo.

- If **Manual** is selected, the window generate a group of default colors.
- If **Gradation** is selected, the button **Color** is used to choose the base color of gradation.

- If **Blend** is selected, the buttons **Start color** and **End color** are used to choose the start and the end colors of blend.
- **Smooth Density (%)**: This option is active only in Smooth mode and is concerning to the density of pixels. The default value is 50%.
- **Scale Mode**: sets the display mode of the Y scales
 - **Normal**: Y scales are displayed with the name of the channels at the top of each scale.
 - **Legend**: To save space, the name of the channels are removed from the top of each scale; these names are grouped into a legend displayed below the graph. If many channels are displayed, the labels of the legend are ordered by column.

Graphs Options

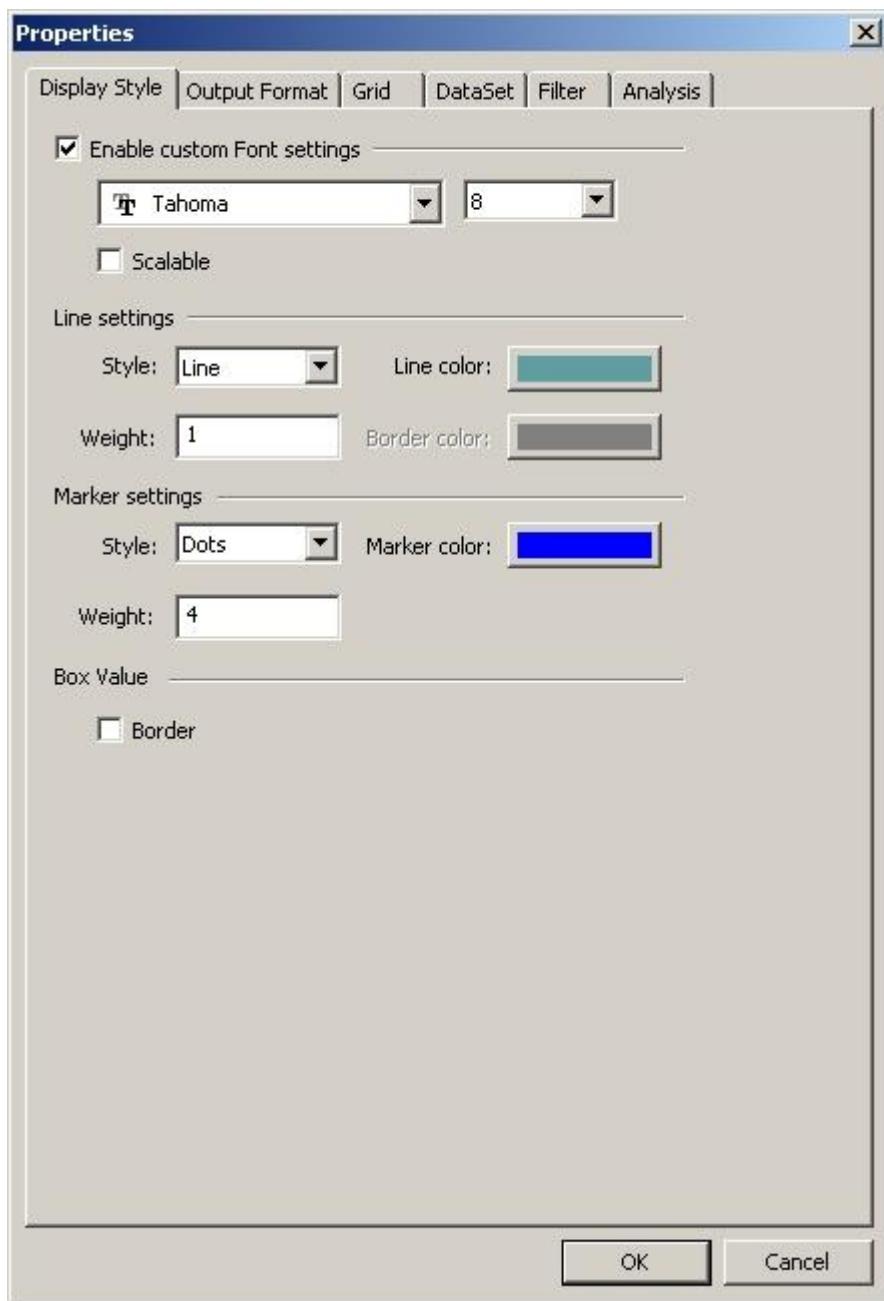
It enables to configure the settings specific for each channel to be displayed in the window. Each line identifies a configured channel, while the columns identify the fields to be configured. Multiple selections are possible through the CTRL and SHIFT keys.

Below the channels grid, there is an "Add channels..." rows, which permits to create groups of channels. The commands for adding channels act on the group, or on the groups, in which there is at least one selected channel. Since it is valid multiple selection, if more than one group is selected, a channel is added in each of them. The maximum number of groups permitted in XY window is 4: X1, X2, X3, X4.

Graphs Options														Filter	Analysis	
Axis	Label	Display						Scale								
		Color	Style	Unit	Format	Grid	Dataset	Local	Min	Max	Mode	Bottom (%)	Top (%)			
X1:	AccX	■	Default	<input checked="" type="checkbox"/>	Auto	-	-	<input type="checkbox"/>	-	-	Linear	<input type="button" value="▼"/>	-	-	Off	Off
Y1:	AccY	■	Default	<input checked="" type="checkbox"/>	Auto	Off	All	<input type="checkbox"/>	-	-	Linear	<input type="button" value="▼"/>	-	-	Off	On
Y2:	AccZ	■	Default	<input type="checkbox"/>	Auto	Off	All	<input type="checkbox"/>	-	-	Linear	<input type="button" value="▼"/>	-	-	Off	Off
X2:	Add channels...															

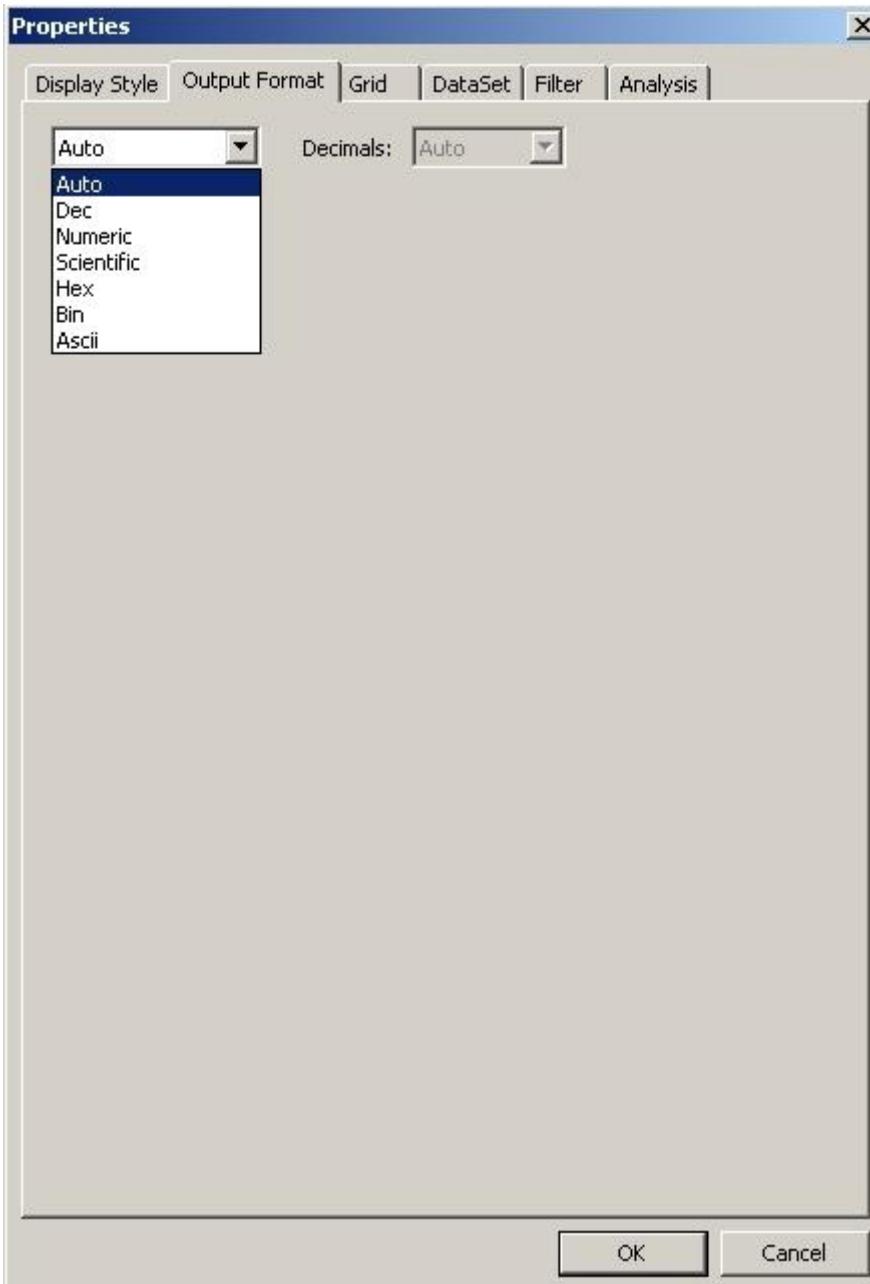
Each group has the same schema and the same rules but they are independent of each other

- **Axis**: identifies the X or Y axis on which the channel is configured. The number following the X (X1, X2, X3, X4) identifies the group of channels and is limited to 4; the number following the Y (Y1, Y2, ..., Yn, ...) identifies the number of the channel in its group and is unlimited. This field isn't editable.
- **Label**: displays the name of the channel. The name of the channel can be edited and can become a math expression if the sing = comes first.
- **Color**: sets the color of the channel graphs.
- **Style**: displays the style of the channels graphs. To modify the setting, edit the channel by opening the Channel Properties page where font and styles are configurable.



- **Enable Custom Font settings:** enables the local font configuration for the selected channels.
 - **Family Font:** sets the font.
 - **Font Dimension:** sets the font size.
 - **Scalable:** enables the adapting of the font size in relations to the window size.
- **Line settings**
 - **Style:** sets the style of the graphs line

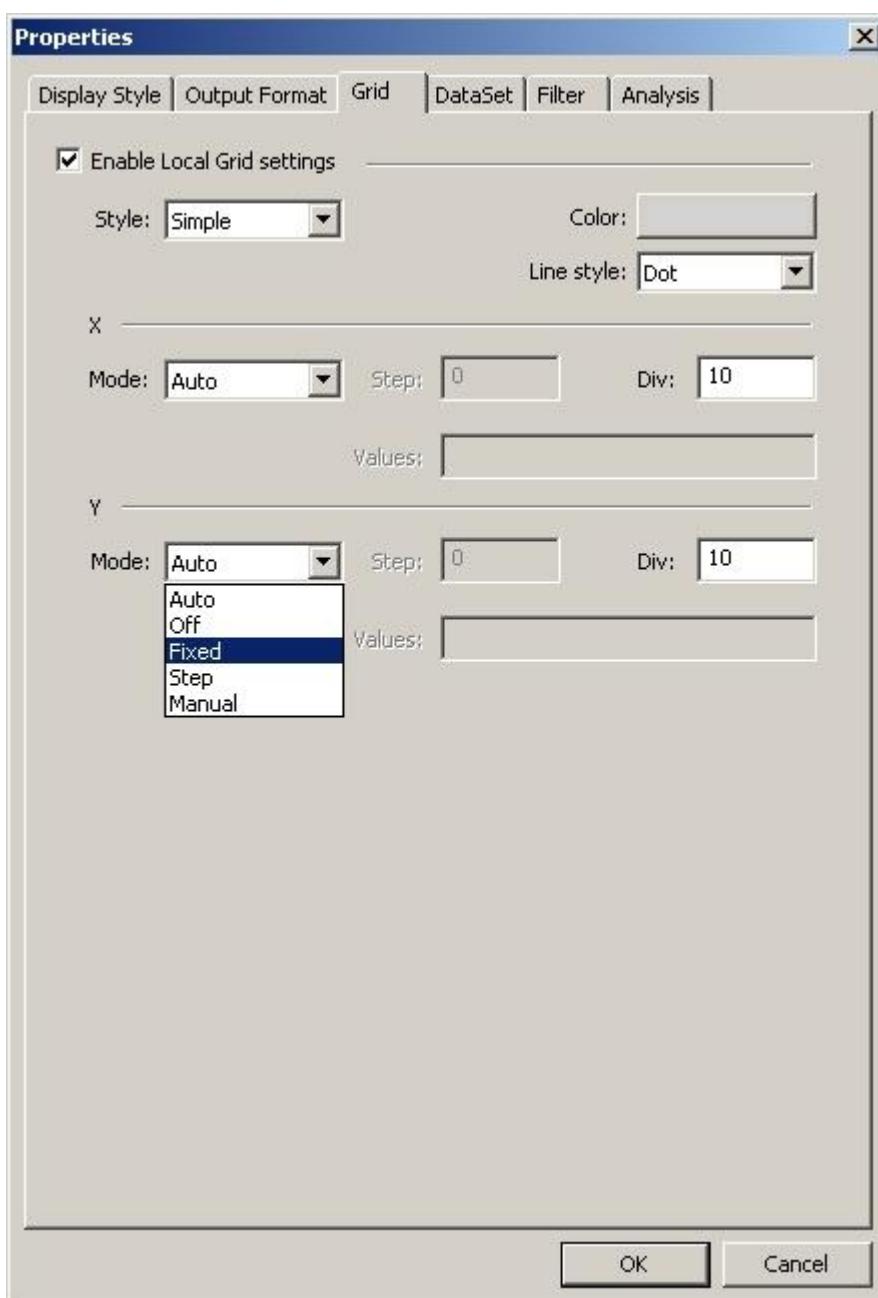
- **None**: no line is drawn
 - **Line**: continuous line
 - **Step**: stepped line
 - **Fill Down**: continuous line with colored bottom area
 - **Fill Up**: continuous line with colored top area
 - **Bordered**: bordered continuous line
- **Weight**: sets the depth of the line in pixel.
- **Line color**: sets the line color.
- **Border Color**: color for the line border
- **Marker settings**
 - **Style**: style of the markers, graphic elements used to represent the marker.
 - **None**: no markers are drawn
 - **Dots**: dot
 - **Cross**: cross
 - **Rhomboid**: rhomboid
 - **Square**: square
 - **Arrow Down**: arrow downwards
 - **Arrow Up**: arrow upwards
 - **Vert Line**: vertical line
 - **Horz Line**: horizontal line
 - **Weight**: size (depth) of the markers in pixel.
 - **Marker color**: color of the markers.
- **Box Value section**
 - **Border**: show the border around the box of the cursor value.
- **Unit**: enables to display the measurement unit of the channel which is configured in Channel Parameters.
- **Format**: displays the style to display the current channel value. To modify the settings, open the configuration window.



In the combo on the left the numeric format is selected, in the combo on the right, the number of decimals is selected. Please find to follow the list of possible formats

- **Auto:** the format is kept unchanged
- **Dec:** the decimal format allows max 5 digits after the comma.
- **Numeric:** the numeric format allows max 15 digits after the comma
- **Scientific:** the scientific format allows max 15 digits after the comma; the result is written in exponential form.
- **Hex:** hexadecimal format; the decimals cannot be configured.

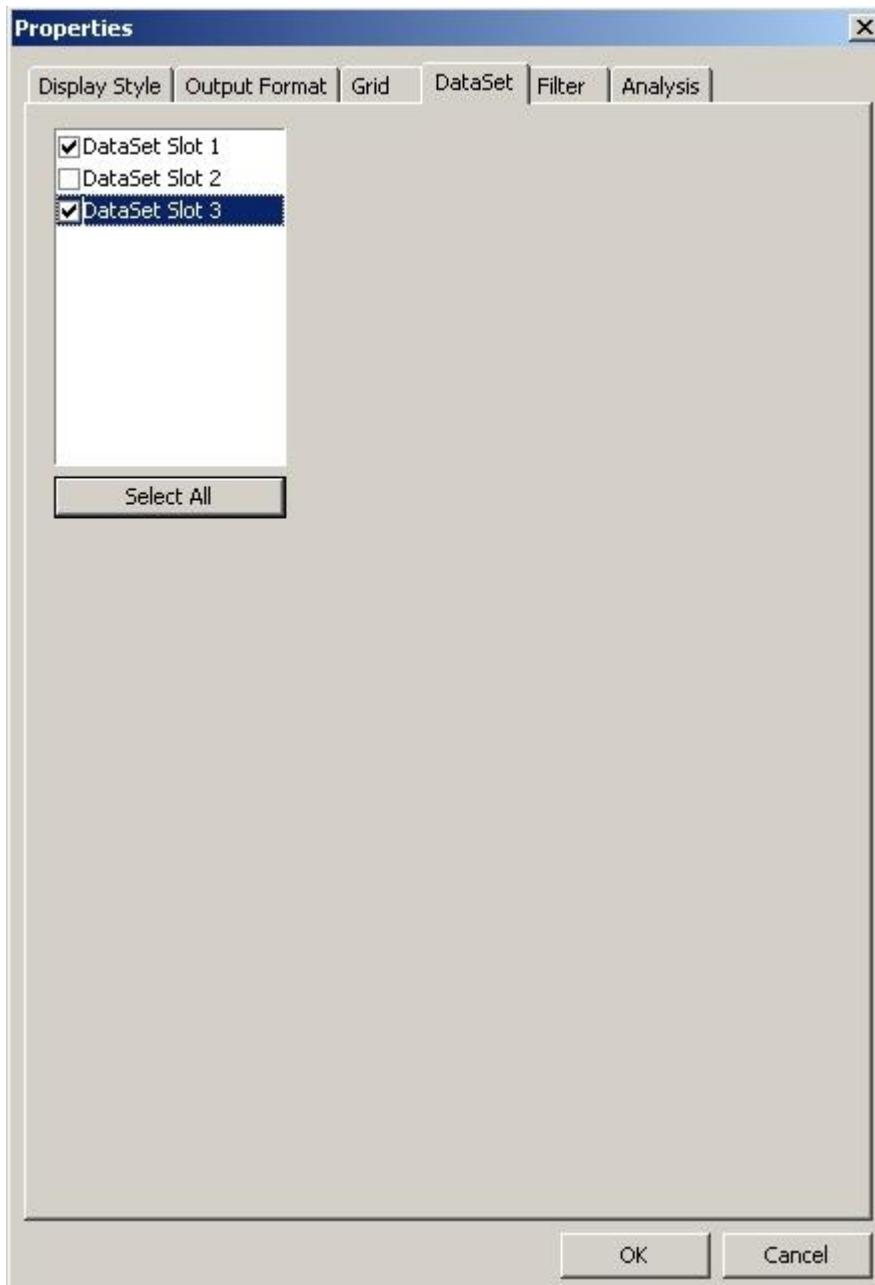
- **Bin:** binary format; the decimals cannot be configured.
- **Ascii:** text format; the decimals cannot be configured.
- **Grid:** displays the enabling of a grid specific for the rectangle of the graphic area dedicated to the channel. The window allowing to enable the grid and configure its parameters is the following:



- **Enable Local Grid settings:** enables the display of the grid with the customized settings.
 - **Style:** sets the style of the grid
 - **Simple:** the grid is formed by continuous lines.

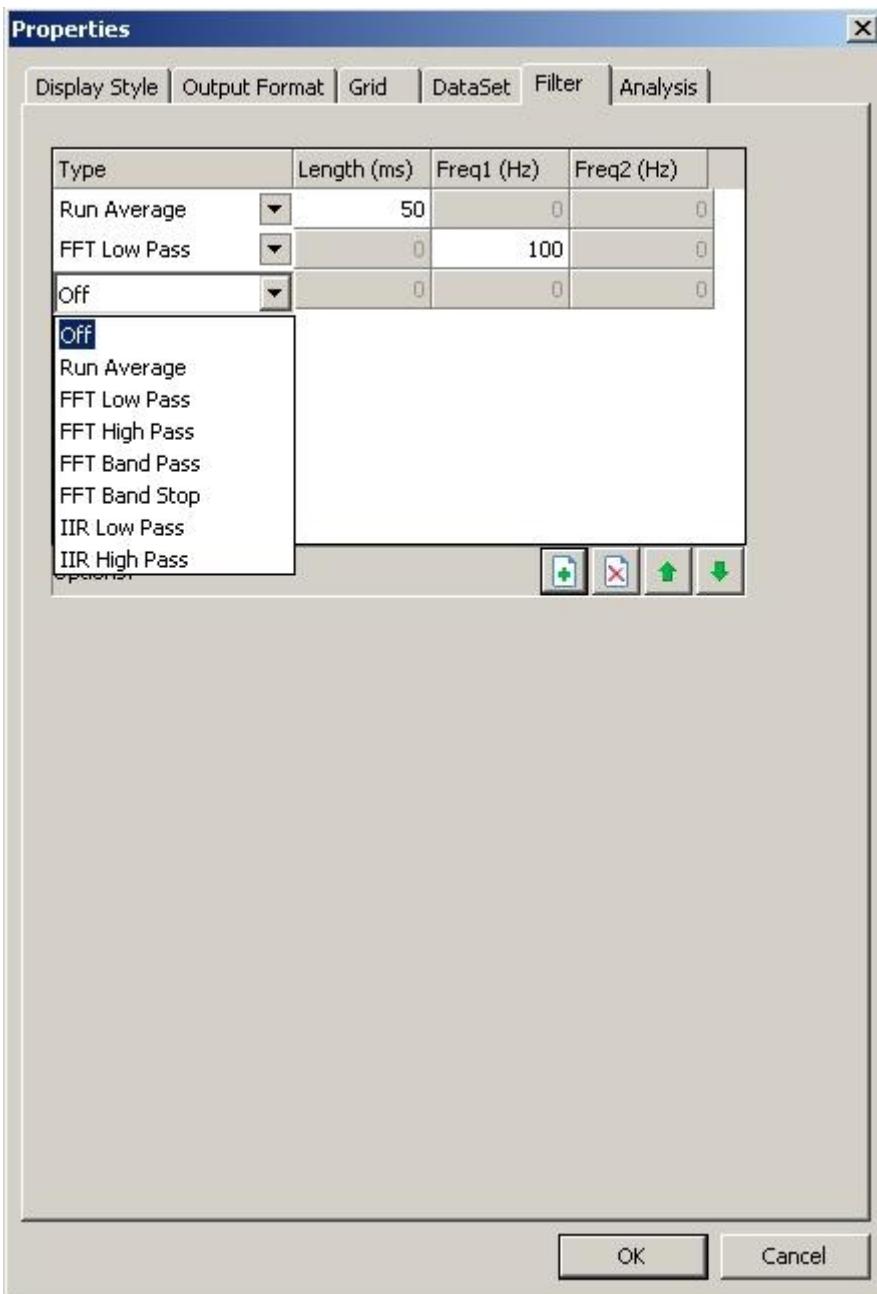
- **Cross**: the grid is formed by crosses indicating the intersection of the vertical and horizontal divisions.
 - **Color**: color of the grid
 - **Line style**: sets the style of the line of the grid
 - **Solid**: continuous line
 - **Dash**: dashed line
 - **Dot**: dotted line
 - **DashDot**: dashed line alternated with 1 dot
 - **DashDotDot**: dashed line alternated with 2 dots
- **X**
 - **Mode**: calculation mode of the horizontal divisions
 - **Auto**, displays an automatic number of equidistant divisions.
 - **Off**, no division is displayed
 - **Fixed**, displays a fixed number of equidistant divisions
 - **Step**, displays the divisions at fixed intervals equal to the Step value.
 - **Manual**, displays the divisions in correspondence with the values on the X axis set by the user in the text box Values.
 - **Step**: fixed step to calculate the horizontal divisions (a division for each Step), valid if Mode is set at Step
 - **Div**: number of horizontal divisions to be displayed, valid if Mode is set at Auto or Fixed
 - **Values**: list of values on the X axis corresponding to the divisions, valid if Mode is set at Custom. The list of values can be added directly in the text box, using as division the character ";"
- **Y**
 - **Mode**: calculation mode of the vertical divisions
 - **Auto**, displays an automatic number of equidistant divisions.
 - **Off**, no division is displayed
 - **Fixed**, displays a fixed number of equidistant divisions
 - **Step**, displays the divisions at fixed intervals equal to the Step value.
 - **Manual**, displays the divisions in correspondence with the values on the Y axis set by the user in the text box Values.

- **Step:** fixed step to calculate the vertical divisions (a division for each Step), valid if Mode is set at Step
- **Div:** number of vertical divisions to be displayed, valid if Mode is set at Auto or Fixed
- **Values:** list of values on the Y axis corresponding to the divisions, valid if Mode is set at Custom. The list of values can be added directly in the text box, using as division the character ";"
- **Dataset:** in this page you can select one or more or all Datasets for comparison.



- **Scale**

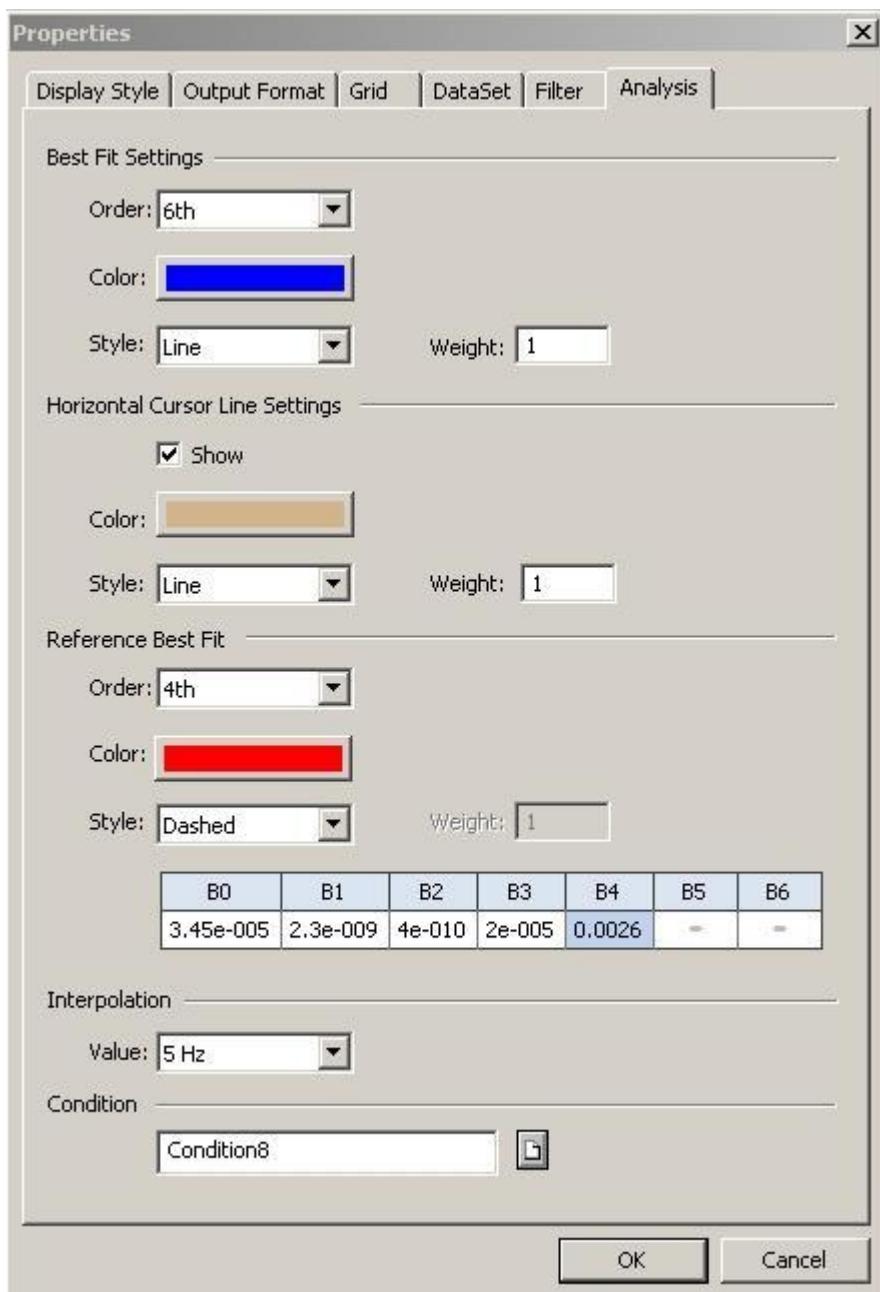
- **Local:** enables the automatic display of the Y scale.
 - **Min:** sets the minimum channel value.
 - **Max:** sets the maximum channel value.
 - **Mode:** switch between linear or logarithmic scale
 - **Bottom (%):** sets the vertical arrangement of the graphs in the vertical area (Bottom).
 - **Top (%):** sets the vertical arrangement of the graphs in the vertical area (Top).
-
- **Filter:** (available only in Post Processing mode) displays the settings on the filters applied to the channel. To modify the setting, open the configuration window.



The filters can be added, removed or moved through the buttons on the Options bar. The filters available are:

- **OFF**: channel values are displayed as logged
- **Run Average**: applies a moving average filter to the channel. Filter length is defined in milliseconds. If set to zero, the filter is not calculated.
- **FFT filters** applies a combination of frequency domain filters to the channel. The frequency content of the signal in the range(s) defined by the cutoff frequency is set to zero and the data is reconstructed in the time-domain. The four types available are:
 - **FFT Low Pass**: maintains frequency content below the cutoff freq. Freq1

- **FFT High Pass:** maintains frequency content above the cutoff freq. Freq1
- **FFT Band Pass:** maintains frequency content in the range $\text{Freq1} < \text{frequency} < \text{Freq2}$
- **FFT Band Stop:** eliminates frequency content in the range $\text{Freq1} < \text{frequency} < \text{Freq2}$
- **IIR Low Pass:** Infinite Impulsive Response Low Pass filter is a recursive filter that maintains frequency content below the cut-off freq
- **IIR High Pass:** Infinite Impulsive Response High Pass filter is a recursive filter that maintains frequency content above the cut-off freq
- **Analysis:** displays the setting for advanced analysis applied to the channel. To modify the setting, open the properties window the Analysis page.



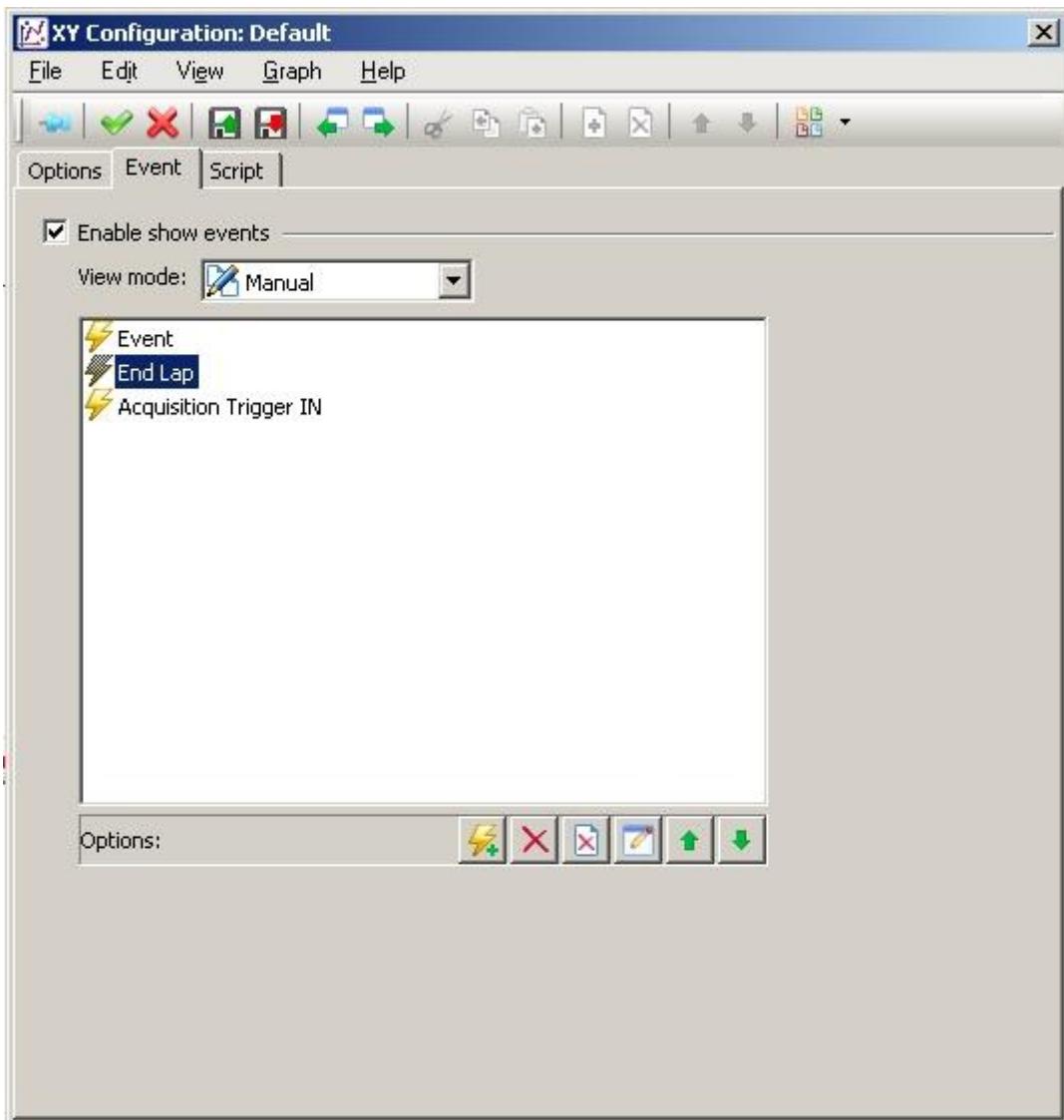
- o **Best Fit Settings**

- **Order:** degree of the polynomial function used to calculate the Best Fit curve. The Off value or one of the predefined values proposed in the combined box can be selected, to avoid setting the Best Fit curve. The maximum degree is 6.
- **Color:** color of the Best Fit curve. To modify the color, open the window to select the color by clicking with the left button of the mouse.
- **Style:** style for Best Fit line.
- **Weight:** weight for Best Fit line.

- **Horizontal Cursor Line Settings**
 - **Show:** enable horizontal cursor lines displaying.
 - **Color:** color for horizontal cursor lines.
 - **Style:** style for horizontal cursor lines.
 - **Weight:** weight for horizontal cursor lines.
- **Reference Best Fit**
 - **Order:** degree of the polynomial function used to calculate the Reference Best Fit curve. The Off value or one of the predefined values proposed in the combined box can be selected, to avoid setting the Reference Best Fit curve. The maximum degree is 6.
 - **Color:** color of the Reference Best Fit curve. To modify the color, open the window to select the color by clicking with the left button of the mouse.
 - **Style:** style for Reference Best Fit line.
 - **Weight:** weight for Reference Best Fit line.
 - **Coefficients B0, B1, B2, B3, B4, B5, B6:** the Reference Best Fit is a manual constructed curve with could be read as an ideal Best Fit. In this section it's possible to insert the coefficients, also in scientific format, to calculate the curve.
- **Interpolation**
 - **Value:** value of the customized sampling frequency. The Off value or one of the pre-defined frequencies proposed in the combined box (Range between 1 Hz and 10 Hz) can be selected, to keep the value set by default.
- **Condition**
 Adding a condition in the text box, on the graphs only the points complying with the condition itself will be displayed. With the button the conditions page opens on the channel browser to add the condition with the drag & drop.

Event Page

The **Event** page allows to configure the events of the **XY** window.



Enable show events: enables to display the events.

View Mode: sets the display mode of the events.

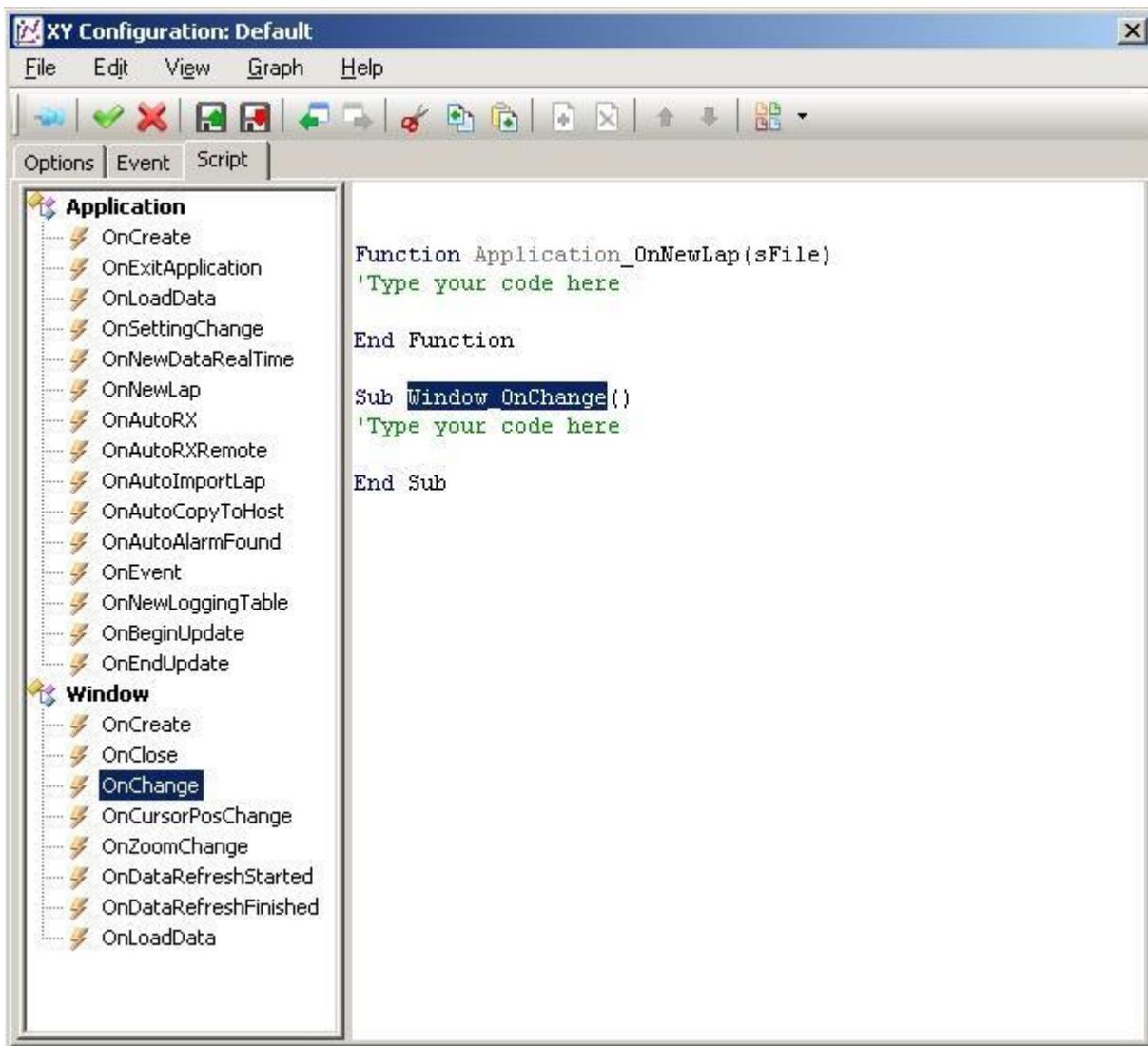
- **All:** all events are displayed.
- **Custom:** only the events selected by the user are displayed.

The list shows the customized events configured by the user.

Each event can be configured by using the buttons of the **Options** bar (to add, remove, modify, move in the list).

Script Page

The **Script** page enables to configure scripts of the events of the **XY** window or of the application, in Visual Basic environment.



The section on the left displays the list of the functions available, grouped for Application and Window.

The section on the right displays the code of the set functions.

Menu

The menu of the **XY Configuration** window allows the access to the following commands, divided in sub menus:

File Menu

COMMAND	SHORTCUT	DESCRIPTION
Apply	A	Applies the current settings of the window
Cancel		Closes the window without applying the current settings
Load		Opens a dialog window to select a XY configuration file to be loaded.
Save As		Opens a dialog window to select a XY configuration file (.XY), on which the current settings can be saved

Edit Menu

COMMAND	SHORTCUT	DESCRIPTION
Cut	Ctrl + X	Copies to clipboard the configurations of the channels selected in the list of the Graphs sections and removes them from the list of the Graphs section.
Copy	Ctrl + C	Copies to clipboard the configurations of the channels selected in the list of the Graphs
Paste	Ctrl + V	Pastes the configurations of the channels available in clipboard adding them to the list of the Graphs section

View Menu

COMMAND	SHORTCUT	DESCRIPTION
Previous page	Ctrl + Shift + Tab	Enables the page of the window previous to the one currently in use
Next page	Ctrl + Tab	Enables the page of the window next to the one currently in use

Graph Menu

COMMAND	DESCRIPTION
Add Graph	Adds a new element to the Graphs list of channels configurations
Remove Graph	Removes from the Graphs list the configurations of the selected channels
Move Up	Moves up by one position the selected elements in the Graphs list
Move Down	Moves down by one position the selected elements in the Graphs list

Help Menu

COMMAND	SHORTCUT	DESCRIPTION
Help	F1	Launch the WinTAX4 help, if available.

Toolbar



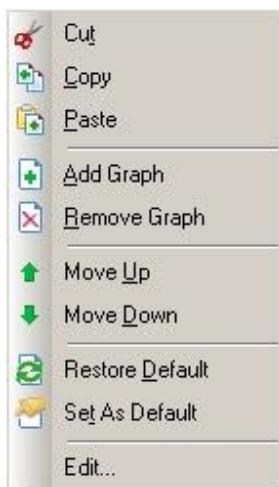
The toolbar of the **XY Configuration** window allows the access to the following commands:

COMMAND	DESCRIPTION
Keep Visible	Enables the Keep Visible mode allowing to keep displayed the configuration window while the application window are in use
Cancel	Closes the configuration window without applying the settings (similar to the Cancel command of the File menu)
Apply	applies the current settings to the configuration of the graphic window (similar to the Apply command of the File menu)
Load	Similar to the Load command of the File menu
Save As	Similar to the Save As command of the File menu

Previous page	Similar to the Previous page command of the View menu
Next page	Similar to the Next page command of the View menu
Cut	Similar to the Cut command of the Edit menu
Copy	Similar to the Copy command of the Edit menu
Paste	Similar to the Paste command of the Edit menu
Add Graph	Similar to the Add Graph command of the Graph menu
Remove Graph	Similar to the Remove Graph command of the Graph menu
Move Up	Similar to the Move Up command of the Graph menu
Move Down	Similar to the Move Down command of the Graph menu
Channel Browser	<p>Displays the pop-up menu to select the page in the Channel Browser window</p>  <ul style="list-style-type: none">  Channels  Information  Virtual Channels  Conditions  Groups  Real Time Channels  Constants  User Records  Events  Import  Variables

Pop-up Menu

The pop-up menu of the window can be displayed by clicking the right button of the mouse on the Options page.



The pop-up menu allows the access to the following commands:

COMMAND	DESCRIPTION
Cut	Similar to the Cut command of the Edit menu
Copy	Similar to the Copy command of the Edit menu
Paste	Similar to the Paste command of the Edit menu
Add Graph	Similar to the Add Graph command of the Graph menu
Remove Graph	Similar to the Remove Graph command of the Graph menu
Move Up	Similar to the Move Up command of the Graph menu
Move Down	Similar to the Move Down command of the Graph menu
Restore Default	Sets in the channel the settings configured in the Channel Parameters.
Set As Default	Sets the channel settings in the Channel Parameters.
Edit...	Gives the possibility to edit the selected parameter (similar to the double clicking).

Functions

The **XY** window has the following functions:

- Cursor
- Graph Layout
- Channels selection
- Elements display
- Analysis

Functions available only in post processing mode:

- Mode
- Selection of rectangles in the graphic area
- Single channel visualization
- Zoom
- Multiple x-axis
- Shift comparison
- Connect cursor

The **XY windows** moreover have functions that can be performed interacting with the other windows displayed:

- Auto Connect

Cursor

The cursor is identified by a horizontal and a vertical line in the graphic area. It allows to scroll all values in the range of the X scale and of the Y scales, updating the corresponding values of the channels in the info boxes.

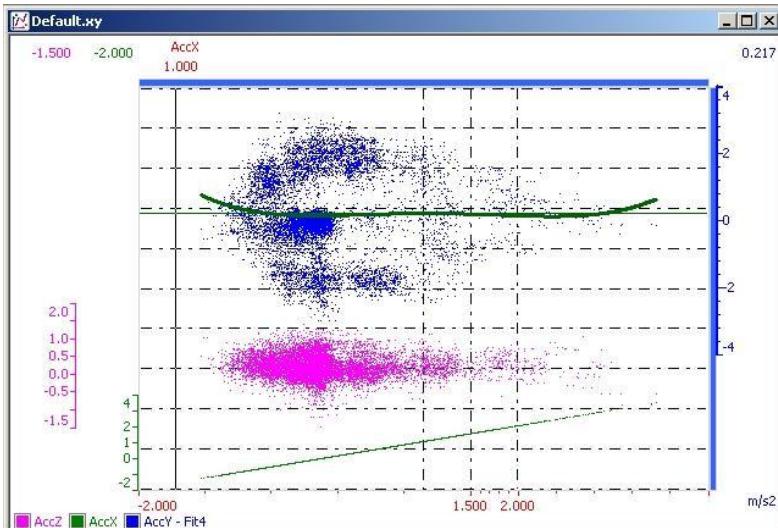
The cursor can be moved in the graphic area moving the mouse and pressing the left button.

Graph Layout

The graph layout functions allow to modify the vertical arrangement of the graphs and Y scales corresponding to the channels configured on the Y axis.

The functions can be enabled through the Graph layout command on the Option menu, on the pop-up menu and on the toolbar, or by configuring the **Layout** field, in the Window Option section in the configuration window.

Parallel		The graphs and the Y scales corresponding to the channels are vertically arranged so as to equally divide the available space.
Overlay		The configured channels share the vertical area; the Y scales are horizontally listed side by side and the graphs overlap.

Manual	 <p>The graphs and the Y scales corresponding to the channels are vertically arranged on the basis of the settings of the user in the Top and Bottom fields that can be modified through the configuration window in the Graphs section or through mouse operations.</p> <p>Clicking on a Y scale appear some small squares; using these squares you can resize or move the Y scale</p>
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Channels selection

A channel (Y scale, graphs and info boxes of a channel) can be selected by clicking with the left button of the mouse on the corresponding Y scale, or on the value box of the cursor channel. To carry out a multiple selection of channels, select the channels pressing the CTRL button.

As an alternative, a channel can be selected with the TAB button of the keyboard.

The Y scale, the graph and the cursor channel of the selected channels are highlighted.

To deselect a channel, click with the left button of the mouse on the Y scale or on the info boxes, or select the Clear Selection command on Options menu or on popup menu.

Display of the elements

The elements of the window can be shown or hidden by enabling the view command on the Options menu or on the pop-up menu. The functions are available only in post processing mode.

Analysis of a channel

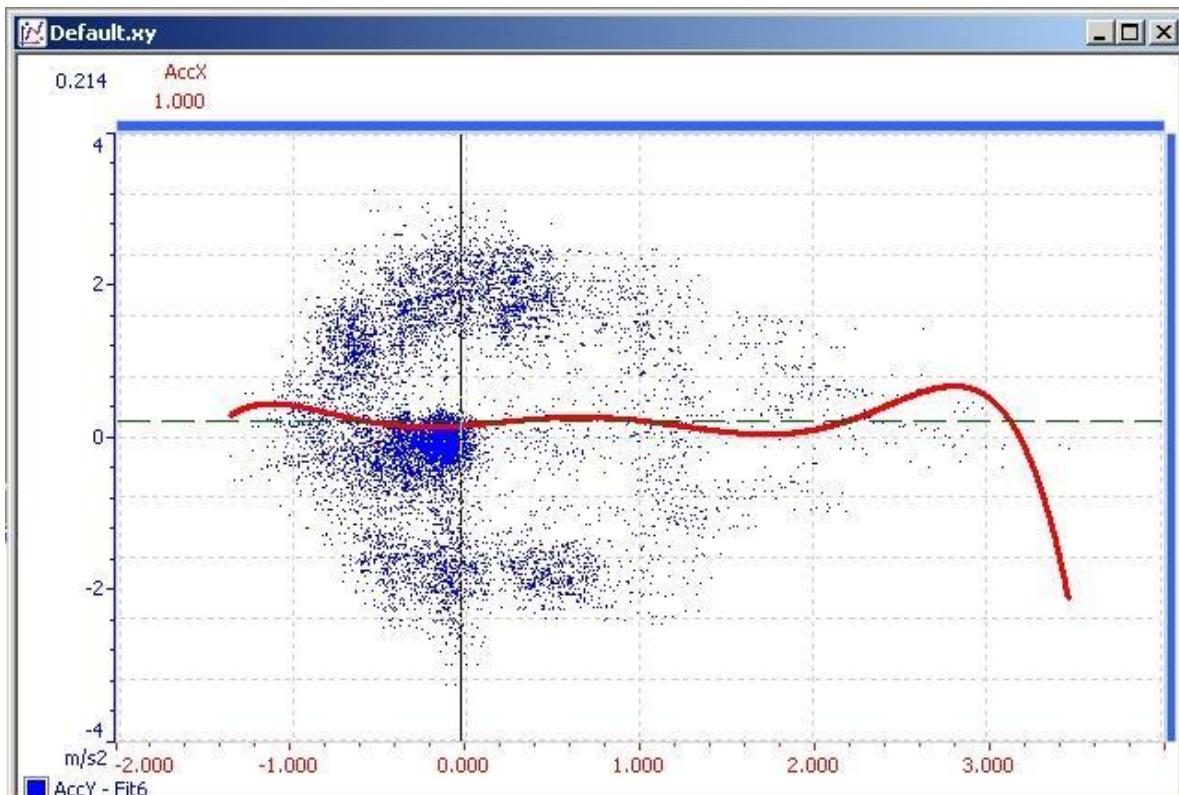
In XY Windows some numerical or statistical analysis are allowed: Best Fit, Reference Best Fit, Interpolation and Condition.

Best Fit: The Best Fit curve is a polynomial function of configurable degree that corresponding to the interpolation of the remarks of the desired channel. Curve fitting is the process of constructing

a curve, or mathematical function, that has the best fit to a series of data points, possibly subject to constraints

For each channel with configured Best Fit the cursors are displayed as horizontal lines, corresponding to the intersection of the vertical cursor with the Best Fit curves. In configuration you can configure the style, the color and the width of the horizontal lines.

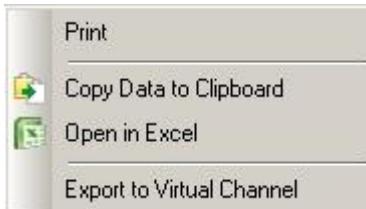
The interpolation degree used for Best Fit calculation is displayed in a text box inside channel cursor. The sampling frequency of each channel configured on the Y axis can be modified.



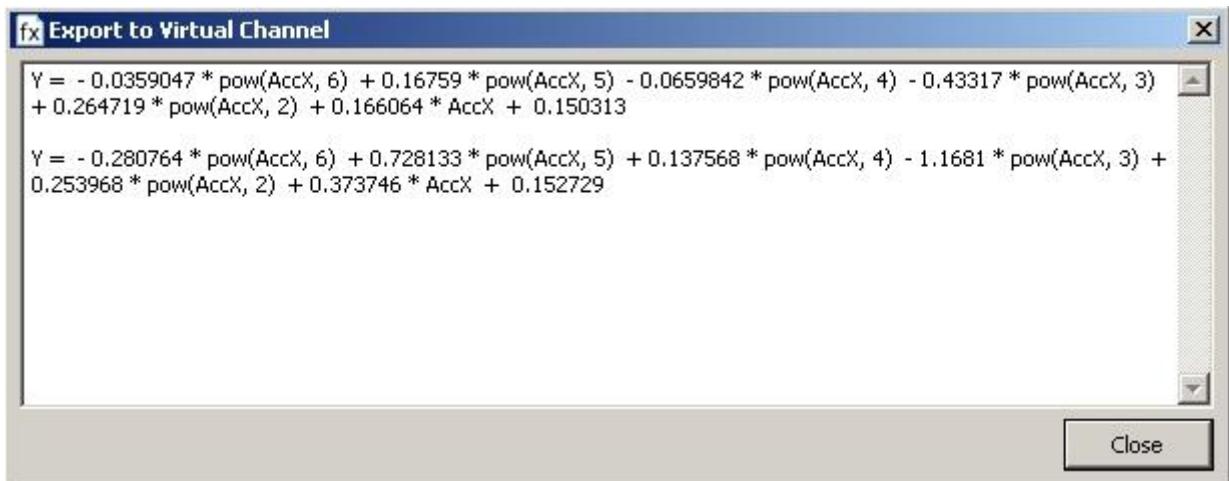
The coefficients used for the Best Fit interpolation in the window can be displayed through the Best Fit Information command.

Best Fit coefficients									
Label	Comparison Mode	B0	B1	B2	B3	B4	B5	B6	Formula
AccX	#A	-0.0373839	-0.169371	0.106357	0.222313	-0.15229	-0.0780314	0.0337634	$y = +0.0337634x^6 - 0.0780314x^5 - 0.15229x^4 + 0.222313x^3 + 0.106357x^2 - 0.169371x - 0.0373839$
AccX	#B	0.00517781	-0.238905	-0.147285	0.577749	-0.222119	-0.370062	0.164341	$y = +0.164341x^6 - 0.370062x^5 - 0.222119x^4 + 0.577749x^3 - 0.147285x^2 - 0.238905x + 0.00517781$
AccX	#C	0.0684774	-0.33685	-0.499329	0.714489	0.540407	-0.58708	0.0395428	$y = +0.0395428x^6 - 0.58708x^5 + 0.540407x^4 + 0.714489x^3 - 0.499329x^2 - 0.33685x + 0.0684774$
AccY	#A	0.291832	-1.38347	0.980817	0.861169	-0.452304	-	-	$y = -0.452304x^4 + 0.861169x^3 + 0.980817x^2 - 1.38347x + 0.291832$
AccY	#B	0.310661	-1.53447	1.13081	0.830289	-0.682413	-	-	$y = -0.682413x^4 + 0.830289x^3 + 1.13081x^2 - 1.53447x + 0.310661$
AccY	#C	0.275026	-2.05887	2.43072	1.73399	-2.20731	-	-	$y = -2.20731x^4 + 1.73399x^3 + 2.43072x^2 - 2.05887x + 0.275026$

On this window there are further commands, calling by right click on window:



- **Print:** Prints the coefficients and formula window.
- **Copy Data to Clipboard:** Copies to clipboard the coefficients values for each channel available taking also into account possible comparisons.
- **Open in Excel:** Opens an Excel sheet containing coefficients values for each channel available taking also into account possible comparisons.
- **Export to Virtual Channel:** Open a further window where the formula is adapted for Virtual channel using. There is a formula for each selected channel.



Reference Best Fit: The Reference Best Fit curve is a polynomial function of configurable degree that is constructed using coefficients can be manually set in configuration. In configuration you can configure the style, the color and the width of the curve.

The interpolation degree used for Best Fit calculation is displayed in a text box inside channel cursor. The sampling frequency of each channel configured on the Y axis can be modified.

Interpolation: With interpolation you can resample the channel choosing a new frequency from configuration.

Conditions: If a condition is set, the points of the graph are displayed only if the condition is verified. Best Fit, Interpolation and Condition can be set through the configuration interface.

Graph Mode

The Graph Mode functions allow to modify the data display in the graphs window. The function is enabled by configuring **Graph Mode** field, in the Window Options section in the configuration window.

Three modes are available, **Graph**, **Smooth**, **Percent**, as displayed below:

Graph		The Graph mode shows all the couple of point (x, y) of all channel configured.
Smooth		The Smooth mode displays the graph using the density of values in small rectangles. Every rectangles contains a certain number of points which are calculated as percentage respect the whole channel. The window shows this percentage value with a variable color scale depending on the density and show the values in brackets near the cursor value. The Smooth mode uses only the X channel and the first Y channel.
Percent		The Percent mode displays the graph using the density of values in grid rectangles. Every rectangles contains a certain number of points which are calculated as percentage respect the whole channel. The window shows this percentage with a text in each rectangle with value greater than zero. The Percent mode is displayed only if a grid is configured because the calculated rectangles correspond to the grid rectangles. The Percent mode uses only the X channel and the first Y channel.

Zoom

The zoom allows to display in detail some sections of the graphic area.

To zoom, use one of the following methods:

- select a rectangle in the graphic areas and select the Zoom command from the pop-up menu
- Zoom Out, Zoom In, Zoom Min, Zoom Max commands form the pop-up menu or from the toolbar.

To scroll the displayed area in details by zooming, use one of the following methods:

- drag the zoom bars with the mouse, pressing the left button
- enable the Pan mode of the commands of the pop-up menu or from the icon on the toolbar, and move the mouse pressing the left button.

Selection of rectangles in the graphic area

The rectangles in the graphic area can be selected dragging the mouse while pressing the right button.

During the dragging, the selected rectangle is highlighted and the information of the range of X axis range and of the zoom percentage on the Y axis of the rectangle are displayed in a pop-up window.

Single channel visualization

The graphs of a channel configured on the y axis can be displayed in single mode using the arrow keys of the keyboard (right arrow, left arrow). The arrows show the channels in sequence in single mode and, after making the full circle, returning to the multiple configuration of departure.

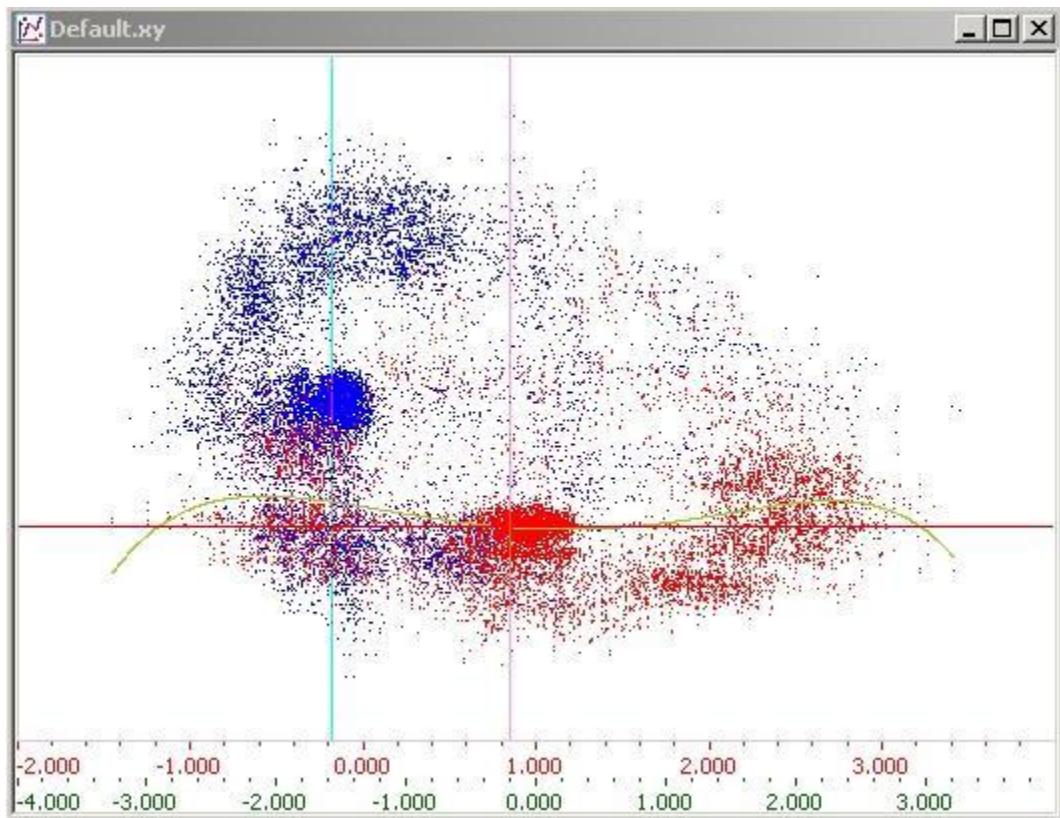
Multiple x-axis

The Window can be configured to have multiple x-axis, up to a maximum of four.

Like standard XY, for each x-axis, the User can configure more than one y-axis.

X-axis will be displayed parallel on the bottom of the graph box.

If the XY is connected to another analysis window (e.g. a Graph window), the XY will show one cursor for each X-[Y] combination.



Shift Comparison

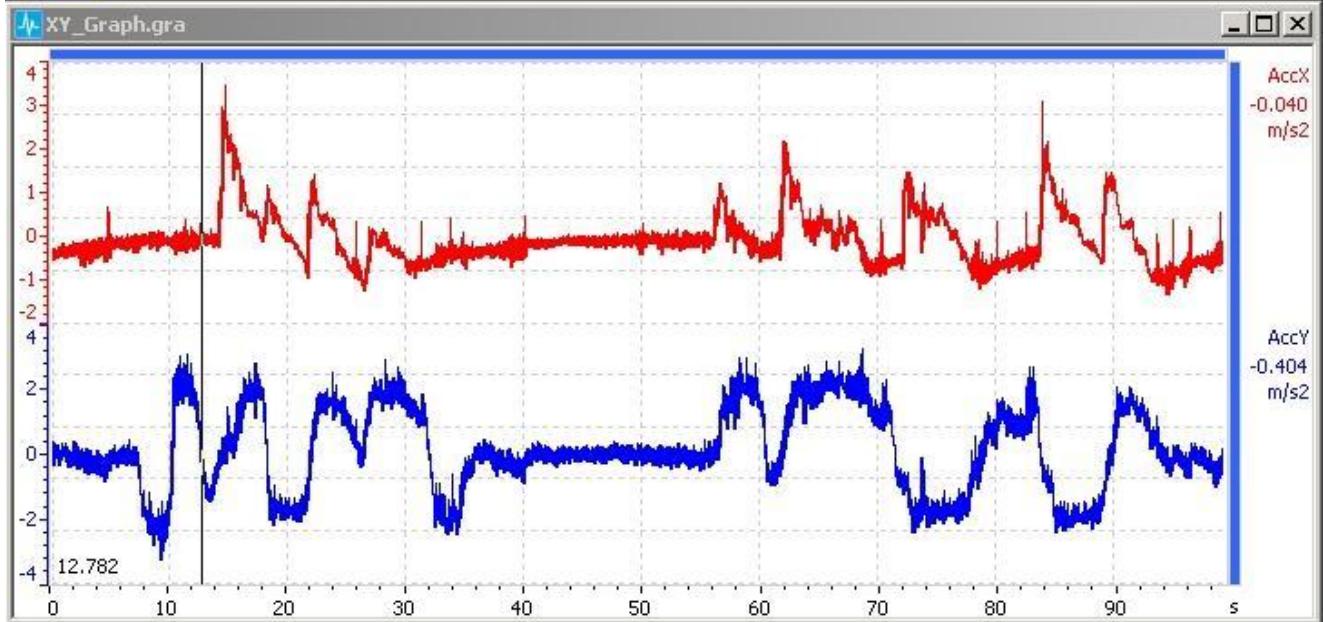
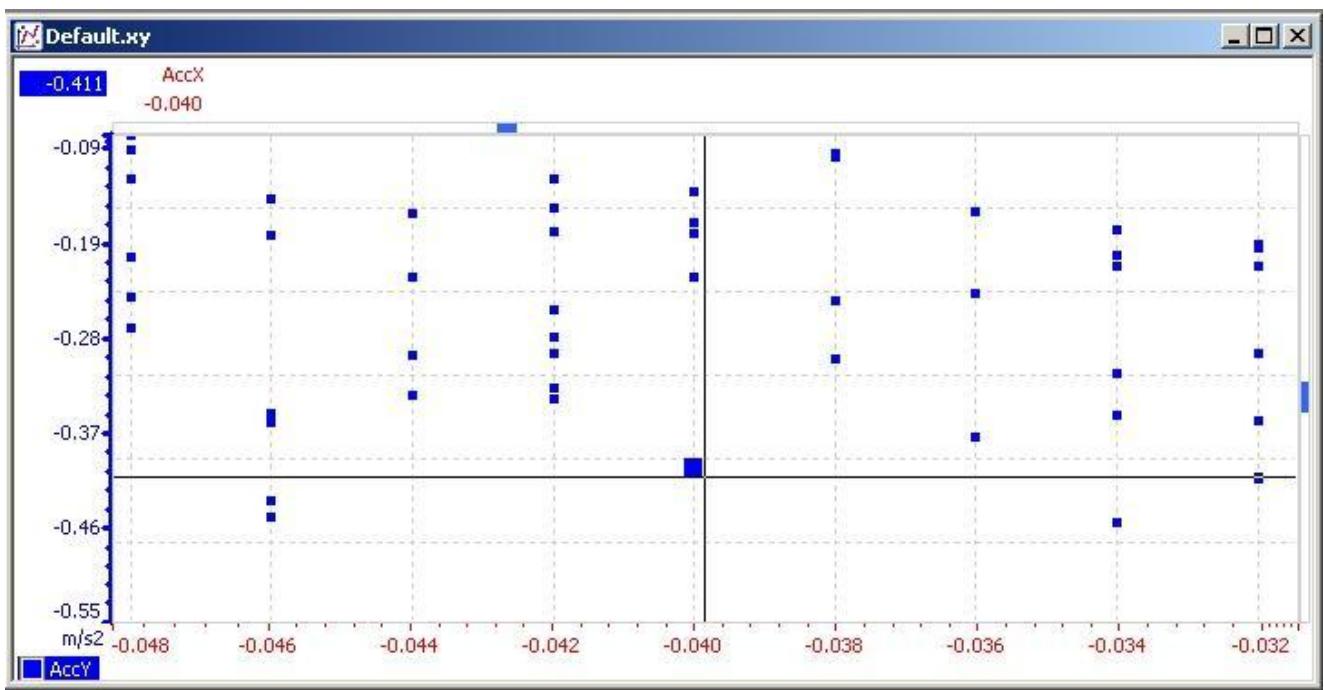
The XY window applies the shift comparison function set on any Graph window. When the shift is confirmed on any lap being compared, the XY window adapts to the new setting. There are two separate cases, based on whether the shift is on the first lap or on any of the other laps.

In the first case, the sampling interval on which the XY window is constructed is reduced because the shift shortens the lap, from a point of view of XY.

The second case is that the shift is applied on any of the other laps. The sampling interval on which the window is constructed this time does not change because the first lap has not changed. The trace of the lap is on the other hand changed in shift.

Connect cursor

The position of the cursor is automatically up-dated in all the displayed windows whenever the position of the cursor is changed in the current XY window. Some windows are always connected, while others are connected only if in Setup/General the auto connect cursor flag is set. To connect two XY windows, this option must be set. If the cursor moves closer to a small neighborhood of each point on the XY window, the point under examination is highlighted and the cursors of the other windows are connected to the X-axis value identified from the intersection of X and Y.



Commands

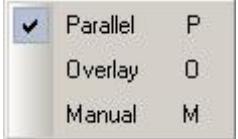
The main commands available in the **XY Window** can be enabled through

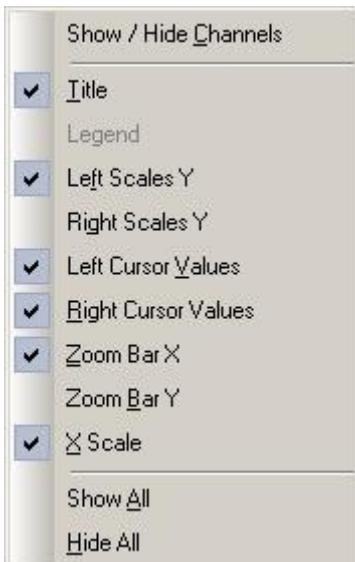
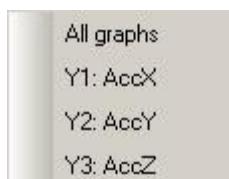
- The **Options menu** in the main menu of the application
- The buttons of the dedicated **Toolbar**
- The **pop-up menu** that can be displayed by clicking with the right button of the mouse on the graphic area of the window
- **Keyboard shortcuts**

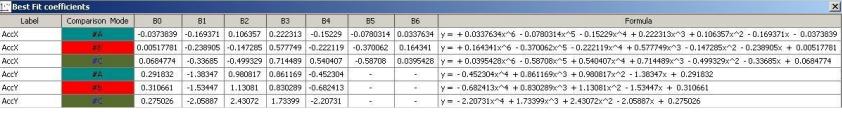
Options Menu



The **Options menu** allows the access to the following commands:

COMMAND	SHORTCUT	DESCRIPTION
Graph Layout	P O M	Displays the sub menu to select the vertical arrangement mode of the channels (Parallel, Overlay, Manual)  the selected mode is highlighted with a check mark
Remove Graphs		Removes from the window the currently selected channels

Clear Selection		Deselect all the selected channels in the window
Select All Channels	Ctrl + A	Selects all channels in the window
View		<p>Displays the pop-up sub menu to select the graphic elements of the window that can be shown or hidden. The viewed elements are highlighted with a check mark on the left.</p>  <ul style="list-style-type: none"> • Show / Hide Channels, displays in a pop-up menu the list of the channels that can be viewed  <p>selecting "All graphs" command, all the configured channels are displayed; selecting an element only the corresponding channel is displayed</p> <ul style="list-style-type: none"> • Title, shows/hides the line which contains the header information • Legend, appears only in Legend Mode. Shows/hides the line which contains the legend information • Left Scales Y, shows/hides the scales of the Y channels

		<p>on the left of the window</p> <ul style="list-style-type: none"> Right Scales Y, shows/hides the scales of the Y channels on the right of the window Left Cursor Values, shows/hides the info boxes containing the current values of the cursor on the left of the window Right Cursor Values, shows/hides the info boxes containing the current values of the cursor on the right of the window Zoom Bar X, shows/hides the horizontal Zoom Bar Zoom Bar Y, shows/hides the vertical Zoom Bar X Scale, shows/hides the X la scale Show All, shows all graphic elements Hide All, hides all graphic elements
Best Fit Information		If at least one channel is configured with Best Fit, it shows a summary containing the values of the coefficients used for the interpolation curve of each channel and the resulting polynomial formula. See Analysis for further details. 
Switch to Telemetry Switch to Post Processing	Ctrl + T	Allows to switch from the Post Processing mode to the Telemetry mode and vice versa.
Properties	E	Opens the interface to configure the XY window

Graph Toolbar



The toolbar allows the access to the following commands:

COMMAND	SHORTCUT	DESCRIPTION
Load		Opens a window to select a configuration file corresponding to a XY window
Save		Saves the current window configuration on a file
Properties	E	See the description of the command in the Options Table.
Zoom In	+	Enlarges the graphic area in relation to the X axis, displaying in higher detail the range around the cursor position (see also the Zoom functions)
Zoom Out	-	Operation opposite to the Zoom In in the graphic area of the window: it shows in smaller detail in relation to the X axis of the range around the present position of the cursor (see also the Zoom functions)
Minimum Zoom	Ctrl + -	Shows the graphic area in relation to the whole range
Pan		Enables the Pan mode to move the displayed zoom area (see also the Zoom functions)
Zoom Undo		Displays in a pop-up menu the list of the zooming operations carried out before the current display. Selecting an item from the list, the window before the zooming is displayed (see also the Zoom functions)
Zoom Redo		Displays in a pop-up menu the list of the zooming operations carried out following to the current display. Selecting an item from the list, the window after the zooming is displayed (see also the Zoom functions)
Graph Layout		See the description of the command in the Options Table.

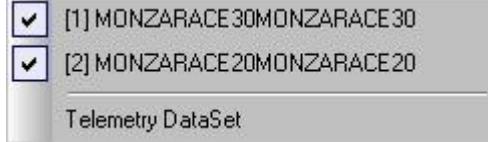
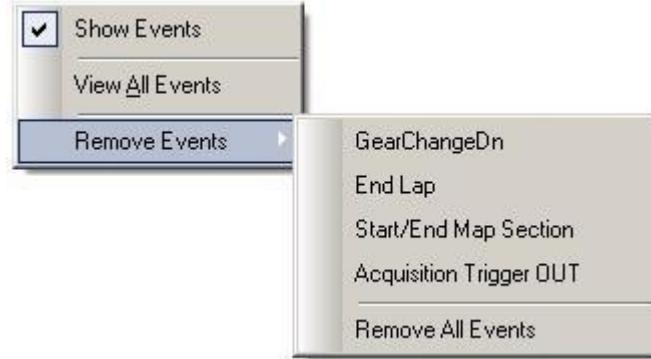
View		See the description of the command in the Options Table.
Show/Hide All Scales Y		Shows / hides all the Y scales
Show Events	Alt + Ctrl + E	Enables the display of the events configured in the window.
Best Fit Information		Shows the Best Fit coefficients window
Datasets		Shows in a sub menu the loaded Datasets list that can be selected (available only in Post Processing mode)
Switch to Telemetry/Post Processing	Ctrl + T	See the description of the command in the Options Table.

Pop-up Menu

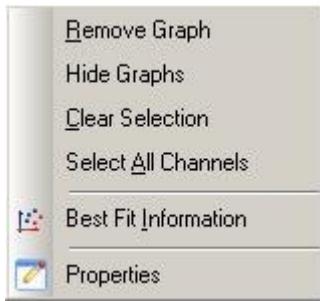
By clicking with the right button of the mouse on the graphic area of the window the following pop-up menu is displayed:



This section will describe only the commands that have not already been described previously.

COMMAND	DESCRIPTION
DataSets	<p>Shows in a sub menu the list of the Datasets loaded that can be displayed. Selecting the item Telemetry Dataset, the user can switch to the corresponding display mode</p> 
Events	<p>Shows the operations linked to the events;</p>  <p>It's a dynamic menu and it can be modified according to the situation. In the example in the figure the following commands are listed:</p> <ul style="list-style-type: none"> • Show Events Enables the display of the events configured in the window • View All Events (View Custom Events) shows all events (only the configured events) in the window. • Remove Events Opens a sub menu to select the event to be removed; all events can be removed. The removal is intended linked to the display of the event in the window and not to the cancellation of the event.

By clicking with the right button of the mouse on an Info box or on the Y scale of a channel, the following pop-up menu is displayed:



This section will describe only the commands that have not already been described previously.

COMMAND	SHORTCUT	DESCRIPTION
Hide Graphs	Alt + Ctrl + H	Hides trace of the selected channel and strikeout the channel name in order to indicate that the channel is not displayed but still available
Show Graphs	Alt + Ctrl + S	Shows the channel if hidden.

Keyboard Shortcut

To see the complete list of shortcuts available for the xy window, see related chapter.

Below are listed those shortcuts that do not appear in any of the commands and of the toolbar buttons described before. These commands can be executed only from keyboard. All these commands are not customizable.

SHORTCUT	DESCRIPTION
Esc	Cancel zoom operation
Left	View next channel in single mode
Right	View previous channel in single mode
Alt + Ctrl + N	Place cursor on next event occurrence
Alt + Ctrl + P	Place cursor on previous event occurrence
Tab	Select next channel in current window
Del	Remove selected channels

XYZ Window

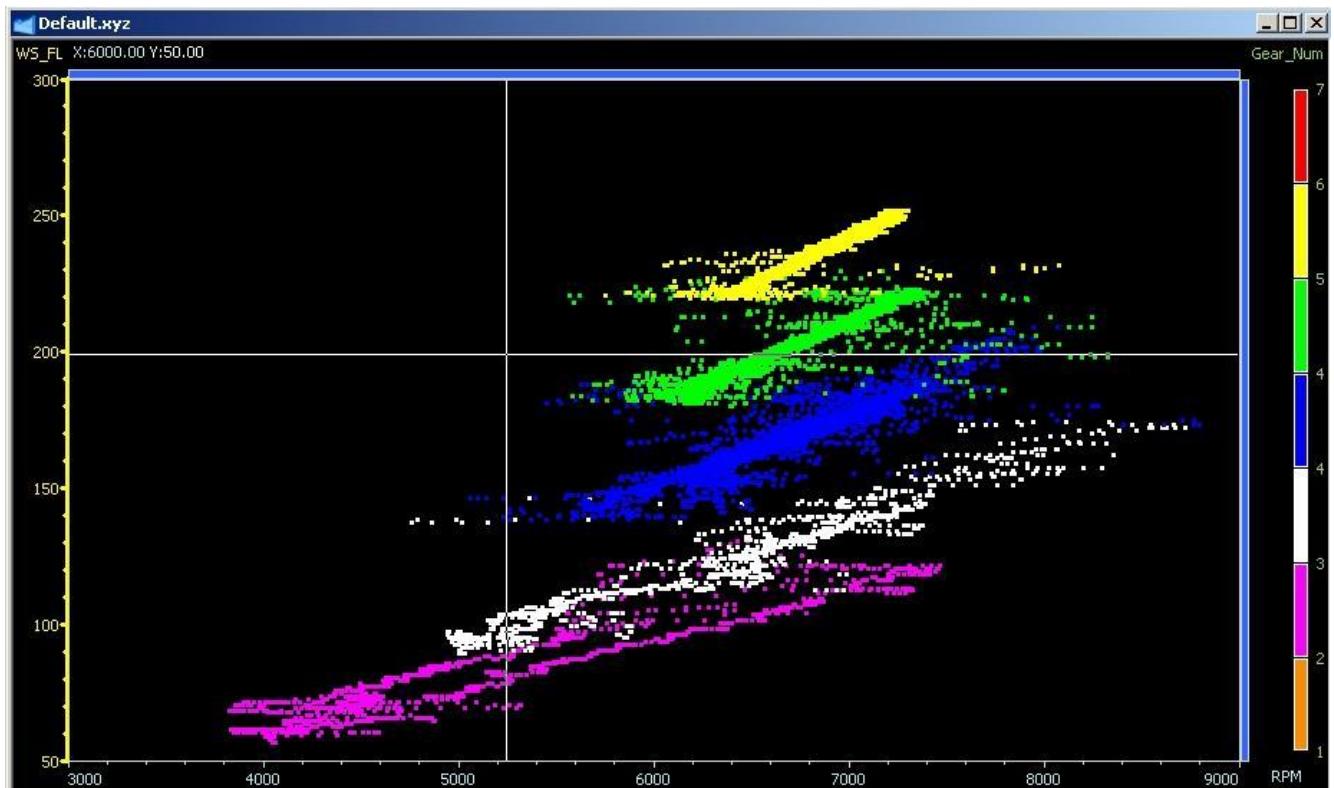
An **XYZ** window displays the distribution of the sampled channel values on the basis of both the series of values of another reference channel, configured on the X axis and on the reference ranges of a third channel. The relationship with the third channel can be displayed as:

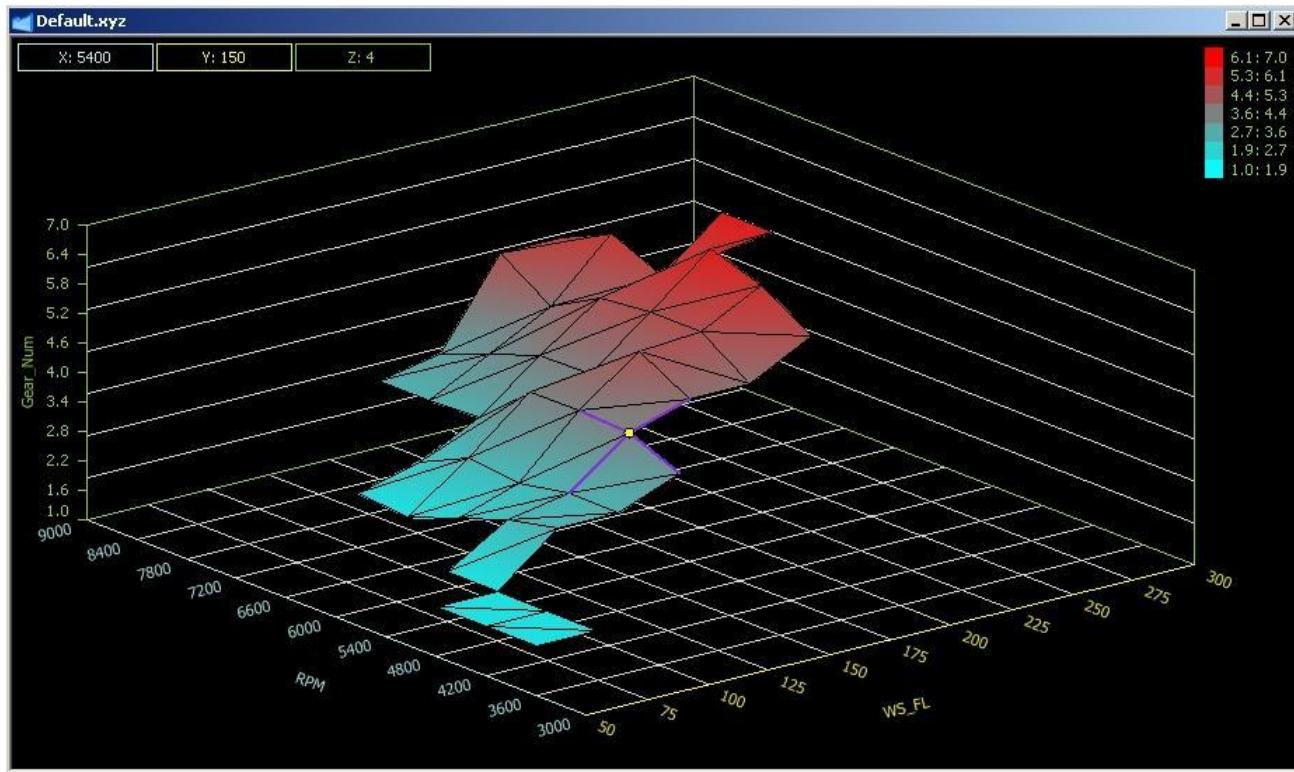
- the hypothetical Z axis is displayed by coloring the reference point of the range taken into account.
- in 3D representation the real Z axis is displayed as third dimension

This window can configure max 3 channels, corresponding to X, Y, Z.

The data on the graphs can be analyzed in detail by zooming or interpolating them with Best Fit functions, the graphics of the elements of the window can be customized.

Elements of the window





Graphic Area

The graphic area displays the cursor, the windows, the channels elements (grids, corners, markers, corners and Best Fit cursor).

Channels Information Area

The Channel Information Area displays the information of the channel configured (name and value). If the Best Fit is configured also the corresponding information are displayed.

Y Scale Area

The Y Scale area displays the scale of the channel identified as Y and unit if configured.

X Scale Area

The X Scale area displays the scale of the channel identified as X and unit if configured.

Z Scale Area

The Z scale is displayed as a series of sections of configurable range; the colors identify a group of samples belonging to a specific range. The scale is interactive and by clicking on a sector a range can be hidden. This is true in color and 3d representation modes both.

Zoom Bars

Horizontal Zoom Bar: displays the percentage of the horizontal zoom, allows to move the horizontal zoom area.

Vertical Zoom Bar: displays the percentage of the vertical zoom, allows to move the vertical zoom area.

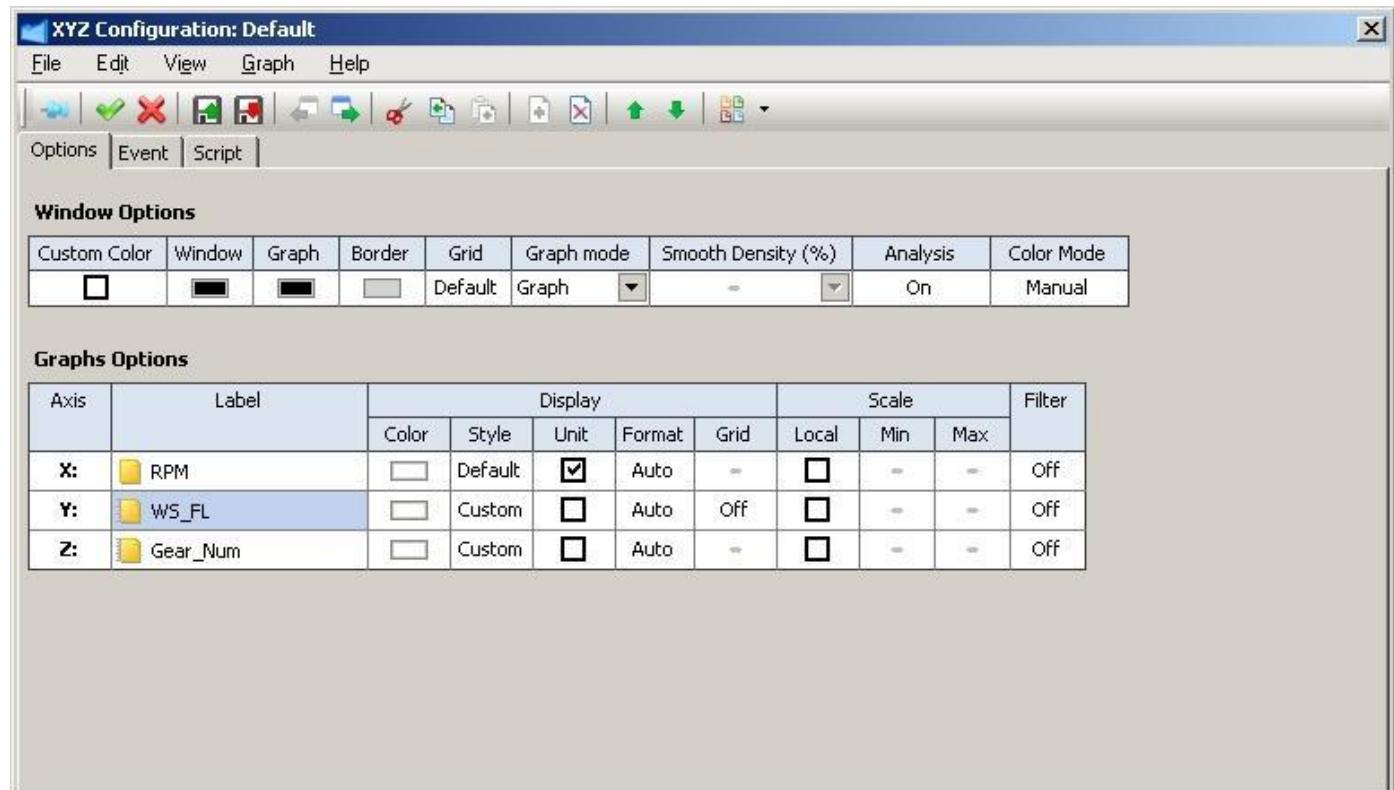
XYZ Configuration Window

The **XYZ Configuration Window** window allows to set the look of the XYZ graphic windows; it has the following pages: **Options**, **Event**, **Script**.

The window moreover includes a menu, a toolbar and a pop-up menu that ease the access to the configuration and management commands of the window itself.

Options Page

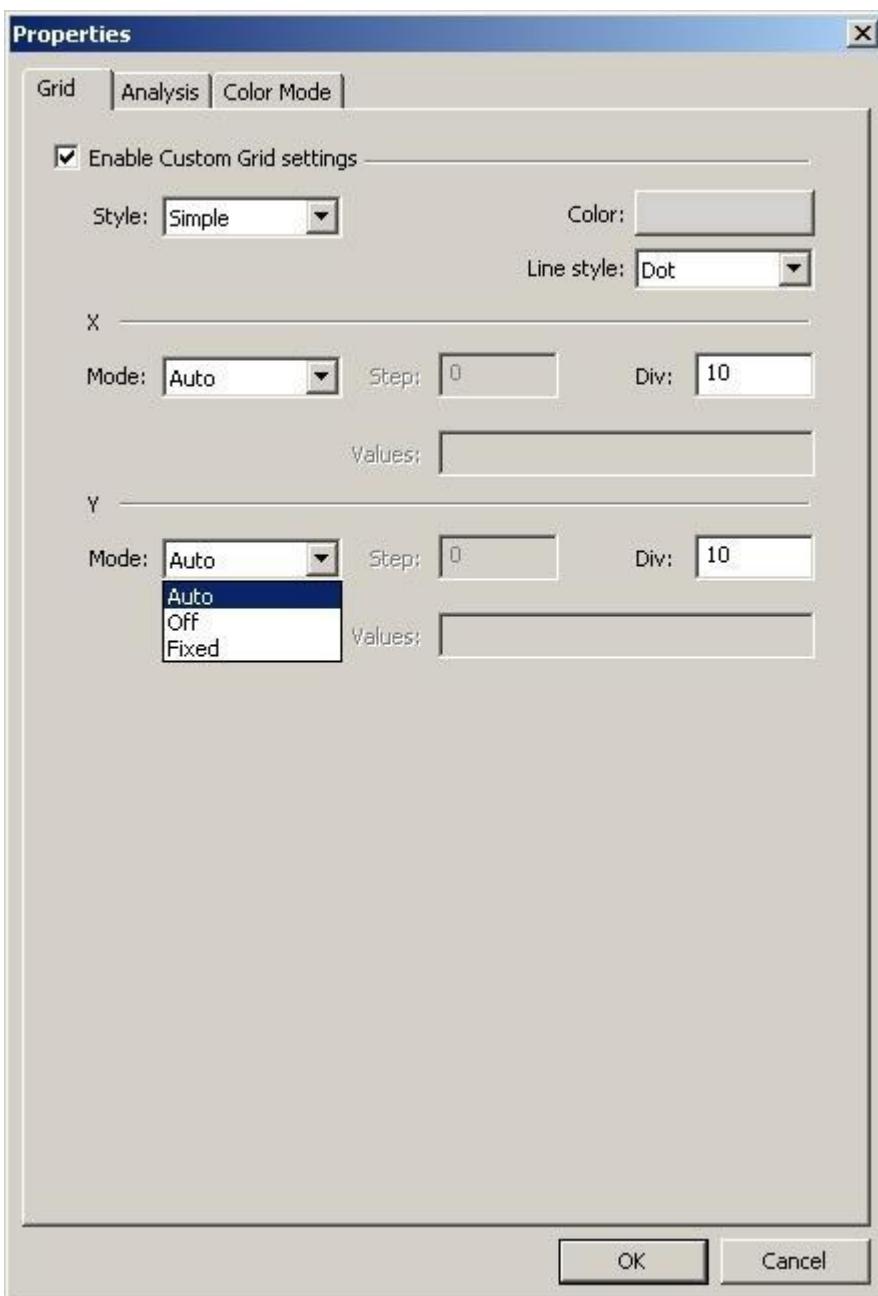
The **Options** page allows to configure the graphic aspect of the **XYZ** windows and it is divided into two sections: **Window** and **Graphs**. Each configurable value can be edited by double clicking with the mouse or by pressing the space bar on the selected element.



Window Options

It allows configuring the general settings of the window.

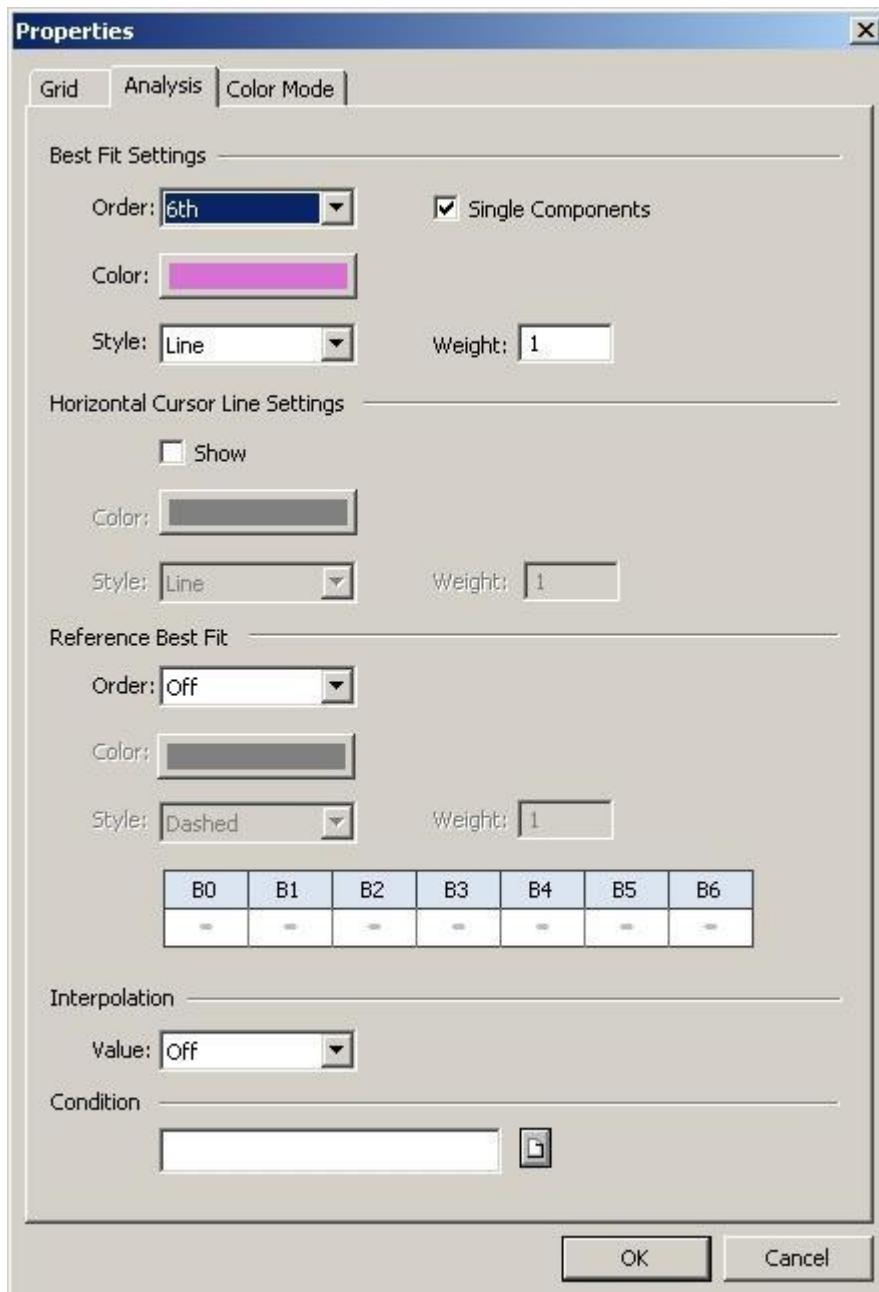
- **Custom color:** Enables the settings of the customized colors for the window.
- **Window:** Sets the background color of the window.
- **Graph:** Sets the background color of the graphic area.
- **Border:** Sets the borders color of the window area.
- **Grid:** displays the setting to enable the grid common to all the channels graphs in the graphic area of the window. The parameter can be modified by editing the corresponding configuration window.



- **Enable Custom Grid settings:** Enables the grid display with the customized settings. If the window grid is disabled, the Default Grid uses the Default Appearance page of the General Setup window (General Settings, general configuration of the WinTAX4 environment).
 - **Style:** Sets the style of the grid.
 - **Simple:** the grid is displayed with continuous lines.
 - **Cross:** the grid is formed by crosses indicating the intersection of the vertical and horizontal divisions.
 - **Color:** Color of the grid.
 - **Line style:** Sets the style of the grid line (valid if the Style Simple is enabled).
 - **Solid:** continuous line
 - **Dash:** dashed line
 - **Dot:** dotted line
 - **DashDot:** dashed line alternated with 1 dot
 - **DashDotDot:** dashed line alternated with 2 dots
- **X**
 - **Mode:** Calculation mode of the horizontal divisions.
 - **Auto**, displays an automatic number of equidistant divisions.
 - **Off**, no division is displayed
 - **Fixed**, displays a fixed number of equidistant divisions
 - **Step**, displays the divisions at fixed intervals equal to the Step value.
 - **Custom**, shows the divisions in correspondence with the values on the X axis set by the user in the text box values **Values**.
 - **Step:** Fixed step to calculate the horizontal divisions (a division for each Step), valid with Mode set at Step.
 - **Div.:** Quantity of horizontal division to be displayed, valid with Mode set at Auto or Fixed.
 - **Values:** List of values on the X axis corresponding to the divisions, valid with Mode set at Custom. The list of values can be directly added in the text box using ';' to separate the values.
- **Y**
 - **Mode:** Calculation mode of the vertical divisions.
 - **Auto**, displays an automatic number of equidistant divisions.

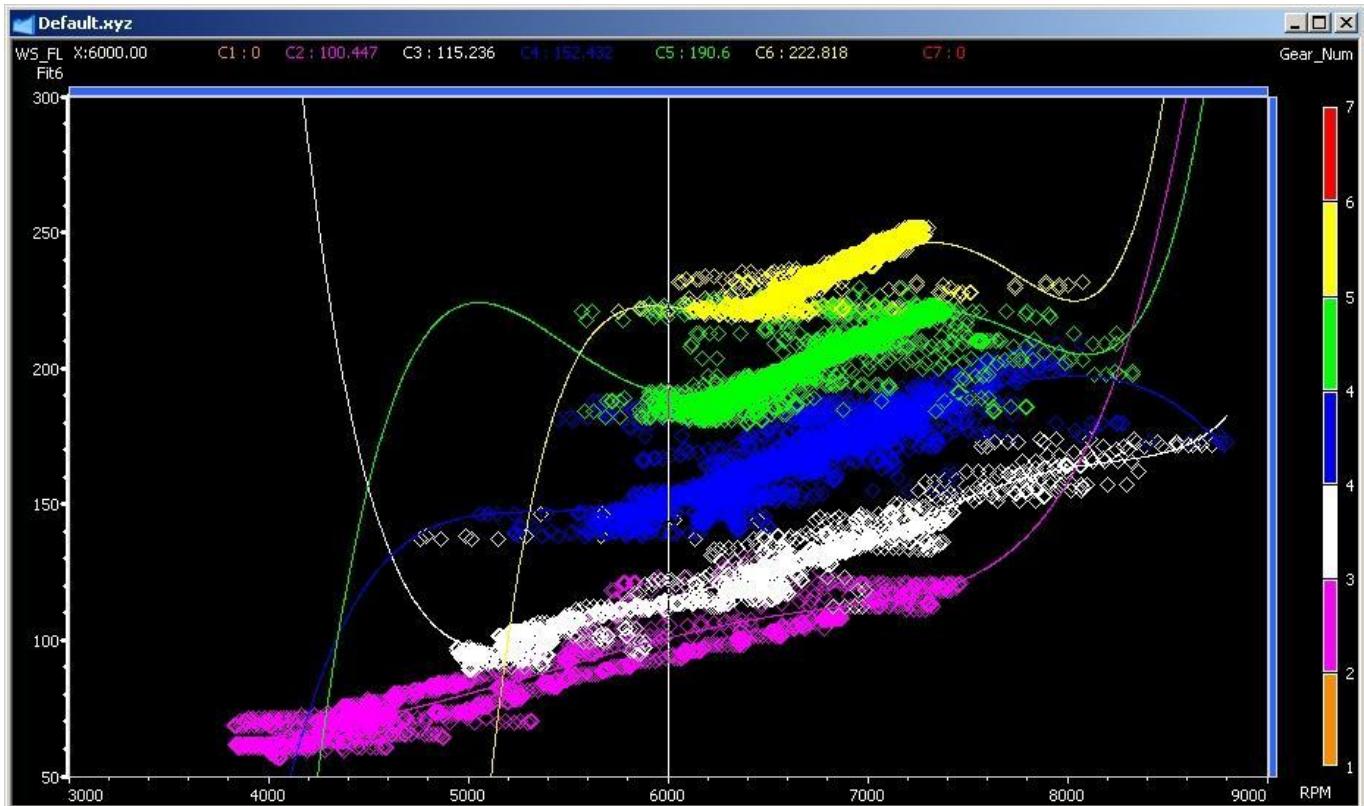
- **Off**, no division is displayed
 - **Fixed**, displays a fixed number of equidistant divisions
 - **Step**, displays the divisions at fixed intervals equal to the Step value.
 - **Custom**, shows the divisions in correspondence with the values on the Y axis set by the user in the text box values **Values**.
- **Step**: Fixed step to calculate the vertical divisions (a division for each Step), valid with Mode set at Step.
- **Div.:** Quantity of vertical division to be displayed, valid with Mode set at Auto or Fixed.
- **Values**: List of values on the Y axis corresponding to the divisions, valid with Mode set at Custom. The list of values can be directly added in the text box using ';' to separate the values.

- **Mode**: sets the display mode of the graphs
 - Graph
 - Smooth
 - 3D
- **Analysis**: Sets the parameters for the advanced analysis of the graphs. The settings can be modified by changing the parameters on the configuration window. It is not just the channel to be analyzed like in XY but the whole window is analyzed; it anyhow refers to the channel set as Y.



o Best Fit Settings

- **Order:** degree of the polynomial function used to calculate the Best Fit curve. The Off value or one of the predefined values proposed in the combined box can be selected, to avoid setting the Best Fit curve. The maximum degree is 6.
- **Single Components:** If checked, the window displays a best fit curve for each cloud of Z point.



- **Color:** color of the Best Fit curve. To modify the color, open the window to select the color by clicking with the left button of the mouse.
- **Style:** style for Best Fit line.
- **Weight:** weight for Best Fit line.

- **Horizontal Cursor Line Settings**

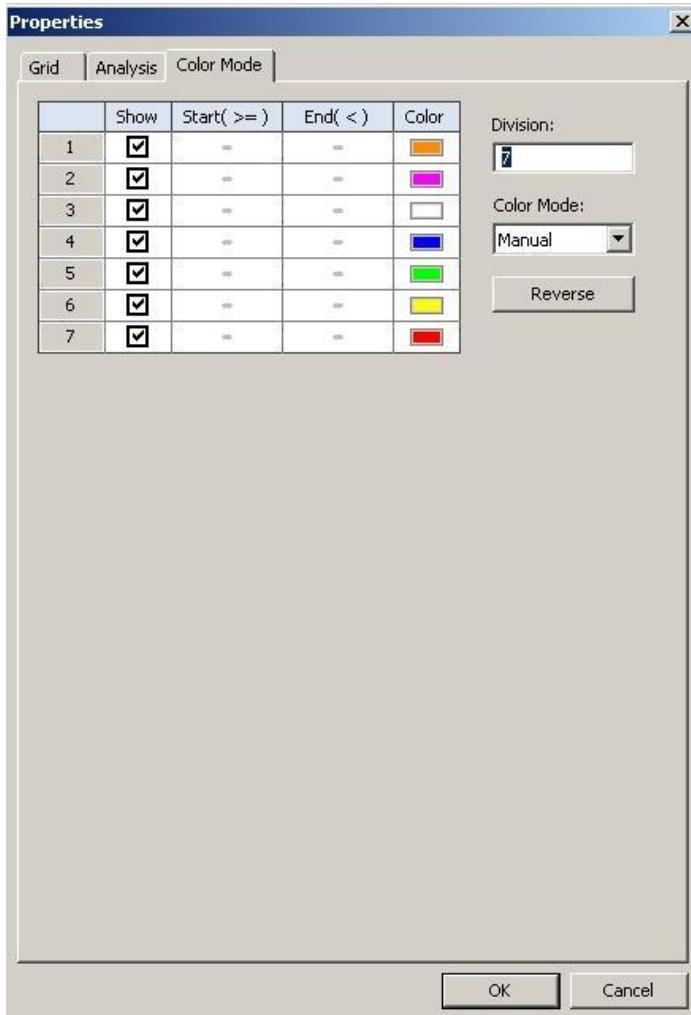
- **Show:** enable horizontal cursor lines displaying.
- **Color:** color for horizontal cursor lines.
- **Style:** style for horizontal cursor lines.
- **Weight:** weight for horizontal cursor lines.

- **Reference Best Fit**

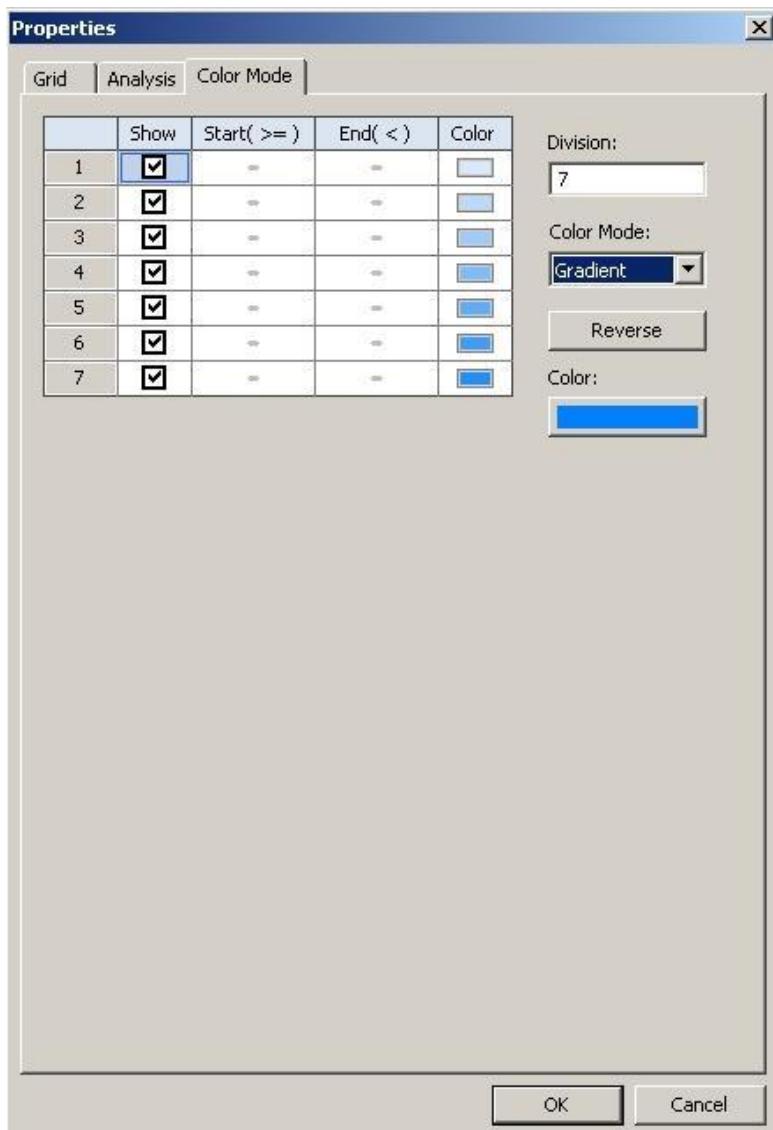
- **Order:** degree of the polynomial function used to calculate the Reference Best Fit curve. The Off value or one of the predefined values proposed in the combined box can be selected, to avoid setting the Reference Best Fit curve. The maximum degree is 6.
- **Color:** color of the Reference Best Fit curve. To modify the color, open the window to select the color by clicking with the left button of the mouse.
- **Style:** style for Reference Best Fit line.
- **Weight:** weight for Reference Best Fit line.

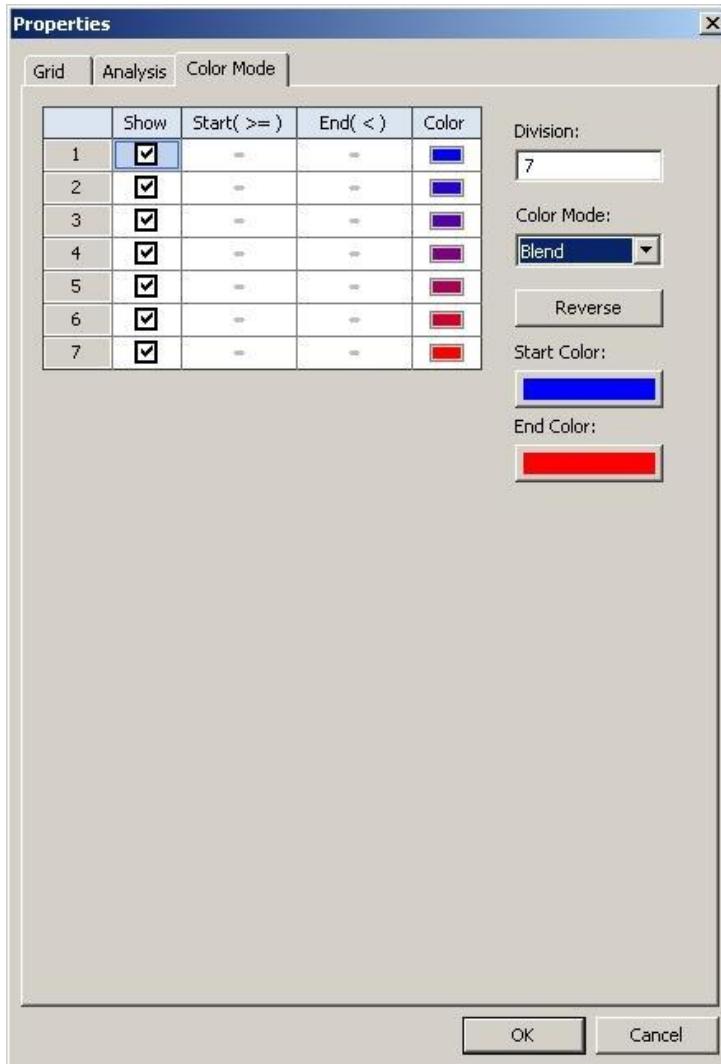
- **Coefficients B0, B1, B2, B3, B4, B5, B6:** the Reference Best Fit is a manual constructed curve with could be read as an ideal Best Fit. In this section it's possible to insert the coefficients, also in scientific format, to calculate the curve.
- **Interpolation**
 - **Value:** value of the customized sampling frequency. The Off value or one of the pre-defined frequencies proposed in the combined box (Range between 1 Hz and 10 Hz) can be selected, to keep the value set by default.
- **Condition**
By adding in the text box a condition, the graphs will display only the points complying with the condition itself. The button opens the conditions page on the channel browser to add the condition with drag & drop.
- **Color Mode:** Sets the parameters for the ranges and the colors of the Z axis.

If mode Manual is selected, the window has the appearance of the picture below.



If mode Gradient or Blend are selected, the window has the appearance of the pictures below. The values in Start and End columns are configured manually or automatically.





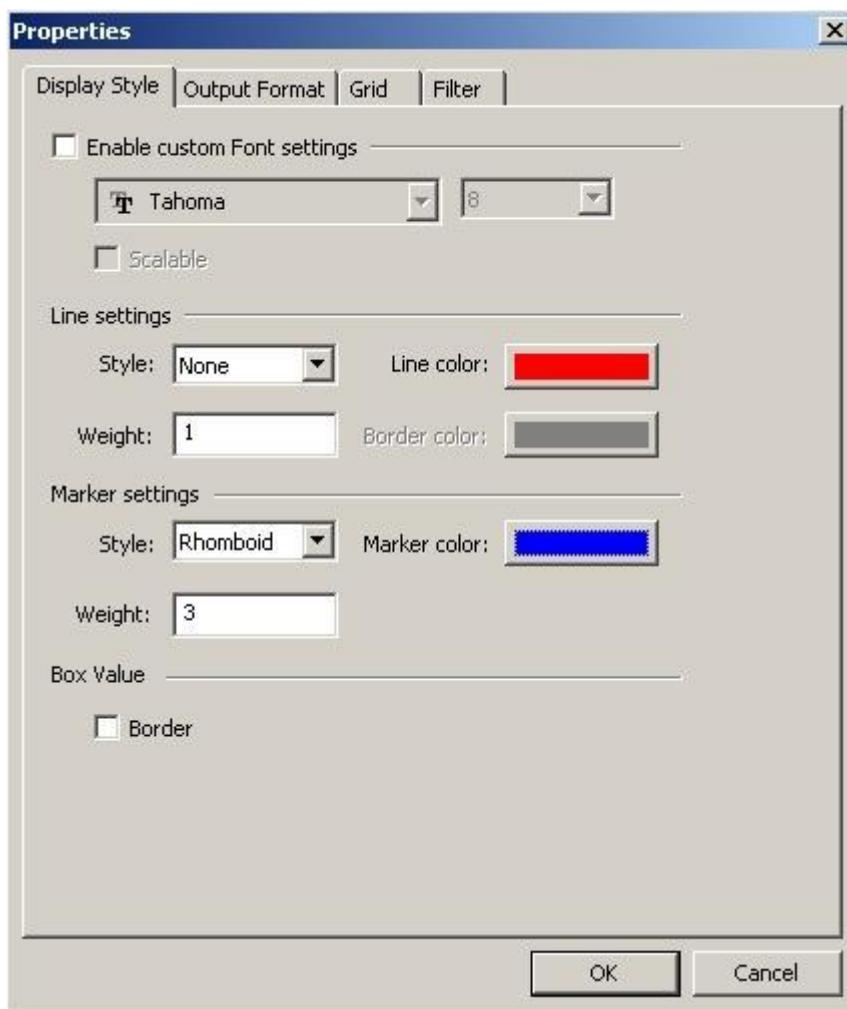
- **Division:** it is a number into the range of 1-10; this value is the number of divisions of Z axis.
- **Color Mode:** In the rows of the start-end-color grid it's always possible to manually configure the colors. Otherwise color can be sets with this combo.
- **Start Color / End Color / Color:** Color selection in the different color modes.
- **Reverse:** Inverts the colors in the table.

Graphs Options

It enables to configure the settings specific for each channel to be graphically displayed. Each line identifies a configured channel, while the columns identify the fields to be configured. Multiple selections are possible with the CTRL and SHIFT buttons.

- **Axis:** identifies the X, Y, Z axis on which the channel is configured. Max three channels can be configured, corresponding to X, Y, Z.

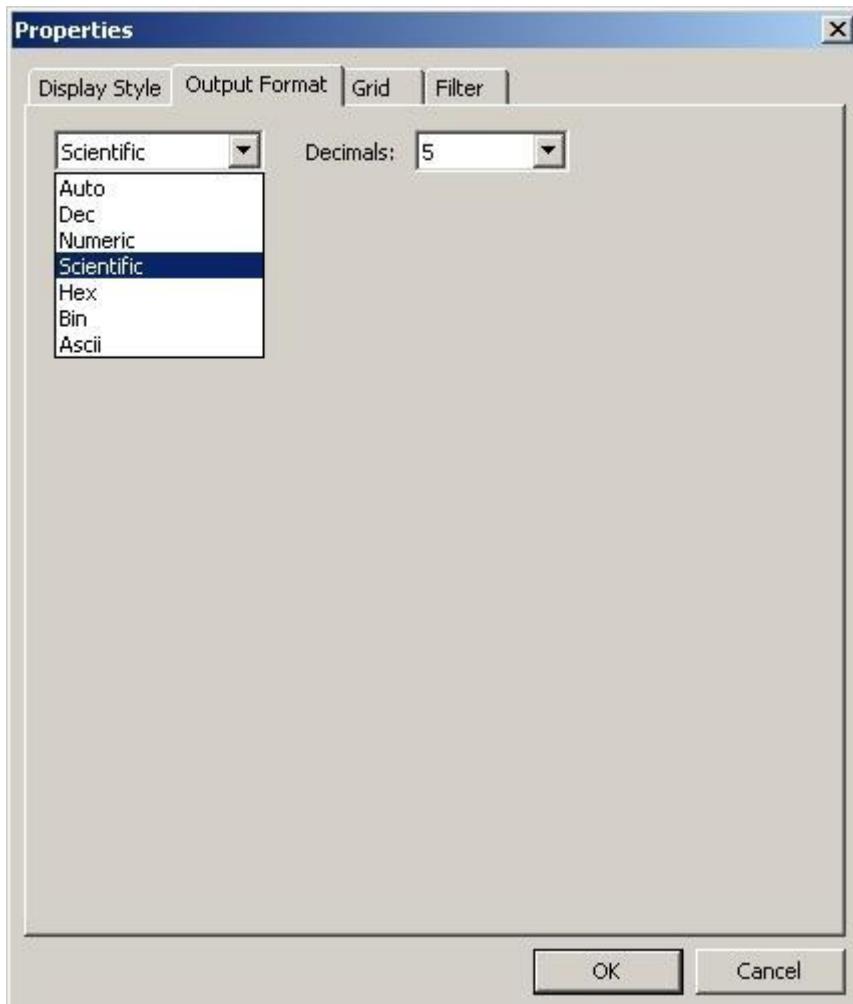
- **Label:** displays the name of the channel. The name of the channel can be edited and can become a math expression if the sign = comes first.
- **Display**
 - **Color:** displays the graphic color of the channel or of the markers. The setting can be modified editing the channel by opening the Channel Properties page where fonts and styles are configured.
 - **Style:** displays the graphic style of the channel. The setting can be modified editing the channel by opening the Channel Properties page where fonts and styles are configured.



- **Enable Custom Font settings:** enables the local font configuration for the selected channels.
 - **Family Font:** sets the font.
 - **Font Dimension:** sets the font size.

- **Scalable:** enables the adapting of the font size in relations to the window size.
- **Line settings**
 - **Style:** sets the style of the graphs line
 - **None:** no line is drawn
 - **Line:** continuous line
 - **Step:** stepped line
 - **Fill Down:** continuous line with colored bottom area
 - **Fill Up:** continuous line with colored top area
 - **Bordered:** bordered continuous line
 - **Weight:** sets the depth of the line in pixel.
 - **Line color:** sets the line color.
 - **Border Color:** color for the line border
- **Marker settings**
 - **Style:** style of the markers, graphic elements used to represent the marker.
 - **None:** no markers are drawn
 - **Dots:** dot
 - **Cross:** cross
 - **Rhomboid:** rhomboid
 - **Square:** square
 - **Arrow Down:** arrow downwards
 - **Arrow Up:** arrow upwards
 - **Vert Line:** vertical line
 - **Horz Line:** horizontal line
 - **Weight:** size (depth) of the markers in pixel.
 - **Marker color:** color of the markers.
- **Box Value section**
 - **Border:** show the border around the box of the cursor value.
- **Unit:** Enables the display of the measurement unit of the channel.

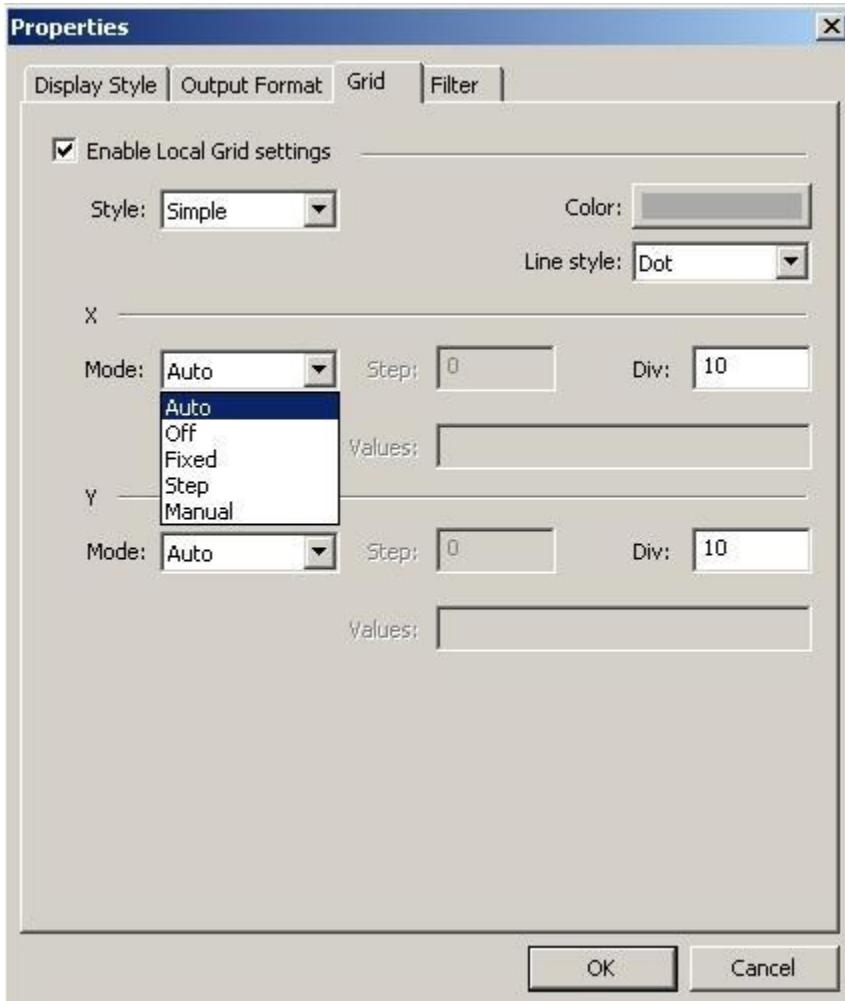
- **Format:** shows the display style of the present channel value. The setting can be modified by opening corresponding configuration window that allows to configure the settings of the display format of the channel values.



In the combo on the left the numeric format is selected, in the combo on the right the quantity of decimals is displayed. Please find to follow the list of the possible formats

- **Auto:** The channel format is kept unchanged.
- **Dec:** The decimal format allows max 5 digits after the comma.
- **Numeric:** The numeric format allows max 15 digits after the comma.
- **Scientific:** the scientific format allows max 15 digits after the format; the result is written in exponential form.
- **Hex:** Hexadecimal format; the decimals cannot be configured.
- **Bin:** Binary format; the decimals cannot be configured.
- **Ascii:** Text format; the decimals cannot be configured

- **Grid:** displays the enabling of a grid specific for the rectangle of the graphic area dedicated to the channel. This window can be configured only for the Ychannel. The window enabling the grid and configuring the parameters is the following:



- **Enable Local Grid settings:** enables the display of the grid with the customized settings.
 - **Style:** sets the style of the grid
 - **Simple:** the grid is formed by continuous lines.
 - **Cross:** the grid is formed by crosses indicating the intersection of the vertical and horizontal divisions.
 - **Color:** color of the grid
 - **Line style:** sets the style of the line of the grid
 - **Solid:** continuous line
 - **Dash:** dashed line
 - **Dot:** dotted line

- **DashDot**: dashed line alternated with 1 dot
- **DashDotDot**: dashed line alternated with 2 dots

- **X**

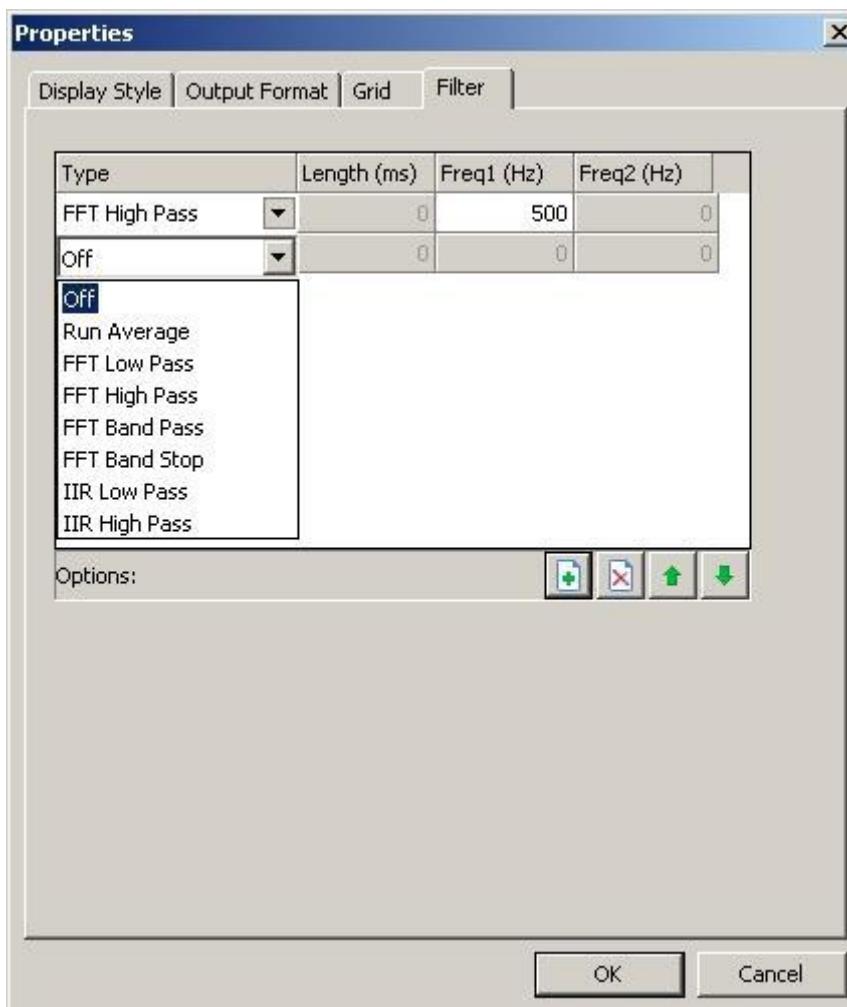
- **Mode**: calculation mode of the horizontal divisions
 - **Auto**, displays an automatic number of equidistant divisions.
 - **Off**, no division is displayed
 - **Fixed**, displays a fixed number of equidistant divisions
 - **Step**, displays the divisions at fixed intervals equal to the Step value.
 - **Manual**, displays the divisions in correspondence with the values on the X axis set by the user in the text box Values.
- **Step**: fixed step to calculate the horizontal divisions (a division for each Step), valid if Mode is set at Step
- **Div**: number of horizontal divisions to be displayed, valid if Mode is set at Auto or Fixed
- **Values**: list of values on the X axis corresponding to the divisions, valid if Mode is set at Custom. The list of values can be added directly in the text box, using as division the character ";"

- **Y**

- **Mode**: calculation mode of the vertical divisions
 - **Auto**, displays an automatic number of equidistant divisions.
 - **Off**, no division is displayed
 - **Fixed**, displays a fixed number of equidistant divisions
 - **Step**, displays the divisions at fixed intervals equal to the Step value.
 - **Manual**, displays the divisions in correspondence with the values on the Y axis set by the user in the text box Values.
- **Step**: fixed step to calculate the vertical divisions (a division for each Step), valid if Mode is set at Step
- **Div**: number of vertical divisions to be displayed, valid if Mode is set at Auto or Fixed
- **Values**: list of values on the Y axis corresponding to the divisions, valid if Mode is set at Custom. The list of values can be added directly in the text box, using as division the character ";"

- **Scale**

- **Local:** enables the automatic display of the Y scale.
- **Min:** sets the minimum channel value.
- **Max:** sets the maximum channel value.
- **Filter:** displays the settings on the filters applied to the channels. The setting can be modified opening the configuration window.



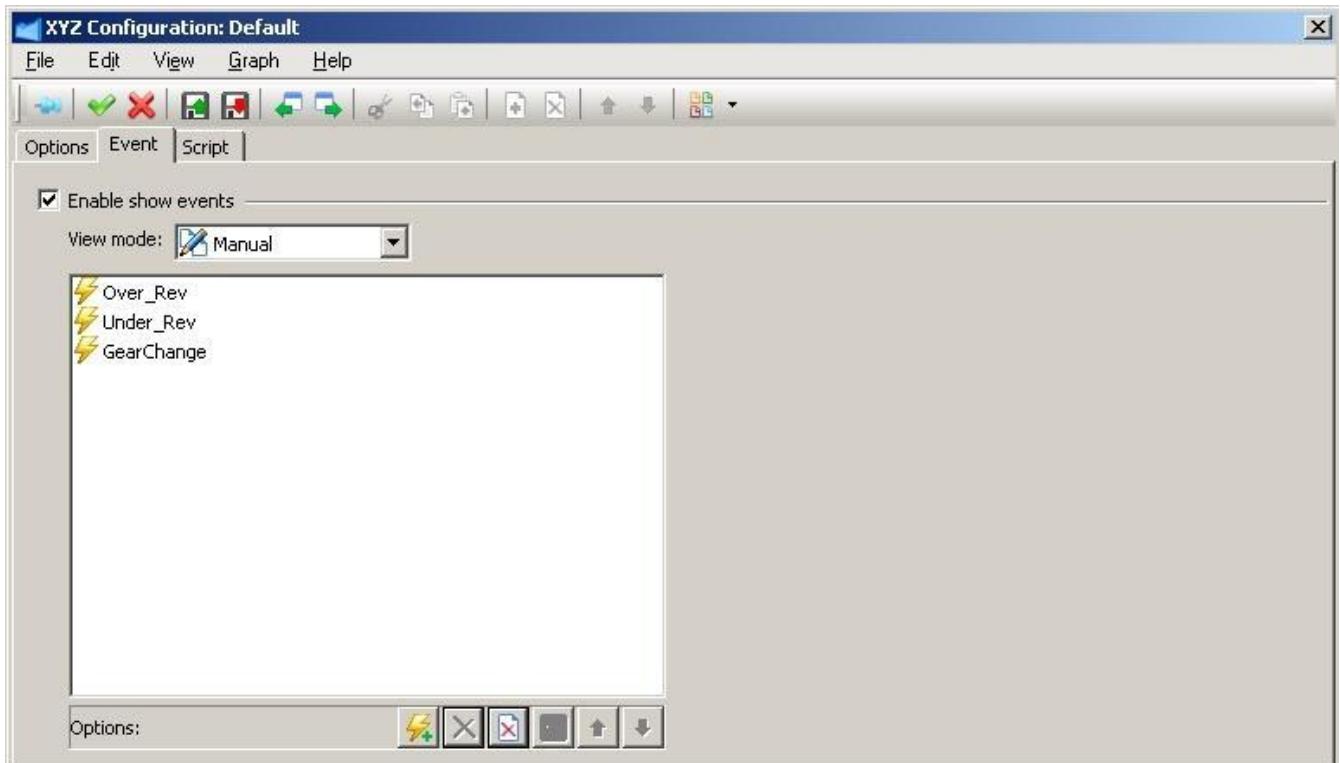
Filters can be added, removed or moved through the buttons in the Options bar. The filters available are:

- **OFF:** Channel values are displayed as logged
- **Run Average:** applies a moving average filter to the channel. Filter length is defined in milliseconds. If set to zero, the filter is not calculated.
- **FFT filters:** applies a combination of frequency domain filters to the channel. The frequency content of the signal in the range(s) defined by the cutoff frequency is set to zero and the data is reconstructed in the time-domain. The four types available are:

- **FFT Low Pass:** maintains frequency content below the cutoff freq. Freq1
- **FFT High Pass:** maintains frequency content above the cutoff freq. Freq1
- **FFT Band Pass:** maintains frequency content in the range $\text{Freq1} < \text{frequency} < \text{Freq2}$
- **FFT Band Stop:** eliminates frequency content in the range $\text{Freq1} < \text{frequency} < \text{Freq2}$
- **IIR Low Pass:** Infinite Impulsive Response Low Pass filter is a recursive filter that maintains frequency content below the cut-off freq
- **IIR High Pass:** Infinite Impulsive Response High Pass filter is a recursive filter that maintains frequency content above the cut-off freq

Event

The **Event** page enables to configure the events linked to the window.



Enable show events: Enables the display of the events.

View Mode: Sets the display mode of the events.

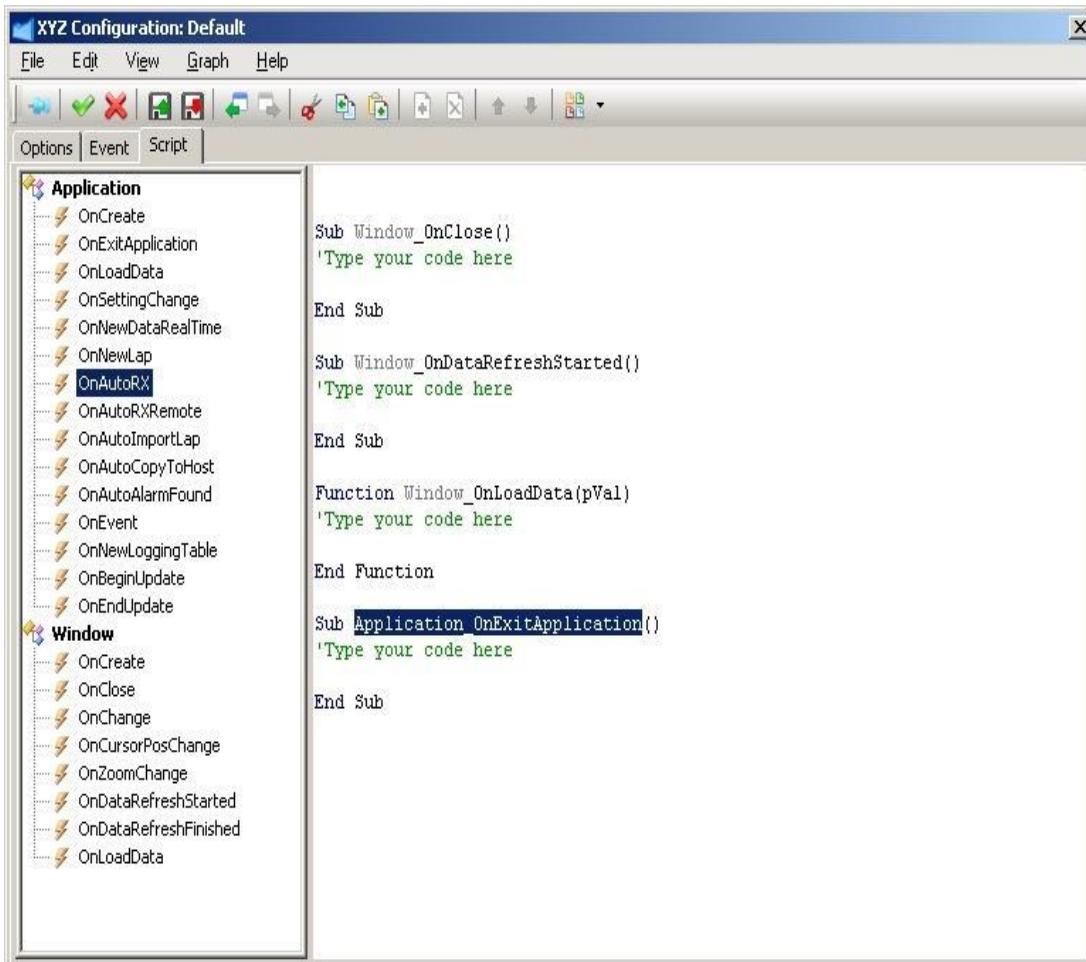
- **All:** all events are displayed.
- **Custom:** only the events selected by the user are displayed.

The list displays the customized events configured by the user.

Each event can be configured using the buttons on the **Options** bar (to add, remove an event, remove all events, modify and move within the list).

Script

The **Script** page enables to configure scripts linked to the events of the **XYZ** window or of the application, in VBScript or JScript.



The section on the left displays the list of the functions available, grouped by Application and Window.

The section on the right displays the code linked to the configured functions.

Menu

The window menu allows the access to the following commands, divided into sub menus:

File Menu

COMMAND	SHORTCUT	DESCRIPTION
Apply	A	Applies the present setting of the window.
Cancel		Closes the window without applying the present settings.
Load		Opens a dialog window to select a configuration file for the xyz window to be loaded.
Save As		Opens a dialog window to select a configuration file for a xyz window to save the current settings.

Edit Menu

COMMAND	SHORTCUT	DESCRIPTION
Cut	Ctrl + X	Copies to clipboard the configurations of the channels selected in the list of the Graphs section and removes them from the Graphs section.
Copy	Ctrl + C	Copies to clipboard the configurations of the channels selected in the list of the Graphs section.
Paste	Ctrl + V	Pastes the configurations of the channels available in clipboard, adding them to the list of the Graphs section.

View Menu

COMMAND	SHORTCUT	DESCRIPTION
Previous page	Ctrl + Shift + Tab	Enables the page of the window previous to the one currently in use.
Next page	Ctrl + Tab	Enables the page of the window next to the one currently in use.

Graph Menu

COMMAND	DESCRIPTION
Add Graph	Adds a new element to the Graphs list of channel configuration.
Remove Graph	Removes from the Graphs list the settings of the selected channels.
Move Up	Moves up by one position the elements selected from the Graphs list.
Move Down	Moves down by one position the elements selected from the Graphs list.

Help Menu

COMMAND	SHORTCUT	DESCRIPTION
Help	F1	Launch the WinTAX4 help, if available.

Toolbar



The toolbar of the **XYZ Configuration** window allows the access to the following commands:

COMMAND	DESCRIPTION
Keep Visible	Enables the Keep Visible mode that allows to keep displayed the configuration window while the application windows are being used.
Cancel	Closes the configuration window without applying the settings (similar to the Cancel command of the File menu).
Apply	Applies the present settings to the configuration of the graphic window (similar to the Apply command of the File menu).
Load	Similar to the Load command of the File menu

Save As	Similar to the Save As command of the File menu
Previous page	Similar to the Previous page command of the View menu
Next page	Similar to the Next page command of the View menu
Cut	Similar to the Cut command of the Edit menu
Copy	Similar to the Copy command of the Edit menu
Paste	Similar to the Paste command of the Edit menu
Add Graph	Similar to the Add Graph command of the Graph menu
Remove Graph	Similar to the Remove Graph command of the Graph menu
Move Up	Similar to the Move Up command of the Graph menu
Move Down	Similar to the Move Down command of the Graph menu
Channel Browser	Displays the pop-up menu to select the page in the Channel Browser window 

Pop-up Menu

The pop-up menu of the **XYZ Configuration** window can be displayed by clicking the right button of the mouse on the Options page.



The pop-up menu of the **XYZ Configuration** window allows the access to the following commands:

COMMAND	DESCRIPTION
Cut	Similar to the Cut command of the Edit menu
Copy	Similar to the Copy command of the Edit menu
Paste	Similar to the Paste command of the Edit menu
Add Graph	Similar to the Add Graph command of the Graph menu
Remove Graph	Similar to the Remove Graph command of the Graph menu
Move Up	Similar to the Move Up command of the Graph menu
Move Down	Similar to the Move Down command of the Graph menu
Restore Default	Sets in the channel the settings configured in the Channel Parameters.
Set As Default	Configures the settings of the channel in the Channel Parameters

Functions

The **XYZ** window has the following functions:

- Cursor
- Graph Layout
- Display of the elements
- Zoom
- Selection of rectangles in the graphic area
- Analysis

Cursor

The cursor is represented by a vertical and a horizontal line on the graphic area. It allows to scroll all values in the range of the X scale and of the Y scale, up-dating the corresponding channels values in the info boxes.

The cursor can be moved in the graphic area moving the mouse by pressing the left button; if the Best Fit analysis are not enabled, the cursor stays on the polynomial curve created.

Graph Layout

The Layout function enables to modify the vertical arrangement of the Y in Manual or Overlay. The function is accessible through the **Graph Layout** command in Options Menu or in popup menu or toolbar or in the configuration window. In Overlay mode the Y scale is displayed on the whole vertical area available; otherwise the user can determine the area to be dedicated to the scales. This operation can be carried out by clicking with mouse on the scale to display the squares selections that if selected allow to narrow, enlarge, move the scale. The area enabled to carry out this operation is identified by the change of the mouse cursor.

Display of the elements

The elements of a window can be shown or hidden by enabling the View command on the Options menu or on the pop-up menu.

Zoom

The zoom enables to display detailed sections of the graphic area.

To zoom, please choose one of the following possibilities:

- select a rectangle in the graphic area and select the Zoom command from the pop-up menu displayed by clicking the right button of the mouse.
- Zoom Out, Zoom In, Zoom Min, Zoom Max commands from the pop-up menu or from the toolbar.

To scroll the displayed area in detail by zooming, please chose one of the following possibilities:

- drag the zoom bars with the mouse, clicking the left button,
- enable the Pan mode from the pop-up menu commands or form the icon on the toolbar, and move the mouse clicking the left button. Another way to enable the panning is to press the CTRL button and move the mouse clicking the left button.

Selection of rectangles in the graphic area

Rectangles in the graphic area can be selected by dragging the mouse and clicking the right button.

During this operation, the selected rectangle is displayed and the rectangle information of the X axis range and of the zoom percentage on the Y axis are displayed.

Analysis

Best Fit: displays the curve corresponding to the interpolation of the observations of the X channel with the Y channel. The interpolation corresponds to a polynomial function with a configurable degree. The cursor movement, if a Best Fit corner is visible, follows the displayed corner.

The interpolation degree used for Best Fit is displayed in a text box below the name of the Y channel.

The coefficients used for the Best Fit interpolation can be displayed in the **Best Fit coefficients** window that can be displayed through the Best Fit Information command of the Options menu or of the toolbar.

Interpolation: the sampling frequency of each channel configured on the Y axis can be modified.

Condition: when a condition is present, only the points complying with this condition are displayed.

Commands

The main commands available in the **XYZ** window can be enabled through

- the **Options** menu in the main menu of the application
- the buttons of the dedicated **Toolbar**,
- **Pop-up menu**, can be displayed by clicking with the right button of the mouse on the graphic area of the window, on the Info boxes or on the Y scales of the selected channels.
- **Keyboard shortcuts**

Options Menu

The **Options** menu for the **XYZ** windows enables the access to the following commands:



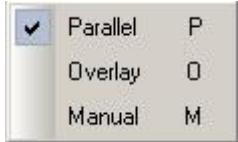
COMMAND	SHORTCUT	DESCRIPTION
Remove Graphs	Delete	Removes from the window the currently selected channels
Clear Selections		De-select possible channels selected in the window.
Select All Channels	Ctrl + A	Select all channels in the window.
View		Shows the pop-up sub menu to select the graphic elements of the window that can be shown or hidden. The displayed elements are highlighted with a check mark on the left. Show All & Hide All visualize and hide all elements respectively.
Best Fit Information		Opens a window visualizing the coefficients value of the polynomial curve representing the Best Fit.
Properties	E	Opens the interface to configure the XYZ window.

Toolbar

The toolbar of the **XYZ** window allows the access to the following commands:



COMMAND	SHORTCUT	DESCRIPTION
Load		Opens a window to select a configuration file corresponding to a XYZ window.
Save		Saves the window present configuration on a file.
Properties	E	See the description of the command in the Options Table.
Zoom In	+	Enlarges the graphic area in relations to the X axis, visualizing in a better detail the range around the present position of the cursor (see also the Zoom functions).
Zoom Out	-	Operation opposite to the Zoom In in the window graphic: it displays in less details than the X axis the range around the present position of the cursor (see also the Zoom functions).
Minimum Zoom	Ctrl + -	Visualizes the graphic area in relation to the whole X axis (see also the Zoom functions).
Pan		Enables the Pan mode to move the displayed zoom area (see also the Zoom functions).
Zoom undo		Visualizes in a pop-up menu the list of the zooming operations before the present visualization. By selecting an item from the list, the visualization of the widow previous following the zooming operation is enabled (see also the Zoom functions).
Zoom redo		Visualizes in a pop-up menu the list of the zooming operations following the present visualization. By selecting an item from the list, the visualization of the widow previous following the zooming operation is enabled (see also the Zoom functions).

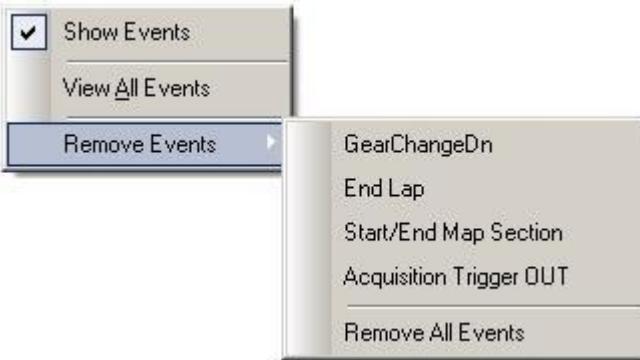
Graph Layout	P O M	Displays the sub menu to select the vertical arrangement mode of the channels (Parallel, Overlay, Manual)
		
		the selected mode is highlighted with a check mark
View		See the description of the command in the Options Table.
Show/Hide events	Alt + Ctrl + E	Enables or disables the visualization of the event on the window.
Best Fit Information		See the description of the command in the Options Table.
DataSets		Visualizes the list of the Datasets available to chose the one to be enabled.

Pop-up menu

By clicking with the right button of the mouse on the graphic area of the window, the following pop-up menu is displayed:



All commands have already been described previously except Events.

COMMAND	DESCRIPTION
Events	<p>Shows the operations linked to the events;</p>  <p>It's a dynamic menu and it can be modified according to the situation. In the example in the figure the following commands are listed:</p> <ul style="list-style-type: none"> • Show Events Enables the display of the events configured in the window • View All Events (View Custom Events) shows all events (only the configured events) in the window. • Remove Events Opens a sub menu to select the event to be removed; all events can be removed. The removal is intended linked to the display of the event in the window and not to the cancellation of the event.

By clicking with the right button of the mouse on an Info box or on the Y Scale of a channel, the following pop-up menu is displayed containing the following commands:



All commands have already been described previously.

Keyboard Shortcut

To see the complete list of shortcuts available for the graph window, see related chapter.

Below are listed those shortcuts that do not appear in any of the commands and of the toolbar buttons described before. These commands can be executed only from keyboard. All these commands are not customizable.

SHORTCUT	DESCRIPTION
Esc	Cancel zoom operation
Tab	Select next channel in current window
Delete	Remove selected channels

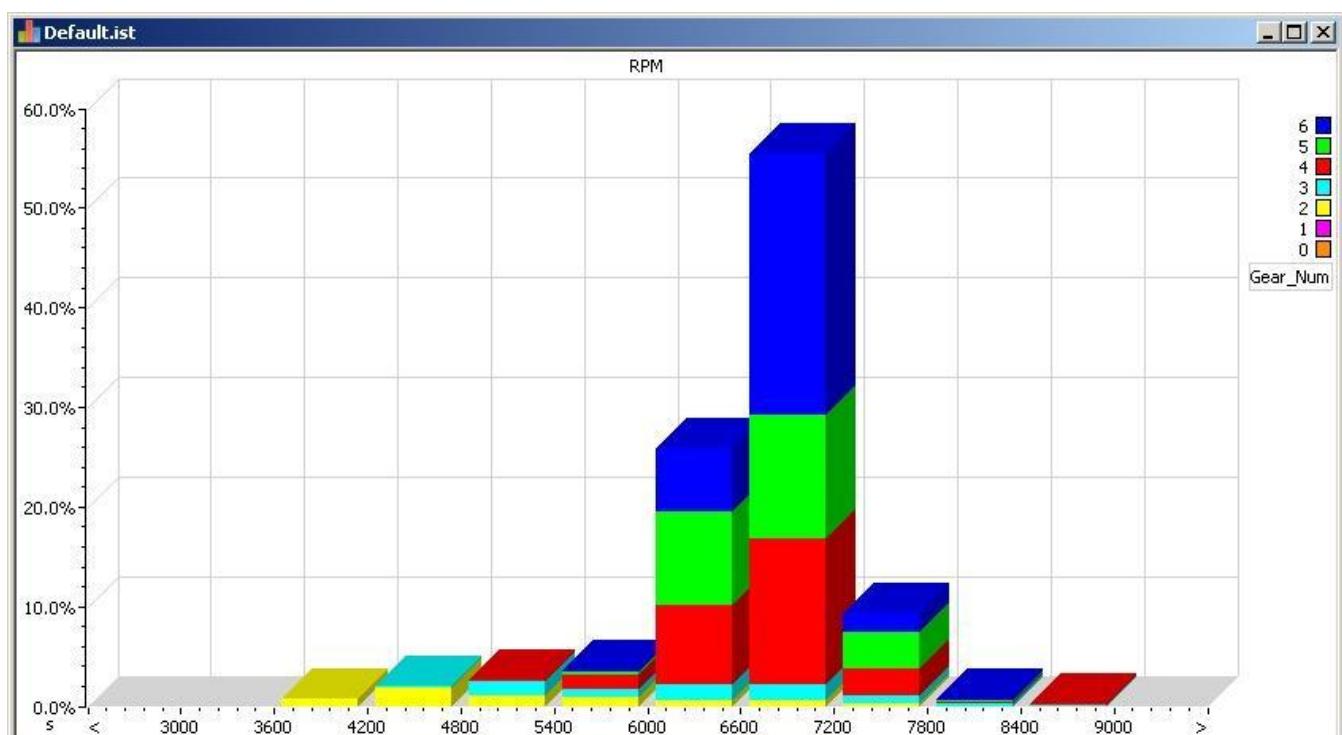
Histogram Window

The Histogram window shows a histogram deriving from the associated channel and from the configurations. The histogram displayed in the window divides automatically or manually the channel into values ranges and graphically shows for how long or for how many meters the value of the channel is contained in each range.

The histogram can be limited by adding a Condition in the configuration. The time or distance range related to the histogram is linked to the zoom on the active **Graph** window.

A Histogram window can show just one channel at a time but it can manage compared laps by listing more columns with different colors in the same range taken into account.

In some licenses it's possible to configure a second channel, called colour channel which shows colour strips inside histogram bands and represents the distributions of values of the second channel in each interval of the main channel



Elements of the window



Graphic Area

The Histogram window shows the distribution of a channel against time or distance. Each column has a label indicating its value or the percentage value.

A Grid can be optionally displayed. The display of labels is optional too.

Colored strips can be optionally displayed inside column, showing the distribution of a second channel.

If selected mode is Table, the graphic area became a report like in the following image.

Histogram_Histogram.ist												
Sinusoid	< -1.000	-1.000 - -0.700	-0.700 - -0.400	-0.400 - -0.100	-0.100 - 0.200	0.200 - 0.500	0.500 - 0.800	0.800 - 1.100	1.100 - 1.400	1.400 - 1.700	1.700 - 2.000	> 2.000
[1] TestData Test driver Car_001 1 1	0.00s	22.80s	10.40s	8.90s	8.65s	9.25s	11.55s	18.45s	0.00s	0.00s	0.00s	0.00s
[2] TestData Test driver Car_001 1 1	0.00s	0.00s	0.00s	0.00s	18.50s	11.50s	9.30s	8.55s	8.90s	10.40s	22.85s	0.00s
[3] TestData Test driver Car_001 1 1	0.00s	22.80s	10.40s	8.90s	8.65s	9.25s	11.55s	18.45s	0.00s	0.00s	0.00s	0.00s

Y Scale

The values (or percent values) of times or distances are displayed as ticks of Y Scale.

X Scale

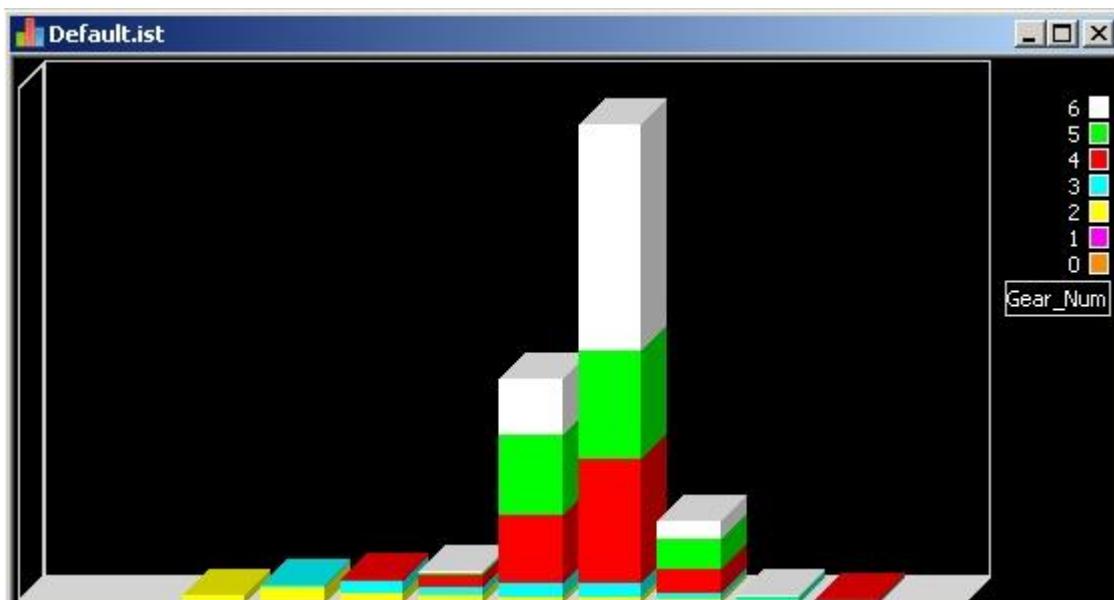
The scale of the ranges in which the channel is divided is displayed in the area of the X Scale.

Time or Distance

The unit (**s** for seconds or **m** for meters) in which the channel is displayed.

Z Scale

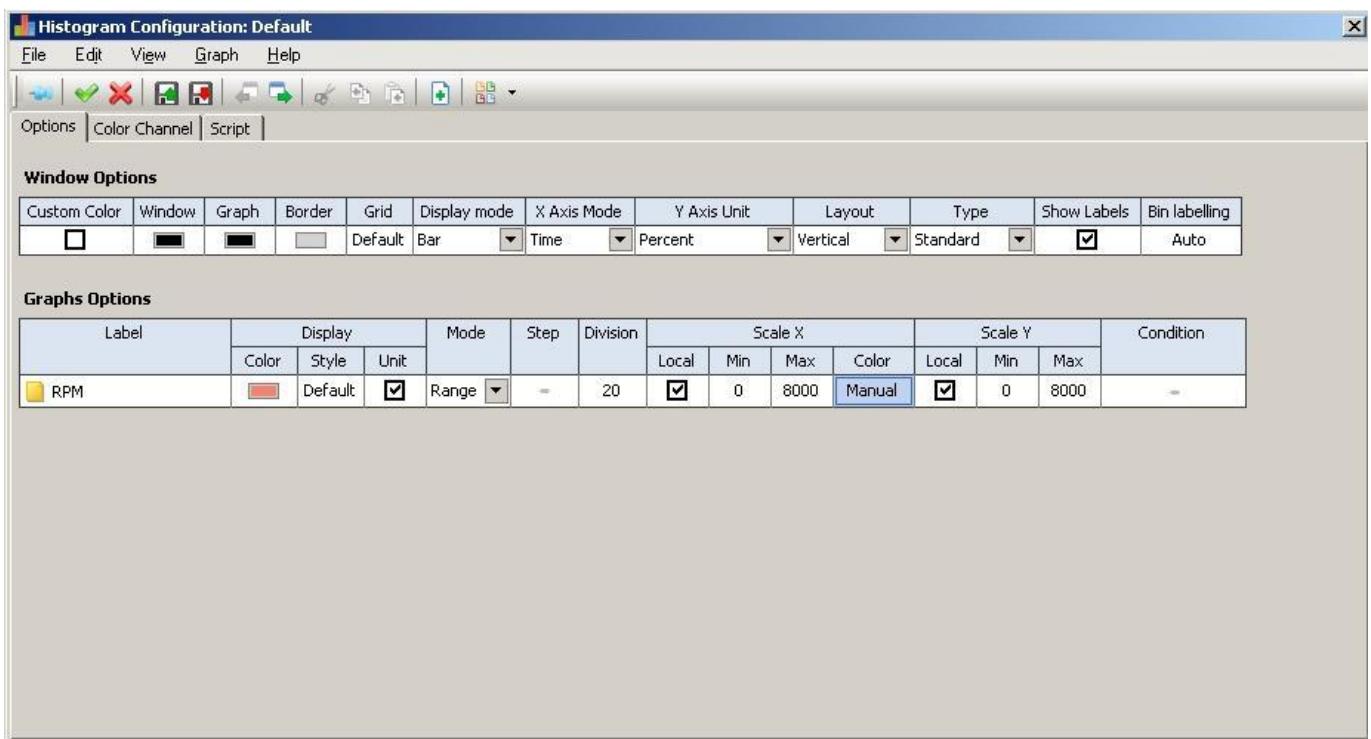
The scale of the color channel.



Histogram Window Configuration

The **Histogram Configuration** window enables to configure the appearance of **Histogram** window; as for all other window it includes the pages **Options**, **Colour Channels**, **Script**.

The window has also a "main menu", a toolbar and a "pop-up menu" that allow to configure and manage the commands of the window itself.



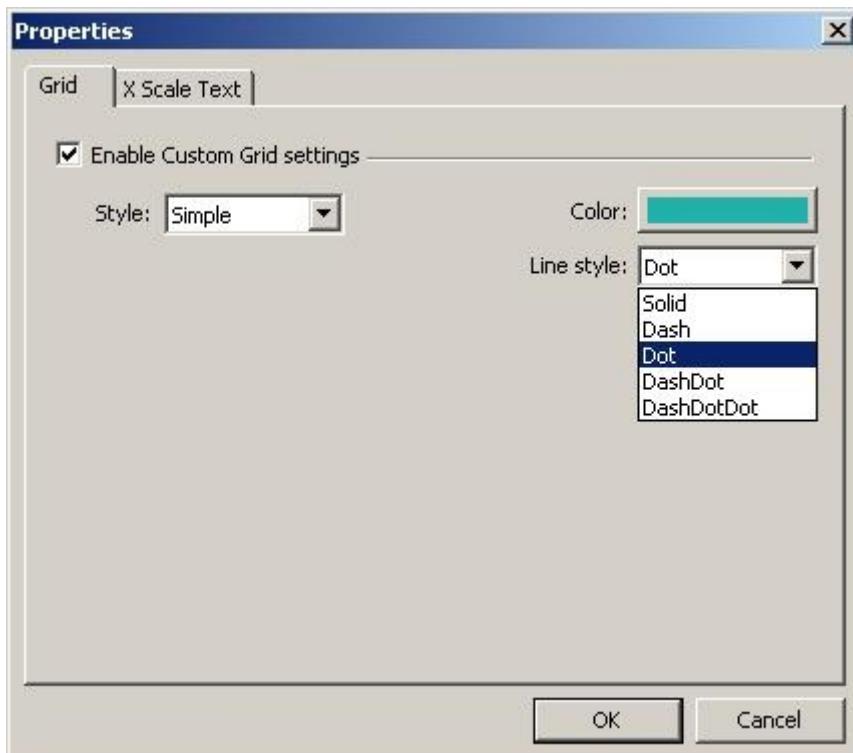
Options

The **Options** page enables to configure the aspect of the **Histogram** window and it is divided in 2 sections: **Window** and **Graph**.

Window Options

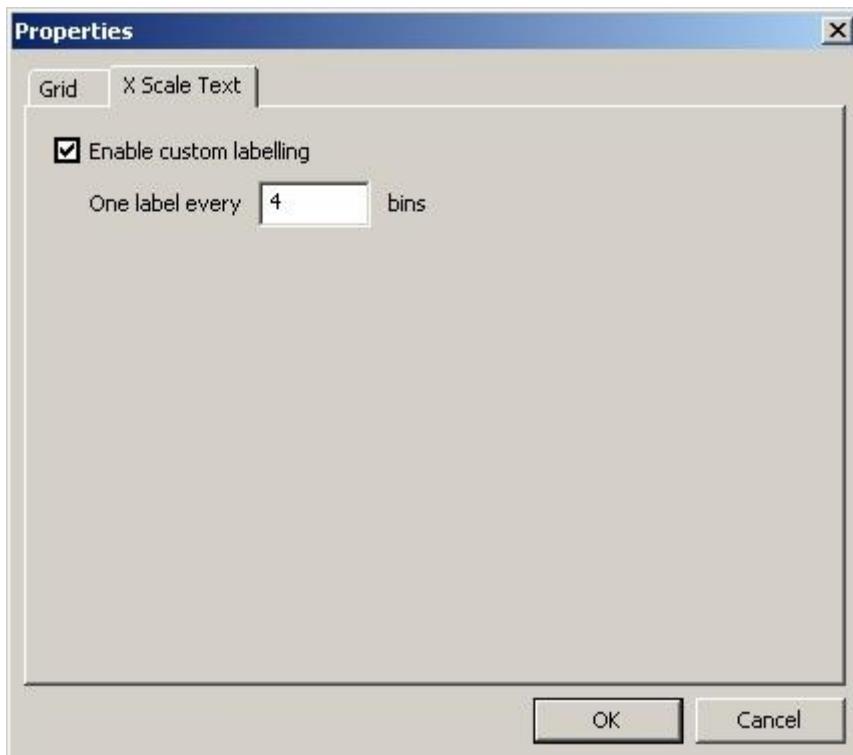
It allows to configure the general setting of the window.

- **Custom color:** allows to define local colors.
- **Window:** sets the background color of the window.
- **Graph:** sets the background color of the graphic area.
- **Border:** sets the borders color of the areas of the window.
- **Grid:** allows to define local grid



- **Enable:** enables the display of the grid with the customized settings.
- **Style:** sets the style of the grid
 - **Simple:** the grid is formed by continuous lines.
 - **Cross:** the grid is formed by crosses indicating the intersection of the vertical and horizontal divisions.
- **Color:** color of the grid
- **Line style:** sets the style of the line of the grid (valid if the Style Simple is set)
 - **Solid:** continuous line
 - **Dash:** dashed line
 - **Dot:** dotted line
 - **DashDot:** dashed line alternated with 1 dot
 - **DashDotDot:** dashed line alternated with 2 dots
- **Display Mode:** style types for bars. Solid Bar, Solid Bar 3D, Line, Table.
- **X Axis Mode:** sets the base for the x-axis, Distance or Time.
- **Y Axis Unit:** sets the display mode for bars values: unit, percent or mixed.
- **Layout:** sets the layout of the window: vertical or horizontal.
- **Type:** sets the layout of calculous: standard or cumulative.

- **Show Label:** Show or hide the labels.
- **Bin Labeling:** allow to configure the labeling of X Axis

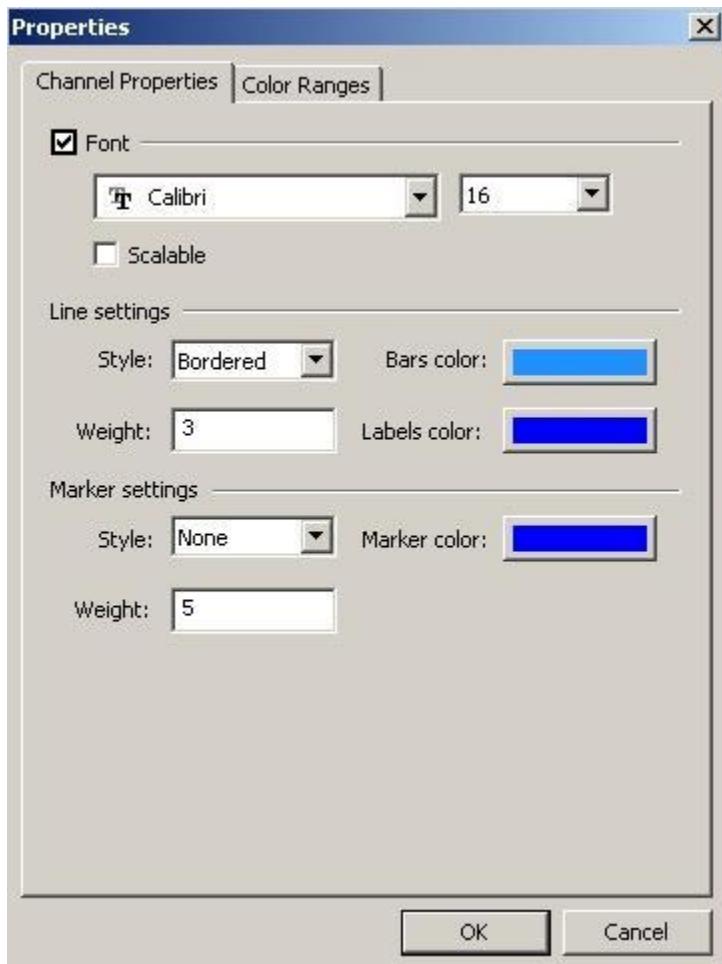


- **Enable custom labeling:** If unchecked, the window uses an automatic labeling system based on space occupation. If checked, you can select the number of labels to display.

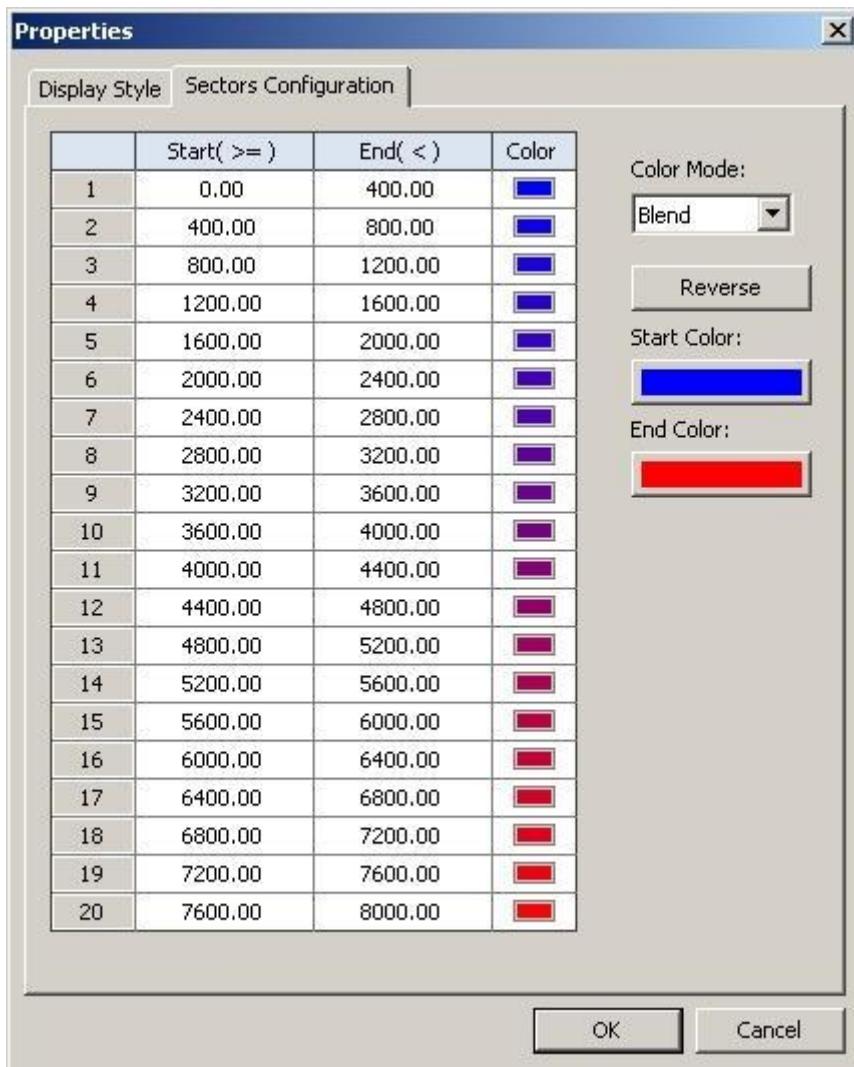
Graphs Options

It allows to configure the specific setting for each channel to be displayed. Multiple selections are possible via CTRL + SHIFT.

- **Label:** displays the name of the channel. The name of the channel can be edited and can become a math expression if a = sign comes first.
- **Display:**
 - **Color:** sets the color of the columns of the histogram; the colors of each column can be modified manually.
 - **Style:** sets the style for line. Color, line weight, line type (line, dashed line), Markers styles



- **Unit:** show/hide measurement unit
- **Mode:** Allows choosing between the Value and Range mode.
 - In Value mode the number of ranges is not set and derives from the ratio (Max - Min)/Step. If Auto Scale X is checked, Max and Min are calculated runtime.
 - In Range mode the number of ranges is fixed and can be set in the Division field; in this case the Step varies because the bounds are always Max and Min; in fact Step = (Max - Min)/Divisions.
- **Step:** step is the length of the single bin and can be configured only in Value mode.
- **Division:** quantity of divisions according to which the distribution of the number of samples is calculated. It can be configured only in Range mode. The minimum number of division is 1 and the maximum could be 32 or 256, depends on license.
- **Scale X**
 - **Local:** Auto/Manual mode for x-axis.
 - **Min:** sets the minimum value of the X manual scale.
 - **Max:** sets the maximum value of the X manual scale.
 - **Color Mode:** permits to configure the color of bins with the following window.



In all modes, except solid, the configuration of the channels values occurs in the same way: if Local is checked, the intervals are automatically recalculated from the minimum and the maximum values configured; if Local is unchecked, only the number of intervals and the correspondents color are created.

The opening mode of a window by default is Solid.

- **Color Mode**

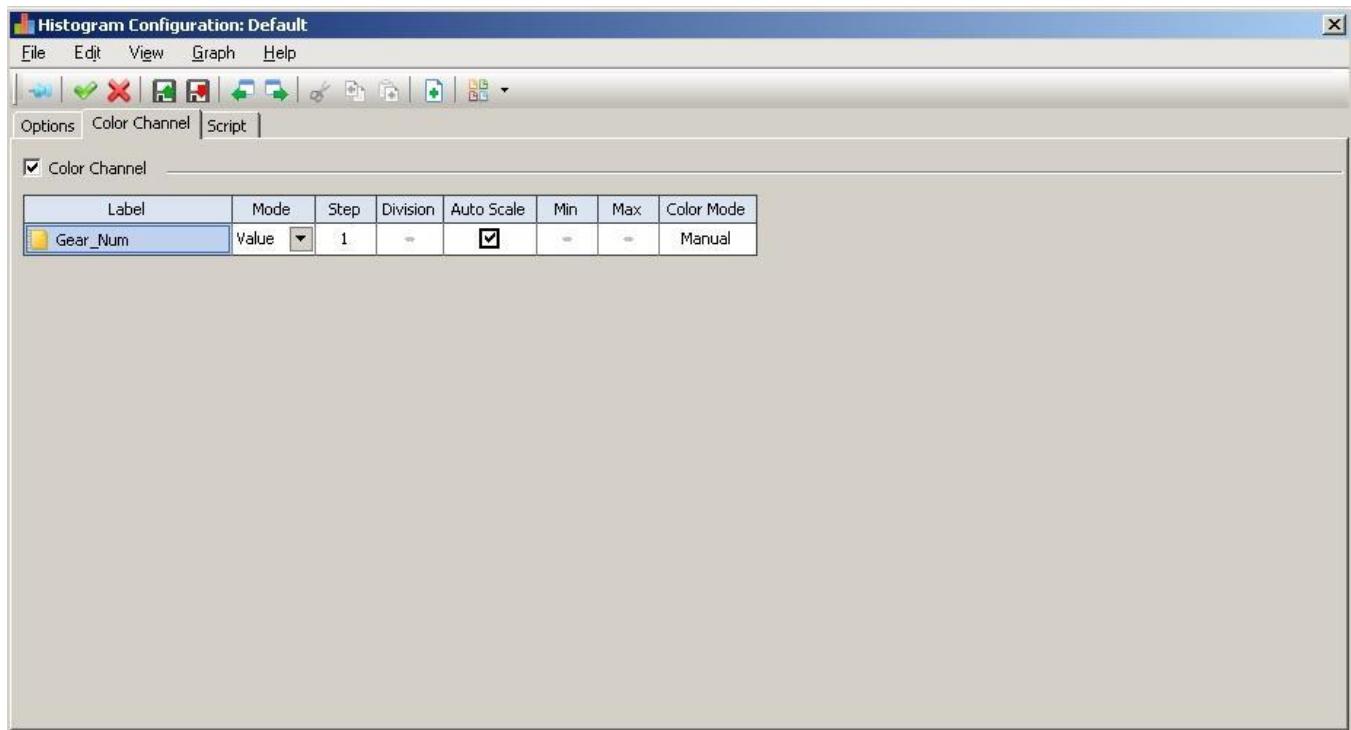
- **Manual:** If Manual is selected, the window generate a group of default colors.
- **Gradient:** If Gradient is selected, the button Color is used to choose the base color of gradation.
- **Blend:** If Blend is selected, the buttons Start color and End color are used to choose the start and the end colors of blend.
- **Solid:** If Solid is selected, this window is empty and bins use a unique color, settings in Color option.

- **Reverse button:** This button reverses the order of the colors.

- **Color:** If Gradation is selected, the button is used to choose the base color of gradation.
- **Start Color:** The start color in blend mode.
- **End Color:** The end color in blend mode.
- **Scale Y**
 - **Local:** Auto/Manual mode for y-axis.
 - **Min:** sets the minimum value of the Y manual scale.
 - **Max:** sets the maximum value of the Y manual scale.
- **Condition:** sets a Condition that is used to limit the calculation of the histogram for those values under which the condition is TRUE.

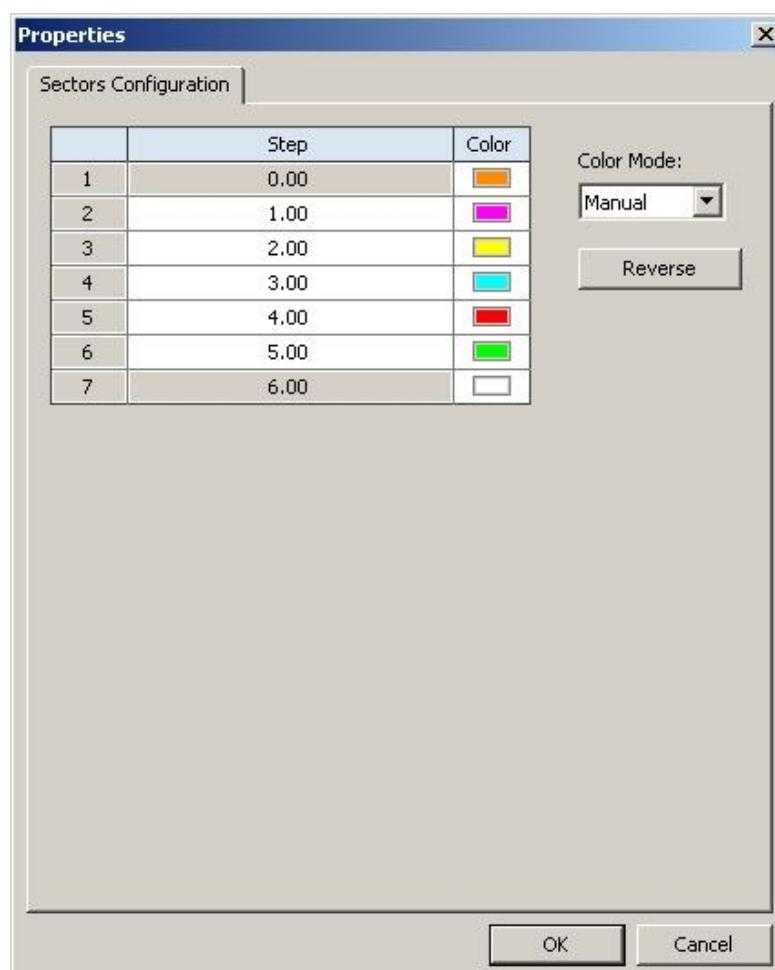
Page Colour Channel

The **Colour Channel** page enables to configure the aspect of the channel showed as color strips in histogram bands.



- **Color Channel:** Enable the configuration of the color channel. When unchecked, the histogram doesn't show any coloured strips.
- **Label:** displays the name of the channel. The name of the channel can be edited and can become a math expression if a = sign comes first.
- **Mode:** Allows choosing between the Value and Range mode.

- In Value mode the number of ranges is not set and derives from the ratio (Max - Min)/Step. This mode shows only the calculated value and not the whole range between two calculated values.
- In Range mode the number of ranges is fixed and can be set in the Division field; in this mode Step = (Max - Min)/Division.
- **Step:** the length of each interval in Values mode.
- **Division:** quantity of ranges according to which the number of coloured strips are calculated [1: 10]
- **Auto Scale:** Auto/Manual mode for color channel.
- **Min:** sets the minimum value of the color channel manual scale.
- **Max:** sets the maximum value of the color channel manual scale.
- **Color Mode:** Opens the page Sectors Configuration.
 - **Color Mode:** In the rows of the start-end-color grid it's always possible to manually configure the colors. Otherwise color can be sets with Color Mode combo. If Manual is selected, the window generate a group of default colors.



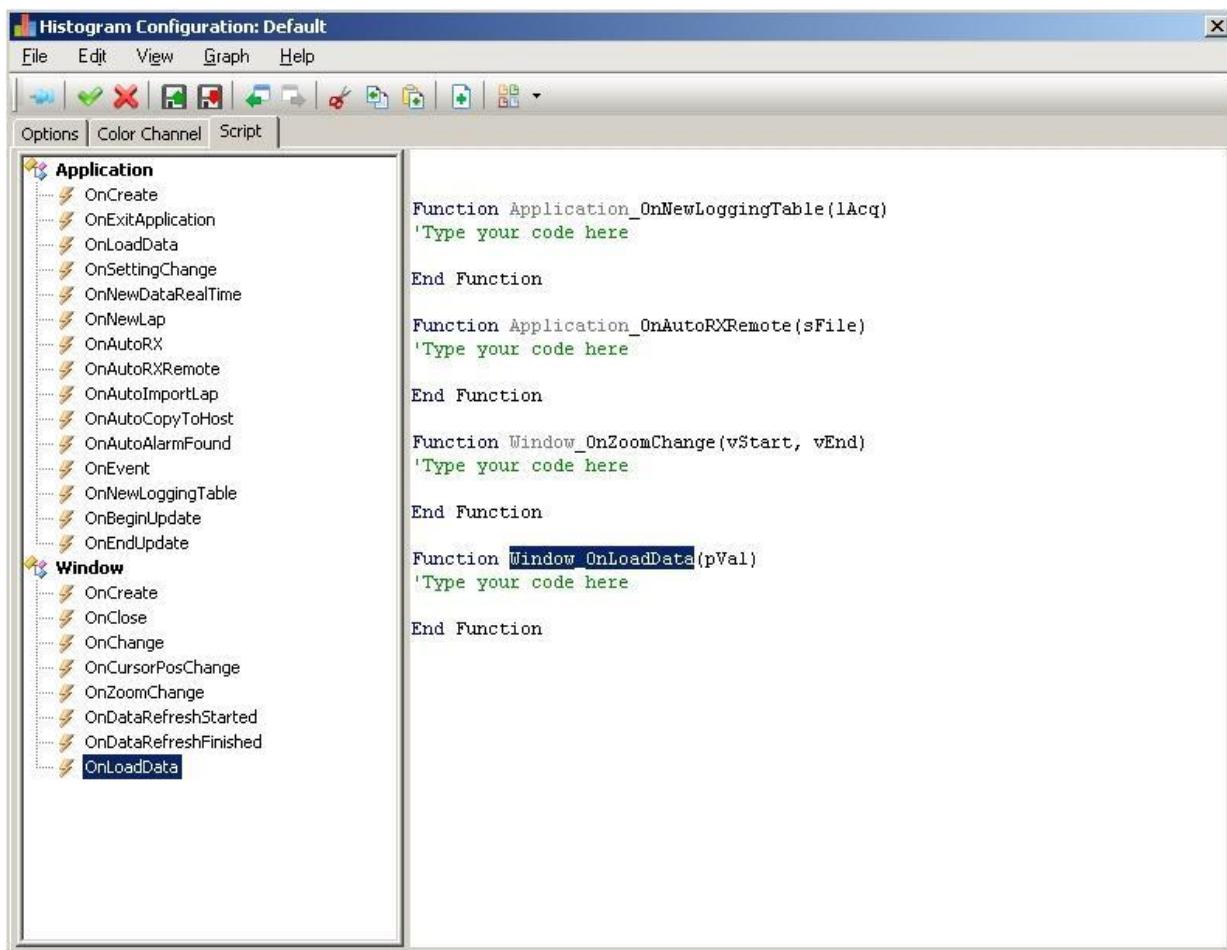
The opening mode of a window by default is Manual.

- **Color Mode**

- **Manual:** If Manual is selected, the window generate a group of default colors.
- **Gradient:** If Gradation is selected, the button Color is used to choose the base color of gradation.
- **Blend:** If Blend is selected, the buttons Start color and End color are used to choose the start and the end colors of blend.
- **Reverse button:** This button reverses the order of the colors.
- **Color:** If Gradation is selected, the button is used to choose the base color of gradation.
- **Start Color:** The start color in blend mode.
- **End Color:** The end color in blend mode.

Script

The **Script** page allows to configure scripts linked to the events of the **Histogram** window or application in VBScript or JScript.



The section on the left shows the list of the functions available, grouped by Application and Window. The section on the right shows the code corresponding to the functions set.

Menu

The window Menu allows the access to the following commands, divided into sub menus:

File Menu

COMMAND	SHORTCUT	DESCRIPTION
Apply	A	Applies the present settings of the window.
Cancel		Closes the window without applying the present settings
Load		Opens a dialogue window to select a configuration file to be loaded.
Save As		Opens a dialogue window to select a configuration file on which the present settings can be saved.

Edit Menu

COMMAND	SHORTCUT	DESCRIPTION
Cut	Ctrl + X	Enabled only on Script page. Copies to clipboard the selected text and removes it from script edit box.
Copy	Ctrl + C	Enabled only on Script page. Copies to clipboard the selected text.
Paste	Ctrl + V	Enabled only on Script page. Pastes the text from the clipboard in the script edit box.

View Menu

COMMAND	SHORTCUT	DESCRIPTION
Previous page	Ctrl + Shift + Tab	Enables the page of the window previous to the current one.
Next page	Ctrl + Tab	Enables the page of the window next to the current one.

Help Menu

COMMAND	SHORTCUT	DESCRIPTION
Help	F1	Launch the WinTAX4 help, if available.

Toolbar



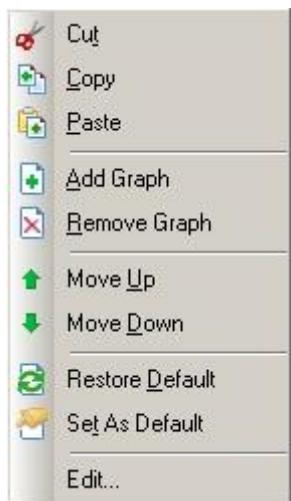
The toolbar of the window enables the access to the following commands:

COMMAND	DESCRIPTION
Keep Visible	Enables the Keep Visible mode that allows to keep visualized the configuration window while the application windows are being used.
Cancel	Closes the configuration window without applying the settings (similar to the Cancel command of the File menu).
Apply	Applies the present settings to the configuration of the graphic window (similar to the Apply command of the File menu).
Load	Similar to the Load command of the File menu
Save As	Similar to the Save As command of the File menu
Previous page	Similar to the Previous page command of the View menu
Next page	Similar to the Next page command of the View menu
Cut	Similar to the Cut command of the Edit menu
Copy	Similar to the Copy command of the Edit menu

Paste	Similar to the Paste command of the Edit menu
Channel Browser	Shows the pop-up menu to select the page in the Channel Browser window 

Pop-up Menu

The pop-up menu of the window can be displayed by clicking with the right button of the mouse on the Options page.



The pop-up menu allows the access to the following commands:

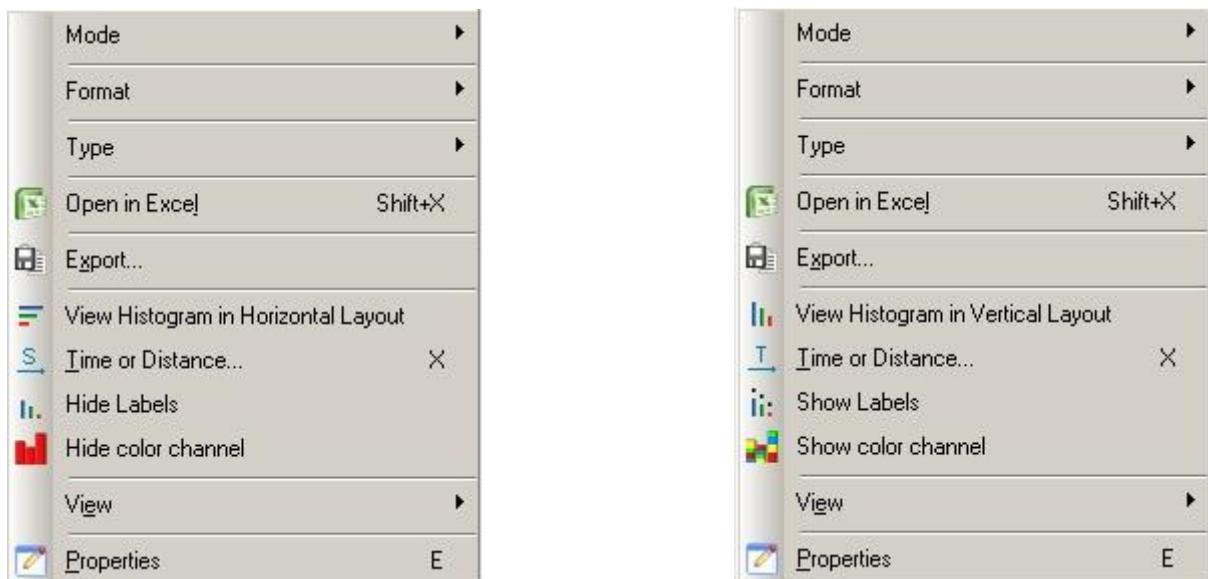
COMMAND	DESCRIPTION
Cut	Similar to the Cut command of the Edit menu
Copy	Similar to the Copy command of the Edit menu
Paste	Similar to the Paste command of the Edit menu
Add Graph	Similar to the Add Graph command of the Graph menu
Remove Graph	Similar to the Remove Graph command of the Graph menu
Move Up	Similar to the Move Up command of the Graph menu
Move Down	Similar to the Move Down command of the Graph menu
Restore Default	Sets in the channel the settings configured in the Channel Parameters
Set As Default	Configures the settings of the channel in the Channel Parameters
Edit...	Enables to edit the selected parameter (similar to the double click)

Commands

The main commands available in the **Histogram** window can be enabled through

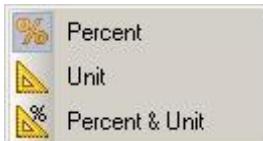
- the **Options** menu on the main menu of the application
- the buttons of the dedicated **Toolbar**,
- **Pop-up menu**, that can be displayed by clicking with the right button of the mouse in the graphic area of the window, on the Info boxes or on the Y scales of the selected channels.
- **Keyboard shortcuts**

Options Menu



The Options menu allows the access to the following commands:

COMMAND	SHORTCUT	DESCRIPTION
Mode		Displays the sub menu to select the graph mode (Solid bar, Solid bar 3D, Line, Table) 
Format		Displays the sub menu to select the format mode

		<ul style="list-style-type: none"> Percent: show the values in percent Unit: show the values in unit Percent & Unit: Mixed mode; there are two parallel scales in the left side on Solid Bar mode and one scale in the left side and another one in the right side on Bar Mode. 
Type		<p>Displays the sub menu to select the type</p> <ul style="list-style-type: none"> Standard: With this type selected, each column shows its value. Cumulative: With this type selected, each column of the histogram sum to its value the value of the previous columns. 
Open in Excel	Shift + X	Opens an Excel sheet with the values of the channel for each range taking also the into account possible comparisons.
Export		Exports all values of the displayed channel in a window to an ASCII file.
View Histogram in Horizontal/Vertical Layout		Switch the chart type between columns (vertical) and bars (horizontal).
Time or Distance	X	Switch the histogram elaboration mode between time and distance.
Hide/Show Labels		Show or hide the histogram labels
Hide/Show color channel		Show or hide the strips of the colour channel.

View		Displays the pop-up sub menu to select the graphic elements of the window that can be shown or hidden. The displayed elements are highlighted by a check mark on the left. Show All & Hide All show and hide all elements, respectively.
Properties	E	Opens the interface to configure the window.

Toolbar



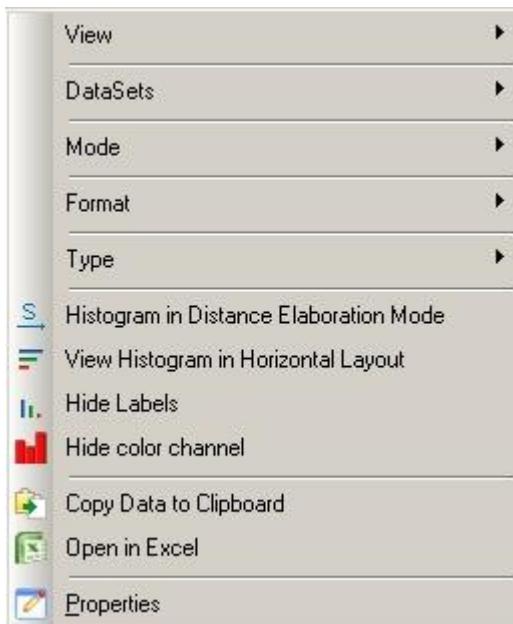
The toolbar enables the following commands:

COMMAND	SHORTCUT	DESCRIPTION
Load		Opens a window to select a configuration file.
Save		Saves the present window configuration on a file.
Properties	E	See the description of the command in the Options Table.
Export		See the description of the command in the Options Table.
View		See the description of the command in the Options Table.
Show/Hide All Scales Y		Displays / hides the Y scales in all windows where they appear.
Solid bar		Select solid bar mode
Solid bar 3D		Select solid bar 3d mode
Line		Select line mode

Table		Select table mode
Time or Distance	X	See the description of the command in the Options Table.
Percent		Select percent format
Unit		Select unit format
Unit & percent		Select unit & percent format
Standard		Select standard type
Cumulative		Select cumulative type
Horizontal		Select horizontal layout
Vertical		Select vertical layout
Hide/Show Labels		See the description of the command in the Options Table.
Hide/Show color channel		See the description of the command in the Options Table.
DataSets		Shows the list of the available Dataset and allows to choose the Dataset to be enabled or disabled.

Pop-up menu

By clicking with the right button of the mouse on the graphic area of the window, the following pop-up menu is displayed:



This section will describe the commands that have not already been described previously.

COMMAND	SHORTCUT	DESCRIPTION
Copy data to clipboard	Ctrl + Shift + C	Copies to the clipboard of Windows the channel values for each range taking also into account possible comparisons.

Channels Window

Allow user to create a window displaying the alphanumeric data of all the acquired or virtual channels. The channel name and data value at the current cursor position on graphic windows are displayed. The cursor may be positioned by clicking with the mouse at the desired position. By holding down the left mouse button the cursor will move along the graph and relative values will be updated.

In real time, it displays the runtime value of channels.

The display mode can be configured to display all channels, a custom list or a whole group of channels.

Elements of the window

Default.chn - View: Manual		
FuelCons	GearBarrel	
39.48	4.959	
FuelConsLap	GIP_AccX	
1.51	0.024	
FuelLevelReset	amplfilter_s	
0	6562	
FuelResetSW	RPM	
0	6563	
FuelTank	Gear_Num	
-19.48	6	
Gear	Acc_X	
54	0.10	
Gear_Num	EngineRunTimeCnt	
6	244	

Area of the Channel Values

The area of the channel values covers the whole window and. There are two fields for each channel: channel name and current value.

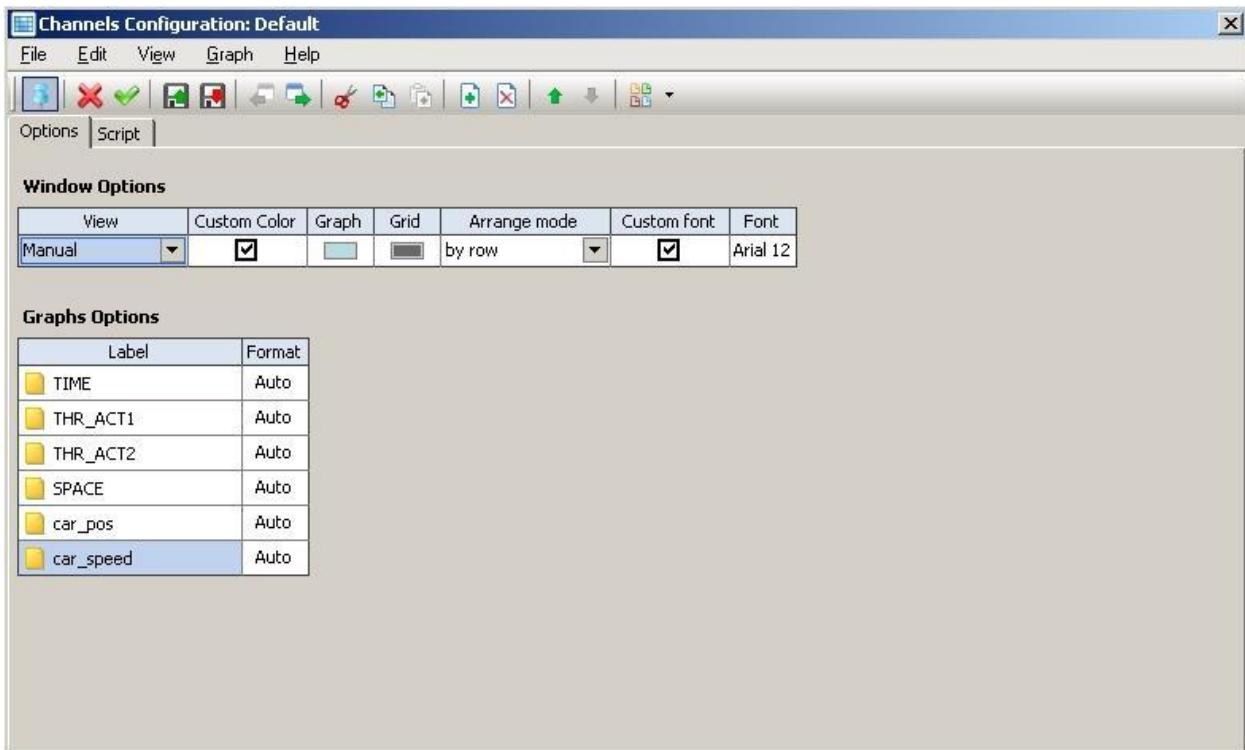
Channel Configuration Window

The configuration window allows to configure the **Channels windows**. The configuration window contains two pages: **Options**, **Script**.

Menu, toolbar and pop-up menu aid the user to configure and manage commands of window.

Options

The Options page allows to configure the graphical aspect of the window; it is composed by two sections: **Window Options** and **Graphs Options**.

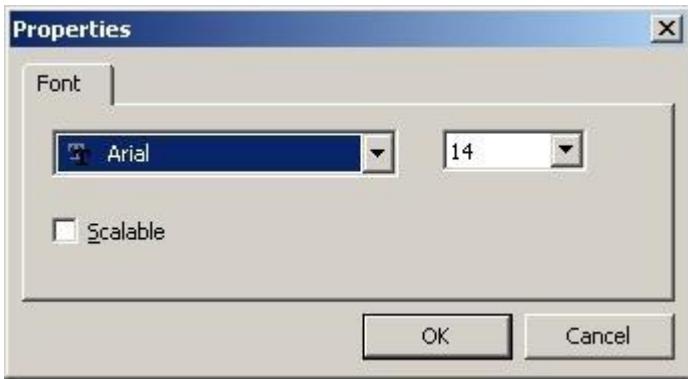


Window Options

It allows to configure the graphical settings of the window. Each box can be edited by double clicking with the left button of the mouse or by pressing the shortcut Space Bar.

- **View:** selects the display mode of the channels
 - **All:** All channels in the logging table
 - **Manual:** The list configured by user in graphs sections
 - **List of groups:** All channels of a group in the logging table
- **Custom Color:** If checked, the window uses custom colour: if unchecked the window uses the colours defined in Setup, General, Default Appearance.
- **Graph:** Sets the background color of the window.
- **Grid:** Sets the background color of the grid.

- **Arrange mode:** Sets the channel boxes arrangement:
 - **by column**, horizontally
 - **by row**, vertically
- **Custom Font:** If checked the window use the local font; if unchecked the window use the font configured in Setup, General, Default Appearance.
- **Font:** Sets the font. By editing the font box, the following configuration window appears:

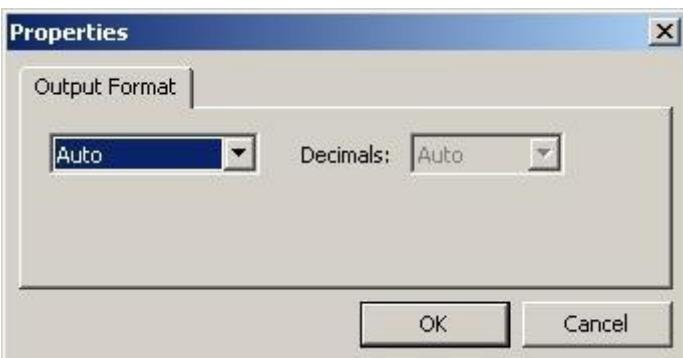


Type of character, its size and font scalability property can be set.

Graphs Options

It allows to configure the specific setting for each channel to be displayed. Each row refers to a configured channel, while columns refer to the field to be configured. Each box can be edited by double clicking with the left button of the mouse or by pressing the Space Bar.

- **Label:** displays the name of the channel. The name of the channel can be edited and can become a math expression if a = sign comes first.
- **Format:** it displays the style for the display of the current channel value. To modify the setting, the corresponding configuration window must be opened to configure the setting for the display format of the channel values.

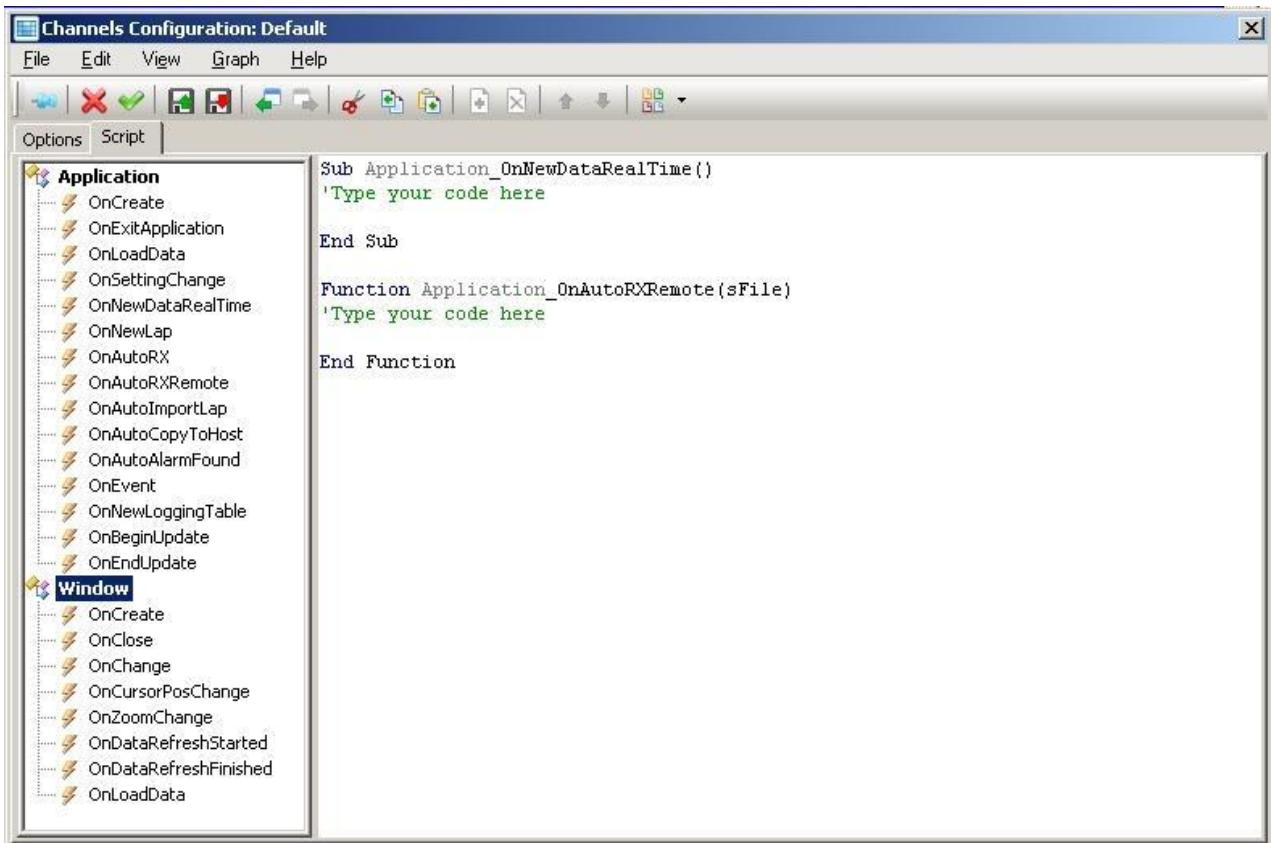


In the combo of the left the numeric format can be selected, in the combo on the right the number of decimals is selected. Please find to follow a list of the possible formats

- **Auto** the channel format is kept unchanged.
- **Dec** the decimal format allows max of 5 digits after the comma.
- **Numeric** the numeric format allows max 15 digits after the comma.
- **Scientific** the scientific format allows max 15 digits after the format; the result is written in exponential form.
- **Hex** hexadecimal format; decimals cannot be configured.
- **Bin** binary format; decimals cannot be configured.
- **ASCII** text format; decimals cannot be configured.

Script

The **Script** page enables to configure the scripts connected to the events of the window or of the application, in VBScript or JScript.



The section on the left displays the list of the functions available, grouped by Application and Window.

The section on the right displays the code corresponding to the set functions.

Menu

The menu of the window allows the access to the following commands, divided by sub menus:

File Menu

COMMAND	SHORTCUT	DESCRIPTION
Apply	A	Applies the present setting of the window
Cancel		Closes the window without applying the present setting
Load		Opens a dialogue window to select a configuration file to be loaded.
Save As		Opens a dialogue window to select a configuration file (.chn), to save the present setting

Edit Menu

COMMAND	SHORTCUT	DESCRIPTION
Cut	Ctrl + X	Copies to clipboard the setting of the channels selected from the Graphs section list, and removes them from the list.
Copy	Ctrl + C	Copies to clipboard the setting of the channels selected from the Graphs section list.
Paste	Ctrl + V	Pastes the setting of the channels in the clipboard, adding them to the Graphs section list.

View Menu

COMMAND	SHORTCUT	DESCRIPTION
Previous page	Ctrl + Shift + Tab	Enables the page of the window previous to the one currently in use
Next page	Ctrl + Tab	Enables the page of the window next to the one currently in use

Graph Menu

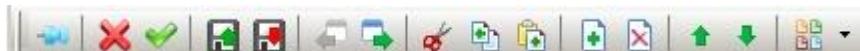
COMMAND	DESCRIPTION
Add Graph	Adds a new element to the Graphs list for the configuration of channels
Remove Graph	Removes from the Graphs list the setting of the selected channels
Move Up	Moves up by one position the elements selected from the Graphs list
Move Down	Moves down by one position the elements selected from the Graphs list

Help Menu

COMMAND	SHORTCUT	DESCRIPTION
Help	F1	Launch the WinTAX4 help, if available.

Toolbar

The toolbar of the window enables the access to the following commands:



COMMAND	DESCRIPTION
Keep Visible	Enables the Keep Visible mode ensuring to keep displayed the configuration window while other application windows are being used
Cancel	Closes the configuration window without applying the setting (similar to the Cancel command of the File menu)
Apply	Applies the present setting to the graphs window (similar to the Apply command of the File menu)
Load	Similar to the Load command of the File menu
Save As	Similar to the Save As command of the File menu

Previous page	Similar to the Previous page command of the View menu
Next page	Similar to the Next page command of the View menu
Cut	Similar to the Cut command of the Edit menu
Copy	Similar to the Copy command of the Edit menu
Paste	Similar to the Paste command of the Edit menu
Add Graph	Similar to the Add Graph command of the Graph menu
Remove Graph	Similar to the Remove Graph command of the Graph menu
Move Up	Similar to the Move Up command of the Graph menu
Move Down	Similar to the Move Down command of the Graph menu
Channel Browser	Shows the pop-up menu to select the page in the Channel Browser window 

Pop-up Menu

The pop-up menu of the window can be displayed by double clicking with the right button of the mouse on the Options page.



The pop-up menu of the window enables the access to the following commands:

COMMAND	DESCRIPTION
Cut	Similar to the Cut command of the Edit menu
Copy	Similar to the Copy command of the Edit menu
Paste	Similar to the Paste command of the Edit menu
Add Graph	Similar to the Add Graph command of the Graph menu
Remove Graph	Similar to the Remove Graph command of the Graph menu
Move Up	Similar to the Move Up command of the Graph menu
Move Down	Similar to the Move Down command of the Graph menu
Restore Default	Sets in the channel the settings configured in the Channel Parameters.
Set As Default	Sets the configurations of the channel in the Channel Parameters.
Edit...	Gives the possibility to edit the selected parameter (similar to the double click).

Functions

- The **Channels** window has the following functions:
 - Mode
 - Arrangement by row or column
 - Channels Selection

Mode

The channels can be displayed according to the following modes: All, Group, Custom. When the display mode All is chosen, all logged channels are shown, while when the display mode Group is chosen, the group of logged channels to be analyzed can be selected. The Custom mode is the only one that can also include all other types of channels, like for instance virtual channels, events and Ole. Moreover the Custom mode enables the drag & drop of the channels on the window. If a different mode is selected, the drag & drop of a channel allows a window to automatically switch to the Custom mode.

Arrangement

Channels can either be displayed by row or by column; the type of arrangement can be selected only through the configuration.

Selection

The channels can be selected according to the rules of the multiple selection by using CTRL and SHIFT in combination with the left button of the mouse, or through the SHIFT key on the keyboard and the arrow keys. The selection influences the Open commands in Excel and Copy Data to Clipboard.

Commands

The main commands available in the **Channel window** can be enabled through:

- the **Options** menu on the main menu of the application
- the buttons of the dedicated **Toolbar**,
- **Pop-up menu**, that can be displayed by clicking with the right button of the mouse on the graphic area of the window, on the Info boxes or on the Y scales of the selected channels.

Options Menu

The **Options** menu allows the access the following commands:

COMMAND	SHORTCUT	DESCRIPTION
Export		(Available only in post processing analysis) Exports all channels displayed in a window in a file with following possible formats: cvs, xls, txt.
Open in Excel	Shift + X	Opens an excel sheet with the selected channels.
Switch to Telemetry/Post Processing	Ctrl + T	Enables to switch from the Post-Processing mode to the Telemetry mode and vice versa.
Properties	E	Opens the interface to configure the window.

Toolbar

The toolbar enables the following commands:

COMMAND	SHORTCUT	DESCRIPTION
Load		Opens a window to select a configuration file corresponding to a Channels window
Save		Saves the present configuration of the window in a file
Properties	E	See the description of the command in the Options Table.

Export		(Available only in post processing analysis) Exports all channels displayed in a window in a file with following possible formats: cvs, xls, txt
Switch to Telemetry/Post Processing	Ctrl + T	See the description of the command in the Options Table.

Pop-up Menu

By clicking with the right button of the mouse on the graphic area of the window, the following pop-up menu is displayed:



This section will describe only the commands that have not already been described previously.

COMMAND	SHORTCUT	DESCRIPTION
Select All Channels	Ctrl + A	Selects all channels in the window
Copy Data to Clipboard	Ctrl + Shift + C	Copies in the clipboard of Windows the selected channels

Numeric Table Window

The Numeric Table Window shows for each configured channel all channel values calculated on the lap loaded in the time ranges determined by the frequency set on the window. The position of the cursor in a Graph window is highlighted on the Numeric Table by selecting the row corresponding to the value immediately previous to the highlighted one.

Elements of the window

Time	Acc_X	Acc_Y	Gear_Num	DistanceLap	P_Oil	P_Fuel	RPM
0.000	0.10	-0.23	6	5786	3.623	3.522	6563
1.000	0.15	-0.43	6	54	3.469	3.511	6680
2.000	0.17	0.09	6	118	3.618	3.516	6731
3.000	0.07	-0.18	6	183	3.663	3.520	6828
4.000	0.05	-0.31	6	249	3.685	3.508	6874
5.000	0.44	-0.12	6	315	3.567	3.513	6949
6.000	0.06	-0.14	6	383	3.739	3.507	7006
7.000	0.53	-0.25	6	450	3.573	3.524	7066
8.000	0.61	-0.23	6	518	3.534	3.501	7142
9.000	0.73	-0.20	6	587	3.572	3.519	7160
10.000	0.33	-0.35	6	656	3.509	3.501	7193
11.000	0.87	-0.80	6	725	3.511	3.523	7208
12.000	0.10	-0.52	6	795	3.537	3.529	7122
13.000	-0.41	-1.44	3	855	3.968	3.571	7735
14.000	-1.19	0.08	2	894	3.479	3.562	5834
15.000	-0.39	1.61	2	920	3.022	3.578	4622
16.000	0.30	1.37	2	940	3.022	3.559	4417
17.000	-0.27	-2.14	2	960	3.011	3.571	4161

Time Column

The time column displays the time ranges in which the lap is divided according to the frequency set in the configuration. The higher is the frequency, the more time ranges of the window will be displayed. The value by default is 1 HZ that corresponds to 1 sec. ranges. When the frequency values are high, it can take some time to make the calculation. The time ranges can be displayed either relative as shown in the picture or absolute. The time ranges are linked to the position of the cursor of the enabled Graph window.

Channel Values Area

Each channel is represented by a column. Each time value of the time column is represented by the corresponding channel value. Multiple rows of channels values can be selected to open an Excel sheet or to copy to clipboard.

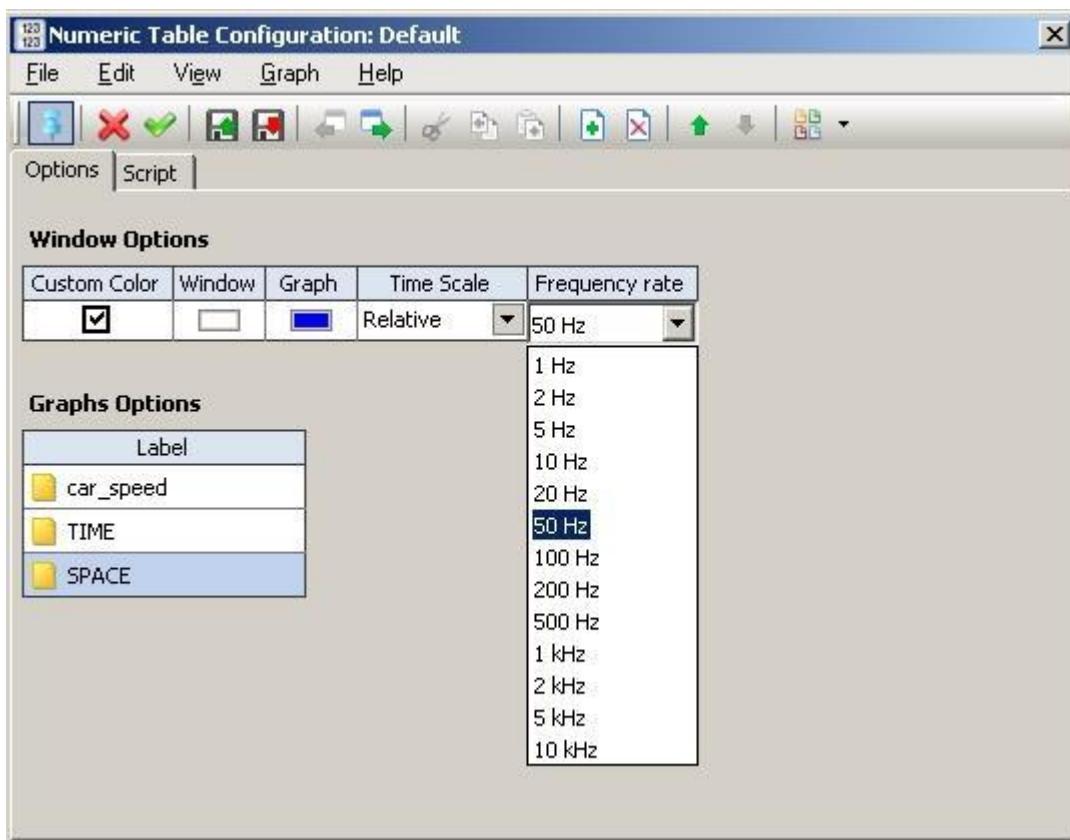
Numeric Table Window Configuration

This section describes the page thanks to which the user can configure some aspects of the **Numeric Table** window.

The window contains the pages: **Options** and **Script**. The window moreover has a menu, a toolbar and pop-up menu that ease the access to the configuration and management commands of the window itself.

Options

The **Options** page enables to configure the graphic aspect of the windows and it is divided into 2 sections.



Window Options

It allows to configure the general window settings. Each element can be edited by double clicking with the left button of the mouse or by pressing the SPACE bar.

- **Custom Color:** If checked, the window uses custom colour: if unchecked the window uses the colours defined in Setup, General, Default Appearance.
- **Window:** Sets the background color of the window.
- **Graph:** Sets the background color of the graphic area.
- **Time Scale:** Selects the time visualization mode

- Relative
 - Absolute
- **Frequency rate:** Sets the visualization frequency of the values. You can choose within this values: 1Hz, 2Hz, 5Hz, 10Hz, 20Hz, 50Hz, 100Hz, 200Hz, 500Hz, 1KHz, 2KHz, 5KHz, 10KHz

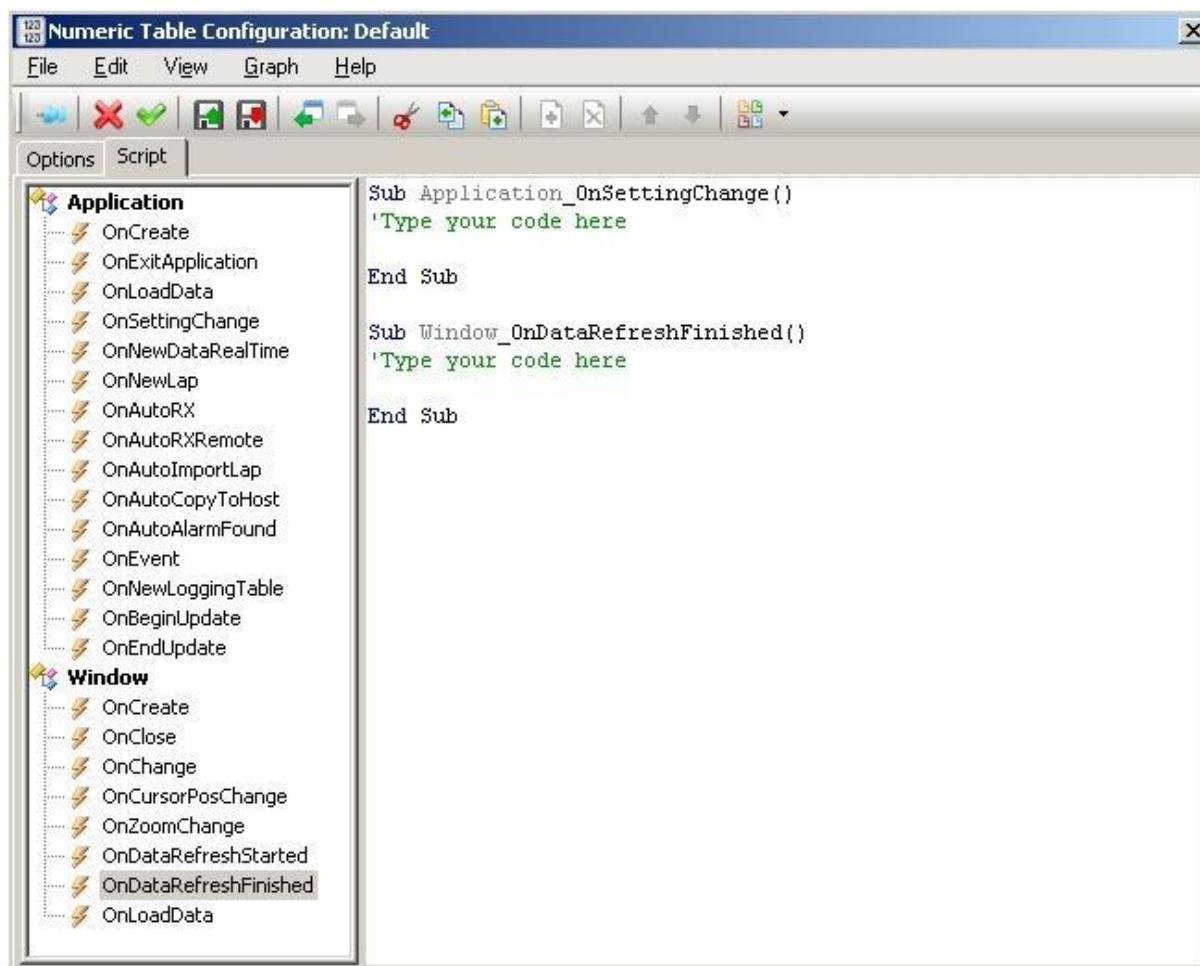
Graphs Options

This window does not allow any customization of the selected channel, it is only possible to include the channel itself.

- **Label:** Displays the name of the channel. The name of the channel can be edited and can become a math expression if the sign = comes first.

Script

The **Script** page allows to configure the scripts connected to the events of the window or of the application, in VBScript or JScript.



The section on the left displays the list of the functions available, grouped by Application and Window. The section on the right displays the code linked to the configured functions.

Menu

The menu of the window allows the access to the following commands, divided into sub menus:

File Menu

COMMAND	SHORTCUT	DESCRIPTION
Apply	A	Applies the present setting of the window.
Cancel		Closes the window without applying the present settings.
Load		Opens a dialogue window to select a NTB configuration file to be loaded.
Save As		Opens a dialogue window to select a NTB configuration file to be loaded (.ntb), on which the present settings must be saved.

Edit Menu

COMMAND	SHORTCUT	DESCRIPTION
Cut	Ctrl + X	Copies to clipboard the configurations of the channels selected in the list of the Graphs section and removes them from the list.
Copy	Ctrl + C	Copies to clipboard the configurations of the channels selected in the list of the Graphs section.
Paste	Ctrl + V	Pastes the configurations of the channels available in clipboard, adding them to the list of the Graphs section.

View Menu

COMMAND	SHORTCUT	DESCRIPTION
Previous page	Ctrl + Shift + Tab	Enables the page of the window previous to the one currently in use.
Next page	Ctrl + Tab	Enables the page of the window next to the one currently in use.

Graph Menu

COMMAND	DESCRIPTION
Add Graph	Adds a new element to the Graphs list of channel configuration.
Remove Graph	Removes from the Graphs list the settings of the selected channels.
Move Up	Move up by one position the elements selected in the Graphs list.
Move Down	Move down by one position the elements selected in the Graphs list.

Help Menu

COMMAND	SHORTCUT	DESCRIPTION
Help	F1	Launch the WinTAX4 help, if available.

Toolbar



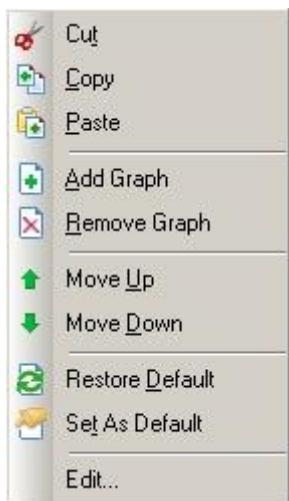
The window toolbar allows the following commands:

COMMAND	DESCRIPTION
Keep Visible	Enables the Keep Visible mode that allows to keep displayed the configuration window while the application windows are being used.
Cancel	Closes the configuration window without applying the settings (similar to the Cancel command of the File menu).
Apply	Applies the present settings to the configuration of the graphic window (similar to the Apply command of the File menu).

Load	Similar to the Load command of the File menu
Save As	Similar to the Save As command of the File menu
Previous page	Similar to the Previous page command of the View menu
Next page	Similar to the Next page command of the View menu
Cut	Similar to the Cut command of the Edit menu
Copy	Similar to the Copy command of the Edit menu
Paste	Similar to the Paste command of the Edit menu
Add Graph	Similar to the Add Graph command of the Graph menu
Remove Graph	Similar to the Remove Graph command of the Graph menu
Move Up	Similar to the Move Up command of the Graph menu
Move Down	Similar to the Move Down command of the Graph menu
Channel Browser	<p>Displays the pop-up menu to select the page in the Channel Browser window.</p>  <ul style="list-style-type: none"> Channels Information Virtual Channels Conditions Groups Real Time Channels Constants User Records Events Import Variables

Pop-up Menu

The pop-up menu of the window can be displayed by clicking the right button of the mouse on the Options page.



The pop-up menu allows the access to the following commands:

COMMAND	DESCRIPTION
Cut	Similar to the Cut command of the Edit menu
Copy	Similar to the Copy command of the Edit menu
Paste	Similar to the Paste command of the Edit menu
Add Graph	Similar to the Add Graph command of the Graph menu
Remove Graph	Similar to the Remove Graph command of the Graph menu
Move Up	Similar to the Move Up command of the Graph menu
Move Down	Similar to the Move Down command of the Graph menu
Restore Default	Sets in the channel the settings configured in the Channel Parameters.
Set As Default	Sets the channel settings in the Channel Parameters.
Edit...	Gives the possibility to edit the selected parameter (similar to the double clicking).

Commands

The main commands available in the **Numeric Table** window can be enabled through:

- the **Options** menu in the main menu of the application
- the buttons of the dedicated **Toolbar**,
- **Pop-up menu**, that can be displayed by clicking with the right button of the mouse on the graphic area of the window.

Options Menu

The **Options** menu allows the following commands:



COMMAND	SHORTCUT	DESCRIPTION
Export		Exports all the displayed channels to a file in one of the following format: csv, xls, txt.
Open in Excel	Shift + X	Opens an Excel sheet with the selected channels.
Properties	E	Opens the interface to configure the window.

Toolbar

The toolbar allows the access to the following commands:

COMMAND	SHORTCUT	DESCRIPTION
Load		Opens a window to select a configuration file corresponding to a Numeric Table window.
Save		Saves the present window configuration on a file.
Properties	E	See the description of the command in the Options Table.
Export		See the description of the command in the Options Table.

Pop-up menu

By clicking with the right button of the mouse on the graphic area of the window, the following pop-up menu is displayed allowing the following commands:



This section will describe only the commands that have not already been described previously.

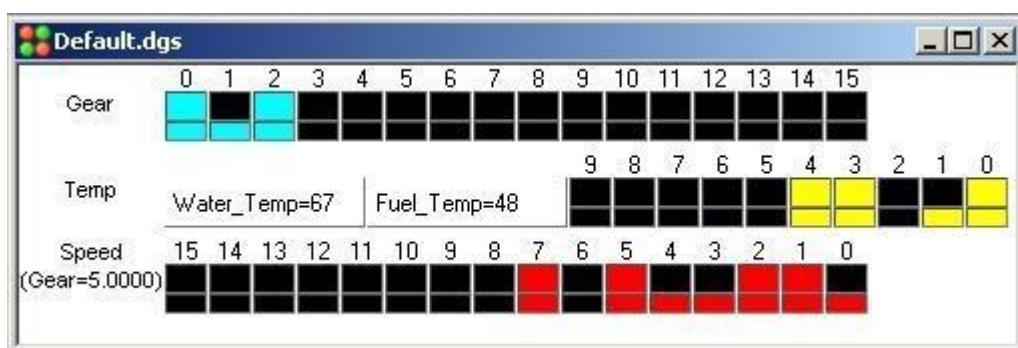
COMMAND	SHORTCUT	DESCRIPTION
Copy Data to Clipboard	Ctrl + Shift + C	Copies to clipboard of Windows the selected channels.

Diagnostics Window

The Diagnostics window shows the bits status of the channel as if its value was represented in binary format. It can be useful while analyzing the channels representing bits masks, and the change of status of each bit has a special meaning that can be interpreted independently from the other bits of the channel. The window can be used both for real time and post processing analysis.

A diagnostics is a container formed by 32 virtual bits that can be divided into maximum four channels. Each diagnostics channel, DiagChannel, is a channel available in the table and can be represented as bit mapped or in numeric form (decimal or hexadecimal).

Elements of the window



The window shows for each diagnostics an info box containing the name and the value of the possible selected channel followed by a bits bar or by a text box for each channel forming the diagnostics.

The bits bar is displayed when the channel is of *Bitmap* type.

Each bit of the bar is formed by three lines:

- a label indicating the bit index or the *Bit Text* (only with *Vertical* layout)
- the current led indicating the current status of the bit
- the history led indicating if the current led has switched at least once since the beginning of the acquisition, if the real time analysis is used, or since the beginning of the DataSet, if the post processing analysis is used.

The text box used for the *Numeric* type, shows the name of the channel and the current value.

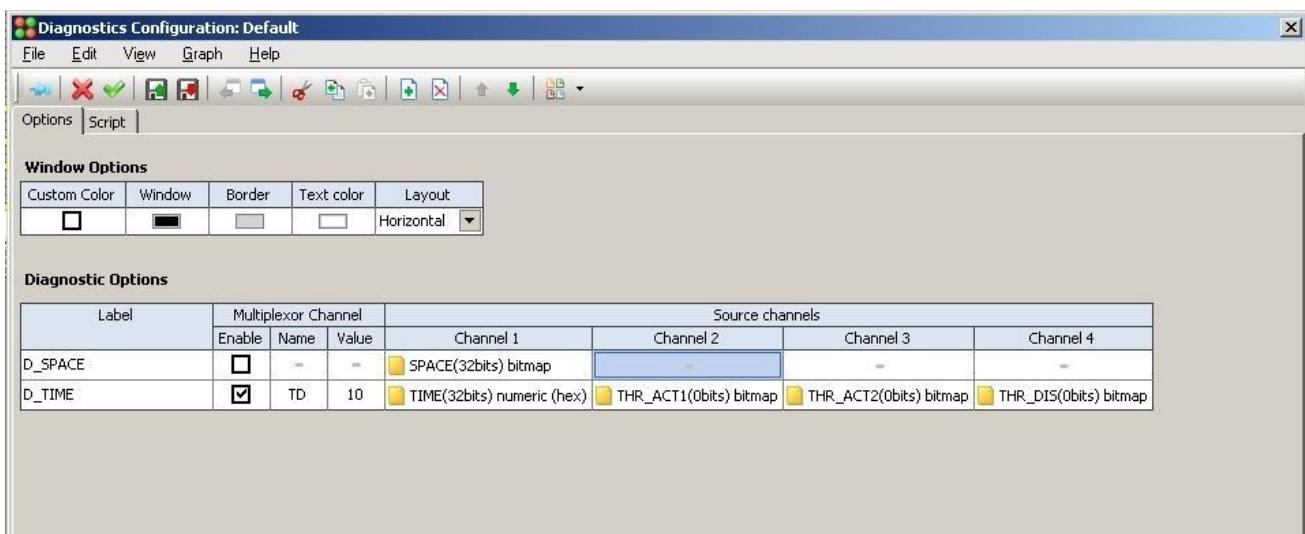
Diagnostics Window Configuration

The **Diagnostics Configuration** window allows to configure the aspect of the Diagnostics graphic windows. The window has the following pages, **Options** and **Script**.

The window also has a menu, a toolbar and a pop-up menu that ease the access to the configuration and management commands of the window itself.

Options

The **Options** page allows to configure the graphic aspect of the **Diagnostics** windows and it is divided into 2 sections.



Window Options

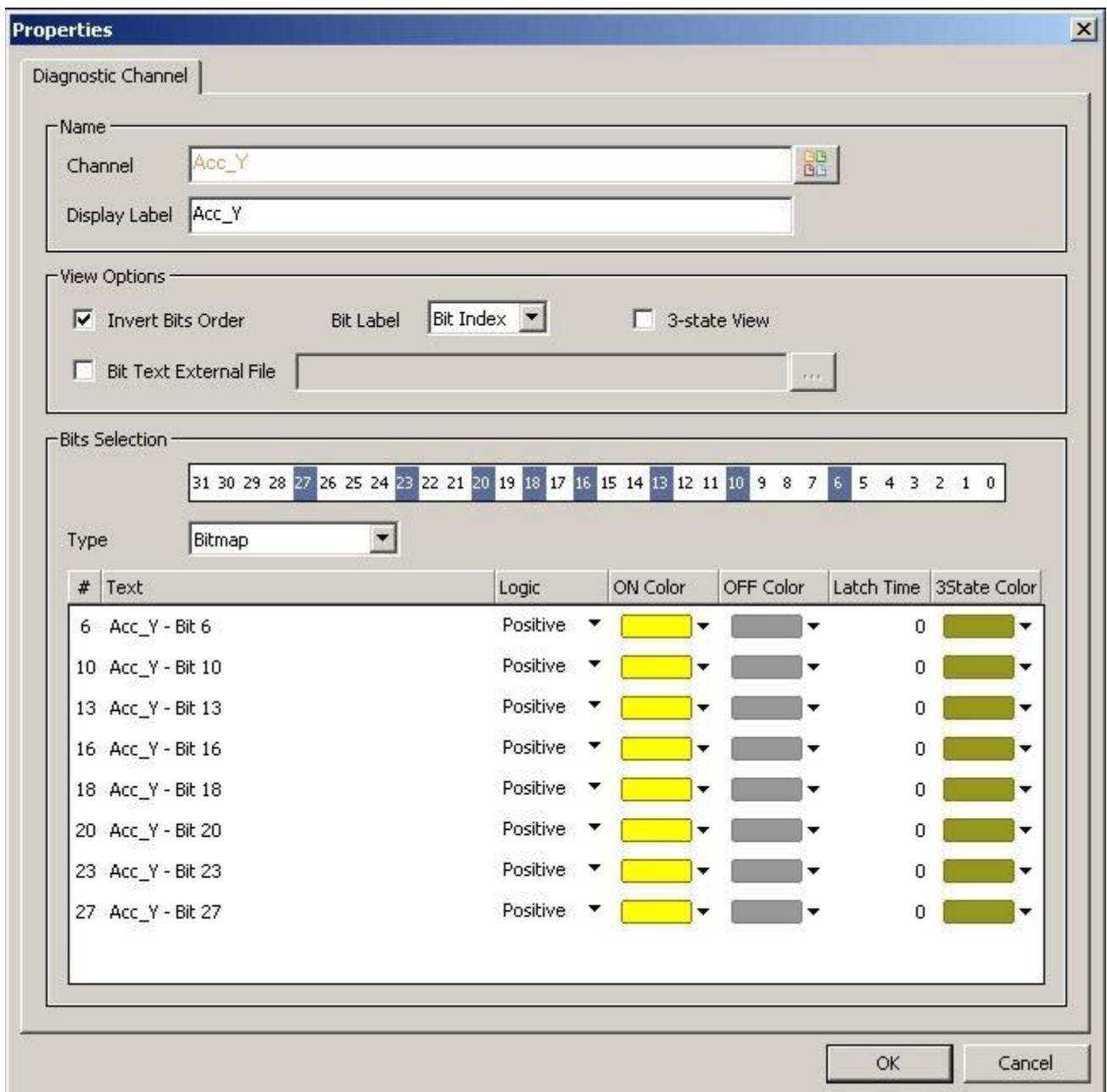
It allows configuring the settings of the aspect of the window. Each box can be edited by double clicking with the left button of the mouse or with the SPACE bar.

- **Custom color:** enables the setting of the window customized colors. If it is enabled, window use the custom color otherwise use colors configured in **Color Settings** section in the **Default Appearance** page of the **General Setup** window.
- **Window:** Window background color.
- **Border:** Border color; it's used only in numeric type.
- **Text Color:** Color of the text of the graphic items.
- **Layout:** Horizontal and vertical arrangement of the diagnostics.

Diagnostic Options

It enables to configure the settings specific of each channel of the window. Each line identifies a configured channel, while the fields to be configured correspond to the columns. Each element can be edited by double clicking with the left button of the mouse or with the SPACE bar. Multiple selections are possible through the CTRL and SHIFT keys.

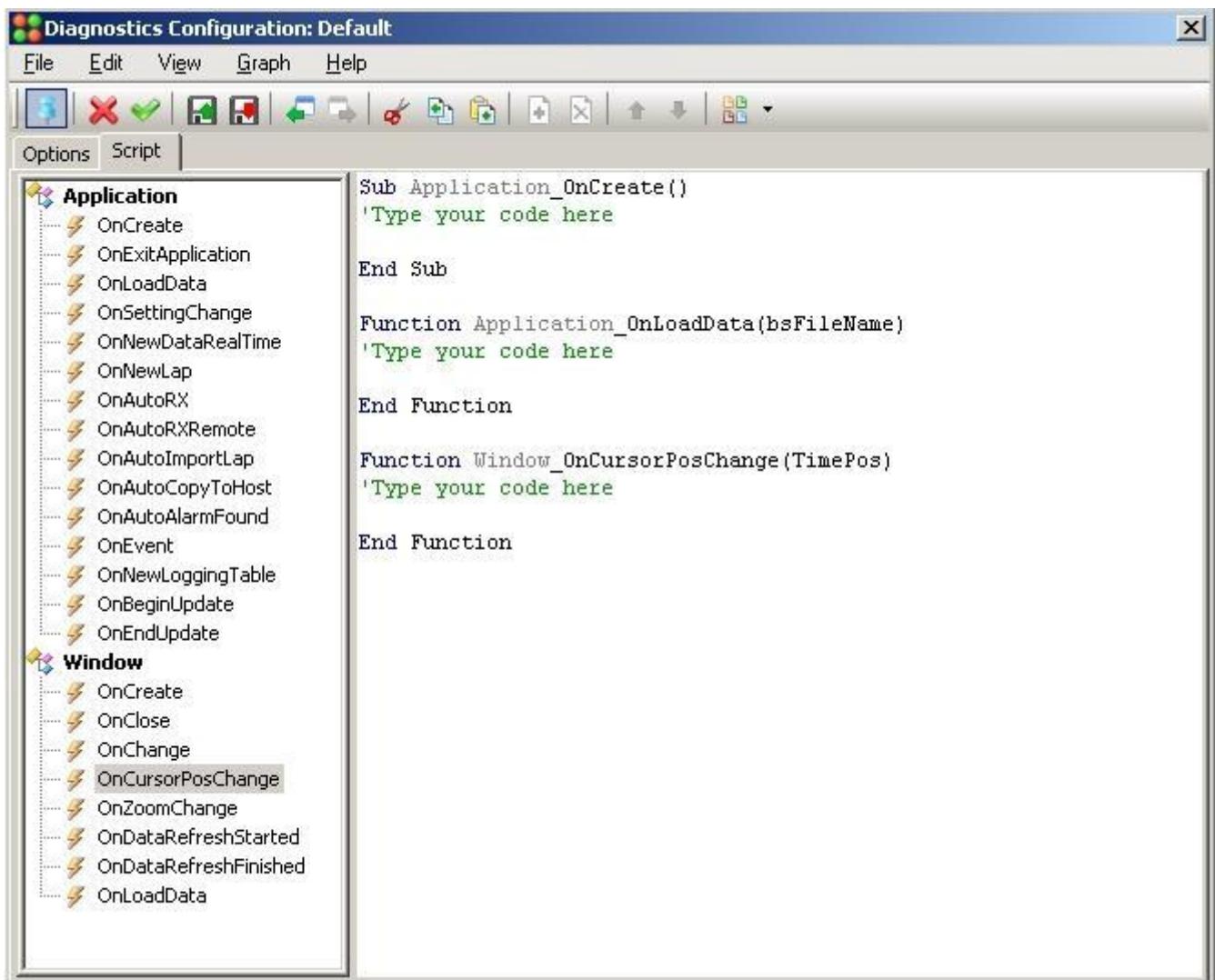
- **Label:** Shows the name of the diagnostic.
- **Multiplexor Channel:** Settings of the multiplexing channel.
 - **Enable:** Enables/disables the multiplexor channel.
 - **Name:** Name of the multiplexor channel.
 - **Value:** Multiplexor value.
- **Source Channels (Channel 1, Channel 2, Channel 3, Channel 4):** The diagnostics channels. Each field shows some information of channel: *Name (number of bits) type of visualization*.



- **Name**
 - **Channel:** name of the channel
 - **Display Label:** Alias name, used in numeric type.
- **View Options**
 - **Invert Bits Order:** If selected, the channel
 - **Bit Label:** Selection of the type of information displayed of the bit (valid only for Diagnostics with *Vertical* layout)
 - **3-state view:** Option available only for Diagnostics; if it is selected, the bits of the diagnostics are no longer displayed with *current value* and *historical value* but with a single value that besides switch on and off can have an intermediate status (displayed with the color configured in the *3State Color* value) representing the bit currently switched off but that in the past it has switched off at least once.
 - **Bit Text External File:** Checking this item, the edit is enabled and the below button, to be used to select a text file and the columns becomes grey. *Text* of the list; this option enables to display in the bit label a text read from the selected file .txt. The text file used must be adequately formatted: It must include a line for each bit text, and they are considered and also empty lines are taken into account considered. It requires the Bit Label configured on *Bit Text*.
- **Bit Selection**
 - **Bit Mask:** Selection mask for the bits.
 - **Type:** display mode of the channel
 - *Bitmap*, typical bits display
 - *Numeric*, numeric display (decimal or hexadecimal) of the value of the bits mask
 - **Bit List:** list of the bits selected in the mask
 - #: bit index
 - **Text:** bit text, displayed in the label and in the tooltip
 - **Logic:** calculation logics, *Positive* or *Negative*
 - **ON Color:** color of the bit when the value is high
 - **OFF Color:** color of bit when the value is low
 - **Latch Time:** minimum time for which the bit is displayed with a high value. If 0 the bit stays high only for the time in which the value is effectively high. The configured value is considered in cents of seconds.
 - **3State Color:** color of the intermediate status (current value low, historical value high).

Script

The **Script** page allows to configure scripts connected to the events of the **Diagnostics** window or of the application, in VBScript or JScript. The choice of the script language can be done in Setup/General.



The section on the left shows the list of the functions available, grouped by Application and Window. The section on the right shows the code of the functions set.

Menu

The menu of the window allows the access to the following commands, divided into sub menu:

File Menu

COMMAND	SHORTCUT	DESCRIPTION
Apply	A	Applies the current settings to the configuration of the graphic window
Cancel		Closes the window without applying the current settings of the graphic window
Load		Opens a dialog window to select a configuration file for the Diagnostic (.dgs) window to be loaded.
Save As		Opens a dialog window to select a configuration file for the Diagnostic (.dgs) window on which the current settings can saved

Edit Menu

COMMAND	SHORTCUT	DESCRIPTION
Cut	Ctrl + X	Copies to clipboard the configuration of the selected channels in the list of the Graphs section, and removes them from the list of the Graphs section.
Copy	Ctrl + C	Copies to clipboard the configuration of the selected channels in the list of the Graphs section
Paste	Ctrl + V	Pastes the configuration of the channels available on clipboard, adding them to the list of the section Graphs

View Menu

COMMAND	SHORTCUT	DESCRIPTION
Previous page	Ctrl + Shift + Tab	Enables the page of the window previous to the one currently in use
Next page	Ctrl + Tab	Enables the page of the window next to the one currently in use

Graph Menu

COMMAND	DESCRIPTION
Add Graph	Adds a new element to the Graphs list of channels configuration
Remove Graph	Removes from the Graphs list the configurations of the selected channels
Move Up	Moves up by one position the selected elements in the Graphs list
Move Down	Moves down by one position the selected elements in the Graphs list

Help Menu

COMMAND	SHORTCUT	DESCRIPTION
Help	F1	Launch the WinTAX4 help, if available.

Toolbar



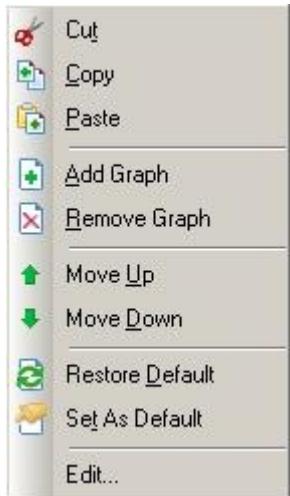
The toolbar of the **Diagnostics Configuration** window allows the access to the following commands:

COMMAND	DESCRIPTION
Keep Visible	Enables the Keep Visible mode allowing to keep displayed the configuration window while the application window are in use
Cancel	Closes the configuration window without applying the settings (similar to the Cancel command of the File menu)
Apply	Applies the current settings to the configuration of the graphic window (similar to the Apply command of the File menu)

Load	Similar to the Load command of the File menu
Save As	Similar to the Save As command of the File menu
Previous page	Similar to the Previous page command of the View menu
Next page	Similar to the Next page command of the View menu
Cut	Similar to the Cut command of the Edit menu
Copy	Similar to the Copy command of the Edit menu
Paste	Similar to the Paste command of the Edit menu
Add Graph	Similar to the Add Graph command of the Graph menu
Remove Graph	Similar to the Remove Graph command of the Graph menu
Move Up	Similar to the Move Up command of the Graph menu
Move Down	Similar to the Move Down command of the Graph menu
Channel Browser	displays the pop-up menu to select the page in the Channel Browser window  <ul style="list-style-type: none">  Channels  Information  Virtual Channels  Conditions  Groups  Real Time Channels  Constants  User Records  Events  Import  Variables

Pop-up Menu

The pop-up menu can be displayed by clicking with the right button on the Options page.



The pop-up menu of the **Graph Configuration** allows the access to the following commands:

COMMAND	DESCRIPTION
Cut	Similar to the Cut command of the Edit menu
Copy	Similar to the Copy command of the Edit menu
Paste	Similar to the Paste command of the Edit menu
Add Graph	Similar to the Add Graph command of the Graph menu
Remove Graph	Similar to the Remove Graph command of the Graph menu
Move Up	Similar to the Move Up command of the Graph menu
Move Down	Similar to the Move Down command of the Graph menu
Restore Default	Modifies the channel configuration restoring the settings in the parameters.
Set As Default	Modifies the parameters configuration with the current settings of the channel.
Edit	Edits the selected cell.

Functions

The **Diagnostics** window has the following functions:

- Tooltip

Tooltip

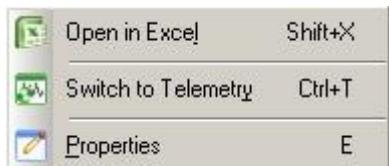
Placing the mouse pointer on a bit, a tooltip will be displayed with the *Bit Text* of the bit.

Commands

The main commands available on the **Diagnostics** window can be enabled through

- the **Options menu** on the main menu of the application
- the buttons of the dedicated **Toolbar**,
- **Pop-up menu** that can be displayed by clicking with the right button of the mouse on the graphic area of the window

Options Menu



The **Options** menu of the Diagnostics windows allows the access to the following commands:

COMMAND	SHORTCUT	DESCRIPTION
Open in Excel	Shift + X	Opens an Excel file where the series of data of the data configured in the window are displayed.
Switch to Telemetry/Post Processing	Ctrl + T	Allows to switch from the Post-Processing mode to the Telemetry mode and vice versa.
Properties	E	Opens the interface to configure the Diagnostics window

Toolbar

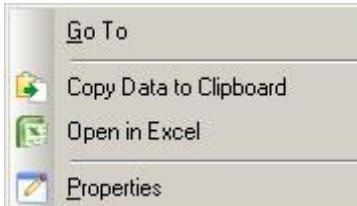


The toolbar of the Diagnostics window allows the access to the following commands:

COMMAND	SHORTCUT	DESCRIPTION
Load		Opens a window to select a configuration file corresponding to a Diagnostics window.
Save		Saves the present window configuration on a file.
Properties	E	See the description of the command in the Options Table.
Switch to Telemetry/Post Processing	Ctrl + T	See the description of the command in the Options Table.

Pop-up Menu

By clicking with the right button of the mouse on the graphic area of the window, the following pop-up menu is displayed:

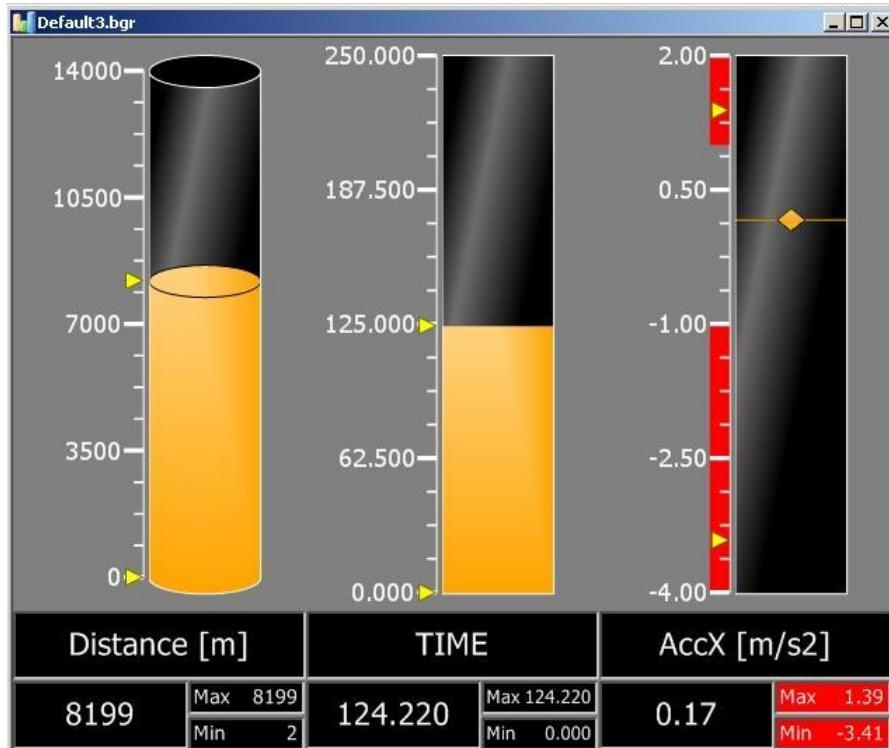


This section will describe only the commands that have not already been described previously.

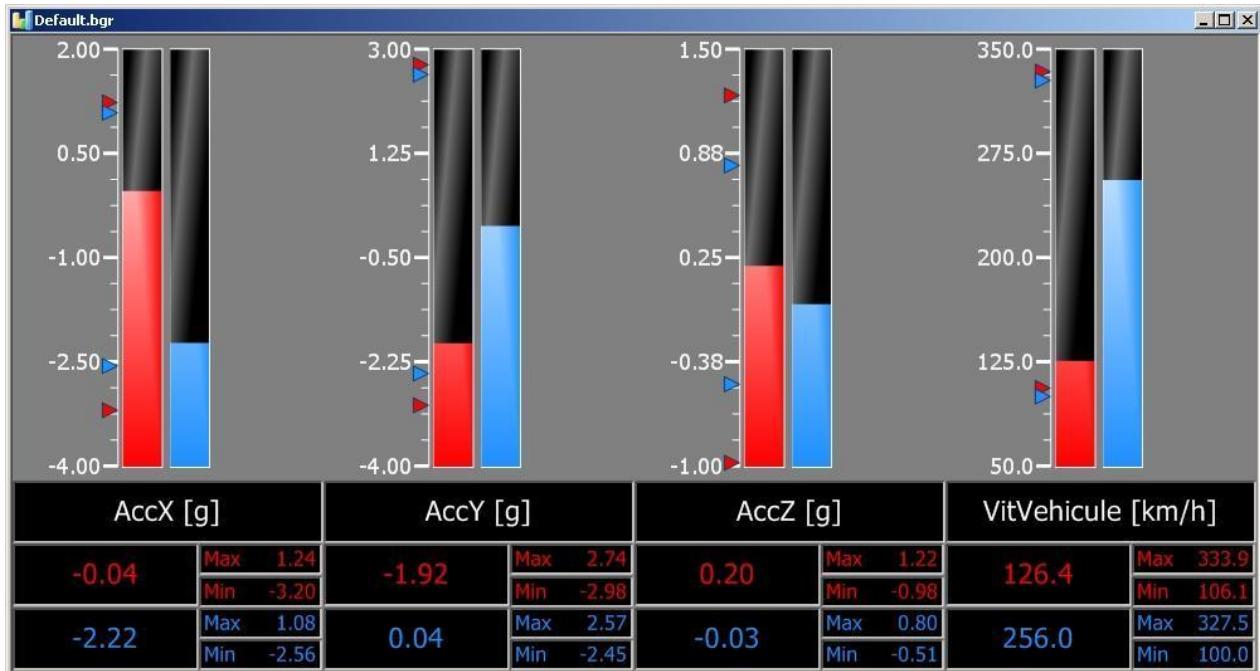
COMMAND	SHORTCUT	DESCRIPTION
Remove Graphs		Removes the selected diagnostics.
Copy Data to Clipboard	Ctrl + Shift + C	Copies the data of the selected channels in the clipboard of Windows.

Bargraph Window

The Bargraph window displays through a graphic bar the value of the channels samples in the precise moment of the Real Time acquisition or at the current position of the cursor in the post processing analysis.

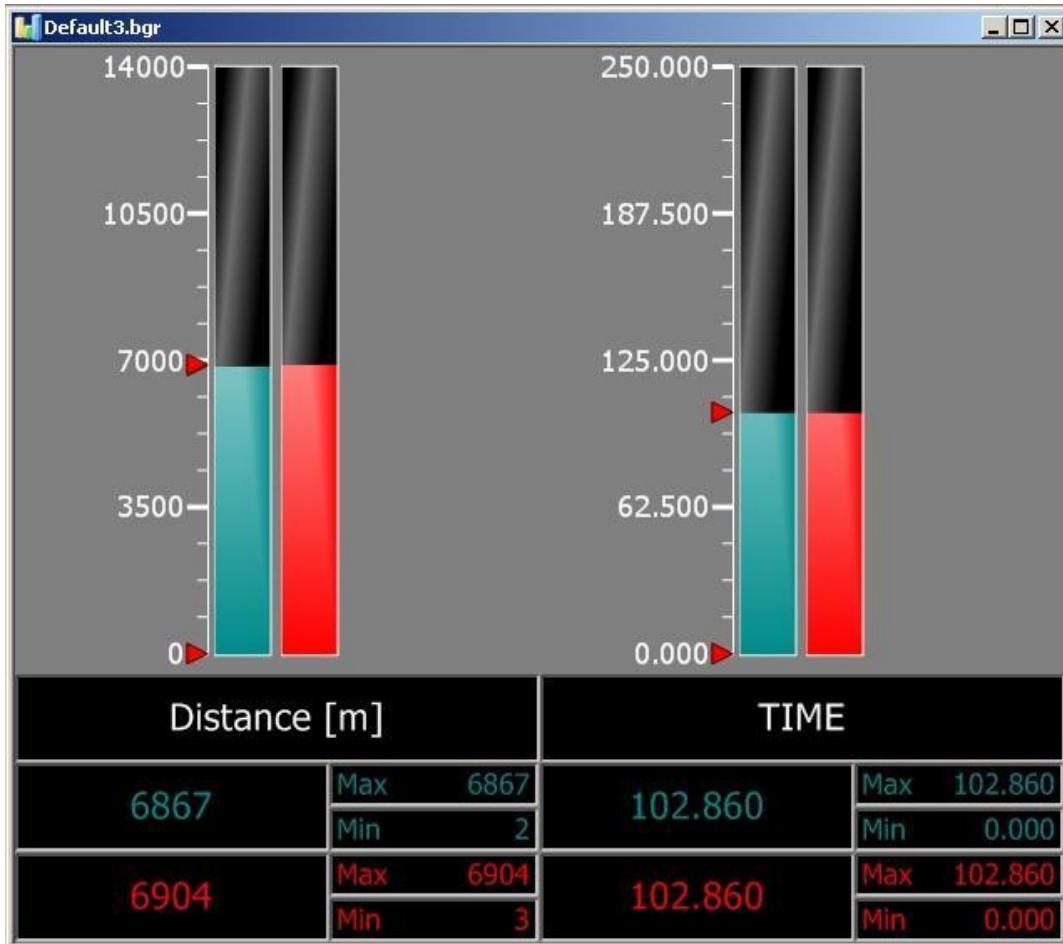


In comparison mode, the first two laps are analyzed, no matter how many laps are compared. See the picture below.



Elements of the window

The Bargraph window is formed by two sections: a graphic area and an information area.



Graphic area

The graphic area of the Bargraph window shows the bar graphs of the configured channels. Each graph displays a scale of values with the corresponding references and the indicator of the minimum and maximum values.

Information Area

Each graph has an information area that is placed below the graph itself with a vertical layout, while it is placed on the right of the graph with a horizontal layout. The information area shows some parameters of the channel: the name in the box on the top, in the other boxes clockwise the current value, the maximum value, the minimum value (Min and Max in case of post processing analysis are calculated from the beginning of the lap to the current position of the cursor).

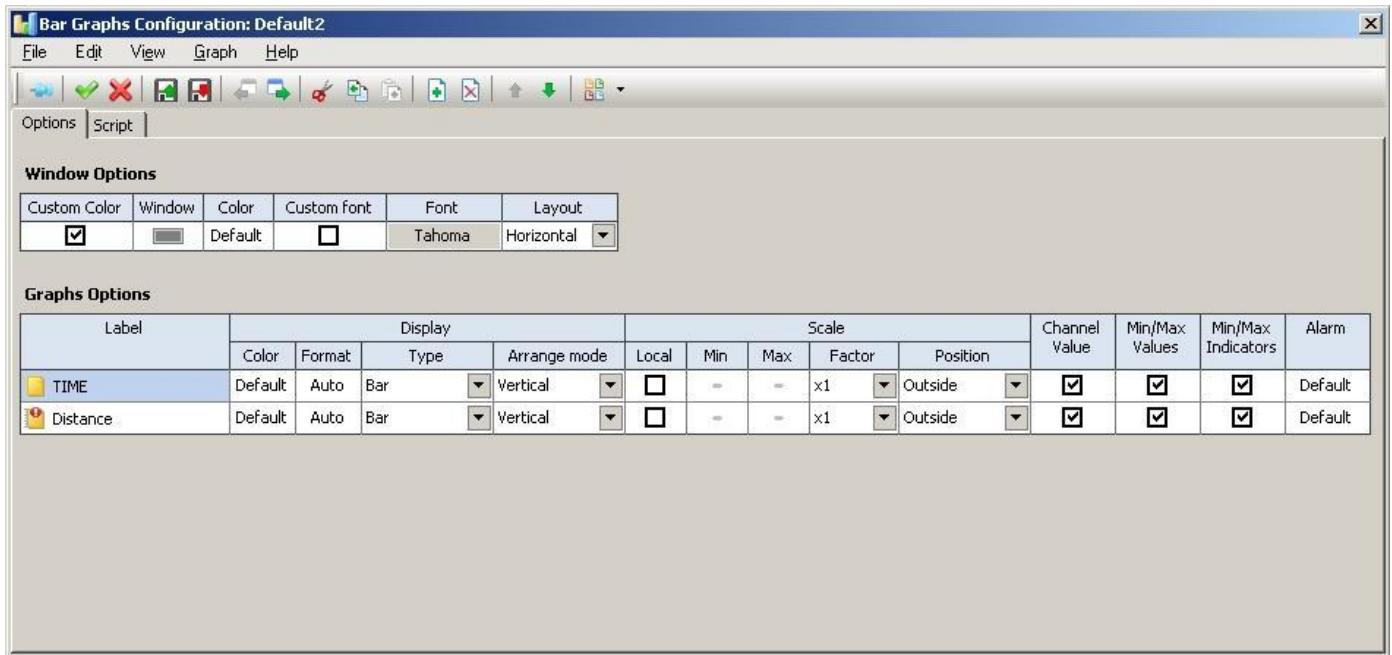
Bargraph Window Configuration

The **Bargraph Configuration** window allows to configure the graphic aspect of the **Bargraph window**: the window has the Options and Script pages.

The window also has a menu, a toolbar and a pop-up menu that ease the access to the configuration and management commands of the window itself.

Options

The **Options** page enables to configure the graphic aspect of the **Bargraph** windows and it is divided into two sections.



Window Options

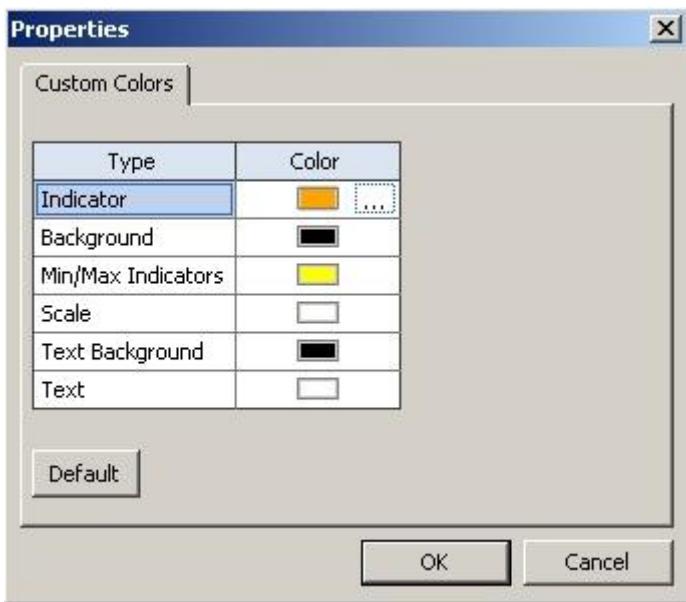
It allows to configure the graphic settings of the window. Each box can be edited by double clicking with the left button of the mouse or by pressing the SPACE Bar.

- **Custom color:** allows the setting of the window background colour.
- **Window:** If enabled, the colour set in the **Window** column of this section is used for the background of the graphic area.

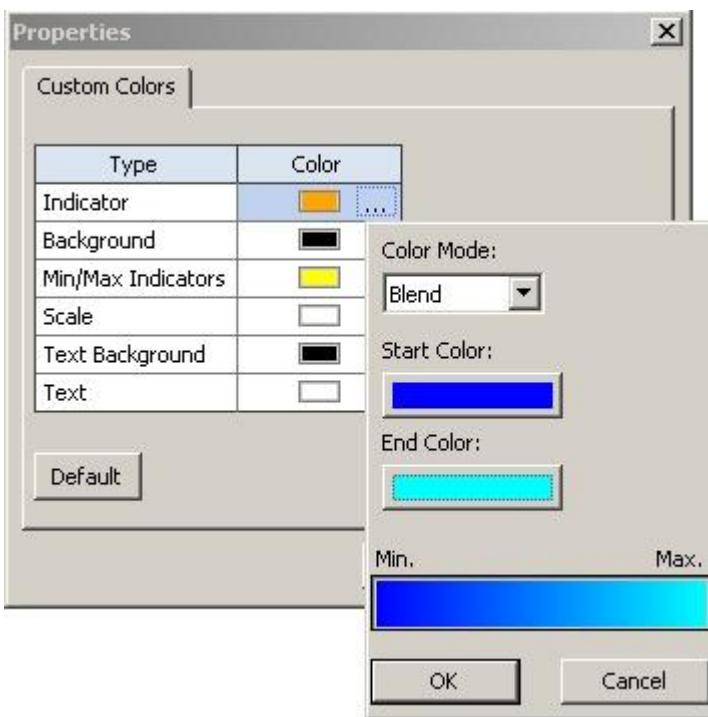
If disabled, the colour set in the **Default Appearance** page of the **General Setup** window (General Settings, general configuration of the WinTAX environment) is used for the background of the graphic area.

- **Color:** sets the gauge instruments default colors. All graphs configured in **Graphs** area inherits these settings as default.

The following elements are customizable: Indicator, Background, Min/Max Indicators, Scale, Text Background, Text

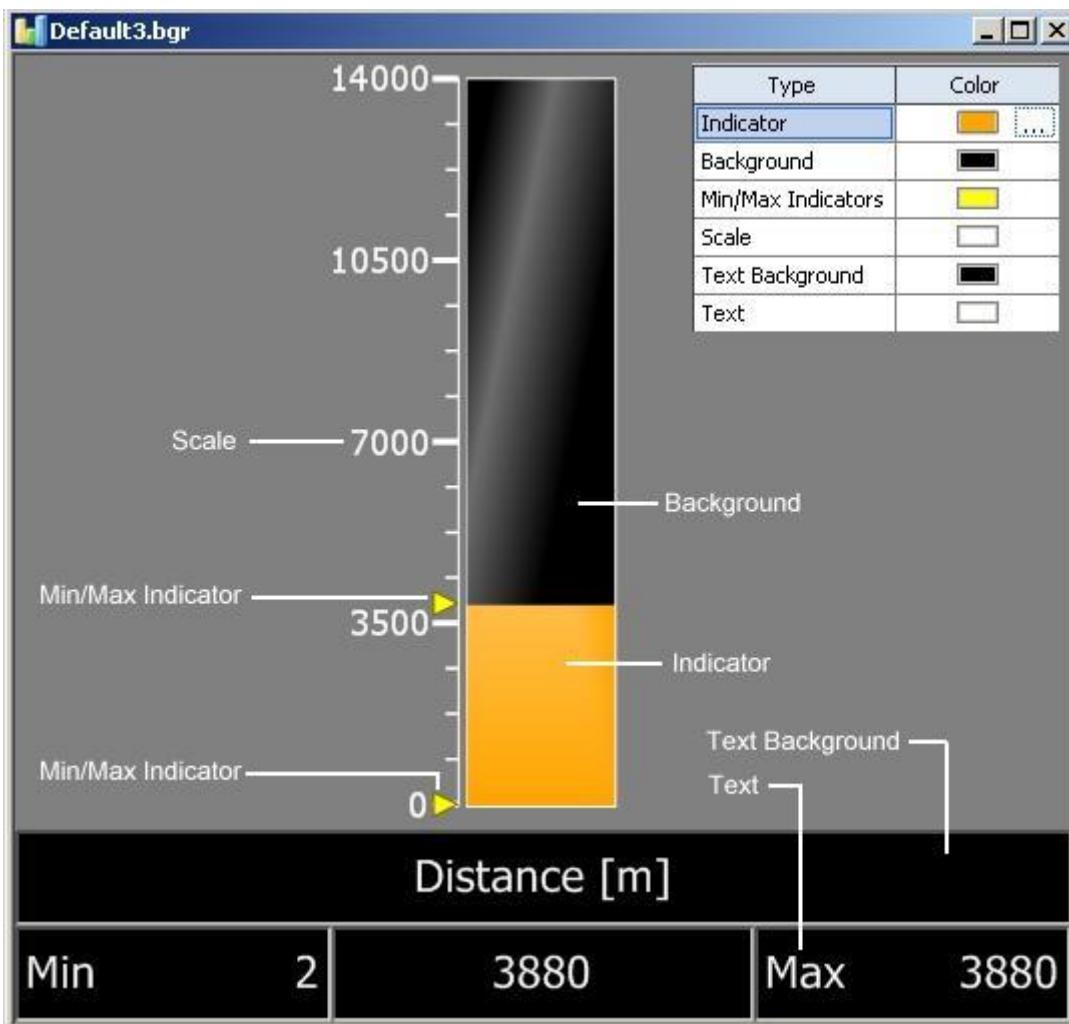


In Indicator color cell there is a button that open the following window:

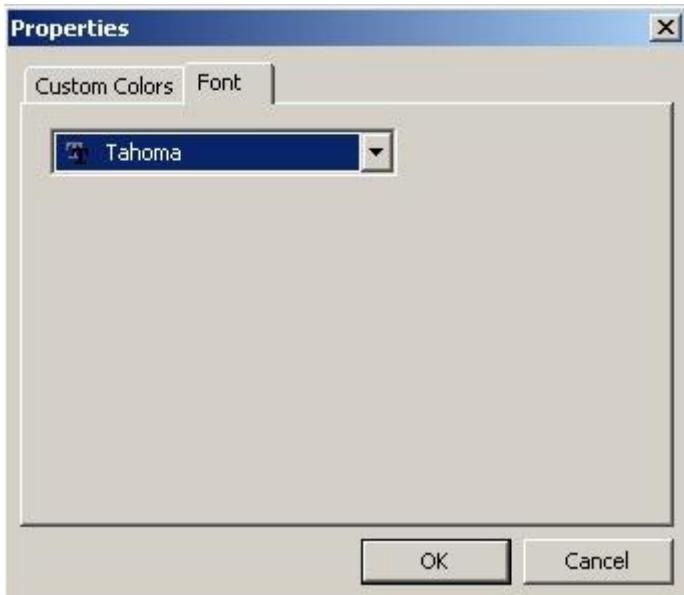


The indicator color can be setting as Solid, Gradient and blend.

In the following picture you can see the correspondence between colors and objects.



- **Custom font:** If checked the window use the local font; if unchecked the window use the font configured in Setup, General, Default Appearance.
- **Font:** allows to select a custom font family for all text elements. The texts are automatically scaled when resizing the window.

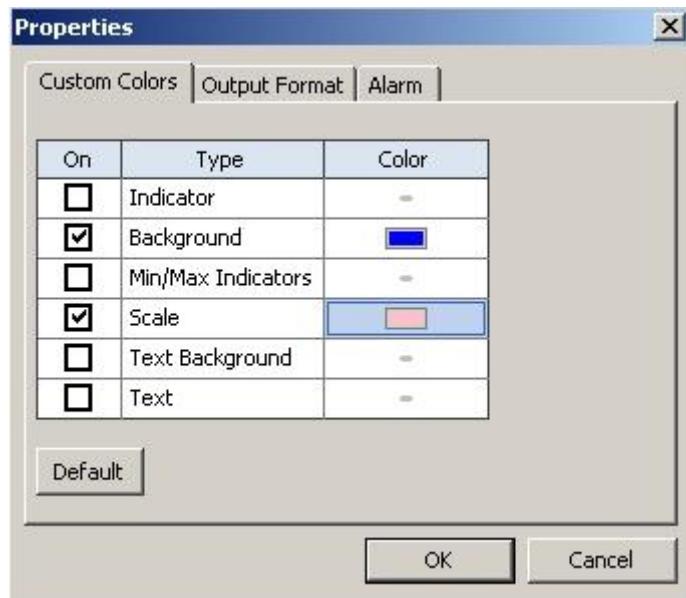


- **Layout:** allows to select the arrangement mode of the graphs
 - Horizontal
 - Vertical
 - Auto

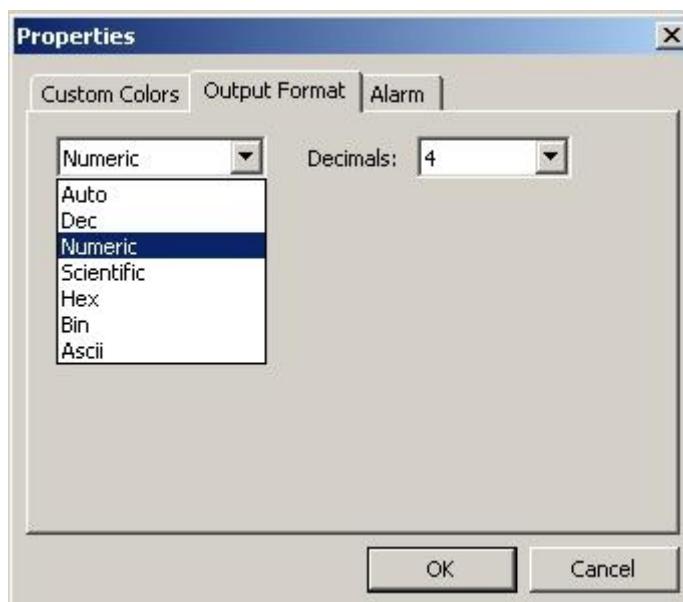
Graphs Options

It allows to configure the settings specific of each configured channel of the window. Each row identifies a configured channel, while the columns correspond to the fields to be configured. Each configurable value can be edited by double clicking with the mouse or by pressing the Space bar on the selected element. Multiple selections are handled through the CTRL and SHIFT keys

- **Label:** Shows the name of the channel. The name of the channel can be edited and can become a math expression if the sign = comes first.
- **Display**
 - **Color:** local configuration of gauge instruments colors. the local setup overwrites the global one defined in Window area. The following elements are customizable:
 - Indicator
 - Background
 - Min/Max Indicators
 - Scale
 - Text Background
 - Text



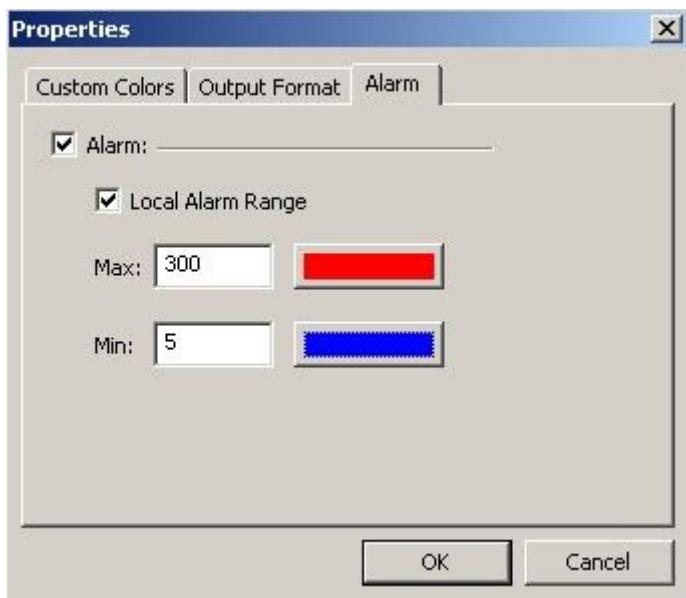
- **Format:** shows the visualization style of the current value of the channel: to modify the setting, open the corresponding configuration window that enables to configure the setting for the visualization format of the channel values.



In the combo on the left, the numeric format is selected, in the combo on the right the number of decimals is chosen. The possible formats are

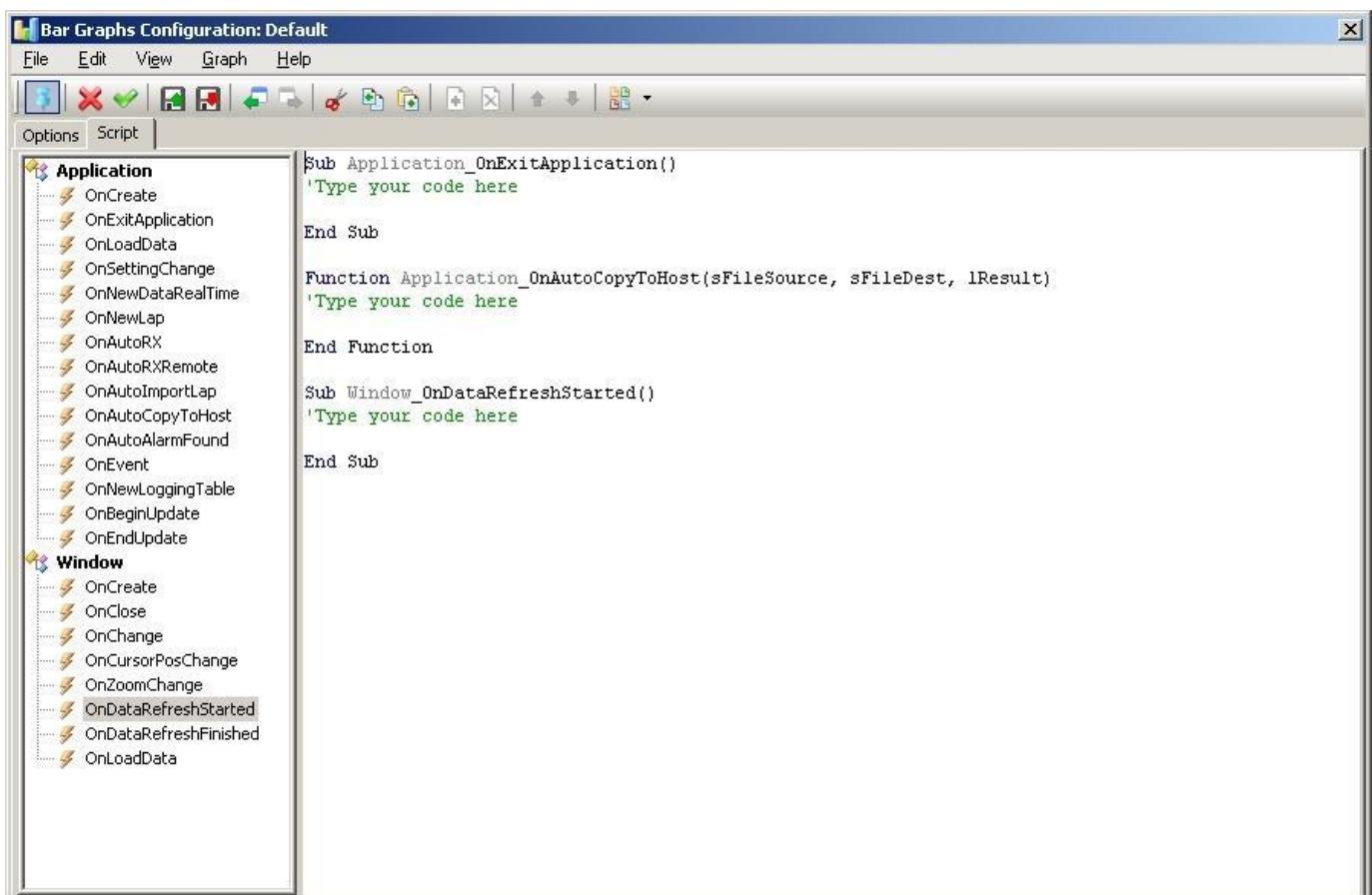
- **Auto:** The channel format is kept unchanged
- **Dec:** The decimal format allows max 5 digits after the comma.
- **Numeric:** The numeric format allows max 15 digits after the comma.

- **Scientific:** The scientific format allows max 15 digits after the format; the result is written in exponential form.
 - **Hex:** Hexadecimal format; decimals cannot be configured.
 - **Bin:** Binary format; decimals cannot be configured.
 - **Ascii:** Text format; decimals cannot be configured.
- **Type:** selects the type of bar. Bar, Cursor, Cylindric Bar styles are available.
- **Arrange Mode:** layout style. Horizontal or Vertical are available.
- **Scale:**
 - **Local:** allows to configure the desired thresholds of channel. If checked, as default, the values are taken from Channel Parameters Setup, if available.
 - **Min:** configure the minimum value of local scale
 - **Max:** configure the maximum value of local scale
 - **Factor:** applies a factor to the scale; the default value is x1 and the admitted values are:
 - x1
 - x10
 - x100
 - x1000
 - **Position:** sets the position of the references on the scale, **Inside** in the middle of the graphs area, **Outside**, outside of the graphic area.
- **Channel Value:** enables the visualization of the boxes of the current value in the information area
- **Min/Max Values:** enables the visualization of the boxes of the minimum and maximum values in the information area.
- **Min/Max Indicators:** Enables the visualization of the minimum and maximum markers in the graphic area.
- **Alarm:** enables the visualization of the Alarms bar. To modify the setting, open the **Properties** window at the **Alarm** page. In this page, the alarm range and the colors used, can be customized. If the Local Alarm Range option is not selected, the alarm configuration used will be as in **Channels Parameters** at the **Alarm** page.



Script

The **Script** page enables to configure the scripts connected to the events of the Bargraph window or of the application, in VBScript or JScript.



The section on the left displays the list of the functions available, grouped by Application and Window. The section on the right displays the code corresponding to the set functions.

Menu

The menu of the window allows the access to the following commands, divided by sub menus:

File Menu

COMMAND	SHORTCUT	DESCRIPTION
Apply	A	Applies the current setting of the window.
Cancel		Closes the window without applying the current setting.
Load		Opens a dialog window to select a configuration file to be loaded.
Save As		Opens a dialog window to select a configuration file to save the current setting.

Edit Menu

COMMAND	SHORTCUT	DESCRIPTION
Cut	Ctrl + X	Copies to clipboard the setting of the channels selected from the Graphs section list, and removes them from the list.
Copy	Ctrl + C	Copies to clipboard the setting of the channels selected from the Graphs section list.
Paste	Ctrl + V	Pastes the setting of the channels from the clipboard, adding them to the Graphs section list.

View Menu

COMMAND	SHORTCUT	DESCRIPTION
Previous page	Ctrl + Shift + Tab	Enables the page of the window previous to the one currently in use.
Next page	Ctrl + Tab	Enables the page of the window next to the one currently in use.

Graph Menu

COMMAND	DESCRIPTION
Add Graph	Adds a new element to the Graphs list for the configuration of channels.
Remove Graph	Removes from the Graphs list the setting of the selected channels.
Move Up	Moves up by one position the elements selected from the Graphs list.
Move Down	Moves down by one position the elements selected from the Graphs list.

Help Menu

COMMAND	SHORTCUT	DESCRIPTION
Help	F1	Launch the WinTAX4 help, if available.

Toolbar

The toolbar of the window allows the access to the following commands:

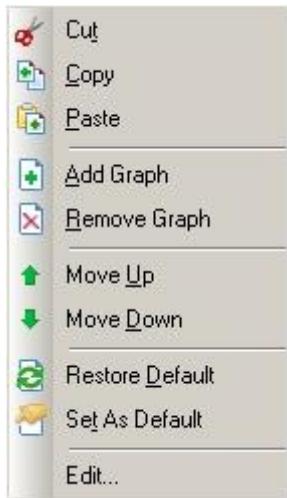


COMMAND	DESCRIPTION
Keep Visible	Enables the Keep Visible mode ensuring to keep displayed the configuration window while other application windows are in use.
Cancel	Closes the configuration window without applying the settings (similar to the Cancel command of the File menu).
Apply	Applies the present settings to the graphs window (similar to the Apply command of the File menu).
Load	Similar to the Load command of the File menu
Save As	Similar to the Save As command of the File menu

Previous page	Similar to the Previous page command of the View menu
Next page	Similar to the Next page command of the View menu
Cut	Similar to the Cut command of the Edit menu
Copy	Similar to the Copy command of the Edit menu
Paste	Similar to the Paste command of the Edit menu
Add Graph	Similar to the Add Graph command of the Graph menu
Remove Graph	Similar to the Remove Graph command of the Graph menu
Move Up	Similar to the Move Up command of the Graph menu
Move Down	Similar to the Move Down command of the Graph menu
Channel Browser	Shows the pop-up menu to select the page in the Channel Browser window 

Pop-up Menu

Pop-up menu can be visualized by clicking with the right button of the mouse on the Options page.



The pop-up menu enables the access to the following commands:

COMMAND	SHORTCUT	DESCRIPTION
Cut	Ctrl + X	Similar to the Cut command of the Edit menu
Copy	Ctrl + C	Similar to the Copy command of the Edit menu
Paste	Ctrl + V	Similar to the Paste command of the Edit menu
Add Graph		Similar to the Add Graph command of the Graph menu
Remove Graph		Similar to the Remove Graph command of the Graph menu
Move Up		Similar to the Move Up command of the Graph menu
Move Down		Similar to the Move Down command of the Graph menu
Restore Default		Sets in the channel the settings configured in the Channel Parameters.
Set As Default		Sets the configurations of the channel in the Channel Parameters.
Edit...		Gives the possibility to edit the selected parameter (double click)

Commands

The main commands available on the **Bargraph** window can be enabled through

- the **Options** menu in the main menu of the application
- the buttons of the dedicated **Toolbar**,
- **Pop-up menu** that can be displayed by clicking with the right button of the mouse on the graphic area of the window, on the Info boxes or on the Y scales of the selected channels.

Options Menu

The **Options** menu for the Bargraph windows allows the access to the following commands:

COMMAND	SHORTCUT	DESCRIPTION
Switch to Telemetry/Post Processing	Ctrl + T	Enables to switch from the Post-Processing mode to the Telemetry mode and vice versa.
Properties	E	Opens the interface to configure the Bargraph window

Toolbar

The toolbar of the windows allows the access to the following commands:

COMMAND	DESCRIPTION
Load	Opens a window to select a configuration file corresponding to a Bargraph window.
Save	Saves the current configuration of the window on a file.
Properties	See the description of the command in the Options Table.
Switch to Telemetry/Post Processing	See the description of the command in the Options Table.

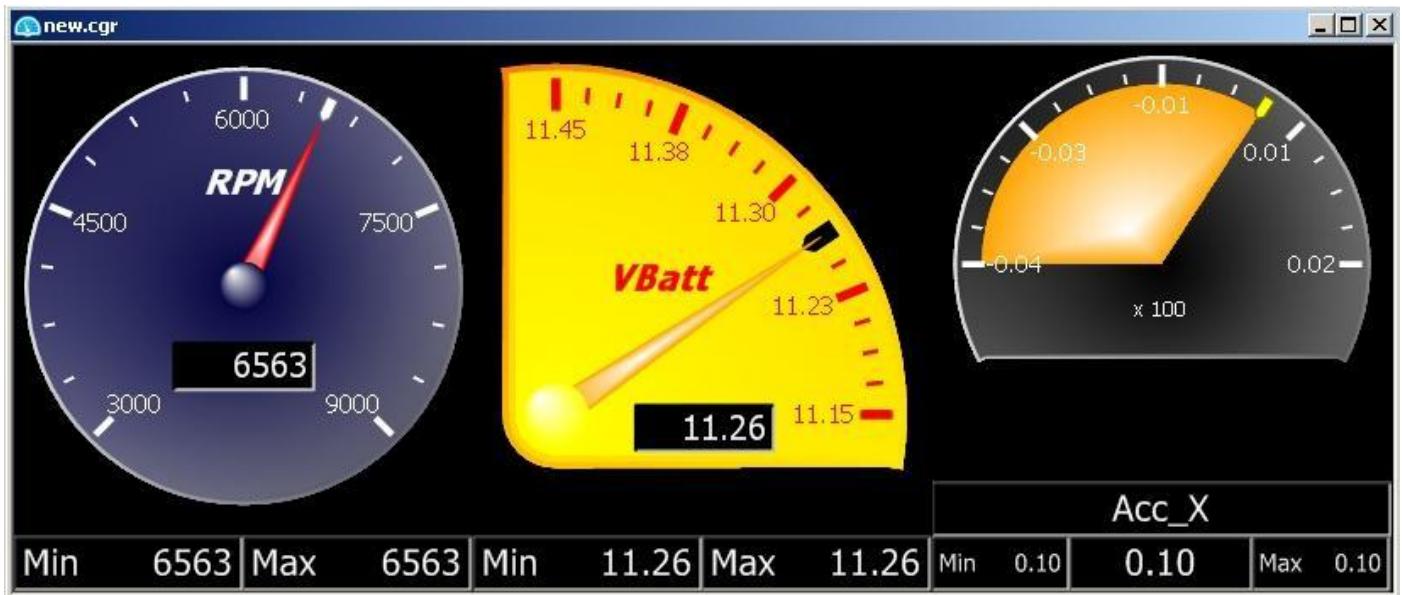
Pop-up Menu

By clicking with the right button of the mouse on the graphic area of the window, the pop-up menu containing the following commands is displayed:

COMMAND	DESCRIPTION
Remove Graphs	Removes the selected channel.
Datasets	Shows in a sub menu the list of the Datasets loaded that can be displayed. Selecting the item Telemetry Dataset, the user can switch to the corresponding display mode.
Properties	Opens the interface to configure the Bargraph window.

Gauge Window

The Gauge window thanks to an automotive instrument appearance displays the value of the sampled channels when acquired in real time or at the current position of the cursor in post processing analysis.



Elements of the window

The Gauge window is formed by two parts: a graphic area and an information area

Graphic Area

The graphic area of the window shows the gauge display of the configured channels. The single graph displays a scale of values with the corresponding references step and the indicators of the minimum and maximum value.

Info Area

To each graph corresponds an information area that can be found below the graph itself, in case of vertical layout, or on the right of the graphs, in case of horizontal layout. The info area displays some parameters of the channel: in the box there is the name, in the other boxes, clockwise, there are the current value, the maximum and minimum values (min and max in case of post processing analysis are calculated from the beginning of the lap to the current position of the cursor).

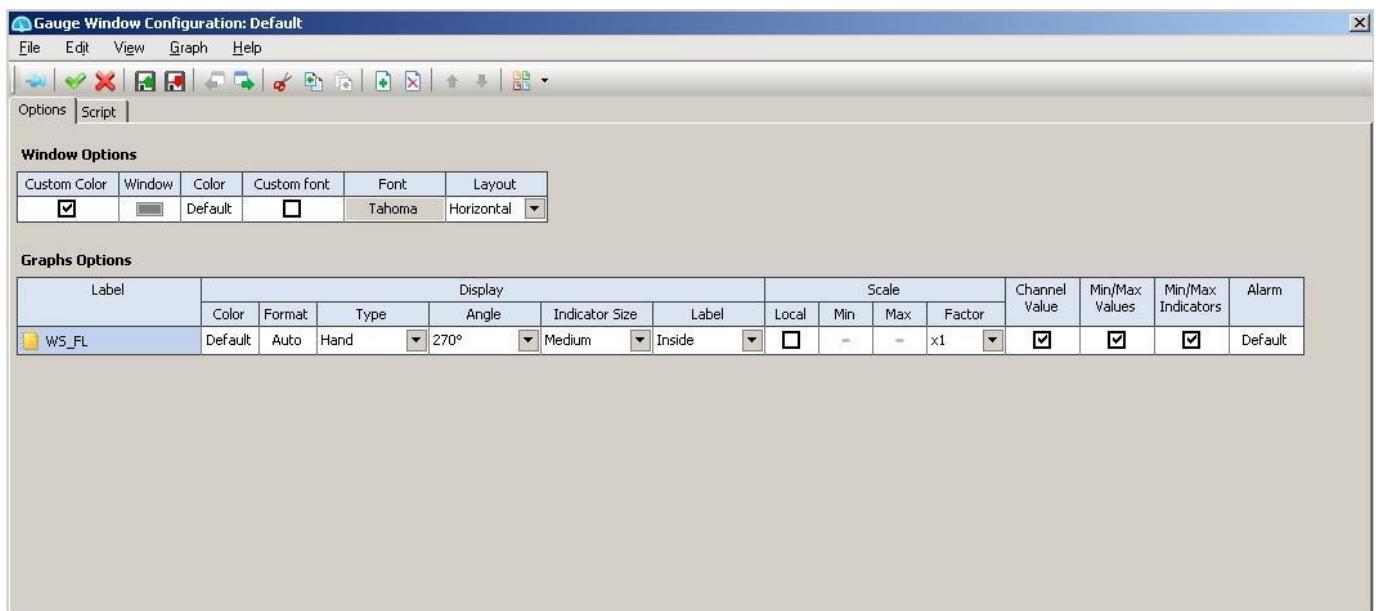
Gauge Configuration window

The **Gauge Configuration** window allows to set the look of the **Gauge windows**; it is formed by the **Options** and **Script** pages.

The window moreover has a menu, a toolbar and a pop-up menu that ease the access to the configuration and management commands of the window itself.

Options

The **Options** page allows to configure the graphic aspect of the **Gauge** windows and it is divided into 2 sections.

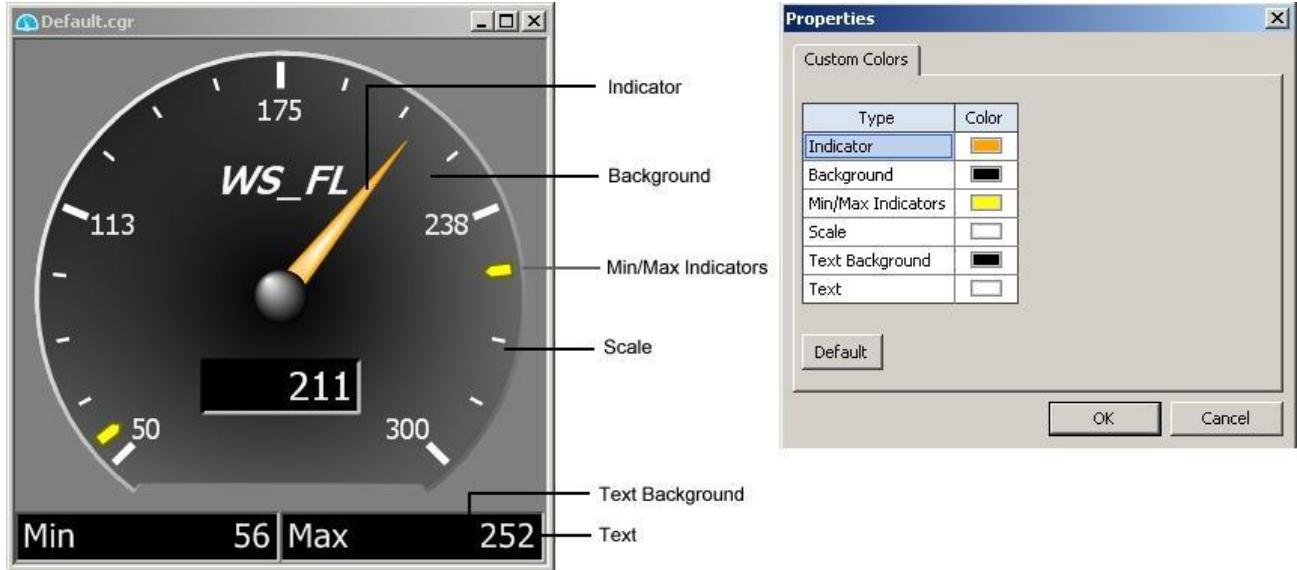


Window Options

It allows to configure the settings of the aspect of the window. Each element can be edited by double clicking with the left button of the mouse or with the SPACE bar.

- **Custom color:** allows the setting of the window background colour.
- **Window:** If Custom color is enabled, the colour set in the **Window** column of this section is used for the background of the graphic area. If disabled, the colour set in the **Default Appearance** page of the **General Setup** window (General Settings, general configuration of the WinTAX environment) is used for the background of the graphic area.
- **Color:** sets the gauge instruments default colors. All graphs configured in **Graphs** area inherits these settings as default. The following elements are customizable:
 - **Indicator**
 - **Background**
 - **Min/Max Indicators**
 - **Scale**

- Text Background
- Text



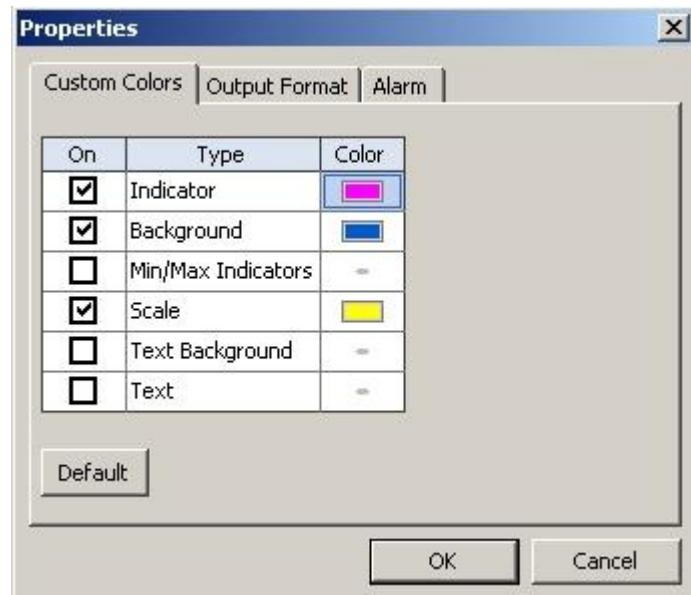
- **Custom Font:** If checked the window use the local font; if unchecked the window use the font configured in Setup, General, Default Appearance.
- **Font:** allows to select a custom font family for all text elements. The texts are automatically scaled when resizing the window.
- **Layout:** allows to select the arrangement mode of the graphs
 - Horizontal - The window organizes all channels in a horizontal manner.
 - Vertical - The window organizes all channels in a vertical manner.
 - Auto - The window organizes all channels to fill the window space in the best possible way.

Graphs Options

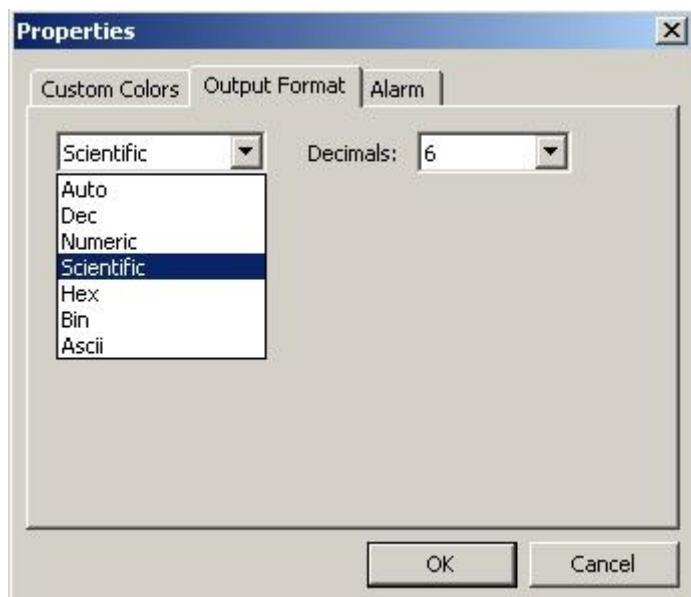
It allows to configure the settings specific of each channel of the window. Each line identifies a configured channel, while the fields to be configured correspond to the columns. Each element can be edited by double clicking with the left button of the mouse or with the SPACE bar. Multiple selections are possible through the CTRL and SHIFT keys.

- **Label:** shows the name of the channel. The name of the channel can be edited and can become a math expression if the sign = comes first.
- **Display**
 - **Color:** local configuration of gauge instruments colors. the local setup overwrites the global one defined in Window area. The following elements are customizable:
 - Indicator
 - Background

- Min/Max Indicators
- Scale
- Text Background
- Text



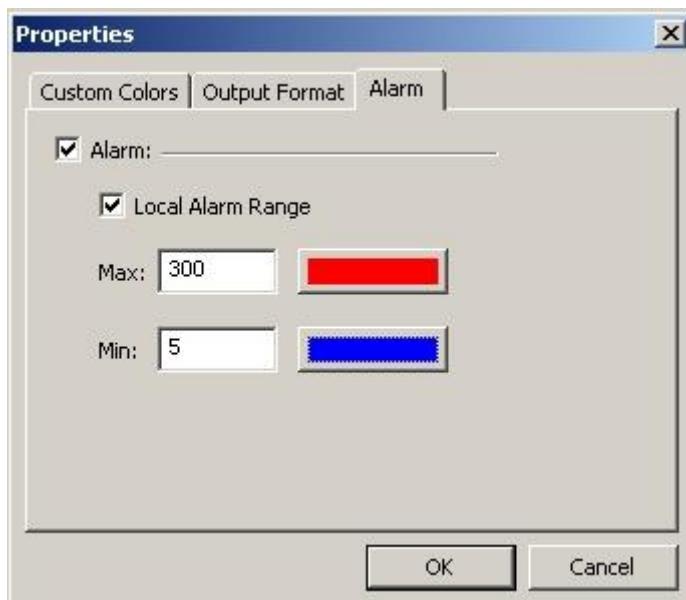
- **Format:** Visualizes the style to display the current value of the channel. To modify the setting, open the corresponding configuration window that allows to configure the settings for the visualization format of the channel values.



In the combo on the left the numeric format is selected, in the combo on the number of decimals. Please find to follow the list of the possible formats

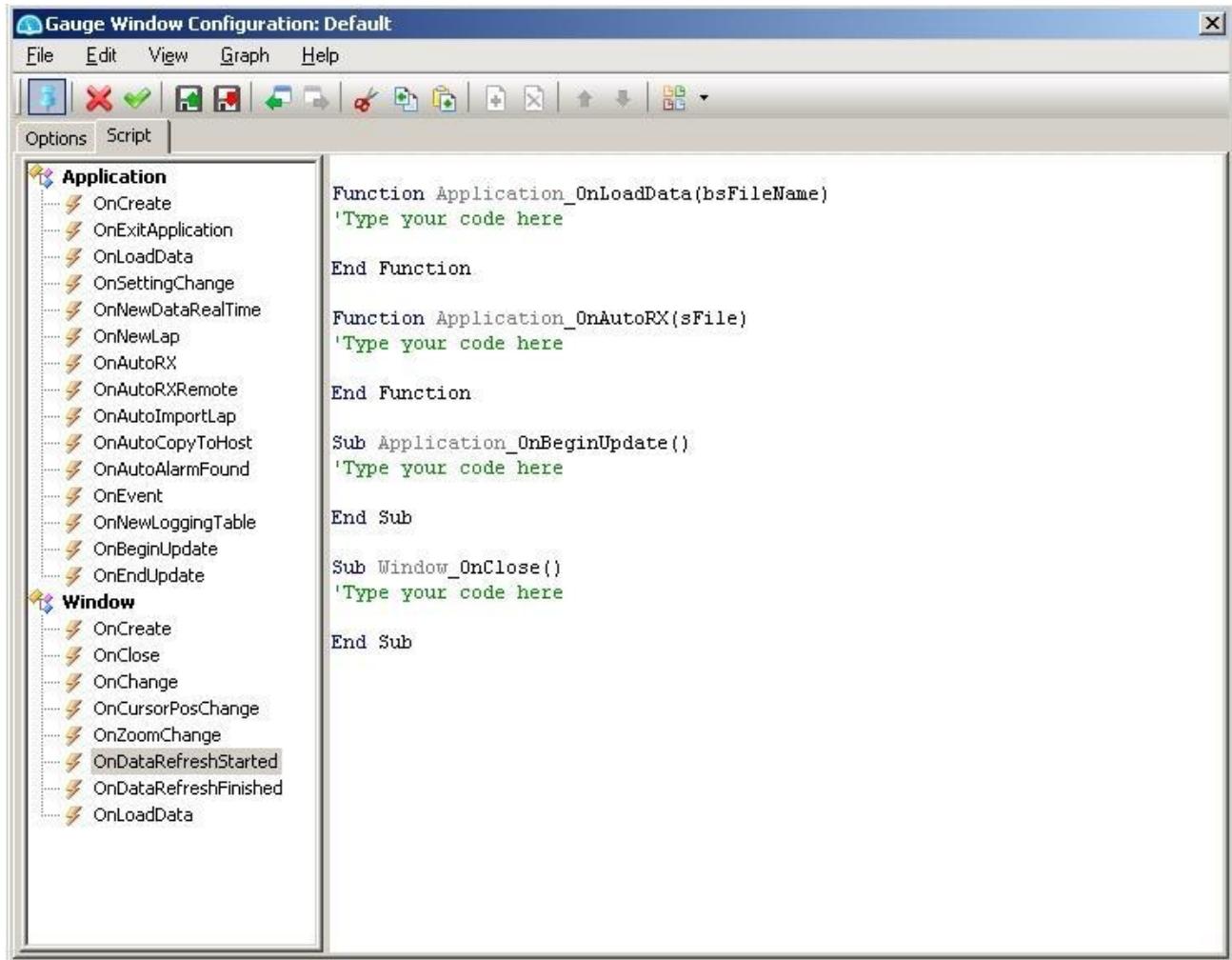
- **Auto:** The channel format is kept unchanged.
- **Dec:** The decimal format allows max 5 digits after the comma.
- **Numeric:** The numeric format allows max 15 digits after the comma.
- **Scientific:** The scientific format allows max 15 digits after the comma; the result is written in exponential form.
- **Hex:** Hexadecimal format; the decimals cannot be configured.
- **Bin:** Binary format; the decimals cannot be configured.
- **Ascii:** Text format; the decimals cannot be configured
- **Type:** selection of the indicator type, Hand or Solid Sector
 - **Solid Sector:** The graphic area is colored up to the current value.
 - **Hand:** The current value is indicated by a minute hand.
- **Angle:** selection of gauge style. the following angles are the available styles of gauges.
 - 90° Left
 - 90° Right
 - 180°
 - 270°
 - 360°
- **Indicator Size:** option only related to Hand type of indicator. Small, Medium, Large are the available dimensions of the minute hand.
- **Label:** The options are:
 - **inside:** allows to display the channel name inside the instrument area.
 - **outside:** allows to display the channel name outside the instrument area.
- **Scale:**
 - **Local:** allows to configure the desired thresholds of channel. If checked, as default, the values are taken from Channel Parameters Setup, if available.
 - **Min:** configure the minimum value of local scale
 - **Max:** configure the maximum value of local scale
 - **Factor:** applies a factor to the scale; the default value is x1 and the admitted values are:
 - x1

- x10
 - x100
 - x1000
- **Channel Value:** enables the visualization of the boxes of the current value in the information area
 - **Min/Max Values:** enables the visualization of the boxes of the minimum and maximum values in the information area.
 - **Min/Max Indicators:** enables the visualization of the minimum and maximum markers in the graphic area.
 - **Alarm:** enables the visualization of the Alarms bar. To modify the setting, open the **Properties** window at the **Alarm** page. In this page, the alarm range and the colors used, can be customized. If the Local Alarm Range option is not selected, the alarm configuration used will be as in **Channels Parameters** at the **Alarm** page.



Script

The **Script** page allows to configure scripts connected to the events of the Gauge window or of the application, in VBScript or JScript.



The section on the left shows the list of the functions available, grouped by Application and Window.

The section on the right shows the code of the functions set.

Menu

The menu of the window allows the access to the following commands, divided into sub menu:

File Menu

COMMAND	SHORTCUT	DESCRIPTION
Apply	A	Applies the current settings of the window.
Cancel		Closes the window without applying the current settings.
Load		Opens a dialog window to select a configuration file to be loaded.
Save As		Opens a dialog window to select a configuration file on which the current settings can saved

Edit Menu

COMMAND	SHORTCUT	DESCRIPTION
Cut	Ctrl + X	Copies to clipboard the configuration of the selected channels in the list of the Graphs section, and removes them from the list.
Copy	Ctrl + C	Copies to clipboard the configuration of the selected channels in the list of the Graphs section,
Paste	Ctrl + V	Pastes the configuration of the channels available on clipboard, adding them to the list of the section Graphs.

View Menu

COMMAND	SHORTCUT	DESCRIPTION
Previous page	Ctrl +Shift + Tab	Enables the page of the window previous to the one currently in use.
Next page	Ctrl + Tab	Enables the page of the window next to the one currently in use.

Menu Graph

COMMAND	DESCRIPTION
Add Graph	Adds a new element to the Graphs list of channels configuration.
Remove Graph	Removes from the Graphs list the configurations of the selected channels.
Move Up	Moves up by one position the selected elements in the Graphs list.
Move Down	Moves down by one position the selected elements in the Graphs list.

Help Menu

COMMAND	SHORTCUT	DESCRIPTION
Help	F1	Launch the WinTAX4 help, if available.

Toolbar

The window toolbar enables the access to the following commands:

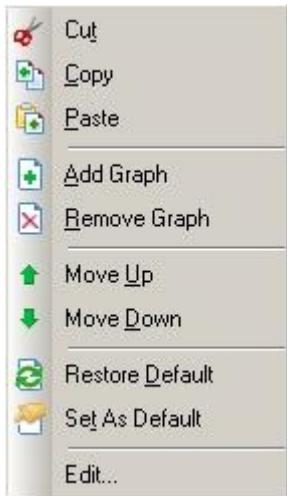


COMMAND	DESCRIPTION
Keep Visible	Enables the Keep Visible mode allowing to keep visualized the configuration window while the application window are in use.
Cancel	Closes the configuration window without applying the settings (similar to the Cancel command of the File menu).
Apply	Applies the current settings to the configuration of the graphic window (similar to the Apply command of the File menu).
Load	Similar to the Load command of the File menu

Save As	Similar to the Save As command of the File menu
Previous page	Similar to the Previous page command of the View menu
Next page	Similar to the Next page command of the View menu
Cut	Similar to the Cut command of the Edit menu
Copy	Similar to the Copy command of the Edit menu
Paste	Similar to the Paste command of the Edit menu
Add Graph	Similar to the Add Graph command of the Graph menu
Remove Graph	Similar to the Remove Graph command of the Graph menu
Move Up	Similar to the Move Up command of the Graph menu
Move Down	Similar to the Move Down command of the Graph menu
Channel Browser	visualizes the pop-up menu to select the page in the Channel Browser window 

Pop-up Menu

Pop-up menu can be visualized by clicking with the right button of the mouse on the Options page.



The pop-up menu enables the access to the following commands:

COMMAND	DESCRIPTION
Cut	Similar to the Cut command of the Edit menu
Copy	Similar to the Copy command of the Edit menu
Paste	Similar to the Paste command of the Edit menu
Add Graph	Similar to the Add Graph command of the Graph menu
Remove Graph	Similar to the Remove Graph command of the Graph menu
Move Up	Similar to the Move Up command of the Graph menu
Move Down	Similar to the Move Down command of the Graph menu
Restore Default	Sets in the channel the settings configured in the Channel Parameters
Set As Default	Configures the channel settings in the Channel Parameters.
Edit...	Gives the possibility to edit the selected parameter (double click)

Commands

The main commands available in the **Gauge Graph** window can be enabled through

- the **Options** menu in the main menu of the application
- the buttons of the **Toolbar** dedicated,
- the **pop-up** menu that can be displayed by double clicking with the right button of the mouse on the graphic area of the window.

Options Menu

Through the **Options** menu for the Gauge Graph windows the following commands can be enabled:

COMMAND	SHORTCUT	DESCRIPTION
Switch to Telemetry/Post Processing	Ctrl + T	Enables to switch from the Post-Processing mode to the Telemetry mode and vice versa.
Properties	E	Opens the interface to configure the Gauge Graph window

Toolbar

The toolbar of the windows allows the access to the following commands:

COMMAND	SHORTCUT	DESCRIPTION
Load		Opens a configuration window to select a configuration corresponding to a Gauge Graph window.
Save		Saves the current window configuration on a file.
Properties	E	See the description of the command in the Options Table.
Switch to Telemetry/Post Processing	Ctrl + T	See the description of the command in the Options Table.

Pop-up Menu

By clicking with the right button of the mouse on the graphic area of the window the pop-up menu is displayed that allows the access to the following commands.



This section will describe only the commands that have not already been described previously.

COMMAND	DESCRIPTION
Remove Graphs	Removes the selected channel.

Track Window

The Track window shows the track set in the Track Editor. Moreover it allows viewing the Section Track configured in the Track Editor. In addition reports concerning the sections, events and markers linked to the channels can be displayed. The track can also be customized by manually adding labels, sections and markers. The car on the track can be linked to the position of the cursor in the Graph window.

Elements of the window

In the Track window the name of the track is displayed on top. In the middle there is the track itself; on the borders of the window according to the configurations selected, some text boxes containing notes or information are displayed. Around the track there are some text boxes containing information about the Track Section and about the corresponding possible reports. Each element will be analyzed and displayed in the **Functions** page.

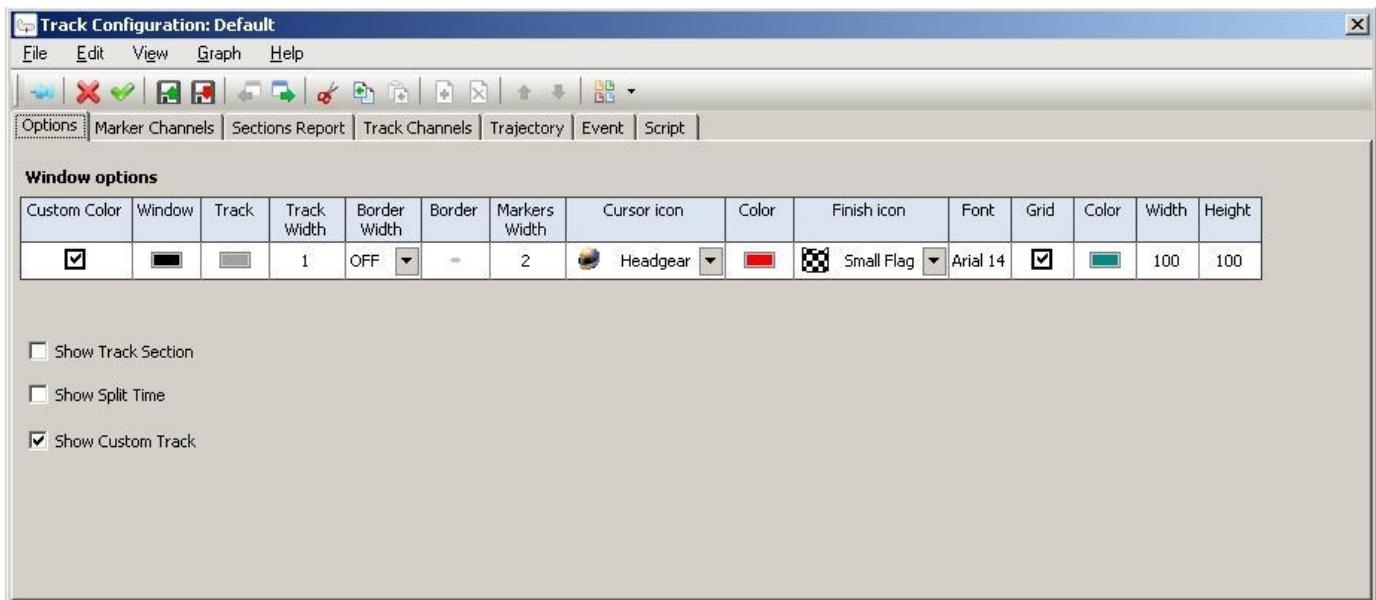


Track Configuration Window

The **Track Configuration** window enables to set the look of the **Track windows** and it is formed by the pages: **Options**, **Marker Channels**, **Sections Report**, **Track Channels**, **Trajectory**, **Event** and **Script**. The window moreover has a menu, a toolbar and a pop-up menu that ease the access to the configuration and management commands of the window itself.

Options

The **Options** page is composed of the **Window Section** and of three check commands.

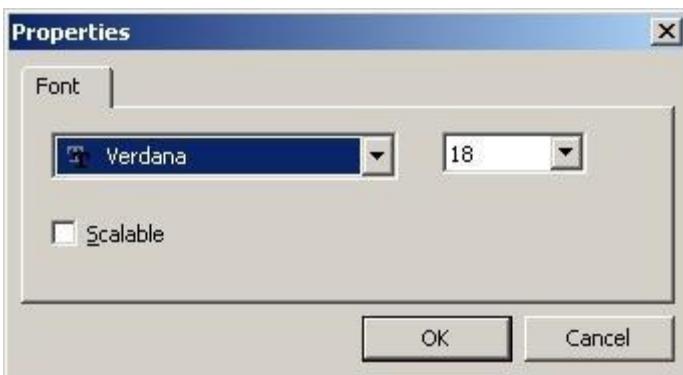


Window Options

It allows configuring the general setting of the window. Each box can be edited by double clicking with the left button of the mouse or by pressing Space Bar.

- **Custom Color:** enables the customized setting of the colours of the window.
- **Window:** sets the background colour of the window.
- **Track:** sets the colour of the track.
- **Track Width:** sets the width of the track. Values ranging from 1 to 20.
- **Border Width:** sets the colour of the borders of the track.
- **Border:** sets the width of the track border, Values ranging from 1 to 10; if border is not required, select OFF.
- **Markers Width:** sets the width of the breakpoints. Values ranging from 1 to 10.
- **Cursor icon:** Sets the icon identifying the car on the track.
- **Color:** sets the colour of the car.
- **Finish icon:** Sets the icon identifying the finish line on the track.

- **Font:** Sets the font. Editing the font box, the following configuration window is displayed



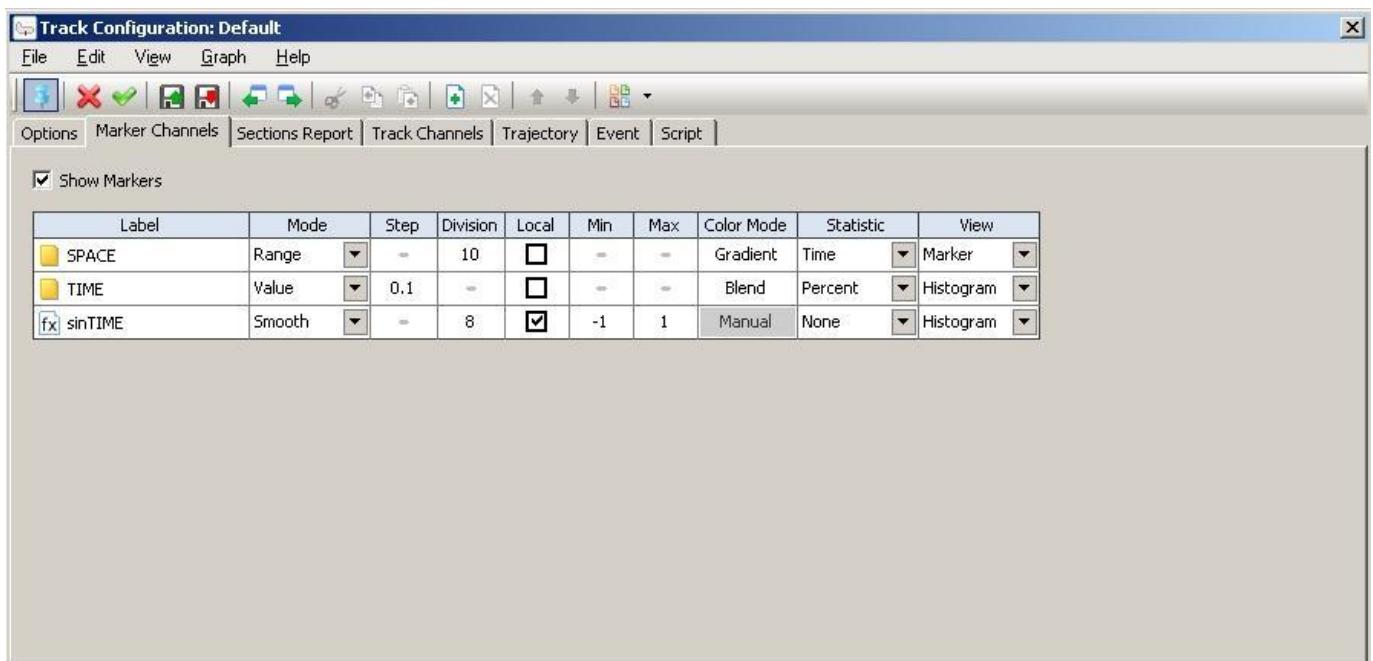
Any type of font, its size and scalability can be set.

- **Grid:** If enabled it uses the next grid configuration instead of the default one.
- **Color:** Sets the custom colour of the grid.
- **Width:** Sets the X division of the grid.
- **Height:** Sets the Y division of the grid.

The checks are:

- **Show Track Section:** enable the visualization of Track Section
- **Show Split Time:** enable the visualization of Split Time
- **Show Custom Track:** enable the visualization of custom track

Marker Channels



The Marker Channels page allows configuring the settings specific for each channel to be displayed in a graph. Each row identifies a configured channel, while the columns identify the fields to be configured. Each cell can be edited by double clicking with the left button of the mouse or by pressing the Space Bar. Multiple selections are possible through to the CTRL and SHIFT buttons.

Show Markers: Enable the visualization of configured markers

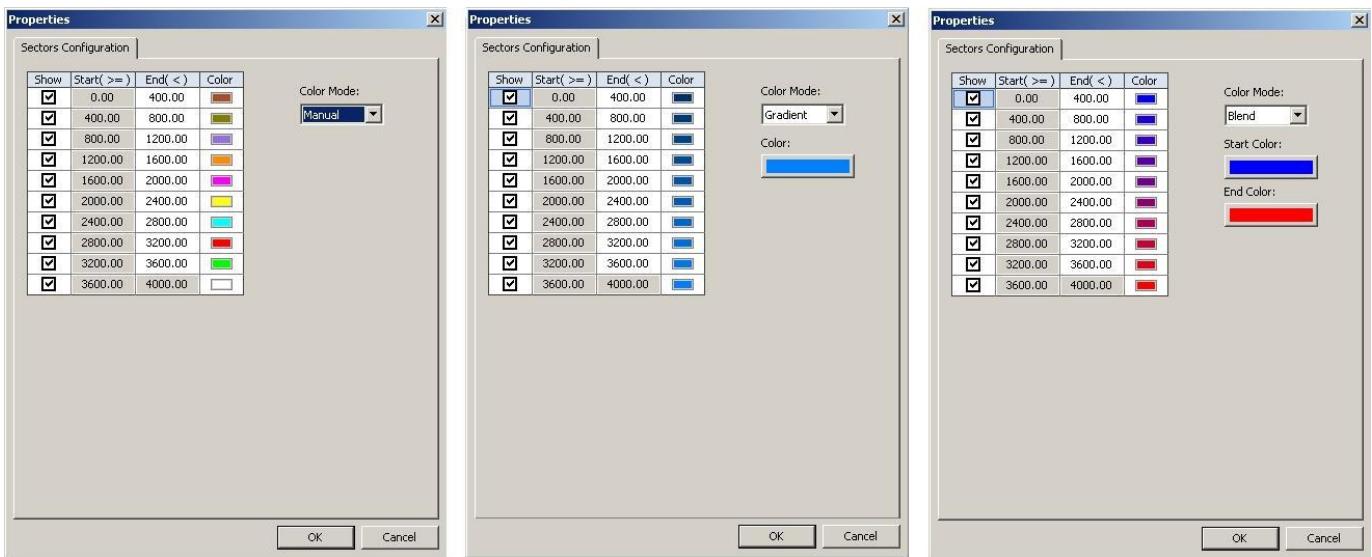
- **Label:** Displays the name of the channel. The name of the channel can be edited and can become a math expression if a = sign comes first.
- **Mode:** Allows choosing between the Value, Range and Smooth mode.
In Value mode the number of ranges is not set and derives from the ratio (Max - Min)/Step. This mode shows only the calculated value and not the whole range between two calculated values.

In Range mode the number of ranges is fixed and can be set in the Bands field, what varies is the Step because the bounds are always Min & Max; in fact Step = (Max - Min)/Division.

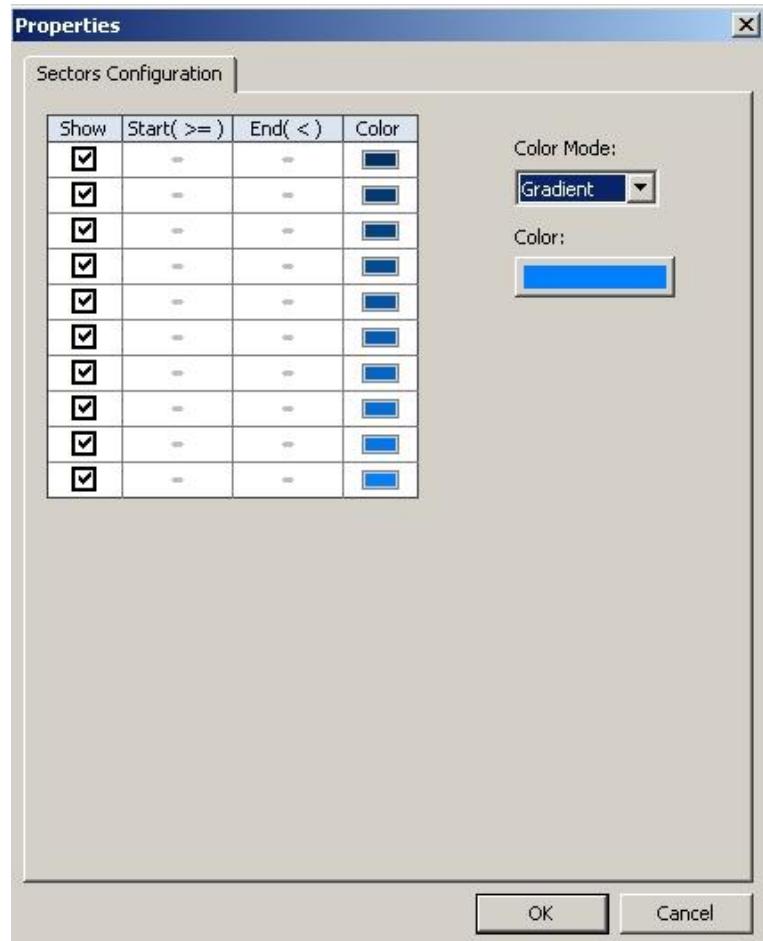
In Smooth mode the colour range is defined as a blend starting from blue up to red. The blue colour represent begin values (little module of value), the red colour represent end values (great module of value). The blending range is depending by minimum, maximum and division values.



- **Step:** Step is enabled only in Value mode and represents the width of each range; its measurement units are the same as the channel ones.
- **Division:** Division is enabled in Range and in Smooth mode and represents the number of ranges to be created to display the marker.
- **Local:** Enable the local scale configuration.
- **Min:** Minimum values to configure the markers, its measurement units are the same as the channel ones.
- **Max:** Maximum values to configure the markers, its measurement units are the same as the channel ones.
- **Color Mode:** Sets the sequence of colours for the range. To modify the settings open the Sectors Configuration window. This window configures the colours and values of the ranges for the window markers. The picture shows the possible modes to select the colour: Manual, Gradients and Blend.



In all modes the configuration of the channels values occurs in the same way: if Local is checked, the intervals are automatically recalculated from the minimum and the maximum values configured; if Local is unchecked, only the number of intervals and the correspondents color are created, as shown in picture below.



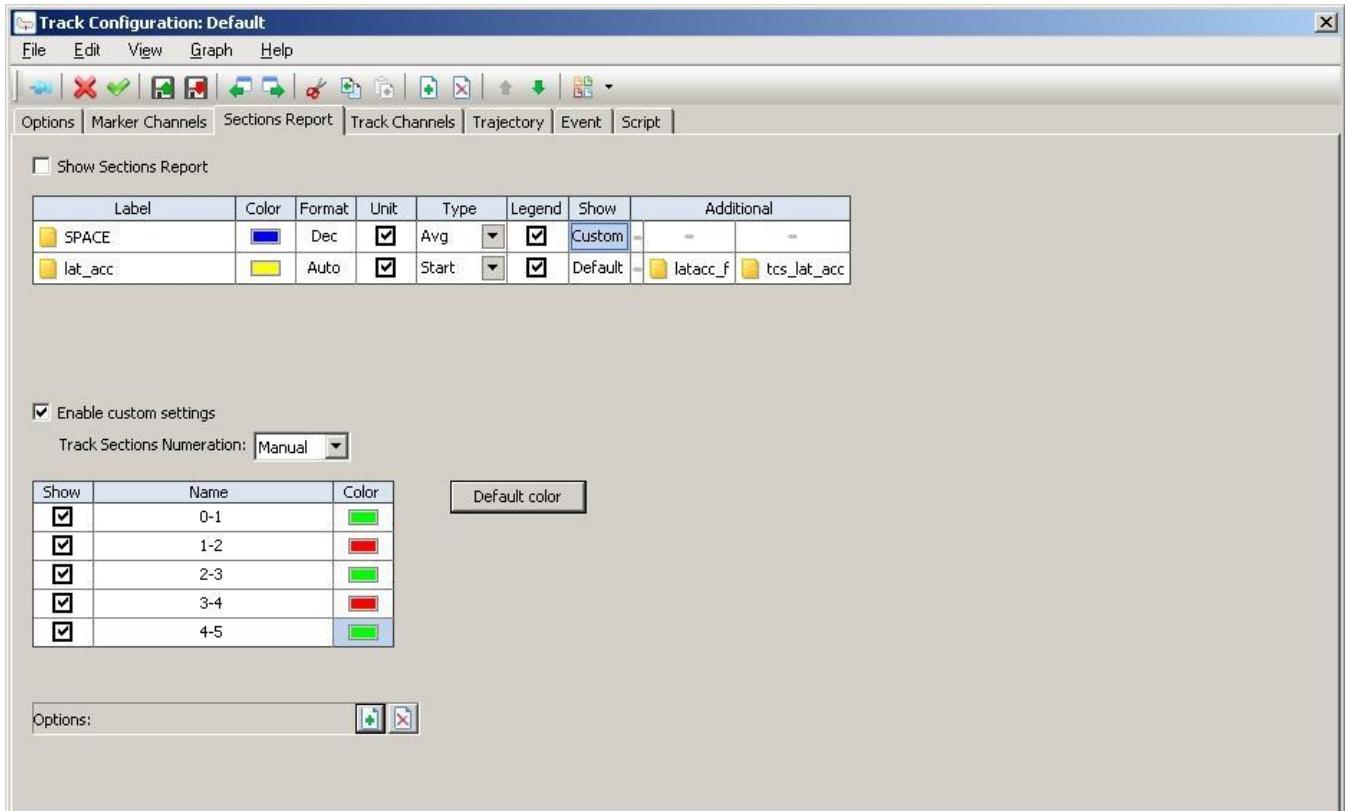
The values of the ranges, when displayed, can also be set manually; the possible values manually set are saved and stored. The values are refreshed automatically when values that affect calculation have changed. The colours can be manually selected also range by range. Every range could be switched off.

The opening mode of a window by default is Manual. This means that the series of colours automatically presented is linked to the custom mode.

- **Manual:** In Manual mode the predefined colours are created according to the background colours of the window. The sequence of colours repeats cyclically each ten colours.
 - **Gradient:** In Gradient mode the colour to be used as a base must be selected; as soon as it is chosen a sequence of colours is created following the colour set.
 - **Blend:** In Blend mode, the window takes two user-defined valid colors and creates a palette between the colors.
-
- **Statistics:** Adds some information in the legend for marker information.
 - **None:** No information added.
 - **Time:** Adds the total time during which a channel remains in the range of each marker.
 - **Percent:** Adds the total percentage time during which a channel remains in the range of each marker.
 - **View:** Selects the visualization mode of marker.
 - **Marker:** Display markers on the trajectory. The display of the marker, if enabled, overtops the display of the track sections.
 - **Histogram:** Display markers as histogram.

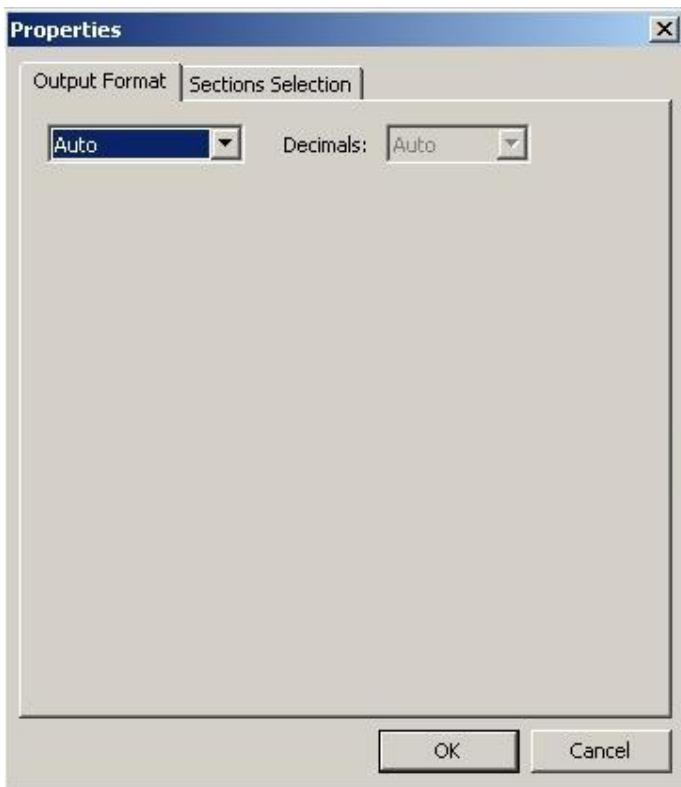
Sections Report

It allows configuring the settings specific for each channel to be displayed for the section report. Each cell can be edited by double clicking with the left button of the mouse or by pressing the Space Bar. Multiple selections are possible through to the CTRL and SHIFT buttons.



Show Section Reports: Enable the visualization of section reports

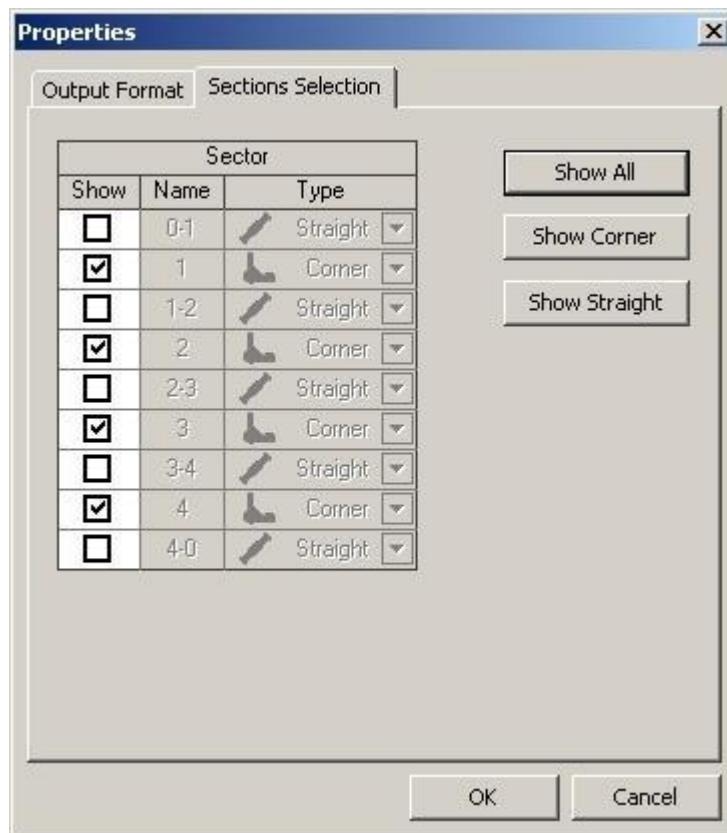
- **Label:** Displays the name of the channel. The name of the channel can be edited and can become a math expression if a = sign comes first.
- **Color:** Sets the graphic colour of the channel.
- **Format:** displays the style to view the present value of the channel. To modify the setting, the corresponding configuration window must be opened to enable to configure the setting for the display format of the channel values.



In the combo of the left the numeric format can be selected, in the combo on the right the number of decimals is selected. Please find to follow a list of the possible formats

- **Auto:** the channel format is kept unchanged.
- **Dec:** the decimal format allows max of 5 digits after the comma.
- **Numeric:** the numeric format allows max 15 digits after the comma.
- **Scientific:** the scientific format allows max 15 digits after the format; the result is written in exponential form.
- **Hex:** hexadecimal format; decimals cannot be configured.
- **Bin:** binary format; decimals cannot be configured.
- **ASCII:** text format; decimals cannot be configured.
- **Unit:** if enabled, the legend of the section report displays the unit of measurement configured in "Setup/Channel Parameters"
- **Type:** The type of statistic to be set in the channel can be configured to calculate the section report; the following possibilities are available:
 - **Start:** returns the channel value to the starting time of each section
 - **End:** returns the channel value to the final time of each section
 - **Max:** returns to the max channel value for each section

- **Min:** returns to the minimum channel value for each section
- **Avg:** returns the average value of the channel samples of each section
- **St Dev:** returns the standard deviation of the channel samples of each section
- **Legend:** If enabled, the bottom of the window shows the display remarks of the channel.
- **Show:** It is used to configure the sections to be displayed in the track. By selecting the individual check boxes, the sections are either displayed or hidden. The buttons are used to quickly select all the sections or just corner or straight sections.



- **Additional** In this section you can add N channels, dragging them on the question mark. The value of these channels will be displayed in the boxes by the sections to which they have been added. The Delete button is used to cancel the channels.

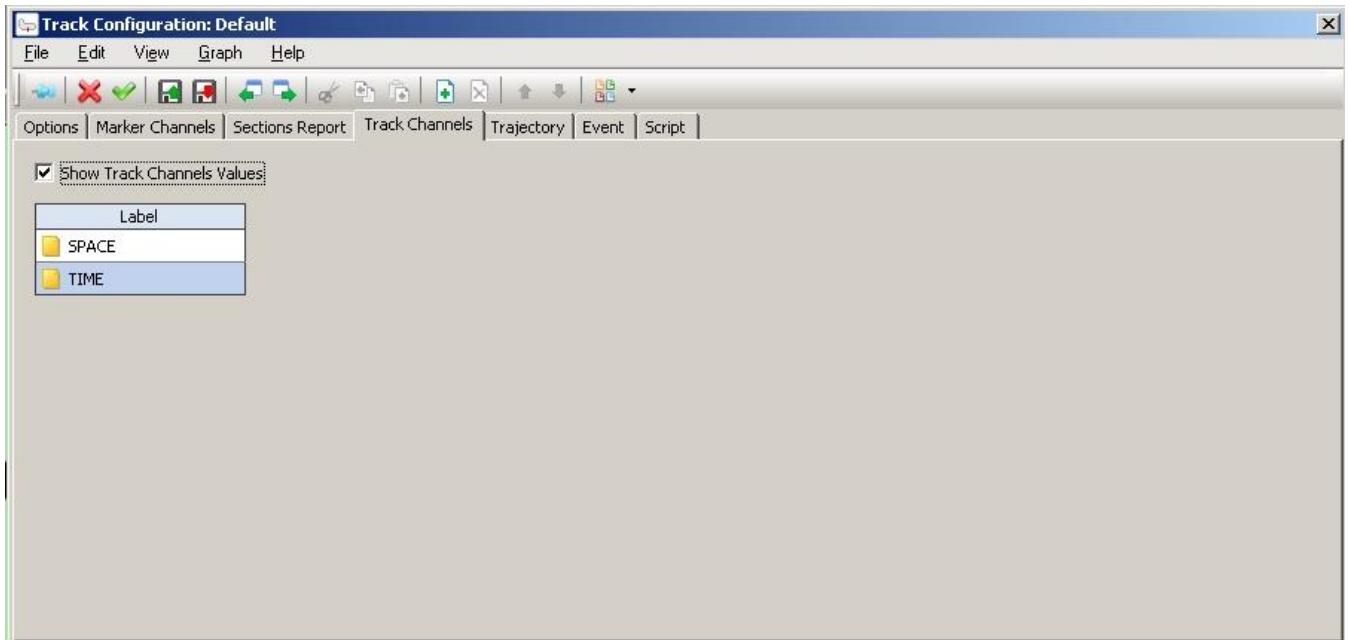
Enable custom settings: Enables the customized settings. If it is disabled, the configurations available on the Track Editor are displayed, while if it is enabled the configuration set in the window are displayed.

- **Track Section Numeration:** sets the visualization mode of the map:
 - **All:** all events of the map are displayed,
 - **Corner:** only corners are displayed
 - **Straight:** only straights are displayed

- **Manual:** the list of the sections is displayed (see picture) and each section can be visualized or not. Each section can also be customized both for the label to be shown and for the visualization colour. Sections can be added or removed thanks to the Options commands. The Default Color button sets red and green alternated colours.
- **Default color:** sets the default color of sections:
- **Options:** the Manual Track Section Numeration is configured using the buttons Add Section and Remove Section.

Track Channels

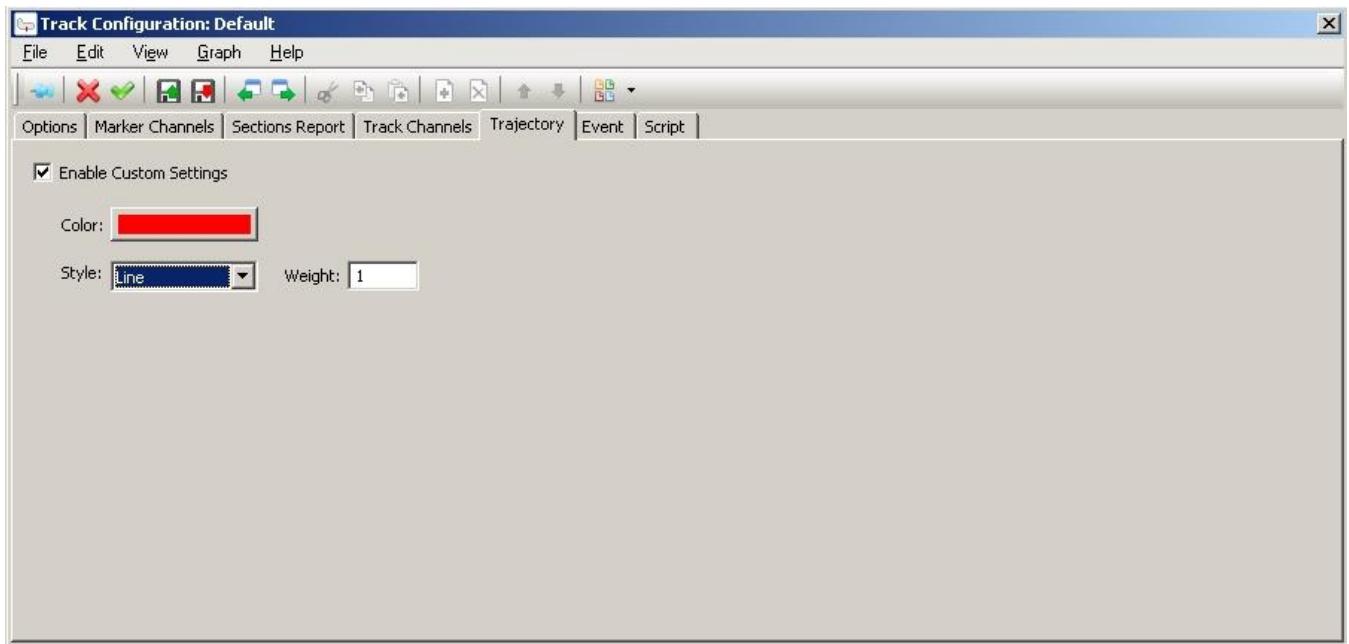
It allows configuring one or more channels to be displayed in a graph. Each row identifies a configured channel. This channels will be displayed on track when "show track channel values" is checked. This function activates a popup that shows the values of channels calculated in current cursor position.



Trajectory

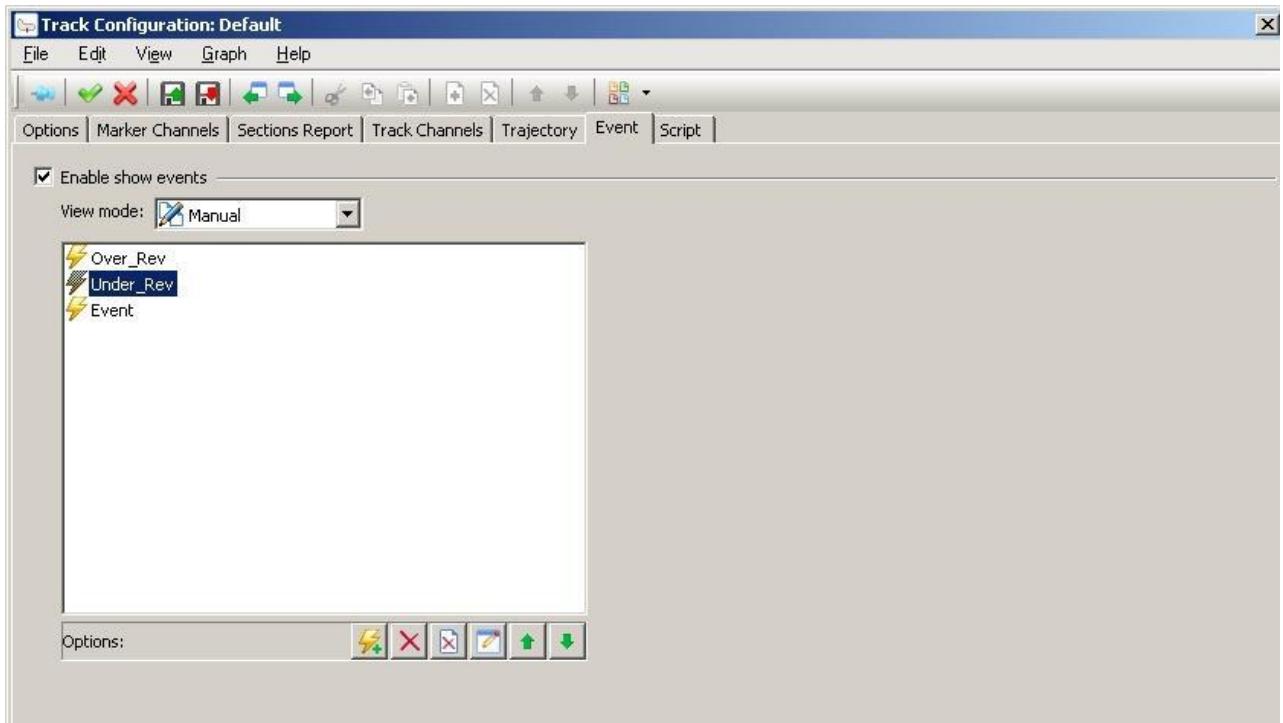
In **Trajectory** you can configure the trajectory so that it is easier to see.

The style of the line, the colour and the weight can be set.



Event

The **Event** page allows configuring the events connected to the **Track** window.



Enable show events: Enables the display of the events.

View Mode: sets the display mode of the events.

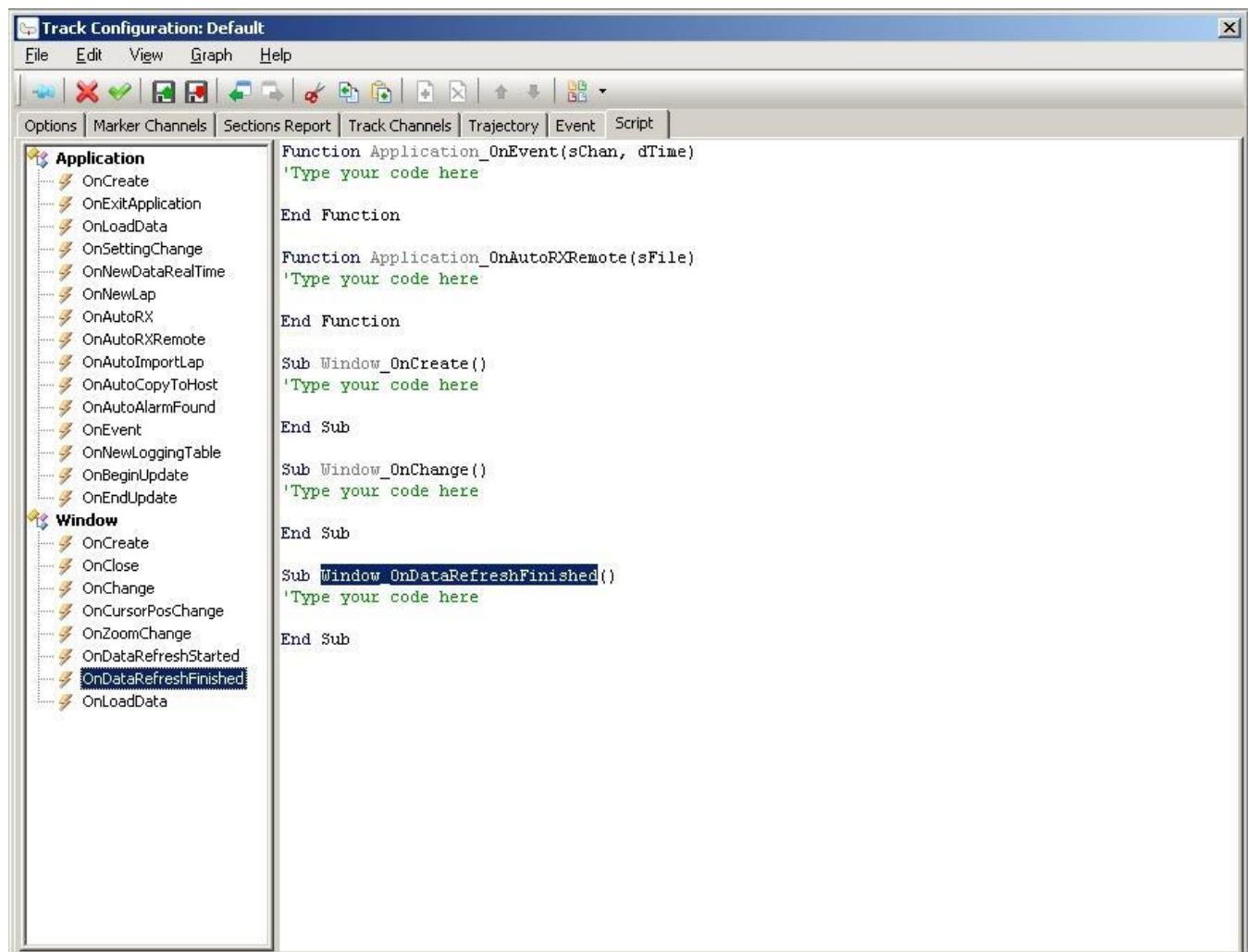
- **All:** all events are displayed.
- **Manual:** only the events selected by the user are displayed in the list.

The list displays the customized events configured by the user.

Each event can be configured by using the buttons on the **Options** bar (to add, remove an event, to remove all events, to modify and move them inside the list).

Script

The **Script** page allows configuring the scripts connected to the events of **Track** window or application, in VBScript or JScript. The script language is chosen in Setup/General.



The section on the left shows the list of the functions available, grouped by Application and Window. The section on the right shows the code connected to the functions set.

Menu

The menu of the **Track** window allows the access to the following commands, divided into sub menus:

File Menu

COMMAND	SHORTCUT	DESCRIPTION
Apply	A	Applies the settings to the window.
Cancel		Closes the window without applying the settings.
Load		Opens a dialogue window to select a configuration file to be loaded.
Save As		Opens a dialogue window to select a configuration file, to save the setting.

Edit Menu

These commands are enabled both in the Section of the Section Reports and in the Markers section. Cut or Copied channels in one of the two sections are pasted always in the same sections.

COMMAND	SHORTCUT	DESCRIPTION
Cut	Ctrl + X	Copies to clipboard the setting of the channels selected from the active section list, and remove them from the list.
Copy	Ctrl + C	Copies to clipboard the setting of the channels selected from the active section list.
Paste	Ctrl + V	Pastes from clipboard the setting of the channels.

View Menu

COMMAND	SHORTCUT	DESCRIPTION
Previous page	Ctrl + Shift + Tab	Enables the page of the window previous to the one currently in use.
Next page	Ctrl + Tab	Enables the page of the window next to the one currently in use.

Graph Menu

These commands are enabled both in the Section of the Section Reports and in the Markers section and work on the section currently enabled. If no section has been selected, the Section Reports is selected by Default.

COMMAND	DESCRIPTION
Add Graph	Adds a new element to the list for the configuration of channels.
Remove Graph	Removes from the list the settings of the selected channels.
Move Up	Moves up by one position the elements selected from the list.
Move Down	Moves down by one position the elements selected from the list.

Help Menu

COMMAND	SHORTCUT	DESCRIPTION
Help	F1	Launch the WinTAX4 help, if available.

Toolbar

The toolbar of the window allows the access to the following commands:



COMMAND	DESCRIPTION
Keep Visible	Enables the Keep Visible mode ensuring to keep visualized the configuration window while other application windows are being used.
Cancel	Closes the configuration window without applying the setting (Similar to the Cancel command of the File menu).
Apply	Applies the setting to the graphs window (Similar to the Apply command of the File menu).

Load	Similar to the al Load command of the File menu
Save As	Similar to the Save As command of the File menu
Previous page	Similar to the Previous page command of the View menu
Next page	Similar to the Next page command of the View menu
Cut	Similar to the Cut command of the Edit menu
Copy	Similar to the Copy command of the Edit menu
Paste	Similar to the Paste command of the Edit menu
Add Graph	Similar to the Add Graph command of the Graph menu
Remove Graph	Similar to the Remove Graph command of the Graph menu
Move Up	Similar to the Move Up command of the Graph menu
Move Down	Similar to the Move Down command of the Graph menu
Channel Browser	Shows the pop-up menu to select the page in the Channel Browser window. 

Pop-up Menu

The pop-up menu of the window can be displayed by double clicking with the right button of the mouse on the Marker Channels, Sections Report and Track Channels pages.



The pop-up menu of the window allows the access to the following commands:

COMMAND	DESCRIPTION
Cut	Similar to the Cut command of the Edit menu
Copy	Similar to the Copy command of the Edit menu
Paste	Similar to the Paste command of the Edit menu
Add Graph	Similar to the Add Graph command of the Graph menu
Remove Graph	Similar to the Remove Graph command of the Graph menu
Move Up	Similar to the Move Up command of the Graph menu
Move Down	Similar to the Move Down command of the Graph menu
Restore Default	Sets in the channel the settings configured in the Channel Parameters.
Set As Default	Sets the configuration of the channels in the Channel Parameters.
Edit...	Gives the possibility to edit the selected parameter (Similar to double click).

Functions

The **Track window** has the following functions:

- Connect Cursor
- Zoom
- Marker display
- Track Marker Compare
- Track Sections display
- Track Sections Report display
- Custom Track
- Track Channel Values
- Integrate Google Earth Maps
- Ruler

Connect Cursor

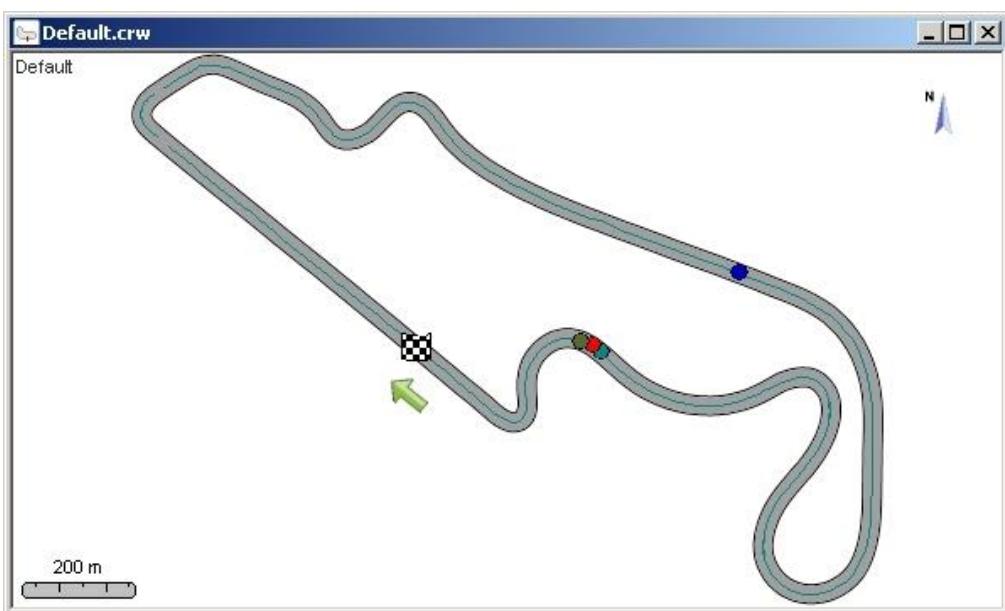
When in the Setup/General the Auto Connect check is enabled, the track is connected from and to the graphic windows. In fact when the cursor is moved on a Graph window, on the Track window the icon identifying the car on the track associated with the moment of time moves. In the same way, by moving the car with the mouse (or with the left and right arrows) the cursor resets on the other windows according to the moment of time associated with the position of the car on the circuit. This function that links time and space to work correctly needs the channel distance in the "Setup/Special Channels" to be properly configured.

The window is structured in a way that in case of zooming the connections between cursor and car are always displayed indicating the car in the middle of the window, this does not happen when the track is completely contained in the window.

In the case of append laps, the link between the car on Track window and cursor position on graph window refers to the current lap.



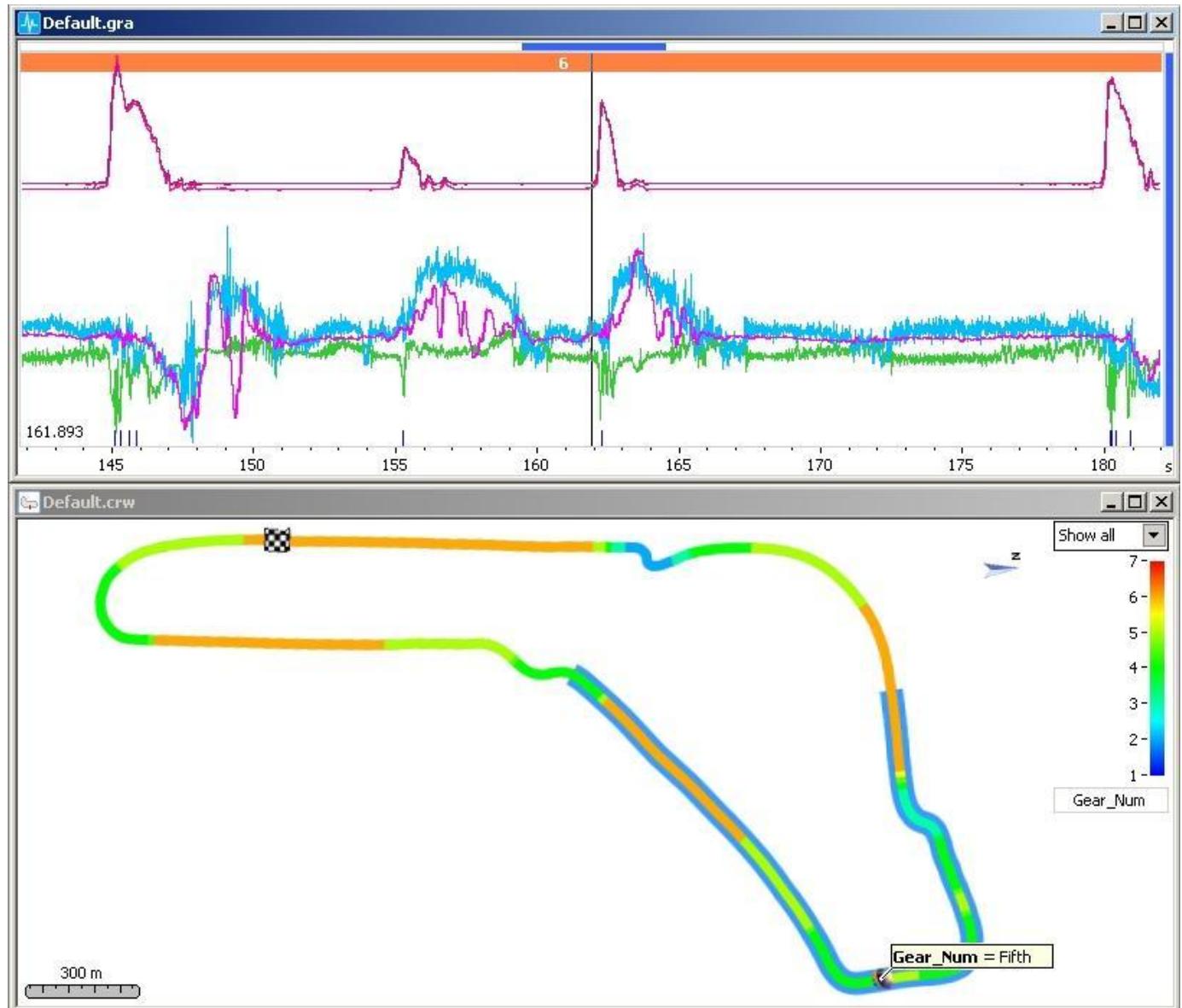
In case of laps comparison, a car for each lap compared is displayed on the track.



Zoom

The zoom on window track does not affect the zoom of the other windows. The only way to zoom an area of the tracks is to select a rectangle by using the right button of the mouse. When zooming, the window displays the car in the middle as soon as a Connect Cursor situation occurs. When zooming, the user can go back to the initial situation through the Minimum Zoom command. When zooming, the Panning function can be used.

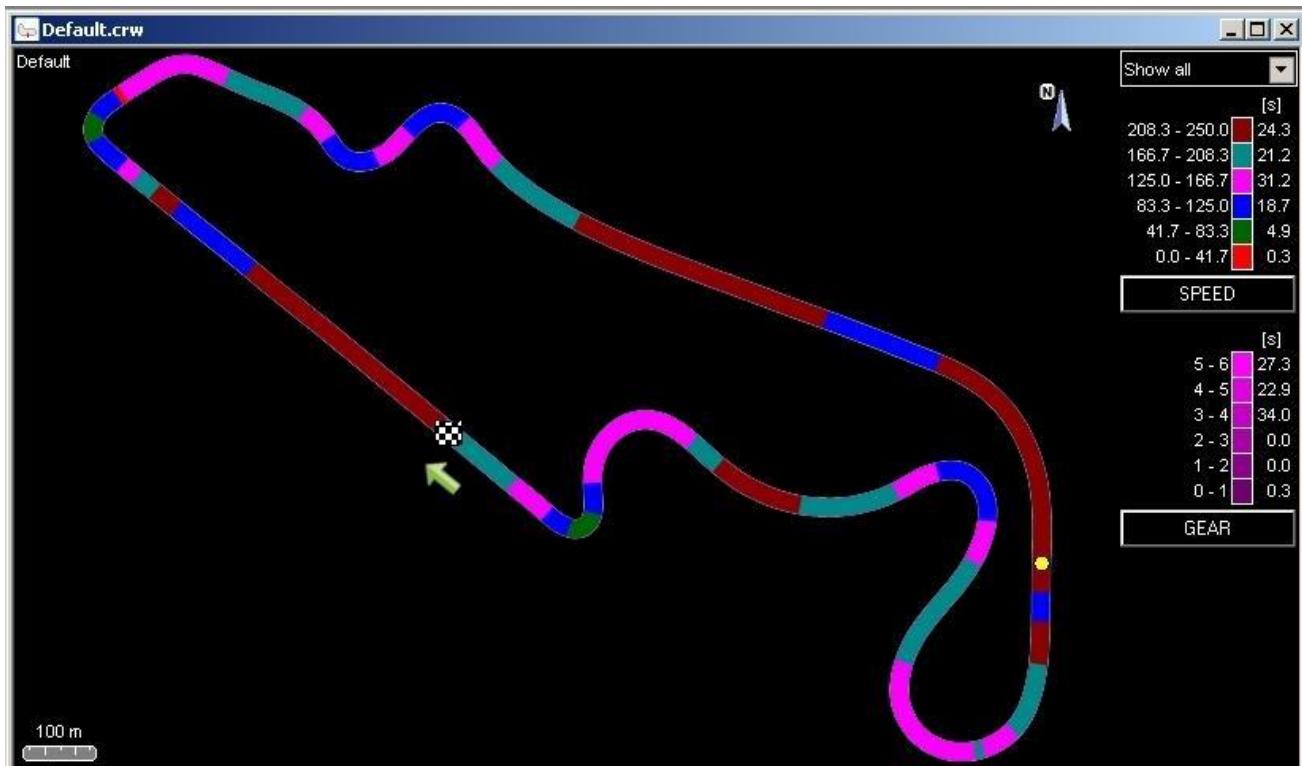
Instead, the zoom on the graph window affects the track window; in fact, when there is an active zoom on the graph windows, the track window shows the part of the circuit that is concerned with the zoom. If an append of laps is loaded and if the zoom includes two contiguous lap, the track is highlighted throughout the affected area unless the track overlaps.



Marker display

It's a display mode that allows showing the markers available in the configuration in the markers section. The markers display on the track can be enabled or disabled through the Markers command, it overtops the Track Sections display if both enabled.

In the picture there are two channels configured as Marker, SPEED and GEAR. Each channel includes an info chart reporting the ranges, the colour associated with the ranges and if configured, the times or the percentage in which the channel has the values included in a certain range. The ranges are indicated on the track. In almost all corners for instance the magenta range appears, this indicates a SPEED ranging from 125 and 166.7.

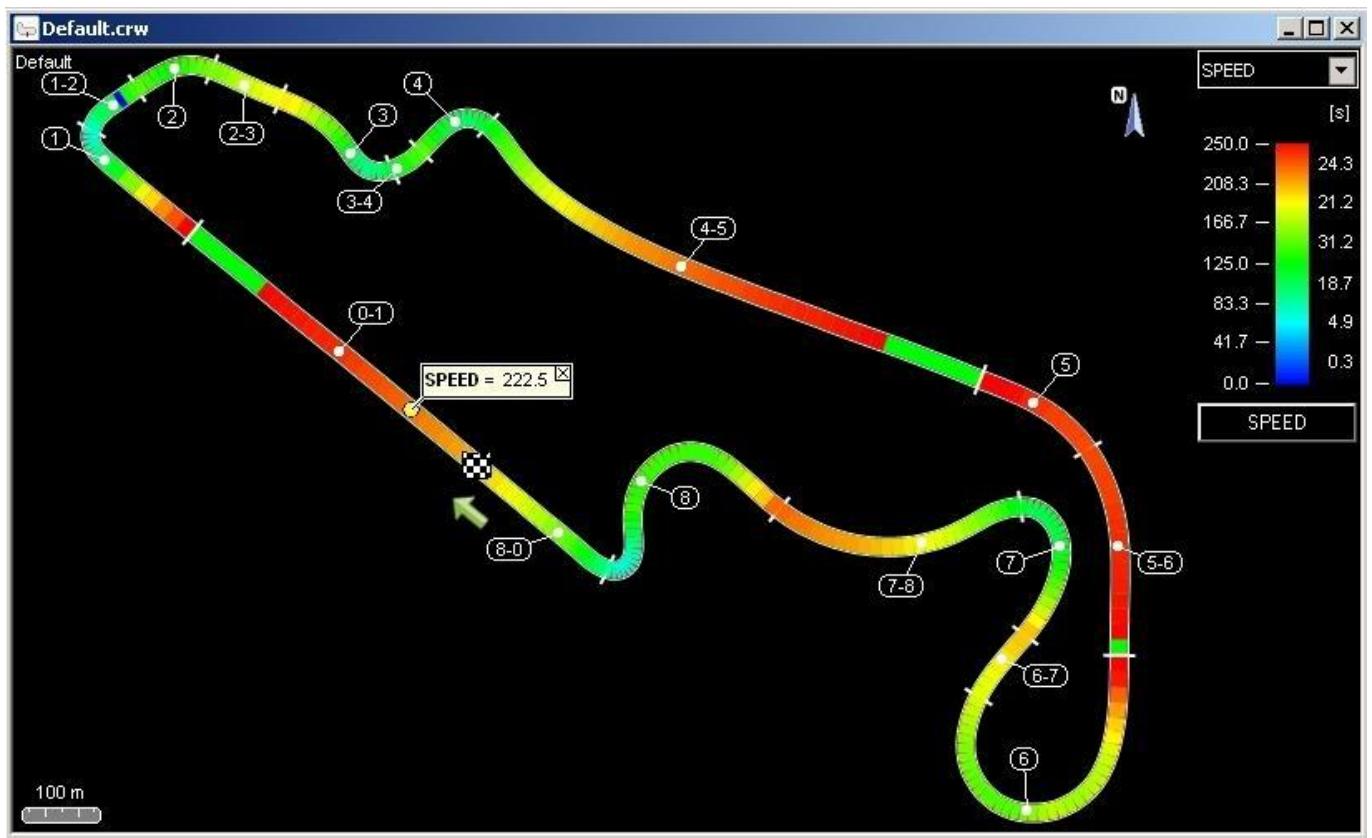


In the picture however there are two Markers. By default the first Marker is displayed, the second one is hidden. There can however be some overlapping markers if the configured ranges do not cover the whole track, therefore combinations of different markers might occur. The gradation mode is useful in these cases to better identify the marker.

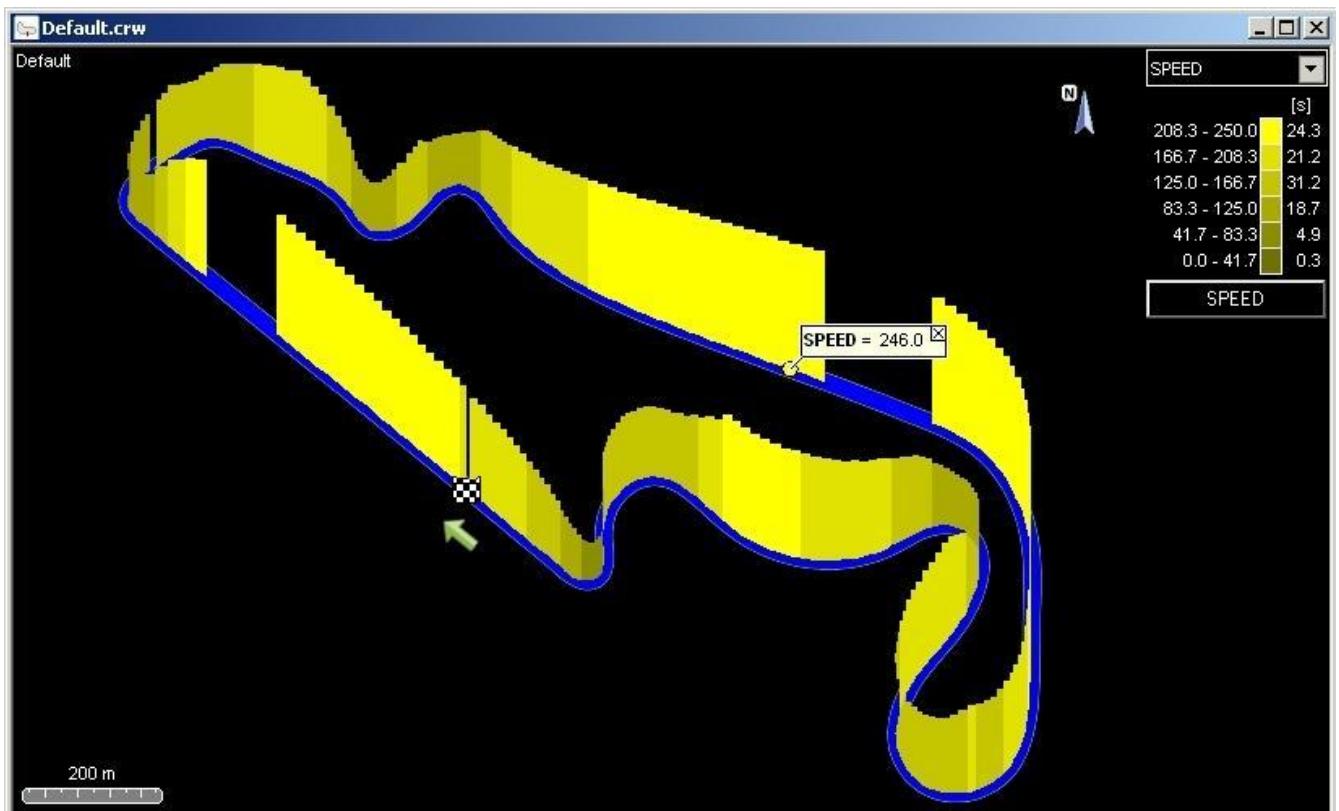
The display of the marker can be disabled by clicking on the name in the ranges table. By clicking once again the display is enabled. In this way the Markers that are in a lower position in the arrangement can be display. For each marker the range can moreover be switched on/off by simply clicking on the corresponding coloured square in the ranges table.

On the top of the channel list, there is a combo that permits to choose which markers show on the track.

In the picture below there is a Marker channel in Smooth mode.

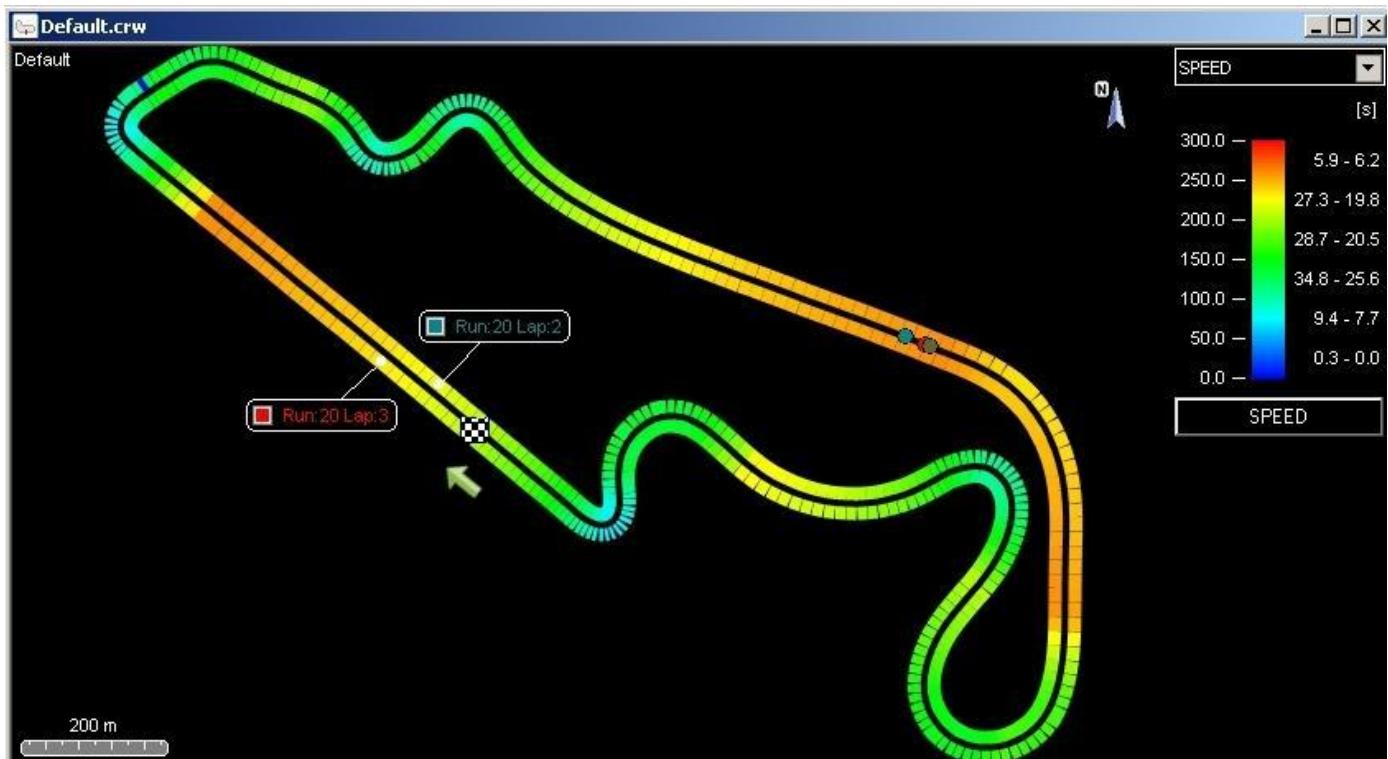


Marker Histogram has the same function of Marker, except for the visualization, as shown in picture.



Track Marker Compare

If the current lap selection is a comparison, marker visualization is active and the marker selected is in "marker" view, Track window shows two concentric markers on the track. A small text box indicates the name of the lap and the run belongs to.

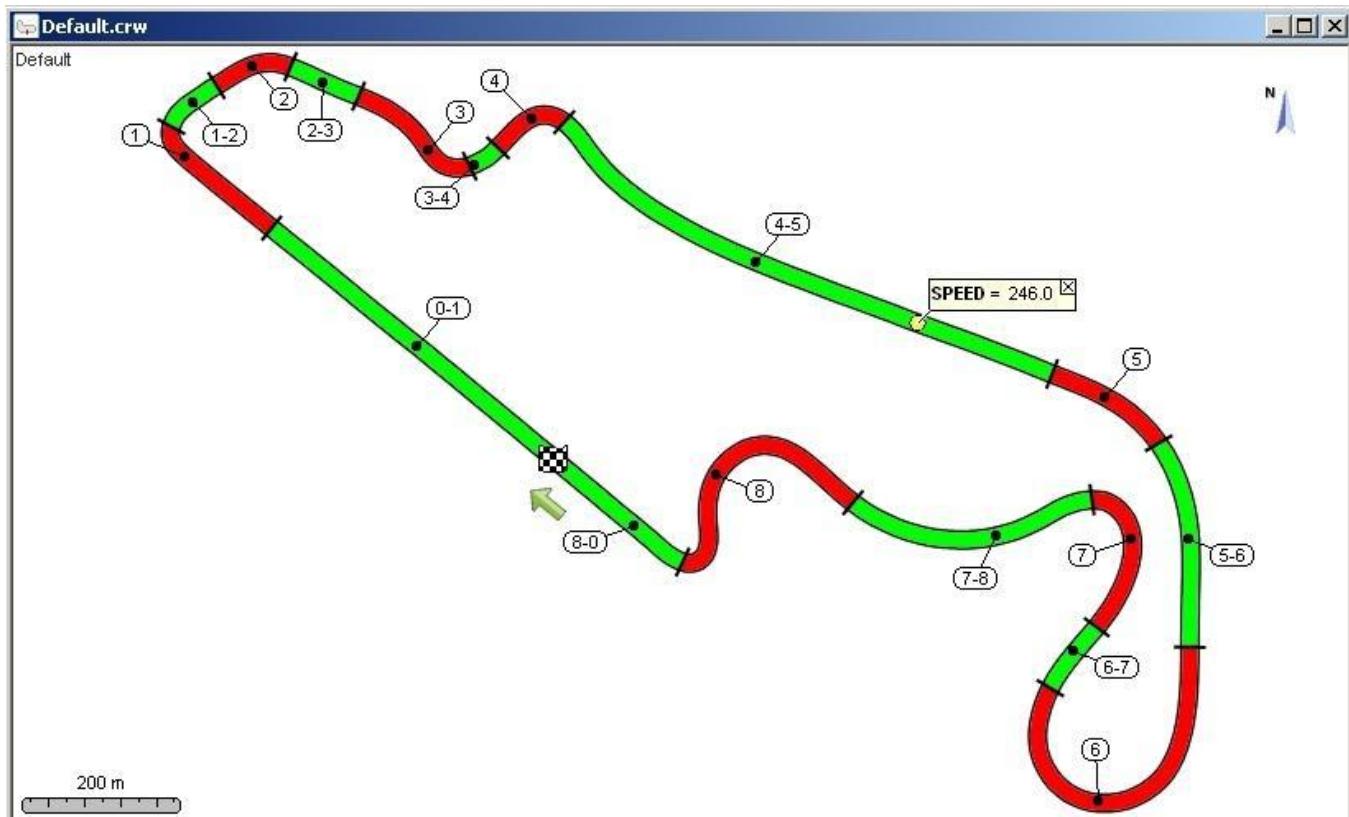


With command "Select lap marker" it's possible to configure which laps are compared; only two laps at a time are allowed.

Chrono Time	Track Name	Session Name	Car Name	Abs
<input checked="" type="checkbox"/> 1:20.385	TEST	RACE-SERVER	908_Test_C1	1639
<input checked="" type="checkbox"/> 1:19.850	TEST	RACE-SERVER	908_Test_C1	1640
1:19.150	TEST	RACE-SERVER	908_Test_C1	1641

Track Sections display

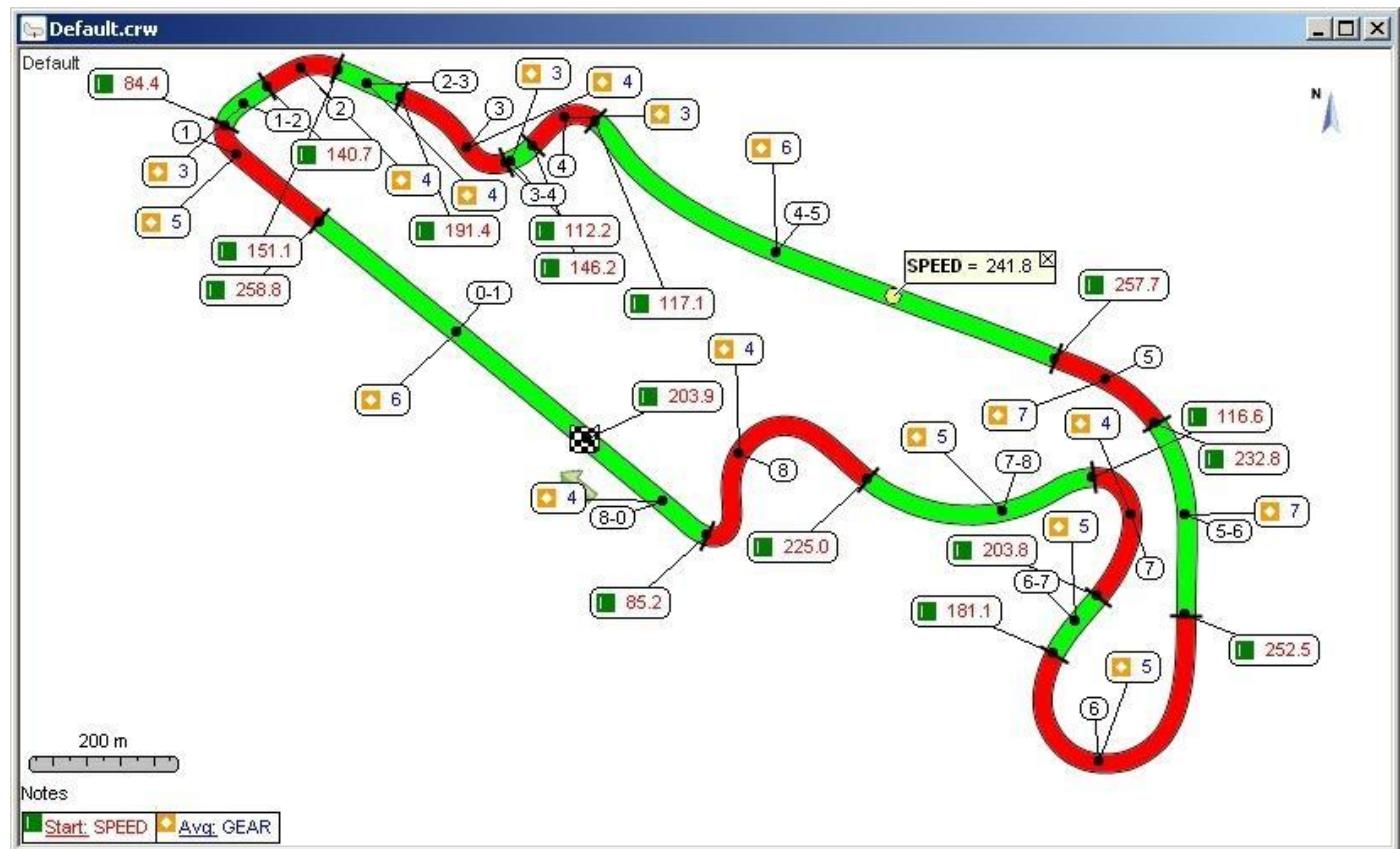
This is a display mode that allows showing the Track Sections according to the options configured in the Track Sections section. The display of the Track Sections on the track can be enabled or disabled through the Track Sections command, the display is hidden if at the same time the Markers display is enabled.



The displayed sections are characterized by the colour of the section and by the identification label. The labels can be moved in the favorite position by clicking on them and dragging them with the mouse. As an alternative the Automatic Placement command can be selected to place the labels in a position calculated by WinTAX. The labels are visible even if Track Section Reports is enabled.

Track Sections Report display

The display of the track is the same as the Track Sections display because the Track Sections are always highlighted and it has a priority always lower than the Markers display. What changes are the highlighted labels that do not contain information on the Track Section, but contain the channel values of the Track Section, calculated according to a certain statistics.



Down on the left there is a small legend with the name of the channel, the statistics calculated and the icon associated to the statistics, this legend is useful to identify the various labels in the window. The labels can be moved in the favorite position by simply clicking on them and dragging them with the mouse. As an alternative the Automatic Placement command can be selected to place the labels in a position calculated by WinTAX. The labels are visible even if the Markers display and / or the Track Section display are enabled.

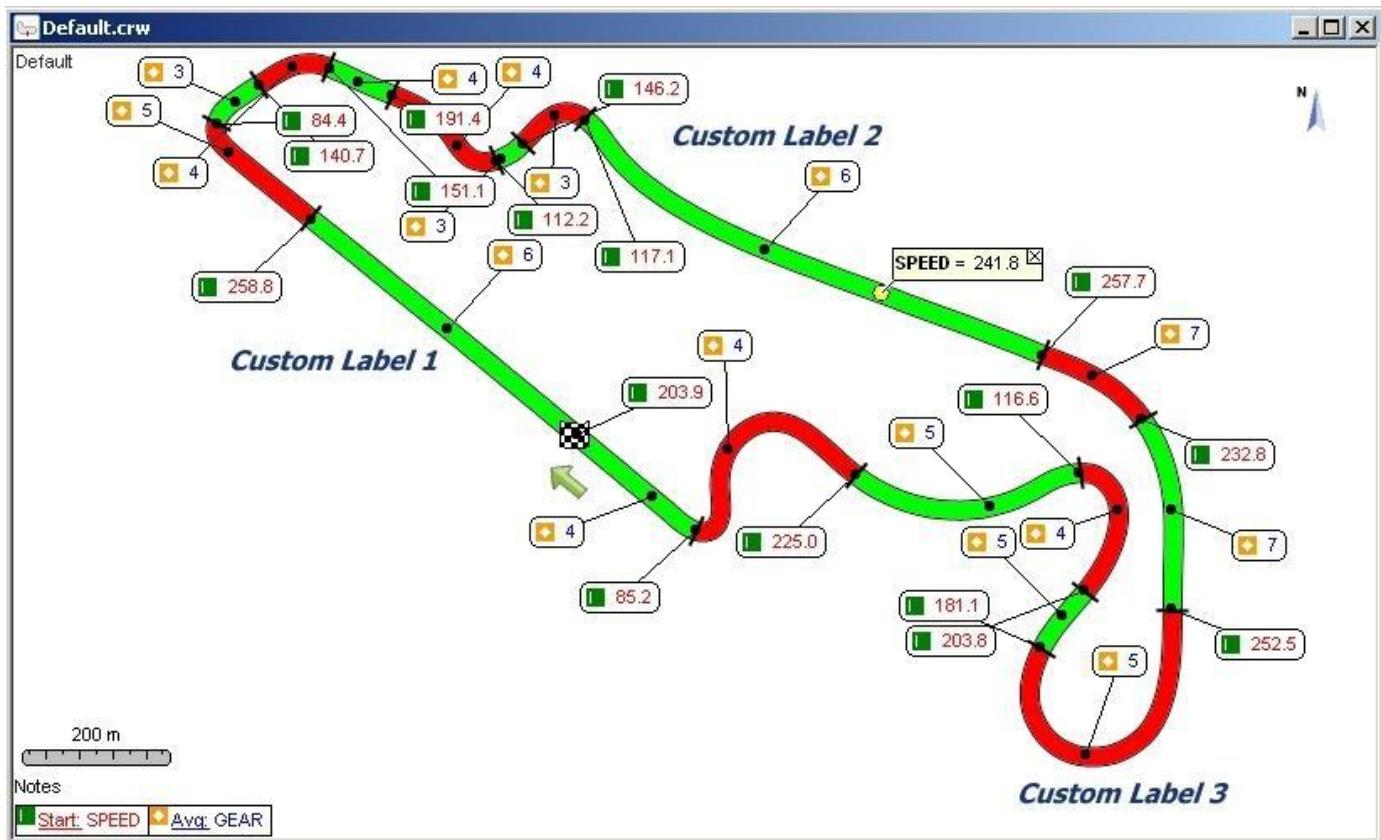
Customization

Customization allows adding text boxes, by setting markers and by dividing them into sections. It's enabled only when track is calculated in Standard mode (Speed/Acceleration), without GPS channels.

Selecting the command *Insert New Text Box* appears the following dialog which permits to write a text and configure font and colour.

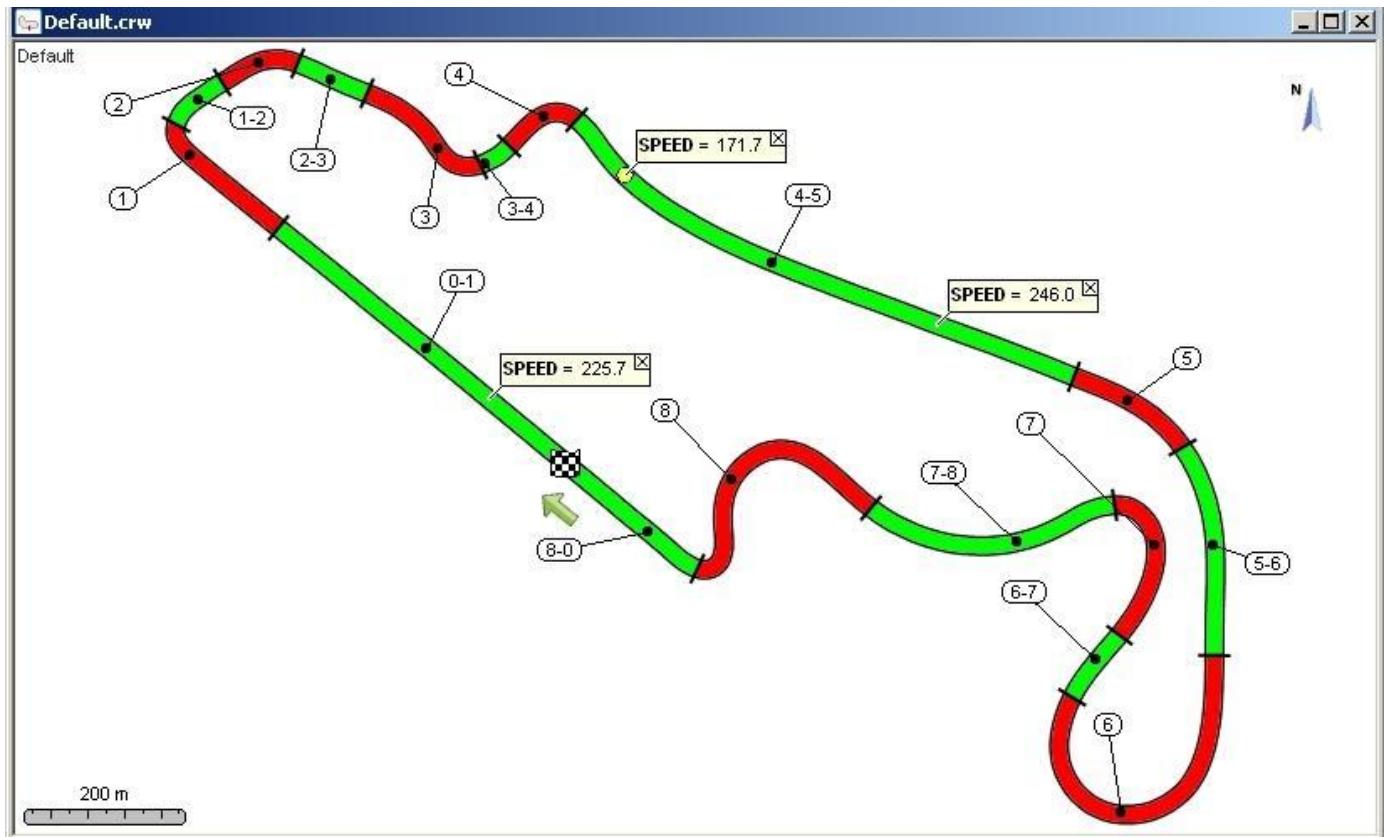


In the picture below Custom Label 1, Custom Label 2 and Custom Label 3 are added with command *Insert New Text Box*.



Track Channel Values

The Track Channel Values mode allows showing, by popup, the channel values in the current cursor position and allows showing the values at the fixed desired points. There are no limits to the number of popup that can be opened. Every fixed popup can be removed by a mouse click on the small cross.



Integrate Google Earth maps

The track can be integrated with the satellite maps of Google Earth. To do so, you must have an active Internet connection to be able to access the Google archive. The chapter entitled Track Editor provides instructions on how to access such maps.



The GE map can be hidden using the GE Map button on the toolbar or in the Options menu. When the GE map is visible, you can zoom and turn it in the same way as when the map is not visible. The automatic scale function, which resizes the track so that it is always within the limits of the window, is not enabled when the GE map is enabled.

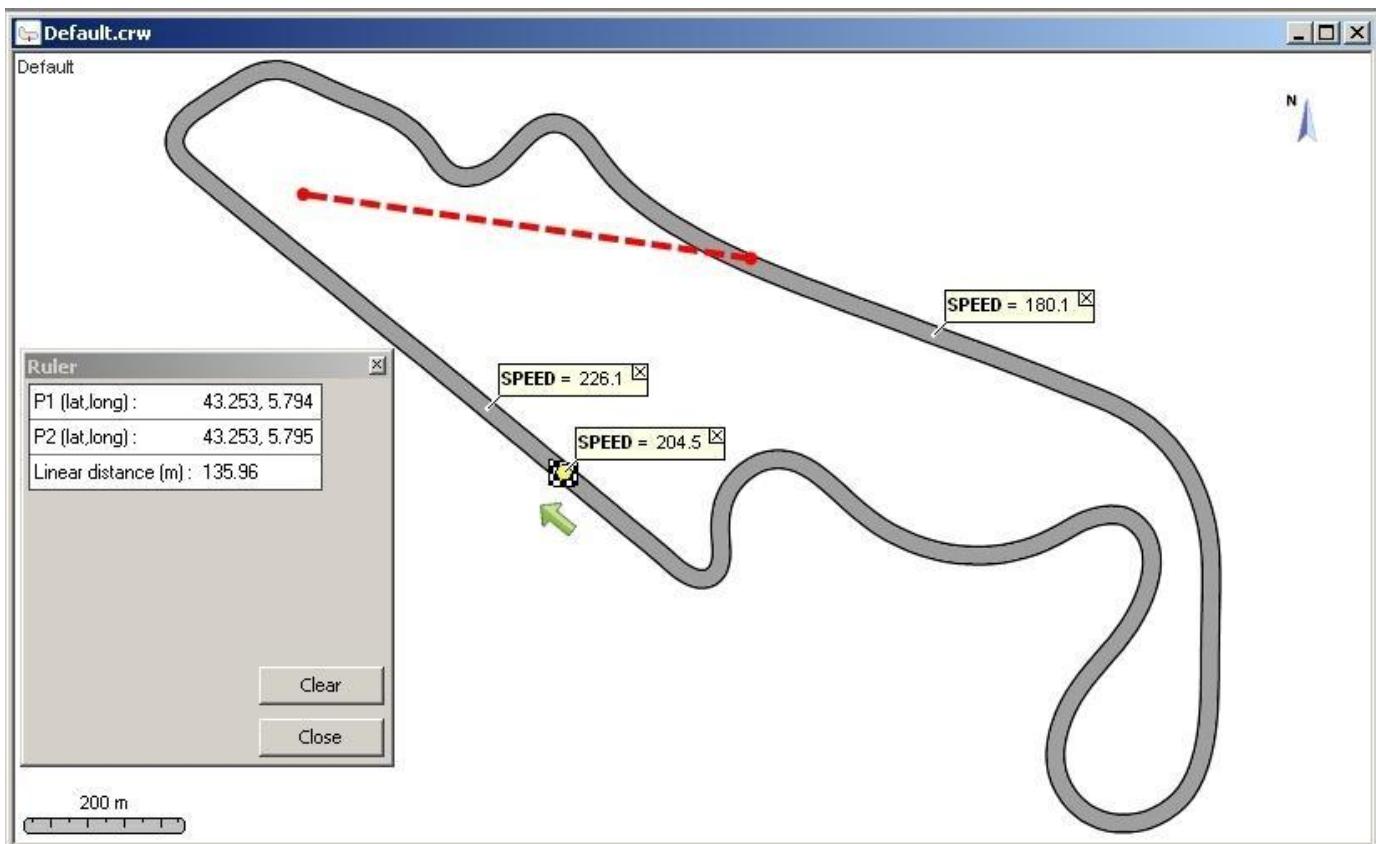
For further information, see Google Earth.

Ruler

Ruler is a tool to measure distances between two points in a circuit. It's enabled only when track is calculated with GPS channels. The tool can be in Line mode or Track Mode. After selecting Line or Track a small window will open; the cursor changes to a square. Click on a point then on another point, this calculates the distance between points. "Clear" delete the selected points, "Close" close the window.

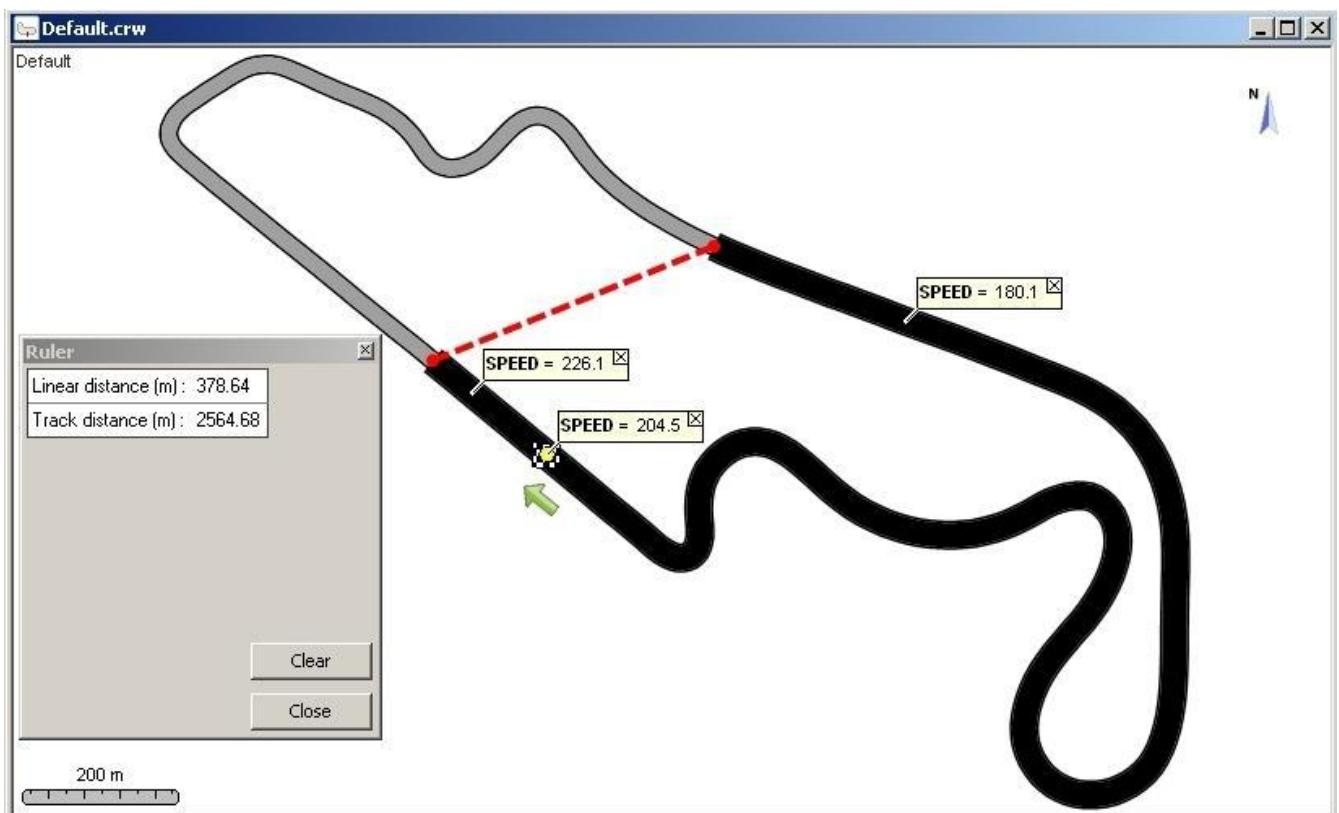
- **Line**

Ruler 'line' calculates the linear distance between two generic clicked points (P1, P2).



- **Track**

Ruler 'Track' calculates the linear distance and the track distance between two points on the trajectory. The measured zone is highlighted in bold in the circuit.

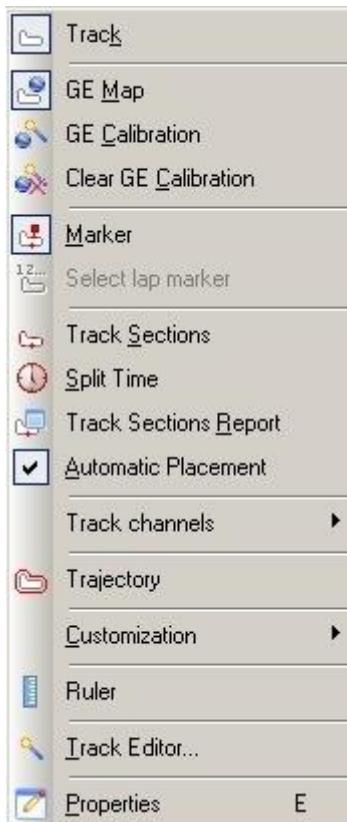


Commands

The main commands available in the **Track** window can be enabled through:

- the **Options** menu in the main menu of the application
- the buttons of the dedicated **Toolbar**,
- **Pop-up menu** that can be displayed by clicking with the right button of the mouse on the graphic area of the window, on the Info boxes or on the Y scales corresponding to the selected channels.
- **Keyboard shortcuts**

Options Menu



The Options menu allows the access to the following commands:

COMMAND	SHORTCUT	DESCRIPTION																				
Track		Show/Hide the track calculated in Track Editor.																				
GE Map		Display or hide the map of Google Earth.																				
GE Calibration		<p>Fine calibration of the satellite map of Google Earth. When you activate the command, the calibration symbols appear on the window, which are used to move the track in the four directions admitted (North, South, West and East)</p>  <p>They also allow you to extend or shorten the trajectory, modifying the shape factor, always compared to the cardinal axes (North, South, West and East). This function proves useful to accurately define the position of the track compared to the satellite map. It therefore allows you to correct any GPS or acquisition errors of the satellite map with great precision (for example, when the position of the satellite is not perpendicular to the zone of the track). To apply the required calibration, simply use the command again. The calibration symbols disappear and the track applies the modifications.</p>																				
Clear GE Calibration		It removes the calibration function from the track, restoring the original position and dimensions.																				
Marker		Displays configured markers; the display of the marker, if enabled, overtops the display of the track sections.																				
Select lap Marker		<p>This command appears only when Marker Histogram is selected and a compare of laps is loaded. The command permits to select the desired lap.</p> <table border="1"> <thead> <tr> <th>Chrono Time</th> <th>Track Name</th> <th>Session Name</th> <th>Car Name</th> <th>Abs</th> </tr> </thead> <tbody> <tr> <td><input checked="" type="checkbox"/> 1:20.385</td> <td>TEST</td> <td>RACE-SERVER</td> <td>908_Test_C1</td> <td>1639</td> </tr> <tr> <td><input checked="" type="checkbox"/> 1:19.850</td> <td>TEST</td> <td>RACE-SERVER</td> <td>908_Test_C1</td> <td>1640</td> </tr> <tr> <td>1:19.150</td> <td>TEST</td> <td>RACE-SERVER</td> <td>908_Test_C1</td> <td>1641</td> </tr> </tbody> </table>	Chrono Time	Track Name	Session Name	Car Name	Abs	<input checked="" type="checkbox"/> 1:20.385	TEST	RACE-SERVER	908_Test_C1	1639	<input checked="" type="checkbox"/> 1:19.850	TEST	RACE-SERVER	908_Test_C1	1640	1:19.150	TEST	RACE-SERVER	908_Test_C1	1641
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1:19.150	TEST	RACE-SERVER	908_Test_C1	1641																		
Track		Display of the Track Sections as configured in Track Editor.																				

Sections		
Split Time		<p>Shows the value of the split time in each section, if sections are displayed.</p>
Track Sections Report		<p>If there are channels configured as section report, text boxes are added to the track to show the report in correspondence of the section.</p>

		<p>The screenshot shows a race track at Le Castellet with a green trajectory line. Numerous track channel values are displayed as popups, such as 149.8, 187.2, 118.4, 151.9, 259.3, 149.1, 113.7, 122.1, 227.5, 194.2, 253.4, 181.1, and 91.3. A scale bar indicates 200 m, and a notes section shows 'Start: SPEED' and 'Avg: ACC_X'.</p>
Automatic Placement		Performs the automatic positioning of the available labels on the track window.
Track Channels		<p>Displays the sub menu to manage track channels</p> <div style="border: 1px solid #ccc; padding: 5px;"> <input checked="" type="checkbox"/> Show track channels values <input type="button" value="Capture track channels values"/> <input type="button" value="Clear track channels values"/> <ul style="list-style-type: none"> • Show track channels values: Shows track channel popup attached to the car icon on window. • Capture track channels values: Places a fixed track channel popup in the current cursor position. • Clear track channels values: Removes all track channels popup. </div>
Trajectory		It opens a menu from which you can select or de-select the trajectory of one or all the laps loaded. The trajectory shows the real path of the vehicle in the lap involved; it may not coincide with the track when this has been calculated differently (based on other data).

		<table border="1"> <thead> <tr> <th></th><th>Chrono Time</th><th>Track Name</th><th>Session Name</th><th>Car Name</th><th>Abs</th></tr> </thead> <tbody> <tr> <td><input checked="" type="checkbox"/></td><td>1:20.385</td><td>TEST</td><td>RACE-SERVER</td><td>908_Test_C1</td><td>1639</td></tr> <tr> <td><input checked="" type="checkbox"/></td><td>1:19.850</td><td>TEST</td><td>RACE-SERVER</td><td>908_Test_C1</td><td>1640</td></tr> <tr> <td><input checked="" type="checkbox"/></td><td>1:19.150</td><td>TEST</td><td>RACE-SERVER</td><td>908_Test_C1</td><td>1641</td></tr> </tbody> </table> <p>Real Time Trajectory Hide all trajectories Show all trajectories</p> <ul style="list-style-type: none"> Dataset trajectories: The Dataset lines allow to show/hide a trajectory for the specified lap. Real Time Trajectory: Show/Hide real time trajectory. Hide all trajectories: Hide all trajectories. Show all trajectories: Show all trajectories 		Chrono Time	Track Name	Session Name	Car Name	Abs	<input checked="" type="checkbox"/>	1:20.385	TEST	RACE-SERVER	908_Test_C1	1639	<input checked="" type="checkbox"/>	1:19.850	TEST	RACE-SERVER	908_Test_C1	1640	<input checked="" type="checkbox"/>	1:19.150	TEST	RACE-SERVER	908_Test_C1	1641
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<input checked="" type="checkbox"/>	1:19.150	TEST	RACE-SERVER	908_Test_C1	1641																					
Customization		<p>Display the customization submenu. The menu is active only if computation mode of the track is standard. Not enabled for GPS.</p> <ul style="list-style-type: none"> Custom elements: shows/hide custom elements Insert New TextBox: Adds a text item anywhere on the track window. In addition to the text, also the font and the colour can be modified. The item can be placed anywhere in the window with the mouse. Edit Loop: Opens a configuration window that allows to add some markers in any position of the track. In addition to the position and the quantity of the markers, also the style, the depth and the colour can be configured. Edit Custom Element: If an element of the custom track is selected, the corresponding configuration window opens to allow to modify the parameters. Remove Custom Element: Removes the selected custom element. 																								

		<ul style="list-style-type: none"> Remove All Custom Element: Removes all the custom elements from the window. <p>Key Esc cancel custom operations</p>
Track Editor	ALT + T	Opens the Track Editor that allows to create or load Track and Track Sections.
Ruler		Display the ruler submenu to calculate distance and GPS coordinate on the track window. 
Properties	E	Opens the interface to configure the window.

Toolbar



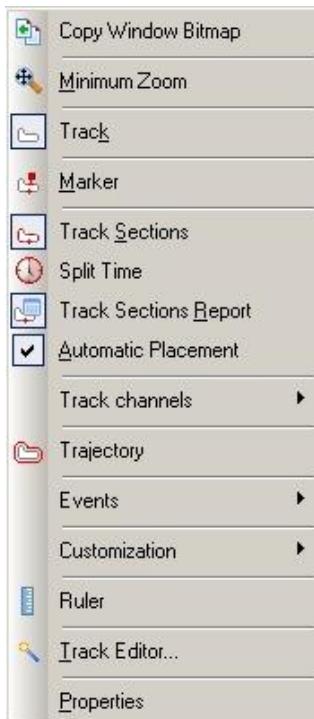
The toolbar enables the access to the following commands:

COMMAND	SHORTCUT	DESCRIPTION
Load		Opens a window to select a configuration file.
Save		Saves the present window configuration on a file.
Properties	E	Opens the interface to configure the window.
Minimum Zoom	Ctrl + -	Shows the track at its max size.
Pan		Enables the Pan mode to move the zoom area viewed with the mouse. It is available only if there is a zoom on the window. The Pan can be activated also by pressing Ctrl and clicking with the left button of the mouse on the area of the track.
Track		See the description of the command in the Options Table.

GE Map		See the description of the command in the Options Table.
GE Calibration		See the description of the command in the Options Table.
Clear GE Calibration		See the description of the command in the Options Table.
Marker		See the description of the command in the Options Table.
Select Lap Marker		See the description of the command in the Options Table.
Track Sections		See the description of the command in the Options Table.
Split Time		See the description of the command in the Options Table.
Track Sections Report		See the description of the command in the Options Table.
Track Channels		See the description of the command in the Options Table.
Trajectory		See the description of the command in the Options Table.
Events	Ctrl + Alt + E	Enables the display of the events on the window.
Custom Elements		Show/hide custom elements.
Ruler		See the description of the command in the Options Table.
Track Editor	Alt + T	See the description of the command in the Options Table.

Pop-up menu

By clicking with the right button of the mouse on the graphic area of the window, a pop-up menu is displayed. Popup menu is built dynamically and can have many commands. In the follow picture there is an example of popup.



This section will describe only the commands that have not already been described previously.

Copy Window Bitmap	Copy track window to clipboard
Events	<p>Opens the sub menu linked to the events:</p> <ul style="list-style-type: none">• Show Events - Shows or hides the events on the window• View All Events/View Custom Events - switches between the display mode of all the events and the display mode of only the events chosen• Remove Events - is available if the mode is custom events and allows to remove either an event or all the events from the window

Keyboard Shortcut

To see the complete list of shortcuts available for the graph window, see related chapter.

Below are listed those shortcuts that do not appear in any of the commands and of the toolbar buttons described before. These commands can be executed only from keyboard. All these commands are not customizable.

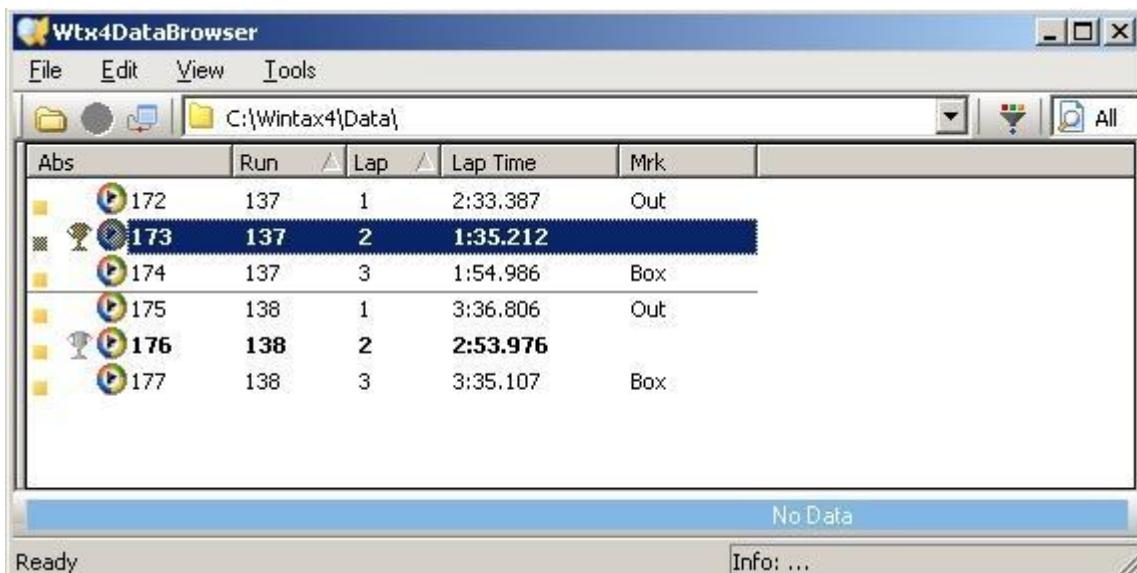
SHORTCUT	DESCRIPTION
Left	Move current car position forward
Right	Move current car position back
Esc	Cancel custom circuit operation

Video Window

A Video Window shows video, captured from DVR (device video recorder), synchronized with data read from files ztx downloaded from a generic data-logger connected to the DVR device. The videos are MPEG2 types at frame rate of 30 frames/sec. Video files are not associated to single lap but to the entire Run. Synchronization permits to display the right frames corresponding to the lap (or the laps) loaded. With multiple cameras, the images are overlaid in one single video divided into more panes, so the video file is just one per Run. The channel used for synchronization is identified as PTS, Presentation Time Stamp. This channel must be configured in the General Setup, in Video Options page.

Videos must be in AVI format. In Data Browser, Menu Tools, there is a command, Import from Video, which permit to convert an mpg files into AVI format and put it in the VIDEO directory of the selected run.

If data contains file video, an icon appears in Abs column Data Browser.



Elements of the window

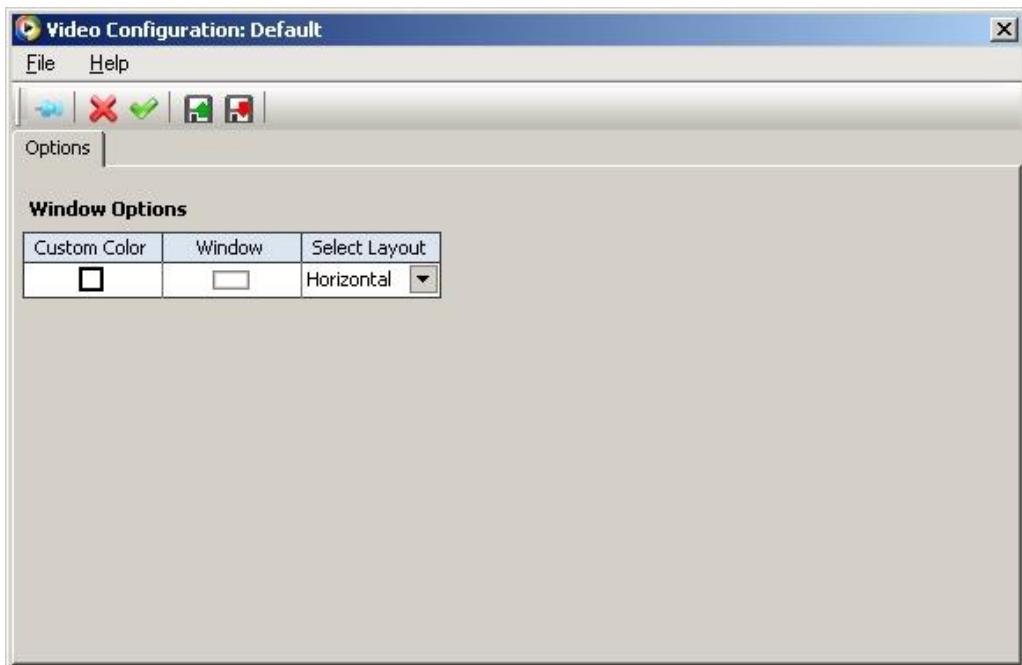


Graphic Area

The Video window shows the frames of a video.

Video Window Configuration

The **Video Configuration** window enables to configure the appearance of **Video** window. The window has also a "main menu", a toolbar and a "pop-up menu" that allow to configure and manage the commands of the window itself.



Page Options

The **Options** page enables to configure the aspect of the **Video** window has only one section: **Window Options**

Window Options

It allows configuring the general setting of the window.

- **Custom Color:** allows to define local colors.
- **Window:** sets the background color of the window.
- **Select Layout:** sets the layout of the window, vertical or horizontal.

Menu

The window Menu allows the access to the following commands, divided into sub menus:

File Menu

COMMAND	SHORTCUT	DESCRIPTION
Apply	A	Applies the present settings of the window.
Cancel		Closes the window without applying the present settings
Load		Opens a dialogue window to select a configuration file to be loaded.
Save As		Opens a dialogue window to select a configuration file on which the present settings can be saved.

Help Menu

COMMAND	SHORTCUT	DESCRIPTION
Help	F1	Launch the WinTAX4 help, if available.

Toolbar

The toolbar of the window enables the access to the following commands:

COMMAND	DESCRIPTION
Keep Visible	Enables the Keep Visible mode that allows keeping visualized the configuration window while the application windows are being used.
Cancel	Closes the configuration window without applying the settings (similar to the Cancel command of the File menu).
Apply	Applies the present settings to the configuration of the graphic window (similar to the Apply command of the File menu).
Load	Similar to the Load command of the File menu
Save As	Similar to the Save As command of the File menu

Functions

The **Video window** has the following functions:

- Connect Cursor
- Zoom
- Comparison

Connect Cursor

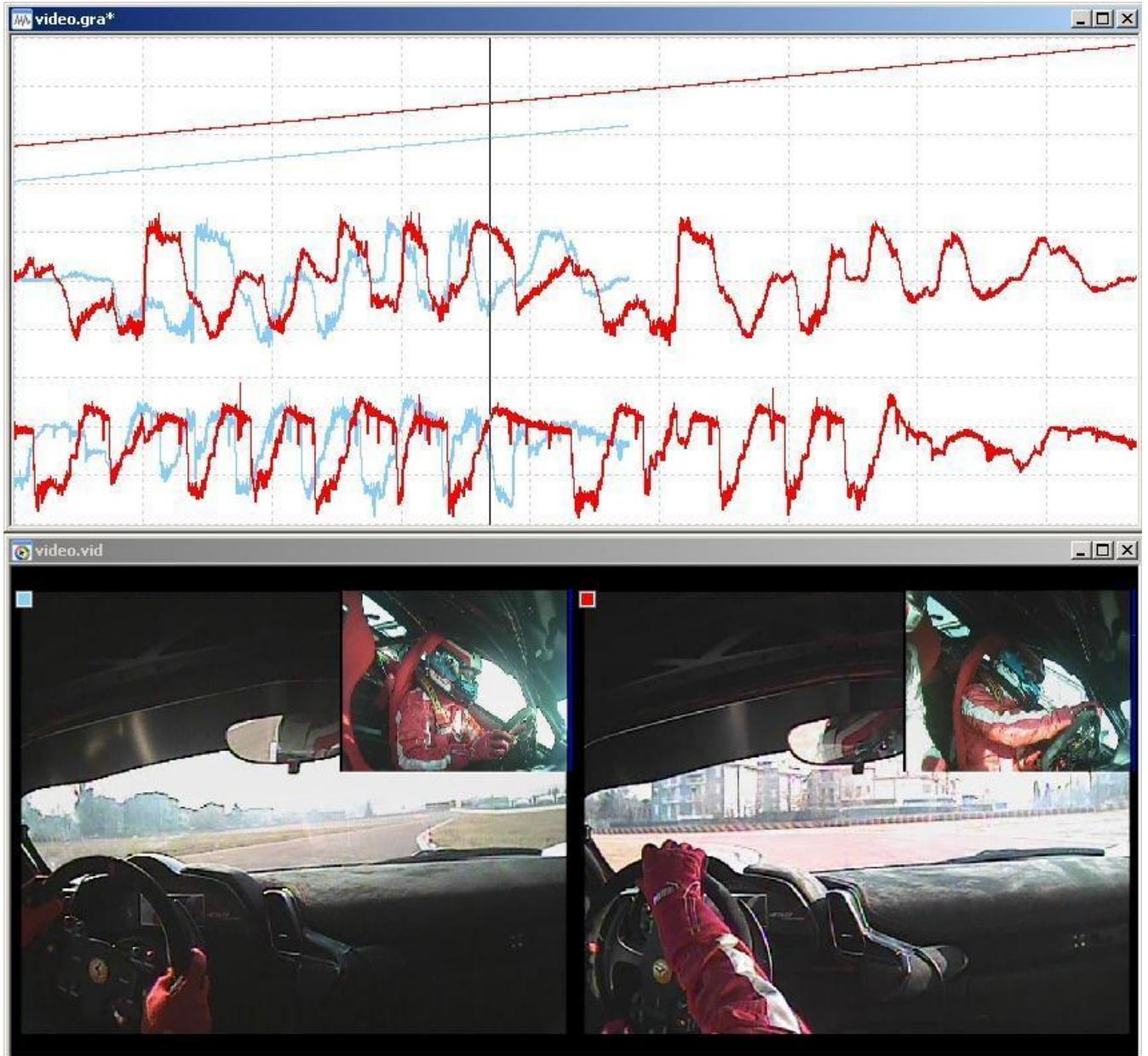
When, in the Setup/General, the Auto Connect check is enabled and the PTS (Presentation Time Stamp) Channel is configured, the video is connected from and to the graphic windows. In fact, when the cursor is moved on a Graph window, the Video window shows the frame at the time selected by the cursor. In the same way, by playing video, the cursor resets on the other windows according to the moment of time associated with the frame currently shows in video window.

Zoom

The Video window is not linked to the Zoom of the other windows. The only way to zoom an area of the tracks is to use the Zoom In and Zoom Out commands.

Comparison

The Video window is enabling to show comparison. Each video is synchronized according to its PTS channel like in the picture below. The time range of analysis when lap of different lengths are loaded is defined by the lap time of the first lap.



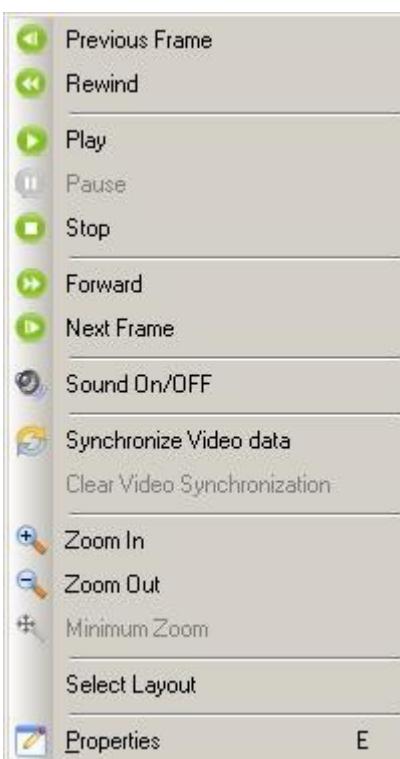
In each video, there is a small square with the same color of the comparison to identify the right lap.

Commands

The main commands available in the **Video** window can be enabled through

- the **Options** menu on the main menu of the application
- the buttons of the dedicated **Toolbar**,
- **Pop-up menu, which** can be displayed by clicking with the right button of the mouse in the graphic area of the window, on the Info boxes or on the Y scales of the selected channels.

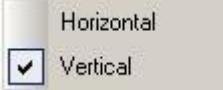
Options Menu



The Options menu allows the access to the following commands:

COMMAND	SHORTCU T	DESCRIPTION
Previous Frame		Seek video to the previous frame
Rewind		Rewind the video to the starting position with high frame speed
Play		Play the video

Pause		Pause the video
Stop		Stop the video
Forward		Forward the video to the end with high frame speed
Next Frame		Seek video to the next frame
Sound On/Off		Enable and disable sound in video.
Synchronize Video data		<p>Inserts a time offset in video frame from a graph window. It's active only if a graph window is present in the layout. A message appears in the graph window for giving instruction on offset settings.</p>
Clear Video Synchronization		Reset the time offset.
Zoom In		Zooms the graphic area respect to the X axis.
Zoom Out		Operation opposite to the Zoom In

Minimum Zoom		Displays the graphic area respect to the whole interval of the X axis
Select Layout		Select the layout of the window, horizontal and vertical. In both cases the frames are resized keeping the original aspect ratio. 
Properties	E	Opens the interface to configure the window.

Toolbar

The toolbar enables the following commands:

COMMAND	DESCRIPTION
Load	Opens a window to select a configuration file.
Save	Saves the present window configuration on a file.
Properties	Opens the interface to configure the window.
Previous Frame	Seek video to the previous frame
Rewind	Rewind the video to the starting position.
Play	Play the video
Pause	Pause the video
Stop	Stop the video
Forward	Forward the video to the end
Next Frame	Seek video to the next frame

Sound On/Off	Enable and disable sound in video.
Zoom In	Zooms the graphic area in respect to the X axis.
Zoom Out	Operation opposite to the Zoom In
Minimum Zoom	Displays the graphic area in respect to the whole interval of the X axis

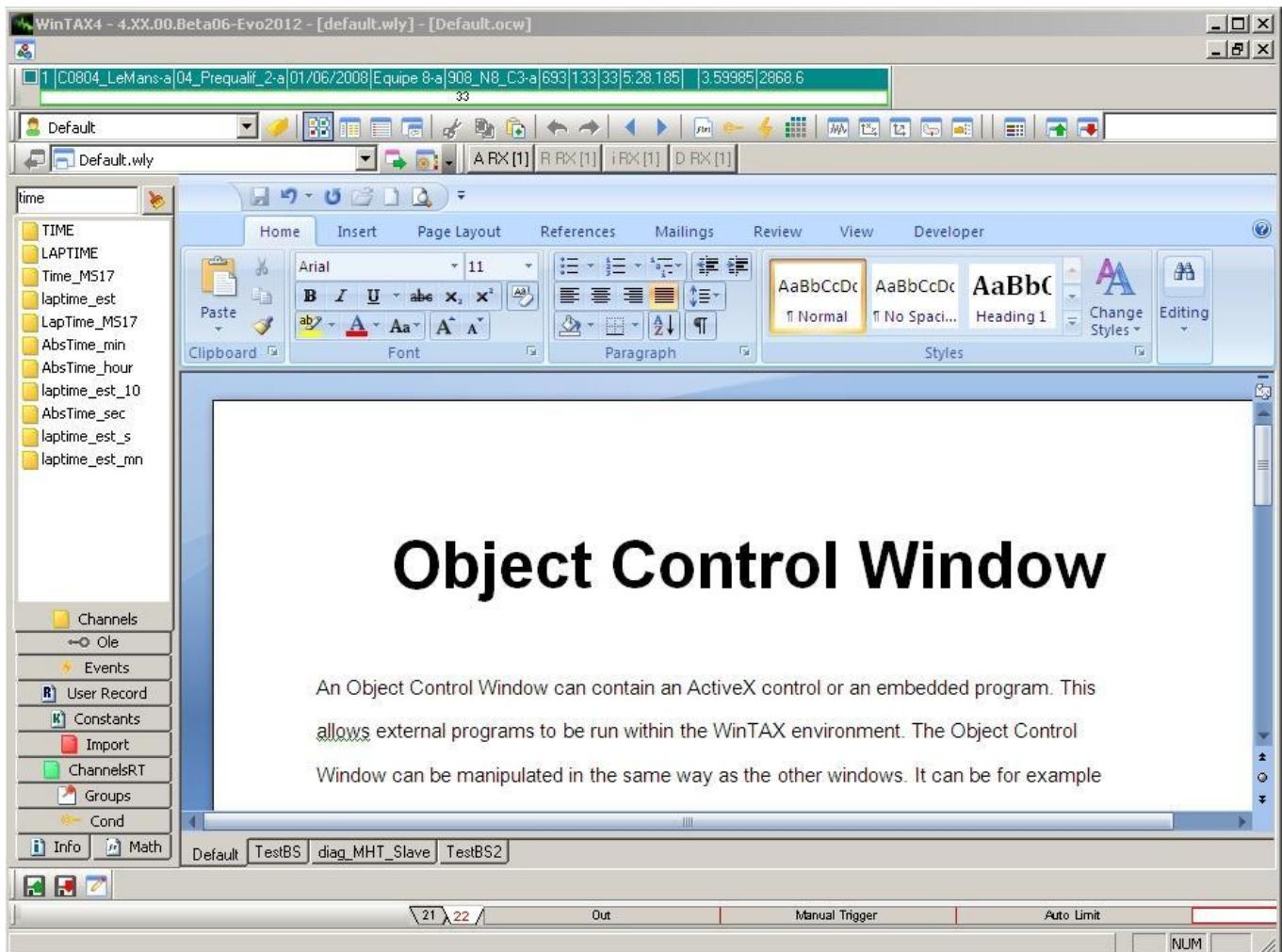
Pop-up menu

By clicking with the right button of the mouse on the graphic area of the window, a pop-up menu is displayed. It shows the same commands of Options Menu.

Object Control Window

An Object Control Window can contain an ActiveX control or an embedded program. This allows external programs to be run within the WinTAX environment. The Object Control Window can be manipulated in the same way as the other windows. It can be for example placed in a layout.

The main function of this window is to manage WinTAX data and events from ActiveX Control. However, the window can also be used to incorporate external programs. The figure above shows a word document embedded in WinTAX.



The Object Control Window can place special commands in the View Menu when the Object Control Window is selected. The embedded program or control object is added to the Object Control Window display from the Configuration Window.

Please refer to <http://support.microsoft.com/kb/127074> for technical details.

Commands

The main commands in the **Object Control Window** can be enabled through:

- the **Options** menu in the main menu of the application
- the buttons of the dedicated **Toolbar**,
- **Pop-up menu** that can be displayed by clicking with the right button of the mouse on the graphic area of the window.

Options Menu

The Options menu allows the access to the following commands:

COMMAND	DESCRIPTION
Properties	Opens the interface to configure the window.

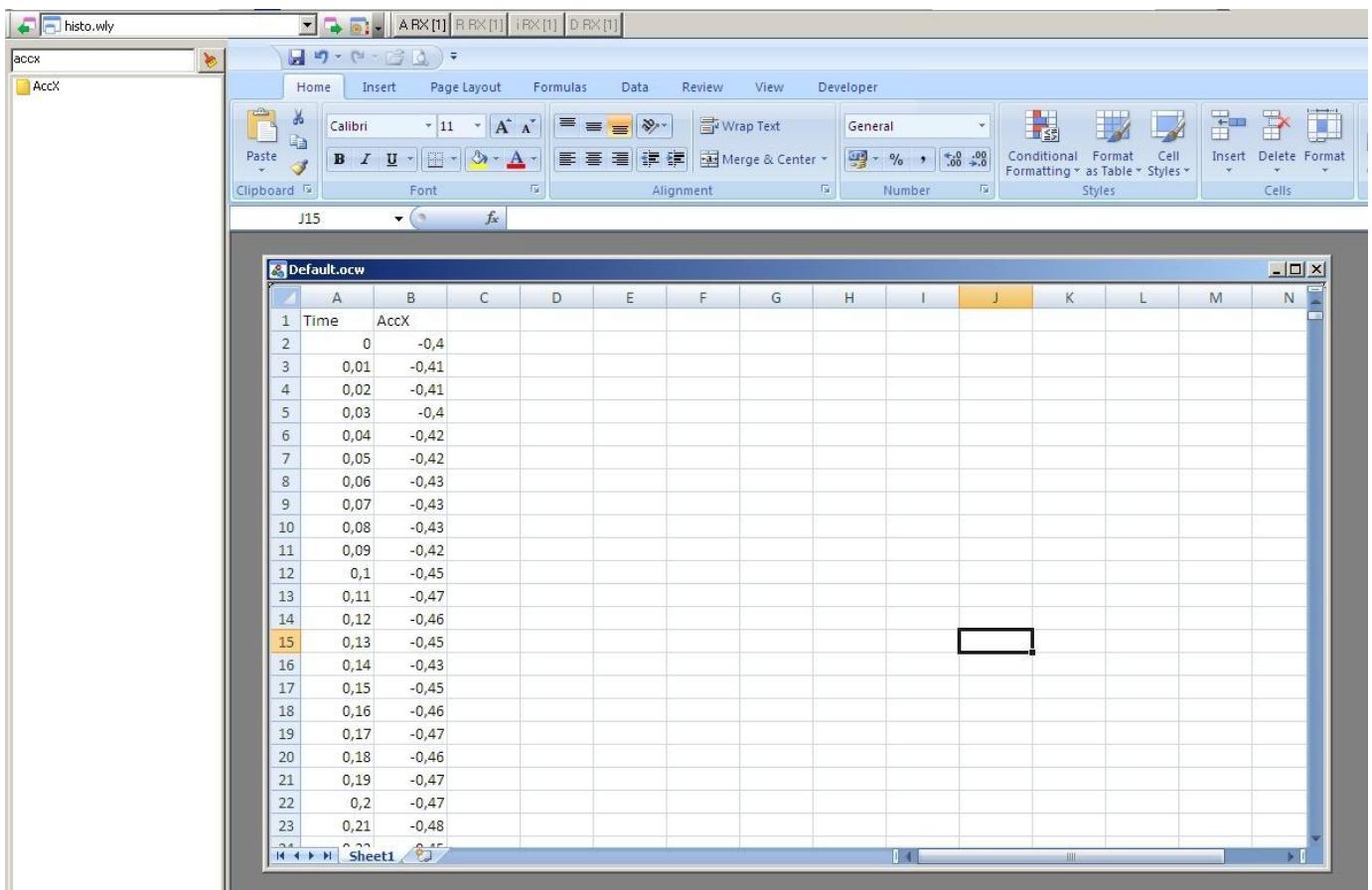
Toolbar

The toolbar allows the access to the following commands:

COMMAND	SHORTCUT	DESCRIPTION
Load		Opens a window to select a configuration file corresponding to a object control window.
Save		Saves the present window configuration on a file.
Properties	E	Opens the interface to configure the object control window.

If ActiveX Control handles its dedicated toolbar, it will be loaded on WinTAX, like excel in picture below.

When the ActiveX Control contains an Embedded Program, the WinTAX environment (the menus and toolbars) are replaced by the environment of the embedded programs.



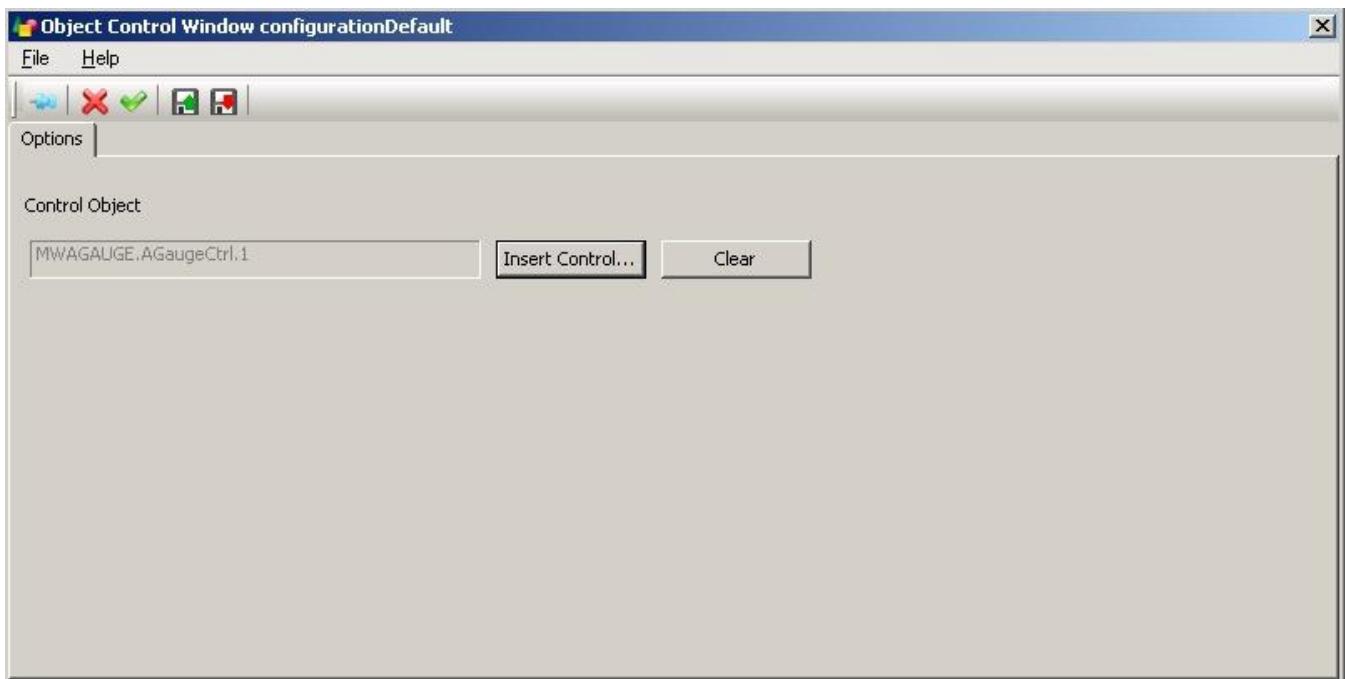
Pop-up menu

By clicking with the right button of the mouse on the graphic area of the window, the pop-up menu is displayed only if managed by ActiveX Control.

Object Control Configuration Window

The **Object Control Configuration** window allows setting the **Object Control** window.

The window moreover includes a menu, a toolbar and a pop-up menu that ease the access to the configuration and management commands of the window itself.



Control Object

- **Insert Control:** Open the Insert Object Window to select the ActiveX control to insert



- **Clear:** Delete the selected ActiveX control

Menu

The **Control Object** window menu enables the access to the following commands, divided into sub menus:

File Menu

COMMAND	SHORTCUT	DESCRIPTION
Apply	A	Applies the present setting of the window.
Cancel		Closes the window without applying the present settings.
Load		Opens a dialogue window to select a configuration file (.ocw) to be loaded.
Save As		Opens a dialogue window to select a configuration file (.ocw) on which the present settings can be saved.

Toolbar

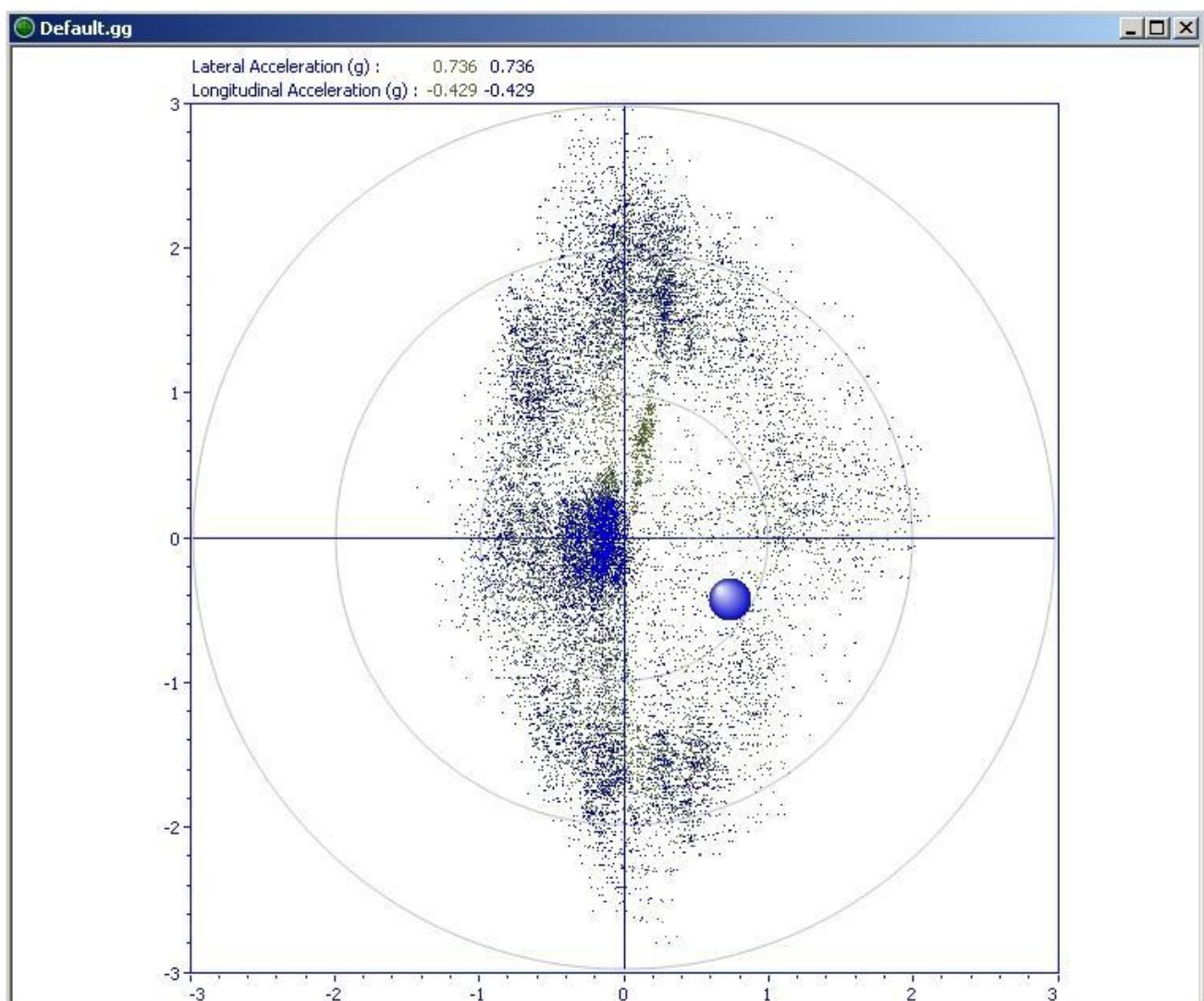
The window toolbar enables the following commands:



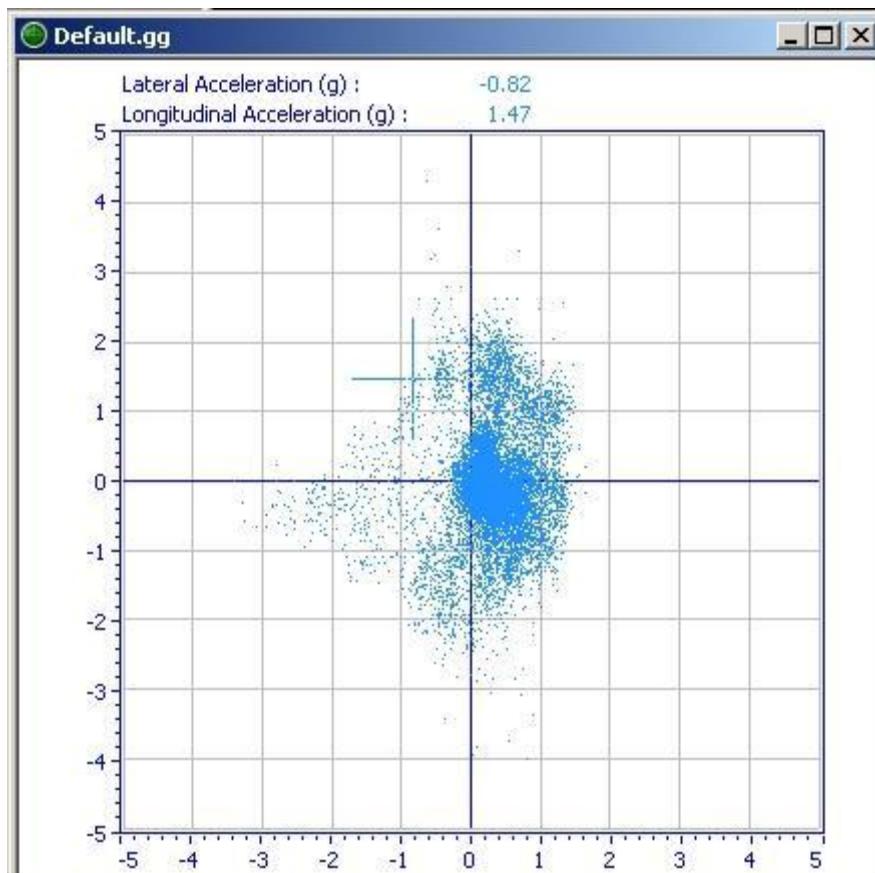
COMMAND	DESCRIPTION
Keep Visible	Enables the Keep Visible mode that allows to keep displayed the configuration window while the application windows are being used.
Cancel	Closes the configuration window without applying the settings (similar to the Cancel command of the File menu).
Apply	Applies the present settings to the configuration of the graphic window (similar to the Apply command of the File menu).
Load	Similar to the Load command of the File menu.
Save As	Similar to the Save As command of the File menu.

G-G Diagram Window

The G-G Diagram Window can describe the performance of a car. It is called G-G Diagram because it plots lateral acceleration or lateral G against longitudinal acceleration or longitudinal G, where G refers to G force and 1g equals 9.8 m/s^2 of acceleration. The G-G diagram is constructed using lateral and longitudinal accelerations recorded during a lap. A car travelling at high speed has a great many forces acting on it, due to acceleration, braking (negative acceleration) and lateral acceleration. Acceleration is therefore a very useful parameters to use, managing to tie together speed with the forces which may be acting on a car at any time.



Elements of the window



Graphic Area

The graphic area displays the graph obtained plotting the lateral acceleration against longitudinal acceleration. It's a special case of a more general XY window. In the graphic area are displayed the cursor, the grid of the window and the scales too.

Channels Information

In the first row is shown lateral acceleration, in the second is shown longitudinal acceleration. Both accelerations are in g unit. If there is a comparison, values are added to display the value of each lap in comparison colors.

X and Y Scales

The X and Y Scales visualizes the values scales of the configured channels in the same interval values. The scale can be configured as internal or external.

Cursor

The Cursor shows the plotting point referred to a couple of value of accelerations. It's connected with graph windows cursor position and zoom interval. If there is a comparison, a cursor is added for each lap compared. The cursor can be a cross or a ball.

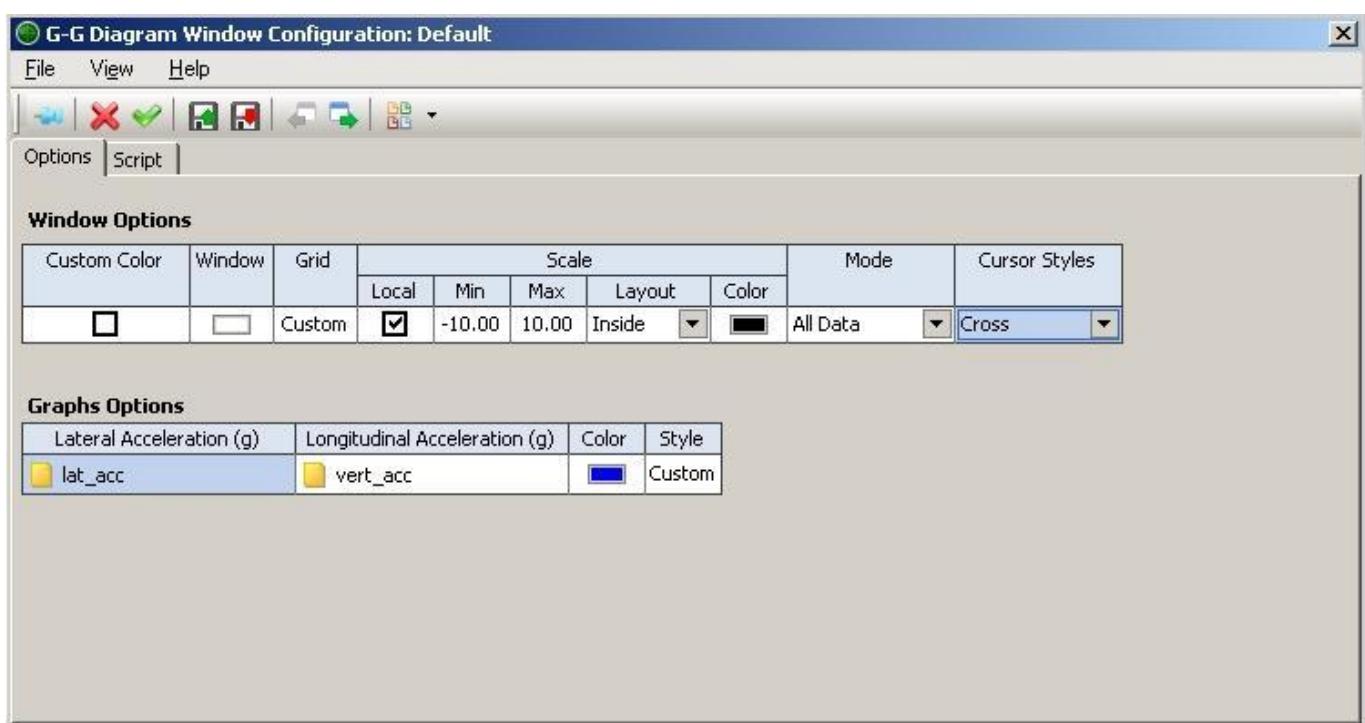
G-G Diagram configuration

The **G-G Diagram Window Configuration** allows setting the **G-G Diagram** window; it is formed by the **Options** and **Script pages**.

The window moreover includes a menu, a toolbar and a pop-up menu that ease the access to the configuration and management commands of the window itself.

Options Page

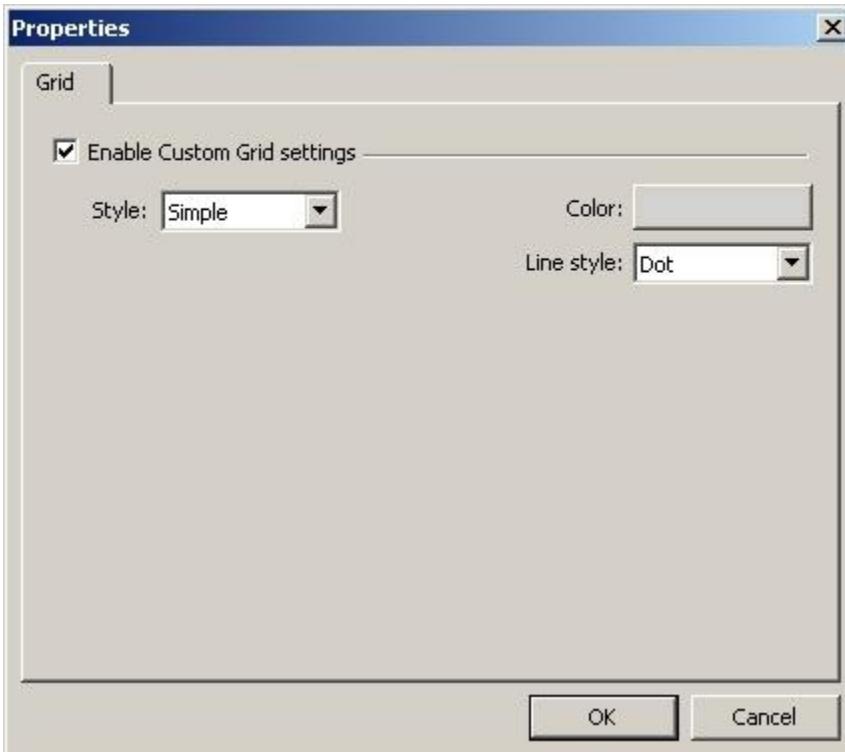
The **Options** page allows configuring the graphic aspect of the **G-G Diagram** windows and it is divided into 2 sections: **Window Options** and **Graph Options**. Each configurable value can be edited by double clicking with the mouse or by pressing the space bar on the selected element.



Window Options

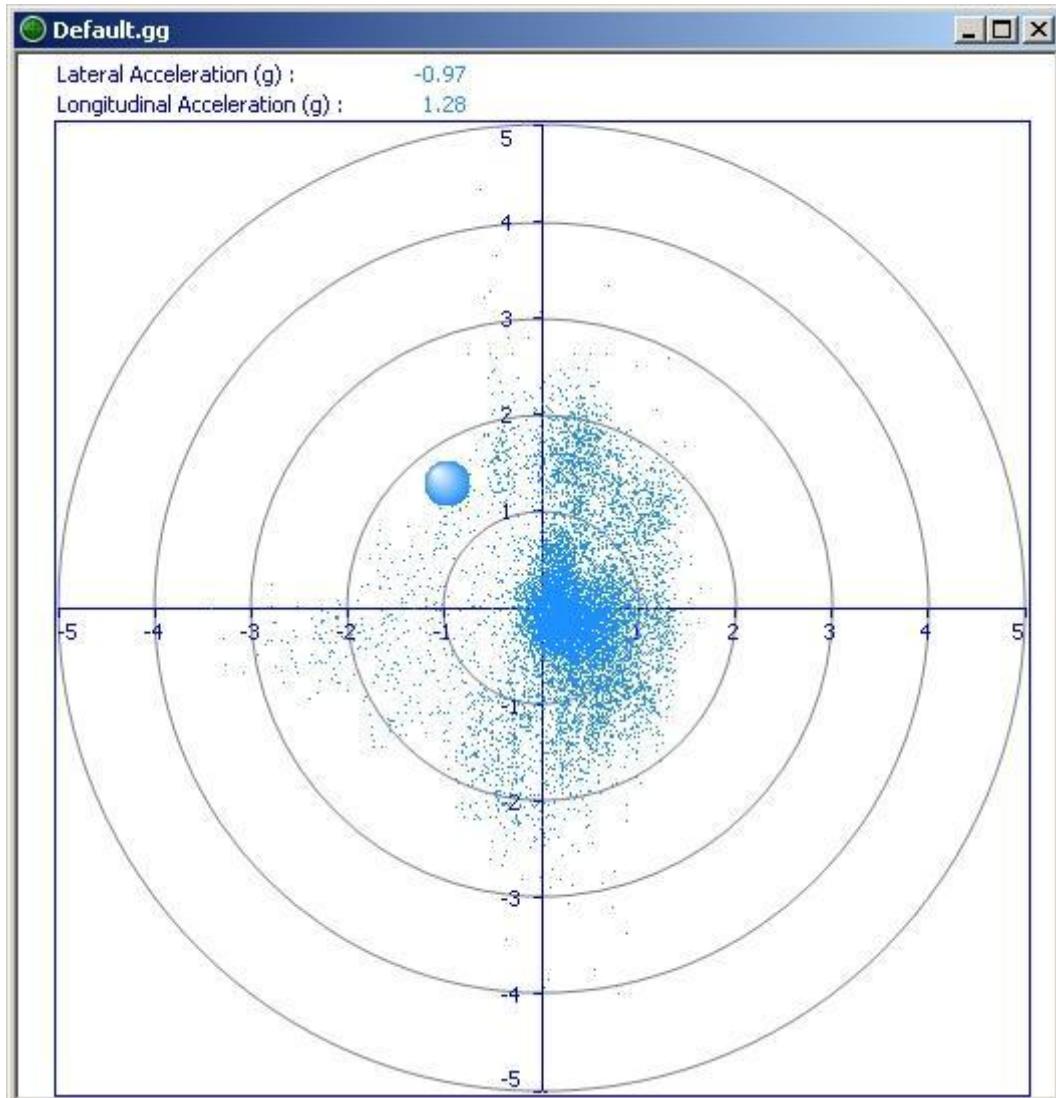
It allows configuring the general settings of the window.

- **Custom color:** enables the settings of the customized colours for the window.
- **Window:** sets the background colour of the window.
- **Grid:** shows the setting to enable the grid in the graphic area of the window. The parameter can be modified by editing the corresponding configuration window.



- **Enable custom grid settings:** Enables the grid display with the customized settings.
 - **Style:** Sets the style of the grid.
 - **Simple:** the grid is displayed with continuous lines.
 - **Cross:** the grid is displayed with crosses.
 - **Circular:** the grid is displayed with concentric circles
 - **Color:** Colour of the grid.
 - **Line style:** Sets the style of the grid line (valid if the Style Simple is enabled).
 - **Solid:** continuous line
 - **Dash:** dashed line
 - **Dot:** dotted line
 - **DashDot:** dashed line alternated with 1 dot
 - **DashDotDot:** dashed line alternated with 2 dots
- **Scale:** this parameters configure both scales, X and Y
 - **Local:** if it is checked, it automatically sets the scale range as minimum and maximum value calculated according on both channels available. If it is not clicked, the frequency range configured in the Min. and Max. Boxes are taken into account.
 - **Min:** minimum value of the scale range if Local is not enabled.

- **Max:** maximum value of the scale range if Local is not enabled.
- **Layout:** It's possible to choose between Outside and Inside. Outside shows the classical scale on X and Y axis out of graphic area. Inside shows scales on orthogonal axis inside the graph as displayed in following bitmap

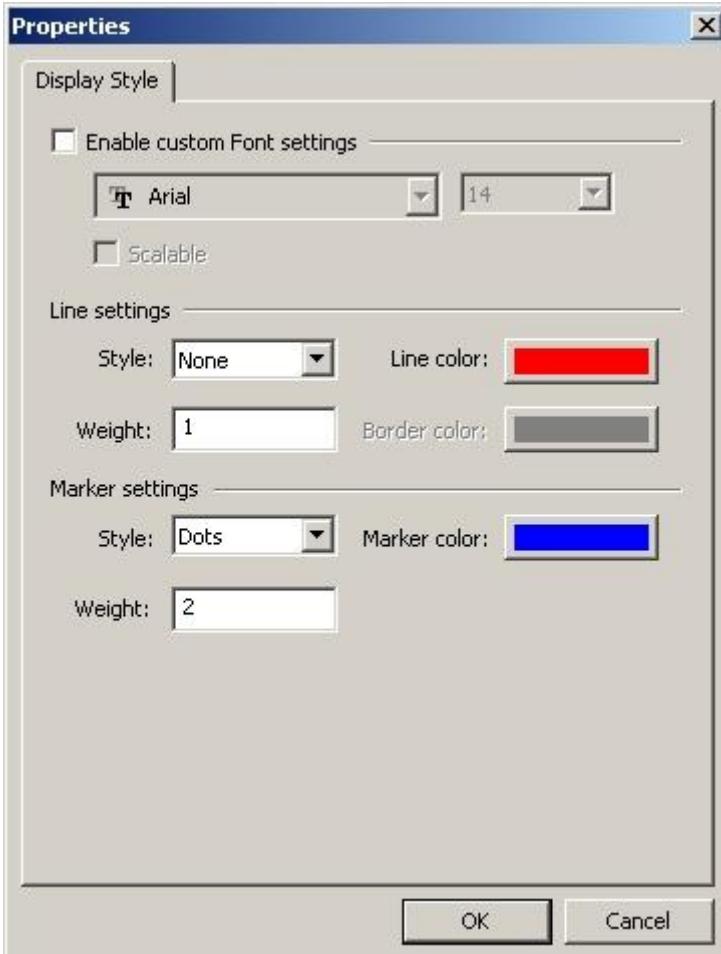


- **Color:** Colour of the scales.
- **Mode:** Switch between "All Data" and "Cursor Value". The default setting is "All Data".
- **Cursor style:** Configure the shape of the cursor.
 - **Cross:** The cursor is displayed as a little cross.
 - **Ball:** the cursor is displayed as a colored ball

Graphs Options

It allows configuring the settings specific for both channels to be graphically displayed.

- **Lateral acceleration (g):** displays the name of the channel that identifies the X acceleration. The name of the channel can be edited or dragged from channel list and can become a math expression if the sign = comes first.
- **Longitudinal acceleration (g):** displays the name of the channel that identifies the Y acceleration. The name of the channel can be edited or dragged from channel list and can become a math expression if the sign = comes first.
- **Color:** Sets the graph colour.
- **Style:** shows the style of the channel graph. To modify the setting, edit the channel by opening the Channel Properties page where fonts and styles can be configured.



- **Enable custom font settings**
 - **Family:** sets the type of font.
 - **Dimension:** sets the size of font.

- **Scalable**: enables the adapting of the font size in relations to the window size.

- **Line settings**

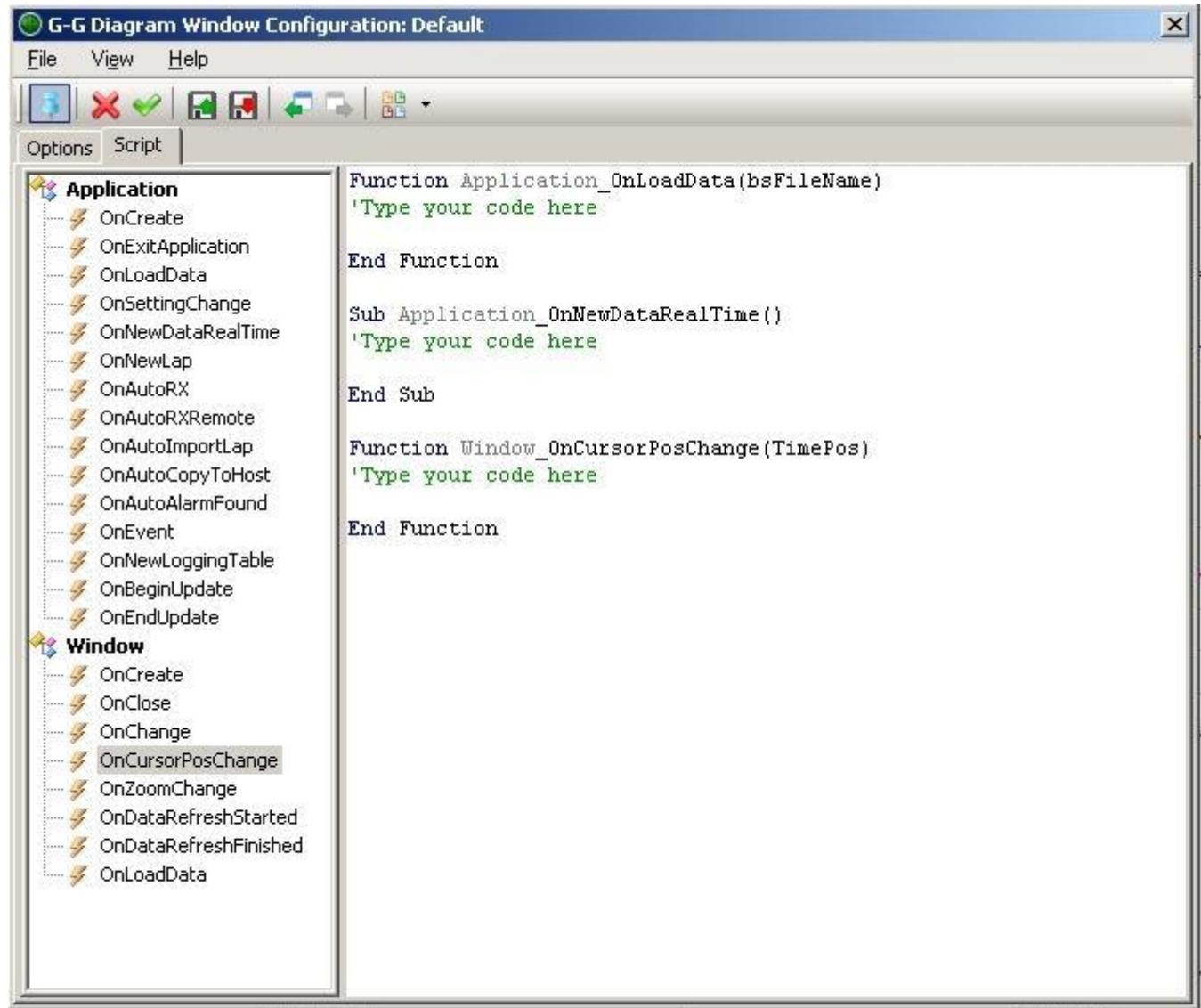
- **Style**: sets the style of the graphs line
 - **None**: no line is drawn
 - **Line**: continuous line
 - **Step**: stepped line
 - **Bordered**: continuous line with border
- **Weight**: sets the depth of the line in pixel.
- **Line color**: sets the line color.
- **Border Color**: color for the line border

- **Marker Settings section**

- **Style**: style of the markers, graphic elements used to represent the marker.
 - **None**: no markers are drawn
 - **Dots**: dot
 - **Cross**: cross
 - **Rhomboid**: rhomboid
 - **Square**: square
 - **Arrow Down**: arrow downwards
 - **Arrow Up**: arrow upwards
 - **Vert Line**: vertical line
 - **Horz Line**: horizontal line
- **Weight**: size (depth) of the markers in pixel.
- **Marker color**: color of the markers.

Script

The **Script** page allows configuring the scripts connected to the events of the **G-G Diagram** window or of the application, in VBScript or Jscript.



The section on the left displays the list of the functions available, grouped by Application and Window.

The section on the right displays the code linked to the configured functions.

Menu

The **G-G Diagram** window menu enables the access to the following commands, divided into sub menus:

File Menu

COMMAND	SHORTCUT	DESCRIPTION
Apply	A	Applies the present setting of the window.
Cancel		Closes the window without applying the present settings.
Load		Opens a dialogue window to select a configuration file (.gg) to be loaded.
Save As		Opens a dialogue window to select a configuration file (.gg) on which the present settings can be saved.

View Menu

COMMAND	SHORTCUT	DESCRIPTION
Previous page	Ctrl + Shift + Tab	Enables the page of the window previous to the one currently in use.
Next page	Ctrl + Tab	Enables the page of the window next to the one currently in use.

Help Menu

COMMAND	SHORTCUT	DESCRIPTION
Help	F1	Launch the WinTAX4 help, if available.

Toolbar



The window toolbar enables the following commands:

COMMAND	DESCRIPTION
Keep Visible	Enables the Keep Visible mode that allows keeping displayed the configuration window while the application windows are being used.
Cancel	Closes the configuration window without applying the settings (Similar to the Cancel command of the File menu).
Apply	Applies the present settings to the configuration of the graphic window (Similar to the Apply command of the File menu).
Load	Similar to the Load command of the File menu
Save As	Similar to the Save As command of the File menu
Previous page	Similar to the Previous page command of the View menu
Next page	Similar to the Next page command of the View menu

Functions

The G-G Diagram Window has the following functions:

- Cursor
- Comparison
- Elements visualization

Cursor

The cursor is identified by a cross or a small ball in the graphic area. It allows to scroll all values in the range of the X scale and of the Y scales, updating the corresponding values of the channels in the information boxes. The cursor can be moved in the graphic area moving the mouse and pressing the left button. Cursor is also connected with graph windows cursor position and zoom interval. If there is a comparison, a cursor is added for each lap compared.

Comparison

The window can show a maximum of 2 laps in comparison. More comparison are ignored.

Elements Visualization

The elements of the window can be shown or hidden by enabling the View command of the Options menu or on the right click pop-up menu.

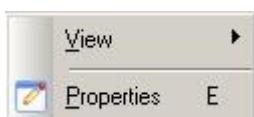
Commands

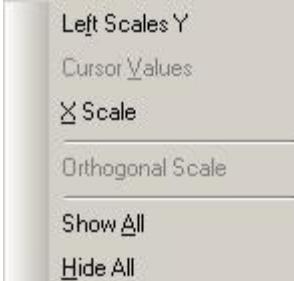
The main commands in the **G-G Diagram Window** can be enabled through:

- the **Options** menu in the main menu of the application
- the buttons of the dedicated **Toolbar**,
- **Pop-up menu** that can be displayed by clicking with the right button of the mouse on the graphic area of the window, on the Info boxes and on the Y scales of the selected channels.
- **Keyboard shortcuts**

Options Menu

The Options menu allows the access to the following commands:



COMMAND	SHORTCUT	DESCRIPTION
View		<p>Shows the pop-up sub menu to select the graphic elements of the window that can be shown or hidden. The displayed elements are highlighted with a check mark on the left. Show All & Hide All show and hide all elements respectively.</p>  <p>Orthogonal Scale: show the values of X and Y axes when scale layout is Inside.</p>
Properties	E	Opens the interface to configure the window.

Toolbar

The toolbar allows the access to the following commands:

COMMAND	SHORTCUT	DESCRIPTION
Load		Opens a window to select a configuration file corresponding to a G-G Diagram window.
Save		Saves the actual window configuration on a file.
Properties	E	See the description of the command in the Options Table.
View		See the description of the command in the Options Table.
Show/Hide All Scales Y		Shows/hides the Y scales in all windows where available.

Pop-up menu

By clicking with the right button of the mouse on the graphic area of the window, on the information box or on the scales, the following pop-up menu is displayed:



This section will describe only the commands that have not already been described previously.

COMMAND	DESCRIPTION
Datasets	Displays the list of the available Datasets and allows choosing the Dataset to be enabled.

Keyboard Shortcut

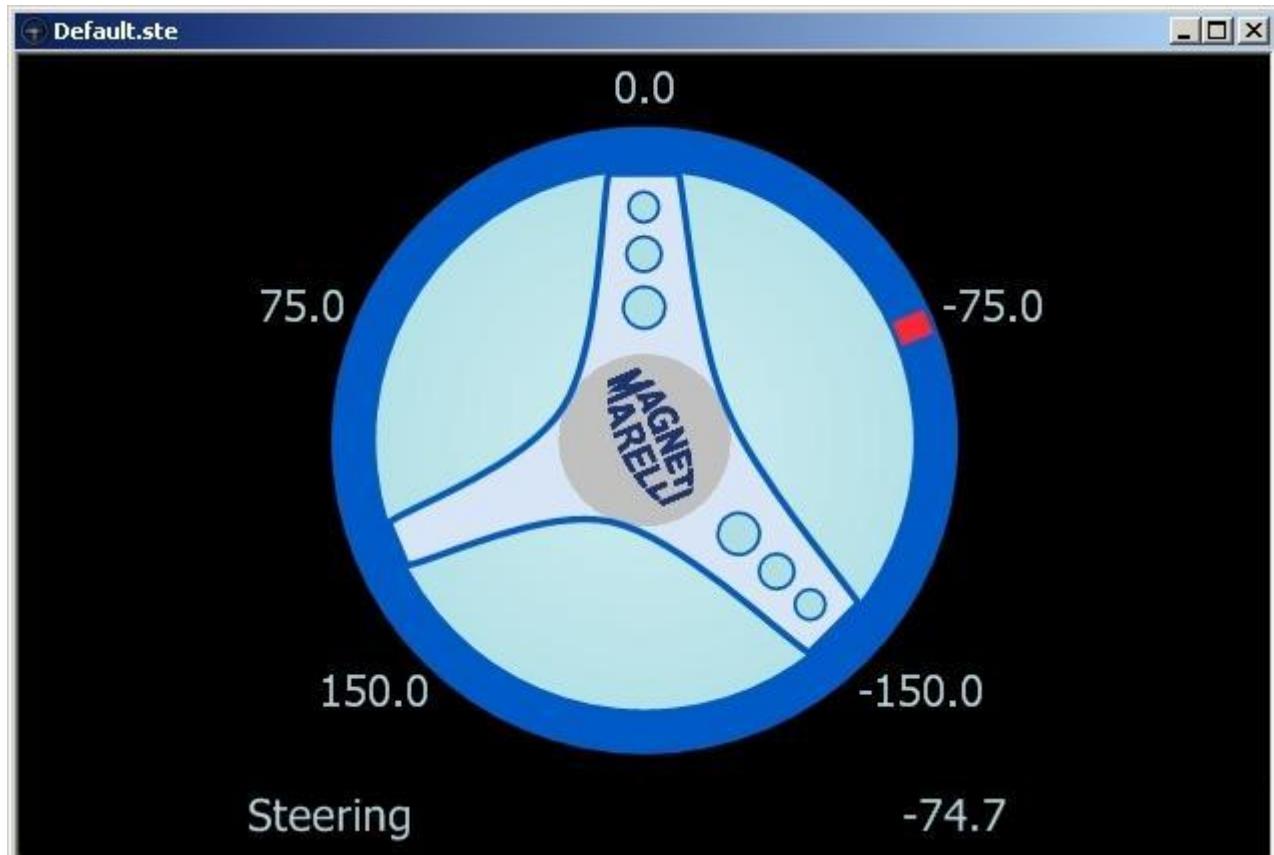
To see the complete list of shortcuts available for the graph window, see related chapter.

Below are listed those shortcuts that do not appear in any of the commands and of the toolbar buttons described before. These commands can be executed only from keyboard. All these commands are not customizable.

SHORTCUT	DESCRIPTION
+	Zoom In
-	Zoom Out

Steering Wheel Window

The Steering Wheel window displays through a graphic wheel the value of the channels samples at the instant of the Real Time acquisition or at the current position of the cursor in the post processing analysis. The window could show only one channel at time and works with single lap or with compare of two laps. If more than two laps are loaded for comparison, The Steering Wheel Windows analyze the first two enabled Datasets.



Elements of the window

The Steering Wheel window is formed by two parts: a graphic area and an information area

Graphic Area

The graphic area of the window shows the graphic wheel of the configured channel. Around the steering wheel some scale indicators are shown. The ticks are related to the Maximum and Minimum values configured for the channel.

Information Area

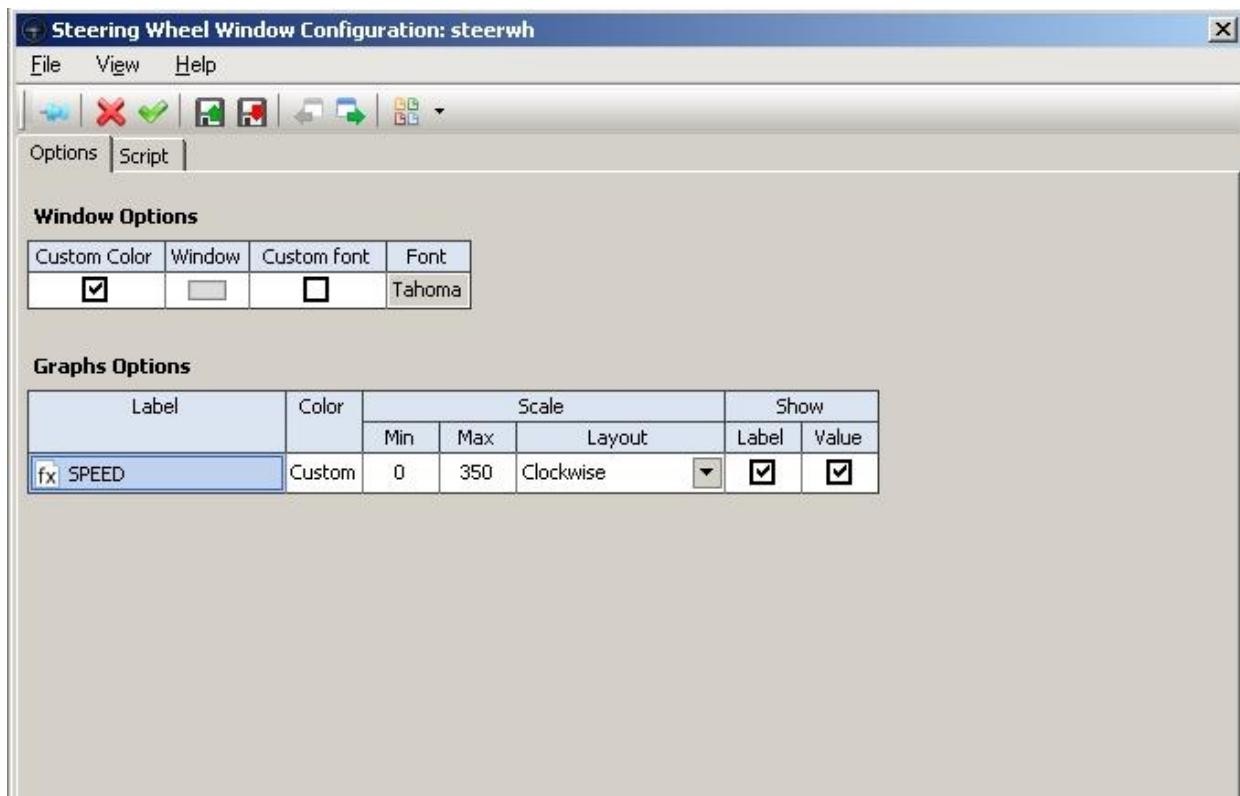
To the graph corresponds an information area that can be found below the graph itself. The info area displays the name and the values of the channel at the current position.

Steering Wheel Window Configuration

The **Steering Wheel Configuration** window allows to set the look of the **Steering Wheel windows**; it is formed by the **Options** and **Script** pages. The window moreover has a menu, a toolbar and a pop-up menu that ease the access to the configuration and management commands of the window itself.

Options

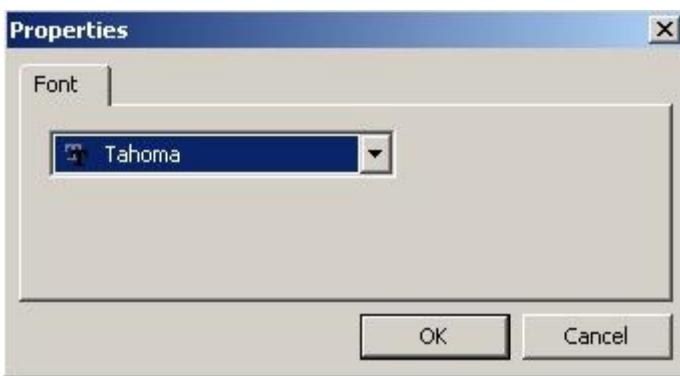
The **Options** page allows to configure the graphic aspect of the **Steering Wheel** windows and it is divided into 2 sections.



Window Options

It allows to configure the settings of the layout of the window. Each element, except checks, can be edited by double clicking with the left button of the mouse or with the SPACE bar.

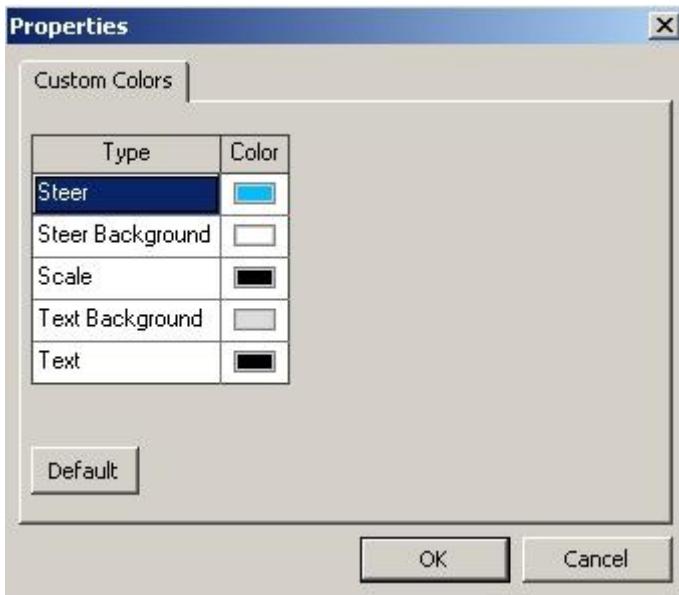
- **Custom color:** allows the setting of the window customized colors.
 - If it is enabled, the color sets in the **Window** column of this section is used for the background of the graphic area.
 - If it is disabled, it is used the **Color Settings** configuration, in the **Default Appearance** page of the **General Setup** window (General Settings, general configuration of the WinTAX environment).
- **Custom Font:** allows the settings of the information area text font.
- **Font:** When Custom font is selected, it's possible to select a custom font (only type) for information area text elements. The text elements are automatically scaled when resizing the window



Graphs Options

It allows to configure the settings specific of each channel of the window. Each line identifies a configured channel, while the fields to be configured correspond to the columns. Each element can be edited by double clicking with the left button of the mouse or with the SPACE bar. Multiple selections are possible through the CTRL and SHIFT keys.

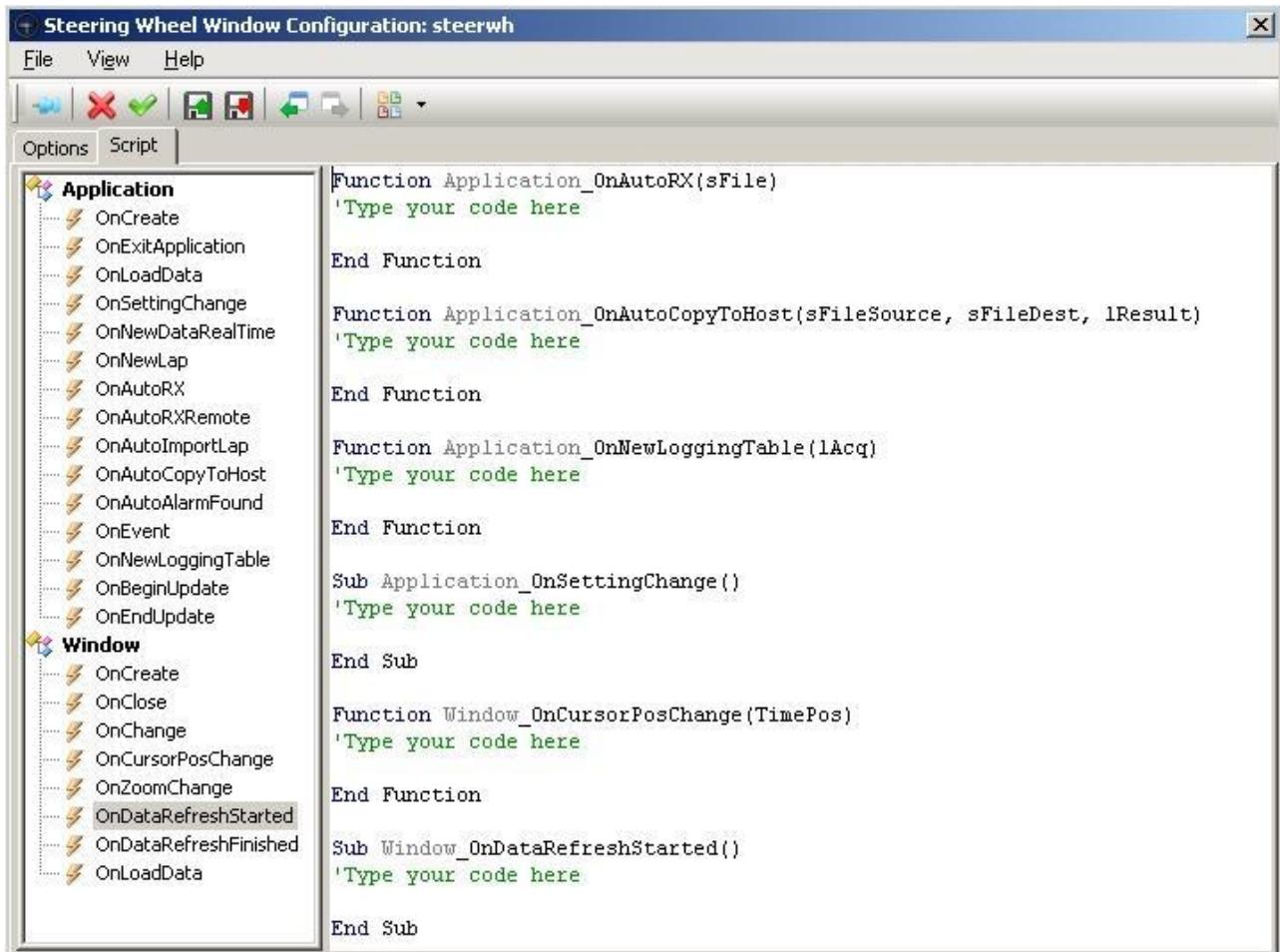
- **Label:** shows the name of the channel. The name of the channel can be edited and can become a math expression if the sign = comes first.
- **Color:** local configuration of steering wheel instruments colors. The local setup overwrites the global one defined in Window area. The following elements are customizable:
 - Steer
 - Steer Background
 - Scale
 - Text Background
 - Text



- **Scale:** allows to configure the minimum and maximum thresholds of channel. As default the values are taken from Channel Parameters Setup
 - **Min:** The minimum values of the channel
 - **Max:** The maximum values of the channel
 - **Layout:** This field can be clockwise or counterclockwise; it refers to the direction of rotation of the circular scale.
- **Show:** allows to show/hide some elements of the window
 - **Label:** If checked, shows the name of the channel
 - **Value:** If checked, shows the value of the channel in the current position

Script

The **Script** page allows to configure scripts connected to the events of the Steering Wheel window or of application, in VBScript or JScript.



The section on the left shows the list of the functions available, grouped by Application and Window.

The section on the right shows the code of the functions set.

Menu

The menu of the window allows the access to the following commands, divided into sub menu:

File Menu

COMMAND	SHORTCUT	DESCRIPTION
Apply	A	Applies the current settings of the window.
Cancel		Closes the window without applying the current settings.
Load		Opens a dialog window to select a configuration file to be loaded.
Save As		Opens a dialog window to select a configuration file on which the current settings can saved

View Menu

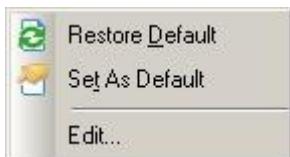
COMMAND	SHORTCUT	DESCRIPTION
Previous page	Ctrl + Shift + Tab	Enables the page of the window previous to the one currently in use.
Next page	Ctrl + Tab	Enables the page of the window next to the one currently in use.

Help Menu

COMMAND	SHORTCUT	DESCRIPTION
Help	F1	Launch the WinTAX4 help, if available.

Pop-up Menu

The pop-up menu of the **Steering Wheel Configuration** window can be displayed by clicking with the right button of the mouse on the Options page.



The pop-up menu allows the access to the following commands:

COMMAND	DESCRIPTION
Restore Default	Modifies the channel configuration restoring the settings in the parameters.
Set As Default	Modifies the parameters configuration with the current settings of the channel.
Edit	Edits the selected cell.

Toolbar

The window toolbar enables the access to the following commands:

COMMAND	COMMAND
Keep Visible	Enables the Keep Visible mode allowing to keep visualized the configuration window while the application window are in use.
Cancel	Closes the configuration window without applying the settings (similar to the Cancel command of the File menu).
Apply	Applies the current settings to the configuration of the graphic window (similar to the Apply command of the File menu).
Load	Similar to the Load command of the File menu

Save As	Similar to the Save As command of the File menu
Previous page	Similar to the Previous page command of the View menu
Next page	Similar to the Next page command of the View menu
Channel Browser	Visualizes the pop-up menu to select the page in the Channel Browser window 

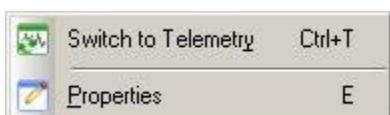
Commands

The main commands available in the **Steering Wheel** window can be enabled through

- the **Options** menu in the main menu of the application
- the buttons of the **Toolbar** dedicated,
- the **pop-up** menu that can be displayed by clicking with the right button of the mouse on the graphic area of the window.

Options Menu

Through the **Options** menu for the Steering Wheel windows the following commands can be enabled:



COMMAND	SHORTCUT	DESCRIPTION
Switch to Telemetry/Post Processing	Ctrl + T	Enables to switch from the Post-Processing mode to the Telemetry mode and vice versa.
Properties	E	Opens the interface to configure the window

Toolbar

The toolbar of the windows allows the access to the following commands:

COMMAND	SHORTCUT	DESCRIPTION
Load		Opens a configuration window to select a configuration corresponding to a Steering Wheel window.
Save		Saves the current window configuration on a file.
Properties	E	Opens the interface to configure the Steering Wheel window
Switch to Telemetry/Post Processing	Ctrl + T	Enables to switch from the Post-Processing mode to the Telemetry mode and vice versa.

Pop-up Menu

By clicking with the right button of the mouse on the graphic area of the window the pop-up menu is displayed that allows the access to the following commands:



This section will describe only the commands that have not already been described previously.

COMMAND	DESCRIPTION
DataSets	Shows the list of the available DataSet and allows to choose the DataSet to be enabled or disabled.

Bitmap View Window

The Bitmap View window has the purpose of showing an image selected by the user. The allowed formats are jpg, gif, png and bmp.

Elements of the window

The Bitmap View window is formed by a graphic area on a background.



Graphic Area

The graphic area of the window shows the selected image. The image must not be stretched, but will have to maintain its original size. You will see only a section of the picture when the window is smaller than image or the background if the window is greater.

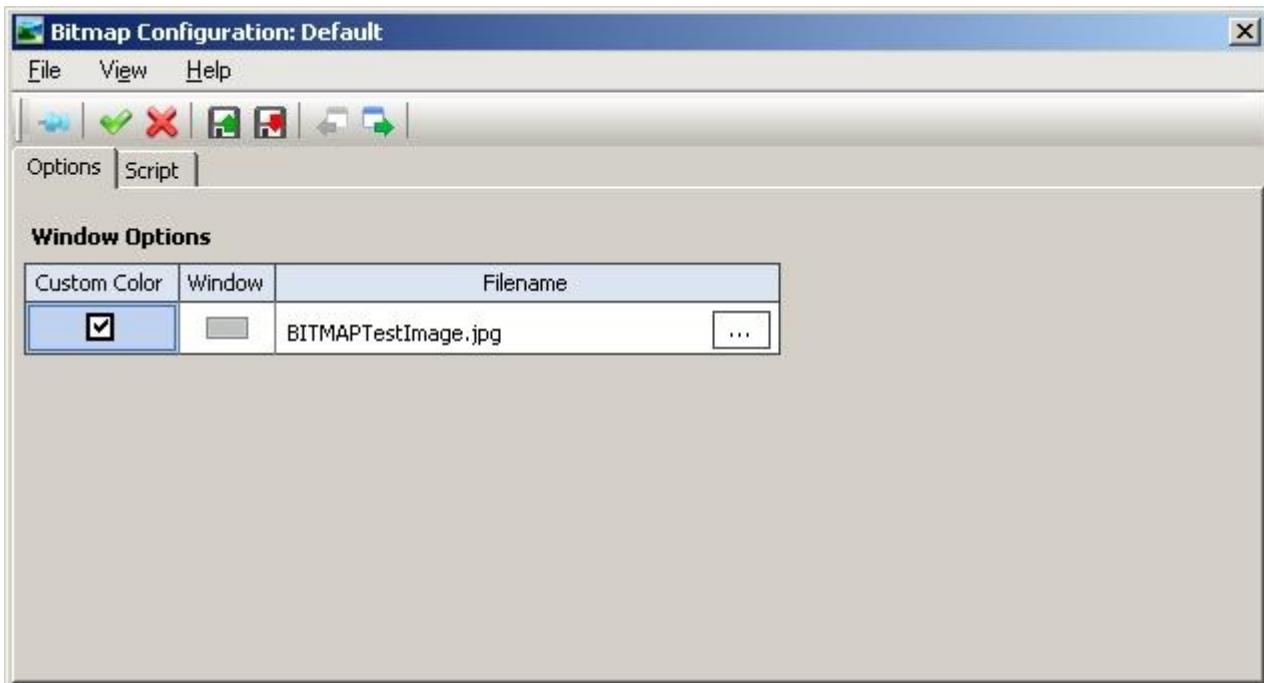
Bitmap View Window Configuration

The **Bitmap View Configuration** window allows to set the look of the **Bitmap View windows**; it is formed by the **Options** and **Script** pages.

The window moreover has a menu and a toolbar that ease the access to the configuration and management commands of the window itself.

Options

The **Options** page allows configuring the graphic aspect of the **Bitmap View** windows.



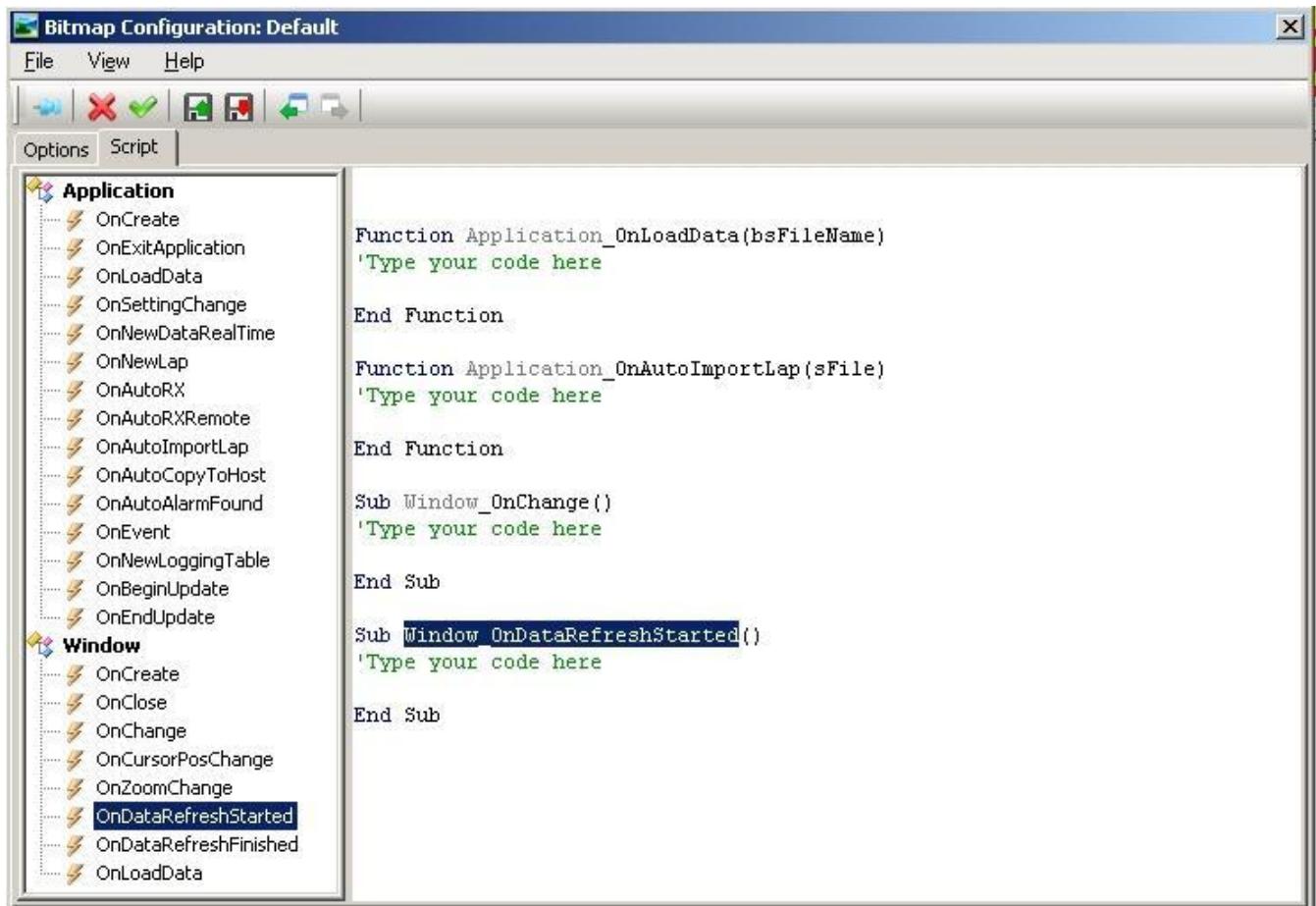
Window Options

It allows to configure the settings of the layout of the window. Each element, except checks, can be edited by double clicking with the left button of the mouse or with the SPACE bar.

- **Custom color:** allows the setting of the window background color.
 - If it is enabled, the color sets in the **Window** column of this section is used for the background of the graphic area.
 - If it is disabled, it is used the **Window** color in **Color Settings** configuration, in the **Default Appearance** page of the **General Setup** window (General Settings, general configuration of the WinTAX environment).
- **Filename.** The user can select any image of type jpg, gif, png o bmp. When confirming with apply button, the image is copied in the dedicated setup directory existing for each user under *WinTAX4\Users*. For this reason, in configuration, is displayed only the name of the uploaded file.

Script

The **Script** page allows to configure scripts connected to the events of the **Bitmap View windows** or of application, in VBScript or JScript.



The section on the left shows the list of the functions available, grouped by Application and Window.

The section on the right shows the code of the functions set.

Menu

The menu of the window allows the access to the following commands, divided into sub menu:

File Menu

COMMAND	SHORTCUT	DESCRIPTION
Apply	A	Applies the current settings of the window.
Cancel		Closes the window without applying the current settings.
Load		Opens a dialog window to select a configuration file to be loaded.
Save As		Opens a dialog window to select a configuration file on which the current settings can saved

View Menu

COMMAND	SHORTCUT	DESCRIPTION
Previous page	Ctrl + Shift + Tab	Enables the page of the window previous to the one currently in use.
Next page	Ctrl + Tab	Enables the page of the window next to the one currently in use.

Help Menu

COMMAND	SHORTCUT	DESCRIPTION
Help	F1	Launch the WinTAX4 help, if available.

Toolbar

The window toolbar enables the access to the following commands:

COMMAND	DESCRIPTION
Keep Visible	Enables the Keep Visible mode allowing to keep visualized the configuration window while the application window are in use.
Cancel	Closes the configuration window without applying the settings (similar to the Cancel command of the File menu).
Apply	Applies the current settings to the configuration of the graphic window (similar to the Apply command of the File menu).
Load	Similar to the Load command of the File menu
Save As	Similar to the Save As command of the File menu
Previous page	Similar to the Previous page command of the View menu
Next page	Similar to the Next page command of the View menu

Commands

The main commands available in the **Bitmap View** window can be enabled through

- the **Options** menu in the main menu of the application
- the buttons of the **Toolbar** dedicated,
- **the pop-up** menu that can be displayed by clicking with the right button of the mouse on the graphic area of the window.

Options Menu

Through the **Options** menu for the Bitmap View windows the following commands can be enabled:



COMMAND	SHORTCUT	DESCRIPTION
Properties	E	Opens the interface to configure the window

Toolbar

The toolbar of the windows allows the access to the following commands:

COMMAND	SHORTCUT	DESCRIPTION
Load		Opens a configuration window to select a configuration corresponding to a Bitmap View window.
Save		Saves the current window configuration on a file.
Properties	E	Opens the interface to configure the Bitmap View window

Pop-up Menu

By clicking with the right button of the mouse on the graphic area of the window the pop-up menu is displayed that allows the access to the following commands:



COMMAND	DESCRIPTION
Properties	Opens the interface to configure the Bitmap View window.

Condition Light Window

The Condition Light window displays a message set by user that depends on the value assumed by a channel in relation to the configured conditions. The message is shown at the instant of the Real Time acquisition or at the current position of the cursor in the post processing analysis. The window works with single lap or with compare of more laps



Elements of the window

The Condition Light window is formed only by a text area which show the configured message calculated by conditions.

Information Area

This area displays the message associated to the verified condition at the current position. The window could show only one channel at time and works with single lap or with compare of laps. In the case of comparison a small colored square to the left side of the channel will be shown to identify the lap related.



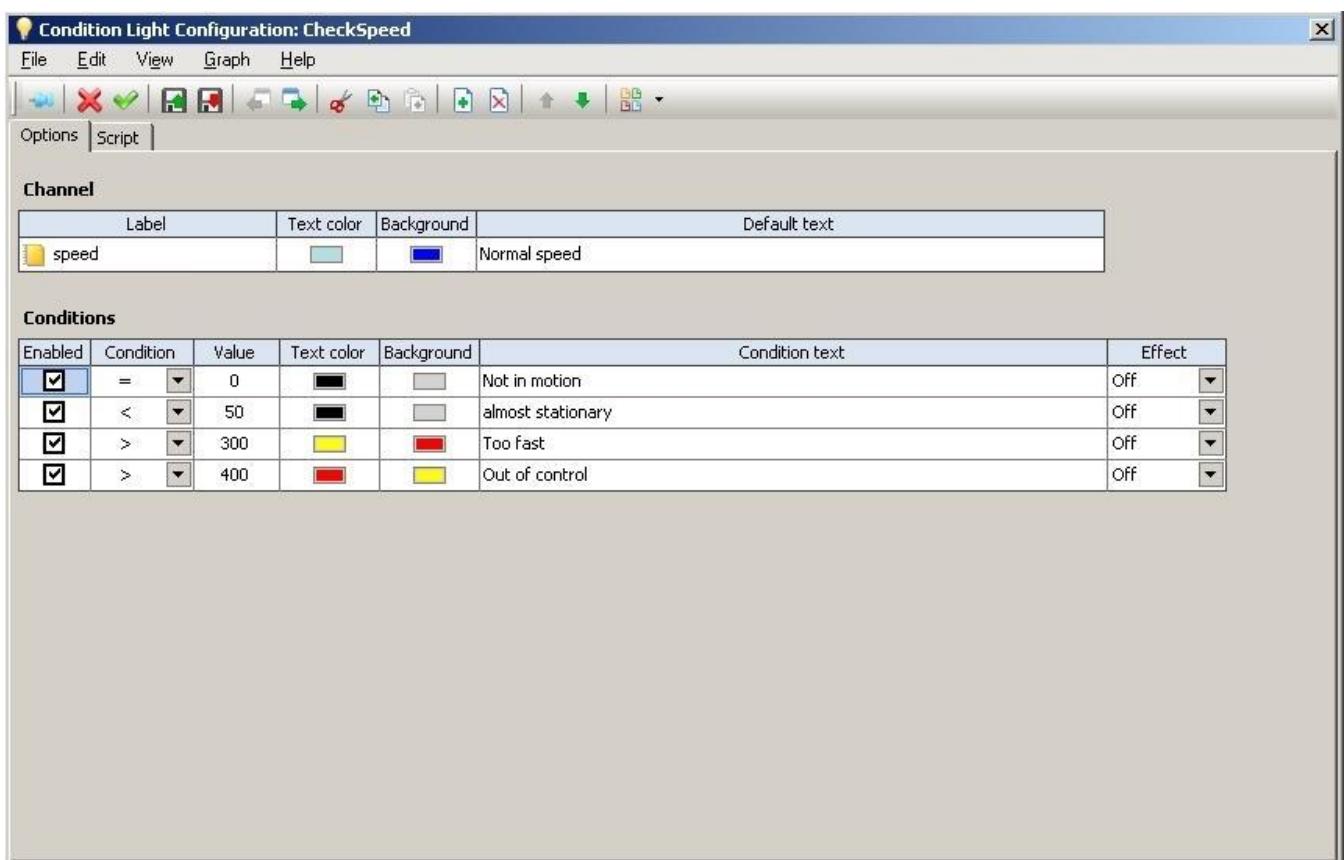
Condition Light Window Configuration

The **Condition Light Configuration** window allows to set the look of the **Condition Light windows**; it is formed by the **Options** and **Script** pages.

The window moreover has a menu, a toolbar and a pop-up menu that ease the access to the configuration and management commands of the window itself.

Options

The **Options** page allows to configure the graphic aspect of the **Condition Light** windows and it is divided in two sections.



Channel

It allows to configure the settings of the channel message without conditions. Each element can be edited by double clicking with the left button of the mouse or with the SPACE bar.

- **Label:** shows the name of the channel. Label can be edited and can become a math expression if the sign = comes first.
- **Text color:** color of text displayed by the window with no conditions applied.
- **Background color:** color of background displayed by the window with no conditions applied.
- **Default text:** text displayed by the window with no conditions applied.

Condition

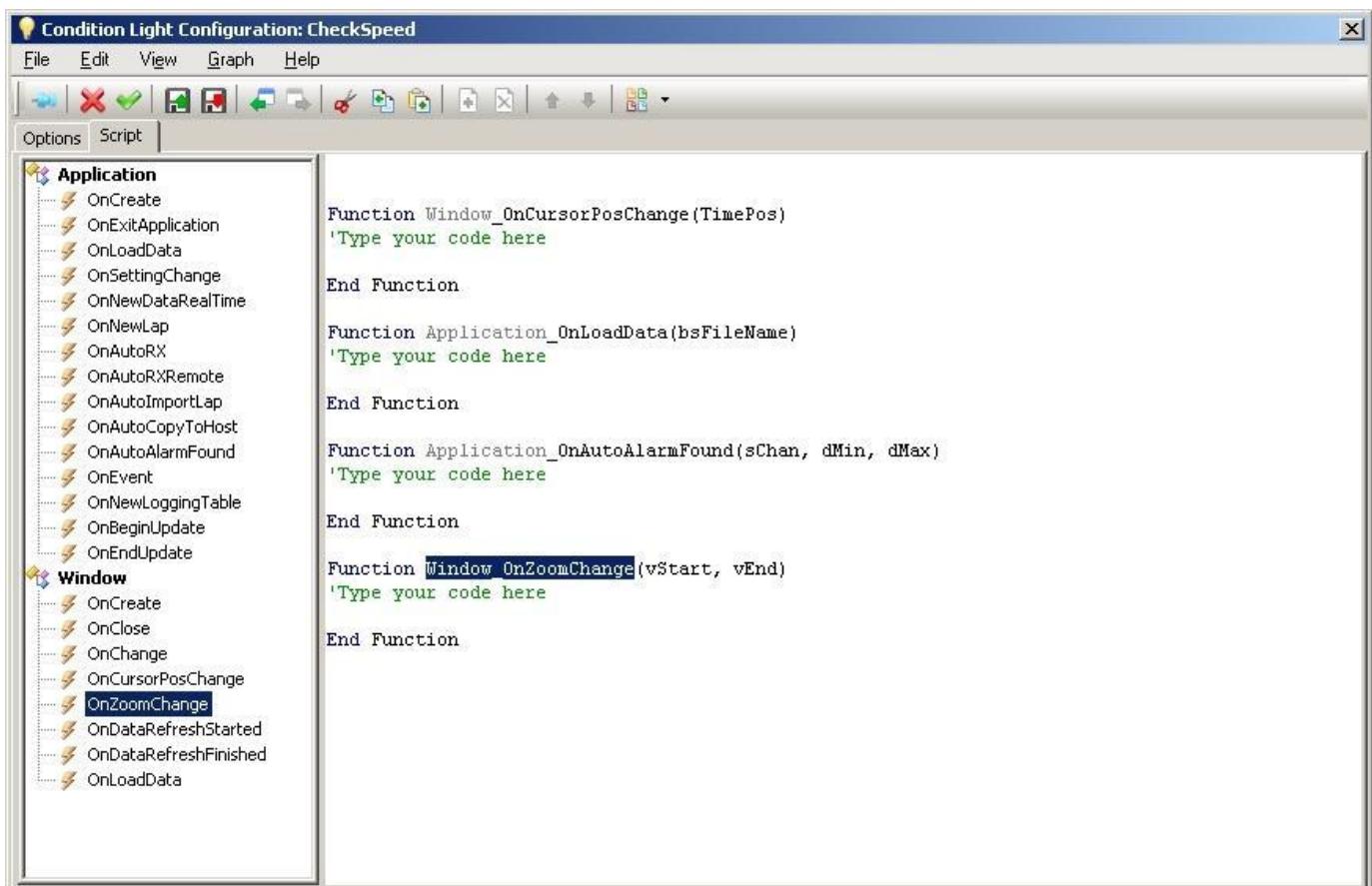
It allows to configure the settings of the conditions and the related messages. Each element, except checks, can be edited by double clicking with the left button of the mouse or with the SPACE bar. The maximum number of allowed conditions is 16.

- **Enabled:** if checked, the condition is included in window elaboration; if unchecked, the window ignore the condition.
- **Condition:** logical operator (=, <>, >, <, >=, <=)
- **Value:** threshold value of the condition.
- **Text color:** color of text displayed by the window if this condition is verified.
- **Background:** color of background displayed by the window if this condition is verified.
- **Condition text:** text displayed by the window if this condition is verified.
- **Effect:** text effect. You can choose among Off (no effects), Blinking and Underline. Blinking is not available in real time analysis.

Condition can be added, removed or moved using the toolbar and the menu commands. The conditions are read in sequence: if one is verified, the following are ignored; if it is not verified, the next will be examined. If neither condition is checked, the window displays the text configured in Channel section.

Script

The **Script** page allows to configure scripts connected to the events of the Condition Light window or of application, in VBScript or JScript.



The section on the left shows the list of the functions available, grouped by Application and Window.

The section on the right shows the code of the functions set.

Menu

The menu of the window allows the access to the following commands, divided into sub menu:

File Menu

COMMAND	SHORTCUT	DESCRIPTION
Apply	A	Applies the current settings of the window.
Cancel		Closes the window without applying the current settings.
Load		Opens a dialog window to select a configuration file to be loaded.
Save As		Opens a dialog window to select a configuration file on which the current settings can saved

Edit Menu

COMMAND	SHORTCUT	DESCRIPTION
Cut	Ctrl + X	Enabled only on Script page. Copies to clipboard the selected text and removes it from script edit box.
Copy	Ctrl + C	Enabled only on Script page. Copies to clipboard the selected text.
Paste	Ctrl + V	Enabled only on Script page. Pastes the text from the clipboard in the script edit box.

View Menu

COMMAND	SHORTCUT	DESCRIPTION
Previous page	Ctrl + Shift + Tab	Enables the page of the window previous to the one currently in use.
Next page	Ctrl + Tab	Enables the page of the window next to the one currently in use.

Graph Menu

COMMAND	DESCRIPTION
Add Graph	Adds a new element to the conditions list
Remove Graph	Removes a condition from the list.
Move Up	Moves up by one position the elements selected from the conditions list
Move Down	Moves down by one position the elements selected from the conditions list

Help Menu

COMMAND	SHORTCUT	DESCRIPTION
Help	F1	Launch the WinTAX4 help, if available.

Pop-up Menu

The pop-up menu of the **Condition Light Configuration** window can be displayed by clicking with the right button of the mouse on the Options page.



The pop-up menu allows the access to the following commands:

The pop-up menu of the window enables the access to the following commands:

COMMAND	DESCRIPTION
Cut	Similar to the Cut command of the Edit menu
Copy	Similar to the Copy command of the Edit menu
Paste	Similar to the Paste command of the Edit menu
Add Graph	Similar to the Add Graph command of the Graph menu
Remove Graph	Similar to the Remove Graph command of the Graph menu
Move Up	Similar to the Move Up command of the Graph menu
Move Down	Similar to the Move Down command of the Graph menu
Restore Default	Sets in the channel the settings configured in the Channel Parameters.
Set As Default	Sets the configurations of the channel in the Channel Parameters.
Edit...	Gives the possibility to edit the selected parameter (similar to the double click).

Toolbar

The toolbar of the window enables the access to the following commands:

COMMAND	DESCRIPTION
Keep Visible	Enables the Keep Visible mode ensuring to keep displayed the configuration window while other application windows are being used
Cancel	Closes the configuration window without applying the setting (similar to the Cancel command of the File menu)
Apply	Applies the present setting to the graphs window (similar to the Apply command of the File menu)

Load	Similar to the Load command of the File menu
Save As	Similar to the Save As command of the File menu
Previous page	Similar to the Previous page command of the View menu
Next page	Similar to the Next page command of the View menu
Cut	Similar to the Cut command of the Edit menu
Copy	Similar to the Copy command of the Edit menu
Paste	Similar to the Paste command of the Edit menu
Add Graph	Similar to the Add Graph command of the Graph menu
Remove Graph	Similar to the Remove Graph command of the Graph menu
Move Up	Similar to the Move Up command of the Graph menu
Move Down	Similar to the Move Down command of the Graph menu
Channel Browser	Shows the pop-up menu to select the page in the Channel Browser window 

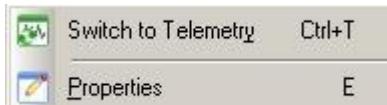
Commands

The main commands available in the **Condition Light** window can be enabled through

- the **Options** menu in the main menu of the application
- the buttons of the **Toolbar** dedicated,
- the **pop-up** menu that can be displayed by clicking with the right button of the mouse on the graphic area of the window.

Options Menu

Through the **Options** menu for the Condition Light windows the following commands can be enabled:



COMMAND	SHORTCUT	DESCRIPTION
Switch to Telemetry/ Post Processing	Ctrl + T	Enables to switch from the Post-Processing mode to the Telemetry mode and vice versa.
Properties	E	Opens the interface to configure the window

Toolbar

The toolbar of the windows allows the access to the following commands:

COMMAND	SHORTCUT	DESCRIPTION
Load		Opens a configuration window to select a configuration corresponding to a Condition Light window.
Save		Saves the current window configuration on a file.
Properties	E	Opens the interface to configure the Condition Light window
Switch to Telemetry/Post Processing	Ctrl + T	Enables to switch from the Post-Processing mode to the Telemetry mode and vice versa.

Pop-up Menu

By clicking with the right button of the mouse on the graphic area of the window the pop-up menu is displayed that allows the access to the following commands:



This section will describe only the commands that have not already been described previously.

COMMAND	DESCRIPTION
Properties	Opens the interface to configure the Condition Light window

Display Value Window

The Display Value window displays the value of the channels samples at the instant of the Real Time acquisition or at the current position of the cursor in the post processing analysis. The window could show only one channel at time and works with single lap or with compare of two laps. If more than two laps are loaded for comparison, the Display Value Windows analyze the first two enabled datasets.



Elements of the window

The Display Value window is formed by two parts: the label area and the value area

Label Area

The label area of the window shows the label name or the alternative text if configured.

Value Area

This area displays the values of the channel at the current position. The window could show only one channel at time and works with single lap or with compare of two laps. In the case of comparison a small colored square to the left side of the channel will be shown to identify the lap related.



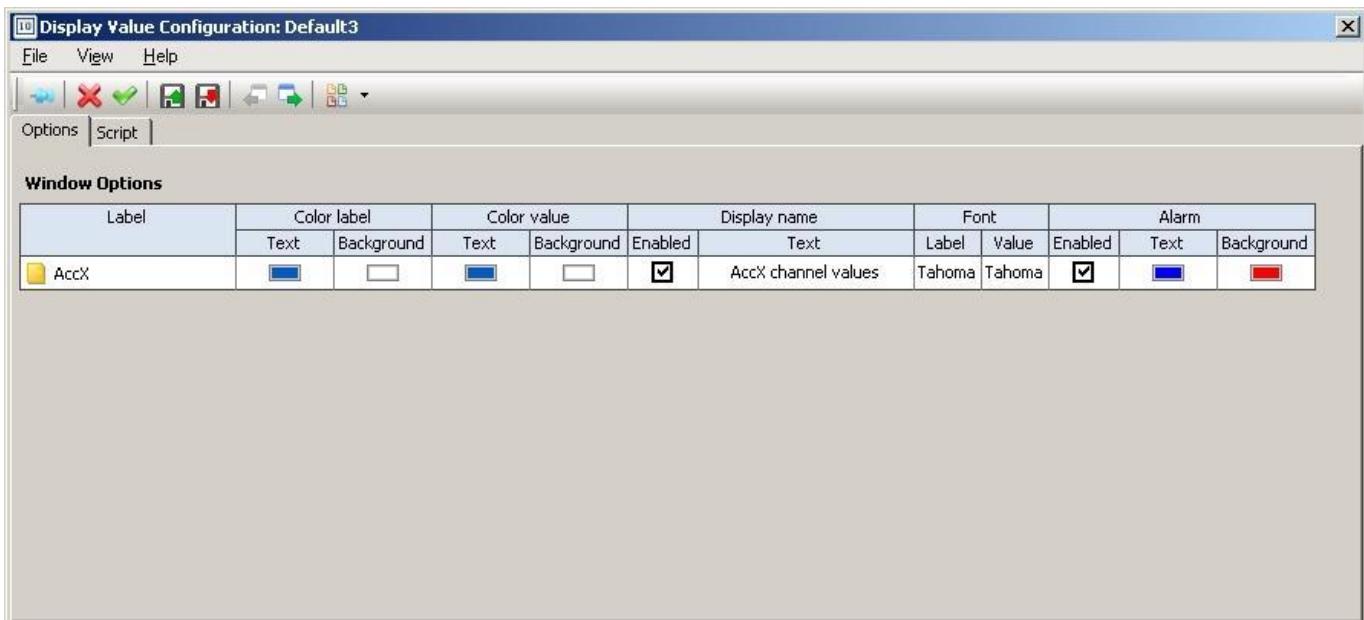
Display Value Window Configuration

The **Display Value Configuration** window allows to set the look of the **Display Value windows**; it is formed by the **Options** and **Script** pages.

The window moreover has a menu and a toolbar that ease the access to the configuration and management commands of the window itself.

Options

The **Options** page allows to configure the graphic aspect of the **Display Value** windows.

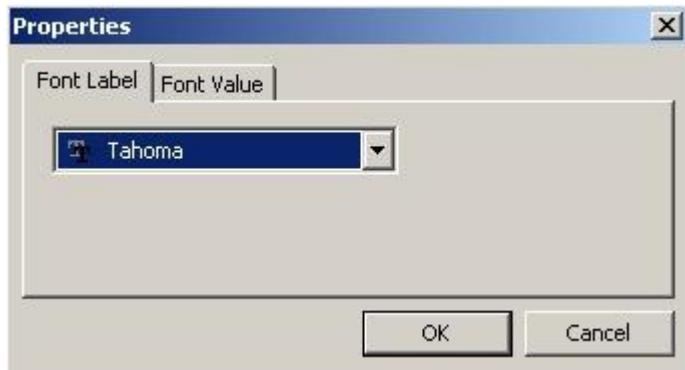


Window Options

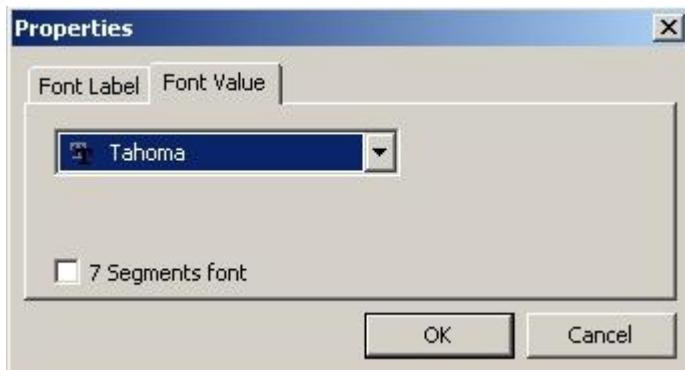
It allows to configure the settings of the layout of the window. Each element, except checks, can be edited by double clicking with the left button of the mouse or with the SPACE bar.

- **Label:** shows the name of the channel. The name of the channel can be edited and can become a math expression if the sign = comes first.
- **Color label:** allows the setting of the label customized colors.
 - The color sets in the **Text** column of this section is used for the label.
 - The color sets in the **Background** column of this section is used for the background of the label area.
- **Color value:** allows the setting of the value customized colors.
 - The color sets in the **Text** column of this section is used for the value.
 - The color sets in the **Background** column of this section is used for the background of the value area.
- **Display name:** allows the setting of the label customized text.
 - **Enabled:** If checked, the window display the Text configured; if unchecked, the window display the channel Label.
 - **Text:** text alternative to Label to be displayed in the window.
- **Font:** allows the settings of the window fonts.

- **Label:** configure the Font name of Label. The label is automatically scaled when resizing the window



- **Value:** configure the Font name of Value. The value is automatically scaled when resizing the window

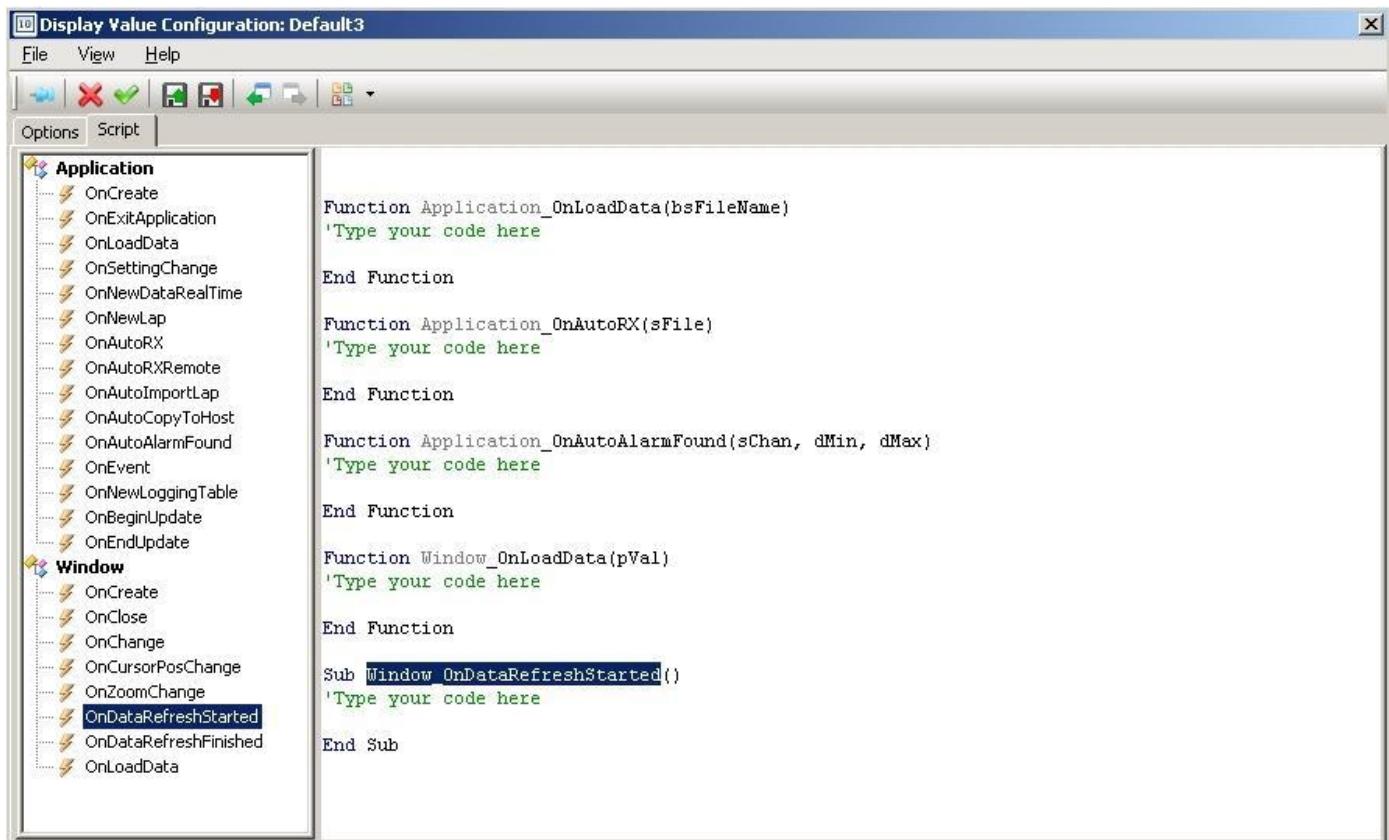


In this configuration is possible to choose the 7 Segments font instead of the list of configurable fonts.

- **Alarm:** The alarm configuration range used will be as in **Channels Parameters** at the **Alarm** page.
 - **Enabled:** enables the visualization of the Alarms.
 - The color sets in the **Text** column of this section is used for the label if in alarm range.
 - The color sets in the **Background** column of this section is used for the background of the label area if in alarm range.

Script

The **Script** page allows to configure scripts connected to the events of the Steering Wheel window or of application, in VBScript or JScript.



The section on the left shows the list of the functions available, grouped by Application and Window.

The section on the right shows the code of the functions set.

Menu

The menu of the window allows the access to the following commands, divided into sub menu:

File Menu

COMMAND	SHORTCUT	DESCRIPTION
Apply	A	Applies the current settings of the window.
Cancel		Closes the window without applying the current settings.
Load		Opens a dialog window to select a configuration file to be loaded.
Save As		Opens a dialog window to select a configuration file on which the current settings can saved

View Menu

COMMAND	SHORTCUT	DESCRIPTION
Previous page	Ctrl + Shift + Tab	Enables the page of the window previous to the one currently in use.
Next page	Ctrl + Tab	Enables the page of the window next to the one currently in use.

Help Menu

COMMAND	SHORTCUT	DESCRIPTION
Help	F1	Launch the WinTAX4 help, if available.

Toolbar

The window toolbar enables the access to the following commands:

COMMAND	DESCRIPTION
Keep Visible	Enables the Keep Visible mode allowing to keep visualized the configuration window while the application window are in use.
Cancel	Closes the configuration window without applying the settings (similar to the Cancel command of the File menu).
Apply	Applies the current settings to the configuration of the graphic window (similar to the Apply command of the File menu).
Load	Similar to the Load command of the File menu
Save As	Similar to the Save As command of the File menu
Previous page	Similar to the Previous page command of the View menu
Next page	Similar to the Next page command of the View menu
Channel Browser	visualizes the pop-up menu to select the page in the Channel Browser window 

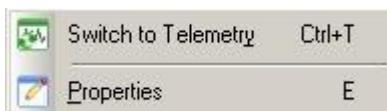
Commands

The main commands available in the **Display Value** window can be enabled through

- the **Options** menu in the main menu of the application
- the buttons of the **Toolbar** dedicated,
- the **popup** menu that can be displayed by clicking with the right button of the mouse on the graphic area of the window.

Options Menu

Through the **Options** menu for the Steering Wheel windows the following commands can be enabled:



COMMAND	SHORTCUT	DESCRIPTION
Switch to Telemetry/Post Processing	Ctrl + T	Enables to switch from the Post-Processing mode to the Telemetry mode and vice versa.
Properties	E	Opens the interface to configure the window

Toolbar

The toolbar of the windows allows the access to the following commands:

COMMAND	SHORTCUT	DESCRIPTION
Load		Opens a configuration window to select a configuration corresponding to a Display Value window.
Save		Saves the current window configuration on a file.
Properties	E	Opens the interface to configure the Display Value window
Switch to Telemetry/Post Processing	Ctrl + T	Enables to switch from the Post-Processing mode to the Telemetry mode and vice versa.

Pop-up Menu

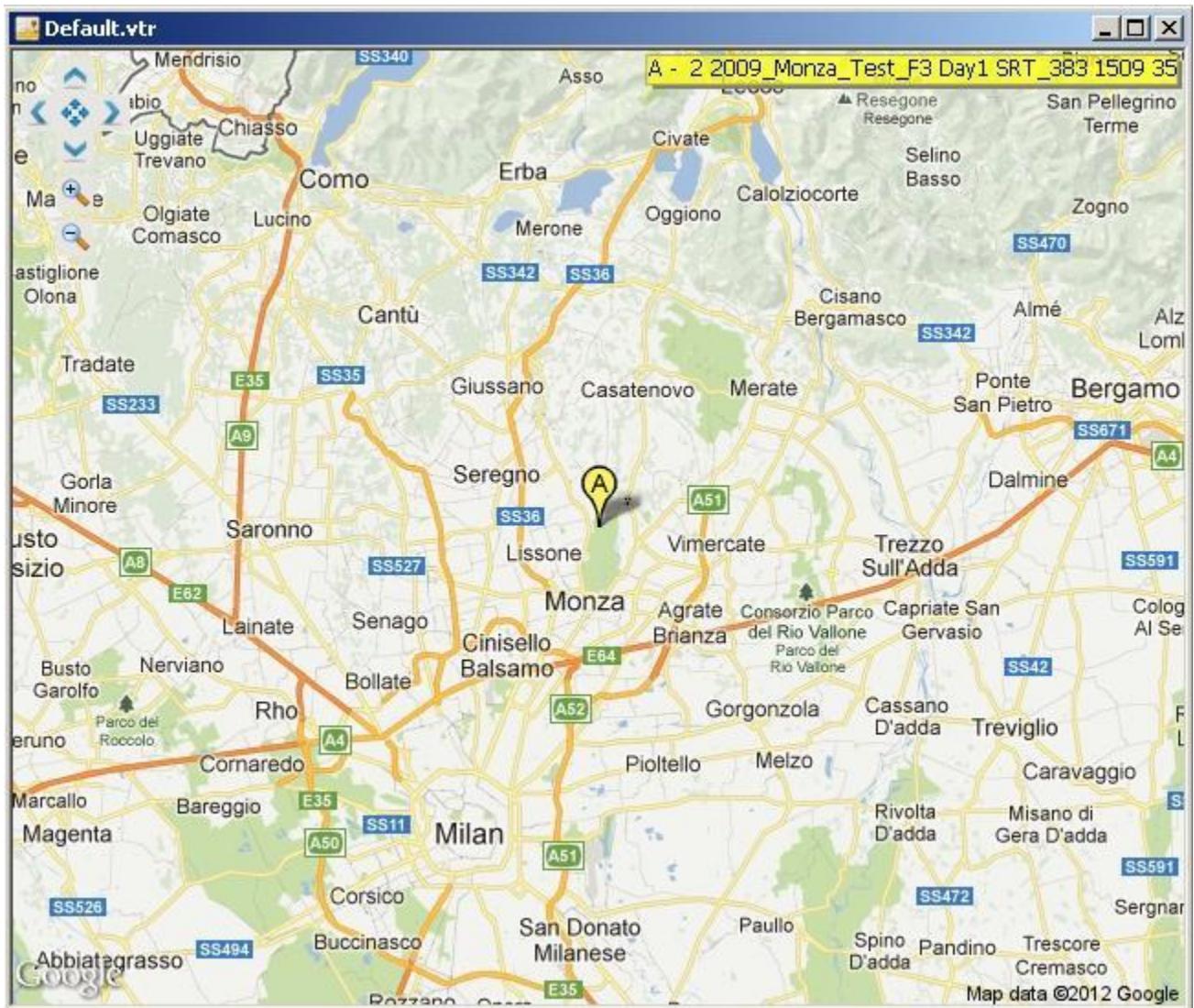
By clicking with the right button of the mouse on the graphic area of the window the pop-up menu is displayed that allows the access to the following commands:



COMMAND	DESCRIPTION
Properties	Opens the interface to configure the Display Value window

Vehicle Tracking Window

The Vehicle Tracking window has the purpose of showing the vehicle positioning on a "Google Map". The map is displayed by going directly to Google Maps, so an internet connection is needed.



Elements of the window

The Vehicle Tracking window is formed by a graphic area and some buttons.



Graphic Area

The graphic area is composed by a graph and a background. The image is not stretchable so, when the map is smaller than window, you see a configurable colored background.

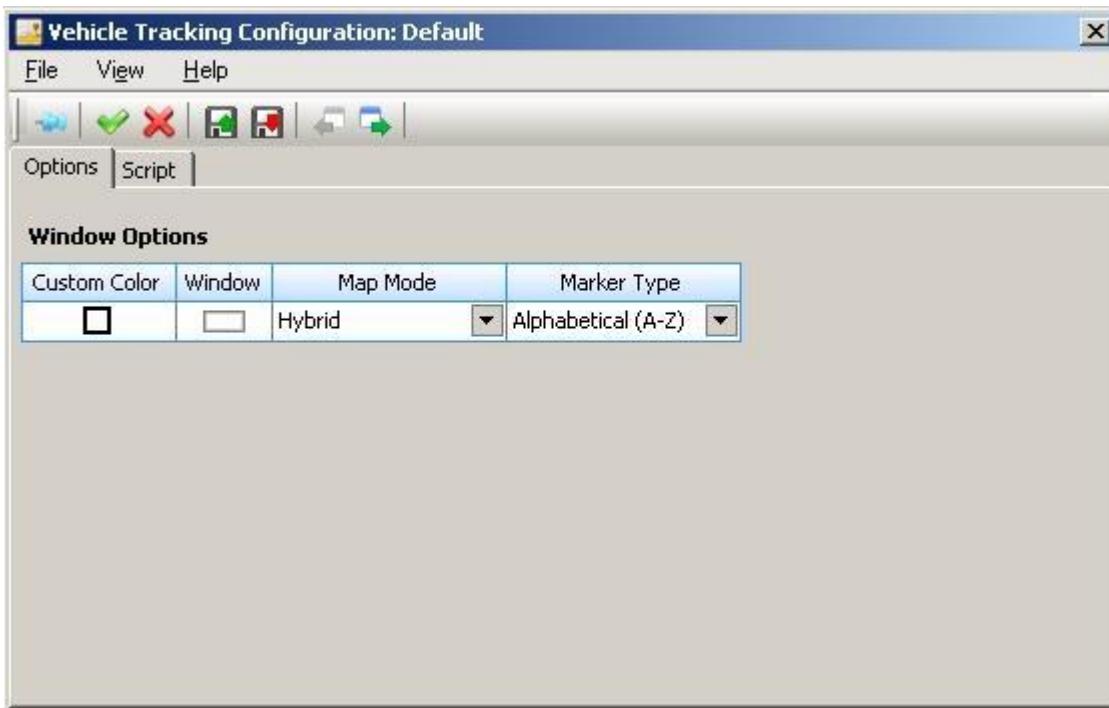
Vehicle Tracking Configuration

The **Vehicle Tracking Configuration** window allows to set the look of the **Vehicle Tracking windows**; it is formed by the **Options** and **Script** pages.

The window moreover has a menu and a toolbar that ease the access to the configuration and management commands of the window itself.

Options

The **Options** page allows to configure the graphic aspect of the **Vehicle Tracking** windows.



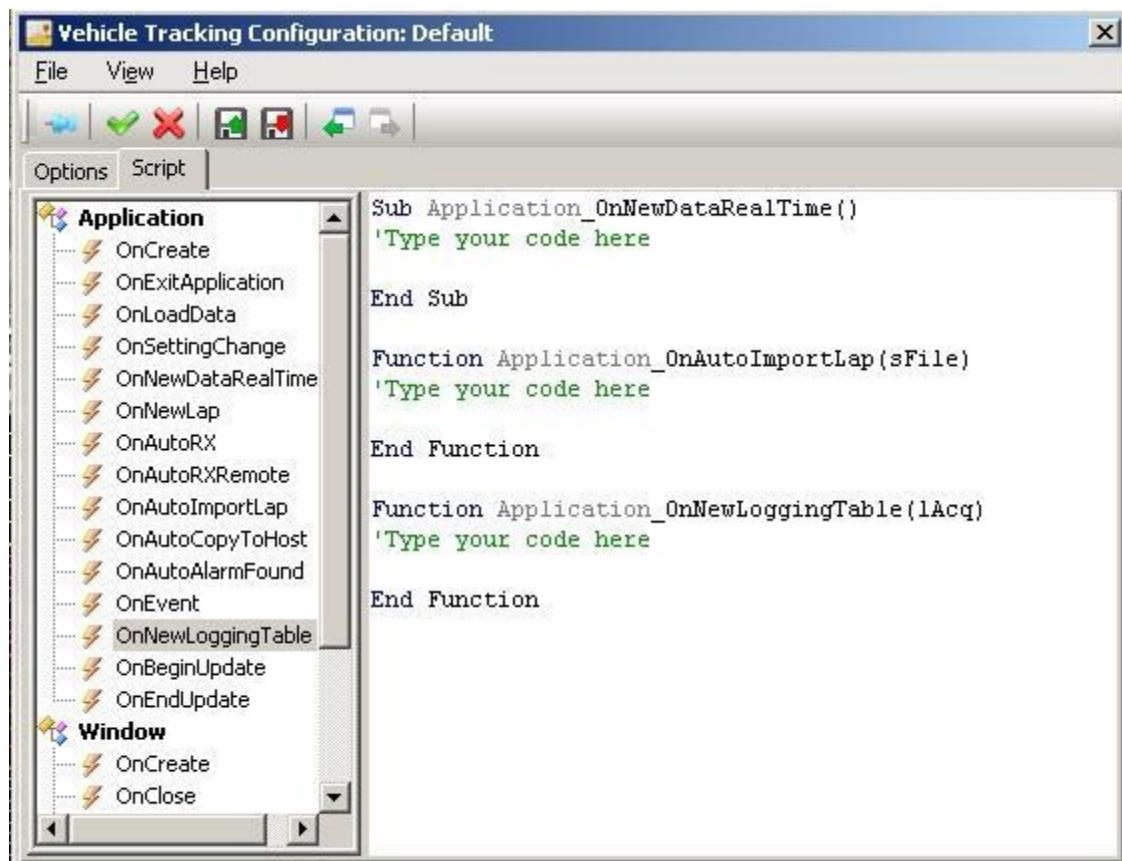
Window Options

It allows to configure the settings of the layout of the window. Each element, except checks, can be edited by double clicking with the left button of the mouse or with the SPACE bar.

- **Custom color:** allows the setting of the window background color.
 - If it is enabled, the color sets in the **Window** column of this section is used for the background of the graphic area.
 - If it is disabled, it is used the **Window** color in **Color Settings** configuration, in the **Default Appearance** page of the **General Setup** window (General Settings, general configuration of the WinTAX environment).
- **Map Mode:** allows to select the Google Map visualization mode: Road Map, Satellite, Terrain, Hybrid
- **Marker Type:** the markers can be alphabetical (from A to Z) or numerical (from 0 to 9)

Script

The **Script** page allows configuring scripts connected to the events of the **Vehicle Tracking windows** or of application, in VBScript or JScript.



The section on the left shows the list of the functions available, grouped by Application and Window.

The section on the right shows the code of the functions set.

Menu

The menu of the window allows the access to the following commands, divided into sub menu:

File Menu

COMMAND	SHORTCUT	DESCRIPTION
Apply	A	Applies the current settings of the window.
Cancel		Closes the window without applying the current settings.
Load		Opens a dialog window to select a configuration file to be loaded.
Save As		Opens a dialog window to select a configuration file on which the current settings can saved

View Menu

COMMAND	DESCRIPTION
Previous page	Enables the page of the window previous to the one currently in use.
Next page	Enables the page of the window next to the one currently in use.

Help Menu

COMMAND	SHORTCUT	DESCRIPTION
Help	F1	Launch the WinTAX4 help, if available.

Toolbar

The window toolbar enables the access to the following commands:

COMMAND	DESCRIPTION
Keep Visible	Enables the Keep Visible mode allowing to keep visualized the configuration window while the application window are in use.
Cancel	Closes the configuration window without applying the settings (similar to the Cancel command of the File menu).
Apply	Applies the current settings to the configuration of the graphic window (similar to the Apply command of the File menu).
Load	Similar to the Load command of the File menu
Save As	Similar to the Save As command of the File menu
Previous page	Similar to the Previous page command of the View menu
Next page	Similar to the Next page command of the View menu

Functions

The **Vehicle Tracking** window has the following functions:

- Google Maps Mode
- Update Map
- Marker

Google Maps Mode

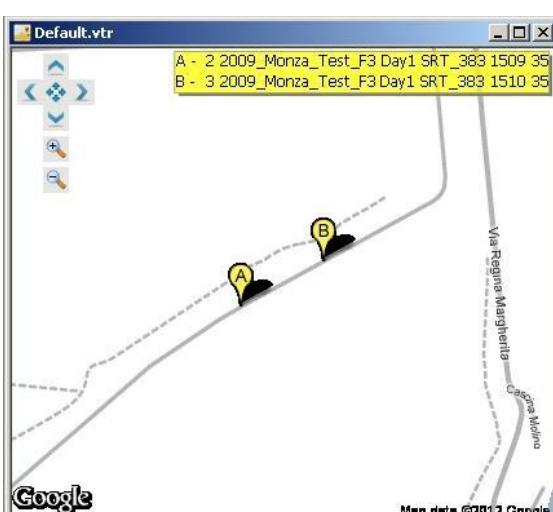
Google Maps can be displayed according to the following modes: Road Map, Satellite, Terrain, Hybrid.



Road Map



Satellite



Terrain



Hybrid

Update Map

The position of the vehicle is updated at current cursor position on graph windows with the Update Map command. If the cursor position changes on graph window, another Update Map command is needed to refresh Google Maps.

Marker

The user can choose between numeric marker or alphabetical marker.

Commands

The main commands available in the **Vehicle Tracking** window can be enabled through

- the **Options** menu in the main menu of the application
- the buttons of the **Toolbar** dedicated,
- the **Popup** menu that can be displayed by clicking with the right button of the mouse on the graphic area of the window.

Options Menu

Through the **Options** menu for the Vehicle Tracking windows the following commands can be enabled:



COMMAND	SHORTCUT	DESCRIPTION
Mode		Displays the sub menu to select the Google Map visualization mode: Road Map, Satellite, Terrain, Hybrid 
Zoom In	+	Zooms the graphic area in respect to the X axis, displaying in better details the interval around the current position of the cursor.
Zoom Out	-	Operation opposite to the Zoom In on the graphic area of the window: it displays in smaller detail in respect to the X axis of the interval around the current position of the cursor.
Pan Up	Up	Pan Up allows to shift up the displayed zoom area using the mouse or the keyboard.
Pan Down	Down	Pan Down allows to shift down the displayed zoom area using the mouse or the keyboard.
Pan Left	Left	Pan Left allows to shift left the displayed zoom area using the mouse or the keyboard.
Pan Right	Right	Pan Right allows to shift right the displayed zoom area using the mouse or the keyboard.
Reset Pan		Cancel all shifts and returns to its original position.
Update Map		Updates the position of the vehicle based on the position of the cursor in graph window.
Switch to Telemetry / Switch to Post Processing	Ctrl + T	Allows to switch from the Post-Processing mode to the Telemetry mode and vice versa.
Properties	E	Opens the interface to configure the window

Toolbar



The toolbar of the windows allows the access to the commands:

COMMAND	SHORTCUT	DESCRIPTION
Load		Opens a configuration window to select a configuration corresponding to a Vehicle Tracking window.
Save		Saves the current window configuration on a file.
Properties	E	Opens the interface to configure the Vehicle Tracking window
Road Map		Select Road Map visualization mode of Google Maps.
Satellite		Select Satellite visualization mode of Google Maps.
Terrain		Select Terrain visualization mode of Google Maps.
Hybrid		Select Hybrid visualization mode of Google Maps.
Zoom In	+	Zooms the graphic area in respect to the X axis, displaying in better details the interval around the current position of the cursor.
Zoom Out	-	Operation opposite to the Zoom In on the graphic area of the window: it displays in smaller detail in respect to the X axis of the interval around the current position of the cursor.
Pan Up	Up	Pan Up allows to shift up the displayed zoom area using the mouse or the keyboard.
Pan Down	Down	Pan Down allows to shift down the displayed zoom area using the mouse or the keyboard.
Pan Left	Left	Pan Left allows to shift left the displayed zoom area using the mouse or the keyboard.

Pan Right	Right	Pan Right allows to shift right the displayed zoom area using the mouse or the keyboard.
Reset Pan		Cancel all shifts and returns to its original position.
Update Map		Updates the position of the vehicle based on the position of the cursor in graph window.
Switch to Telemetry / Switch to Post Processing	Ctrl + T	Allows to switch from the Post-Processing mode to the Telemetry mode and vice versa.

Pop-up Menu

By clicking with the right button of the mouse on the graphic area of the window the pop-up menu is displayed that allows the access to the same commands of Options menu.

Lap Report Window

The Lap Report window displays some statistics for selected channels. There are four display modes: Session, Run, Selected, and Section. The first three modes (Session, Run and Selected) operate on whole laps (one or more) while the Section mode requires the lap to be split up into sections (see Track Editor)

Default.rep (Run Laps)																		
▼	Lap	Run	Lap Time	Session	AccX						AccY						AccZ	
	Info	Info	Info	Info	Min	Max	Avg	Start	End	StDev	Min	Max	Avg	Start	StDev	Avg		
	1	6	2:29.253	BOXPERS03	-1.053	1.877	-0.057	-0.004	-0.284	0.380	-2.107	2.277	0.120	0.020	0.807	0.127		
	2	6	1:51.990	BOXPERS03	-1.253	1.685	-0.035	-0.284	-0.270	0.455	-2.459	2.756	0.146	-0.442	1.108	0.199		
	3	6	1:50.260	BOXPERS03	-1.087	1.915	-0.039	-0.270	-0.432	0.460	-2.659	2.647	0.137	-0.062	1.150	0.223		
	4	6	1:52.120	BOXPERS03	-1.283	1.927	0.005	-0.432	-0.630	0.521	-2.774	2.902	0.189	0.048	1.129	0.160		
	5	6	1:42.950	BOXPERS03	-1.443	2.125	-0.040	-0.630	-0.376	0.546	-2.816	3.244	0.183	-0.138	1.205	0.179		
	6	6	1:40.920	BOXPERS03	-1.489	2.459	-0.047	-0.376	-0.462	0.584	-3.082	3.142	0.196	0.132	1.244	0.186		
➡	7	6	1:39.330	BOXPERS03	-1.361	3.472	-0.053	-0.462	-0.472	0.588	-3.286	3.248	0.181	0.082	1.278	0.199		
	8	6	2:00.483	BOXPERS03	-1.311	3.170	0.014	-0.472	NoRx	0.544	-3.532	3.222	0.183	-0.240	1.155	0.125		

Elements of the window

Default.rep (Run Laps)																		
Track: TRKTEST Session: BOXPERS03 Device: HEI Driver: Engine:																		
▼	Lap	Run	Lap Time	Session	AccX						AccY						AccZ	
	Info	Info	Info	Info	Min	Max	Avg	Start	End	StDev	Min	Max	Avg	Start	StDev	Avg		
	1	6	2:29.253	BOXPERS03	-1.053	1.877	-0.057	-0.004	-0.284	0.380	-2.107	2.277	0.120	0.020	0.807	0.127		
	2	6	1:51.990	BOXPERS03	-1.253	1.685	-0.035	-0.284	-0.270	0.455	-2.459	2.756	0.146	-0.442	1.108	0.199		
	3	6	1:50.260	BOXPERS03	-1.087	1.915	-0.039	-0.270	-0.432	0.460	-2.659	2.647	0.137	-0.062	1.150	0.223		
	4	6	1:52.120	BOXPERS03	-1.283	1.927	0.005	-0.432	-0.630	0.521	-2.774	2.902	0.189	0.048	1.129	0.160		
	5	6	1:42.950	BOXPERS03	-1.443	2.125	-0.040	-0.630	-0.376	0.546	-2.816	3.244	0.183	-0.138	1.205	0.179		
	6	6	1:40.920	BOXPERS03	-1.489	2.459	-0.047	-0.376	-0.462	0.584	-3.082	3.142	0.196	0.132	1.244	0.186		
➡	7	6	1:39.330	BOXPERS03	-1.361	3.472	-0.053	-0.462	-0.472	0.588	-3.286	3.248	0.181	0.082	1.278	0.199		
	8	6	2:00.483	BOXPERS03	-1.311	3.170	0.014	-0.472	NoRx	0.544	-3.532	3.222	0.183	-0.240	1.155	0.125		
Min	-	-	-	-	-	-1.489	1.685	-0.057	-0.630	-0.630	0.380	-3.532	2.277	0.120	-0.442	0.807	-	
Max	-	-	-	-	-	-1.053	3.472	0.014	-0.004	-0.270	0.588	-2.107	3.248	0.196	0.132	1.278	-	
Avg	-	-	-	-	-	-1.285	2.329	-0.031	-0.366	-0.418	0.510	-2.839	2.930	0.167	-0.075	1.135	-	

This window is a table structured in three parts. The first one, gray-colored, is the header. The middle one is the real table, the one at the bottom, gray-colored, are the statistics.

Header

In the first row of the header there are some Session information. This row can be hidden. In the following two header rows there are the name of the channel and the name of the calculated statistics.

Table

In the middle table each row identifies a lap or a part of a lap; the number of laps depends on the configured mode. There are five possible modes, four of them (Session, Run, Selected, Single Lap) shows laps and one (Section) which shows parts of lap.

- **Session Mode:** All laps of the current session; if the configuration lap filters are enabled, the number of laps might be lower.
- **Run Mode:** All laps of the current run; if the configuration lap filters are enabled, the number of laps might be lower.
- **Selected Mode:** Only the laps loaded in WinTAX; if the configuration lap filters are enabled, the number of laps might be lower.
- **Single Mode:** Only the first lap loaded in WinTAX.
- **Section Mode:** Only the first lap loaded in WinTAX, split in sections.

Statistics

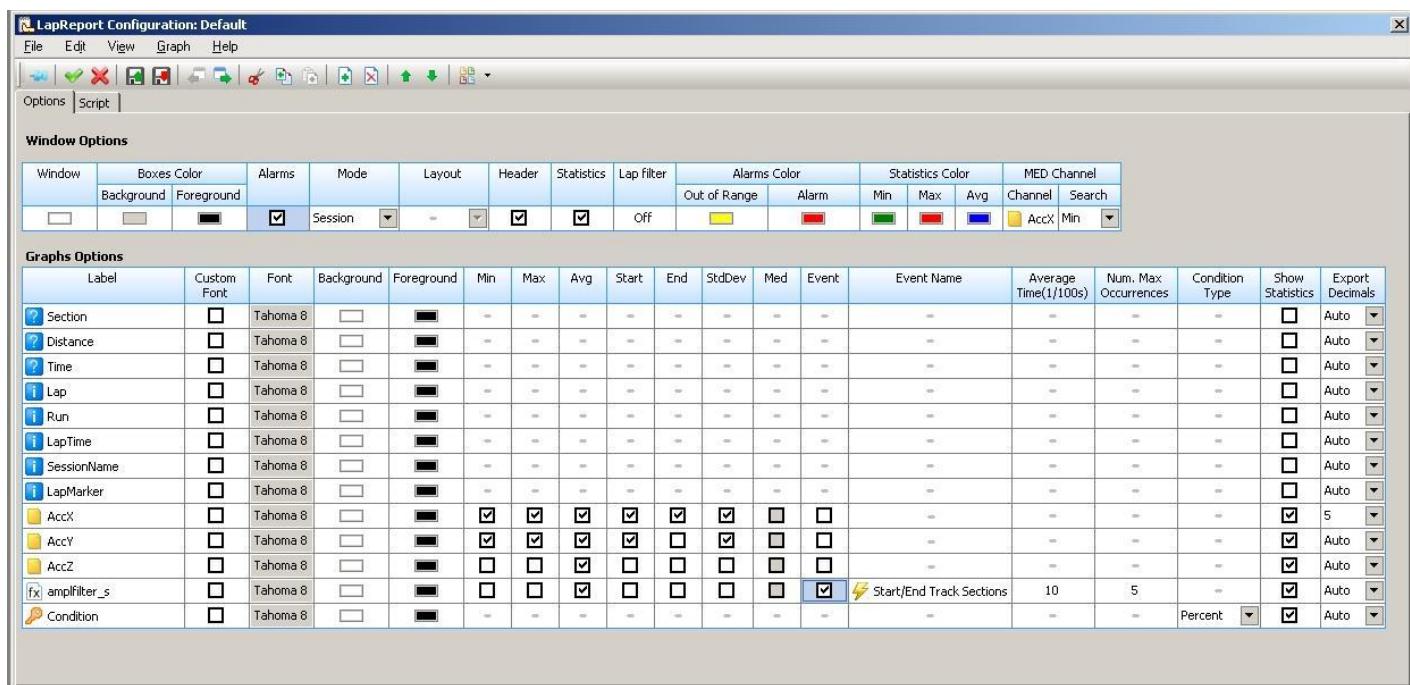
Statistics area, which is visible, if configured, in the bottom of the window, displays the statistics summary.

Lap Report Configuration

The **Lap Report Configuration** window allows configuring the aspect of the **Lap Report** window and it is formed by the following pages: **Options**, **Script**. The window has moreover a menu, a toolbar and a pop-up menu that ease the access to the configuration and management commands of the window itself

Options Page

The **Options** page allows configuring the graphic aspect of the **Lap Report** windows and it is divided into 2 sections: **Window** and **Graph**.

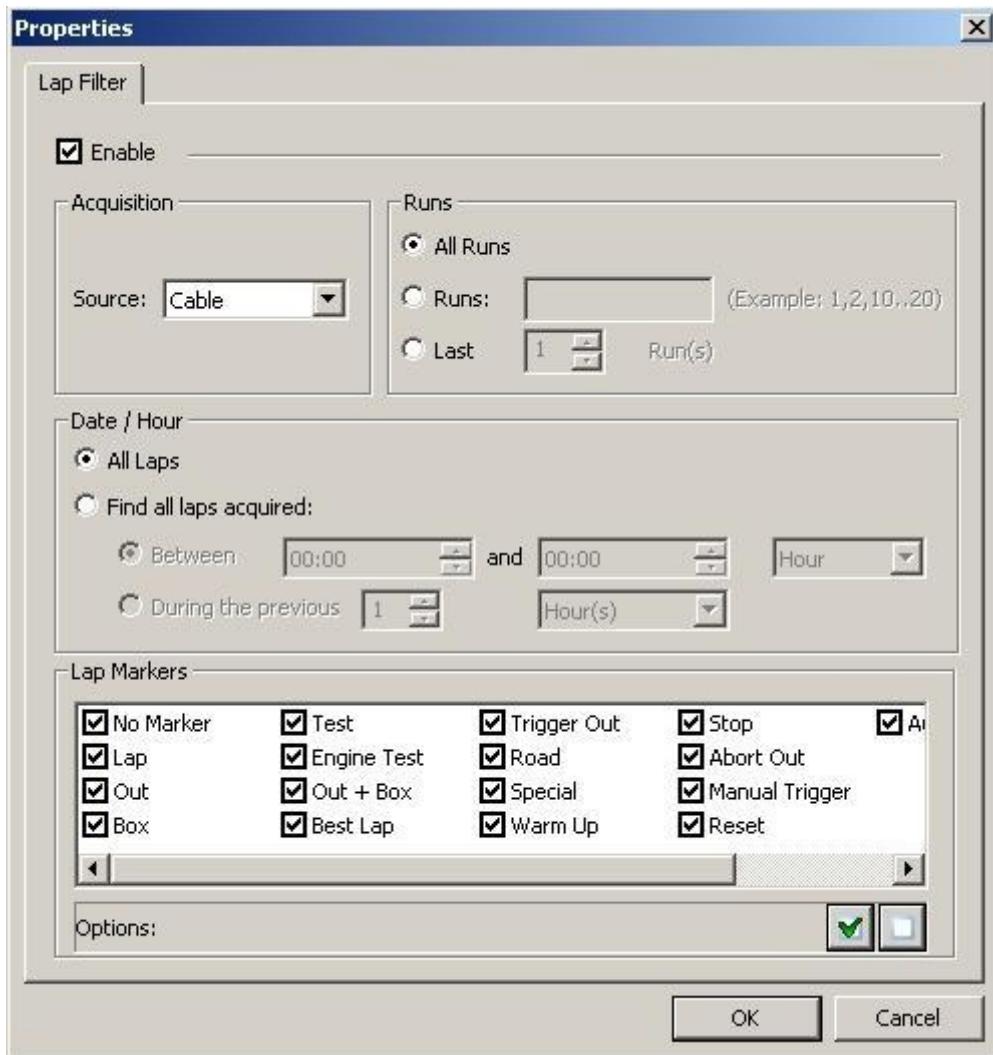


Window Options

It allows to configure the general settings of the windows. Each configurable value can be edited by double clicking with the mouse or by pressing the space bar on the selected element

- **Window:** sets the window background color.
- **Boxes color**
 - **Background:** sets the background color of the header rows and first column
 - **Foreground:** sets the foreground color of the header rows and first column
- **Alarms:** Enables to highlight the channels that have exceeded alarm thresholds during a lap (except in Section mode)
- **Mode:** Selects report mode (Session, Run, Selected, Section, Single Lap)

- **Lap Filter:** displays the setting to enable the lap filters. The lap filters area is an additional filter on the lap, used by the calculation window. To modify the setting and filter the laps, change the settings of the edit window of the filters.



Enable: Enables the customized settings.

- **Acquisition**

- **Source:** The laps are filtered on the basis of the source of data: **All** no filter is applied, **Cable** filters taking into account only the cable data (files cableData.ztx), **Real time** filters taking into account only the data acquired in real time (files dstData.ztx and nbtData.ztx), **NBT** filters only the real time NBT data (files nbtData.ztx), **Real time** filters only the real time **Real time** data (files dstData.ztx). The **Radio** type keeps compatibility with WinTAX2 and WinTAX3 files and is relative to *.dtx file types.

- **Runs**

- **All Runs:** Selects all the runs

- **Runs:** Filters to keep all runs specified in the list of the text box: The comma is used to list more runs or a tow dots to define an interval (Example: 1,2,3,10..12)
 - **Last:** Selects the last runs
- **Date / Hour**
 - **All Laps:** By default and selects all laps of the run
 - **Find all laps acquired:**
 - **Between:** Filters only the laps acquired during the set interval
 - **During the previous:** Filters only the laps acquired during the last hours set.
- **Lap Markers:**

The filter is carried out on the basis of the selected Markers. By default everything is selected. The Markers are information contained inside each lap and define the type of Lap. The two buttons on the options space bar are used to select or deselect all markers.

 - **Boxes color**
 - **Out of Range:** background color for out of range values
 - **Alarm:** background color for alarm values
 - **Statistics color**
 - **Min:** foreground color of the minimum value of a statistic between all laps.
 - **Max:** foreground color of the maximum value of a statistic between all laps.
 - **Avg:** foreground color of the average value of a statistic between all laps.
 - **MED Channel**

The MED ("median") point is at the chord of the corner. It is used in section reports to display the corresponding values of other channels at the centre of the corner (e.g. steer angle, brake pressure etc.)

 - **Channel:** enter name of channel to be used to find MED point (typically *wheel speed* or *lateral acceleration*).
 - **Search:** MED point can be either at the Min or Max value of the channel specified (e.g. use *Min* with *Wheel Speed* or *Max* with *Lateral Acceleration*)

Graphs Options

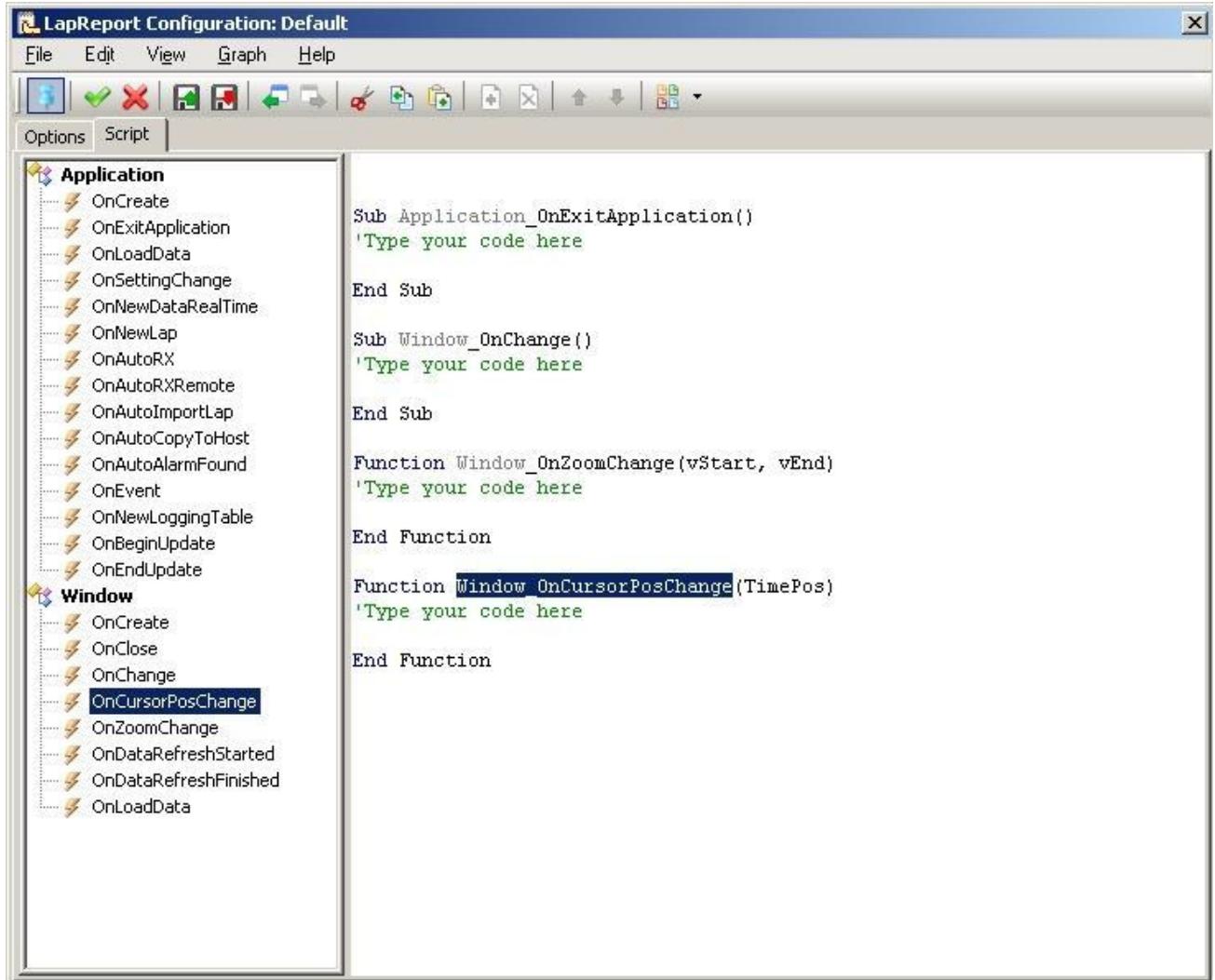
It allows to configure the settings specific of the channel to be graphed. Each configurable value can be edited by double clicking with the mouse or by pressing the space bar on the selected element. Multiple selections are possible through the CTRL and SHIFT keys.

- **Label:** Element to be displayed in report (channel, info etc.)
- **Custom font:** Enables a custom font for this entry

- **Font:** Custom font type
- **Background:** Cell background color
- **Foreground:** Text color
- **Min:** Shows minimum value of the selected element
- **Max:** Shows maximum value of the selected element
- **Avg:** Shows average (mean) value of the selected element
- **Start:** Shows start value of the selected element
- **End:** Shows end value of the selected element
- **StdDev:** Shows Standard Deviation value of the selected element
- **Med:** Shows medium value of the selected element for Section (Section report mode only)
- **Event:** Enable the event search
- **Event Name:** Specifies an event whose corresponding values will be displayed (not active in Section report mode)
- **Average Time:** Specifies a time duration in 1/100s of a second over which the channel values are averaged when searching for events
- **Num Max Occurrences:** Maximum number of event occurrences (columns) which will be displayed in each line of the report.
- **Time or Percent:** representation of how long a given condition was true.
- **Show Statistic:** Enable the visualization of statistic values (min, max, avg) for each channel in the Run, Session or Selected Laps.
- **Export Decimals:** This parameter acts on the number of decimals of the channel during exporting. If Auto is set, the number of decimals belonging to the channel is used, otherwise the number of decimals set is taken. It applies to all the export processes.

Script

The **Script** page allows to configure the scripts of the events of the **Lap Report** window or of the application, in VBScript or JScript.



The section on the left displays the list of the functions available, grouped for Application and Window.

The section on the right displays the code of the set functions.

Menu

The menu of the **Lap Report** window enables the access to the following commands, divided in sub menus:

File Menu

COMMAND	SHORTCUT	DESCRIPTION
Apply	A	Applies the current settings of the window.
Cancel		Closes the window without applying the current settings.
Load		Opens a dialog window to select a XY configuration file to be loaded.
Save As		Opens a dialog window to select a XY configuration file.XY), on which the current settings can be saved.

Edit Menu

COMMAND	SHORTCUT	DESCRIPTION
Cut	Ctrl + X	Copies to clipboard the configurations of the channels selected in the list of the Graphs sections and removes them from the list of the Graphs section.
Copy	Ctrl + C	Copies to clipboard the configurations of the channels selected in the list of the Graphs.
Paste	Ctrl + V	Pastes the configurations of the channels available in clipboard adding them to the list of the Graphs section.

View Menu

COMMAND	SHORTCUT	DESCRIPTION
Previous page	Ctrl + Shift + Tab	Enables the page of the window previous to the one currently in use.
Next page	Ctrl + Tab	Enables the page of the window next to the one currently in use.

Graph Menu

COMMAND	DESCRIPTION
Add Graph	Adds a new element to the Graphs list of channels configurations.
Remove Graph	Removes from the Graphs list the configurations of the selected channels.
Move Up	Moves up by one position the selected elements in the Graphs list.
Move Down	Moves down by one position the selected elements in the Graphs list.

Toolbar

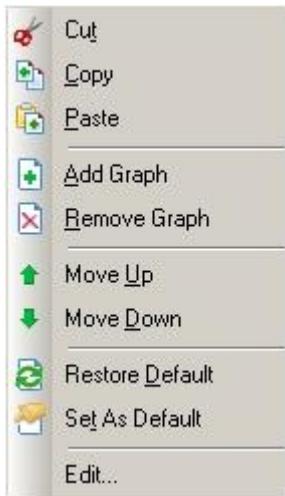
The toolbar of the window allows the access to the following commands:

COMMAND	DESCRIPTION
Keep Visible	Enables the Keep Visible mode allowing to keep displayed the configuration window while the application window are in use.
Cancel	Closes the configuration window without applying the settings (similar to the Cancel command of the File menu).
Apply	Applies the current settings to the configuration of the graphic window (similar to the Apply command of the File menu).
Load	Similar to the Load command of the File menu
Save As	Similar to the Save As command of the File menu
Previous page	Similar to the Previous page command of the View menu
Next page	Similar to the Next page command of the View menu
Cut	Similar to the Cut command of the Edit menu
Copy	Similar to the Copy command of the Edit menu

Paste	Similar to the Paste command of the Edit menu
Add Graph	Similar to the Add Graph command of the Graph menu
Remove Graph	Similar to the Remove Graph command of the Graph menu
Move Up	Similar to the Move Up command of the Graph menu
Move Down	Similar to the Move Down command of the Graph menu
Channel Browser	<p>Displays the pop-up menu to select the page in the Channel Browser window.</p>  <ul style="list-style-type: none">  Channels  Information  Virtual Channels  Conditions  Groups  Real Time Channels  Constants  User Records  Events  Import  Variables

Popup Menu

The pop-up menu can be displayed by clicking with the right button on the Options page.



The pop-up menu of the window allows the access to the following commands:

COMMAND	DESCRIPTION
Cut	Similar to the Cut command of the Edit menu
Copy	Similar to the Copy command of the Edit menu
Paste	Similar to the Paste command of the Edit menu
Add Graph	Similar to the Add Graph command of the Graph menu
Remove Graph	Similar to the Remove Graph command of the Graph menu
Move Up	Similar to the Move Up command of the Graph menu
Move Down	Similar to the Move Down command of the Graph menu
Restore Default	Sets in the channel the settings configured in the Channel Parameters.
Set As Default	Configures the channel settings in the Channel Parameters.
Edit...	Gives the possibility to edit the selected parameter (similar to double click).

Functions

The **Lap Report** window has the following functions:

- Visualization of the Elements
- Channel Selection
- Mode
 - Session
 - Run
 - Selected
 - Single Lap
- Statistics

Visualization of the Elements

The header and the statistics area can be hidden from configuration.

Channels selection

A channel can be selected by clicking with the left button of the mouse on the info boxes. To make a multiple selection of the channels, select the channels by pressing the CTRL key. The information boxes of the selected channels are highlighted. To remove the selection of a channel, select another channel or click on the down arrow at the beginning of the header.

Mode

The main feature of Lap report window is to show statistics based on different modalities.

Session mode

In this mode all laps of the current session will be used to create the report. The calculation can take quite a while. You can stop it before the end using the command Stop Operations.

Default.rep (Session Laps)																	
Track: TEST Session: debug - 4.18.4.3 - 51 Device: 03-RK Driver: Engine:																	
▼	Lap	Run	Lap Time	Session		Marker	AccX						AccY				AccZ
	Info	Info	Info	Info		Info	Min	Max	Avg	Start	End	StDev	Min	Max	Avg	Start	StDev
1	201	1:01.950	debug - 4.18.4.3 - 51	Engine	Test	0.00	0.06	0.03	0.03	0.03	0.01	-0.05	-0.01	-0.03	-0.03	0.00	-0.04
1	202	4:32.280	debug - 4.18.4.3 - 51		Out	-1.62	1.25	0.04	0.03	-0.47	0.52	-2.33	2.12	-0.13	-0.04	0.73	-0.03
2	202	0:15.320	debug - 4.18.4.3 - 51		Test	-0.47	0.14	0.01	-0.47	0.00	0.02	-0.06	0.05	-0.01	-0.01	0.01	-0.01
1	203	4:17.525	debug - 4.18.4.3 - 51		Out	-2.04	1.29	0.03	0.00	0.56	0.57	-2.50	2.45	-0.10	-0.01	0.81	0.01
2	203	3:32.130	debug - 4.18.4.3 - 51			-2.59	1.29	-0.00	0.56	0.42	0.67	-3.25	2.51	-0.14	0.01	0.99	0.03
3	203	3:47.350	debug - 4.18.4.3 - 51			-2.99	1.27	-0.05	0.42	-1.11	0.65	-2.52	2.59	-0.10	0.00	0.88	0.04
4	203	0:15.295	debug - 4.18.4.3 - 51		Test	-1.11	0.06	-0.05	-1.11	-0.04	0.09	-0.03	0.09	0.03	0.04	0.01	0.04
1	204	3:56.270	debug - 4.18.4.3 - 51		Out	-3.02	1.29	0.02	-0.04	0.40	0.64	-2.71	2.33	-0.11	0.03	0.91	0.04
2	204	3:28.050	debug - 4.18.4.3 - 51			-3.36	1.24	-0.01	0.40	0.48	0.72	-3.43	2.89	-0.13	0.04	1.05	0.04
3	204	3:29.590	debug - 4.18.4.3 - 51			-2.83	1.17	-0.02	0.48	0.45	0.69	-3.15	2.73	-0.12	0.00	1.04	0.05
4	204	3:43.790	debug - 4.18.4.3 - 51			-3.26	1.25	-0.06	0.45	-0.45	0.68	-48.92	2.59	-0.11	0.17	0.99	0.06
5	204	0:15.300	debug - 4.18.4.3 - 51		Test	-0.45	-0.01	-0.05	-0.45	-0.04	0.03	0.03	0.05	0.04	0.04	0.00	0.06
5	204	8:20.000	debug - 4.18.4.3 - 51		Auto Limit	-2.36	1.22	-0.02	-0.05	-1.10	0.38	-2.52	1.96	-0.02	0.04	0.41	0.05
1	205	4:08.310	debug - 4.18.4.3 - 51		Out	-2.71	1.02	0.00	-1.06	0.55	0.60	-2.48	2.48	-0.00	-0.84	1.39	0.03
2	205	3:37.050	debug - 4.18.4.3 - 51			-2.62	1.15	-0.02	0.55	0.52	0.64	-2.91	2.52	-0.11	0.11	0.93	0.04
3	205	3:30.930	debug - 4.18.4.3 - 51			-3.44	1.21	-0.02	0.52	0.55	0.70	-3.11	2.70	-0.11	0.20	0.99	0.05
4	205	3:48.085	debug - 4.18.4.3 - 51			-3.15	1.25	-0.06	0.55	-0.88	0.65	-2.51	2.56	-0.08	0.25	0.87	0.06
5	205	0:16.975	debug - 4.18.4.3 - 51		Test	-0.90	0.13	-0.05	-0.88	-0.05	0.08	-0.03	0.15	0.05	0.05	0.01	0.06
1	206	4:03.705	debug - 4.18.4.3 - 51		Out	-3.25	1.22	-0.00	-0.05	0.46	0.62	-2.98	2.42	-0.08	0.04	0.83	0.05
2	206	3:35.590	debug - 4.18.4.3 - 51			-2.99	1.26	-0.02	0.46	0.47	0.67	-3.01	2.65	-0.10	0.06	0.93	0.05
3	206	3:30.090	debug - 4.18.4.3 - 51			-3.31	1.20	-0.02	0.47	0.37	0.70	-2.96	2.83	-0.10	0.22	1.00	0.05
4	206	3:42.450	debug - 4.18.4.3 - 51			-2.61	1.26	-0.07	0.37	0.00	0.68	-2.96	2.68	-0.10	0.10	0.95	0.06
5	206	0:15.315	debug - 4.18.4.3 - 51		Test	-0.09	0.00	-0.05	0.00	-0.05	0.01	0.04	0.06	0.05	0.05	0.01	0.06
1	207	3:57.960	debug - 4.18.4.3 - 51		Out	-2.91	1.29	-0.00	-0.05	0.48	0.64	-2.91	2.77	-0.07	0.05	0.90	0.06
2	207	3:29.090	debug - 4.18.4.3 - 51			-3.20	1.35	-0.03	0.48	0.45	0.70	-3.19	2.74	-0.11	0.22	1.00	0.06
3	207	3:25.430	debug - 4.18.4.3 - 51			-3.38	1.30	-0.03	0.46	0.43	0.72	-3.29	2.99	-0.12	0.11	1.07	0.06

Multi Session mode

The Multisession Mode allows generating Lap Report for more than one session. Sessions can be selected from the Data Browser by means of mouse and CTRL button. Then Sessions can be loaded in WinTAX pressing "Enter". This action has only effect into Lap Report windows. The green arrow shows the current lap.

Run mode

In this mode all laps of the current run will be used to create the report. The calculation can take quite a while. You can stop it before the end using the command Stop Operations. The green arrow shows the current lap.

Default.rep (Run Laps)																	
Track: TEST Session: debug - 4.18.4.3 - 51 Device: 03-RK Driver: Engine:																	
▼	Lap	Run	Lap Time	Session		Marker	AccX						AccY				AccZ
	Info	Info	Info	Info	Info	Info	Min	Max	Avg	Start	End	StDev	Min	Max	Avg	Start	StDev
1	207	3:57.960	debug - 4.18.4.3 - 51	Out	-2.91	1.29	-0.00	-0.05	0.48	0.64	-2.91	2.77	-0.07	0.05	0.90	0.06	
2	207	3:29.090	debug - 4.18.4.3 - 51		-3.20	1.35	-0.03	0.48	0.45	0.70	-3.19	2.74	-0.11	0.22	1.00	0.06	
3	207	3:25.430	debug - 4.18.4.3 - 51		-3.38	1.30	-0.03	0.46	0.43	0.72	-3.29	2.99	-0.12	0.11	1.07	0.06	
4	207	3:39.250	debug - 4.18.4.3 - 51		-2.56	1.29	-0.04	0.43	0.43	0.63	-2.78	2.57	-0.08	0.13	0.89	0.07	
5	207	3:25.230	debug - 4.18.4.3 - 51		-3.41	1.39	-0.05	0.43	0.43	0.73	-3.07	2.83	-0.11	0.11	1.06	0.07	
6	207	3:51.145	debug - 4.18.4.3 - 51		-2.66	1.19	-0.08	0.43	-0.05	0.63	-2.71	2.48	-0.07	0.13	0.85	0.07	
7	207	0:15.295	debug - 4.18.4.3 - 51	Test	-0.13	0.27	-0.05	-0.05	-0.05	0.05	0.01	0.10	0.05	0.05	0.01	0.07	

Selected mode

Only laps currently loaded in memory as "append" are used to create the report

Default.rep (Selected Laps)																		
Track: TEST Session: debug - 4.18.4.3 - 51 Device: 03-RK Driver: Engine:																		
▼	Lap	Run	Lap Time	Session	Marker	AccX						AccY						AccZ
	Info	Info	Info	Info	Info	Info	Min	Max	Avg	Start	End	StDev	Min	Max	Avg	Start	StDev	Avg
▶	3	207	3:25.430	debug - 4.18.4.3 - 51		-3.38	1.30	-0.03	0.46	0.43	0.72	-3.29	2.99	-0.12	0.11	1.07	0.06	
▶	4	207	3:39.250	debug - 4.18.4.3 - 51		-2.56	1.29	-0.04	0.43	0.43	0.63	-2.78	2.57	-0.08	0.13	0.89	0.07	
▶	5	207	3:25.230	debug - 4.18.4.3 - 51		-3.41	1.39	-0.05	0.43	0.43	0.73	-3.07	2.83	-0.11	0.11	1.06	0.07	
▶	6	207	3:51.145	debug - 4.18.4.3 - 51		-2.66	1.19	-0.08	0.43	-0.05	0.63	-2.71	2.48	-0.07	0.13	0.85	0.07	
▶	7	207	0:15.295	debug - 4.18.4.3 - 51	Test	-0.13	0.27	-0.05	-0.05	-0.05	0.05	0.01	0.10	0.05	0.05	0.01	0.07	

Single lap mode

Only the first lap currently loaded in memory is used to create the report. In Single Lap the layout can be horizontal or vertical, as shown in the following pictures.

Default.rep (Single Lap)																																		
Track: TEST Session: debug - 4.18.4.3 - 51 Device: 03-RK Driver: Engine:																																		
Lap	Info	3																																
	Run	Info	207																															
Lap Time	Info	14:36.350																																
Session	Info	debug - 4.18.4.3 - 51																																
Marker	Info																																	
AccX	Min	-3.41																																
	Max	1.39																																
	Avg	-0.05																																
	Start	0.46																																
	End	-0.05																																
	StDev	0.67																																
AccY	Min	-3.29																																
	Max	2.99																																
	Avg	-0.09																																
	Start	0.11																																
	StDev	0.96																																
AccZ	Avg	0.07																																

Default.rep (Single Lap)																		
Track: TEST Session: debug - 4.18.4.3 - 51 Device: 03-RK Driver: Engine:																		
Lap	Run	Lap Time	Session	Marker	AccX						AccY						AccZ	
	Info	Info	Info	Info	Info	Min	Max	Avg	Start	End	StDev	Min	Max	Avg	Start	StDev	Avg	
3	207	14:36.350	debug - 4.18.4.3 - 51		-3.41	1.39	-0.05	0.46	-0.05	0.67	-3.29	2.99	-0.09	0.11	0.96	0.07		

Section mode

This report is created from current lap section map. Each row shows the statistics of a sector of the current map, if configured. The green arrow shows the section connected with the cursor position on a graph window.

Default.rep (Sections)																		
Track: TRKTEST Session: SESSION TEST Device: H-Test Driver: drv1 Engine: X1 Run: 6 Lap: 7 Abs: 21																		
Section	Distance (m)			TIME		AccX							AccY					AccZ
	Num	Start	End	Split		Min	Max	Avg	Start	End	StDev	Min	Max	Avg	Start	StDev	Avg	
#0-1		0.00	920.66	0:12.068	-0.706	0.678	-0.199	-0.462	-0.194	0.150	-3.286	3.086	-0.179	0.082	1.304	0.196		
#1		920.66	1362.70	0:08.176	-0.314	3.472	0.643	-0.194	-0.070	0.823	-2.253	2.816	0.142	1.805	1.396	0.168		
#1-2		1362.70	2619.00	0:24.114	-1.275	1.405	-0.270	-0.070	-0.104	0.368	-2.529	2.900	0.234	-1.733	1.186	0.167		
→ #2		2619.00	3505.62	0:10.550	-0.422	0.282	-0.102	-0.104	-0.118	0.080	-0.502	0.350	-0.022	-0.032	0.176	0.249		
#2-3		3505.62	4865.38	0:25.611	-1.229	2.177	0.060	-0.118	-0.648	0.610	-2.471	3.248	0.582	0.024	1.476	0.251		
#3		4865.38	5779.00	0:18.811	-1.361	3.092	-0.108	-0.648	-0.472	0.726	-2.433	2.683	-0.070	1.565	1.227	0.155		

In Section Mode, with a comparison of laps, the report displays a row for each lap.

Default.rep (Sections)																		
Track: TEST Session: debug - 4.18.4.3 - 51 Device: 03-RK Driver: Engine: Run: 207 Lap: - Abs: -																		
Section	Distance (m)			TIME		AccX							AccY					AccZ
	Num	Start	End	Split		Min	Max	Avg	Start	End	StDev	Min	Max	Avg	Start	StDev	Avg	
→ #0-1		0	921	2:28.182	-2.23	1.04	-0.11	0.46	0.92	0.79	-2.89	1.92	-0.44	0.11	1.08	0.06		
				0:37.003	-1.86	1.24	-0.12	0.48	0.88	0.73	-2.46	1.98	-0.43	0.22	1.09	0.05		
				0:36.371	-2.23	1.04	-0.11	0.46	0.92	0.79	-2.89	1.92	-0.44	0.11	1.08	0.06		
#1		921	1363	0:07.471	-2.54	0.99	0.01	0.92	-0.29	0.93	-3.13	2.22	-0.24	-0.13	1.54	0.06		
				0:07.681	-2.15	0.92	0.03	0.88	-0.41	0.82	-2.98	2.29	-0.19	-0.18	1.51	0.06		
				0:07.471	-2.54	0.99	0.01	0.92	-0.29	0.93	-3.13	2.22	-0.24	-0.13	1.54	0.06		
#1-2		1363	2619	2:30.950	-1.61	0.79	0.19	-0.29	0.06	0.42	-2.80	2.99	-0.52	2.22	1.23	0.11		
				0:39.726	-1.57	0.82	0.18	-0.41	0.18	0.41	-2.92	2.74	-0.54	2.29	1.22	0.10		
				0:39.138	-1.61	0.79	0.19	-0.29	0.06	0.42	-2.80	2.99	-0.52	2.22	1.23	0.11		
#2		2619	3506	0:09.936	-0.22	0.23	0.02	0.06	-0.01	0.07	-0.43	0.23	0.01	-0.40	0.11	0.03		
				0:09.946	-0.15	0.23	0.03	0.18	0.00	0.06	-0.32	0.23	0.02	-0.32	0.09	0.03		
				0:09.936	-0.22	0.23	0.02	0.06	-0.01	0.07	-0.43	0.23	0.01	-0.40	0.11	0.03		
#2-3		3506	4865	2:33.153	-3.38	0.96	-0.11	-0.01	-0.03	0.87	-2.50	2.00	-0.05	0.00	0.87	0.05		
				0:41.917	-3.20	1.08	-0.08	0.00	0.13	0.85	-2.51	2.00	-0.03	0.03	0.87	0.04		
				0:41.342	-3.38	0.96	-0.11	-0.01	-0.03	0.87	-2.50	2.00	-0.05	0.00	0.87	0.05		
#3		4865	5779	6:46.608	-2.93	0.28	-0.35	-0.03	-1.73	0.89	-0.08	0.87	0.09	0.00	0.12	0.04		
				1:12.817	-3.06	0.33	-0.31	0.13	-1.91	0.87	-0.13	0.76	0.07	0.09	0.13	0.04		
				1:11.172	-2.93	0.28	-0.35	-0.03	-1.73	0.89	-0.08	0.87	0.09	0.00	0.12	0.04		

Statistics

For each channel that have the Statistic check enabled, the minimum, maximum, average values are marked with selected colors.

In the picture below, the Statistics check in window section of configuration is enabled, so the summary statistics area is visible in the bottom of the window.

Track: TRKTEST Session: BOXPERSO3 Device: HEI Driver: Engine:																	
▼	Lap	Run	Lap Time	Session	AccX					AccY					AccZ		
	Info	Info	Info	Info	Min	Max	Avg	Start	End	StDev	Min	Max	Avg	Start	StDev	Avg	
➡	1	6	2:29.253	BOXPERSO3	-1.053	1.877	-0.057	-0.004	-0.284	0.380	-2.107	2.277	0.120	0.020	0.807	0.127	
	2	6	1:51.990	BOXPERSO3	-1.253	1.685	-0.035	-0.284	-0.270	0.455	-2.459	2.756	0.146	-0.442	1.108	0.199	
	3	6	1:50.260	BOXPERSO3	-1.087	1.915	-0.039	-0.270	-0.432	0.460	-2.659	2.647	0.137	-0.062	1.150	0.223	
	4	6	1:52.120	BOXPERSO3	-1.283	1.927	0.005	-0.432	-0.630	0.521	-2.774	2.902	0.189	0.048	1.129	0.160	
	5	6	1:42.950	BOXPERSO3	-1.443	2.125	-0.040	-0.630	-0.376	0.546	-2.816	3.244	0.183	-0.138	1.205	0.179	
	6	6	1:40.920	BOXPERSO3	-1.489	2.459	-0.047	-0.376	-0.462	0.584	-3.082	3.142	0.196	0.132	1.244	0.186	
	7	6	1:39.330	BOXPERSO3	-1.361	3.472	-0.053	-0.462	-0.472	0.588	-3.286	3.248	0.181	0.082	1.278	0.199	
	8	6	2:00.483	BOXPERSO3	-1.311	3.170	0.014	-0.472	NoRx	0.544	-3.532	3.222	0.183	-0.240	1.155	0.125	
Min	-	-	-	-	-	-1.489	1.685	-0.057	-0.630	-0.630	0.380	-3.532	2.277	0.120	-0.442	0.807	-
Max	-	-	-	-	-	-1.053	3.472	0.014	-0.004	-0.270	0.588	-2.107	3.248	0.196	0.132	1.278	-
Avg	-	-	-	-	-	-1.285	2.329	-0.031	-0.366	-0.418	0.510	-2.839	2.930	0.167	-0.075	1.135	-

Commands

The main commands available in the **Lap Report** window can be enabled through:

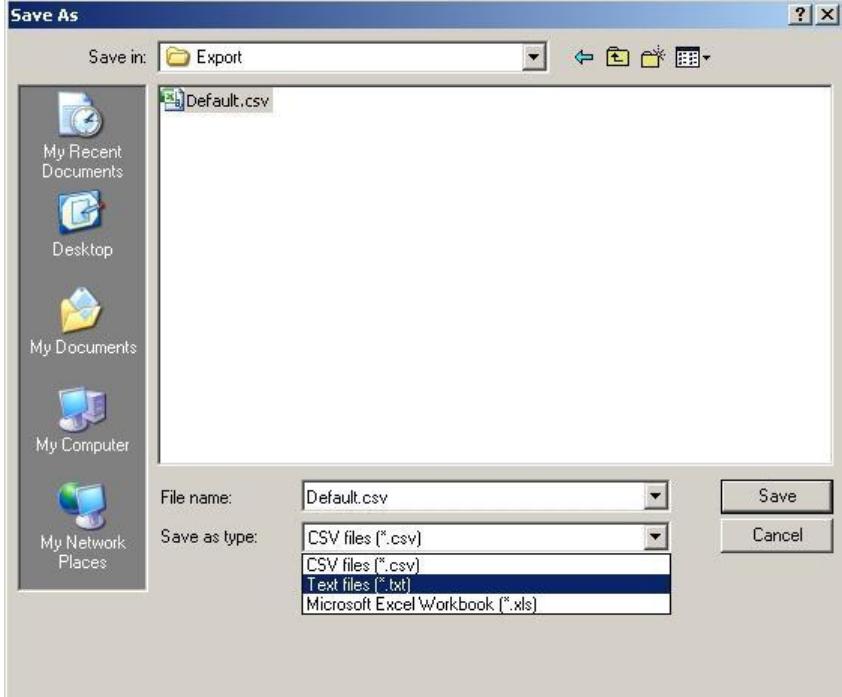
- The **Options** menu in the main menu of the application
- the buttons of the dedicated **Toolbar** dedicated
- **Pop-up menu** that can be displayed by clicking with the right button of the mouse on the graphic area of the window, on the Info boxes or on Y scales of the selected channels.

Options Menu

The **Options menu** for the **Lap Report** allows the access to the following commands:



COMMAND	SHORTCUT	DESCRIPTION
Mode		Session, Run, Selected, Section or Single Lap loaded. Each mode is described in function section.  A small dialog box with five items: "Session" (selected), "Run", "Selected", "Section", and "Single Lap".
Copy Data to Clipboard	Ctrl + Shift + C	Copies to Windows clipboard the reports displayed in the window
Open in Excel	Shift + X	Open data in Excel sheet

Export...		Exports report as csv, txt (text files), xls (Microsoft Excel).  A screenshot of a Windows 'Save As' dialog box. The 'Save in:' dropdown shows 'Export'. The main area contains a list with 'Default.csv' selected. The 'File name:' field also contains 'Default.csv'. The 'Save as type:' dropdown has several options: 'CSV files (*.csv)' (selected), 'CSV files (*.csv)', 'Text files (*.txt)', and 'Microsoft Excel Workbook (*.xls)'. The 'Save' and 'Cancel' buttons are visible at the bottom right.
Properties	E	Opens the interface to configure the window.
Refresh Windows		Recalculates manually the Lap Report window.
Stop Operations	Esc	It is enabled only during the calculation and it used to stop it in case it takes a long time.

Toolbar



The toolbar of the **Lap Report** window allows the access to the following commands:

COMMAND	SHORTCUT	DESCRIPTION
Load		Opens a window to select a configuration file.
Save		Saves the window present configuration on a file
Properties	E	Opens the interface to configure the window.
Export		See the description of the command in the Options Table.
Session		Calculates report in all laps of current Session
Run		Calculates report in all laps of current Run
Selected		Calculates report in all laps of current laps selection
Section		Calculates statistics in sectors of the current map, if configured.
Single Lap		Calculates report to current displayed lap
Refresh		Recalculates manually the Lap Report window.
Stop Operations	Esc	It is enabled only during the calculation and it used to stop it in case it takes a long time.

Pop-up Menu

By clicking with the right button of the mouse on the graphic area of the window, the following popup menu is displayed



This section will describe only the commands that have not already been described previously.

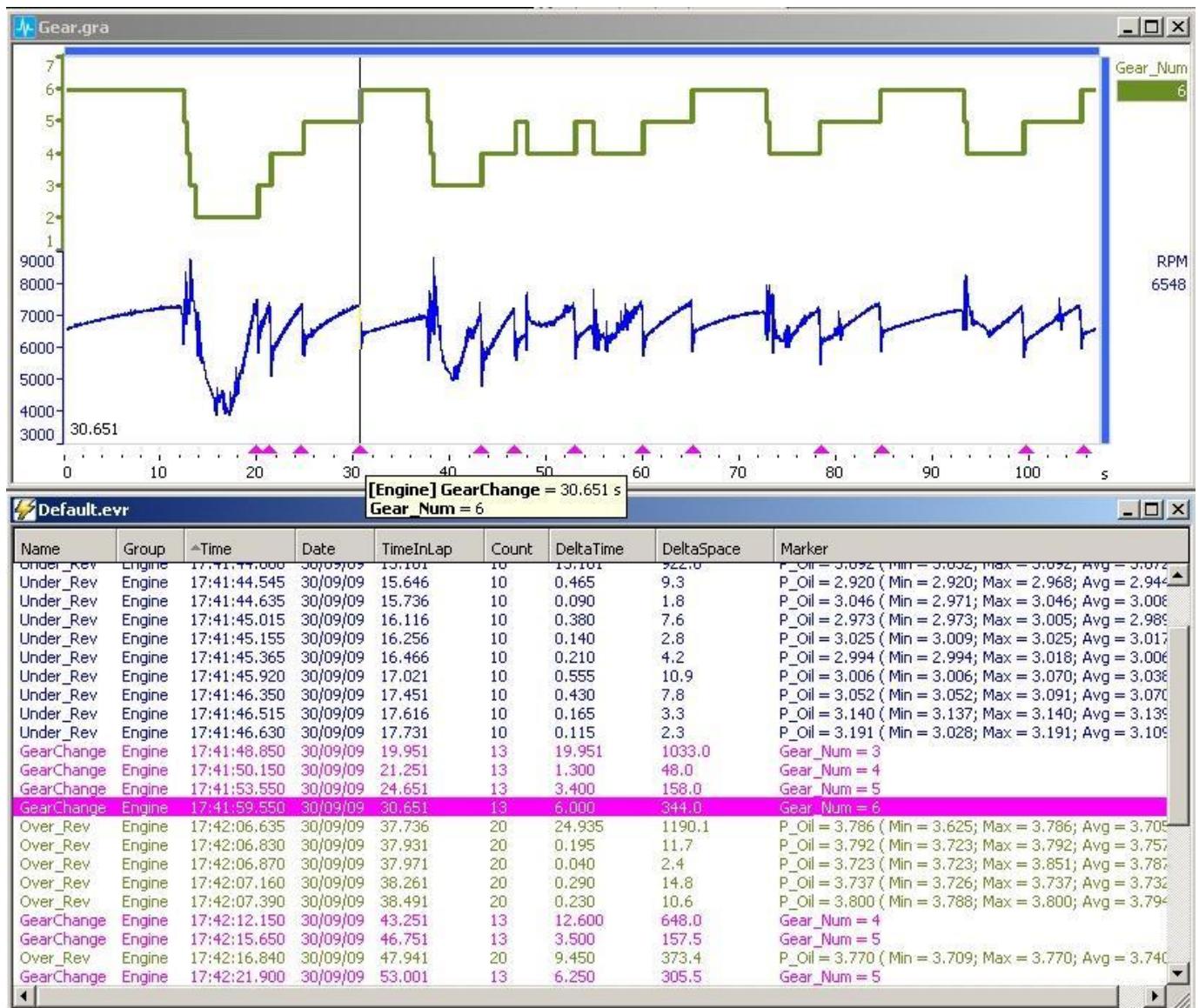
COMMAND	SHORTCUT	DESCRIPTION
Remove	Delete	Removes the selected channels from the graphs.
Edit Virtual Channel		Opens the VCH Editor (if the selected channel is a VCH)

Events Report Window

The Event Report shows selected events which occurred in the current session for the selected car (see also Diagnostics Report). Multiple event windows may be included in any layout, each one showing a different selection of events.

The *cursor connect* feature allows to use the event report to find occurrences of events within the graphs just by clicking on the relevant entry in the report and moving up and down with the arrow keys.

Thus, event report windows work as **search filters** which can be used to step through the data looking for selected events.



Elements of the window

Name	Group	Time	Date	TimeInLap	Count	DeltaTime	DeltaSpace	Marker1	Marker2	
Gear DOWN	Gear change	09:07:56.500	09/04/06	3.914	13	3.914	240.0	RPM = 6043	-	
Over Revs	Gear change	09:07:56.600	09/04/06	4.014	1	4.014	247.0	Gear = 6	Speed = 218	
Gear DOWN	Gear change	09:08:03.800	09/04/06	11.214	13	7.300	395.0	RPM = 6804	-	
Gear DOWN	Gear change	09:08:04.100	09/04/06	11.514	13	0.300	16.0	RPM = 7318	-	
Gear DOWN	Gear change	09:08:04.700	09/04/06	12.114	13	0.600	25.0	RPM = 6489	-	
Gear UP	Gear change	09:08:10.000	09/04/06	17.414	13	17.414	824.0	RPM = 6258	-	
Gear UP	Gear change	09:08:12.000	09/04/06	19.414	13	2.000	77.0	RPM = 6405	-	
Gear DOWN	Gear change	09:08:14.600	09/04/06	22.014	13	9.900	343.0	RPM = 6176	-	
Gear UP	Gear change	09:08:25.000	09/04/06	32.414	13	13.000	494.0	RPM = 6572	-	
Gear DOWN	Gear change	09:08:26.600	09/04/06	34.014	13	12.000	449.0	RPM = 6492	-	
Gear UP	Gear change	09:08:33.600	09/04/06	41.014	13	8.600	321.0	RPM = 6796	-	
Gear UP	Gear change	09:08:36.300	09/04/06	43.714	13	2.700	130.0	RPM = 6540	-	
Gear DOWN	Gear change	09:08:39.200	09/04/06	46.614	13	12.600	536.0	RPM = 6218	-	
Gear DOWN	Gear change	09:08:39.500	09/04/06	46.914	13	0.300	15.0	RPM = 7457	-	
Gear UP	Gear change	09:08:46.900	09/04/06	54.314	13	10.600	431.0	RPM = 6636	-	
Gear DOWN	Gear change	09:08:50.800	09/04/06	58.214	13	11.300	445.0	RPM = 6248	-	
Gear DOWN	Gear change	09:08:51.100	09/04/06	58.514	13	0.300	13.0	RPM = 6524	-	
Gear UP	Gear change	09:08:56.700	09/04/06	64.114	13	9.800	359.0	RPM = 5811	-	
Gear UP	Gear change	09:08:58.600	09/04/06	66.014	13	1.900	75.0	RPM = 6046	-	
Gear UP	Gear change	09:09:06.300	09/04/06	73.714	13	7.700	368.0	RPM = 6352	-	
Gear DOWN	Gear change	09:09:10.900	09/04/06	78.314	13	19.800	853.0	RPM = 6527	-	
Gear DOWN	Gear change	09:09:11.200	09/04/06	78.614	13	0.300	15.0	RPM = 7370	-	
Gear DOWN	Gear change	09:09:11.600	09/04/06	79.014	13	0.400	18.0	RPM = 6353	-	
Gear UP	Gear change	09:09:16.200	09/04/06	83.614	13	9.900	426.0	RPM = 6501	-	
Gear UP	Gear change	09:09:18.200	09/04/06	85.614	13	2.000	79.0	RPM = 6420	-	
Gear UP	Gear change	09:09:21.200	09/04/06	88.614	13	3.000	144.0	RPM = 6797	-	
Gear UP	Gear change	09:09:24.300	09/04/06	91.714	13	3.100	172.0	RPM = 6205	-	

The window is formed by cells arranged by row and column. Rows represent a single occurrence of an event; columns represent all the values connected with that occurrence.

The Event Report window can be configured to contain the following information:

- Name: Event name and bit label (for bitmapped diagnostics)
- Group: Event group name
- TimeInLap: Event time from start of lap (sec, resolution 1ms)
- Date: Event date (dd/mm/yy)
- Time: Event timestamp (hh:mm:ss.mmm)
- Count: number of occurrences within current data selection
- DeltaTime: time elapsed since last event of same type
- DeltaSpace: distance covered since last event of same type
- Markers: The values of multiple marker channels taken at the event time (or at the time offset from the event, if defined in the event properties)
- Lap header information (configurable) from lap in which event was detected

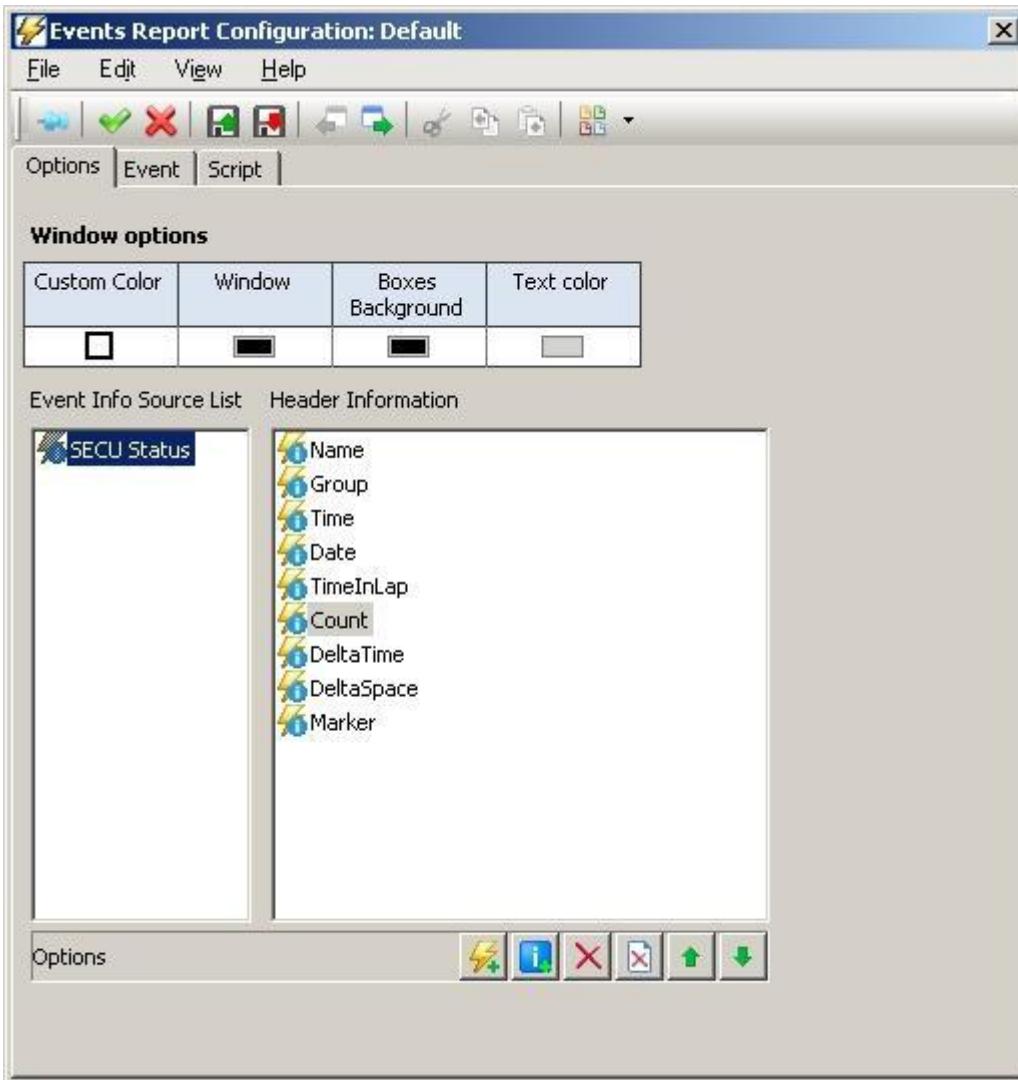
Event Report Configuration Window

The configuration window is formed by the pages: **Options**, **Event**, **Script**.

The window is moreover provided with a menu and a toolbar, that ease the access to the configuration and management commands of the window itself.

Options

The **Options** page enables to configure the graphic aspect of the windows and it is divided into 2 sections, the Window and the Event Information sections.



Window options

It allows to configure the general setting of the window. Each box can be edited by double clicking with the left button of the mouse or by pressing Space Bar.

- **Custom Color** Check that enables or disables the manual selection of the colors of the window.
- **Window:** Sets the background color of the window area where no events are displayed.

- **Boxes Background:** Sets the background color of the window header.
- **Text color:** Sets the background color of the text of the window header.

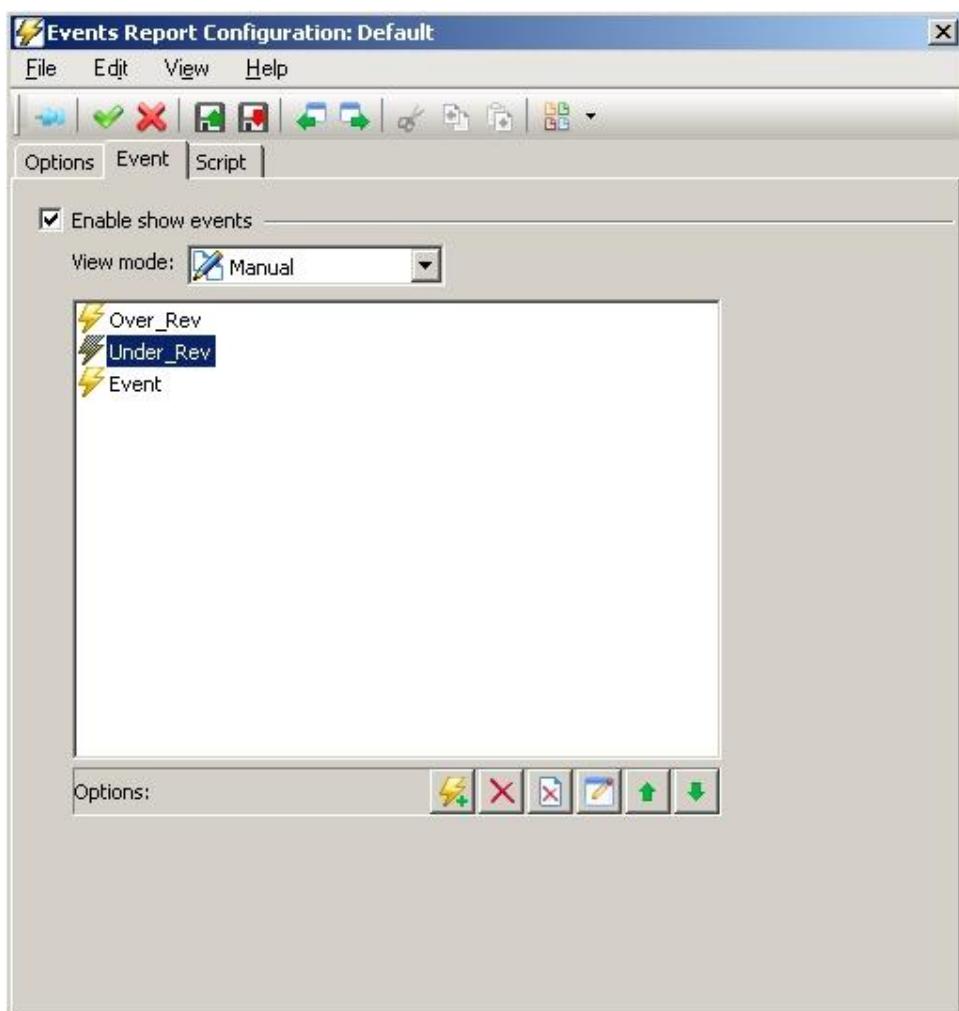
N.B.: The color of the text and of the background of the lines of each occurrence is determined by the graphic options of the configuration of each event.

Event Information Section

It allows to configure which information should be viewed for each event occurrence on the report. Information specific for the events and information available on the loaded lap can be added. The list on the left, indicated as **Event Info Source List**, gathers all information specific for the events. To display them in the report, bring them in the list on the right either by double clicking with the mouse or by using the first button on the left on the Options bar. In the list on the right, the **Header Information**, all information that will be displayed in the report are displayed, included the lap header info that are added with drag & drop from the Channel Browser. In the Header Information list the display arrangement can be modified or information can be removed or added by using the buttons of the Options bar.

Event Page

The **Event** page allows configuring the events related to the window.

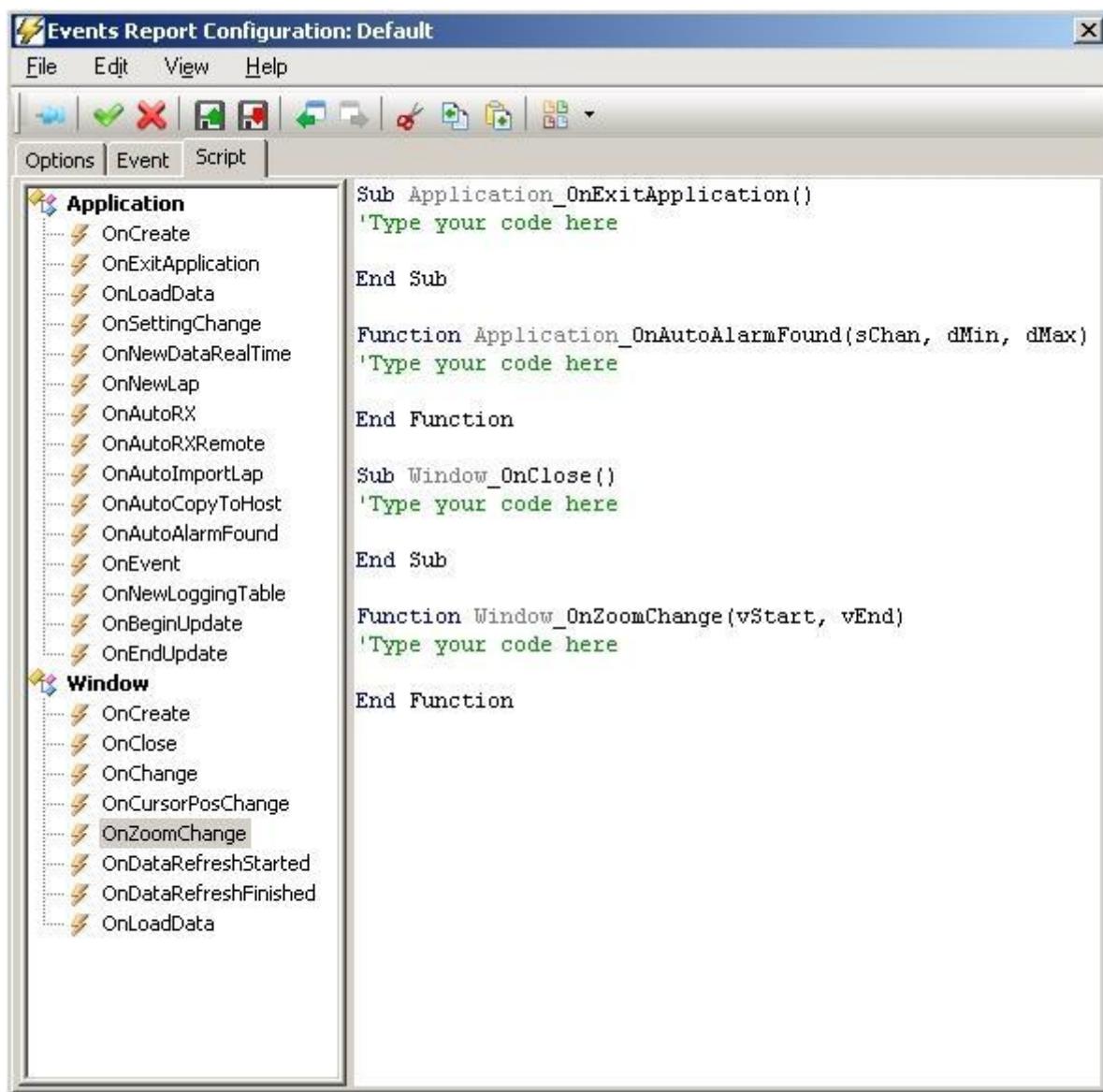


- **Enable show events:** enables the display of the events.
- **View Mode:** sets the display mode of the events. It can be Manual or All.
 - **All:** the window shows all events configured.
 - **Manual:** the window displays only the events selected by the user.

The list displays the customized events set by the user. Each event can be configured by using the buttons on the **Options** bar (to add, remove, modify, move the events within the list).

Script

The **Script** page allows to configure the scripts connected to the events of the window or of the application in VBScript or JScript.



The section on the left shows the list of the functions available, grouped by Application and Window. The section on the right shows the code corresponding to the functions set.

Menu

The menu of the window enables the access to the following commands, divided into sub menus:

File Menu

COMMAND	SHORTCUT	DESCRIPTION
Apply	A	Applies the present setting of the window.
Cancel		Closes the window without applying the present settings.
Load		Opens a dialogue window to select a configuration file EVR to be loaded.
Save As		Opens a dialogue window to select a EVR configuration file (.evr), to save the present setting.

Edit Menu

COMMAND	SHORTCUT	DESCRIPTION
Cut	Ctrl + X	Copies to clipboard the setting of the channels selected, and removes them from the list.
Copy	Ctrl + C	Copies to clipboard the setting of the channels selected from the list.
Paste	Ctrl + V	Pastes the setting from the clipboard, adding them to the list.

View Menu

COMMAND	SHORTCUT	DESCRIPTION
Previous page	Ctrl + Shift + Tab	Enables the page of the window previous to the one currently in use.
Next page	Ctrl + Tab	Enables the page of the window next to the one currently in use.

Toolbar

The toolbar of the window allows the access to the following commands:

COMMAND	DESCRIPTION
Keep Visible	Enables the Keep Visible mode that allows to keep displays the configuration window while the application windows are being used.
Cancel	Closes the configuration window without applying the setting (similar to the Cancel command of the File menu).
Apply	Applies the present setting to the configuration of the graphic window (similar to the Apply command of the File menu).
Load	Similar to the Load command of the File menu
Save As	Similar to the Save As command of the File menu
Previous page	Similar to the Previous page command of the View menu
Next page	Similar to the Next page command of the View menu
Cut	Similar to the Cut command of the Edit menu
Copy	Similar to the Copy command of the Edit menu
Paste	Similar to the Paste command of the Edit menu
Channel Browser	<p>displays the pop-up menu to select the page in the Channel Browser window.</p>  <ul style="list-style-type: none">  Channels  Information  Virtual Channels  Conditions  Groups  Real Time Channels  Constants  User Records  Events  Import  Variables

Functions

The **Event Report** window has the following functions:

- Freeze Real time Analysis.

Freeze Real time Analysis

Acquisition can be paused during normal running and real time data, up to a maximum of 180 seconds since the current time, frozen in order to allows user to work as in post processing analysis.

This function affects all real time windows displayed in the layout. When freeze condition is unlocked, all windows return to the normal real time state and frozen data won't be saved on disk. Command is available clicking with left-button mouse on a row of the report.

Commands

The main commands available in the **window** can be enabled through

- the **Options** menu on the main menu of the application
- the buttons of the dedicated **Toolbar**,
- **Pop-up menu** that can be displayed by clicking with the right button of the mouse on the graphic area of the window, on the Info boxes or on the Y scales of the selected channels

Moreover there is also the drag & drop channels on the window; if "All" is currently displayed, the drag & drop of one or more channels can automatically move to the Custom display.

Options Menu

The **Options** menu enables the access to the following commands:



COMMAND	SHORTCUT	DESCRIPTION
Export		Exports all the displayed channels to a file with following formats: CSV, XLS, TXT
Open in Excel	Shift + X	Opens an Excel sheet with the selected channels
Edit Events		It opens the interface window for Events Setup configuration.
Mask Secu Event		See the description of the command in SECU Events
Switch to Telemetry/Post Processing	Ctrl + T	It switches between Telemetry and Post Processing visualization mode.
Properties	E	Opens the interface to configure the window.

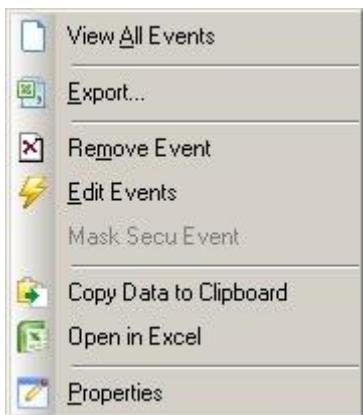
Toolbar

The toolbar enables the following commands:

COMMAND	SHORTCUT	DESCRIPTION
Load		Opens a window to select a configuration file corresponding to an Event Report window.
Save		Saves the present window configuration on a file.
Properties	E	See the description of the command in the Options Table.
Export		See the description of the command in the Options Table.
Switch to Telemetry/Post Processing	Ctrl + T	See the description of the command in the Options Table.

Pop-up menu

By clicking with the right button of the mouse on the graphic area of the window, the following pop-up menu is displayed:



This section will describe the commands that have not already been described previously.

COMMAND	SHORTCUT	DESCRIPTION
Unfreeze		Unfreeze data and re-start scrolling values in Real Time if report is freezed.
View All Events/View Custom Events		Changes the display of the window between All and Configured.
Remove Events		Available only in the Custom display: it removes from the report all the occurrences of the selected event.
Copy Data to Clipboard	Ctrl + Shift + C	Copies to the clipboard of Windows the selected channels.

Section Time Report Window

The Section Time Report window enables to calculate the partial times of each lap. The analysis can be carried out both on the selected laps and on all the laps of a run and on all the laps of a session. The number of laps analyzed is limited to those identified by the following Lap Markers: NO MARKER, LAP, BEST LAP, BOX, OUT, OUT+BOX. This number can be further reduced through the local filters. The partial times are calculated on the basis of the division of the Track in Sections, this division is made using the Track Editor or the command Manual Section Definition on a Graph window. The Section Time Report opens in just one case. To understand the window, please bear in mind the following definitions:

- **Split Time** is the coverage time of a single section of a lap.
- **Lap Time** is the coverage time of the lap that is equal to the sum of all the split times of the lap.
- **Ideal Time** is the sum of the best split times of each section. The best split time of a section corresponds to the lowest value of the coverage time of the section itself among all the selected laps; split times equal to 0 are not taken into account for the calculation of ideal time.
- **Rolling Lap** is the fastest lap formed by consecutive sections that do not necessarily begin from the first one. From the calculation of the Rolling Lap, split times equal to 0 are excluded.

Elements of the window

The window is formed by two tables, the first represents in details all sections of the lap; the second shows the Ideal Time and the Rolling Lap.

Section Time Report (Session)																
Abs	Run	Lap	Marker	0-1	1	1-2	2	2-3	3	3-4	4	4-0	Lap Time	Diff. Ideal	Diff. Rolling	
911	1	1	Out	-	-	-	-	-	-	-	-	-	4:32.280	-	-	
913	2	1	Out	-	-	-	-	-	-	-	-	-	4:17.525	-	-	
914	2	2		0:28.461	0:03.864	0:31.784	0:12.105	0:23.661	0:19.693	0:17.457	0:03.313	1:11.792	3:32.130	0:30.474	0:20.470	
915	2	3		0:30.403	0:04.104	0:36.714	0:12.177	0:24.644	0:19.578	0:18.675	0:03.314	1:17.741	3:47.350	0:45.694	0:35.690	
917	3	1	Out	-	-	-	-	-	-	-	-	-	3:56.270	-	-	
918	3	2		0:27.904	0:03.802	0:31.168	0:12.036	0:23.148	0:19.392	0:17.095	0:03.302	1:10.203	3:28.050	0:26.394	0:16.390	
919	3	3		0:27.906	0:03.924	0:31.243	0:12.015	0:23.611	0:19.693	0:17.237	0:03.315	1:10.646	3:29.590	0:27.934	0:17.930	
920	3	4		0:29.517	0:03.944	0:32.904	0:12.125	0:24.802	0:19.602	0:18.809	0:03.292	1:18.795	3:43.790	0:42.134	0:32.130	
922	4	1	Out	-	-	-	-	-	-	-	-	-	4:08.310	-	-	
923	4	2		0:28.449	0:04.032	0:32.982	0:13.336	0:24.553	0:20.232	0:17.599	0:03.332	1:12.535	3:37.050	0:35.394	0:25.390	
924	4	3		0:28.183	0:03.984	0:31.339	0:11.997	0:23.569	0:19.873	0:17.335	0:03.304	1:11.346	3:30.930	0:29.274	0:19.270	
925	4	4		0:31.558	0:04.384	0:34.126	0:12.095	0:24.994	0:19.672	0:18.881	0:03.312	1:19.063	3:48.085	0:46.429	0:36.425	
927	5	1	Out	-	-	-	-	-	-	-	-	-	4:03.705	-	-	
928	5	2		0:28.620	0:04.072	0:31.940	0:12.065	0:24.258	0:20.592	0:17.705	0:03.342	1:12.996	3:35.590	0:33.934	0:23.930	
929	5	3		0:28.182	0:03.972	0:31.491	0:12.087	0:23.290	0:19.352	0:17.227	0:03.383	1:11.106	3:30.090	0:28.434	0:18.430	
930	5	4		0:29.255	0:04.072	0:32.624	0:11.987	0:25.044	0:21.118	0:18.395	0:03.354	1:16.601	3:42.450	0:40.794	0:30.790	
932	6	1	Out	-	-	-	-	-	-	-	-	-	3:57.960	-	-	
933	6	2		0:27.991	0:04.012	0:31.234	0:11.947	0:23.269	0:19.158	0:17.281	0:03.312	1:10.886	3:29.090	0:27.434	0:17.430	
934	6	3		0:27.619	0:03.864	0:30.674	0:11.967	0:22.934	0:19.092	0:16.882	0:03.292	1:09.106	3:25.430	0:23.774	0:13.770	
935	6	4		0:28.778	0:04.192	0:33.221	0:13.077	0:24.360	0:20.029	0:17.932	0:03.332	1:14.329	3:39.250	0:37.594	0:27.590	
936	6	5		0:27.714	0:03.912	0:30.730	0:11.914	0:22.999	0:19.032	0:16.824	0:03.305	1:08.800	3:25.230	0:23.574	0:13.570	
937	6	6		0:30.099	0:04.192	0:35.223	0:12.137	0:25.712	0:20.092	0:19.190	0:03.514	1:20.986	3:51.145	0:49.489	0:39.485	
939	7	1	Out	-	-	-	-	-	-	-	-	-	4:05.025	-	-	
940	7	2		0:28.015	0:03.732	0:31.174	0:11.987	0:23.409	0:19.247	0:17.191	0:03.322	1:10.813	3:28.890	0:27.234	0:17.230	
941	7	3		0:31.239	0:04.104	0:34.399	0:12.021	0:22.079	0:00.011	0:16.991	0:00.003	1:24.943	3:25.790	0:24.134	0:14.130	
942	7	4		0:28.052	0:04.164	0:31.655	0:11.982	0:23.715	0:19.293	0:17.668	0:03.303	1:12.918	3:32.750	0:31.094	0:21.090	
943	7	5		0:33.112	0:03.904	0:37.392	0:12.547	0:28.872	0:20.462	0:22.588	0:03.597	1:37.011	4:19.485	1:17.829	1:07.825	
Ideal Time				0:27.619	0:03.732	0:30.674	0:11.914	0:22.079	0:00.011	0:16.824	0:00.003	1:08.800	3:01.656			
Rolling Lap				0:31.239	0:04.104	0:34.399	0:12.021	0:22.079	0:00.011	0:16.991	0:00.003	1:10.813	3:11.660			

In the first table each row identifies a lap; the number of laps depends on the configured mode. There are three possible modes

- **Session Mode:** All laps of the current session; if the configuration lap filters are enabled, the number of laps might be lower.
- **Run Mode:** All laps of the current run; if the configuration lap filters are enabled, the number of laps might be lower.
- **Selected Mode:** Only the laps loaded in WinTAX; if the configuration lap filters are enabled, the number of laps might be lower.

Not all laps of the session or of the current run are taken into account to calculate the ideal time and the rolling time, only the laps marked by the following Lap Markers: NO MARKER, LAP, BEST LAP, BOX, OUT, OUT + BOX. Furthermore it is possible to apply additional filters, both calculation and visualization, to the remaining lap.

The columns have the following meaning:

- The grey column shows a green arrow in correspondence with the laps loaded on WinTAX
- Laps information configured in the window setup environment will be shown in the first columns
- The columns coming after the information up to the LapTime column represent **Sections** into which the Track is divided and they were obtained by using the Track Editor. Each lap is then

divided into N sections and for each lap the coverage times of each section are shown. The times of each section are called **split time**.

- After the sections, the **LapTime** column is displayed that represents the coverage time of the lap of the car. For each lap the sum of the times of all sections corresponds to the Lap Time.
- The fore last column shows the **Diff. Ideal**. It contains the time difference between the Lap Time of the current time and the Ideal Time. If the Lap Time has a value lower than the Ideal Time, the difference is equal to 0.
- Last columns shows the **Diff. Rolling**. It shows the time difference between the Lap Time of the current lap and the Rolling Lap. If the Lap Time has a value lower than the Ideal Time, the difference is equal to 0.

The cells forming the various sections have the following properties.

- The split times which make the Fastest Rolling Lap are in bold.
- The split times which make Ideal Time are shown by a configurable color (cyan on the image).
- The split times of the loaded laps are highlighted and they can be selected making a zoom in other graphs windows (Graph, XY, etc.)
- The cells in yellow (configurable color) show a comparison between the split times of a single section: the split times higher than the best one and included in the configured range are highlighted (see Percentage in Configuration).
- The grayed cells are those relating to filtered lap.

The second table is always formed by two rows, the first one represents the Ideal Time and the second one the Rolling Lap: each row is formed by the various split times that make the two ideal laps; the last column shows the sum of all the tabled split times that are the Ideal Time and the Rolling Lap values.

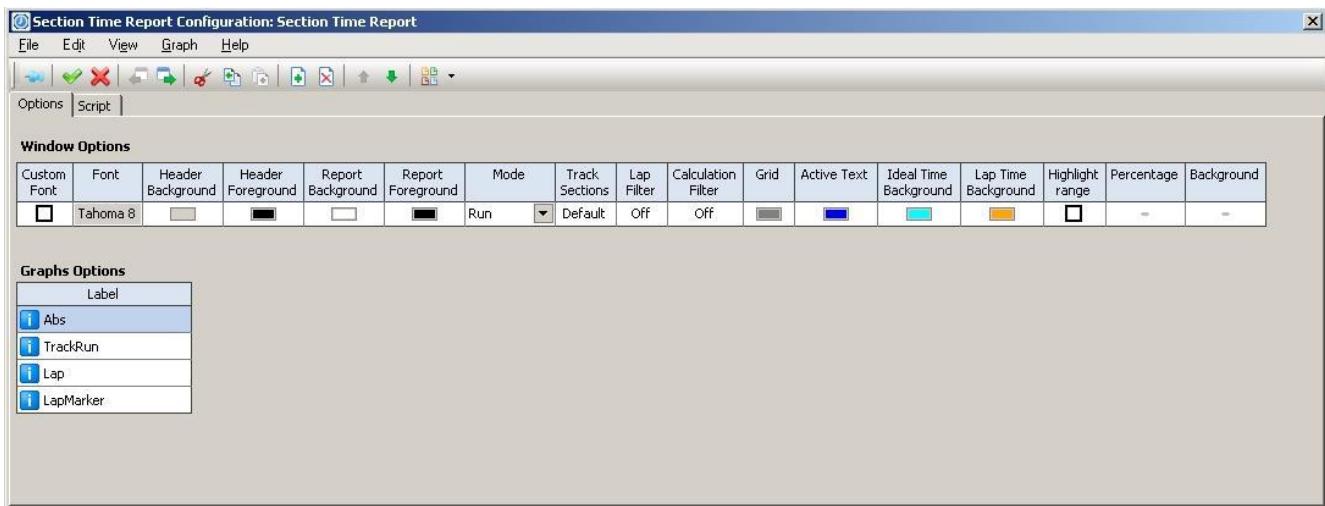
Section Time Report Window Configuration

The configuration window is formed by the following pages: **Options** and **Script**.

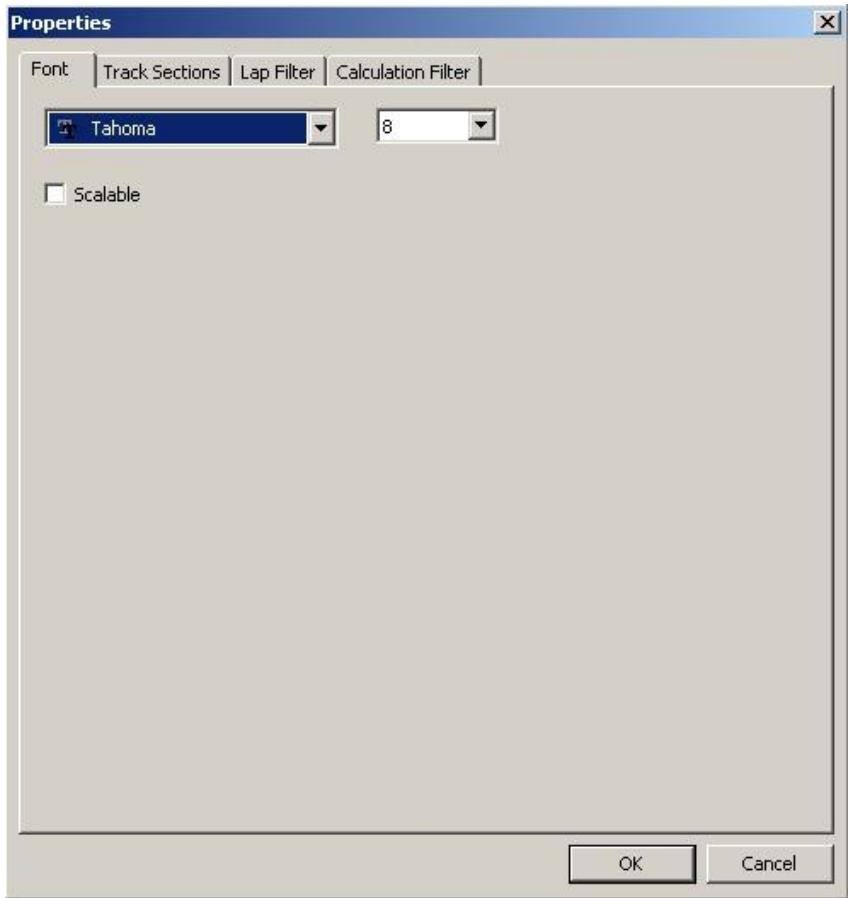
The window also has a menu and a toolbar, that ease the access to the configuration and management commands of the window itself

Options

The following options are configurable on the window:

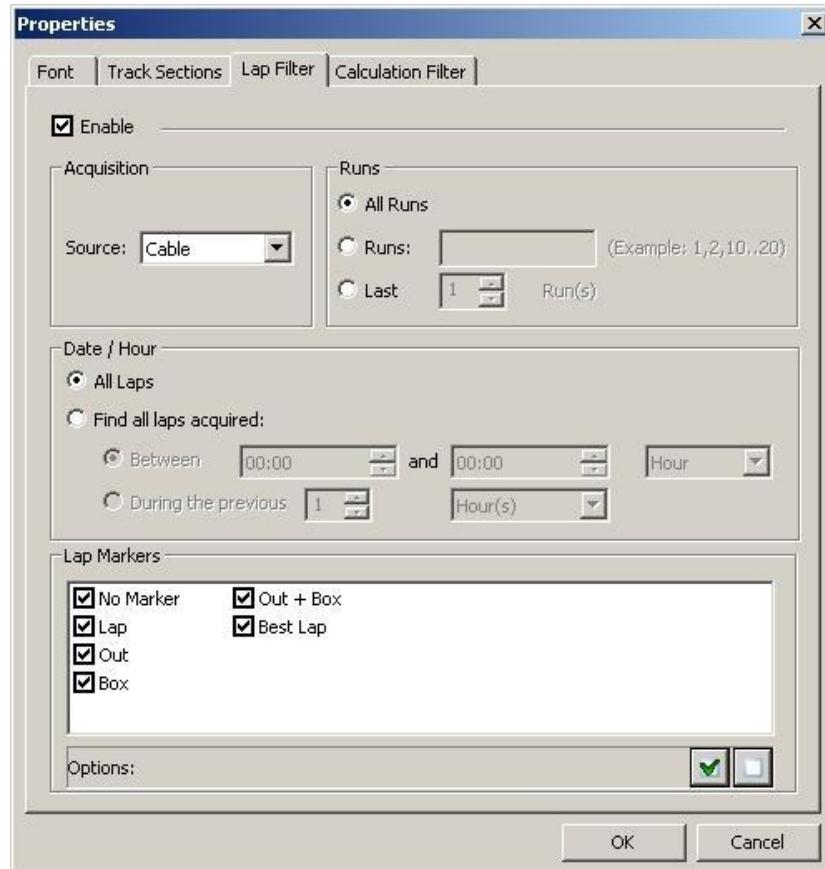


Window

Custom Font	Enables/disables custom Font option.
Font	Settings Local Fonts. 
Header Background	Window header color.
Header Foreground	Header font color.
Report Background	Report color.
Report Foreground	Report font color.
Mode	Selection of "Run Mode" or "Selection Mode" or "Session Mode" as starting report.
Track Sections	Sets map for report computation

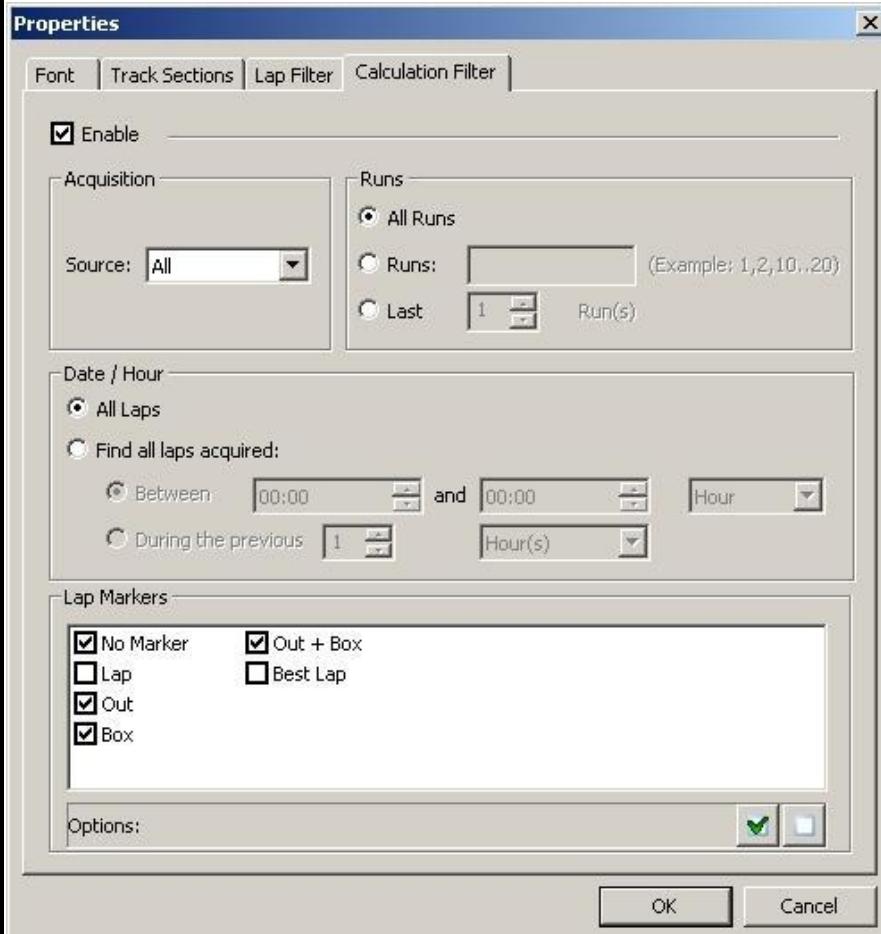
Lap Filter

Displays the setting to enable the lap filter. The lap filters are an additional filter on the laps used by the window for the calculation. To modify the setting and filter the laps, modify the edit window of the filters.



- **Enable:** enables the customized settings
- **Acquisition**
 - **Source:** the laps are filtered according to the data origin: **All** no filter is applied, **Cable** filters taking into account only the cable data (files cableData.ztx), **Real time** filters taking into account only the data acquired in real time (files dstData.ztx and nbtData.ztx), **NBT** filters only the real time data NBT (files nbtData.ztx), **Real time** filters only the real time data Real time (files dstData.ztx). **Radio** keeps the compatibility with files of WinTAX2 and WinTAX3 and refers to a *.dtx file.
- **Runs**
 - **All Runs:** selects all runs

	<ul style="list-style-type: none"> ▪ Runs: filters keeping all runs specified in the list of the text box. The comma is used to list more runs or a double dot to define an interval (Example: 1,2,3,10..12) ▪ Last: selects the last run • Date / Hour <ul style="list-style-type: none"> ▪ All Laps: It is by default and selects all laps of the run ▪ Find all laps acquired: <ul style="list-style-type: none"> ▪ Between: filters only the laps acquired in the set time range ▪ During the previous: filters only the laps acquired in the last hours set. • Lap Markers Section: <ul style="list-style-type: none"> • The filter is enabled according to the Markers selected. By default everything is selected. The Markers are information container inside each lap and define the type of Lap. The two buttons on the options bar are used to select all markers or to deselect them all. 																																																																																																
Calculation Filter	<p>Displays the setting to enable the calculation filter. With this filter, which is configured in the same way the Lap Filter, you determine which lap should be displayed but not calculated, as shown in the figure below where the lap with marker Out is not calculated.</p> <table border="1" style="margin-top: 20px; width: 100%;"> <thead> <tr> <th>Abs</th><th>Run</th><th>Lap</th><th>Marker</th><th>0-1</th><th>1</th><th>1-2</th><th>2</th><th>2-3</th><th>3</th><th>3-4</th><th>4</th><th>4-0</th><th>Lap Time</th><th>Diff. Ideal</th><th>Diff. Rolling</th> </tr> </thead> <tbody> <tr> <td>927</td><td>5</td><td>1</td><td>Out</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>4:03.705</td><td>-</td><td>-</td> </tr> <tr> <td>928</td><td>5</td><td>2</td><td></td><td>0:28.620</td><td>0:04.072</td><td>0:31.940</td><td>0:12.065</td><td>0:24.258</td><td>0:20.592</td><td>0:17.705</td><td>0:03.342</td><td>1:12.996</td><td>3:35.590</td><td>0:05.641</td><td>0:05.500</td> </tr> <tr> <td>929</td><td>5</td><td>3</td><td></td><td>0:28.182</td><td>0:03.972</td><td>0:31.491</td><td>0:12.087</td><td>0:23.290</td><td>0:19.352</td><td>0:17.227</td><td>0:03.383</td><td>1:11.106</td><td>3:30.090</td><td>0:00.141</td><td>0:00.000</td> </tr> <tr> <td>930</td><td>5</td><td>4</td><td></td><td>0:29.255</td><td>0:04.072</td><td>0:32.624</td><td>0:11.987</td><td>0:25.044</td><td>0:21.118</td><td>0:18.395</td><td>0:03.354</td><td>1:16.601</td><td>3:42.450</td><td>0:12.501</td><td>0:12.360</td> </tr> <tr> <td colspan="16" style="text-align: center; padding-top: 10px;"> Ideal Time 0:28.182 0:03.972 0:31.491 0:11.967 0:23.290 0:19.352 0:17.227 0:03.342 1:11.106 3:29.949 Rolling Lap 0:28.182 0:03.972 0:31.491 0:12.087 0:23.290 0:19.352 0:17.227 0:03.383 1:11.106 3:30.090 </td></tr> </tbody> </table> <p>In the picture below there is the configuration window.</p>	Abs	Run	Lap	Marker	0-1	1	1-2	2	2-3	3	3-4	4	4-0	Lap Time	Diff. Ideal	Diff. Rolling	927	5	1	Out	-	-	-	-	-	-	-	-	-	4:03.705	-	-	928	5	2		0:28.620	0:04.072	0:31.940	0:12.065	0:24.258	0:20.592	0:17.705	0:03.342	1:12.996	3:35.590	0:05.641	0:05.500	929	5	3		0:28.182	0:03.972	0:31.491	0:12.087	0:23.290	0:19.352	0:17.227	0:03.383	1:11.106	3:30.090	0:00.141	0:00.000	930	5	4		0:29.255	0:04.072	0:32.624	0:11.987	0:25.044	0:21.118	0:18.395	0:03.354	1:16.601	3:42.450	0:12.501	0:12.360	Ideal Time 0:28.182 0:03.972 0:31.491 0:11.967 0:23.290 0:19.352 0:17.227 0:03.342 1:11.106 3:29.949 Rolling Lap 0:28.182 0:03.972 0:31.491 0:12.087 0:23.290 0:19.352 0:17.227 0:03.383 1:11.106 3:30.090															
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- **Enable:** enables the customized settings
- **Acquisition**
 - **Source:** the laps are filtered according to the data origin: **All** no filter is applied, **Cable** filters taking into account only the cable data (files cableData.ztx), **Real time** filters taking into account only the data acquired in real time (files dstData.ztx and nbtData.ztx), **NBT** filters only the real time data NBT (files nbtData.ztx), **Real time** filters only the real time data Real time (files dstData.ztx). **Radio** keeps the compatibility with files of WinTAX2 and WinTAX3 and refers to a *.dtx file.
- **Runs**
 - **All Runs:** selects all runs
 - **Runs:** filters keeping all runs specified in the list of the text box. The comma is used to list more runs or a double dot to define an interval (Example: 1,2,3,10..12)

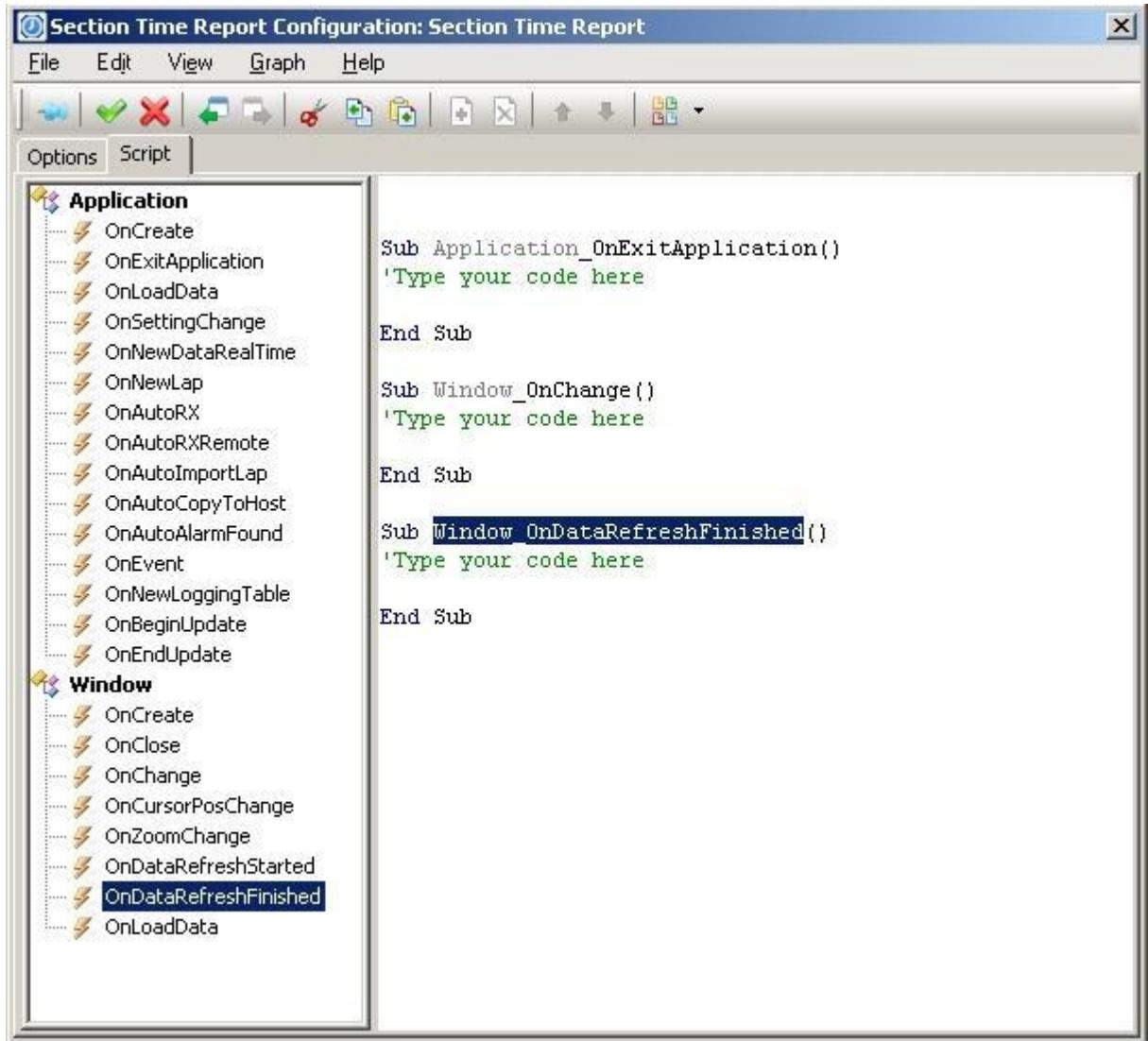
	<ul style="list-style-type: none"> ▪ Last: selects the last run • Date / Hour <ul style="list-style-type: none"> ▪ All Laps: It is by default and selects all laps of the run ▪ Find all laps acquired: <ul style="list-style-type: none"> ▪ Between: filters only the laps acquired in the set time range ▪ During the previous: filters only the laps acquired in the last hours set. • Lap Markers Section: <ul style="list-style-type: none"> • The filter is enabled according to the Markers selected. By default everything is selected. The Markers are information container inside each lap and define the type of Lap. The two buttons on the options bar are used to select all markers or to deselect them all.
Grid	Color of the grid.
Active Text	Color of the loaded laps.
Ideal Time Background	Color of the cell which represents the best sector.
Lap Time Background	Background color of the Lap Time column.
Highlight Range	Flag which allows enabling to show the sectors nearest to the best one.
Percentage	Percentage of the Highlight Range.
Background	Background: color of the highlighted cell

Graphs

Left columns of report can be configured by user adding laps information into window setup page.

Script

The **Script** page enabled to configure the scripts of the events of the window or of the application, in VBScript or JScript.



The section on the left displays the list of the functions available, grouped by Application and Window.

The section on the right displays the code of the functions set.

Menu

The menu of the window allows the access to the following commands, divided into sub menus:

File Menu

COMMAND	SHORTCUT	DESCRIPTION
Apply	A	Applies the current settings of the window.
Cancel		Closes the window without applying the current settings.

View Menu

COMMAND	SHORTCUT	DESCRIPTION
Previous page	Ctrl + Shift + Tab	Enables the page of the window previous to the one currently in use.
Next page	Ctrl + Tab	Enables the page of the window next to the one currently in use.

Toolbar

The toolbar of the window allows the access to the following commands:

COMMAND	DESCRIPTION
Keep Visible	Enables the Keep Visible mode allowing to keep displayed the configuration window while the application window are in use.
Cancel	Closes the configuration window without applying the settings (similar to the Cancel command of the File menu).
Apply	Applies the current settings to the configuration of the graphic window (similar to the Apply command of the File menu).
Previous page	Similar to the Previous page command of the View menu
Next page	Similar to the Next page command of the View menu

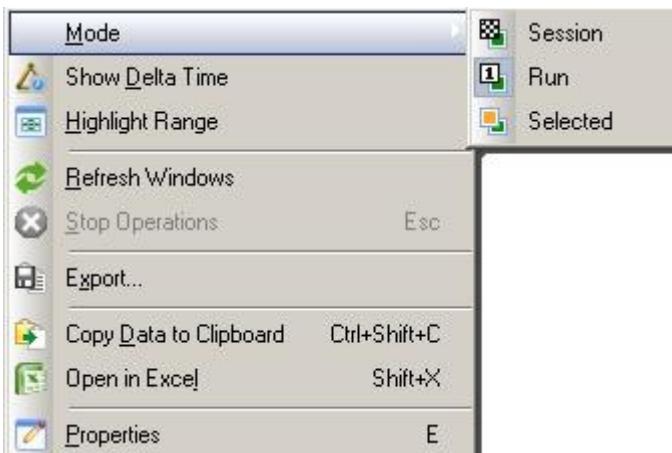
Commands

The main commands available in the **window** can be enabled through

- the **Options** menu in the main menu of the application
- the buttons of the dedicated **Toolbar**,
- **Pop-up menu**, that can be displayed by clicking with the right button of the mouse on the graphic area of the window.

Options Menu

The **Options** Menu allows the access to the following commands:



COMMAND	SHORTCUT	DESCRIPTION
Mode		Chooses one of the three display modes: Session , Run , Selected
Show Delta Time		Shows the difference between the best sectors.
Highlight Range		Shows the sectors nearest to the best one (configurable percentage of difference and background color).
Refresh		Recalculates report.
Stop Operations	Esc	Stops recalculating (available only when report is recalculating). After stop, report shows partial results.
Export		Exports report as csv, txt (text files), xls (Microsoft Excel).

Copy Clipboard	to	Ctrl + Shift + X	Copies the value of the cells for external applications.
Open in Excel		Shift + X	Opens the Sections Time report window in Excel.
Properties		E	Opens report configuration.

Toolbar

The toolbar allows the access to the following commands:



The commands are the same as in the Options menu where the commands are described.

Pop-up Menu

The commands are the same as in the Options menu where the commands are described.

Diagnostics Report Window

The Diagnostics Report window saves the changes of status on the rise front, from a low to a high value, of each bit of channels configured as *Bitmap*, that form the diagnostic. Each change of status, *event*, is notified as a report.

The window can be used both for real time and post processing analysis.

Elements of the window

Diag. Time	Diag. Name	Event
00:00:001	D_Acc_Y (Diag_BAND)	Diag_BAND - Bit 5
00:01:041	D_Acc_Y (Diag_BAND)	Diag_BAND - Bit 2
00:01:041	D_Acc_Y (Diag_BAND)	Diag_BAND - Bit 5
00:02:651	D_Acc_Y (Diag_BAND)	Diag_BAND - Bit 5
00:03:621	D_Acc_Y (Diag_BAND)	Diag_BAND - Bit 2
00:03:621	D_Acc_Y (Diag_BAND)	Diag_BAND - Bit 5
00:05:131	D_Acc_Y (Diag_BAND)	Diag_BAND - Bit 5
00:07:141	D_Acc_Y (Acc_X)	Acc_X - Bit 0
00:08:281	D_Acc_Y (Diag_BAND)	Diag_BAND - Bit 2
00:08:281	D_Acc_Y (Diag_BAND)	Diag_BAND - Bit 5
00:09:041	D_Acc_Y (Acc_X)	Acc_X - Bit 0
00:09:891	D_Acc_Y (Acc_X)	Acc_X - Bit 0
00:10:051	D_Acc_Y (Acc_X)	Acc_X - Bit 0
00:10:091	D_Acc_Y (Acc_X)	Acc_X - Bit 0
00:10:221	D_Acc_Y (Diag_BAND)	Diag_BAND - Bit 5
00:10:281	D_Acc_Y (Acc_X)	Acc_X - Bit 0
00:10:301	D_Acc_Y (Acc_X)	Acc_X - Bit 0
00:10:471	D_Acc_Y (Acc_X)	Acc_X - Bit 0
00:10:491	D_Acc_Y (Acc_X)	Acc_X - Bit 0
00:10:511	D_Acc_Y (Acc_X)	Acc_X - Bit 0
00:10:611	D_Acc_Y (Acc_X)	Acc_X - Bit 0
00:10:641	D_Acc_Y (Acc_X)	Acc_X - Bit 0
00:10:701	D_Acc_Y (Acc_X)	Acc_X - Bit 0
00:10:771	D_Acc_Y (Acc_X)	Acc_X - Bit 0
00:10:811	D_Acc_Y (Acc_X)	Acc_X - Bit 0
00:10:861	D_Acc_Y (Acc_X)	Acc_X - Bit 0
00:10:881	D_Acc_Y (Acc_X)	Acc_X - Bit 0
00:10:901	D_Acc_Y (Acc_X)	Acc_X - Bit 0
00:10:951	D_Acc_Y (Acc_X)	Acc_X - Bit 0
00:11:091	D_Acc_Y (Acc_X)	Acc_X - Bit 0
00:11:121	D_Acc_Y (Acc_X)	Acc_X - Bit 0
00:11:261	D_Acc_Y (Acc_X)	Acc_X - Bit 0

The window shows a report where each line represents an event. Each event records the moment when it occurred, *Diag. Time*, the channel and the diagnostics to which it belongs, *Diag. Name*, the *Bit Text* of the bit that created it, *Event*.

Diagnostics Report Window Configuration

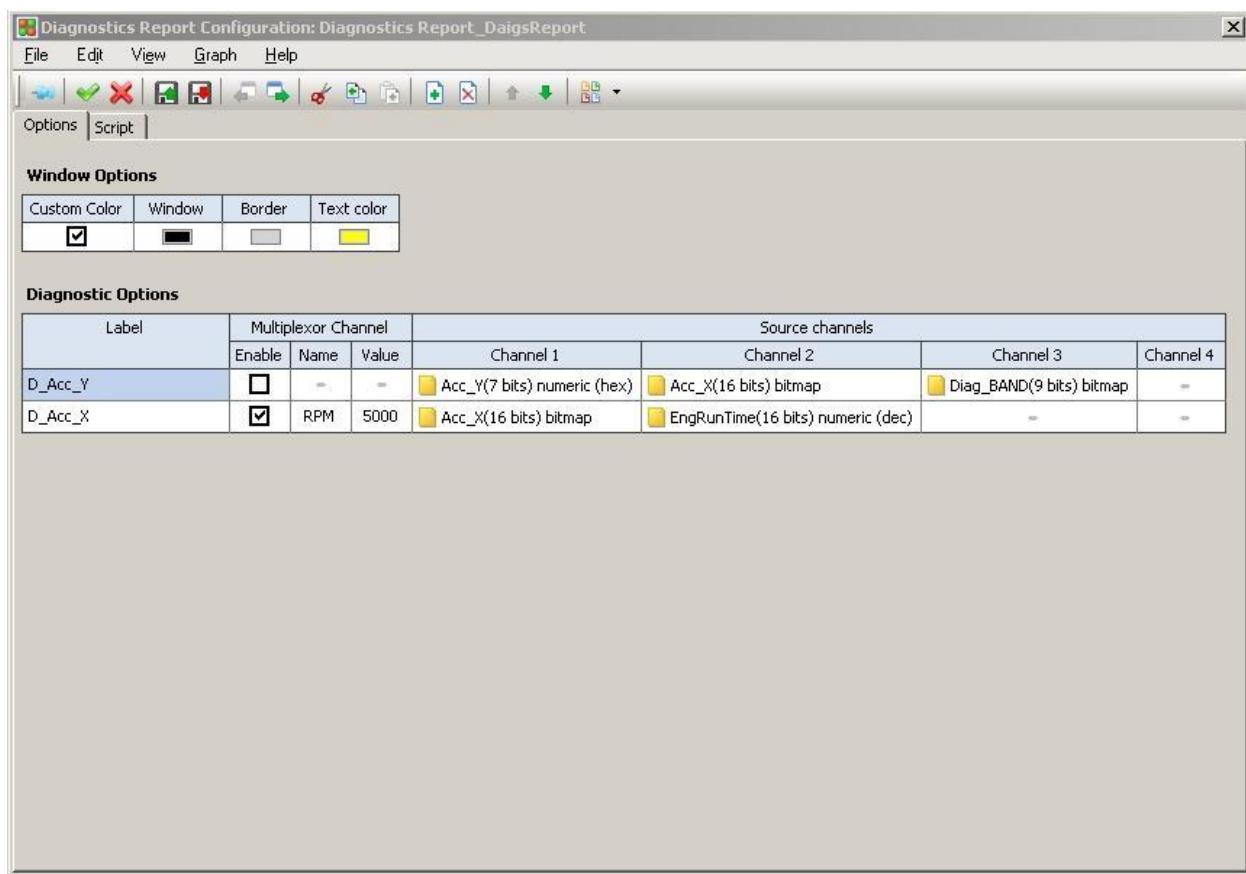
The **Diagnostics Report Configuration** window allows to configure the look of the Diagnostics Report graphic windows.

The window has the following pages: **Options**, **Script**.

The window also has a menu, a toolbar and a pop-up menu that ease the access to the configuration and management commands of the window itself.

Options

The **Options** page allows to configure the graphic aspect of the **Diagnostics Report** windows and it is divided into 2 sections. Each configurable value can be edited by double clicking with the left button of the mouse or pressing the SPACE bar on the selected element



Window Options

It allows to configure the settings of the aspect of the window.

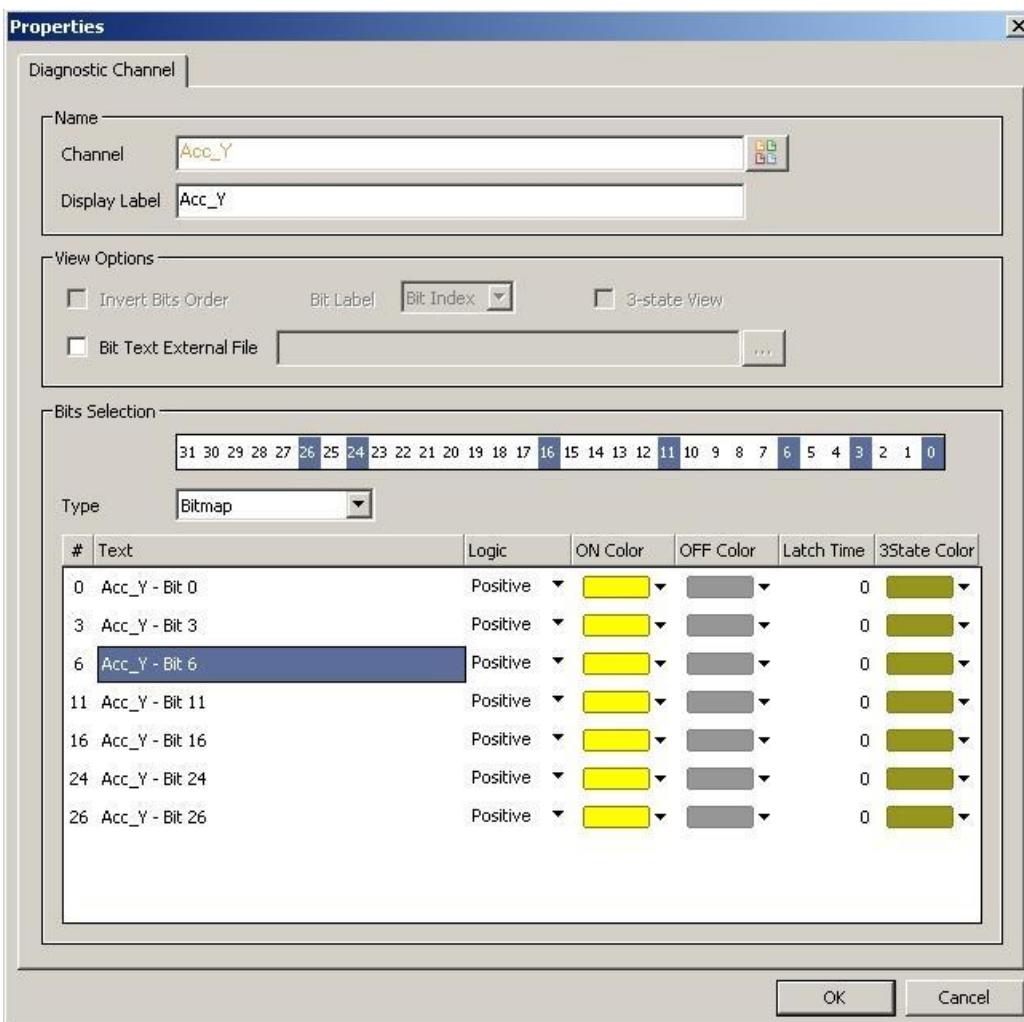
- **Custom color:** Enables the setting of the window customized colors
If it is enabled, it is used for the background of the graphic area, the color set in the **Window** column of this section. If it is disabled, it is used for the setting of the **Color Settings**, section in the **Default Appearance** page of the **General Setup** window (General Settings, general configuration of the WinTAX4 environment).
- **Window:** Sets the window background color.

- **Border:** Background color of the graphic item (not used).
- **Text color:** Color of the text of the graphic items.

Graphs Options

It allows to configure the settings specific of each channel of the window. Each line identifies a configured channel, while the fields to be configured correspond to the columns. Multiple selections are possible through the CTRL and SHIFT keys.

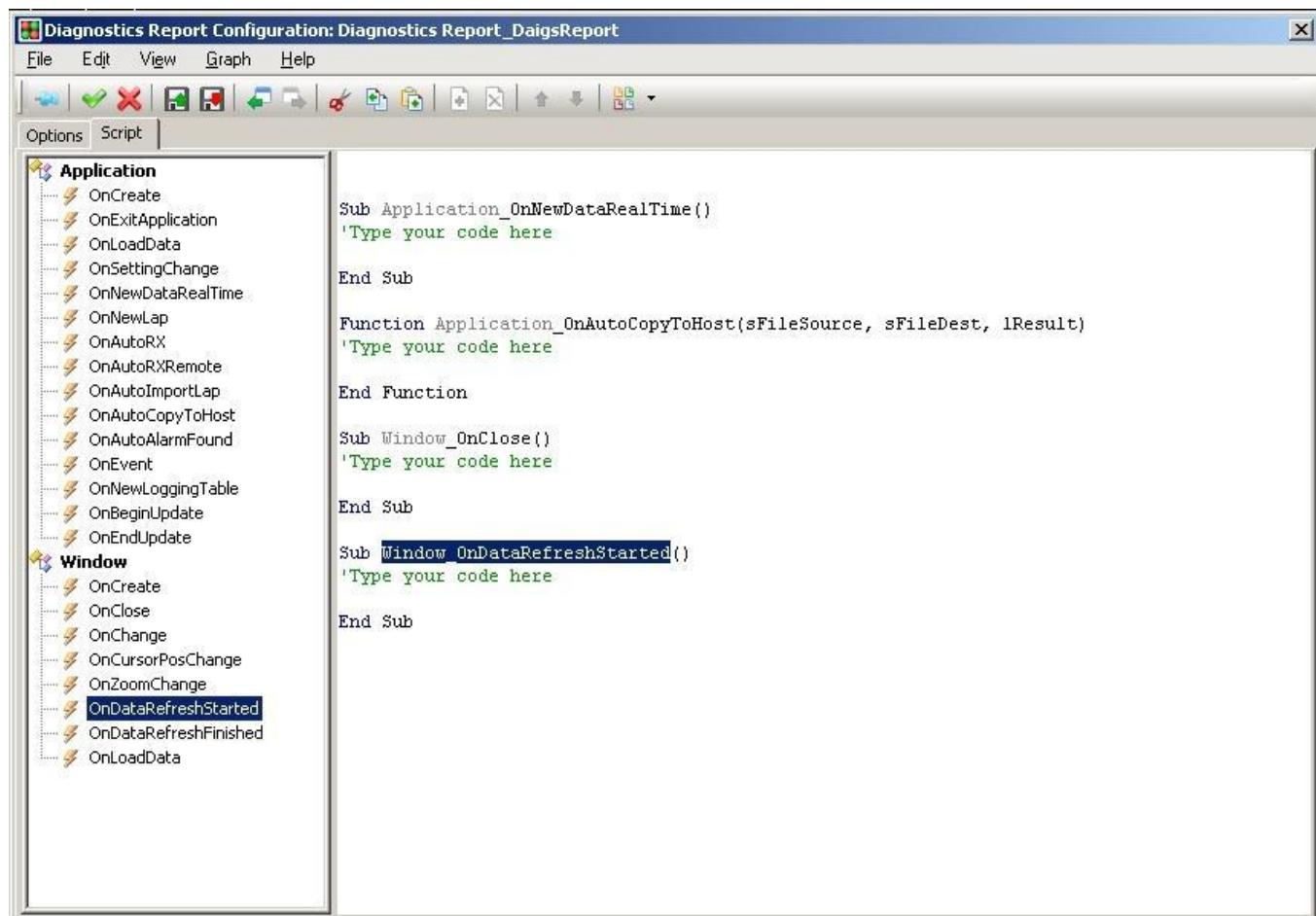
- **Label:** shows the name of the channel. The name of the channel can be edited and can become a math expression if the sign = comes first.
- **Multiplexor Channel:** Settings of the multiplexing channel.
 - **Enable:** Enables/disables the selection channel.
 - **Name:** Name of the selection channel.
 - **Value:** Selection value.
- **Channel 1, 2, 3, 4:** The diagnostics channels. The field shows some information about the channel: Name (number of bits) type of display.



- **Name**
 - **Channel:** name of the channel in the table
 - **Display Label:** Alias name, used in numeric type.
- **View Options**
 - **Invert Bits Order:** If selected, the channel
 - **Bit Label:** Selection of the type of information displayed of the bit; the label is disabled because it's valid only for Diagnostics with *Vertical* layout.
 - **3-state view:** Option available only for Diagnostics; if it is selected, the bits of the diagnostics are no longer displayed with *current value* and *historical value* but with a single value that besides switch on and off can have an intermediate status (displayed with the color configured in the *3State Color* value) representing the bit currently switched off but that in the past it has switched off at least once.
 - **Bit Text External File:** Checking this item, the edit is enabled and the below button, to be used to select a text file and the columns becomes grey. *Text* of the list; this option enables to display in the bit label a text read from the selected file .txt. The text file used must be adequately formatted: It must include a line for each bit text, and they are considered and also empty lines are taken into account considered. It requires the Bit Label configured on *Bit Text*.
- **Bit Selection**
 - **Bit Mask:** Selection mask for the bits.
 - **Type:** display mode of the channel
 - *Bitmap*, typical bits display
 - *Numeric*, numeric display (decimal or hexadecimal) of the value of the bits mask
 - **Bit List:** list of the bits selected in the mask
 - #: bit index
 - **Text:** bit text, displayed in the label and in the tooltip
 - **Logic:** calculation logics, *Positive* or *Negative*
 - **ON Color:** color of the bit when the value is high
 - **OFF Color:** color of bit when the value is low
 - **Latch Time:** minimum time for which the bit is displayed with a high value. If 0 the bit stays high only for the time in which the value is effectively high. The configured value is considered in cents of seconds.
 - **3State Color:** color of the intermediate status (current value low, historical value high).

Script

The **Script** page allows to configure scripts connected to the events of the **Diagnostics Report** window or of the application, in VBScript or JScript. The script language can be chosen in Setup/General.



The section on the left shows the list of the functions available, grouped by Application and Window. The section on the right shows the code of the functions set.

Menu

The menu of the window allows the access to the following commands, divided into sub menus:

File Menu

COMMAND	SHORTCUT	DESCRIPTION
Apply	A	Applies the current settings to the configuration of the graphic window.
Cancel		Closes the window without applying the current settings to the configuration of the graphic window.
Load		Opens a dialog window to select a configuration file for the Diagnostic Report (.dgs) window to be loaded.
Save As		Opens a dialog window to select a configuration file for the Diagnostic Report (.dgs) window on which the current settings can saved.

Edit Menu

COMMAND	SHORTCUT	DESCRIPTION
Cut	Ctrl + X	Copies to clipboard the configuration of the selected channels in the list of the Graphs section, and removes them from the list of the Graphs section.
Copy	Ctrl + C	Copies to clipboard the configuration of the selected channels in the list of the Graphs section.
Paste	Ctrl + V	Pastes the configuration of the channels available on clipboard, adding them to the list of the section Graphs.

View Menu

COMMAND	SHORTCUT	DESCRIPTION
Previous page	Ctrl + Shift + Tab	Enables the page of the window previous to the one currently in use.
Next page	Ctrl + Tab	Enables the page of the window next to the one currently in use.

Graph Menu

COMMAND	DESCRIPTION
Add Graph	Adds a new element to the Graphs list of channels configuration.
Remove Graph	Removes from the Graphs list the configurations of the selected channels.
Move Up	Moves up by one position the selected elements in the Graphs list.
Move Down	Moves down by one position the selected elements in the Graphs list.

Toolbar



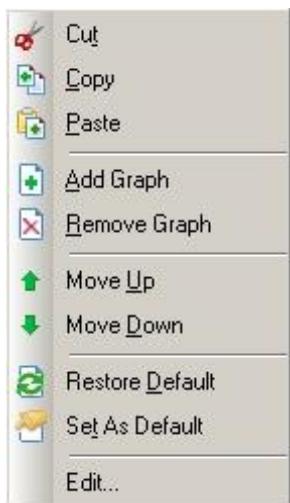
The window toolbar enables the access to the following commands:

COMMAND	DESCRIPTION
Keep Visible	Enables the Keep Visible mode allowing to keep displayed the configuration window while the application window are in use
Cancel	Closes the configuration window without applying the settings (similar to the Cancel command of the File menu)
Apply	Applies the current settings to the configuration of the graphic window (similar to the Apply command of the File menu)
Load	Similar to the Load command of the File menu
Save As	Similar to the Save As command of the File menu
Previous page	Similar to the Previous page command of the View menu
Next page	Similar to the Next page command of the View menu
Cut	Similar to the Cut command of the Edit menu
Copy	Similar to the Copy command of the Edit menu

Paste	Similar to the Paste command of the Edit menu
Add Graph	Similar to the Add Graph command of the Graph menu
Remove Graph	Similar to the Remove Graph command of the Graph menu
Move Up	Similar to the Move Up command of the Graph menu
Move Down	Similar to the Move Down command of the Graph menu
Channel Browser	Displays the pop-up menu to select the page in the Channel Browser window 

Pop-up Menu

The pop-up menu of the window can be displayed by clicking with the right button of the mouse on the Options page..



The pop-up menu of the **window** enables the access to the following commands:

COMMAND	DESCRIPTION
Cut	Similar to the Cut command of the Edit menu
Copy	Similar to the Copy command of the Edit menu
Paste	Similar to the Paste command of the Edit menu
Add Graph	Similar to the Add Graph command of the Graph menu
Remove Graph	Similar to the Remove Graph command of the Graph menu
Move Up	Similar to the Move Up command of the Graph menu
Move Down	Similar to the Move Down command of the Graph menu
Restore Default	Modifies the channel configuration restoring the settings in the parameters.
Set As Default	Modifies the parameters configuration with the current settings of the channel.
Edit	Edits the selected cell.

Functions

The **Diagnostics Report** window has the following functions:

- Go To

Go To

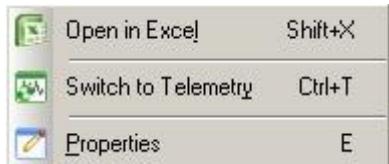
The *Go To function* allows to up-date the position of the cursor on the displayed windows modifying the position of the cursor in the current graphic window.

Commands

The main commands available in the **Diagnostic Report** window can be enabled through

- the **Options** menu in the main menu of the application
- the buttons of the dedicated **Toolbar**,
- **Popup menu** that can be displayed by clicking with the right button of the mouse on the graphic area of the window

Options Menu



The **Options** menu for the Diagnostics Report windows allows the access to the following commands:

COMMAND	SHORTCUT	DESCRIPTION
Open in Excel	Shift + X	Opens an Excel file where the series of data of the configured channels configured in the window are displayed.
Switch to Telemetry/Post Processing	Ctrl + T	Allows to switch from the Post-Processing mode to the Telemetry mode and vice versa.
Properties	E	Opens the interface to configure the Diagnostics Report window.

Toolbar



The toolbar of the Diagnostics Report windows allows the access to the following commands:

COMMAND	DESCRIPTION
Load	Opens a window to select a configuration file corresponding to a Diagnostics Report window.
Save	Saves the current configuration on a file.
Properties	See the description of the command in the Options Table.
Switch to Telemetry/Post Processing	See the description of the command in the Options Table.

Pop-up Menu

Clicking with the right button of the mouse on the graphic area of the window, the following pop-up menu is displayed:



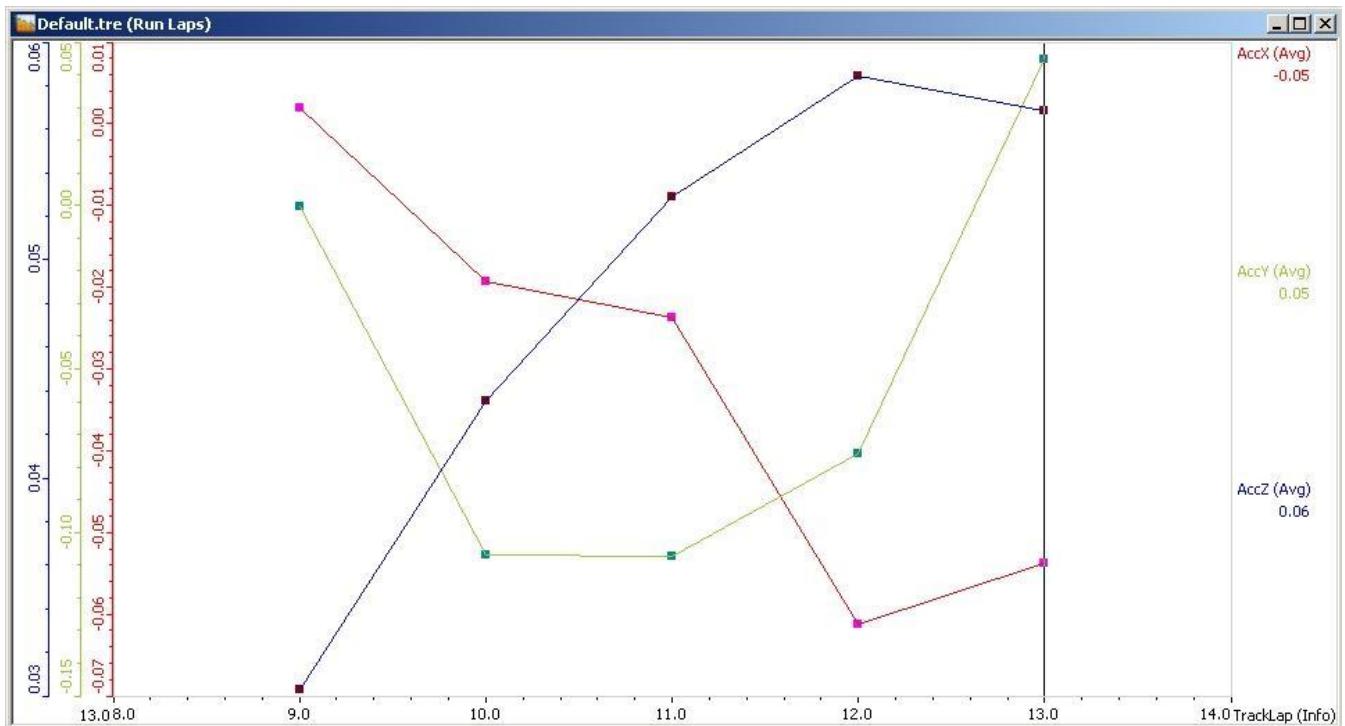
This section will describe only the commands that have not already been described previously.

COMMAND	SHORTCUT	DESCRIPTION
Go To		Moves the cursor to the time of the selected event.
Copy Data to Clipboard	Ctrl + Shift + C	Copies the data of the selected channels in the clipboard of Windows.

Trend Window

The Trend window takes as a reference a channel on which for each N lap of the session a specific statistic value is calculated. This channel is considered as X axis and the values associated to the X axis will be therefore the same as the quantity of N laps taken into account. For the following channels indicated as Y_i , a specific statistic value is similarly calculated for each lap, in this way for each Y_i channel there is the same quantity of N values and of laps. The Trend window just shows the arrangement of the N values for each Y_i channel on the basis of the N values of the X channel.

Elements of the window



Graphic Area

The graphic area displays the graphs, the cursor, the window and the grid of the window.

Y Scale

The Y Scale displays the scales of the configured channels. The vertical arrangement of the Y scales is fixed and it is linked to the window Overlay mode. The Y Scale can be automatically or manually configured.

X Scale

The X Scale displays the scale of the channel identified as X. The X scale can be automatically or manually configured. On the left is shown the value corresponding to the present position of the cursor; on the right is shown the name of the channel

Cursor Values

The Y channel information area displays the name of the channels, the statistic to be calculated for the channel. and the values corresponding to the present position of the cursor. It is on the right of the window.

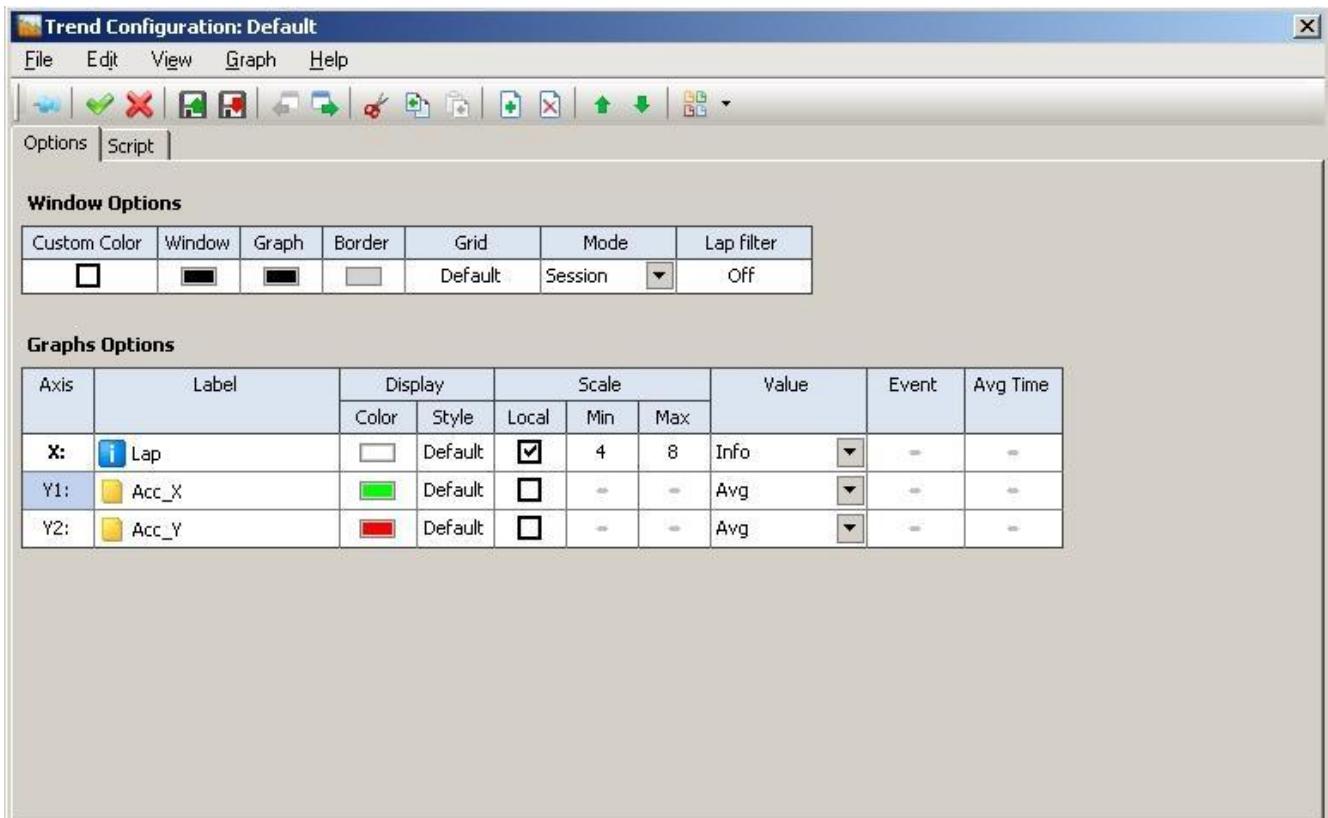
Trend Window Configuration

The **Trend Configuration** window allows to configure the aspect of the graphic **Trend windows** and it is formed by the following pages: **Options, Script**.

The window has moreover a menu, a toolbar and a pop-up menu that ease the access to the configuration and management commands of the window itself

Options Page

The **Options** page allows to configure the graphic aspect of the **Trend** windows and it is divided into 2 sections: **Window** and **Graph**.

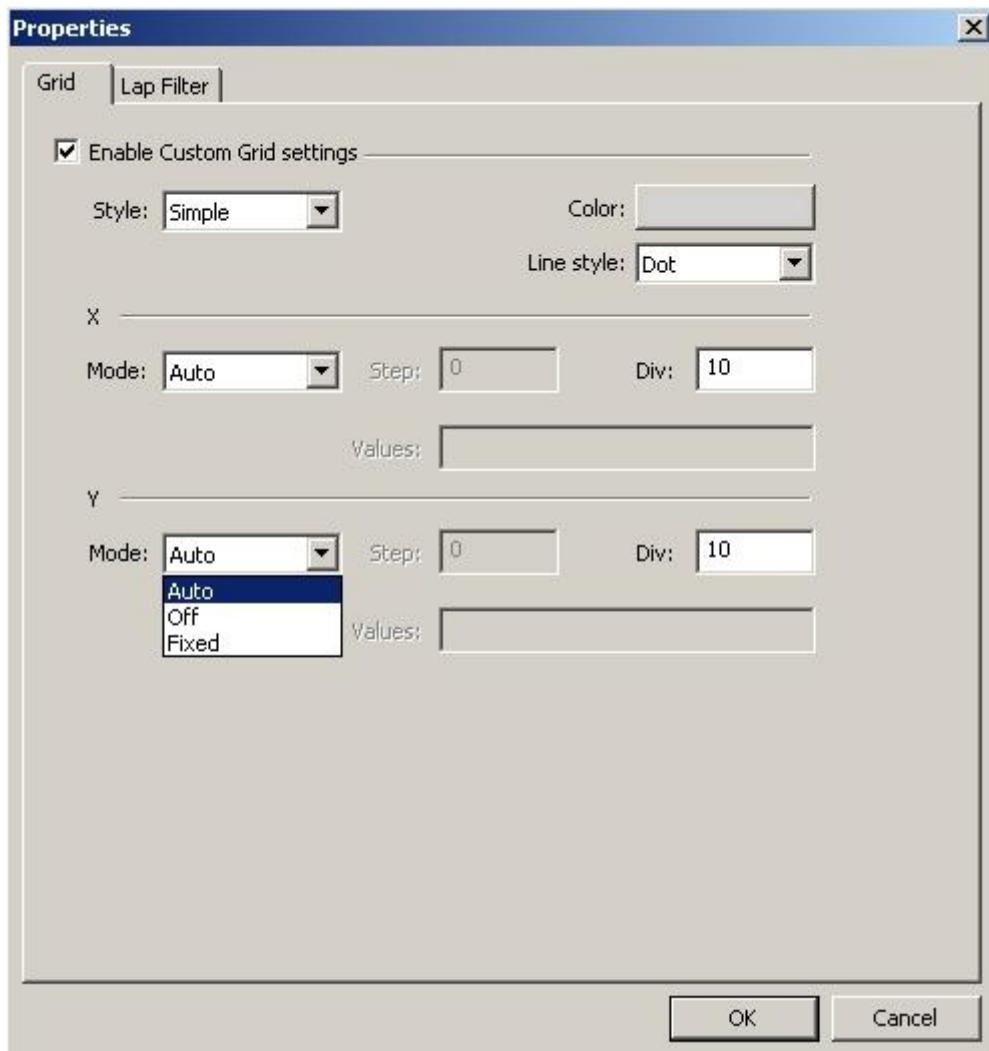


Window Options

It allows to configure the general settings of the windows. Each configurable value can be edited by double clicking with the mouse or by pressing the space bar on the selected element

- **Custom color:** enables the setting of the window customized colors.

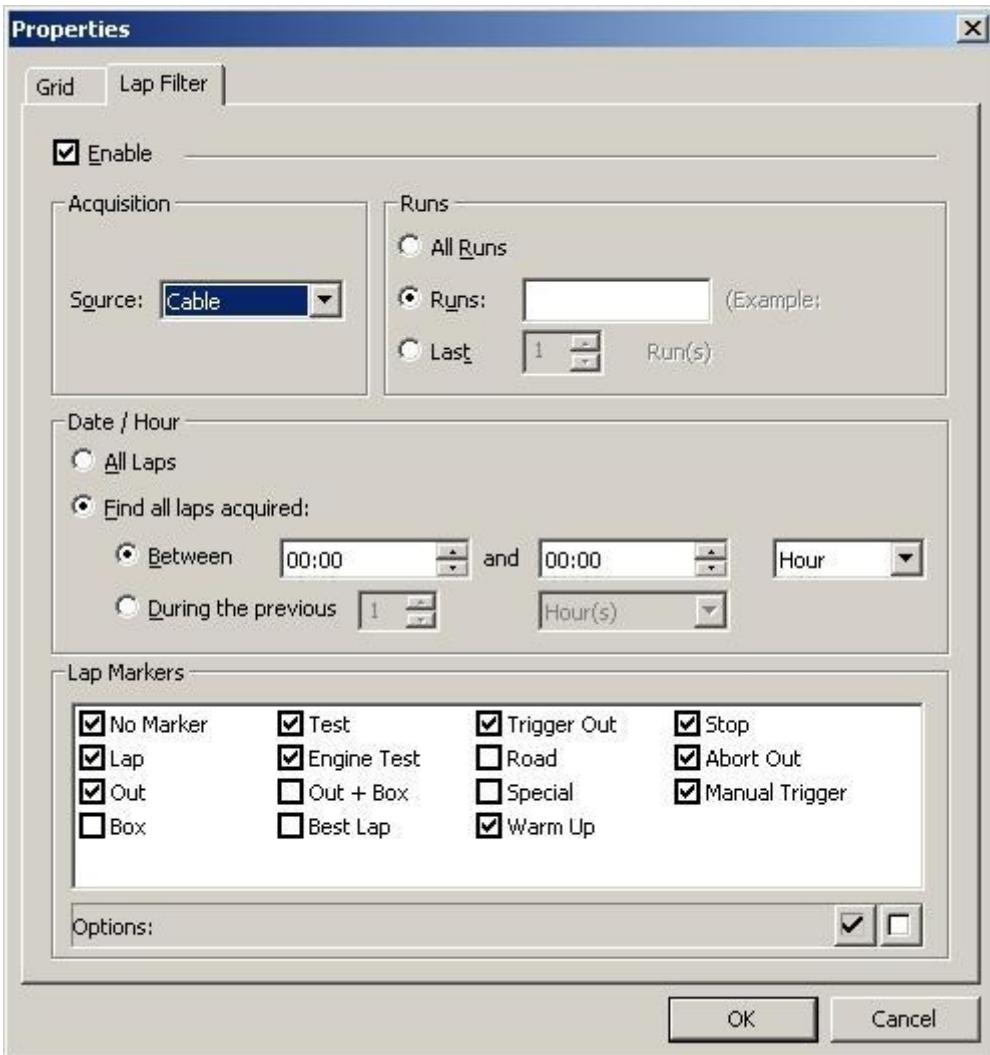
- **Window**: sets the window background color.
- **Graph**: sets the background color of the graphic area.
- **Border**: sets the borders color of the graphic areas of the window.
- **Grid**: displays the setting to enable the grid common to all channels graphs, in the graphic area of the window. To modify the parameter, edit the associated configuration window.



- **Enable Custom Grid settings**: Enables the grid display with the customized settings.
 - **Style**: Sets the style of the grid
 - **Simple**: the grid is formed by continuous lines.
 - **Cross**: the grid is formed by crosses indicating the intersection of the vertical and horizontal divisions.
 - **Color**: Color of the grid
 - **Line style**: Sets the style of the grid line (valid if the Style Simple is set)
 - **Solid**: continuous line

- **Dash:** dashed line
 - **Dot:** dotted line
 - **DashDot:** dashed line alternated with 1 dot
 - **DashDotDot:** dashed line alternated with 2 dots
- X
 - **Mode:** Calculation mode of the horizontal divisions.
 - **Auto,** displays an automatic number of equidistant divisions
 - **Off,** no division is displayed
 - **Fixed,** displays a fixed number of equidistant divisions
 - **Step,** displays the divisions at fixed intervals equal to the Step value
 - **Custom,** displays the divisions in correspondence with the values on the X axis set by the user in the text box **Values.**
 - **Step:** Fixed step to calculate the horizontal divisions (a division for each Step), valid with Mode set.
 - **Div.:** The number of horizontal divisions to be displayed, valid with Mode set at Auto or Fixed.
 - **Values:** List of values on Z axis corresponding to the divisions, valid with Mode set at Custom. The list of values can be added directly in the text box, using as division the character ','.
- Y
 - **Mode:** Calculation mode of the vertical divisions.
 - **Auto,** displays an automatic number of equidistant divisions
 - **Off,** no division is displayed
 - **Fixed,** displays a fixed number of equidistant divisions
 - **Step,** displays the divisions at fixed intervals equal to the Step value
 - **Custom,** displays the divisions in correspondence with the values on the Y axis set by the user in the text box **Values.**
 - **Step:** Fixed step to calculate the horizontal divisions (a division for each Step), valid with Mode set at Step
 - **Div.:** Number of vertical divisions to be displayed, valid with Mode set at Auto or Fixed.
 - **Values:** List of values on the Y axis corresponding to the divisions, valid with Mode set at Custom. The list of values can be added directly in the text box, using as division the character ','.

- **Mode:** selects Trend mode. The x-axis is based to all laps of Session, Run, Selected (could be one or more lap) or Single Lap loaded.
- **Lap Filter:** displays the setting to enable the lap filters. The lap filters area is an additional filter on the lap, used by the calculation window. To modify the setting and filter the laps, change the settings of the edit window of the filters.



Enable: Enables the customized settings.

- **Acquisition**

- **Source:** The laps are filtered on the basis of the source of data: **All** no filter is applied, **Cable** filters taking into account only the cable data (files cableData.ztx), **Real time** filters taking into account only the data acquired in real time (files dstData.ztx and nbtData.ztx), **NBT** filters only the real time NBT data (files nbtData.ztx), **Real time** filters only the real time **Real time** data (files dstData.ztx).

The **Radio** type keeps compatibility with WinTAX2 and WinTAX3 files and is relative to *.dtx file types.

- **Runs**

- **All Runs:** Selects all the runs
- **Runs:** Filters to keep all runs specified in the list of the text box: The comma is used to list more runs or a tow dots to define an interval (Example: 1,2,3,10..12)
- **Last:** Selects the last runs

- **Date / Hour**

- **All Laps:** By default and selects all laps of the run
- **Find all laps acquired:**
 - **Between:** Filters only the laps acquired during the set interval
 - **During the previous:** Filters only the laps acquired during the last hours set.

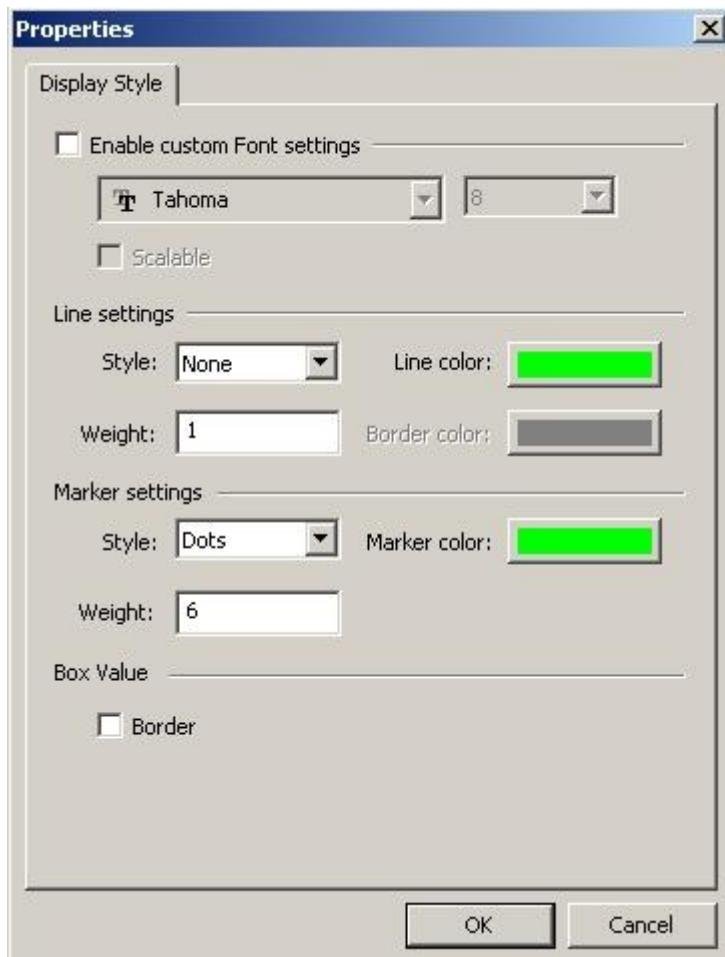
- **Lap Markers:**

The filter is carried out on the basis of the selected Markers. By default everything is selected. The Markers are information contained inside each lap and define the type of Lap. The two buttons on the options space bar are used to select or deselect all markers.

Graphs Options

It allows to configure the settings specific of the channel to be graphed. Each configurable value can be edited by double clicking with the mouse or by pressing the space bar on the selected element. Multiple selections are possible through the CTRL and SHIFT keys.

- **Label:** displays the name of the channel. The name of the channel can be edited and can become a math expression if the sing = comes first.
- **Display:**
 - **Color:** Displays the color of the channel graphs or of the markers. To modify the setting, edit the channel by opening the Channel Properties page where fonts and style are configured.
 - **Style:** displays the style of the channels graphs. To modify the setting, edit the channel by opening the Channel Properties page where font and styles are configured.



- **Enable custom Font settings:** The font section can be disabled through the check button.
 - **Family Font:** Sets the font.
 - **Font Dimension:** Sets the font size.
 - **Scalable:** Enables the adapting of the font size in relations to the window size.
- **Line settings**
 - **Style:** Sets the style of the graphs
 - **None:** no line is drawn
 - **Line:** continuous line
 - **Step:** stepped line
 - **Fill Down:** continuous line with colored bottom area
 - **Fill Up:** continuous line with colored top area
 - **Bordered:** bordered continuous line

- **Weight:** Sets the depth of the line in pixel.
- **Line color:** Sets the line color.
- **Border Color:** Color for the line border

- **Marker Settings**

- **Style:** Style of the markers, graphic elements used to represent the marker.
 - **None:** no markers are drawn
 - **Dots:** dot
 - **Cross:** cross
 - **Rhomboid:** rhomboid
 - **Square:** square
 - **Arrow Down:** arrow downwards
 - **Arrow Up:** arrow upwards
 - **Vert Line:** vertical line
 - **Horz Line:** horizontal line
- **Weight:** Size (depth) of the markers in pixel.
- **Marker color:** Color of the markers.

- **Box Value:** If checked, inserts a border in the value box of the channels.

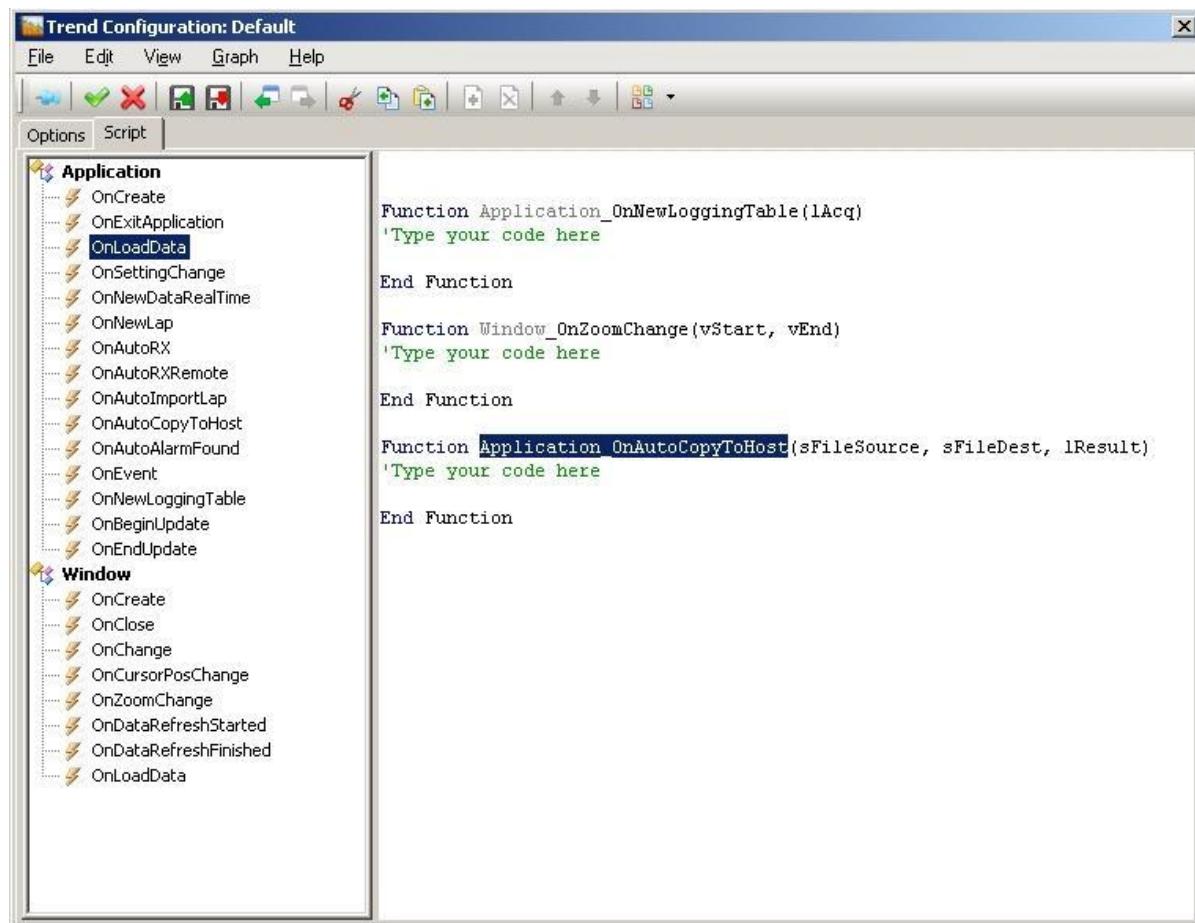
- **Scale:**

- **Local:** If Local is selected, the scale is automatically calculated. If Local is not selected, the outer limits of the scale can manually set.
- **Min:** Sets the minimum value of the manual y scale
- **Max:** Sets the maximum value of the manual y scale
- **Value:** Configures the statistics to be calculated for the channel. The following calculation possibilities are available:
 - **Min:** Returns to the minimum value of the channel in the lap analyzed
 - **Max:** Returns to the maximum value of the channel in the lap analyzed
 - **Avg:** Returns to the average value of the channel in the lap analyzed
 - **Start:** Returns to the value of the channel at the beginning of the lap analyzed
 - **End:** Returns to the value of the channel at the end of the lap analyzed
 - **Event:** Returns to the value of the channel at the time when the first occurrence of the event set in the Event box takes place. This is true when Avg. Time is set to 0. If this value is higher than 0, the average of the channels calculated on the left, set in Avg. Time, at the time of the first occurrence.

- **Info:** Available only for the Info, returns to the value of the Info associated with the lap analyzed
- **Occurrences:** Available only for the events, returns to the number of occurrences of the event in the lap analyzed.
- **StDev:** Returns to the standard deviation of the channel in the analyzed lap.
- **Event:** Sets the event for the calculation of the Event statistics;
- **Avg. Time:** Sets the left area where the event statistics can be calculated. The value 0 presupposes the calculation in the same instant of the first occurrence of the event. A value higher than 0, calculates the average of the channel in a time interval ranging from the instant of the event minus the value set and the instant of the event itself. The value set is in cents of second, so if the left area has to be set to 1 second, 100 should be the value. If the lowest limit of the range has a negative value, during the calculation it is forced to 0.

Script

The **Script** page allows to configure the scripts of the events of the **Trend** window or of the application, in VBScript or JScript.



The section on the left displays the list of the functions available, grouped for Application and Window. The section on the right displays the code of the set functions.

Menu

The menu of the **Trend** window enables the access to the following commands, divided in sub menus:

File Menu

COMMAND	SHORTCUT	DESCRIPTION
Apply	A	Applies the current settings of the window.
Cancel		Closes the window without applying the current settings.
Load		Opens a dialog window to select a XY configuration file to be loaded.
Save As		Opens a dialog window to select a XY configuration file.XY), on which the current settings can be saved.

Edit Menu

COMMAND	SHORTCUT	DESCRIPTION
Cut	Ctrl + X	Copies to clipboard the configurations of the channels selected in the list of the Graphs sections and removes them from the list of the Graphs section.
Copy	Ctrl + C	Copies to clipboard the configurations of the channels selected in the list of the Graphs.
Paste	Ctrl + V	Pastes the configurations of the channels available in clipboard adding them to the list of the Graphs section.

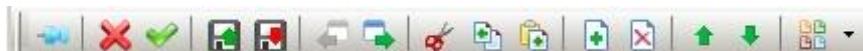
View Menu

COMMAND	SHORTCUT	DESCRIPTION
Previous page	Ctrl + Shift + Tab	Enables the page of the window previous to the one currently in use.
Next page	Ctrl + Tab	Enables the page of the window next to the one currently in use.

Graph Menu

COMMAND	DESCRIPTION
Add Graph	Adds a new element to the Graphs list of channels configurations.
Remove Graph	Removes from the Graphs list the configurations of the selected channels.
Move Up	Moves up by one position the selected elements in the Graphs list.
Move Down	Moves down by one position the selected elements in the Graphs list.

Toolbar



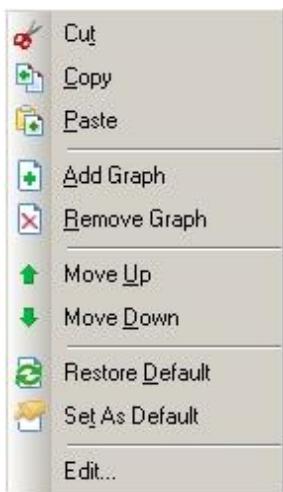
The toolbar of the window allows the access to the following commands:

COMMAND	DESCRIPTION
Keep Visible	Enables the Keep Visible mode allowing to keep displayed the configuration window while the application window are in use.
Cancel	Closes the configuration window without applying the settings (similar to the Cancel command of the File menu).
Apply	Applies the current settings to the configuration of the graphic window (similar to the Apply command of the File menu).
Load	Similar to the Load command of the File menu
Save As	Similar to the Save As command of the File menu
Previous page	Similar to the Previous page command of the View menu
Next page	Similar to the Next page command of the View menu
Cut	Similar to the Cut command of the Edit menu
Copy	Similar to the Copy command of the Edit menu

Paste	Similar to the Paste command of the Edit menu
Add Graph	Similar to the Add Graph command of the Graph menu
Remove Graph	Similar to the Remove Graph command of the Graph menu
Move Up	Similar to the Move Up command of the Graph menu
Move Down	Similar to the Move Down command of the Graph menu
Channel Browser	<p>Displays the pop-up menu to select the page in the Channel Browser window.</p>  <ul style="list-style-type: none"> Channels Information Virtual Channels Conditions Groups Real Time Channels Constants User Records Events Import Variables

Popup Menu

The pop-up menu of the window can be displayed by clicking with the right button of the mouse on the Options page.



The pop-up menu of the window allows the access to the following commands:

COMMAND	DESCRIPTION
Cut	Similar to the Cut command of the Edit menu
Copy	Similar to the Copy command of the Edit menu
Paste	Similar to the Paste command of the Edit menu
Add Graph	Similar to the Add Graph command of the Graph menu
Remove Graph	Similar to the Remove Graph command of the Graph menu
Move Up	Similar to the Move Up command of the Graph menu
Move Down	Similar to the Move Down command of the Graph menu
Restore Default	Sets in the channel the settings configured in the Channel Parameters.
Set As Default	Configures the channel settings in the Channel Parameters.
Edit...	Gives the possibility to edit the selected parameter (similar to double click).

Functions

The **Trend** window has the following functions:

- Cursor
- Elements
- Channels

Cursor

The cursor is represented by a vertical line moving only on the graphs point.

The cursor can be moved in the graphic area moving the mouse by pressing the left button. Cursor is always placed on the point next to the present position of the mouse because the Trend values are discrete and the positions between the points have no meaning.

Visualization of the Elements

The elements of a window can be shown or hidden by enabling the View command on the Options menu or on the pop-up menu.

Channels selection

A channel can be selected by clicking with the left button of the mouse on the info boxes. To make a multiple selection of the channels, select the channels by pressing the CTRL key. As an alternative, a channel can be selected by pressing the TAB key of the keyboard. In Options menu or popup menu, command "Select All Channels" is available. The information boxes of the selected channels are highlighted. To remove the selection of a channel, select another channel or click on the graphic area to de-select all. Also the right mouse button can be used to select the channel and to open the pop-up menu.

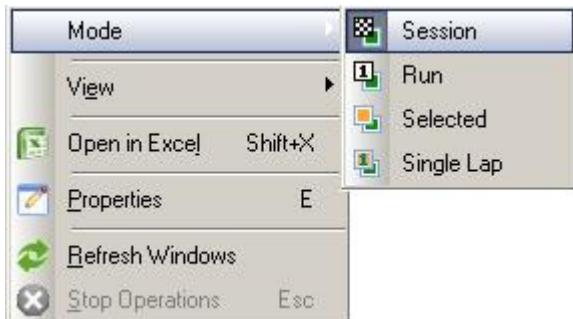
Commands

The main commands available in the **Trend** window can be enabled through:

- The **Options** menu in the main menu of the application
- the buttons of the dedicated **Toolbar** dedicated
- **Pop-up menu** that can be displayed by clicking with the right button of the mouse on the graphic area of the window, on the Info boxes or on Y scales of the selected channels.
- **Keyboard shortcuts**

Options Menu

The **Options menu** for the **Trend windows** allows the access to the following commands:



COMMAND	SHORTCUT	DESCRIPTION
Mode		Session, Run, Selected (could be one or more lap) or Single Lap loaded
View		Displays the pop-up sub menu to select the window graphic elements that can be shown or hidden. The elements displayed are highlighted with a check mark in the left. Show All & Hide All show and hide all elements respectively.
Open in Excel	Shift + X	Open data in Excel sheet
Properties	E	Opens the interface to configure the window.
Refresh Windows		Recalculates the Trend window.
Stop Operations	Esc	Is enabled only during the calculation and it used to stop it in case it takes a long time for the calculation.

Toolbar

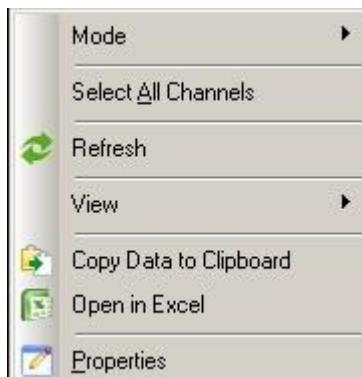


The toolbar of the **Trend windows** allows the access to the following commands:

COMMAND	SHORTCUT	DESCRIPTION
Load		Opens a window to select a configuration file.
Save		Saves the window present configuration on a file
Properties	E	See the description of the command in the Options Table.
Session		Calculates Trend to all laps of current Session
Run		Calculates Trend to all laps of current Run
Selected		Calculates Trend to all laps of current laps selection
Single Lap		Calculates Trend to current displayed lap
View		See the description of the command in the Options Table.
Show/Hide All Scales Y		Show/hide the Y scales in all window where available.
Refresh		See the description of the command in the Options Table.
Stop Operations	Esc	See the description of the command in the Options Table.

Pop-up Menu

By clicking with the right button of the mouse on the graphic area of the window, the following pop-up menu is displayed



This section will describe only the commands that have not already been described previously.

COMMAND	SHORTCUT	DESCRIPTION
Select All Channels	Ctrl + A	Selects all channels in the window
Copy Data to Clipboard	Ctrl + Shift + C	Copies to clipboard of Windows the series of data of the channels configured in the window

By clicking with the right button of the mouse on the channels area of the window, the following pop-up menu is displayed:



This section will describe only the commands that have not already been described previously.

COMMAND	SHORTCUT	DESCRIPTION
Remove	Delete	Removes the selected channels from the graphs.
Edit Virtual Channel		Opens the VCH Editor (if the selected channel is a VCH)

Keyboard Shortcut

To see the complete list of shortcuts available for the window, see related chapter.

Below are listed those shortcuts that do not appear in any of the commands and of the toolbar buttons described before. These commands can be executed only from keyboard. All these commands are not customizable.

SHORTCUT	DESCRIPTION
Tab	Select next channel in current window

Alarms Window

The Alarms window includes all channels that in "Setup - Channel Parameters" contain configured alarms. The window can be configured to become part of a Layout, or display modes can be configured so that the window will open when an alarming situation occurs.

An alarm can be associated with each type of channel according to the following modes:

- By setting a range within which the channel is not in alarm, called OK Range.
- By setting a further range, called Valid Range, within which the permitted values are configured. If the alarm is correctly configured, the OK Range is completely included in the Valid Range.

Alarm situations are also recognized using alias channels.

Only one Alarms window can be displayed. Any attempt to open the Alarms window when it is already displayed, leads only to focus the window itself.

Elements of the window



The window is formed by a single area where the alarm boxes of each channel are automatically displayed. The window shows the name and the max and min values of each channel. The values are indicated in text boxes with different background colors according to the alarm conditions. The standard colors are:

- Green, used to indicate an ideal situation. In this case the value is within the OK Range.
- Red, used to indicate an alarming situation. In this case the value is within the Valid Range but exceeds the OK Range.
- Yellow, used to indicate an invalid value. In this case the value exceeds the Valid Range.

The alarms shown in the picture are configured by giving the following values:

AccX: OK Range [-1,1] - Valid Range [-2,2]

AccY: OK Range [-2,2] - Valid Range [-10,10]

AccZ: OK Range [-1.2,1.40] - Valid Range [-10,10]

In some licenses the values are underlined; with a left click on a value in this situation, the cursor of the layout moves at the corresponding time in all open windows.



Configuration

The **Alarms** window has no real configuration interface as only *Auto Search Alarms* feature can be configured.



Post Processing section

Enables automatic alarms search each time a new lap is loaded. Alarm window is displayed if any channels exceed the alarm thresholds programmed.

- **Alarms:** search current lap for alarm conditions and show only channels in alarm condition.
- **Invalid Values:** search current lap for alarm conditions and show all configured alarm channels. This check is disabled if **Alarms** is disabled too.

Real Time section

Enables automatic search alarms during real time analysis, showing them through a popup or into the Event Report window basing of channel parameter setup.

- **Alarms:** search current lap for alarm conditions and show only channels in alarm condition.
- **Invalid Values:** search current lap for alarm conditions and show all configured alarm channels. This check is disabled if **Alarms** is disabled too.

Commands

The main commands available in the **Alarms** window can be enabled through:

- the **Options** menu on the main menu of the application
- the buttons of the dedicated **Toolbar**,
- **Pop-up menu**, that can be displayed by clicking with the right button of the mouse on the graphic area of the window, on the Info boxes or on the Y scales of the selected channels.

Options Menu

The Options menu allows the access to the following commands:

COMMAND	SHORTCUT	DESCRIPTION
Open in Excel	Shift + X	Opens an Excel sheet with the values of the channel for each range taking also into account possible comparisons.
Properties	E	Opens the interface to configure the window.

Toolbar

The toolbar enables the following commands:

COMMAND	DESCRIPTION
Properties	See the description of the command in the Options Table.

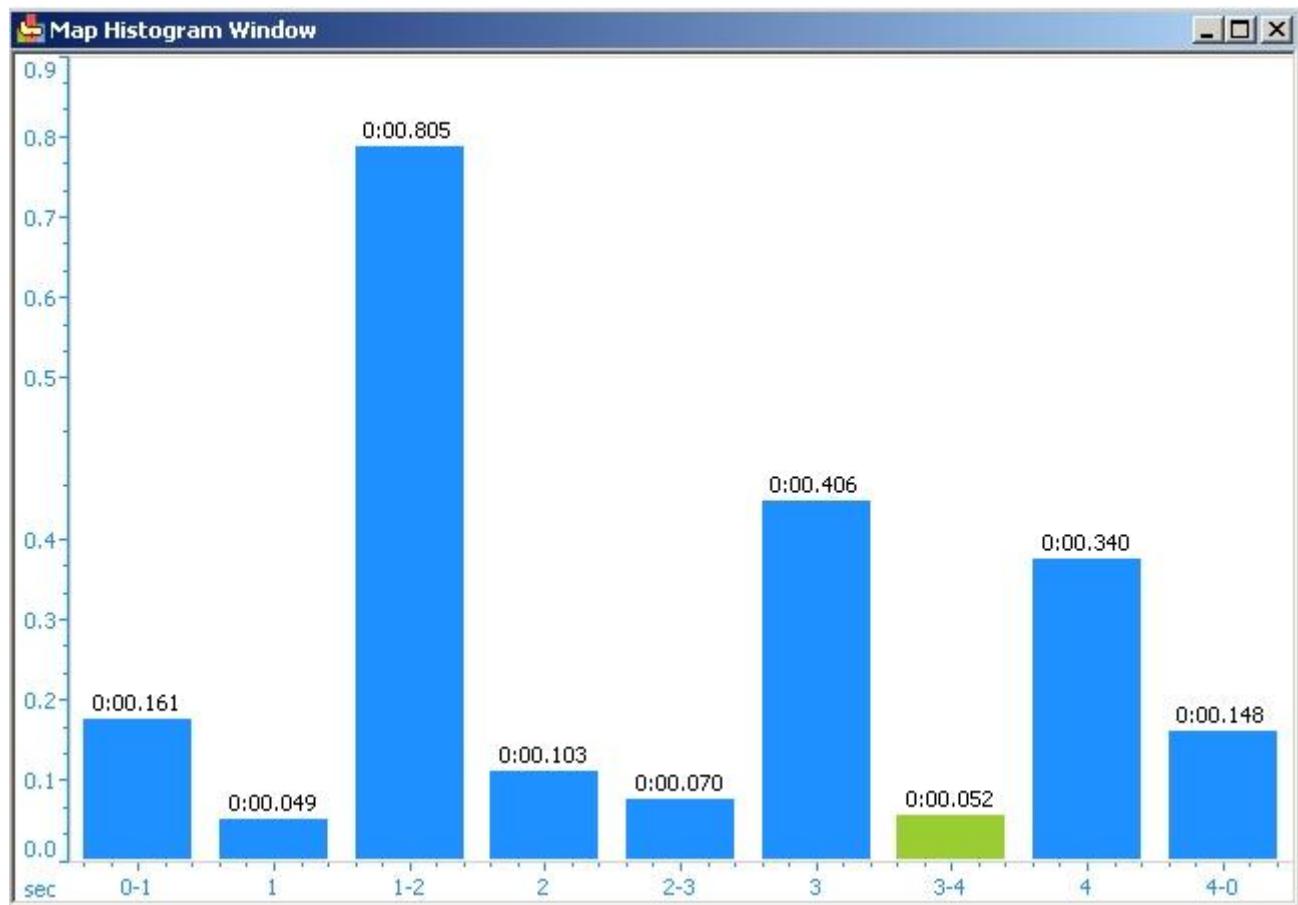
Pop-up Menu

By clicking the right button of the mouse on the graphic area of the window, the following pop-up menu is displayed:

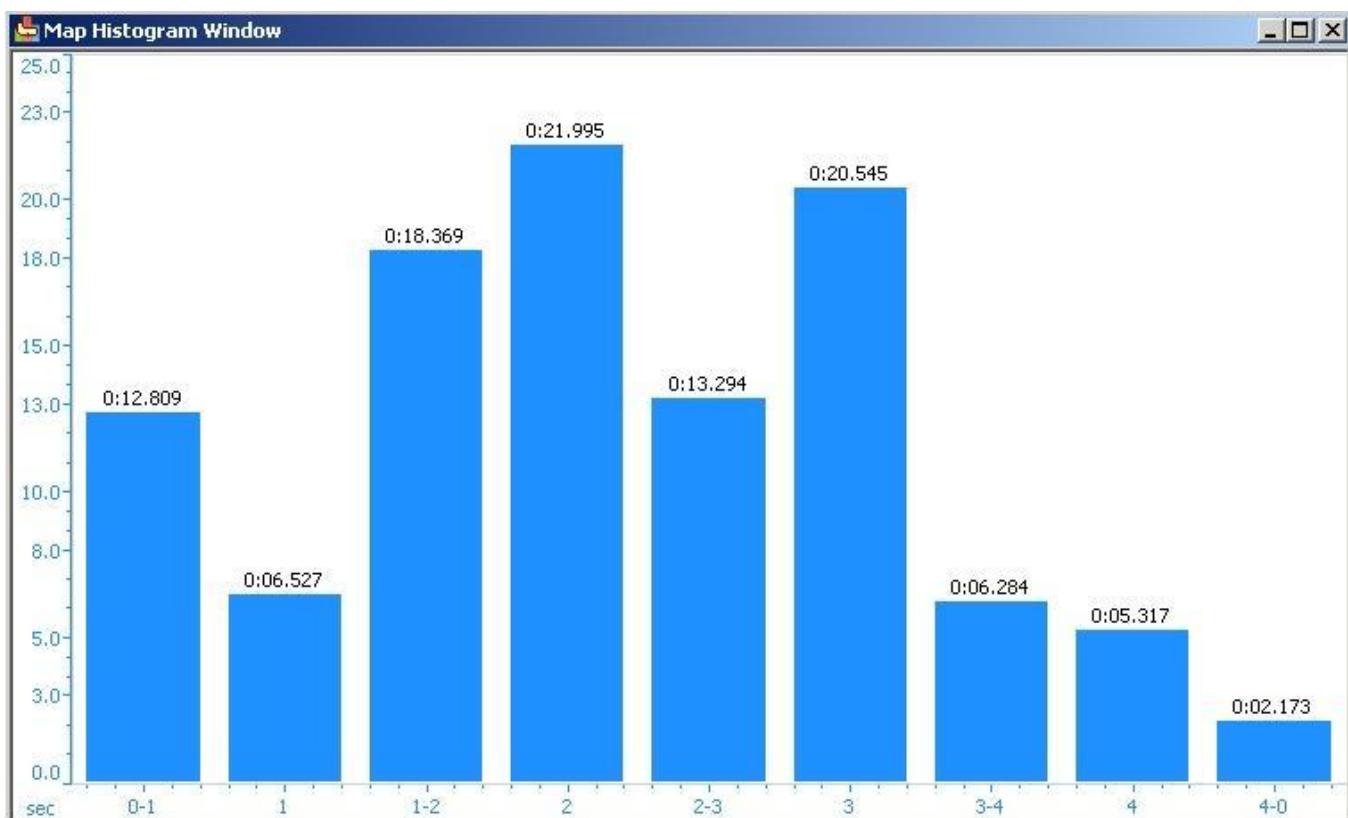
COMMAND	DESCRIPTION
Copy Data to Clipboard	Copies to the clipboard of Windows the channel values for each range taking also into account possible comparisons.
Open in Excel	Opens an Excel sheet with the channel values for each range taking also into account possible comparisons.
Properties	Opens the interface to configure the window.
Go To	This command appears only if the right click is on a cell with underlined value and move the cursor values at the corresponding time. It also be possible to left click the cells to obtain the same effect.

Map Histogram Window

The Map Histogram window shows a histogram indicating the distribution of the split time according to map sections. This window has as many columns as the sections of the map. In the single lap mode the height of each column is given by the value of the split time in the section. In the comparison mode, the first two laps are analyzed, no matter how many laps are compared and the height of a column is determined by the difference between the split times of the two laps in the same section.



Elements of the window



Graphic Area

The graphic area displays the histogram of the split time. On top of each histogram, the value in m:ss:mmm of the split time is displayed for each section. The color of the columns is the color configured for the first lap compared in the Setup / General.

If it is a comparison, the column shows on top the value of the difference of the split time; the color of the column is the color of the comparison with the shorter split time.

The color of the column is set according to which one of the two sections is covered in the shortest time: the color of the lap which has the fastest split time is taken as reference.

Y Scale

The area of the Y Scale displays the scale indicating the time in seconds.

X Scale

The area of the X Scale displays the scale of the ranges in which the channel is divided. The quantity of columns corresponds to the quantity of sections configured in the map.

Commands

The main commands available in the **Map Histogram** window can be enabled through

- the **Options** menu on the main menu of the application
- the buttons of the dedicated **Toolbar**,
- **Pop-up menu** that can be displayed by clicking with the right button of the mouse on the graphic area of the window, on the Info boxes or on the Y scales of the selected channels.

Options Menu

The Options menu allows the access to the following commands:

COMMAND	SHORTCUT	DESCRIPTION
Open in Excel	Shift + X	Opens an Excel sheet containing the channel values for each range also taking into account possible comparisons.

Toolbar

The toolbar allows the following commands:

COMMAND	DESCRIPTION
Show/Hide All Scales Y	Shows/hides the Y scales in all windows, where available.

Pop-up menu

By clicking with the right button of the mouse on the graphic area of the window, the following pop-up menu is displayed:

COMMAND	SHORTCUT	DESCRIPTION
Copy Data to Clipboard	Ctrl + Shift + C	Copies to clipboard of Windows the channel values for each range also taking into account possible comparisons.
Open in Excel	Shift + X	Opens an Excel sheet containing the channel values for each range also taking into account possible comparisons.

FFT Analysis Window

The frequency analysis functions are based upon the Discrete Fourier Transform (DTF), specifically the Fast Fourier Transform (FFT).

Computation is performed through RADIX-2 by Real data sequences (RFFT - R2), sampled with a fixed interval using Decimation Interval Time (DIT) and IN-PLACE computation. The same rules are followed for the Inverted Transform (IRFFT). When necessary, a PAD is performed with a value not equal to zero, but with values copied from the already existing ones.

Generally, the following points should be considered:

- The FFT considers the sampled data as a periodic signal of period T equal to the length of the sample itself
- The subject of the computation is a Finite and Discrete Series of finite values which represent a continuous signal
- The intense processing of data may lead to a loss of precision.
- Negative effects of the computation have been compensated where possible by using well-known techniques, which are widely described in the specialized literature.

From the Nyquist Sampling Theorem, a signal that represents a given frequency bandwidth W must be sampled with a frequency derived from the following equation: $F_c \geq 2*W$ (The Sampling Theorem sets a Theoretical Lower Limit to the sampling frequency for a given band of frequencies, equal to: $F_c \geq 2*F_{max}$. If this is not respected, the signal energy, related to frequencies higher than $F_c/2$, will be distributed over the lower frequencies, resulting in distortion of the spectrum. The above-mentioned condition is thus necessary to completely reconstruct the signal itself, but may be not sufficient. It depends on both the technique and the instrument used to condition the signal itself, which depends in turn on the purpose of the analysis. Therefore, it may be necessary to sample at a frequency higher than the indicated lower limit). Based upon N given data samples, the FFT produces N complex frequency samples which are equal and opposite the one to the other with respect to the $N/2$ th order, corresponding to the frequency W, or equal to $N/2$ real samples. The resolution in frequency is thus equal to $D_f = W/(N/2) = F_c/N$.

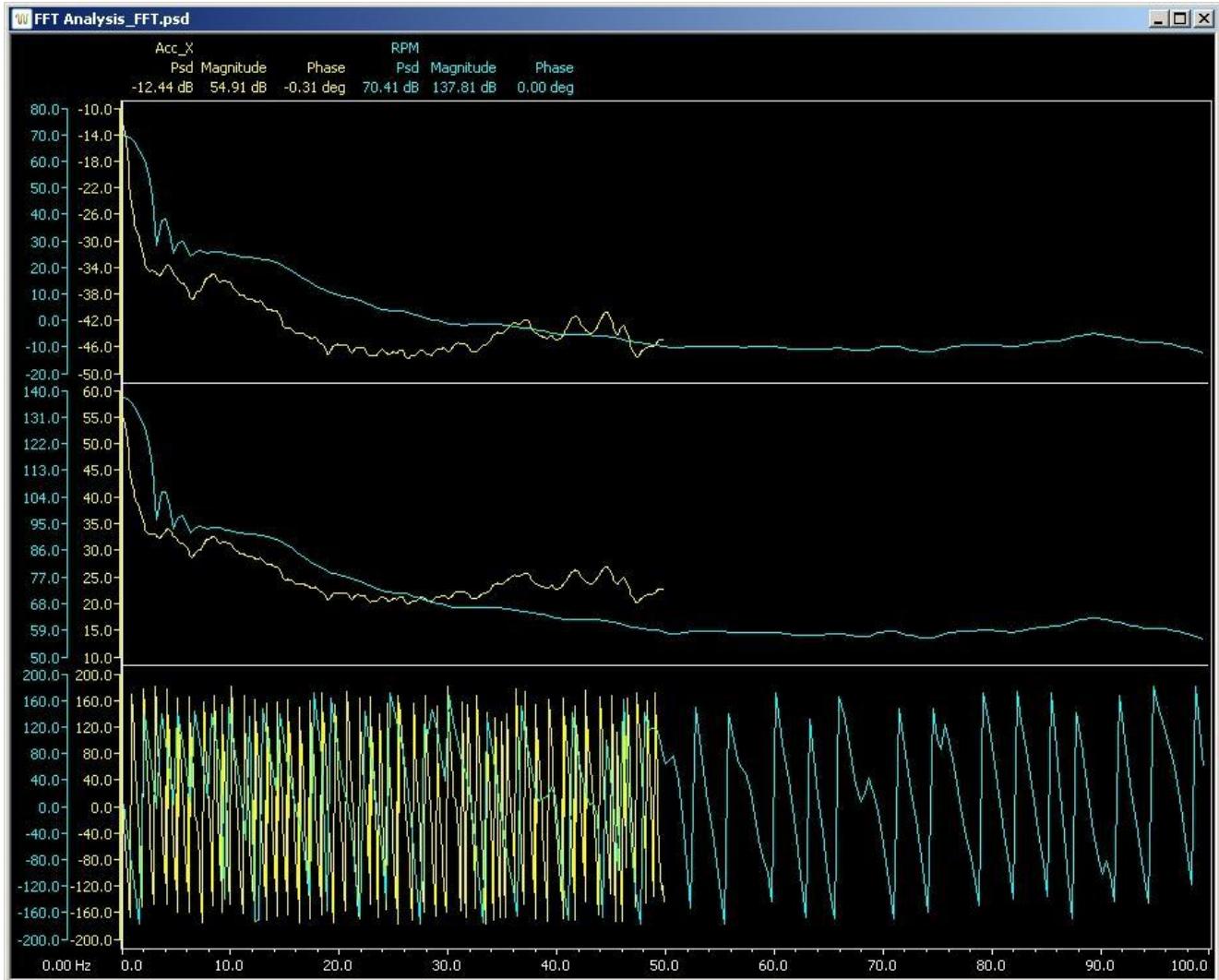
Information that has been processed in this way can be presented as **FFT** or as a Power Spectral Density (**PSD**).

The resulting spectrum is given by the square of the amplitudes of the harmonics and is equivalent to the spectral Power: $\{P_i\} = \{A_i^2\}$. The value is expressed in Decibels ($10*\log_{10}(P_i)$). The computation of the both Estimate and Power Spectrum (PSD) aims to minimize the effects of either statistical variation, computational or signal noise; a Confidence Interval of 95% in dB is given.

WinTAX can also present the data as a Transfer Function (TF) between a system's input and output. It uses the Fourier Transforms of the parameters to calculate the magnitude and the phase of the transfer function against frequency. The result is plotted as dB plot of magnitude and linear plot of phase (Bode's diagram).

By configuring Mode parameter as **Spectrogram**, the window shows a graphical representation of the frequency of the signal. A Spectrogram is a time-varying spectral representation that shows how the spectral density of a signal varies with time.

Elements of the window: Frequency Analysis



Graphic Area

The graphic area displays the graphs of the configured channels, the cursor and the grid of the window. If there are some comparisons, for each channel a graphic is displayed for each lap. The graphs are always displayed in Overlay mode.

Y Scale

The Y Scale area visualizes the values scales of the configured channels. The vertical arrangement of the Y scales cannot be configured and it is linked to the Overlay mode of the window. The scale can be configured as a linear or logarithmic scale.

X Scale

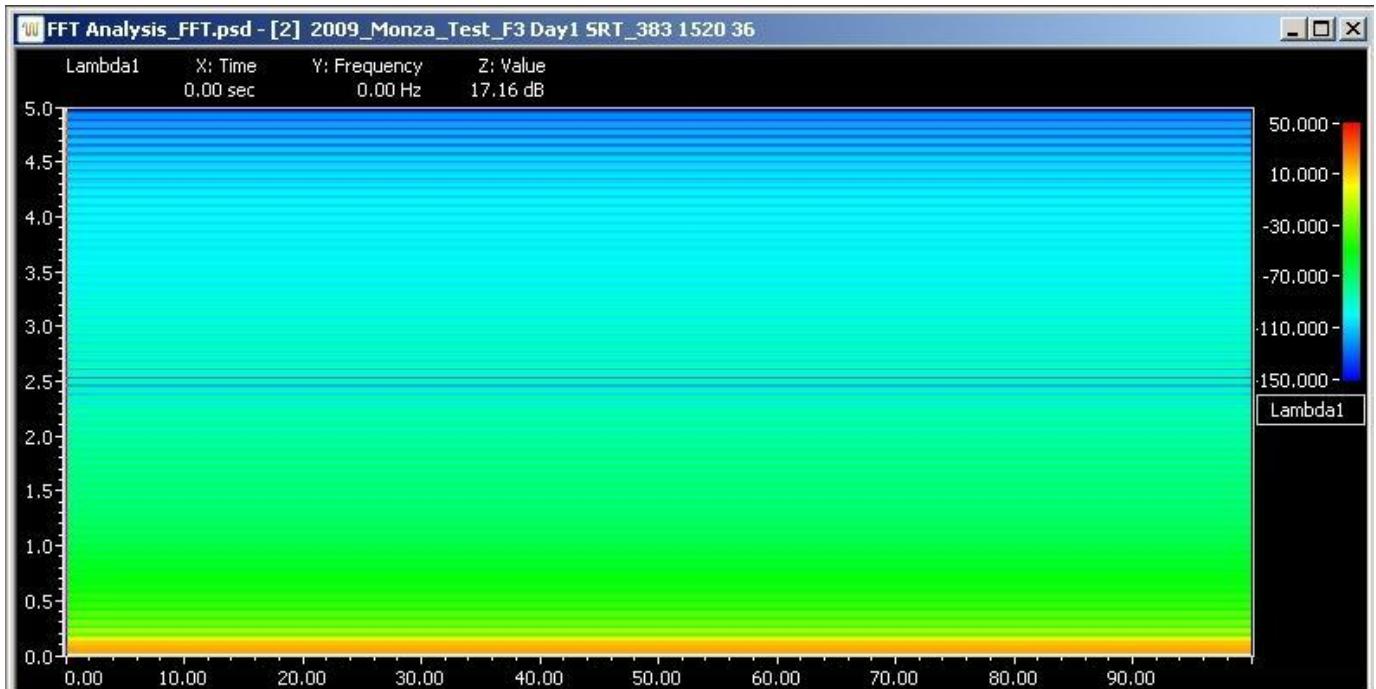
The X Scale area visualizes the frequencies scale of the harmonics of the Fourier transform. The scale can be configured as a linear or logarithmic scale.

Channels Information

Each showed analysis has in the first row the name of the channel, in the second row the type of analysis (psd, magnitude and phase) and in the third row the value corresponding to the cursor position and to the related type; psd and magnitude are in decibels, phase in radians. If there is a comparison, a row is added to display the value of each lap.

Elements of the window: Spectrogram

When mode Spectrogram is selected, the window changes appearance as in the picture shown below.



Graphic Area

The graphic area displays the spectrogram of the first configured channel and the cursor. Comparisons are not handled. Only one channel at a time is shown, so drag & drop function acts to change the channel on the window with the dropped one.

Y Scale

The Y Scale area visualizes the frequencies scale of the harmonics of the Fourier transform of the first configured channels. The vertical arrangement of the Y scales cannot be configured and it is linked to the Overlay mode of the window.

X Scale

The X Scale area visualizes the time length of the lap.

Z Scale

Scale Z is displayed with colours and visualizes the values of spectrogram as shown in the gradient colour box on the right of the window.

Channels Information

Time, Frequency and Value of analysis of the first configured channel are shown.

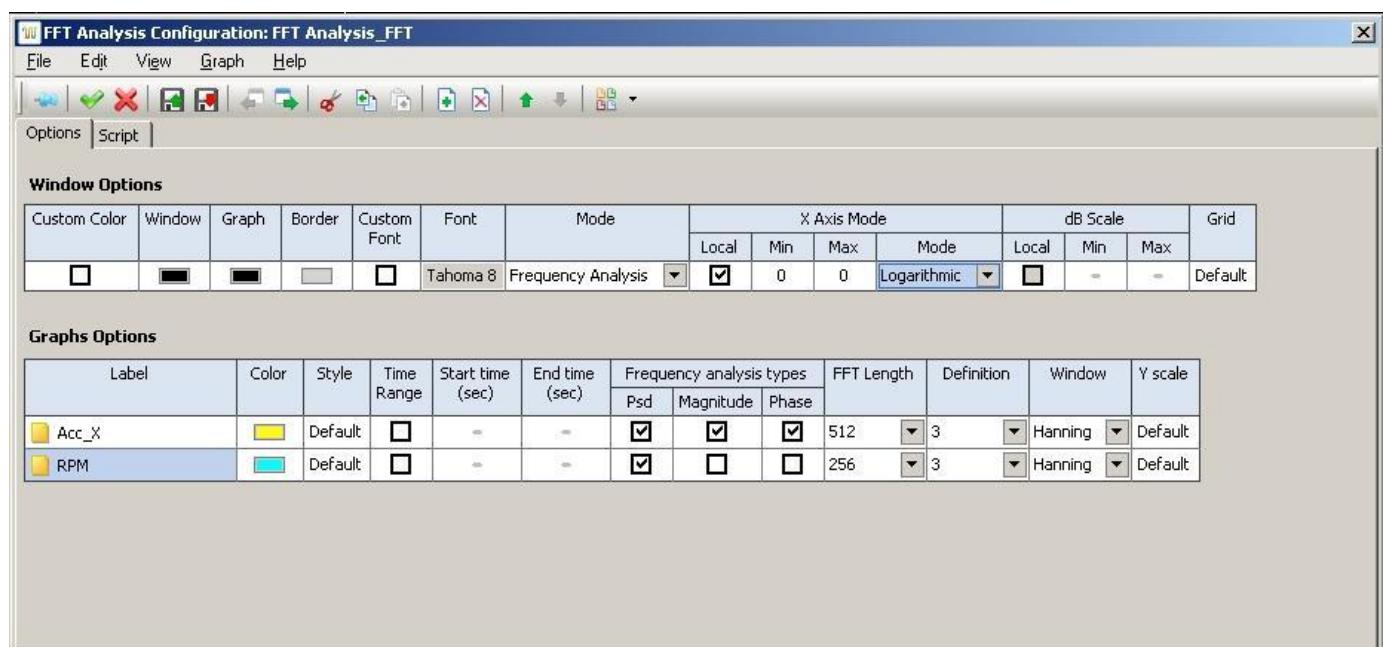
FFT Configuration Window

The **FFT Configuration** window allows setting the **FFT Analysis** window; it is formed by the **Options** and **Script** pages.

The window moreover includes a menu, a toolbar and a pop-up menu that ease the access to the configuration and management commands of the window itself.

Options Page

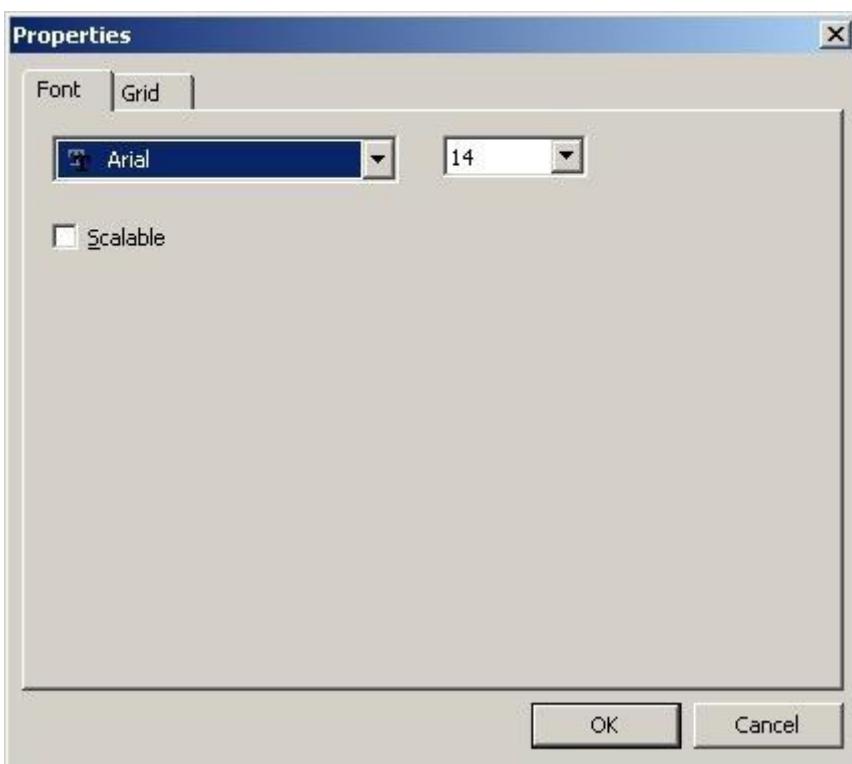
The **Options** page allows configuring the graphic aspect of the **FFT Analysis** windows and it is divided into 2 sections: **Window** and **Graph**. Each configurable value can be edited by double clicking with the mouse or by pressing the space bar on the selected element.



Window Options

It allows configuring the general settings of the window.

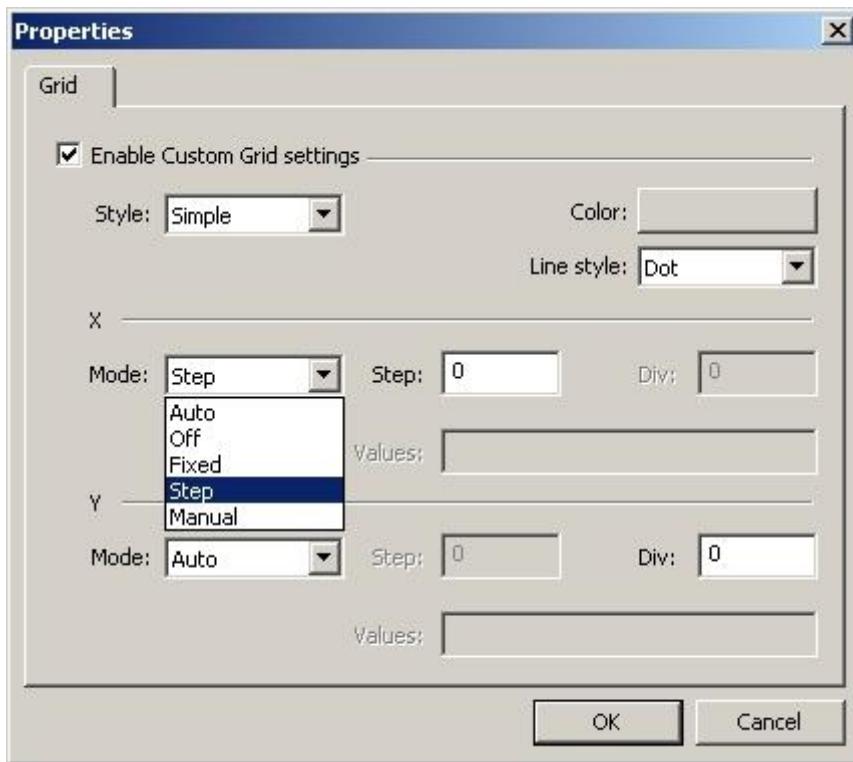
- **Custom color:** enables the settings of the customized colours for the window.
- **Window:** sets the background colour of the window.
- **Graph:** sets the background colour of the graphic area.
- **Border:** sets the borders colour of the window areas.
- **Custom Font:** if enabled, it uses the Font locally set instead of the font usually set by the parameters or by default.
- **Font:** sets the type font. By editing the font box the following configuration window is displayed:



The type of character, its size and the font scalability can be set.

- **Mode:** Switch between Spectrogram and Frequency Analysis. The default setting is "Frequency Analysis"
- **X Axis Mode**
 - **Local:** if it is checked, it automatically sets the frequencies range at 0 as min and max value calculated according to the max frequency of all the channels available and according to the sampling theorem. If it is not clicked, the frequency range is configured in the Min. and Max. boxes.
 - **Min:** minimum value of the frequency range if Local is not enabled.
 - **Max:** maximum value of the frequency range if Local is not enabled.

- **Mode:** the linear or logarithmic scale can be selected for the frequencies ranges on X Axis.
- **dB Scale**
 - **Local:** if it is checked, it automatically sets the db Scale range at min and max value calculated. If it is not clicked, the frequency range is configured in the Min. and Max. boxes. It is used in Spectrogram mode.
 - **Min:** minimum value of the frequency range if Local is not enabled; it is used in Spectrogram mode.
 - **Max:** maximum value of the frequency range if Local is not enabled; it is used in Spectrogram mode.
- **Grid:** shows the setting to enable the grid common to all the channels graphs in the graphic area of the window. The parameter can be modified by editing the corresponding configuration window.



- **Enable Custom Grid settings:** Enables the grid display with the customized settings.
 - **Style:** Sets the style of the grid.
 - **Simple:** the grid is displayed with continuous lines.
 - **Cross:** the grid is displayed with crosses.
 - **Color:** Colour of the grid.
 - **Line style:** Sets the style of the grid line (valid if the Style Simple is enabled).

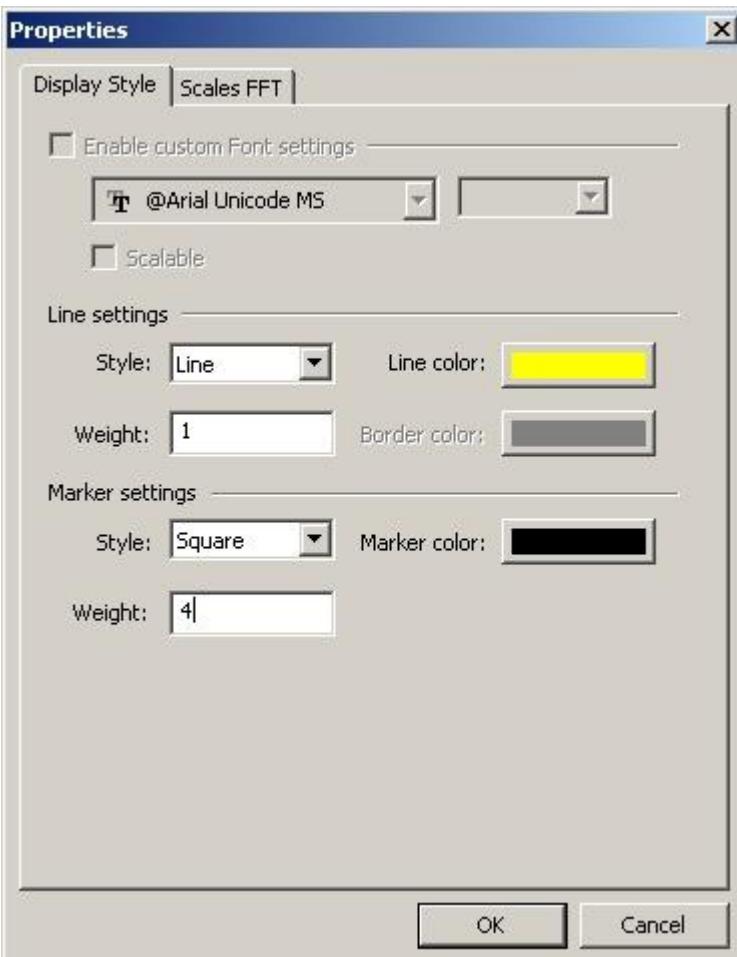
- **Solid:** continuous line
 - **Dash:** dashed line
 - **Dot:** dotted line
 - **DashDot:** dashed line alternated with 1 dot
 - **DashDotDot:** dashed line alternated with 2 dots
- X
 - **Mode:** Calculation mode of the horizontal divisions.
 - **Auto**, displays an automatic number of equidistant divisions.
 - **Off**, no division is displayed
 - **Fixed**, displays a fixed number of equidistant divisions
 - **Step**, displays the divisions at fixed intervals equal to the Step value.
 - **Custom**, displays the divisions in correspondence with the values on the X axis set by the user in the text box **Values**.
 - **Step:** Fix step to calculate the horizontal divisions (a division for each Step), valid with Mode set at Step.
 - **Div.:** Quantity of horizontal division to be displayed, valid with Mode set at Auto or Fixed.
 - **Values:** List of values on the X axis corresponding to the divisions, valid with Mode set at Custom. The list of values can be directly added in the text box using ';' to separate the character.
- Y
 - **Mode:** Calculation mode of the vertical divisions.
 - **Auto**, displays an automatic number of equidistant divisions.
 - **Off**, no division is displayed
 - **Fixed**, displays a fixed number of equidistant divisions
 - **Step**, displays the divisions at fixed intervals equal to the Step value.
 - **Custom**, displays the divisions in correspondence with the values on the Y axis set by the user in the text box **Values**.
 - **Step:** Fix step to calculate the vertical divisions (a division for each Step), valid with Mode set at Step.
 - **Num. div.:** Quantity of vertical division to be displayed, valid with Mode set at Auto or Fixed.

- **Values:** List of values on the Y axis corresponding to the divisions, valid with Mode set at Custom. The list of values can be directly added in the text box using ';' to separate the character.

Graphs Section

It allows configuring the settings specific for each channel to be graphically displayed. Each line identifies a configured channel, while the columns identify the fields to be configured. Multiple selections are possible with the CTRL and SHIFT keys. In Spectrogram Mode only the first row is configurable.

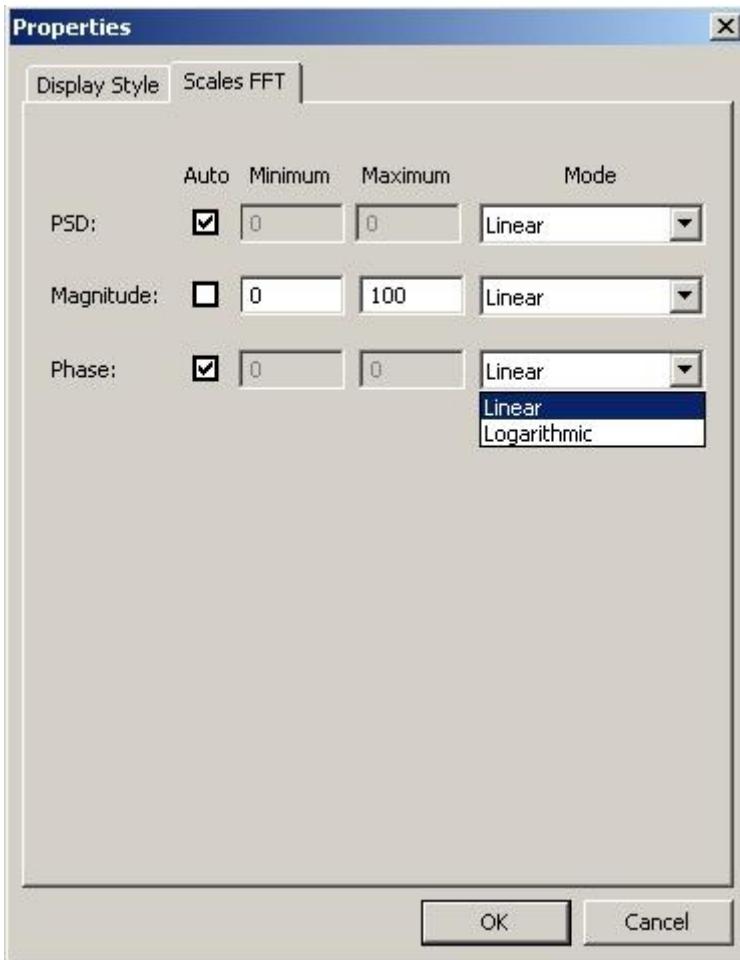
- **Label:** displays the name of the channel. The name of the channel can be edited and can become a math expression if the sign = comes first.
- **Color:** Sets the graphic colour of the channel.
- **Style:** shows the style of the channel graph. To modify the setting, edit the channel by opening the Channel Properties page where fonts and styles can be configured.



- **Line settings section**
 - **Style:** sets the style of the graphs line
 - **None:** no line is drawn
 - **Line:** continuous line

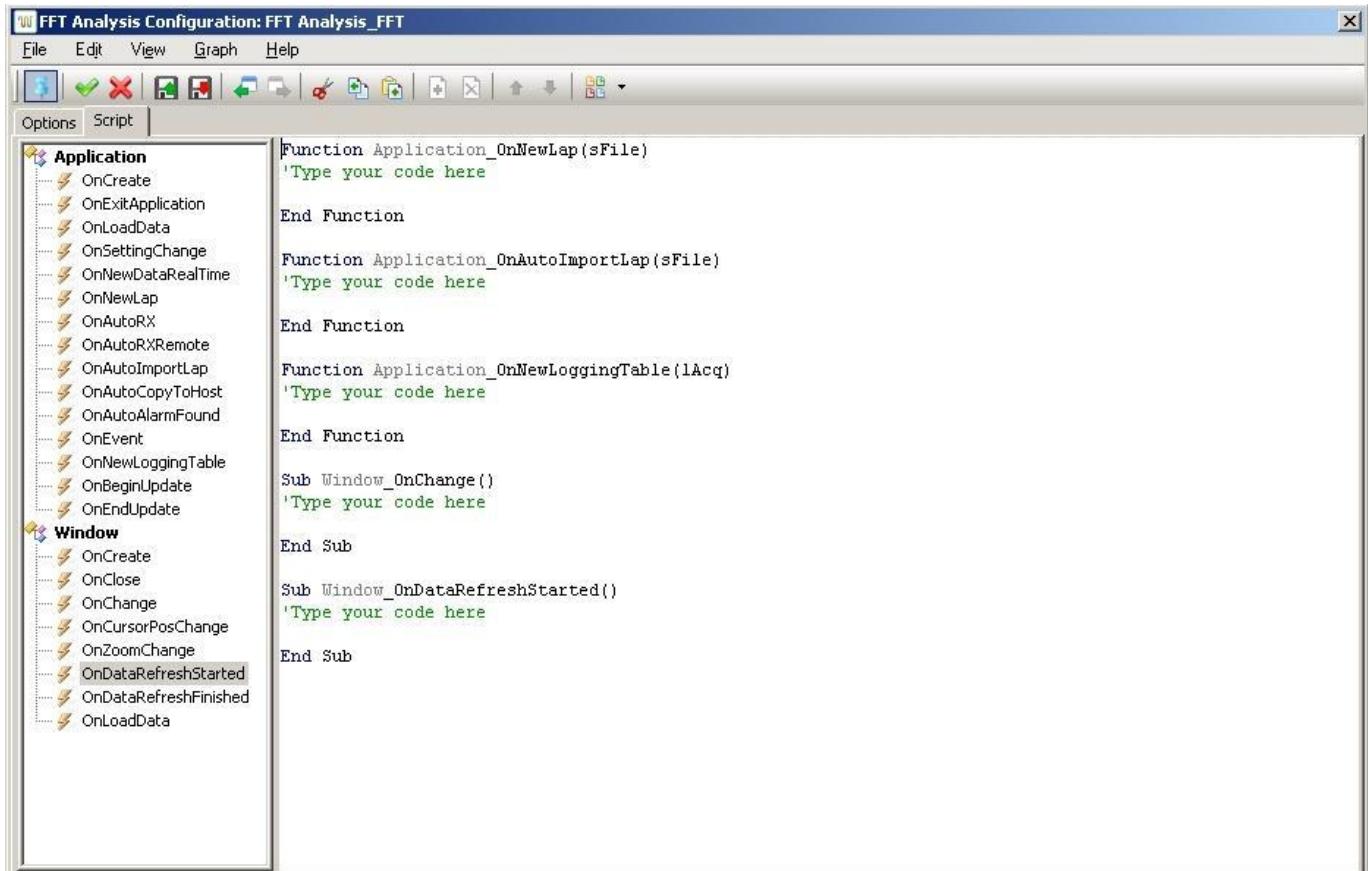
- **Step:** stepped line
 - **Fill Down:** continuous line with colored bottom area
 - **Fill Up:** continuous line with colored top area
 - **Bordered:** continuous line with border
 - **Weight:** sets the depth of the line in pixel.
 - **Line color:** sets the line color.
 - **Border Color:** color for the line border
- **Marker Settings section**
 - **Style:** style of the markers, graphic elements used to represent the marker.
 - **None:** no markers are drawn
 - **Dots:** dot
 - **Cross:** cross
 - **Rhomboid:** rhomboid
 - **Square:** square
 - **Arrow Down:** arrow downwards
 - **Arrow Up:** arrow upwards
 - **Vert Line:** vertical line
 - **Horz Line:** horizontal line
 - **Weight:** size (depth) of the markers in pixel.
 - **Marker color:** color of the markers.
- **Time Range:** If it is enabled, it limits the channel analysis to the time range identified by Init and Final.
- **Start Time (sec):** Value of the minimum time range in seconds according to which the frequency analysis must be performed.
- **End Time (sec):** Value of the maximum time range in seconds according to which the frequency analysis must be performed.
- **Frequency Analysis types:** for each channel allows displaying **PSD** and/or **Magnitude** and/or **Phase**. On Spectrogram mode checks are disabled.
- **FFT Length:** Length of the FFT filter. It coincides with the resulting quantity of points of the graphic.
- **Definition:** Definition degree; to obtain a good graphic resolution and to highlight the pikes, uses a value at least greater or equal to 3.

- **Window:** Window applied by the analysis: it is used to reduce the "leakage" and discontinuity effects of the data on the limits of the range taken into account. The "windows" available are: Hamming, Hanning, Triangle, BlackMan and Harris.
- **Scale:** The linear or logarithmic scales can be selected for the values of the analysis of each channel for each representation (PSD, Magnitude and Phase). On Spectrogram mode selection is disabled.



Script

The **Script** page allows configuring the scripts connected to the events of the **FFT Analysis** window or of the application, in VBScript or Jscript.



The section on the left displays the list of the functions available, grouped by Application and Window.

The section on the right displays the code linked to the configured functions.

Menu

The **FFT Analysis** window menu enables the access to the following commands, divided into sub menus:

File Menu

COMMAND	SHORTCUT	DESCRIPTION
Apply	A	Applies the present setting of the window.
Cancel		Closes the window without applying the present settings.
Load		Opens a dialogue window to select a configuration file (.psd) to be loaded.
Save As		Opens a dialogue window to select a configuration file (.psd) on which the present settings can be saved.

Edit Menu

COMMAND	SHORTCUT	DESCRIPTION
Cut	Ctrl + X	Copies to clipboard the configurations of the channels selected in the list of the Graphs section and remove them from the list.
Copy	Ctrl + C	Copies to clipboard the configurations of the channels selected in the list of the Graphs section.
Paste	Ctrl + V	Pastes the configurations of the channels available in clipboard, adding them to the list of the Graphs section.

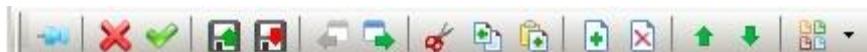
View Menu

COMMAND	SHORTCUT	DESCRIPTION
Previous page	Ctrl + Shift + Tab	Enables the page of the window previous to the one currently in use.
Next page	Ctrl + Tab	Enables the page of the window next to the one currently in use.

Graph Menu

COMMAND	DESCRIPTION
Add Graph	Adds a new element to the Graphs list of channel configuration.
Remove Graph	Removes from the Graphs list the settings of the selected channels.
Move Up	Moves up by one position the elements selected from the Graphs list.
Move Down	Moves down by one position the elements selected from the Graphs list.

Toolbar



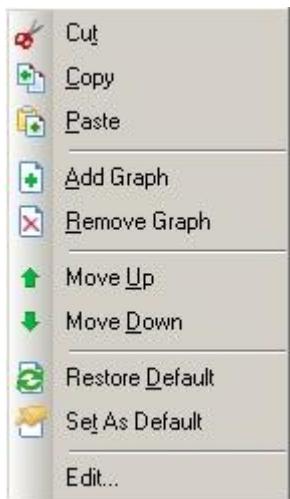
The window toolbar enables the following commands:

COMMAND	DESCRIPTION
Keep Visible	Enables the Keep Visible mode that allows keeping displayed the configuration window while the application windows are being used.
Cancel	Closes the configuration window without applying the settings (Similar to the Cancel command of the File menu).
Apply	Applies the present settings to the configuration of the graphic window (Similar to the Apply command of the File menu).
Load	Similar to the Load command of the File menu
Save As	Similar to the Save As command of the File menu
Previous page	Similar to the Previous page command of the View menu
Next page	Similar to the Next page command of the View menu

Cut	Similar to the Cut command of the Edit menu
Copy	Similar to the Copy command of the Edit menu
Paste	Similar to the Paste command of the Edit menu
Add Graph	Similar to the Add Graph command of the Graph menu
Remove Graph	Similar to the Remove Graph command of the Graph menu
Move Up	Similar to the Move Up command of the Graph menu
Move Down	Similar to the Move Down command of the Graph menu
Channel Browser	Displays the pop-up menu to select the page in the Channel Browser window  <ul style="list-style-type: none"> Channels Information Virtual Channels Conditions Groups Real Time Channels Constants User Records Events Import Variables

Pop-up Menu

The pop-up menu of the window can be displayed by clicking the right button of the mouse on the Options page.



The pop-up menu allows the access to the following commands:

COMMAND	DESCRIPTION
Cut	Similar to the Cut command of the Edit menu
Copy	Similar to the Copy command of the Edit menu
Paste	Similar to the Paste command of the Edit menu
Add Graph	Similar to the Add Graph command of the Graph menu
Remove Graph	Similar to the Remove Graph command of the Graph menu
Move Up	Similar to the Move Up command of the Graph menu
Move Down	Similar to the Move Down command of the Graph menu
Restore Default	Sets in the channel the settings configured in the Channel Parameters.
Set As Default	Sets the channel settings in the Channel Parameters.
Edit...	Gives the possibility to edit the selected parameter (Similar to the double clicking).

Functions (Frequency analysis mode)

The FFT Analysis Window has the following functions in Frequency analysis mode:

- Cursor
- Channel selection
- Elements visualization

Cursor

When only one common type (Psd, Magnitude and Phase) is selected for all channels, the cursor is the combination of the vertical and horizontal lines displayed in the graphic area, otherwise only vertical line is displayed. If two or more laps are compared, the cursor is always displayed just like the vertical line. The cursor allows viewing all values in the range of the X axis scrolling simultaneously on the corner and up-dating therefore the corresponding channel values in the info boxes. The cursor can be moved along the X axis by moving the mouse in the graphic area pressing the left button. If many channels are displayed, the cursor moves on the selected channel; in this case, the cursor values in the info boxes are anyhow up-dated even if they belong to another channel.

Channel Selection

A channel can be selected (i.e. the Y scale, the graphs and the info boxes corresponding to a channel), by clicking with the left button of the mouse on the Y scale, or on the info boxes of the channel. For the multiple selections of the channels, select the channels by pressing the CTRL key.

As an alternative, select in sequence just one channel using the TAB key.

The Y scale, the graphs and the info boxes of the selected channels are highlighted.

To de-select a channel, click with the left button of the mouse on the Y scale or on the info boxes, or select the Clear Selection command of the Options menu or of the pop-up menu.

In Spectrogram mode, selection is not enabled because there is only one active channel.

Elements Visualization

The elements of the window can be shown or hidden by enabling the View command of the Options menu or on the pop-up menu.

Functions (Spectrogram mode)

The FFT Analysis Window has the following functions in Spectrogram mode:

- Cursor
- Elements visualization

Cursor

The cursor is the combination of vertical and horizontal lines displayed in the graphic area. The cursor allows to view all values in the range of the X, Y, Z axis in the info boxes. The cursor can be moved along the X-axis by moving the mouse in the graphic area pressing the left button.

Elements Visualization

The elements of the window can be shown or hidden by enabling the View command of the Options menu or on the pop-up menu.

Commands

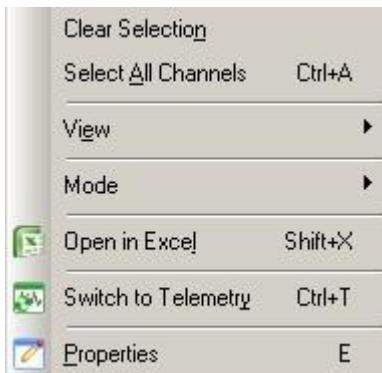
The main commands in the **FFT Analysis Window** can be enabled through:

- the **Options** menu in the main menu of the application
- the buttons of the dedicated **Toolbar**,
- **Pop-up menu** that can be displayed by clicking with the right button of the mouse on the graphic area of the window, on the Info boxes and on the Y scales of the selected channels.
- **Keyboard shortcuts**

The commands are distinguished according to Mode (Frequency Analysis or Spectrogram)

Options Menu (Frequency Analysis Mode)

The Options menu allows the access to the following commands:



COMMAND	SHORTCUT	DESCRIPTION
Clear Selection		De-select all the channels selected in the window.
Select All Channels	Ctrl + A	Select all channels in the window.
View		Shows the pop-up sub menu to select the graphic elements of the window that can be shown or hidden. The displayed elements are highlighted with a check mark on the left. Show All & Hide All show and hide all elements respectively. 
Mode		Switch between Frequency Analysis Mode and Spectrogram Mode
Open in Excel	Shift + X	Opens an Excel sheet containing the X and Y values for each available channel taking also into account possible comparisons.
Switch to Telemetry/Post Processing	Ctrl + T	Enables to switch from the Post-Processing mode to the Telemetry mode and vice versa.
Properties	E	Opens the interface to configure the window.

Options Menu (Spectrogram Mode)



COMMAND	SHORTCUT	DESCRIPTION
View		Shows the pop-up sub menu to select the graphic elements of the window that can be shown or hidden. The displayed elements are highlighted with a check mark on the left. Show All & Hide All show and hide all elements respectively. 
Mode		Switch between Frequency Analysis Mode and Spectrogram Mode
Open in Excel	Shift + X	Opens an Excel sheet containing the X and Y values for each available channel taking also into account possible comparisons.
Properties	E	Opens the interface to configure the window.

Toolbar (Frequency Analysis Mode)

The toolbar allows the access to the following commands:

COMMAND	SHORTCUT	DESCRIPTION
Load		Opens a window to select a configuration file corresponding to a FFT window.
Save		Saves the present window configuration on a file.
Properties	E	See the description of the command in the Options Table.
View		See the description of the command in the Options Table.
Show/Hide All Scales Y		Shows/hides the Y scales in all windows where available.
Datasets		<p>Displays the list of the available Datasets and allows choosing the Dataset to be enabled.</p> <div style="background-color: #f0f0f0; padding: 5px;"> <input checked="" type="checkbox"/> [1] TEST debug - 4.18.4.3 - S1 03-RK 936 6 <input checked="" type="checkbox"/> [2] TEST debug - 4.18.4.3 - S1 03-RK 934 6 <input checked="" type="checkbox"/> [3] TEST debug - 4.18.4.3 - S1 03-RK 935 6 <input checked="" type="checkbox"/> [4] TEST debug - 4.18.4.3 - S1 03-RK 937 6 </div>
Switch to Telemetry/Post Processing	Ctrl + T	See the description of the command in the Options Table.
Mode		See the description of the command in the Options Table.

Toolbar (Spectrogram Mode)

COMMAND	SHORTCUT	DESCRIPTION
Load		Opens a window to select a configuration file corresponding to a FFT window.
Save		Saves the present window configuration on a file.
Properties	E	See the description of the command in the Options Table.
Datasets		<p>Displays the list of the available Datasets and allows choosing the Dataset to be enabled.</p> <div style="background-color: #e0e0e0; padding: 5px;"> <input checked="" type="checkbox"/> [1] TEST debug - 4.18.4.3 - S1 03-RK 936 6 <input checked="" type="checkbox"/> [2] TEST debug - 4.18.4.3 - S1 03-RK 934 6 <input checked="" type="checkbox"/> [3] TEST debug - 4.18.4.3 - S1 03-RK 935 6 <input checked="" type="checkbox"/> [4] TEST debug - 4.18.4.3 - S1 03-RK 937 6 </div>
Mode		See the description of the command in the Options Table.

Pop-up menu (Frequency Analysis Mode)

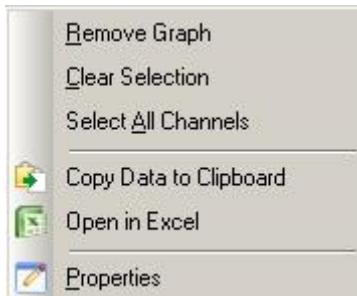
By clicking with the right button of the mouse on the graphic area of the window, the following pop-up menu is displayed:



This section will describe only the commands that have not already been described previously.

COMMAND	SHORTCUT	DESCRIPTION
Copy Data to Clipboard	Ctrl + Shift + C	Copies to clipboard of Windows the X and Y values for each channel available taking also into account possible comparisons.

By clicking with the right button of the mouse on an Info box or on the Y Scale of a channel, the following pop-up menu is displayed:

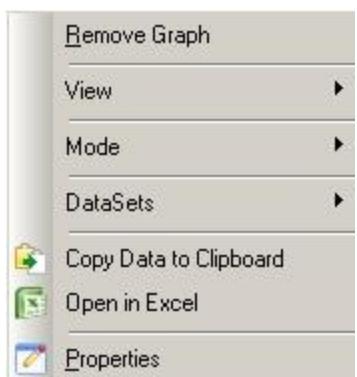


This section will describe only the commands that have not already been described previously.

COMMAND	DESCRIPTION
Remove Graph	Removes the selected channels.

Pop-up menu (Spectrogram Mode)

By clicking with the right button of the mouse on the window, the following pop-up menu is displayed:



This section will describe only the commands that have not already been described previously.

COMMAND	SHORTCUT	DESCRIPTION
Remove Graph		Removes the selected channels.
Copy Data to Clipboard	Ctrl + Shift + C	Copies to clipboard of Windows the X and Y values for each channel available taking also into account possible comparisons.

Keyboard Shortcut

To see the complete list of shortcuts available for the graph window, see related chapter.

Below are listed those shortcuts that do not appear in any of the commands and of the toolbar buttons described before. These commands can be executed only from keyboard. All these commands are not customizable.

SHORTCUT	DESCRIPTION
Tab	Select next channel (only in Frequency Analysis mode)
Del	Remove selected channels

Layout

In WinTAX the configuration of the analysis windows can be saved so that they can quickly be reopened afterwards. WinTAX offers the possibility to access to the saved layouts and to reorganize them at will. The Layouts can be saved, opened, arranged through the commands available in the file menu and in the Layout toolbar. Moreover there is a bar containing some tabs that allow to quickly open the favourite Layouts. By saving of the layout therefore it is intended the saving of the position of each analysis window open; the position of the toolbars and of the possible working windows is not saved. The licenses granting the enabled Dataset allow to save in the layout also the slots active for each window.

Menu File Menu

- **Load Layout:** This command opens a selection window that searches for all layout previously saved in the User directory and allows to select one of them to be opened.
- **Save Layout:** Saves on the current layout file (.wly) the position of the windows currently open on WinTAX and the information about the slots in the Dataset.
- **Save Layout As:** Opens a window to select a layout file (.wly) to save the position of the windows currently open on WinTAX and the information of the slots of the Dataset. An existing layout can be overlapped or the name of a new layout can be written.

Layout Toolbar

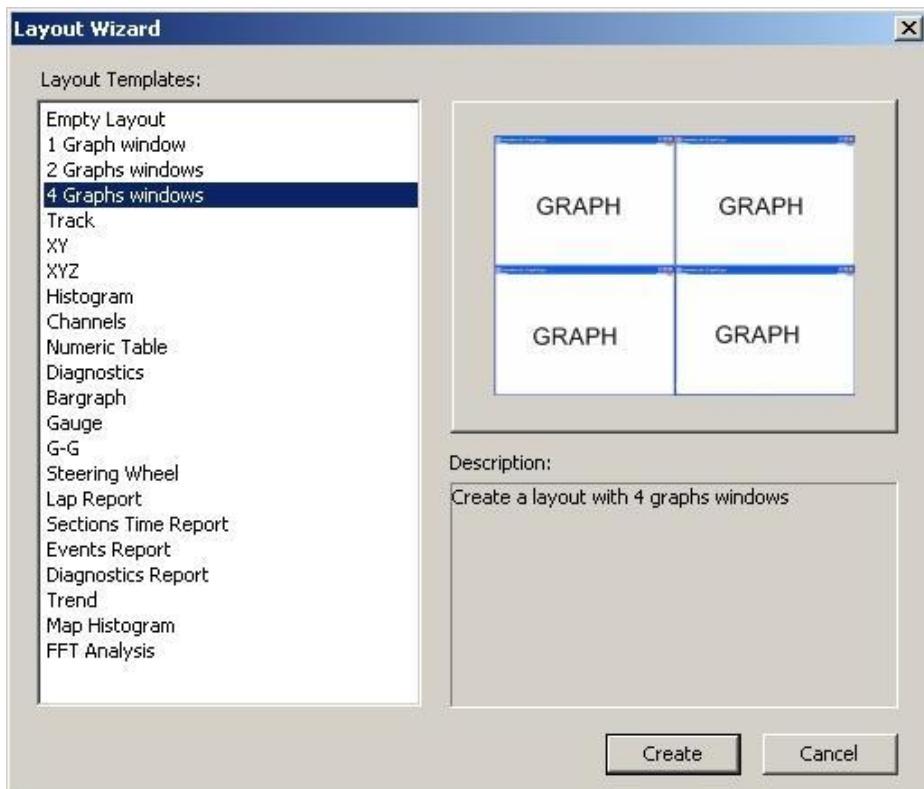
The visualization of the Layout Toolbar can be enable/disabled through the View/Toolbars/Layout command of the main menu. Other elements can be added to the list also through the Workspace window. In this window just place the mouse on the element to be added, open the pop-up menu clicking the right button and select the **Add to layout bar** command. To cancel the elements added, always open the Layout Bar window.

Layout Selection Tab

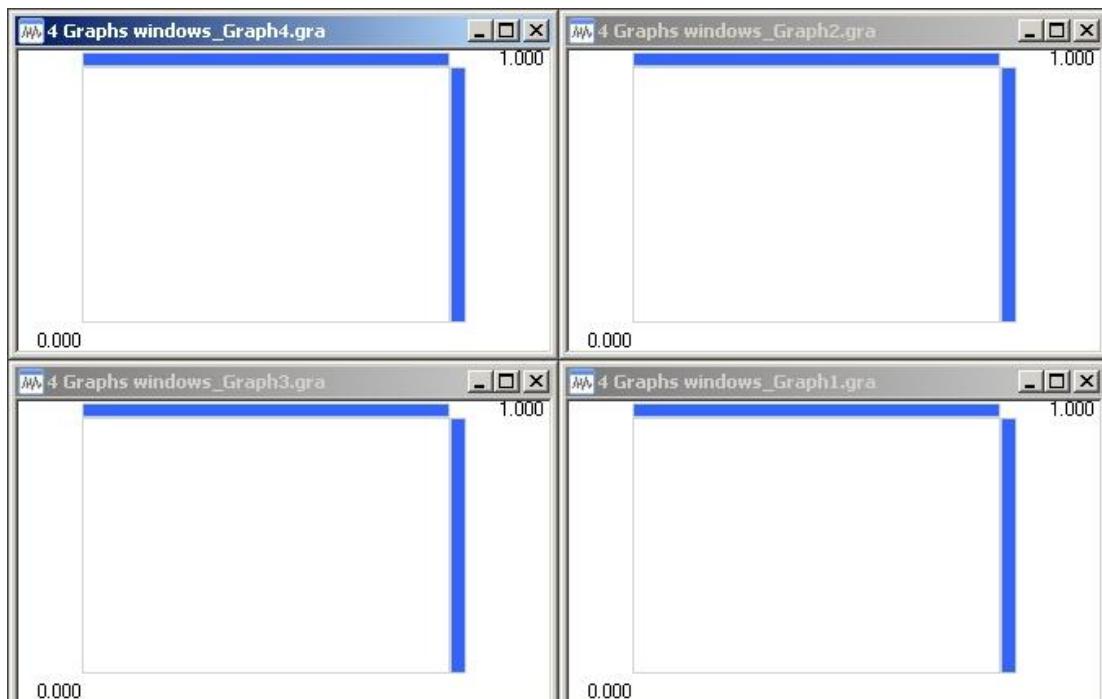
The Layout Selection Tab is displayed in the bottom part of the main window of WinTAX and it is formed by as many Tabs as the layouts available in the list of the Layout Bar window. Elements available in the list that are not layouts and that are not displayed. So it's possible to have an easy access to the favourite layouts by simply clicking on the corresponding tab. The Layout Selection Tab is enabled when there is at least one layout loaded in the list; it can be displayed or not through the **Layout Selection Tab** command in the View menu.



The Layout Selection Tab is synchronized with the combo so that they both display the current layout. The last element of the Layout Selection Tab is a tab with a plus. A click on the plus sign opens the Layout Wizard.



With this wizard you can select the preferred layout. An overview will be shown in the preview window while a description of the layout appears in the text box. Pressing the button Create, you can build, save and open a new layout with the desired structure.



Print

In WinTAX the single analysis windows or the current layout can be printed. The File menu of the main menu has the following commands:

- **Print Setup** Configuration of the print settings. For a detailed description of the configuration options, see related chapter
- **Print Window** It prints the single window; the active window is printed, i.e. the window being focused.
- **Print Layout** It prints the current layout.

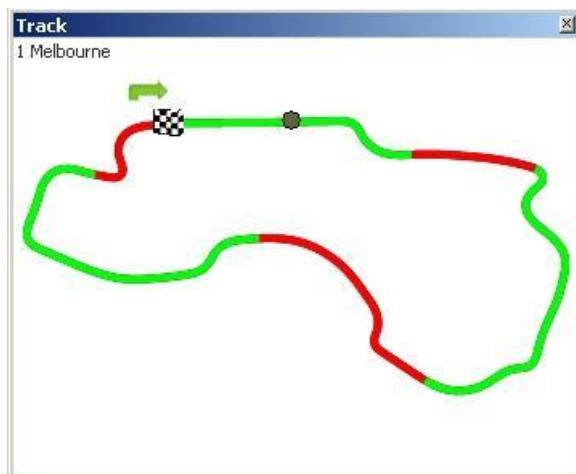
Work Windows

WinTAX4 has the following working windows that can be opened from the View Menu of the main menu:

- **Channel Browser**
- **Data Set**
- **Popup Track**
- **Search Events**
- **Popup Legend**
- **Log Window**
- **Workspace**
- **Logging Table**
- **Debug Virtual Channel**
- **Rx Buttons Bar**
- **Popup Alarms**

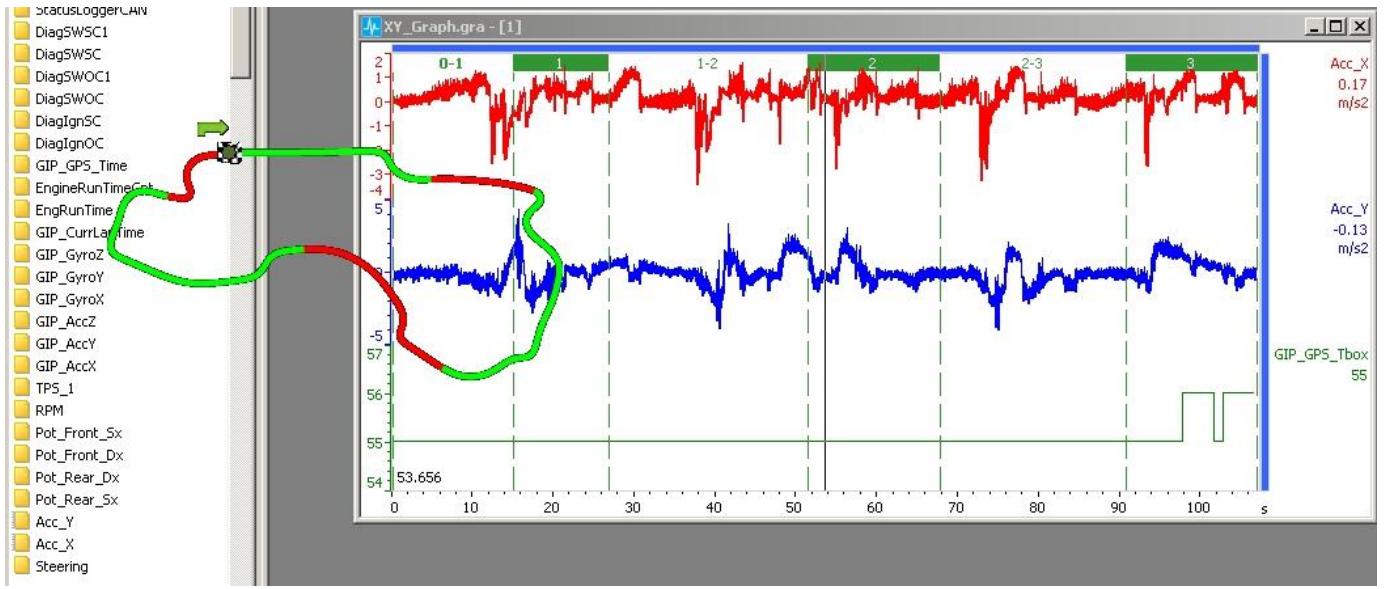
PopUp Track

The window can be displayed or hidden through *View/Popup Track* command of the main menu. The window is not dockable but it can be resized on demand. The window shows the track currently loaded on WinTAX with its corresponding name. Nothing can be configured in this window which therefore is configured by default. The background color is set in *Setup/General* in the Window section of the Default Appearance page while the line color *Setup/General* in the Track section of the Default Appearance page. The window receives the connection of the cursor position from the other windows.



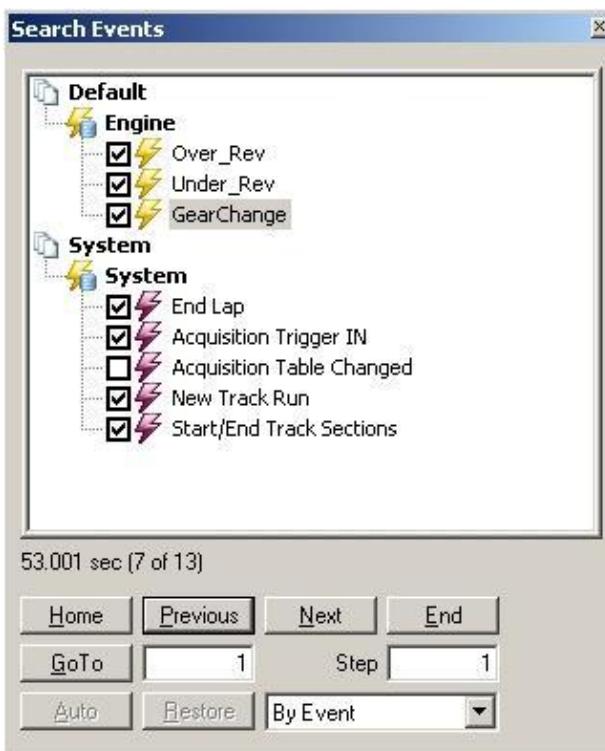
Transparent Popup Track

The Popup Track can be made transparent in any point. To make it transparent or to remove the transparency use the *View/Transparent Popup Track* command of the main menu. Once transparent it cannot be moved if the transparency is not removed. In the next figure the Popup Track is made transparent overlapping with a Graphs window.



Search Events

This dockable window allows to search for individual or multiple events.



In the definition of each event it is possible to set up a zoom range that is automatically applied when the event is searched. A time offset parameter is used to place the cursor and centre the zoom at a predefined time before or after the event. It is also possible to set up a specific layout which will be opened when the event is detected. By default the current layout is maintained. Above the buttons there is an info line indicating how many occurrences the event has, the currently pointed one and the moment associated with it. The window is also provided with a combo allowing to choose if the occurrences of the event must be searched following a chronological order or event by event. If the **by event** is selected, the buttons of the window have the following functions:

- **Home**

Moves the cursor to the first occurrence of the selected event if it is checked; if it is not checked the command is active on the first checked event next to the selected one.

- **Previous**

Moves the cursor to the previous occurrence of the selected event. If no occurrences for the same event are available, the last occurrence of the previously checked occurrence is selected. It stops at the first occurrence of the first checked event. If previous is pressed when a non checked event is selected, the last occurrence of the last checked event previous to the selected one is chosen; if none is available, the last occurrence of the last checked event is chosen.

- **Next**

Moves the cursor to the next occurrence of the selected event. If no occurrences for the same event are available, the first occurrence of the next checked occurrence is selected. It

stops at the last occurrence of the last checked event. If it is pressed when a non checked event is selected, the first occurrence of the first checked next to the selected one is chosen; if no next checked events are available, the first occurrence of the first checked event is chosen.

- **End**

Moves the cursor to the last occurrence of the selected event if it is checked; if it is not checked the command is active on the first checked item following to the selected one.

- **GoTo**

If pressed when a checked event is selected, the cursor moves to the indicated occurrence.

- **Step**

Step for the Prev and Next command. It allows to scroll quicker the occurrences when many of them are available.

- **Auto**

Moves the cursor to the first occurrence of the event Configured as Auto Search in the Search tab in Tools/Events/Default Settings

- **Restore**

If in the configuration of an event the opening of a certain layout is programmed whenever an occurrence takes place, this button is enabled so that the default previous to the taking place of the event is restores.

If **chronologically** is selected, the buttons of the window have the following functions:

- **Home**

Moves the cursor to the occurrence with the shortest time instant among all the checked ones.

- **Previous**

Among all the checked events, moves to the occurrence coming previously, no matter to which event it belongs.

- **Next**

Among all the checked events, moves to the occurrence coming next, no matter to which event it belongs.

- **End**

Moves the cursor to the occurrence with the highest instant among all the checked ones.

- **GoTo**

Disabled

- **Step**

Disabled

- **Auto**

Same functions as by event

- **Restore**

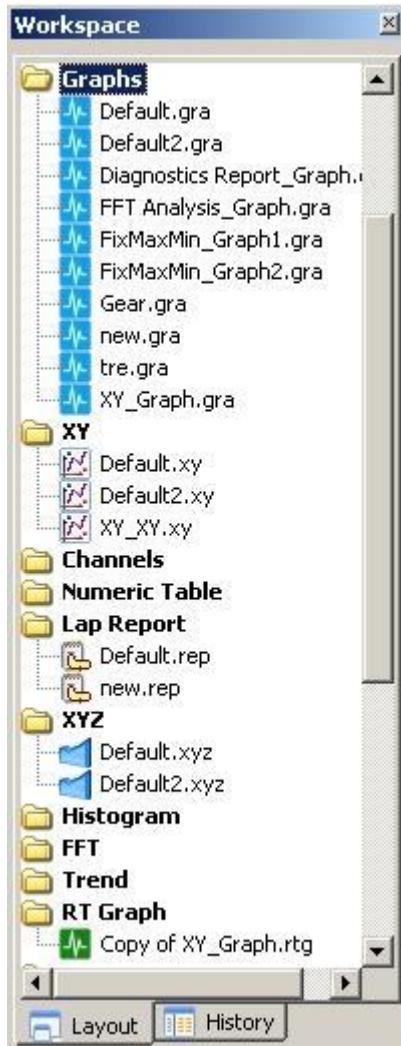
Same functions as by event

Workspace

The window is displayed or hidden through the *View/Workspace* command of the main menu. The window is dockable and can be blocked in any of the four sides of the main window. The Workspace window is divided into two sections, the **Layout** section and the **History** section.

Layout

This section shows grouped by type all the configuration Windows and the Layout available in the users directory active in WinTAX session.



A window or a layout can be opened by double clicking with the mouse on the wished item. By clicking with the right button on an item the pop-up menu containing a single command opens **Add to layout bar**. This command adds any selected item to the layout. The Layout section is loaded at the beginning of the session of a certain user, then possible window and layouts created during the current session are not displayed.

History

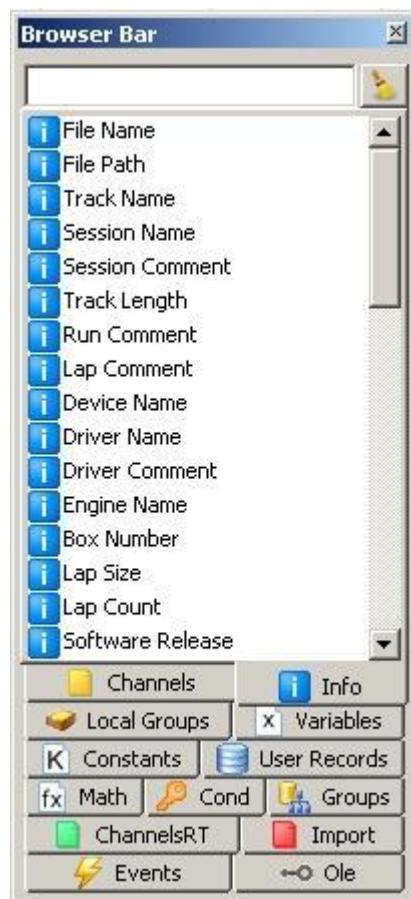
The History section is formed just like the layout session with the only difference that it shows only the items opened since the beginning of the session.



A window or a layout can be opened by double clicking with the mouse on the chosen item. The History section keeps track also of possible new items created during the session.

Channel Browser

The Channel Browser is shown or hidden through the *View/Channel Browser* command of the main menu. The window is dockable and can be blocked in any of the four sides of the main window. The Channel Browser is a folder displaying all types of channels, logged, math, events, etc. Besides displaying a list of channels available, its function is to support all the drag & drop operations that are necessary to show the different channels on the analysis windows. To this aim the window has the special feature, both in floating mode and in docking mode, of being accessible also from the modal windows of the configurations, so that the drag & drop is possible not only on the windows but also on their configurations.



The drag & drop, i.e. the dragging of the channel with the mouse on the wished place, is not the only way to add a channel in a window.

Edit box on the top of the list can be used to search for channels. The channels list is updated runtime, while editing characters, showing channels which name matches the filter string. The search is case insensitive but you can still use the Shift key to edit the uppercase letters. Filter can be deleted by keyboard or button .

In the complete configuration the Channel Browser is provided with following Tabs: **Channels**, **Info**, **Events**, **OLE**, **ChannelsRT**, **Constants**, **Math**, **Cond**, **Groups**, **Local Groups**, **Import**, **WDS** and **Variables**. However not all tabs are available on different licences.

Channels

The Tab Channels includes the logged channels. Besides the basic functions, for the logged channel clicking with the right button enables the access to a pop-up menu that includes the following commands

- **Sort** If the check of the Sort command is enabled the channels are in alphabetical order, otherwise they appear according to the loading order. The status is saved and kept till the next loading.

Info

The Info Tab contains all information associated to the lap and the weather data if available. Besides the basic functions, for the Info clicking with the right button enables the access to a pop-up menu that includes the following commands

- **Sort** If the check of the Sort command is enabled the channels are in alphabetical order, otherwise they appear according to the loading order. The status is saved and kept till the next loading.

Events

The Event Tab contains all configured events that have the Show parameter enabled. In addition, the events are grouped on the basis of the group they belong to. The group unlike the event cannot be dragged on a window. It's also possible to drag on a window the event pressing the CTRL key; in this case it will not be considered as an event but as math channel and it will be regularly graphed.

When an event is in red, it means that it is configured to be a Hot Event, i.e. an event where the occurrences can be scrolled with the shortcuts ALT+P and ALT+N. There can be just one Hot Event so the setting of a Hot Event removes this feature to another event that previously had this feature.

Channels, that are unavailable for syntax error(s) in formula, will be displayed with a grayed icon overlapped by red cross. Moving the mouse cursor over items, a tooltip with error description will appear.

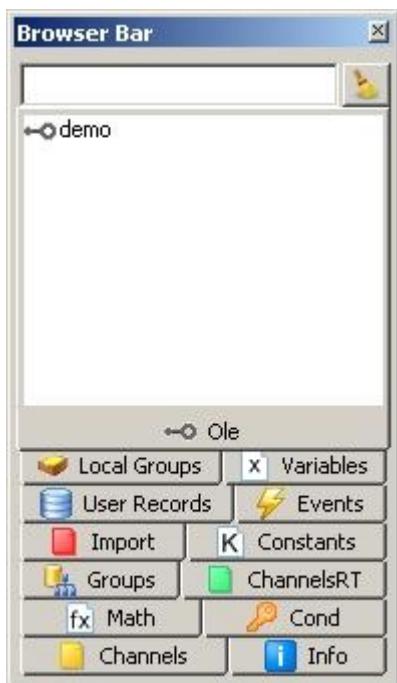


When the icons of the events are in green, it means that the active analysis window displays these events. Besides the basic functions, for the Info clicking with the right button enables the access to a pop-up menu that includes some of the following commands, depending on the licenses.

- **Edit Events** Opens the configuration page placed on the selected event. If no event is selected, the configuration page set on the first group of the first library is anyhow opened.
- **Global Show Events** Enables/disables the display of the events on all WinTAX windows. Available only for some licenses.
- **Show Event** When it is enabled, displays the event on all windows managing the events. If it is not enabled, each window displaying its own event works normally. The global event is identified by the icon that shows a blue circle behind the usual symbol of the events. Enabled only for some licenses.
- **Hide Event** Removes the event from the Channel Browser, hiding it throughout all WinTAX. It decreases the flag of the Show configuration parameter. To show the hidden event again, the configuration flag must be increased again. It is enabled only for some licenses.
- **Set As Hot Event** Sets the selected event as an Hot Event..
- **Clear Hot Event** Removes the Hot Event status from the event possibly having this feature.
- **Sort** If the check of the Sort command is enabled, the events are in alphabetical order, otherwise they appear according to the loading order. The status is saved and kept till the next loading.

OLE

The OLE tab includes the channels added to WinTAX from outside through OLE Automation or also by WinTAX itself through the script.



Besides the basic functions, for the logged channel clicking with the right button enables the access to a pop-up menu that includes the following commands

- **Sort** If the check of the Sort command is enabled the OLE are in alphabetical order, otherwise they appear according to the loading order. The status is saved and kept till the next loading

ChannelsRT

The ChannelsRT tab contains the channels that are acquired through Real Time; the icon is the same as the logged channels, only in green. Besides the basic functions, for the logged channel clicking with the right button enables the access to a pop-up menu that includes the following commands

- **Sort** If the check of the Sort command is enabled the OLE channels are in alphabetical order, otherwise they appear according to the loading order. The status is saved and kept till the next loading.

Math

The Math tab contains all configured Virtual Channels (VCH) and where the Show parameter is checked in configuration. Besides the basic functions, for the logged channel clicking with the right button enables the access to a pop-up menu that includes the following commands

- **Edit Virtual Channels** Opens the configuration page placed on the selected VCH. If no VCH is selected, the configuration page set in the first library is anyhow opened.
- **Sort** If the check of the Sort command is enabled the VCH are in alphabetical order, otherwise they appear according to the loading order. The status is saved and kept till the next loading.

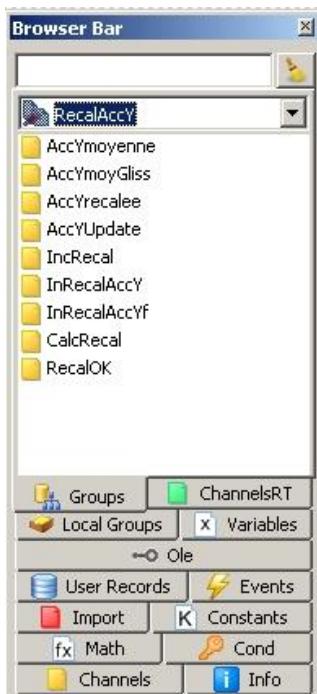
Cond

The Cond Tab contains all configured Conditions having the Show parameter checked in configuration. Besides the basic functions, for the logged channel clicking with the right button enables the access to a pop-up menu that includes the following commands

- **Edit Conditions** Opens the configuration page placed on the selected Condition. If no Condition is selected, the configuration page set in the first library is anyhow opened.
- **Sort** If the check of the Sort command is enabled the conditions are in alphabetical order, otherwise they appear according to the loading order. The status is saved and kept till the next loading.

Groups

The Group Tab contains a combo which allows selecting among various groups of channels into which the logged channels have been divided. The list shows all channels belonging to that group.



Besides the basic functions, for the logged channel clicking with the right button enables the access to a pop-up menu that includes the following commands.

- **Sort** If the check of the Sort command is enabled the channels are in alphabetical order, otherwise they appear according to the loading order. The status is saved and kept till the next loading

User Record

The **User Record** Tab contains the user records configured in acquisition manager and then saved within acquired data. As for all other Tabs, the sort option is available by mouse right click:

- **Sort:** If checked the items are displayed in alphabetical order, otherwise they appear as saved into data. Sort status is kept in memory until next lap is loaded.

Import

The **Import** Tab contains the channels imported from ASCII and stored in file ImportData.ztx. As for all other Tabs, the sort option is available by mouse right click:

- **Sort:** If checked the items are displayed in alphabetical order, otherwise they appear as saved into data. Sort status is kept in memory until next lap is loaded.

WDS

The **WDS** Tab contains the channels acquired from Wireless Distribution System. The WDS channels are of four basic types: CAR, DOWN, UP and ACCESS POINT. Each type is identified by a different icon. These channels are merged with the cars contained in WDS Car Toolbar to obtain the list of logged channels in Channels Tab.

As for all other Tabs, the sort option is available by mouse right click:

- **Sort:** If checked the items are displayed in alphabetical order but grouped by type; otherwise they appear as saved into data. Sort order is kept in memory until next lap is loaded.



Local Group

The **Local Group** Tab contains the groups configured in Channel Parameters. Dragging a Local Group on a Graph Window, all channels belonging to the group are loaded on the window.

As for all other Tabs, the sort option is available by mouse right click:

- **Sort:** If checked the items are displayed in alphabetical order, otherwise they appear as saved into data. Sort status is kept in memory until next lap is loaded.

Variables

The **Variables** Tab contains the static variables. The drag and drop of Variables is allowed only on Setup of Virtual Channels but not on the analysis windows.

As for all other Tabs, the sort option is available by mouse right click:

- **Sort:** If checked the items are displayed in alphabetical order, otherwise they appear as saved into data. Sort status is kept in memory until next lap is loaded.

Custom Mode

In some licenses a further Tab called Custom is available allowing to group various channels in a single position.

For further details on the Custom tab see the Setup Channel Browser.

In this mode three types of arrangement are available

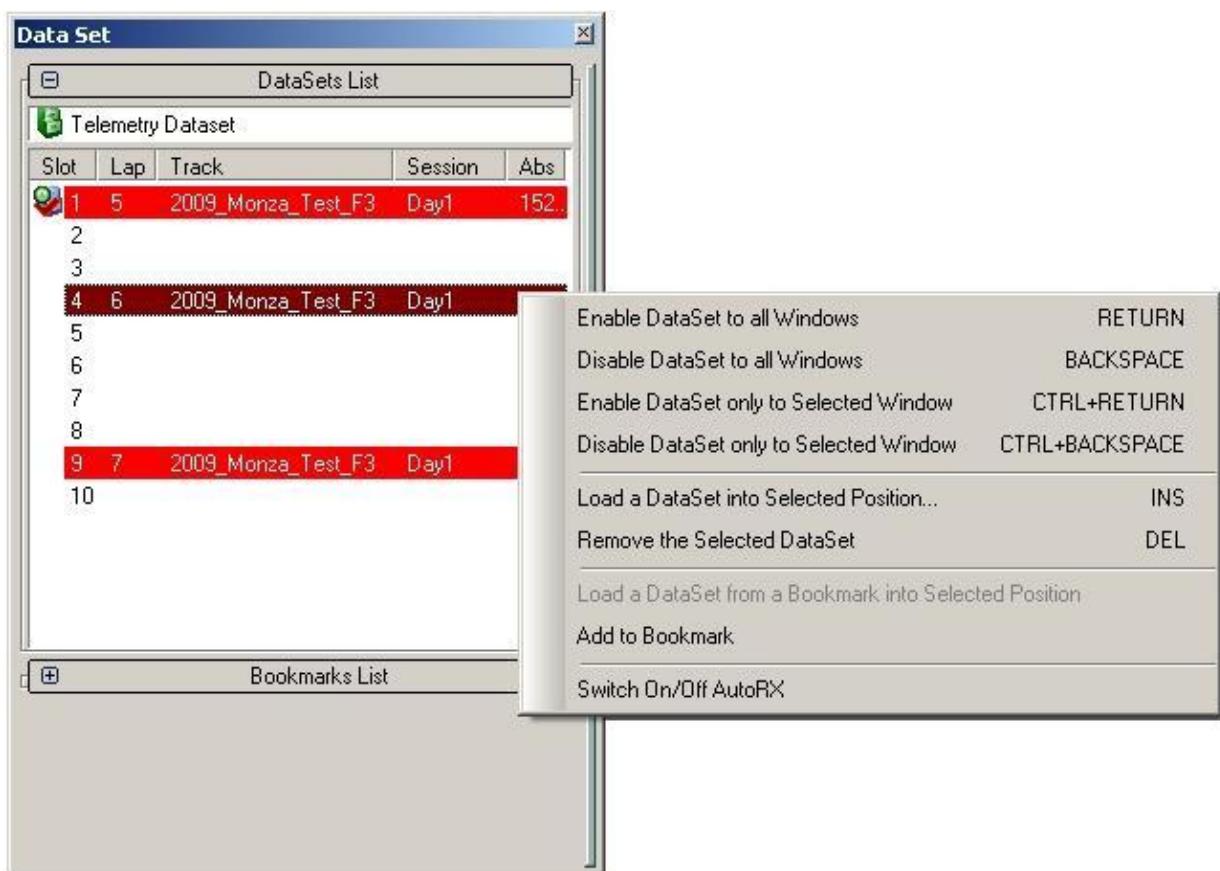
- The arrangement by default places the channels groups arranged by the Setup configuration; in each group the channels are arranged according to the loading order. It's available when the Sort by Name and Sort by Type commands are not checked,
- **Sort by Name** arranges the channels in alphabetical order
- **Sort by Type** arranges the channels in alphabetical order but for each group, keeping the order of the group in the Setup.

Priority Loading

WinTAX allows having more channels with the same name. When a lap is loaded (see Selection and Loading) only one of these channels with the same name appears in analysis windows; the following list of priority determines which kind of channel is shown: logged, constants, information, Ole, virtual channels, conditions, events, aliases, user records. If the channels with the same name also have the same type, WinTAX choose the first channel founded during the search.

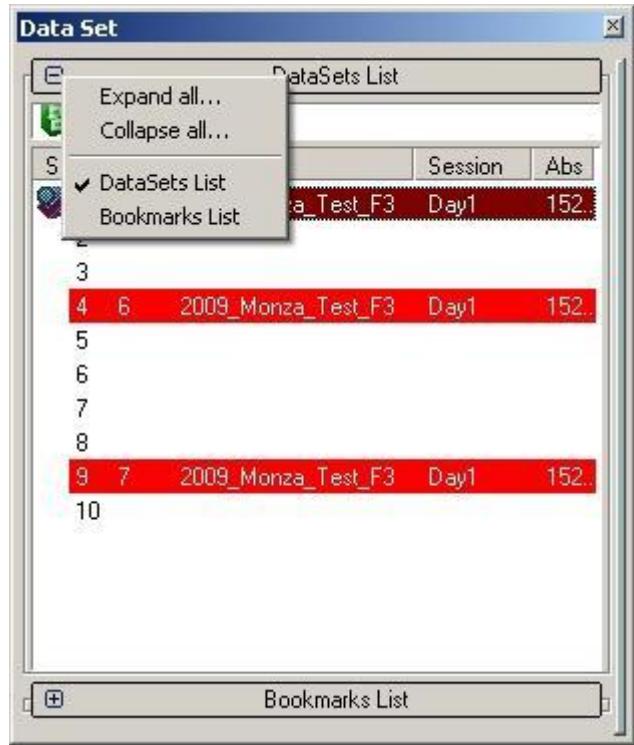
DataSet panel

The Dataset panel is used to control which DataSets are displayed within the various windows of a layout during a working session. It is an interactive control which is used both to see which DataSets are active in a particular window and to enable Datasets to one View/*DataSet Panel*.



The DataSet Panel is formed by the DataSet List section and by the Bookmark List section. The lists can be both expanded or compressed through the button of the corresponding headers.

Also the commands of the pop-up menu can be used.



- **Expand All** Expands both lists
- **Collapse All** Compresses both lists
- **DataSets List** Expands the list if is selected
- **Bookmark List** Expands the list if is selected

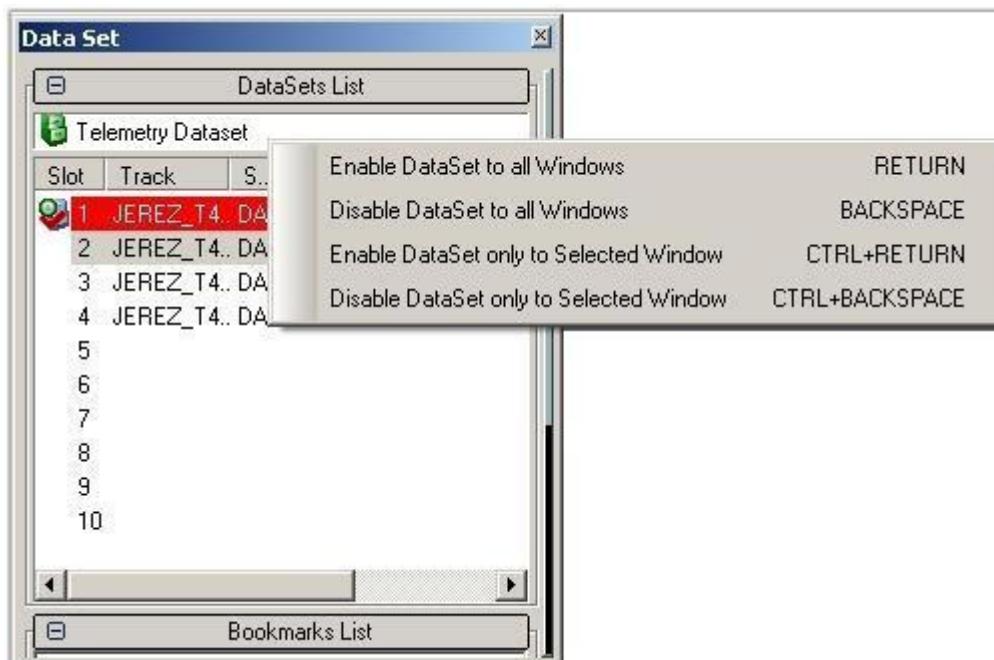
DataSets List

The DataSet List includes the Telemetry DataSet that dragged on a Graph window in PostProcessing, changes it into a Real Time window. Below the Telemetry DataSet there is the list of the DataSets.

Telemetry DataSet

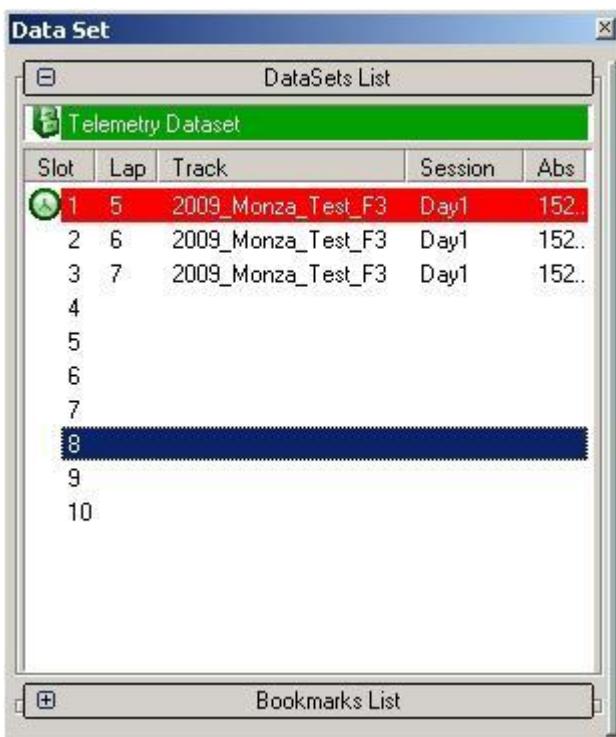
The Telemetry DataSet represents the Real Time stream coming from the Realtime acquisition process

This special DataSet can be used to select which windows are set to display Real Time or PostProcessing data (available for Graph windows). It's located at the top of the Dataset List in the workspace panel. The Telemetry Dataset is connected to standard enable/disable commands and drag&drop into windows. (See the description of available commands in DataSets List)



The RETURN command ('Enable dataset to all windows') can be used as a short-cut to change a post processing layout to real time layout

The background color of the Telemetry Dataset allows you to know when it's connected to a (or more) window



DataSets List

Below the Telemetry there is the header of the list, with headings that can be configured in the DataSet Header Setup.

Then there is the list of the 10 Slots where each line corresponds to a possible DataSet loaded.

The red check mark means that this is the working DataSet and that it is globally active on all windows.

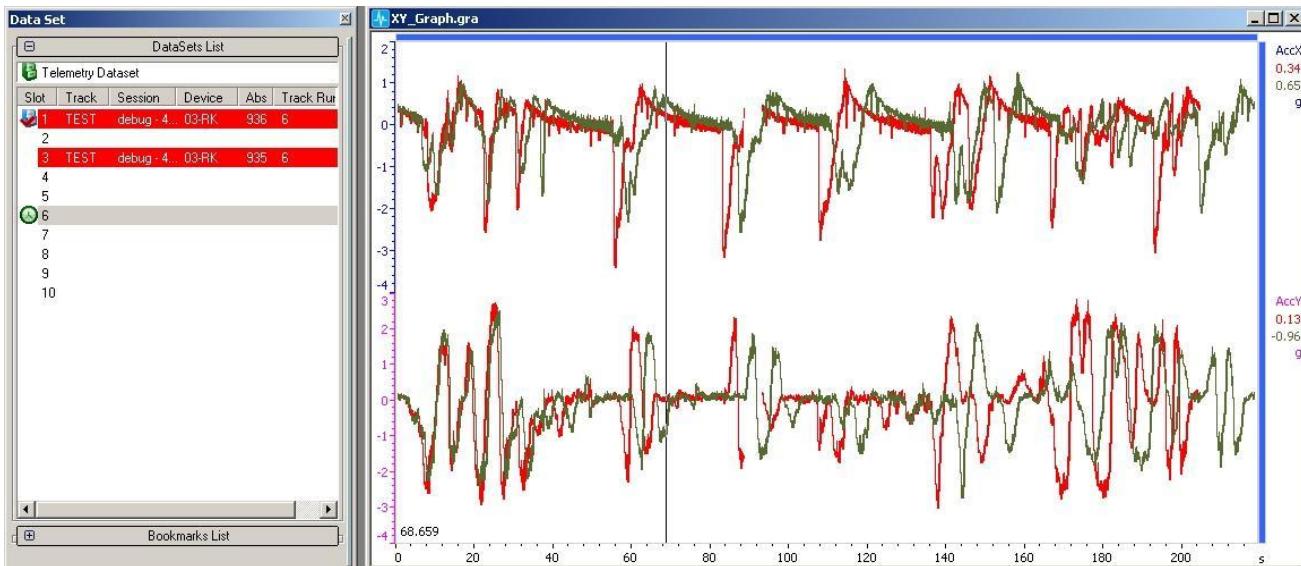
The clock icon means that in AutoRx the lap is loaded on that DataSet.

When the line of the DataSet is red (or brown if the line of the list is selected with the mouse), it means that the DataSet is active on the selected window.

When the line of the DataSet is white (or black if the line of the list is selected with the mouse), it means that the DataSet is not active on the selected window.

This means that the highlights on the list indicate which DataSets are active on the selected window.

In the following example on the Graph window the DataSets available on slot 1 and on slot 3 are displayed and compared. The DataSet on the slot 1 is also valid globally on all layout windows; in case of AutoRx Slot 6 would receive the new lap.



The DataSet can be dragged in drag & drop:

- on the DataSets List to change their position
- on the Bookmark List to save the references
- on the Analysis windows to enable them to that DataSet

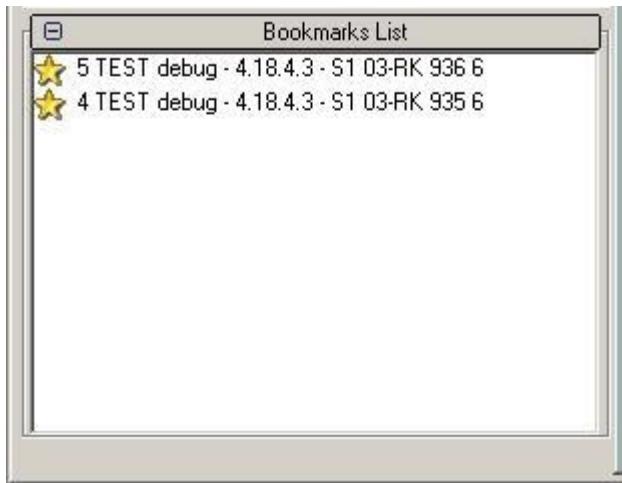
Commands

Click with the right button of the mouse in the Datasets List to see the options.

COMMAND	SHORTCUT	DESCRIPTION
Enable DataSet to all windows	Return	Displays the selected DataSet in all windows
Disable DataSet to all windows	Backspace	Hides the selected DataSet in all windows
Enable DataSet only to selected window	Ctrl + Return	Displays the selected DataSet in the window with the focus
Disable DataSet only to selected window	Ctrl + Backspace	Hides the selected DataSet in the window with the focus
Load a DataSet into selected position	Ins	Allows to return to the Data Browser and select some data to load into the selected DataSet slot
Remove the selected DataSet	Del	Clear the Dataset from memory
Load a DataSet from a Bookmark into Selected Position		Allows to select a DataSet from Bookmark list to be loaded into the selected Dataset slot
Add to Bookmark		Adds the selected DataSet to Bookmark List
Switch on/off AutoRx		Defines which DataSet will be refreshed with the AutoRx function.

Bookmark List

The Bookmarks are references to favorite DataSet that can be loaded by double clicking on the wished bookmark or dragging it with the mouse in a slot.



Bookmarks can be added as follows:

- Through drag & drop from DataSets List
- Through the **Add to Bookmark** command from the pop-up menu opened by clicking with the right button of the mouse on DataSets List
- Through the **Add** command from the pop-up menu opened by clicking with the right button of the mouse on Bookmark List.

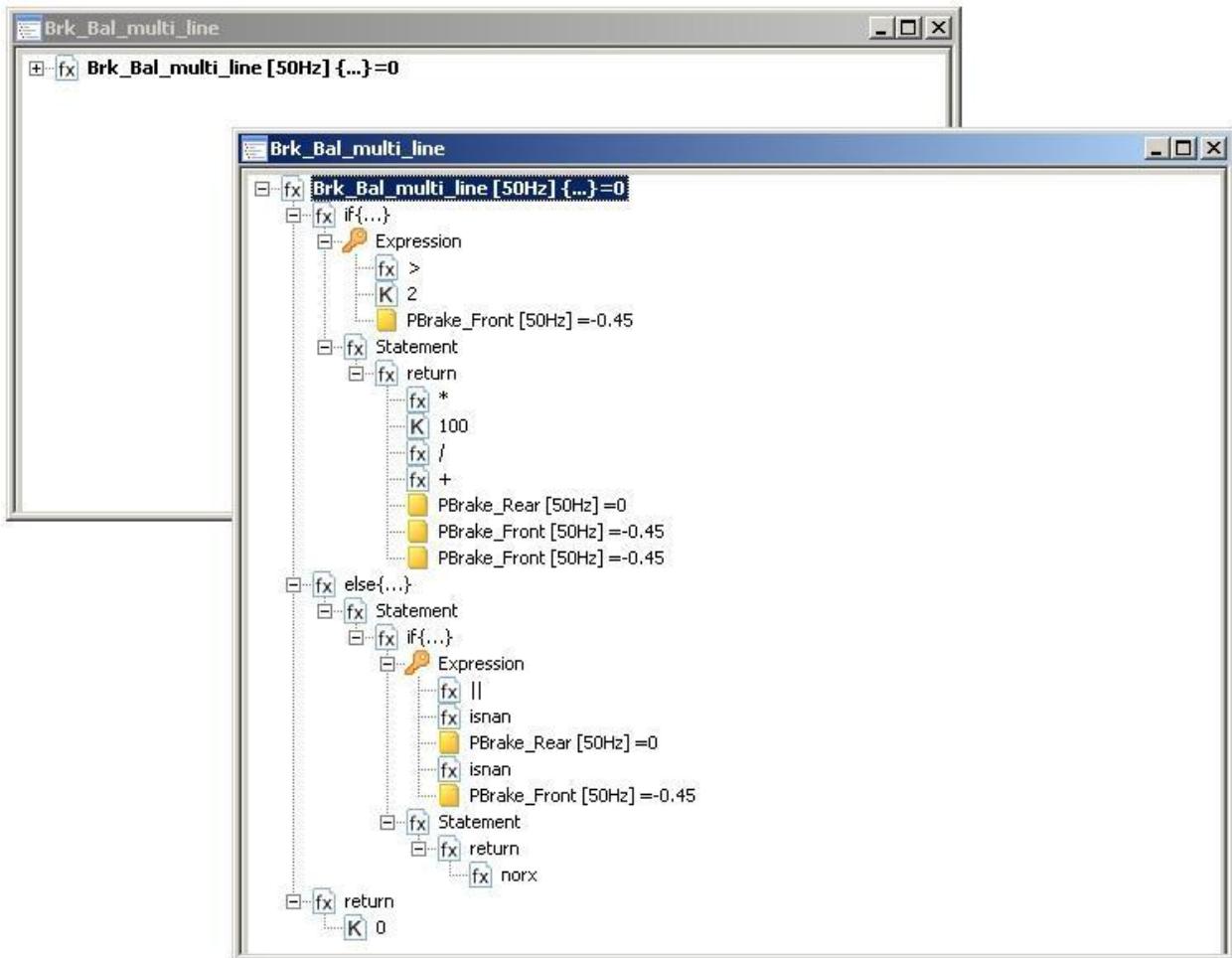
Other commands of the window (with pop-up menu) are:

- **Remove** removes the bookmark cancelling the reference to the dataset
- **Rename** renames the bookmark.

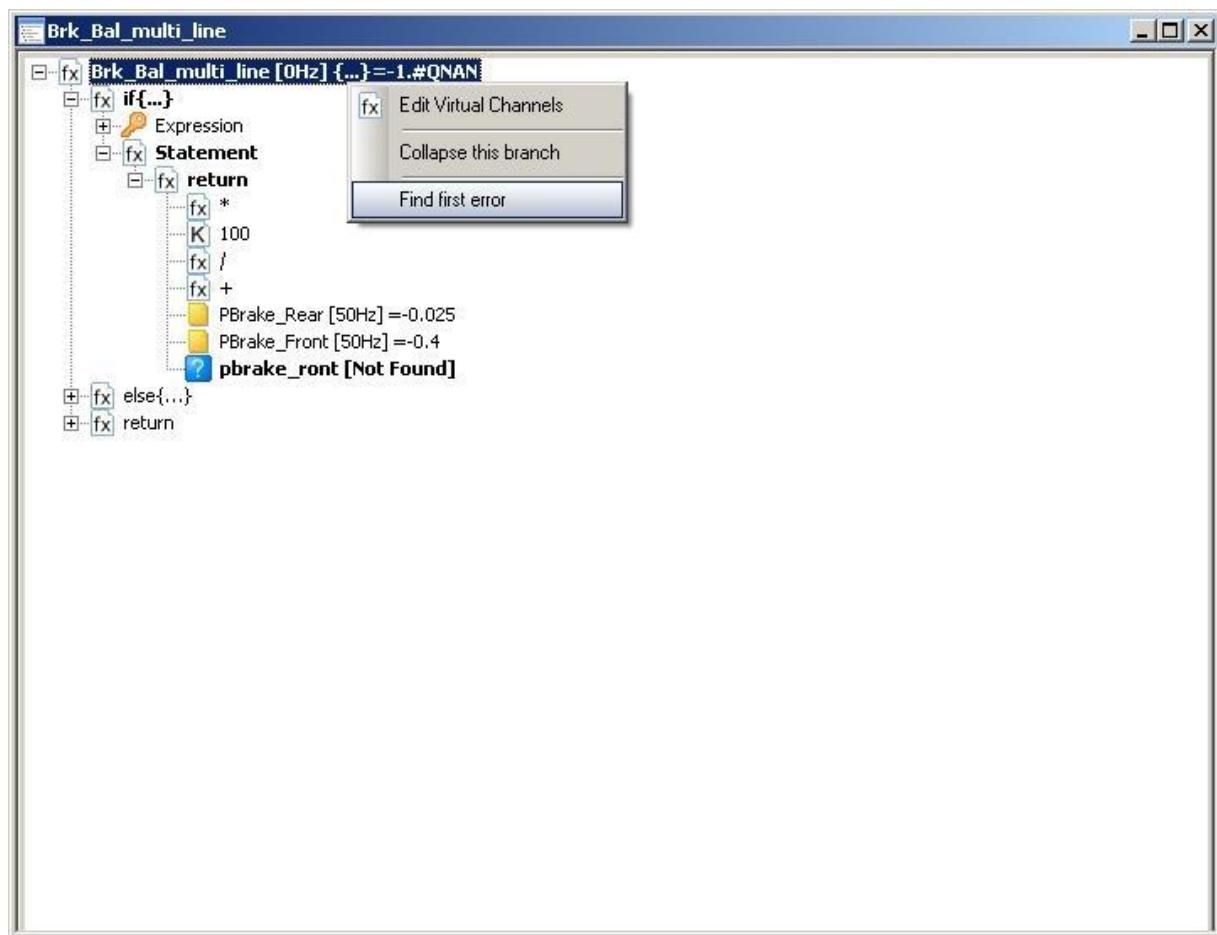
Debug virtual channel window

This is a debugging window that is used to control Virtual Channels and to help find any errors.

1. Open a *Debug Virtual channel* window from View Menu
2. Drop a math channel on it
3. Expand the branches to see intermediate results of composite expressions while moving the cursor within the graphs windows



4. To use this graphical parser to find out why an expression does not calculate, click with the right button of the mouse on the window and select *Find first error*. The tree will be expanded and the cursor positioned on the first sub-expression which returns an error.



To delete a channel use **Delete**

Logging Table

Select *View - Logging table* to view the contents of the logging table associated with

- The currently loaded Datasets (DataSet 1, DataSet 2, DataSet n, ...)
- The Real Time telemetry process (if active)
- Data contained within any *.ztx or *.dls file selected via Menu *Options\Open Custom acquisition table*
- The NBT data stream (if available).

Acquisition Table Content											
DataSet:	2	Channels:	12759	Bytes / Sec:	257886	Acquisition:	Cable A	Trigger Channel:	-	Distance Channel:	
Channel Name		Frequency (Hz)	Decimals	Type	Output Format	Index	Elaboration Type		Elaboration Parameters	Alphabet Name	Alphabet Comment
AccX		200	3	Float	Numeric	105	-		-	-	-
AccXDef	1	0	0	uShort	Numeric	12365	-		-	-	-
AccXDefState	1	0	0	uShort	Numeric	12364	-		-	-	-
AccXEOS	1	3	3	Float	Numeric	7716	-		-	-	-
AccXLapMax	1	3	3	Float	Numeric	7715	-		-	-	-
AccXLapMin	1	3	3	Float	Numeric	7714	-		-	-	-
AccXPreOffset	1	3	3	Float	Numeric	7713	-		-	-	-
AccXRaceMax	1	3	3	Float	Numeric	7712	-		-	-	-
AccXRaceMin	1	3	3	Float	Numeric	7711	-		-	-	-
AccXRaw	1	3	3	Float	Numeric	7710	-		-	-	-
AccXUnfilt	1	3	3	Float	Numeric	7709	-		-	-	-
AccXZeroConfigurable	1	3	3	Float	Numeric	7708	-		-	-	-
AccXZeroOffset	1	3	3	Float	Numeric	7707	-		-	-	-
AccY	200		3	Float	Numeric	104	-		-	-	-
AccYDefState	1	0	0	uShort	Numeric	12363	-		-	-	-
AccYEOS	1	3	3	Float	Numeric	7706	-		-	-	-
AccYLapMax	1	3	3	Float	Numeric	7705	-		-	-	-
AccYLapMin	1	3	3	Float	Numeric	7704	-		-	-	-
AccYPreOffset	1	3	3	Float	Numeric	7703	-		-	-	-
AccYRaceMax	1	3	3	Float	Numeric	7702	-		-	-	-
AccYRaceMin	1	3	3	Float	Numeric	7701	-		-	-	-
AccYRaw	1	3	3	Float	Numeric	7700	-		-	-	-
AccYUnfilt	1	3	3	Float	Numeric	7699	-		-	-	-
AccYZeroConfigurable	1	3	3	Float	Numeric	7698	-		-	-	-
AccYZeroOffset	1	3	3	Float	Numeric	7697	-		-	-	-
AccZ	200		3	Float	Numeric	103	-		-	-	-
AccZDef	1	0	0	uShort	Numeric	12362	-		-	-	-
AccZDefState	1	0	0	uShort	Numeric	12361	-		-	-	-
AccZEOS	1	3	3	Float	Numeric	7696	-		-	-	-
AccZLapMax	1	3	3	Float	Numeric	7695	-		-	-	-
AccZLapMin	1	3	3	Float	Numeric	7694	-		-	-	-

Options Menu

Through the **Options** menu the following commands can be enabled:



COMMAND	DESCRIPTION
Print Acquisition Table	Prints the logging table
Export Acquisition Table	Exports the logging table to a text file
Open Custom Acquisition Table	Opens any *.ztx or *.dls file
Acquisition Type	Selects the type of channels to display of the custom table by <i>Acquisition Type</i>  A small rectangular window containing four options: Acquisition, Dst, Real Time, and Burst, each on a new line.
Properties	

Log Window

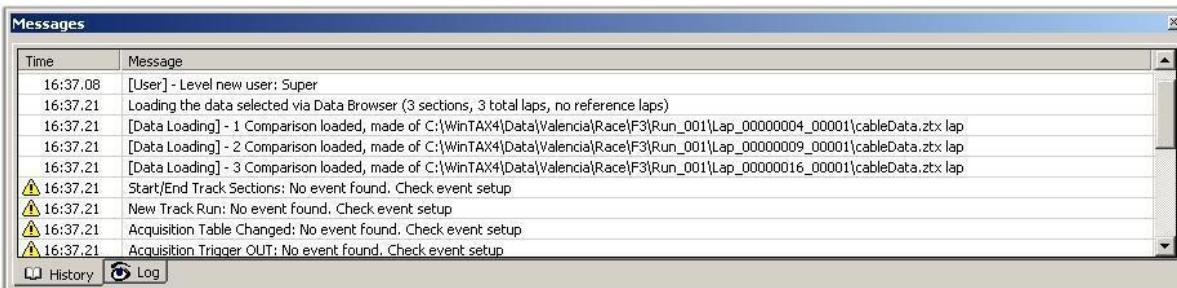
The window can be displayed or hidden through the *View/Log Window* command of the main menu. The window is dockable and can be blocked either on the top or on the bottom of the work window.

Log Window is used by WinTAX to show in real time possible messages linked to the carrying out and the result of some commands, possible events occurred during the management of some functions or messages customized through the scripts.

The window is divided into two sections, the **History** section and the **Log** section. The first section shows in real time the messages linked to the carrying out, the result of some commands, and to the presence of events and other things anyhow connected to the functioning of the program. In the second window the Log section includes all messages written through script using the Application.LogText() function.

By clicking with the right button of the mouse on the Log Window a pop-up menu is enabled containing the following commands:

- **Clear:** All messages on the window are cancelled.
- **Save As:** The list of messages is exported to a text file.



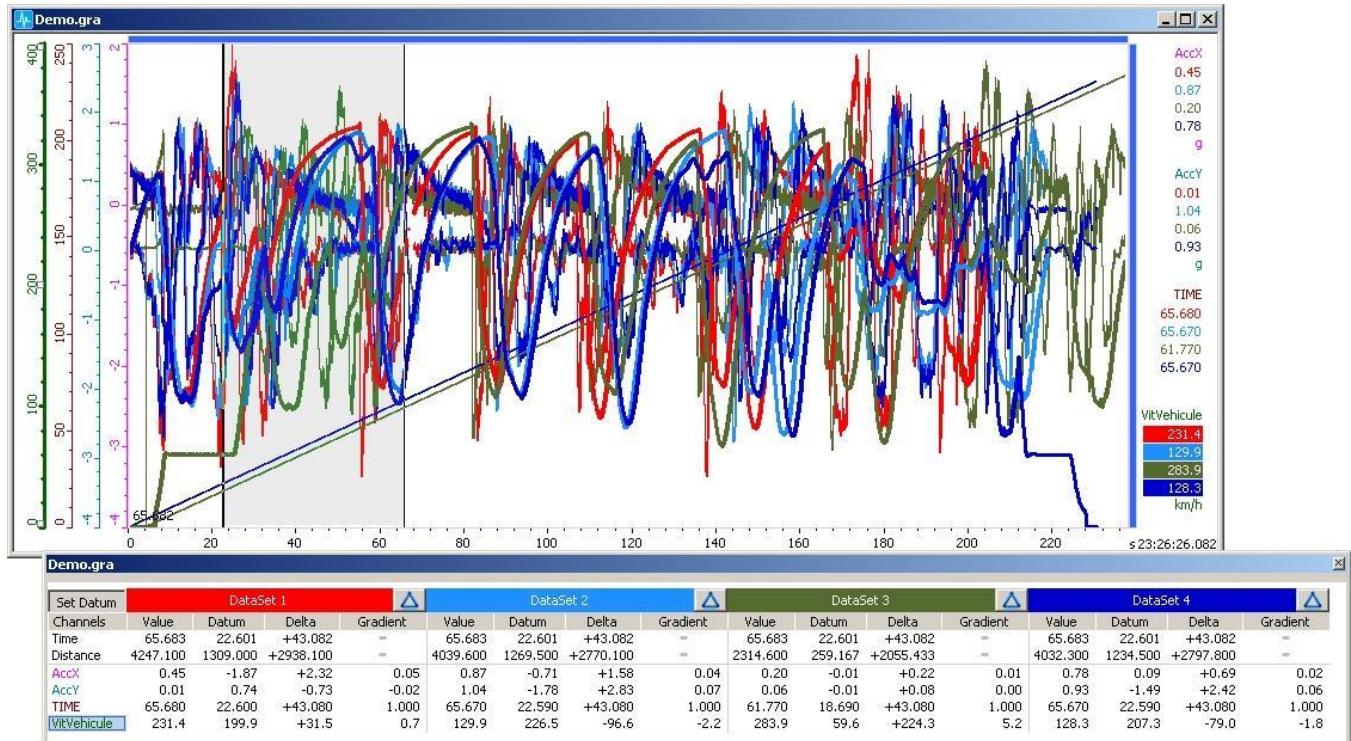
PopUp Legend

The Popup Legend displays in a popup window the values of the channels available on the graph in the moment corresponding to the cursor; the difference between the values and the values available at Datum can also be displayed.

The function can be enabled through the Options menu, or the popup menus displayed by clicking with the mouse on the graphic area or on the channels Info area.

The window also has the following features:

- It's a dockable object
- It allows to calculate the difference (time based and distance based) between the current position of the cursor and a fixed point (Set Datum) and the difference between one Set of Data and all other Set of Data currently loaded in a window.
- It's linked to the Graph window which is currently focused



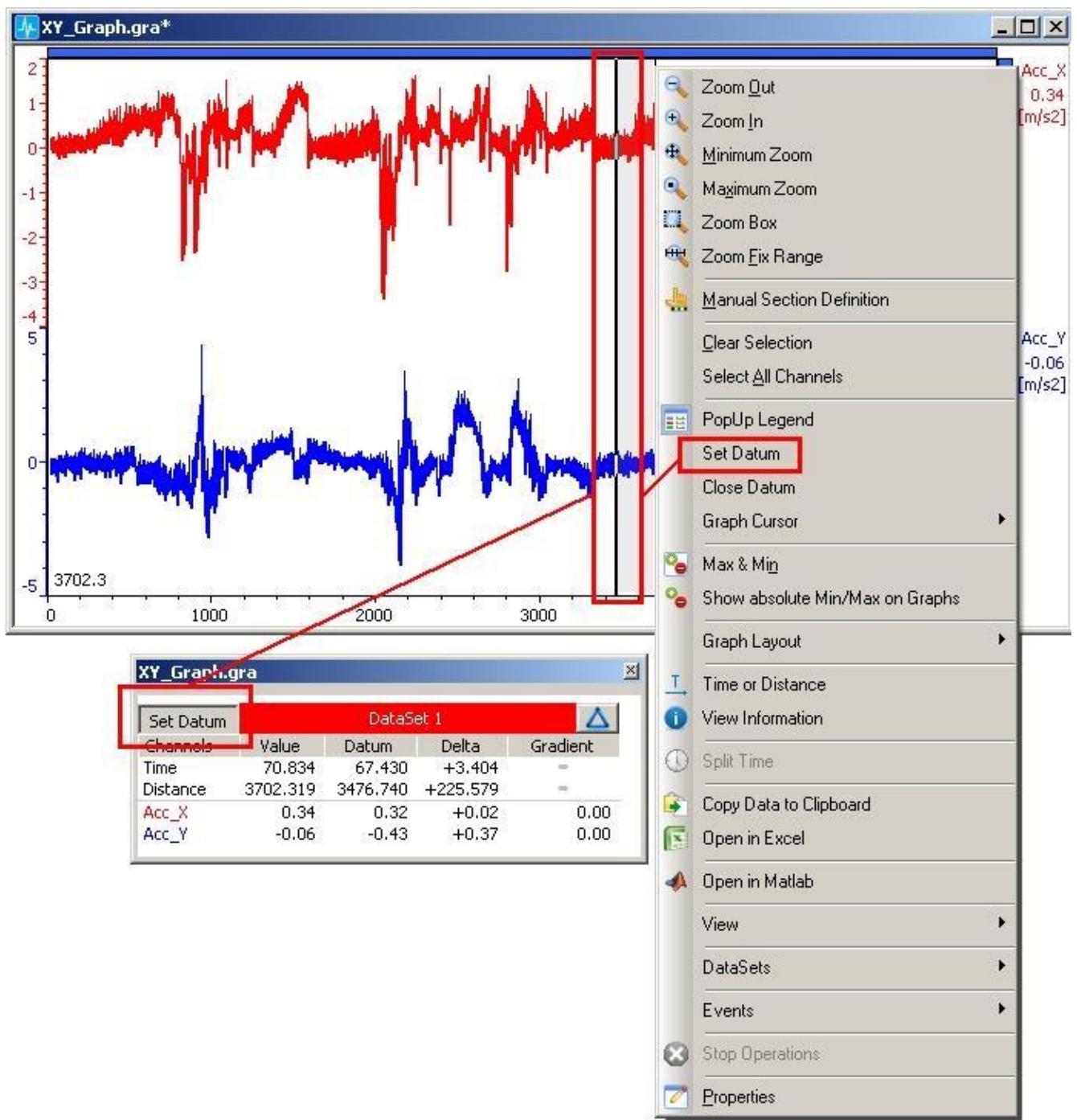
All Graphs

The standard mode for the PopUp Legend is as in the All Graph mode: the window shows for every channel and every DataSet the current position of the cursor (time and distance) and the cursor values.

Demo.gra				
Set Datum	DataSet 1	DataSet 2	DataSet 3	DataSet 4
Channels	Value	Value	Value	Value
Time	65.683	65.683	65.683	65.683
Distance	4247.100	4039.600	2314.600	4032.300
AccX	0.45	0.87	0.20	0.78
AccY	0.01	1.04	0.06	0.93
TIME	65.680	65.670	61.770	65.670
VitVehicule	231.4	129.9	283.9	128.3

Set Datum

To switch to Set Datum mode, simply press the *Set Datum* button or click with the right button of the mouse in the graph window to open the popup menu. When Set Datum is active, the area between the datum and the cursor is grayed.



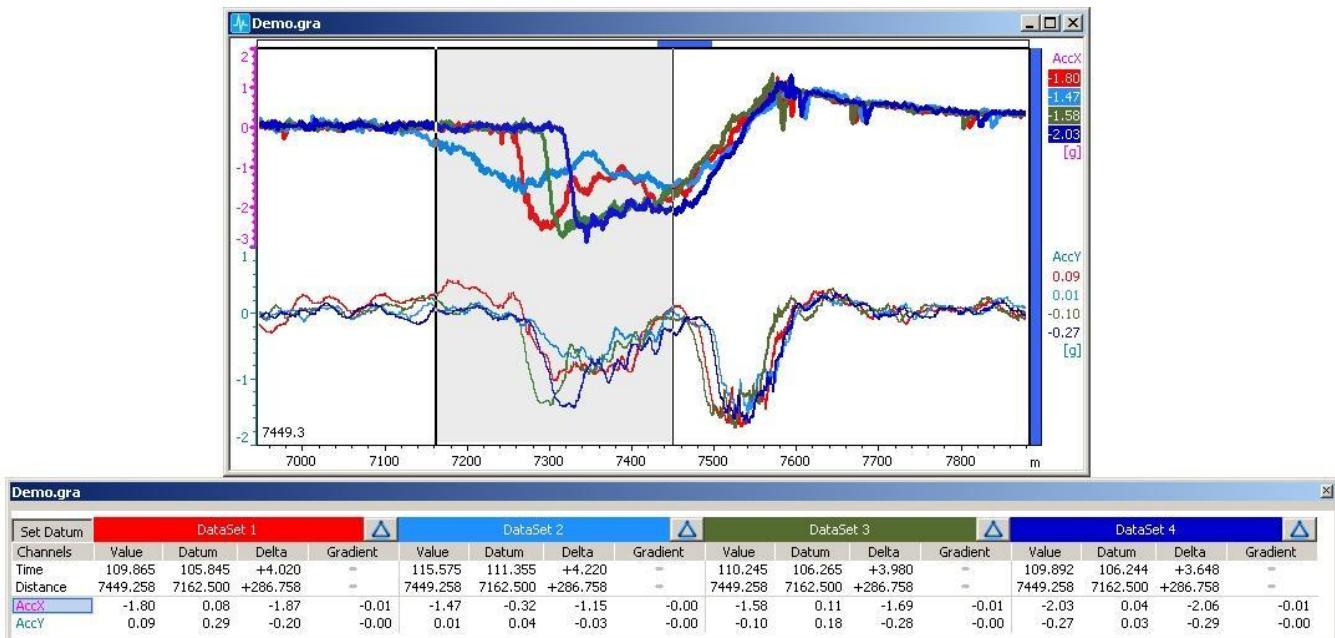
In Set Datum Mode, for each channel and for each Dataset the following values are shown:

Value: The value of the channel in the specified Dataset.

Datum: The value of the channel in the fixed datum.

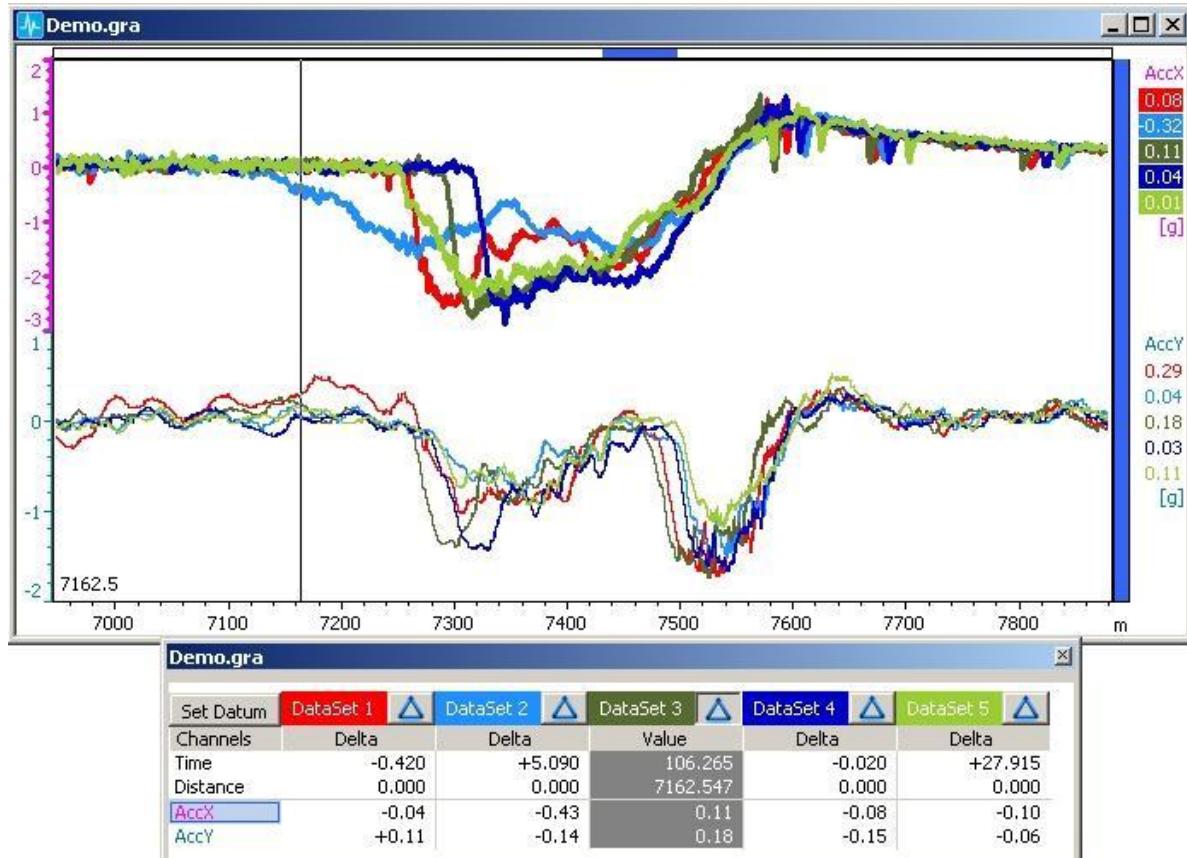
Delta: The difference between the value of the channel in the current position and the value of the channel in the fixed datum.

Gradient: The "difference quotient" between channel value and fixed datum (it is the function difference divided by the point difference).



Delta Mode

The Delta mode allows to calculate the difference between the selected DataSet and the other ones. The user can select which DataSet is the reference for the difference, simply using the Delta button on the header; the reference DataSet will be highlighted on legend window. In the reference DataSet column there are his values; in the other columns there are the differences.



Commands

The main commands available in the PopUp Legend window can be enabled through the

- **Pop-up menu** that can be displayed by clicking with the right button of the mouse in the graphic area of the window.

Pop-up menu

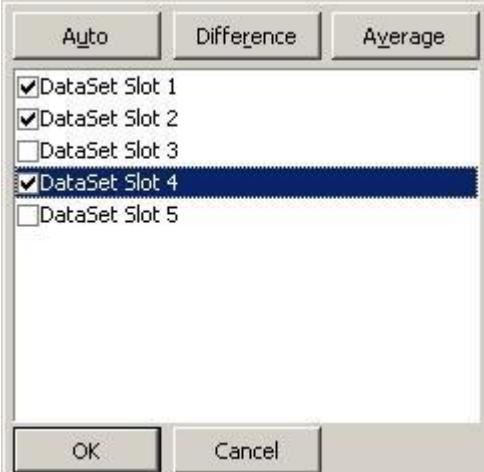
By clicking with the right button of the mouse on the graphic area of the window, the following pop-up menu is displayed.



COMMAND	SHORTCUT	DESCRIPTION
Remove Graphs	Delete	Removes from the window the channels currently selected.
Clear Selection		Clear channels selection in the current window.
Select All Channels	Ctrl + A	Selects all channels in the current window.
Show Graphs	Alt + Ctrl + S	Shows the graphs corresponding to the selected channels.
Hide Graphs	Alt + Ctrl + H	Hides the graphs corresponding to the selected channels

Search	Shift + - Shift + +	Displays the sub menu to select the method to search the absolute Minimum and Maximum points in the curve of the graph of the selected channel. To use the commands, a channel must be selected; the Minimum will place the cursor on the absolute minimum point in the part displayed of the graphs, the Maximum will place the cursor on the maximum point.
Set Datum	D	Set the Datum cursor
Close Datum	Ctrl + D	Close the Datum cursor
Graph Cursor		<p>Displays the sub menu to select the graph cursor (single, multiple, vertical)</p> <ol style="list-style-type: none"> 1. <u>Single</u>. The window displays a cross cursor for the selected channel. 2. <u>Multiple</u>. The window displays a cross cursor for each channel in the window. 3. <u>Vertical</u> (default). The window displays a vertical cursor.
Copy Data to Clipboard	Ctrl + Shift + C	Copies to clipboard of Windows the series of data of the channels configured in the window
Open in Excel	Shift + X	Opens an Excel sheet the with data displayed in the PopUp legend
Open in Matlab		If you select a channel on the PopUp window, you can launch the Open command in MatLab, using the right key or via the Options menu, which you will use to open a Workspace window of MatLab in which the required channel is loaded. On MatLab, the channel appears as an array of double values; with this array, you can carry out all the operations and analyses that MatLab allows you to use. If you repeat the Open in MatLab operation on a number of channels, they will be added to the list of channels in the workspace.
Properties	E	Opens the interface to configure the Graph window

COMMAND	SHORTCUT	DESCRIPTION
Copy Data to	Ctrl + Shift +	Copies to clipboard of Windows the series of data of the

Clipboard	C	channels configured in the window												
Set Comparison...		<p>It opens an interface window for selecting datasets to compare and comparison mode.</p>  <p>Click on each button to enable a comparison mode; the shortcuts are valid only if this window is open.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: #0072BD; color: white;"> <th style="text-align: left;">COMMAND</th> <th style="text-align: left;">SHORTCUT</th> <th style="text-align: left;">DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>Auto</td> <td>U</td> <td>default comparison</td> </tr> <tr> <td>Difference</td> <td>R</td> <td>difference between selected data sets is calculated</td> </tr> <tr> <td>Average</td> <td>V</td> <td>the plotted trace of a Channel represent the average of samples of compared laps. Average is automatically calculated in distance or in time base depending by the setting of x-axis</td> </tr> </tbody> </table>	COMMAND	SHORTCUT	DESCRIPTION	Auto	U	default comparison	Difference	R	difference between selected data sets is calculated	Average	V	the plotted trace of a Channel represent the average of samples of compared laps. Average is automatically calculated in distance or in time base depending by the setting of x-axis
COMMAND	SHORTCUT	DESCRIPTION												
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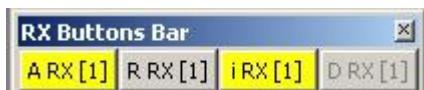
Keyboard Shortcut

Below are listed those shortcuts that do not appear in any of the commands and of the toolbar buttons described before. These commands can be executed only from keyboard. All these commands are not customizable.

SHORTCUT	DESCRIPTION
Space	Opens the popup menu on selected channels.

Rx Buttons Bar

The Rx Buttons Bar is a dockable window in the toolbars area that can be shown or hidden through the *View/Rx command Buttons Bar*.

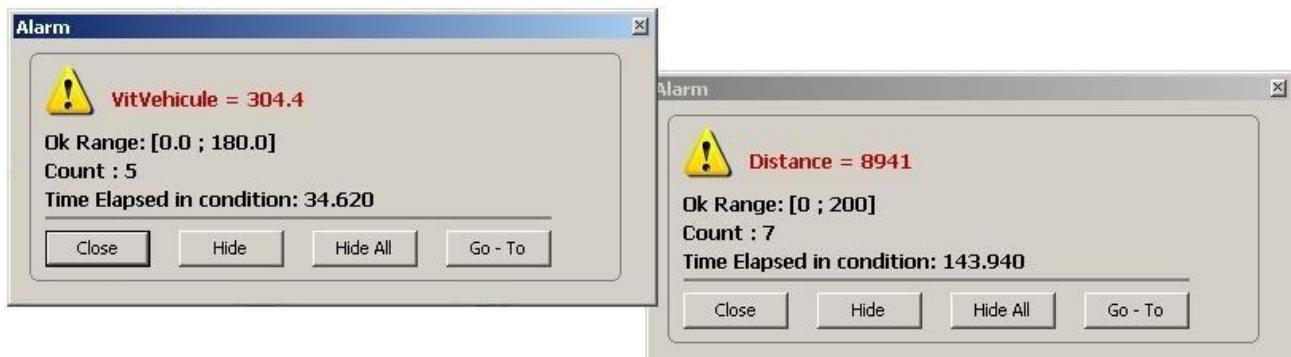


The three buttons in the window enable the quick access to the configuration of three RxTasks.

- **A RX** Enables / Disables AutoRx
- **R RX** Enables / Disables AutoRx Remote
- **i RX** Enables / Disables AutoRx Import Lap
- **D RX** Enables / Disables Intelligent Data Loading (Available only for some licenses)

Popup Alarms

A pop-up window appears for each alarm enabled. A subsequent alarm related to the same channel uses the same window; alarms of different channels open new pop-up windows.



You can do the following for each pop-up window:

Close: it closes the alarms window of that channel; the window will appear again the next time that alarm triggers. If different alarms have already triggered on that channel, each time you press Close, you will go back to the alarm right before it.

Hide: it closes the window concerning the alarms of that channel; when subsequent alarms trigger, it will remain hidden. To re-activate the pop-up window referred to the alarms of that channel, select the Tool – Alarms – View menu from WinTAX and re-activate the hidden alarm.



Hide All: it closes the pop-up windows concerning all the alarms. To re-activate the pop-up windows, proceed in the same way as for the Hide function.

Go - To: it launches a freeze command that blocks the windows and takes the cursor to the alarm selected. Press the button again to restore normal operation.

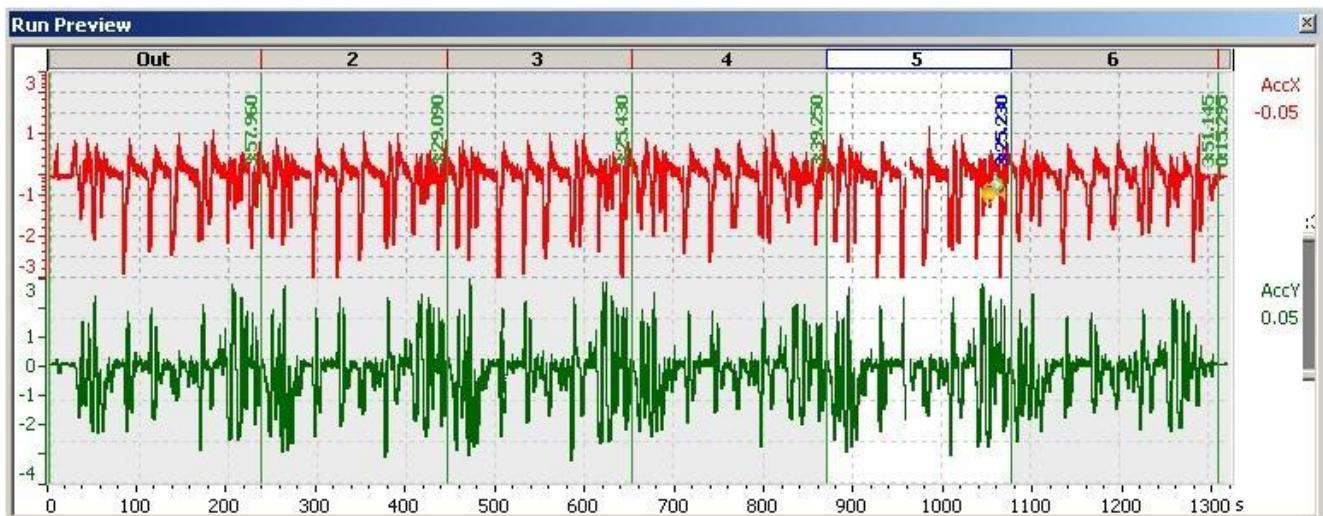
Cars Toolbar

The Car Toolbar is shown or hidden through the View/Car Toolbar command of the main menu. The window is dockable and can be blocked in any of the four sides of the main window. The Car Toolbar is a folder that displays all cars. Besides displaying a list of channels available, its function is to select the main car. The main car will be combined with the WDS Channels to obtain the logged channels for the car selected.

ID	Car Name
01	Red Bull Racing 1
02	Red Bull Racing 2
03	Mc Laren Mercedes 1
04	Mc Laren Mercedes 2
05	Scuderia Ferrari 1
06	Scuderia Ferrari 2
07	Mercedes GP 1
08	Mercedes GP 2
09	Lotus Renault GP 1
10	Lotus Renault GP 2
11	Sauber F1 1
12	Sauber F1 2
13	Force India 1
14	Force India 2
15	Toro Rosso 1
16	Toro Rosso 2
17	Williams F1 1
18	Williams F1 2
19	Lotus 1
20	Lotus 2
21	HRT F1 1
22	HRT F1 2
23	Virgin 1
24	Virgin 2
25	Red Bull Racing
26	Mc Laren Mercedes
27	Scuderia Ferrari
28	Mercedes GP
29	Lotus Renault GP
30	Sauber F1
31	Force India
32	Toro Rosso
33	Williams F1
34	HRT F1
35	Lotus
36	Virgin

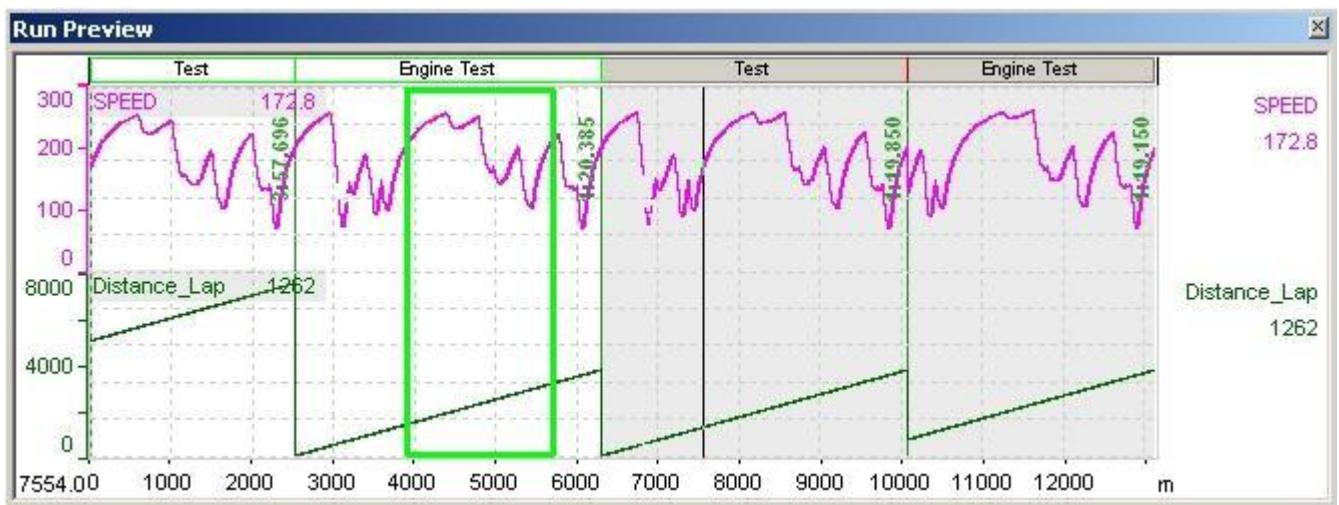
Run Preview

The window can be displayed or hidden through *View/Run Preview* command of the main menu. The window is dockable and it can be resized on demand. The window is like an extended graph window which is able to show channels on the whole run of the selected laps.



Elements of the window

The Run Preview window is divided into areas containing graphic elements (scales, graphs, info boxes).



Graphic area

The graphic area shows the graphs of the configured channels, the cursor of the X axis, the grid of the window and the grids of each channel, the transparent cursors (name and value compared to the position of the cursor), a line with the lap time at the end of each lap and the best lap icon.

The graphs are arranged on the basis of the layout mode: in Parallel they are parallel and not overlapping, in Overlay they share the whole vertical area and the overlap, in Manual they are vertically arranged as set by the user and can be overlapping.

The area corresponding at the laps loaded in WinTAX is white; other laps have a gray background. The zoom on Run Preview window is represented by a green rectangle.

Data Selection Bar

Above the graphic area there is a bar showing the information about the laps of the current run. There is a section for each lap. The bar is predefined and it cannot be configured. Clicking with the mouse on one of these sections, the correspondent lap is loaded on WinTAX. The laps belonging to the current Dataset loaded are highlighted. One or more sections can be selected using the mouse: first select one lap and then, without release the left button, lead the mouse to pass over the required sections.

A Load operation made on the Run Preview Data Selection Bar means actually loading data from the archive (from the local disk or from the network), it is not the same as the operations made on *Interactive Data Header* where the data are already in memory

Y Scale

The Y Scale area shows the scales of values of the configured channels.

The vertical arrangement of the Y scales changes according to the configured layout mode.

X Scale

The X Scale area shows the scales of the times or of the distances covered according to the set a X-Axis mode.

Value of the X Cursor

The X Cursor area displays the current value of the cursor for the X axis.

Channels Information

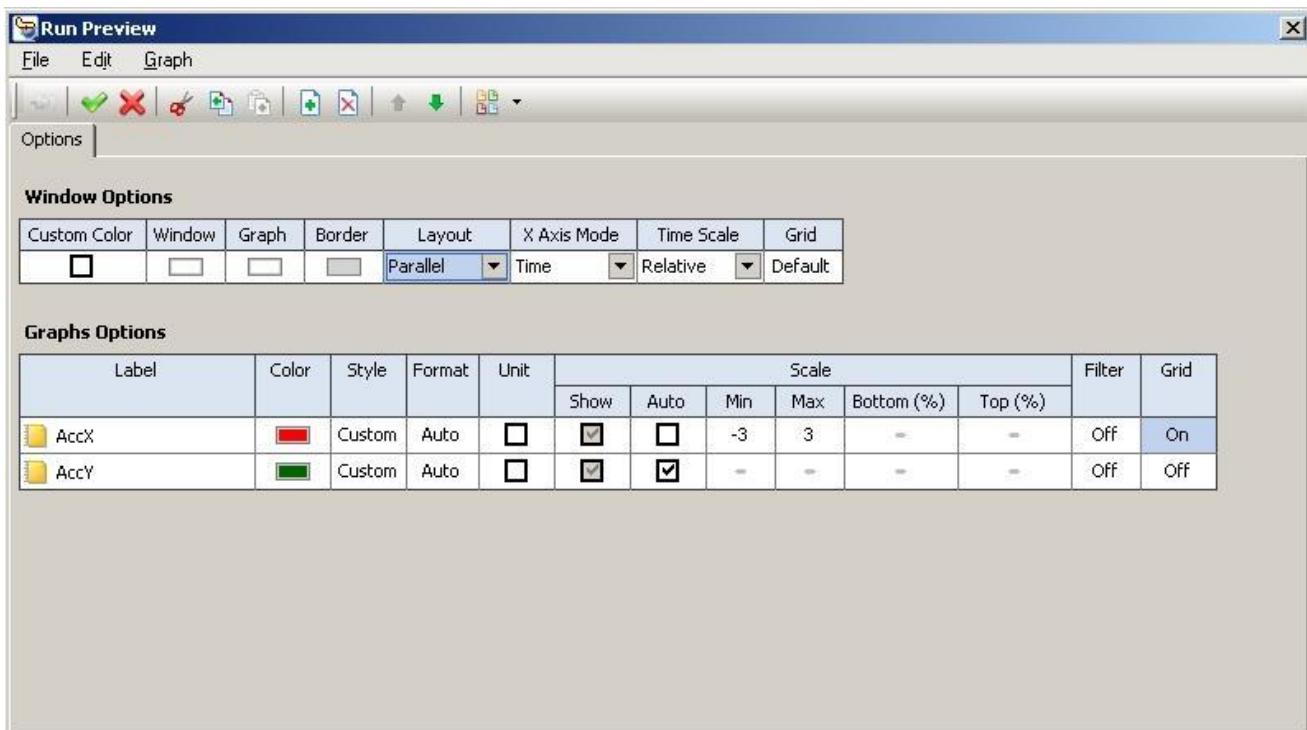
The Channels Information area shows in text boxes the information of the configured channels; name of the channel, value in relations to the current position of the cursor. The same information can be displayed also in the graphic area, on top right in the rectangle dedicated to each channel (Transparent Cursor Values).

Run Preview Configuration window

The **Run Preview Configuration** window allows to configure the aspect of the Run Preview window; it is composed of only one page, Options. The window has also a menu, a toolbar and an integrated pop-up menu that ease the access to the configuration and management of the window itself.

Options Page

The **Options** page enables to configure the graphic aspect of the **Run Preview window** and it is divided into two sections: Window and Graphs.



Window Options

It enables to configure of the layout of the window. Each element of the grid can be edited by double clicking with the mouse or by pressing the space bar.

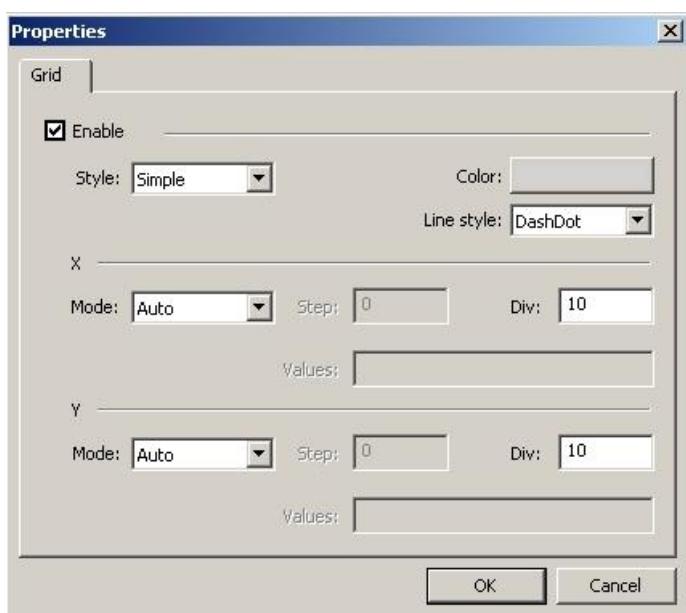
- **Custom color:** enables the setting of the customized colors of the window.

If it is enabled, the colors set in the **Window**, **Graph** and **Border** columns of this section are used for the background of the window, the background and the border of the graphic area.

If it is disabled, the default colors are used that correspond to the settings of the **Color Settings** section, in the **Default Appearance** page of the **General Setup** window (General Settings, general configuration of the WinTAX4 environment).

- **Window:** sets background color of the window.

- **Graph:** sets the background color of the graphic area.
- **Border:** sets the color of the borders of the areas of the window.
- **Layout:** enables to select the vertical arrangement mode of the channels graphs and of the corresponding Y scales (see also: **Layout** function).
 - **Parallel:** the graphic area is divided into rectangles of the same height and the graphs of the channels are arranged in vertical sequence so that they do not overlap.
 - **Overlay:** all graphs share the vertical area available in the graphic area and are overlapping.
 - **Manual:** each graphs can be placed by the user in a portion of the vertical area; the graphs can be overlapping. The vertical coordinates of the rectangle reserved to the channel correspond to the settings of the **Top** and **Bottom** fields of the **Graphs** section.
- **X Axis Mode:** Sets the X axis in the time scale (Time) or in the distance scale (Distance) (see also **X Scale** mode function).
 - **Time:** the X axis displays the scale of times (in seconds).
 - **Distance:** the X axis displays the scale of the distances covered (in meters).
- **Time Scale:** sets the display Time mode for the X scale.
 - **Relative:** The time instant displayed in the values box of the X axis is a relative instant that depends on the length of the lap with initial instant equal to 0.
 - **Absolute:** Absolute not only displays the value of the relative but also shows a box containing the absolute value of the instant of the lap, a value expressed in hh:mm:ss:mmm
- **Grid:** displays the setting to enable the grid common to all graphs of the channels, in the graphic area of the window. To modify the parameter, edit the associated configuration window.



- **Enable:** enables the display of the grid with the customized settings.
- **Style:** sets the style of the grid
 - **Simple:** the grid is formed by continuous lines.
 - **Cross:** the grid is formed by crosses indicating the intersection of the vertical and horizontal divisions.
- **Color:** color of the grid
- **Line style:** sets the style of the line of the grid (valid if the Style Simple is set)
 - **Solid:** continuous line
 - **Dash:** dashed line
 - **Dot:** dotted line
 - **DashDot:** dashed line alternated with 1 dot
 - **DashDotDot:** dashed line alternated with 2 dots

X

- **Mode:** calculation mode of the horizontal divisions
 - **Auto**, shows an automatic number of equidistant divisions.
 - **Off**, no division is displayed.
 - **Fixed**, shows a fixed number of equidistant divisions.
 - **Step**, shows the divisions at fixed intervals equal to the Step value.
 - **Custom**, shows the divisions in correspondence with the values on the X axis set by the user in the text box **Values**.
- **Step:** fixed step to calculate the horizontal divisions (a division each Step), valid if Mode is set to Step
- **Div.:** number of horizontal divisions to be displayed, valid if Mode is set to Auto or Fixed
- **Values:** list of values on the X axis corresponding to the divisions, valid if Mode is set to Custom. The list of values can be directly added in the text box using as division the character ','.

Y

- **Mode:** calculation mode of the vertical divisions
 - **Auto**, shows an automatic number of equidistant divisions.
 - **Off**, no division is displayed
 - **Fixed**, shows a fixed number of equidistant divisions

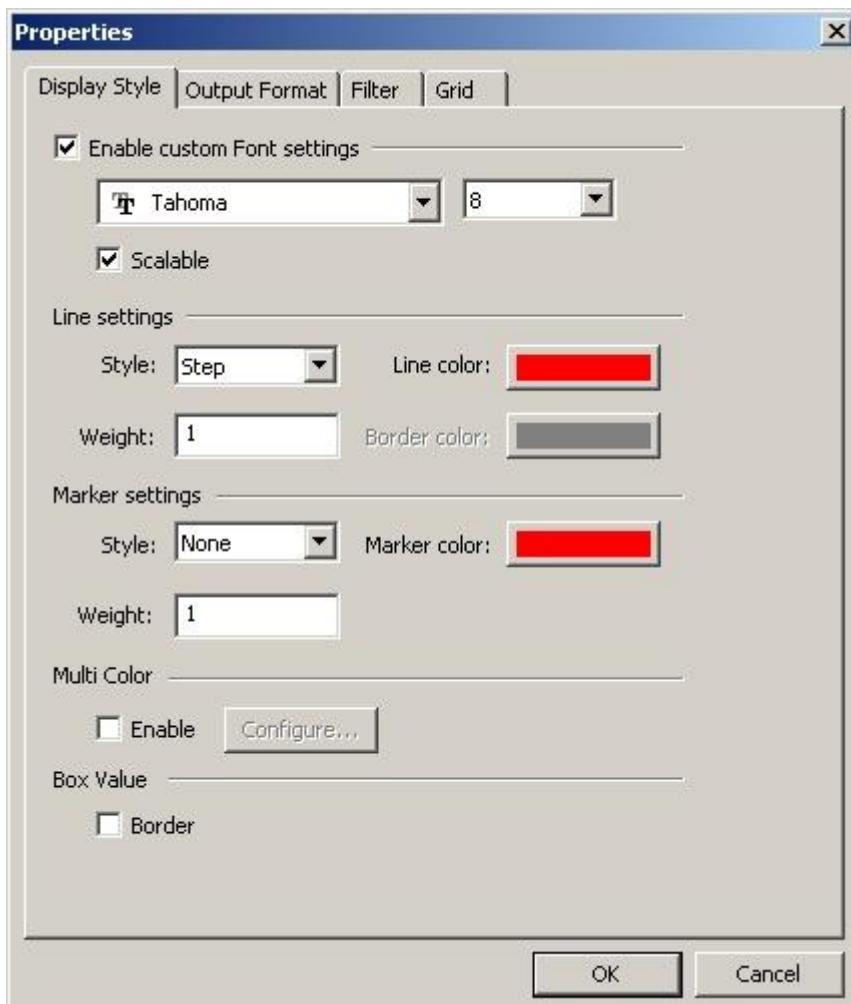
- **Div.:** number of vertical divisions to be displayed, valid if Mode is set to Auto or Fixed

If the window grid is disabled, the settings of the **Default Grid** in the **Default Appearance** of the **General Setup** window (General Settings, general configuration of the WinTAX environment), are valid.

Graphs Section

Enables to configure the settings specific for each channel of the window. Each line identifies a configured channel, while the columns identify the fields to be configured. Each element of the grid can be edited by double clicking with the mouse or by pressing the space bar. Multiple sections are possible through the CTRL and SHIFT keys

- **Label:** shows the name of the channel. The name of the channel can be edited and can become a math expression if the sign = comes first.
- **Color:** shows the color of the channel or markers graph. To modify the setting, edit the channel by opening the Channel Properties window where fonts and styles can be configured.
- **Style:** shows the style of the channel graph. To modify the setting, edit the channel by opening the display Style page where fonts and styles can be configured.



Enable custom font settings: enable/disable the custom font

- **Family Font:** sets the type of font.
- **Font Dimension:** sets the size of font.
- **Scalable:** enables the adapting of the font size regarding to the window size.

Line settings

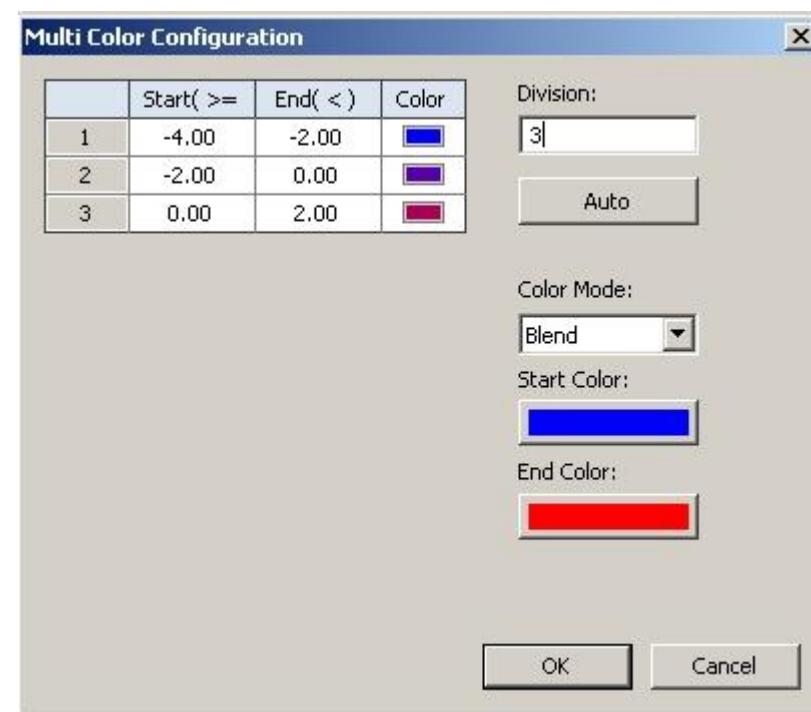
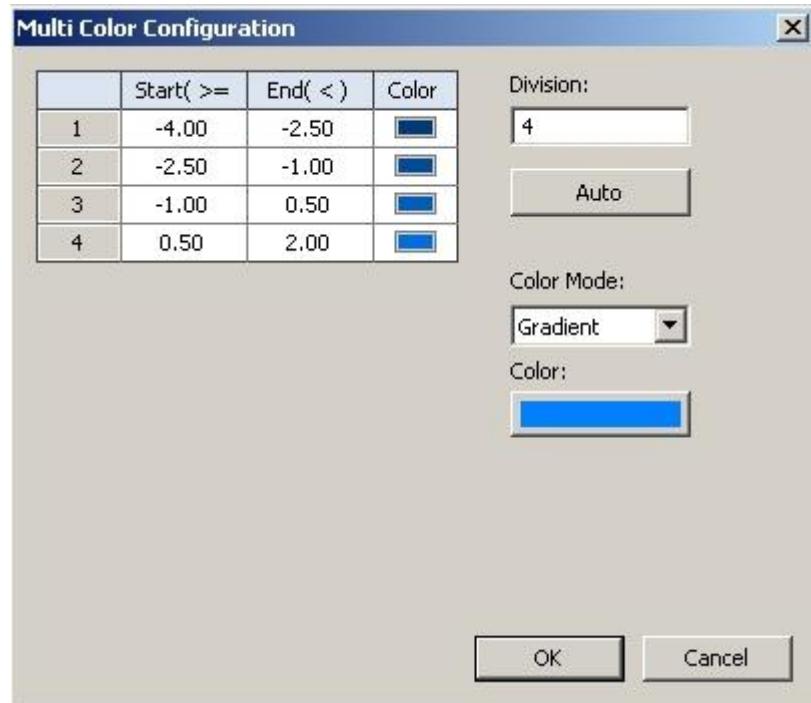
- **Style:** sets the style of the graphs line
 - **None:** no line is drawn
 - **Line:** continuous line
 - **Step:** stepped line
 - **Fill Down:** continuous line with colored bottom area
 - **Fill Up:** continuous line with colored top area
 - **Bordered:** continuous line with border
- **Weight:** sets the depth of the line in pixel.
- **Line color:** sets the line color.
- **Border Color:** color for the line border

Marker Settings

- **Style:** style of the markers, graphic elements used to represent the marker.
 - **None:** no markers are drawn
 - **Dots:** dot
 - **Cross:** cross
 - **Rhomboid:** rhomboid
 - **Square:** square
 - **Arrow Down:** arrow downwards
 - **Arrow Up:** arrow upwards
 - **Vert Line:** vertical line
 - **Horz Line:** horizontal line
- **Weight:** size (depth) of the markers in pixel.
- **Marker color:** color of the markers.

Multi Color

- **Enable:** enable the multicolor settings
- **Configure:** open the multicolor configuration window



Division: number of colored bands. The value must be included between 1 and 4. Changing the value of division, the start-end-color

grid redraws the number of rows configured. In the rows it's possible manually configure the values or recalculate it

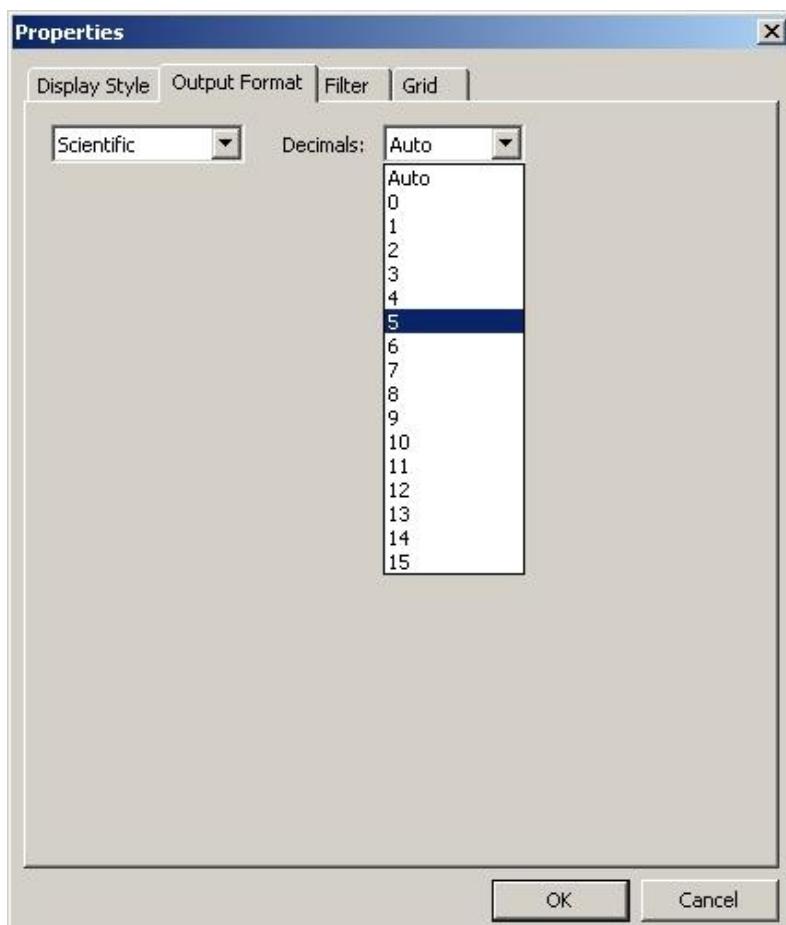
Auto: calculate steps value using Start of the first row and End of the last row as fixed values.

Color Mode: In the rows of the start-end-color grid it's always possible to manually configure the colors. Otherwise color can be sets with color mode combo.

- If **Manual** is selected, the window generate a group of default colors.
- If **Gradation** is selected, the button **Color** is used to choose the base color of gradation.
- If **Blend** is selected, the buttons **Start color** and **End color** are used to choose the start and the end colors of blend.

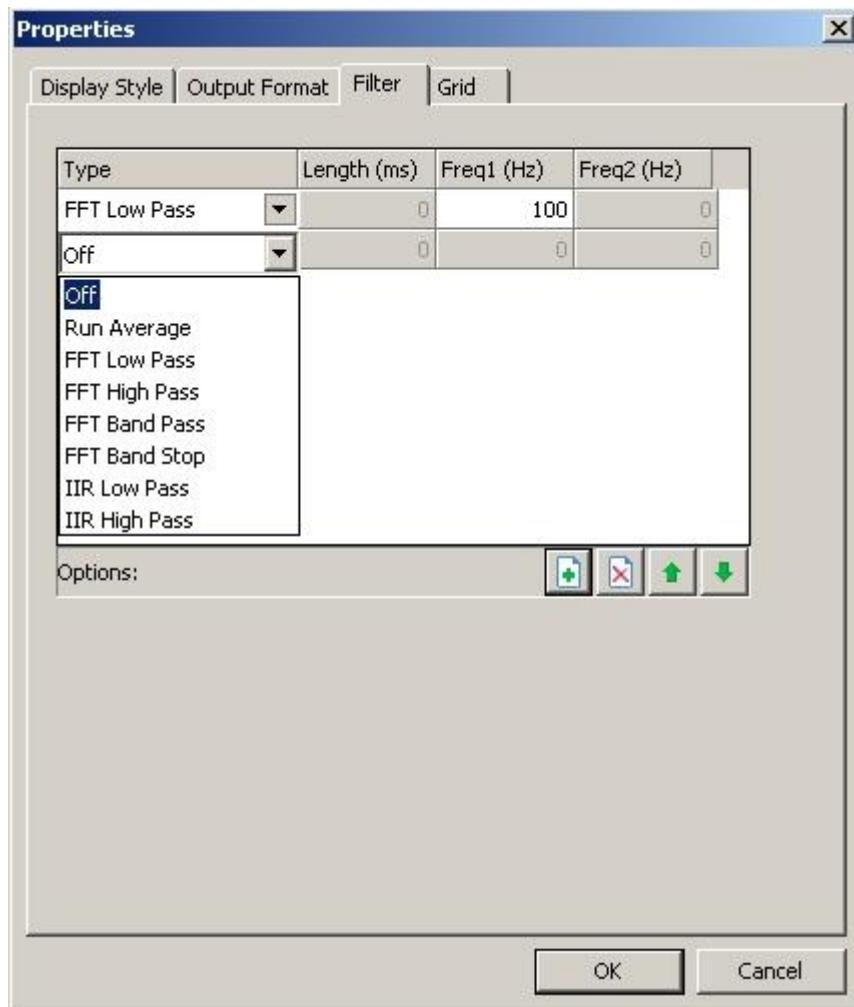
Box Value

- **Border:** show the outline border of cursor value.
- **Format:** displays the style to show the current channel value. To modify the setting, open the configuration window that enables to configure the setting for the display format of the channel values.



In the combo on the left the numeric format is selected, in the combo on the right, the number of decimals is selected. Please find to follow the list of possible formats

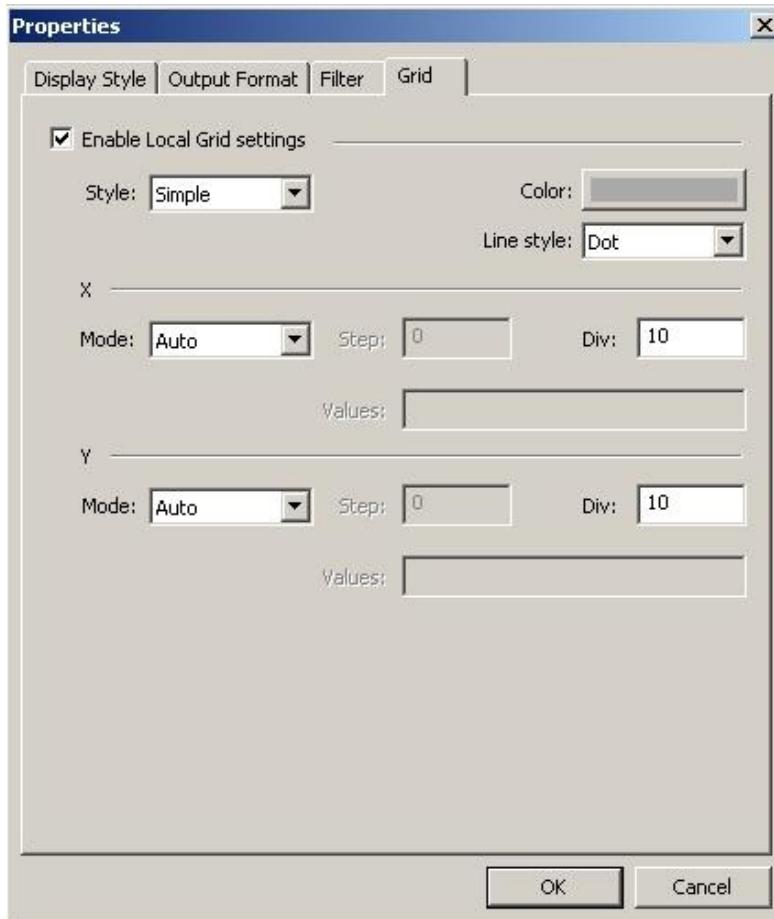
- **Auto:** the format is kept unchanged
- **Dec:** the decimal format allows max 5 digits after the comma.
- **Numeric:** the numeric format allows max 15 digits after the comma.
- **Scientific:** the scientific format allows max 15 digits after the comma; the result is written in exponential form.
- **Hex:** hexadecimal format; the decimals cannot be configured.
- **Bin:** binary format; the decimals cannot be configured.
- **ASCII:** text format; the decimals cannot be configured.
- **Unit:** Enables to display the measurement unit of the channel.
- **Scale**
 - **Show:** show/hide the scale Y. In Run preview is always enabled.
 - **Auto:** Enables to automatically display the Y scale.
 - **Min:** Sets the minimum value of the channel.
 - **Max:** Sets the maximum value of the channel.
 - **Bottom (%):** Sets the vertical arrangement of the graph in the vertical area (Bottom).
 - **Top (%):** Sets the vertical arrangement of the graph in the vertical area (Top).
- **Filter:** Shows the settings on the filters applied to the channel. To modify the setting, open the configuration window.



The filters can be added, removed or moved through the buttons on the Options bar. The filters available are:

- **OFF:** Channel values are displayed as logged
- **Run Average:** Applies a moving average filter to the channel. Filter length is defined in milliseconds. If set to zero, the filter is not calculated.
- **FFT filters** applies a combination of frequency domain filters to the channel. The frequency content of the signal in the range(s) defined by the cut-off frequency is set to zero and the data is reconstructed in the time-domain. The four types available are:
 - **FFT Low Pass:** maintains frequency content below the cut-off freq. Freq1
 - **FFT High Pass:** maintains frequency content above the cut-off freq. Freq1
 - **FFT Band Pass:** maintains frequency content in the range Freq1 < frequency < Freq2

- **FFT Band Stop:** eliminates frequency content in the range $\text{Freq1} < \text{frequency} < \text{Freq2}$
- **IIR Low Pass:** Infinite Impulsive Response Low Pass filter is a recursive filter that maintains frequency content below the cut-off frequency
- **IIR High Pass:** Infinite Impulsive Response High Pass filter is a recursive filter that maintains frequency content above the cut-off frequency
- **Grid:** displays the setting to enable the grid specific of the rectangle of the graphic area reserved to the channel. The window enabling the grid and the configuration of the parameters is the following:



- **Enable Local Grid Settings:** enables to display the grid with the customized settings.
- **Style:** sets the style of the grid
 - **Simple:** the grid is formed by continuous lines.
 - **Cross:** the grid is formed by crosses indicating the intersection of the vertical and horizontal divisions.
- **Color:** color of the grid
- **Line style:** sets the style of the grid line (valid if Style Simple is set)
 - **Solid:** continuous line

- **Dash:** dashed line
- **Dot:** dotted line
- **DashDot:** dashed line alternated with 1 dot
- **DashDotDot:** dashed line alternated with 2 dots

X

- **Mode:** calculation mode of the horizontal divisions
 - **Auto**, displays an automatic number of equidistant divisions.
 - **Off**, no division is displayed
 - **Fixed**, displays a fixed number of equidistant divisions
 - **Step**, displays the divisions at fixed intervals equal to the Step value.
 - **Custom**, displays the division in correspondence with the values on the X axis set by the user in the info box **Values**.
- **Step:** fixed step to calculate the horizontal divisions (a division for each Step), valid if Mode is set to Step
- **Div:** number of horizontal divisions to be displayed, valid if Mode is set at Auto or Fixed
- **Values:** list of values on the X axis corresponding to the divisions, valid if Mode is set at Custom. The list of values can be added directly in the text box, using as division the character ';'.

Y

- **Mode:** calculation mode of the vertical divisions
 - **Auto**, displays an automatic number of equidistant divisions.
 - **Off**, no division is displayed
 - **Fixed**, displays a fixed number of equidistant divisions
 - **Step**, displays the divisions at fixed intervals equal to the Step value.
 - **Custom**, displays the division in correspondence with the values on the Y axis set by the user in the info box **Values**.
- **Step:** fixed step to calculate the vertical divisions (a divisions for each Step), valid if Mode is set to Step
- **Div:** the number of vertical divisions to be displayed, valid with Mode set at Auto or Fixed
- **Values:** list of values on Y axis corresponding to the divisions, valid with Mode set at Custom. The list of values can be added directly in the text box, using as division the character '.'.

Menu

The menu of the **Run Preview window** allows the access to the following commands, divided in sub menus:

File Menu

Apply	Applies the current settings of the Run Preview window
Cancel	Closes the window without applying the current settings to the configuration of the Run Preview window

Edit Menu

Cut	Copies to clipboard the configurations of the channels selected in the list of the Graphs section and it removes them from the list of the Graphs section.
Copy	Copies to clipboard the configurations of the channels selected in the list of the Graphs section
Paste	Pastes the configurations of the channels available in clipboard adding them to the list of the Graphs section

Menu Graph

Add Graph	Adds a new element to the Graphs list of channels configurations
Remove Graph	Removes from the Graphs list the configurations of the selected channels
Move Up	Moves up by one position the selected elements in the Graphs list
Move Down	Moves down by one position the selected elements in the Graphs list

Toolbar

The toolbar of the **Run Preview window** allows the access to the following commands:

Keep Visible	This button is disabled.
Apply	Applies the current settings to the configuration of the graphic window (similar to the Apply command of the File menu)
Cancel	Closes the configuration window without applying the settings (similar to the Cancel command of the File menu)
Cut	Similar to the Cut command of the Edit menu
Copy	Similar to the Copy command of the Edit menu
Paste	Similar to the Paste command of the Edit menu
Add	Similar to the Add Graph command of the Graph menu
Remove	Similar to the Remove Graph command of the Graph menu
Move Up	Similar to the Move Up command of the Graph menu
Move Down	Similar to the Move Down command of the Graph menu
Channel Browser	Displays the pop-up menu to select the page in the Channel Browser window



Pop-up Menu

The pop-up menu of the **Run Preview window** can be displayed by clicking with the right button of the mouse on the Options page.

The pop-up menu of the **Run Preview window** allows the access to the following commands:

Cut	Similar to the Cut command of the Edit menu
Copy	Similar to the Cut command of the Edit menu
Paste	Similar to the Paste command of the Edit menu
Add Graph	Similar to the Add Graph command of the Graph menu
Remove Graph	Similar to the Remove Graph command of the Graph menu
Move Up	Similar to the Move Up command of the Graph menu
Move Down	Similar to the Move Down command of the Graph menu
Edit	Edit the selected element of the grid.

Functions

The Run Preview window has the following functions:

- Cursor
- Layout
- Zoom
- Rectangles selection in the graphic area
- Channels selection
- X Scale Mode
- Manual Range
- Lap Selection

The **Run Preview window** moreover have a function that can be performed interacting with the other windows displayed:

- Auto Connect Zoom: the position of the zoom is automatically updated in all the displayed windows whenever the position of the zoom in the current Run Preview window changed and vice versa. The zoom is bidirectional connected only if in Setup/General the auto connect zoom flag is set. If this flag is off Run Preview Window can update the zoom of the other windows but cannot be update by them.

Cursor

The cursor is the vertical line displayed in the graphic area that enables to scroll all values in the range of the X-axis, updating the corresponding values of the channels in the info boxes.

The cursor can be moved along the X-axis in one of following ways.

- Moving the mouse in the graphic area while the left button is pressed.
- through the arrow keys of the keyboard (right and left arrow key).

The step of the cursor can be configured using shift + arrow keys up and down. The minimum value is 0.001s and the maximum 50s.

Graph Layout

The Graph Layout function enables to change the aspect of the graphic window and especially the vertical arrangement of the graphs and of the Y scales.

It can be enabled through the Graph Layout command of the Options menu, of the popup menu and of the button on the toolbar, selecting one of the suggested modes:

Parallel	The vertical space is divided for the number of channels configured; the graphs and the scales of the channels are vertically arranged without overlapping
Overlay	The configured channels share the vertical space; the Y scales are horizontally arranged side by side, the graphs overlay.
Manual	<p>The graphs and the Y scale corresponding to the channels are vertically arranged based on the settings of the user in the Top and Bottom fields that can be changed through the configuration window in the Graphs section.</p> <p>To quickly configure the graphs, just select with the mouse the channel to highlight the selection squares allowing to drag the graph along the vertical axis or allowing to enlarge or reduce the space covered.</p>

Zoom

The zoom doesn't enlarge the graphic area to display in higher or smaller details the channels graphs as in Graph Window; in Run Preview window the zoom identify a square rectangle that encloses the area which will be zoomed in the other windows.

The only zooming available is **Horizontal Zoom** refers to an interval of the X-axis.

There are different ways to zoom and to move the area displayed in details

- **manual selection of a zoom rectangle in the graphic area.**

Select a rectangle of the graphic area with the mouse or the keyboard. Select Zoom in the Popup menu displayed by clicking with the right button of the mouse.

- **Zoom In, Zoom Out, Zoom Min, Zoom Max** commands in pop-up menu.

- **Zoom In:** Zooms horizontally the graphic area in relation to the X-axis; the interval around the current position of the cursor is also displayed.
- **Zoom Out:** Opposite operation compared to Zoom In, the graphic area is displayed in lower detail with reference to the interval of the X-axis around the current position of the cursor.
- **Zoom Min:** Zooms the graphic area in relation to the X-axis, in maximum details, with reference to the current position of the cursor.
- **Zoom Max:** The graphic area is displayed in comparison with the whole extent of the X-axis; it corresponds to the minimum details (100%) and it is the default setting when the graphic windows are opened to be displayed.

- **Zoom Fix Range**

The Zoom Fix Range can be enabled through the popup menu of the Zooks horizontally the graphic area, displaying the interval around the current position of the cursor for a fixed interval whose value set in the Zoom Fix field (Time to Distance according to the mode of the X scale) of the General Options of the General Setup window.

- **Pan**

The Pan mode allows to shift the displayed zoom area using the mouse or the keyboard.

The Pan mode is automatically enabled when mouse is over the zoom area. The cursor of the mouse is displayed as hand-shaped..

To shift the displayed zoom area, move the mouse pressing the left button.,.

To exit the Pan mode, just release the left button of the mouse

Selection of rectangles in the graphic area

To select rectangles in the graphic area, proceed as follows: drag the mouse while pressing the right button and the Ctrl key.

During this operation, the selected rectangle is highlighted and in a pop-up window, the information about the interval of the X-axis and about the zoom percentage on the Y-axis of the rectangle is displayed.

Selection of the channels

A channel can be selected (i.e. the Y scale, the graphs and the info boxes of a channel) by clicking with the left button of the mouse on the Y scale or on the info boxes of the channel. The channel is selected also clicking on the area of the transparent cursors. To multiple select channels, select the channels keeping the CTRL key pressed.

The Y scale, the graphs and the info boxes of the selected channels are highlighted.

To deselect a channel, click with the left button of the mouse on the Y scale or on the info boxes or deselect the Clear Selection command of the Options menu or of the pop-up menu.

Clicking with the right button of the mouse on the Y scale or on the info boxes of the Info Channels area, the channel is automatically selected; if the channel was not selected, other already selected channels are deselected.

The selected channel has two display modes that can be configured in Setup/General. In the highlight combo, two modes can be chosen **Bold** that shows the channel in bold or the **Blink** mode shows the blinking channel.

X Scale Mode

The **Time** mode displays on the X-axis the scale, the times of the Laps loaded. The **Distance** mode displays on the X-axis the scale of the distances covered of the Laps loaded. To apply the **Distance** mode, set the Distance channel in the **Special Channels** page of the **General Setup** window.

The mode of the X scale can be changed through the configuration, or through the X-Axis command of the Options menu, of the popup menu or of the toolbar.

Manual Range

Automatically calculates the limits of the Y scale so that the channel is fully displayed and sets the manual mode of the Y scale (*Auto Y off*).

Lap Selection

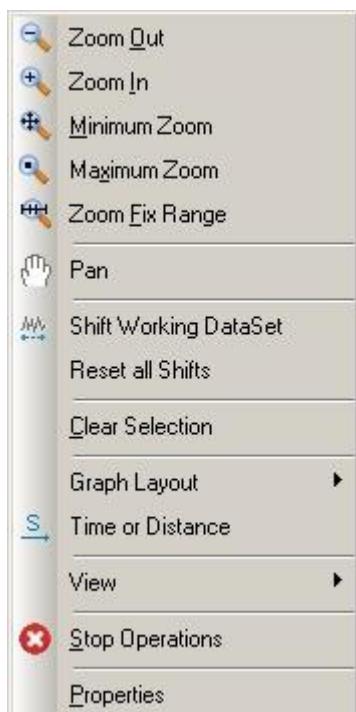
Clicking with the mouse on one of the sections of the Data Selection Bar, the correspondent lap is loaded on WinTAX. The laps belonging to the current Dataset loaded are highlighted. One or more sections can be selected using the mouse: first select one lap and then, without release the left button, lead the mouse to pass over the required sections.

Commands

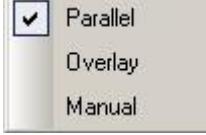
The main commands available in the **Run Preview window** can be enabled through the **Popup menu** that can be displayed by clicking with the right button of the mouse in the graphic area of the window, on the Info boxes or on the Y scales of the selected channels. Some commands are also available with **Keyboard shortcuts**.

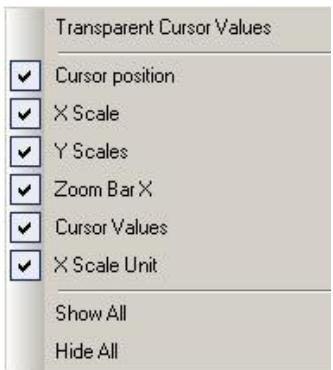
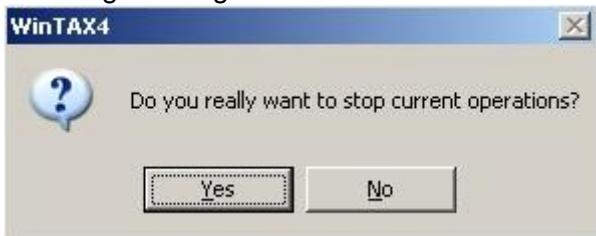
Popup menu

By clicking with the right button of the mouse on the graphic area of the window, the following popup menu is displayed. The menu is dynamic as it can be configured according to the license granted, but also according to the situation in which it is created; for example the Pan command is displayed only if there is a zoom active or the Clear Selection command is displayed only if at least one channel is selected. In general all pop-up commands of the pop-up menu are the same as those on the toolbar, the Options menu or other WinTAX menus.



this pop-up menu allows the access to the following commands:

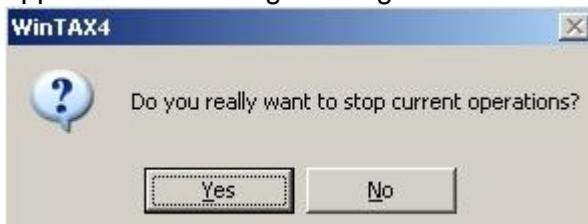
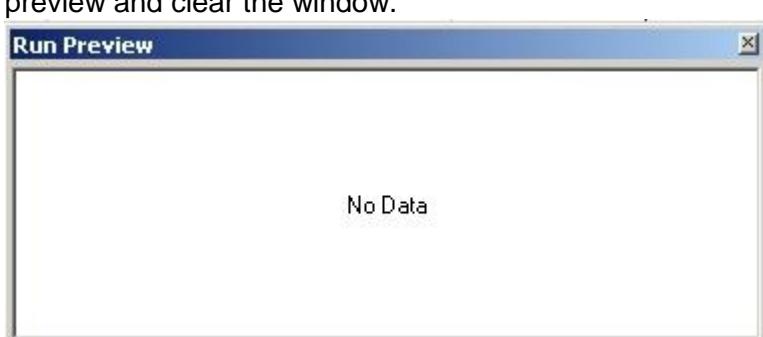
DESCRIPTION	SHORTCUT	DESCRIPTION
Zoom Out		Operation opposite to the Zoom In on the graphic area of the window: it displays in smaller detail in respect to the X axis of the interval around the current position of the cursor (see also the Zoom functions)
Zoom In		Zooms the graphic area in respect to the X axis, displaying in better details the interval around the current position of the cursor (see also the Zoom functions)
Minimum Zoom		Shows the graphic area in respect to the whole interval of the X axis (see also the Zoom functions)
Maximum Zoom		Zooms the graphic area in respect to the X axis, showing in maximum details the interval around the current position of the cursor (see also the Zoom functions)
Zoom Fix Range		Shows the graphic area in correspondence with a fixed range of the X axis (see also the Zoom functions)
Shift Working Dataset		Choosing this command, the cursor on Run Preview is fixed at the current position. Then, with the left button of the mouse, it's possible to shift the cursor. When the left mouse button will be released, the shift is propagated to the windows of the layout.
Reset all shifts		Resets the shift restoring the initial situation.
Pan		Enables the Pan mode to shift the zoom area displayed (see also the Zoom functions)
Clear Selection		Deselects the channels selected on the window
Graph Layout		Shows the sub menu to select the vertical arrangement mode of the channels (Parallel, Overlay, Manual).  the selected mode is highlighted by a check mark
Time or Distance		Switch between Distance (space) mode and Time mode of the X scale <ul style="list-style-type: none"> • Time: The X axis represents the time instants in seconds. • Distance: The X axis represents the distances covered in meters. The Distance channel must be configured in the Special Channels (see the Special Channels page of the General Setup window). The switch can also be done by the short cut X.

View		<p>Displays the sub menu to select the graphic elements of the window that can be shown or hidden</p>  <ul style="list-style-type: none"> • Transparent Cursor Values shows cursor values in transparent mode on the left side of the graph box. • Cursor position, shows/hides the information box indicating the cursor position on the X axis • X Scale, shows/hides the X scale • Y Scale, shows/hides the Y scale • Zoom Bar X, shows/hides the horizontal Zoom Bar • Cursor Values, shows/hides the information boxes indicating the current values of the cursor • X Scale Unit, shows/hides the measurement unit of the X scale • Show All, shows all the graphic elements • Hide All, hides all the graphic elements
Stop Operations	Esc	<p>Stops calculating. When you choose this command appears the following message.</p>  <p>Choosing Yes, the run Preview windows interrupts the preview and clear the window.</p> 
Properties		Opens the interface to configure the Run Preview window

By clicking with the right button of the mouse on an Info box or on the Y scale of the channel, the following pop-up menu is displayed. The menu is dynamic as it can be configured according to the license granted, but also according to the situation in which it is created. In general all pop-up commands of the pop-up menu are the same as those on the toolbar, the Options menu or other WinTAX menus



this pop-up menu allows the access to the following commands:

COMMAND	ICON	SHORTCUT	DESCRIPTION
Remove Graphs			Removes from the window the channels currently selected
Clear Selection			Deselects possible channels selected in the window
Stop Operations	✖	Esc	<p>Stops calculating. When you choose this command appears the following message.</p>  <p>Choosing Yes, the run Preview windows interrupts the preview and clear the window.</p> 
Properties	✎		Opens the interface to configure the Run Preview window

Keyboard Shortcut

To see the complete list of shortcuts available for the graph window, click [here](#).

Below are listed those shortcuts that do not appear in any of the commands and of the toolbar buttons described before. These commands can be executed only from keyboard. All these commands are not customizable.

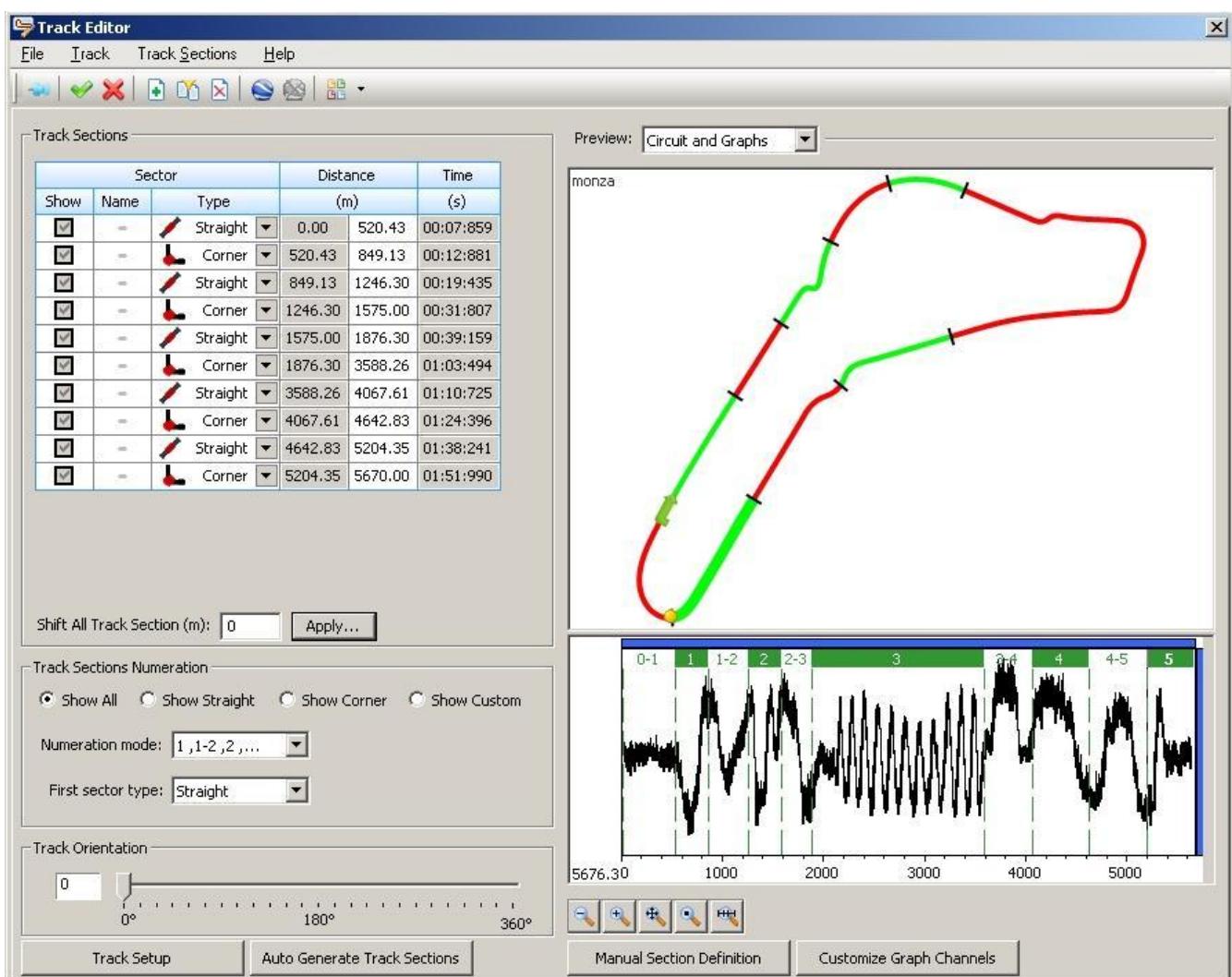
SHORTCUT	DESCRIPTION
Up	Increase cursor step in current window
Down	Decrease cursor step in current window
Left	Move the cursor left by one step
Right	Move the cursor right by one step

Tools

Track Editor

Track Editor is used to set up how WinTAX creates the Track (circuit trajectory) and the Track Sections (Map) linked to a circuit. Note that in WinTAX4 the expression 'Circuit' and 'Map' will be replaced by 'Track' and 'Track Sections' respectively. In order to start using the Track Editor, go to menu: *Tools/Track Editor*.

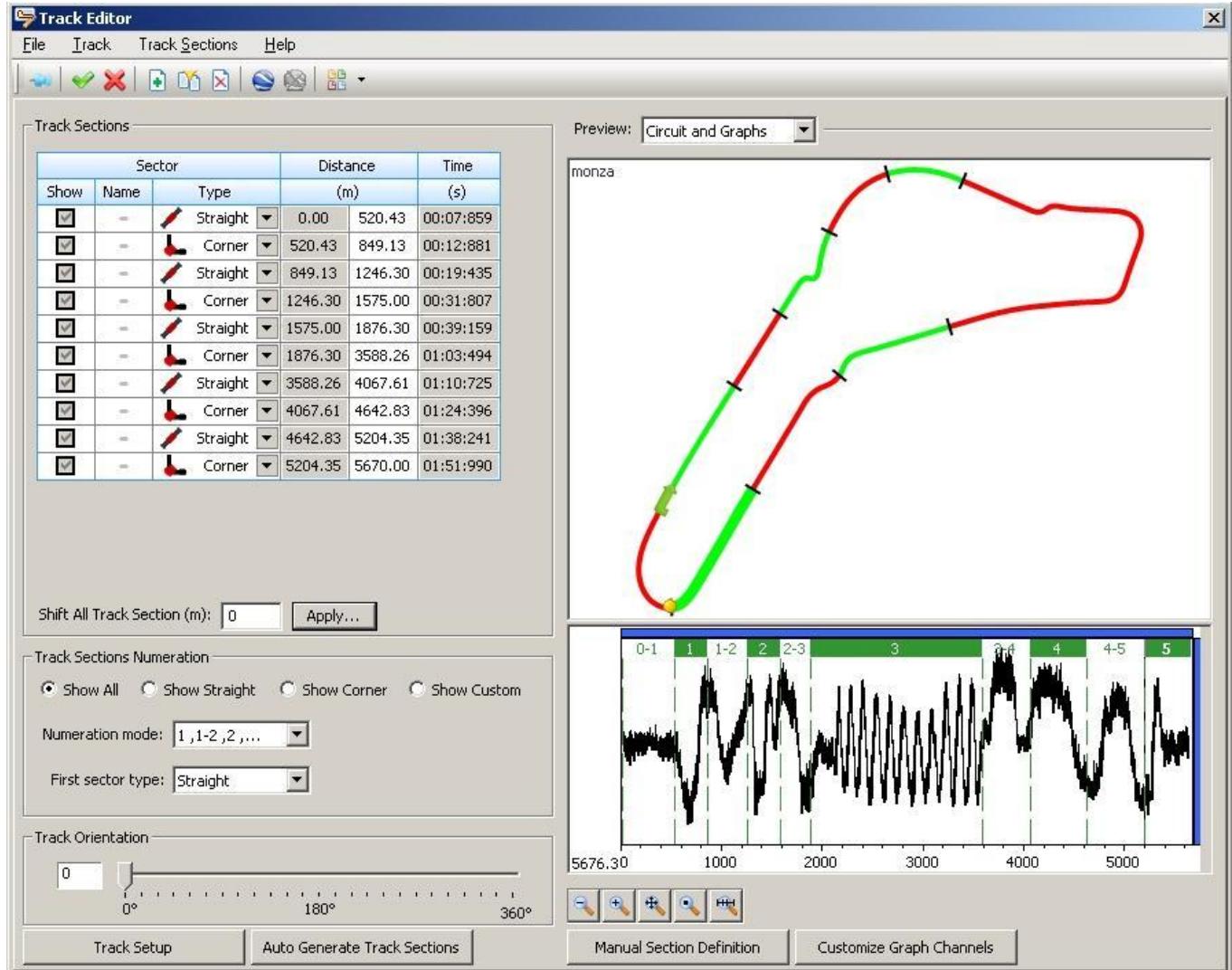
The Track Editor function needs at least one lap loaded in WinTAX.



Elements of the window

The Track Editor dialog is composed by the following logical areas:

- **Track Sections Table:** Tabular editor of sections, distance and time.
- **Preview and Orientation:** Graph preview of circuit and sections



Track Sections Table

The Track Sections area permits to customize manually the sections of the track. In the Sector table there are three main columns:

- **Sector:**
 - **Show:** This check is enabled in "Show Custom" mode. In all the others mode the check is disabled and shows if the corresponding section is visible or hidden.
 - **Name:** The custom name of the section, if configured. It is enabled in "Show Custom" mode.
 - **Type:** The type of each sector can be straight or corner.

- **Distance (m):** the start and the end point, in meters, of each sectors. The end point is always editable and there are controls that prevent you to enter values that are not consistent.
- **Time (s):** Time, in seconds, taken to travel each sector.

Track Sections

Sector		Distance		Time
Show	Name	Type	(m)	(s)
<input checked="" type="checkbox"/>	-	Straight	0	921 00:15:084
<input checked="" type="checkbox"/>	-	Corner	921	1363 00:26:936
<input checked="" type="checkbox"/>	-	Straight	1363	2619 00:51:503
<input checked="" type="checkbox"/>	-	Corner	2619	3506 01:07:880
<input checked="" type="checkbox"/>	-	Straight	3506	4865 01:30:938
<input checked="" type="checkbox"/>	-	Corner	4865	5779 01:47:313

Shift All Track Section (m): Apply...

Track Sections Numeration

Show All Show Straight Show Corner Show Custom

Numeration mode:

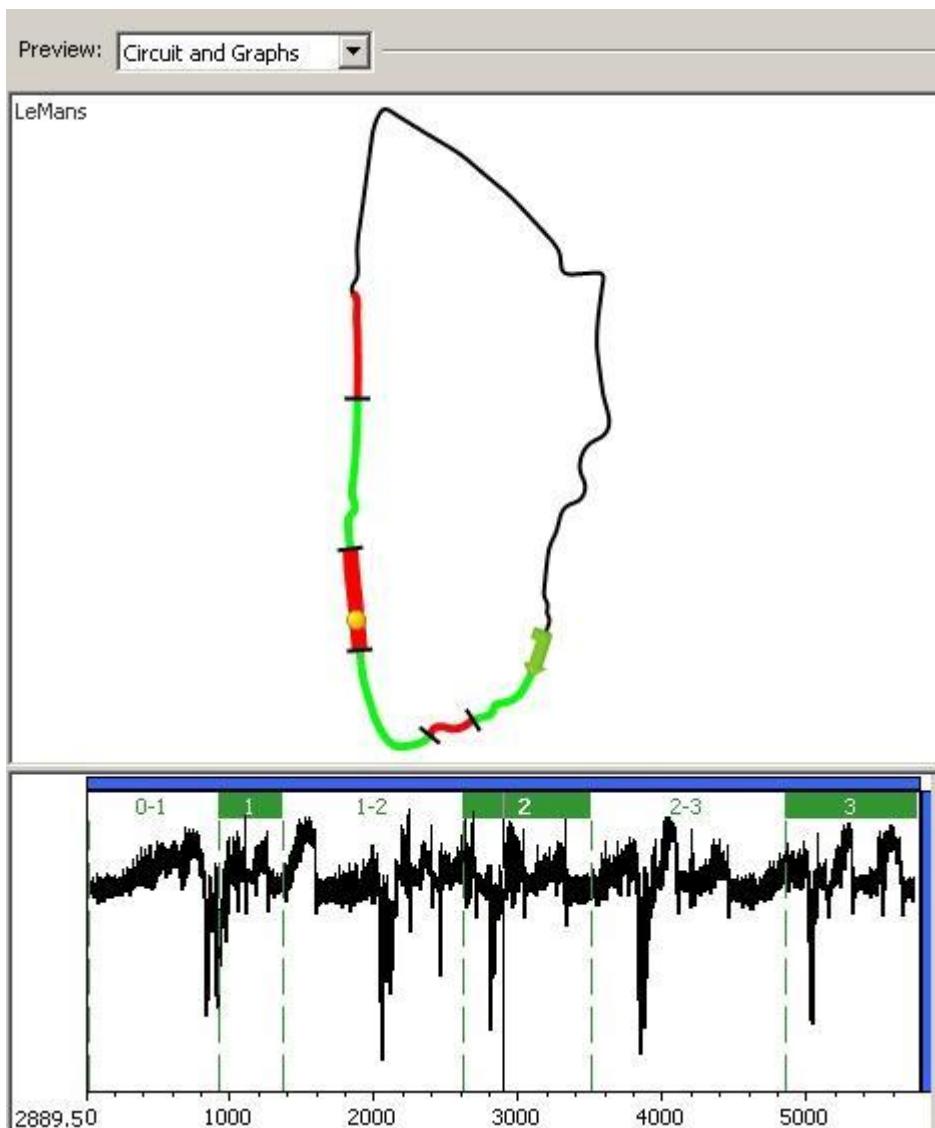
First sector type:

Track Orientation

0  180° 360°

Preview Area

In the preview area there may be one or two distinct zones, chosen by the combo preview, circuit and graphs. The first zone shows the circuit, the second zone displays a graphical window. Through menu commands and by the mouse, you can change the sections of the circuit.



The length of every field can be graphically modified working directly on the trajectory through the mouse.

Commands

The main commands available in the Track Editor window can be enabled through the

- Menu in the main menu of the application
 - **File**
 - **Track**
 - **Track Section**
 - **Help**
- The buttons of the dedicated **Toolbar** and on the window area.

- **Pop-up menu** that can be displayed by clicking with the right button of the mouse in the graphic area of the window, on the Info boxes or on the Y scales of the selected channels.
- **Keyboard shortcuts**

Menu File

The menu **File** allows the access to the following commands:



COMMAND	DESCRIPTION
Apply	Applies the current settings of the Track Editor
Cancel	Closes the window without applying the current settings to the configuration of the Track Editor
Load Track	<p>Opens a dialog window to select a configuration file for the Track (*.crt, *.crg, *.cre) window to be loaded.</p> <ul style="list-style-type: none"> • A file *.crt is a standard track, calculated by speed and acceleration • A file *.crg is a track calculated by GPS channels • A file *.cre is a track calculated by GPS channels and contains a Google map also
Unselect Current Track	Remove the current calculated track
Save Track As	Opens a dialog window to select a configuration file or a new file to save the current track.
Export to CRT	Exports the current track in a *crt track
Load Track Sections	With this command you can select and load a *.poi file. A *.poi file contains information about a track and contains information relating to the sectors in which the track was divided. To ensure a proper

	loading, the file name and the name of the track must be the same.
Save Track Section As	Save a *.poi file with the configured sections.

Menu Track

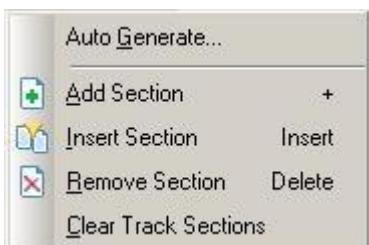
The menu **Track** allows the access to the following commands:



COMMAND	DESCRIPTION
Setup...	Opens the Track Setup Window.
Google Earth Link	Opens the Google Earth interface.
Remove Google Earth map	Remove from preview and from configuration the Google Map of the track.

Menu Track Sections

The menu **Track Sections** allows the access to the following commands:

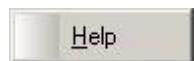


COMMAND	SHORTCUT	DESCRIPTION
Auto Generate...		Opens the Auto Generate Track Sections window
Add Section	+	Adds a new section at the end of the list. See Manual Generate Track Section for further details.

Insert Section	Insert	Splits in two parts the selected section. See Manual Generate Track Section for further details.
Remove Section	Delete	Removes the selected sections. See Manual Generate Track Section for further details.
Clear Track Sections		Remove all sections. See Manual Generate Track Section for further details.

Menu Help

The menu **Track Sections** allows the access to the following commands:



COMMAND	SHORTCUT	DESCRIPTION
Help	F1	Launch the WinTAX4 help, if available.

Toolbar and buttons

The figure below shows the Track Editor toolbar.



The toolbars of the Graph window allow the access to the following commands:

COMMAND	DESCRIPTION
Keep Visible	Allows to keep displayed the window after performing calculations.
Apply	Applies the current settings of the Track Editor
Cancel	Closes the window without applying the current settings to the configuration of the Track Editor

Add Section	Adds a new section at the end of the list. See Manual Generate Track Section for further details.
Insert Section	Splits in two parts the selected section. See Manual Generate Track Section for further details.
Remove Section	Removes the selected sections. See Manual Generate Track Section for further details.
Google Earth Link	Opens the Google Earth interface.
Remove Google Earth map	Remove from preview and from configuration the Google Map of the track.
Open Channel Browser	Shows the pop-up menu to select the page in the Channel Browser window 

Window commands

On the window there are the following commands:

COMMAND	DESCRIPTION
Track Setup	Opens the Track Setup Window.
Auto Generate Track Sections	Opens the Auto Generate Track Sections window
Manual Sections Definitions	This button is displayed only when there is a graph in the preview window (Combo Preview in Graph mode or in Circuit and Graph Mode). See Manual Generate Track Section for further details.
Customize Graph Channels	<p>This button is displayed only when there is a graph in the preview window (Combo Preview in Graph mode or in Circuit and Graph Mode).</p> <p>As default (Auto), in the graph preview the waveform shows the special channels configured in General Setup. By the "Customize Channels" button the user can add generic channels in window. The buttons below the channel list are used to add, remove and move channels.</p> 

Pop-up menu

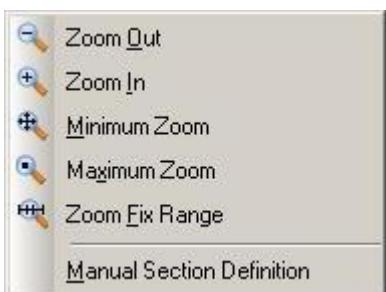
By clicking with the right button of the mouse on the table section, the following pop-up menu is displayed.



This section will describe only the commands that have not already been described previously.

COMMAND	DESCRIPTION
Add Section	Adds a new section at the end of the list. See Manual Generate Track Section for further details.
Insert Section	Splits in two parts the selected section. See Manual Generate Track Section for further details.
Remove Section	Removes the selected sections. See Manual Generate Track Section for further details.

By clicking with the right button of the mouse on the preview graph window, the following pop-up menu is displayed.



This section will describe the commands that have not already been described previously.

COMMAND	DESCRIPTION
Zoom Out	Operation opposite to the Zoom In on the graphic area of the window: it displays in smaller detail in respect to the X axis of the interval around

	the current position of the cursor (see also the Zoom functions).
Zoom In	Zooms the graphic area in respect to the X axis, displaying in better details the interval around the current position of the cursor (see also the Zoom functions).
Minimum Zoom	Zooms at maximum details in respect to the X axis, showing in maximum details the interval around the current position of the cursor (see also the Zoom functions).
Maximum Zoom	Displays the graphic area in respect to the whole interval of the X axis (see also the Zoom functions).
Zoom Fix Range	Displays the graphic area corresponding to a fixed interval of the X axis (see also the Zoom functions).
Manual Section Definition	See Manual Generate Track Section for further details.

Keyboard Shortcut

To see the complete list of shortcuts available for the graph window, click [here](#).

Below are listed those shortcuts that do not appear in any of the commands and of the toolbar buttons described before. These commands can be executed only from keyboard. All these commands are not customizable.

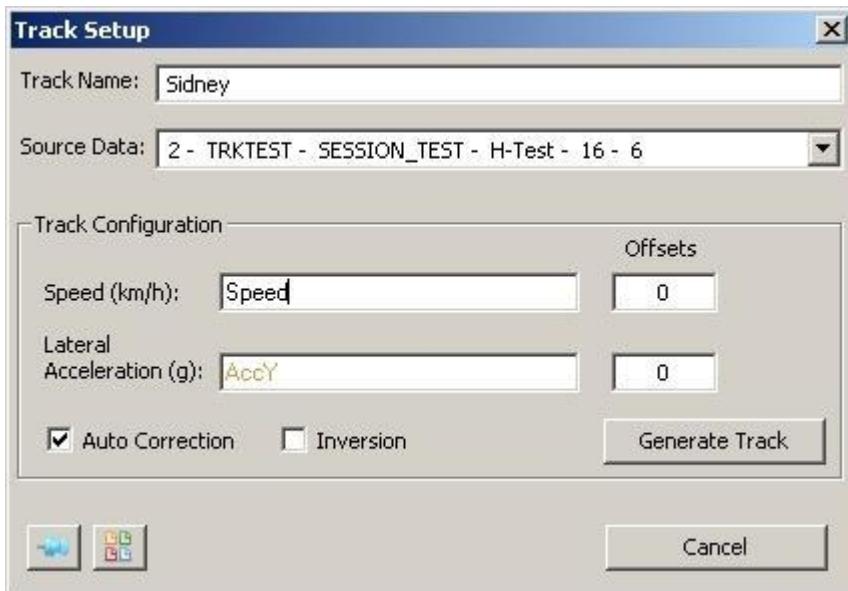
SHORTCUT	DESCRIPTION
Esc	Closes the edit of section cells in the table.

Track Setup

Track Setup allows to set the computation mode of the track trajectory and calculate it. There are three ways to do that, depending on Computation Mode configured in General Setup \ Special Channels:

Standard

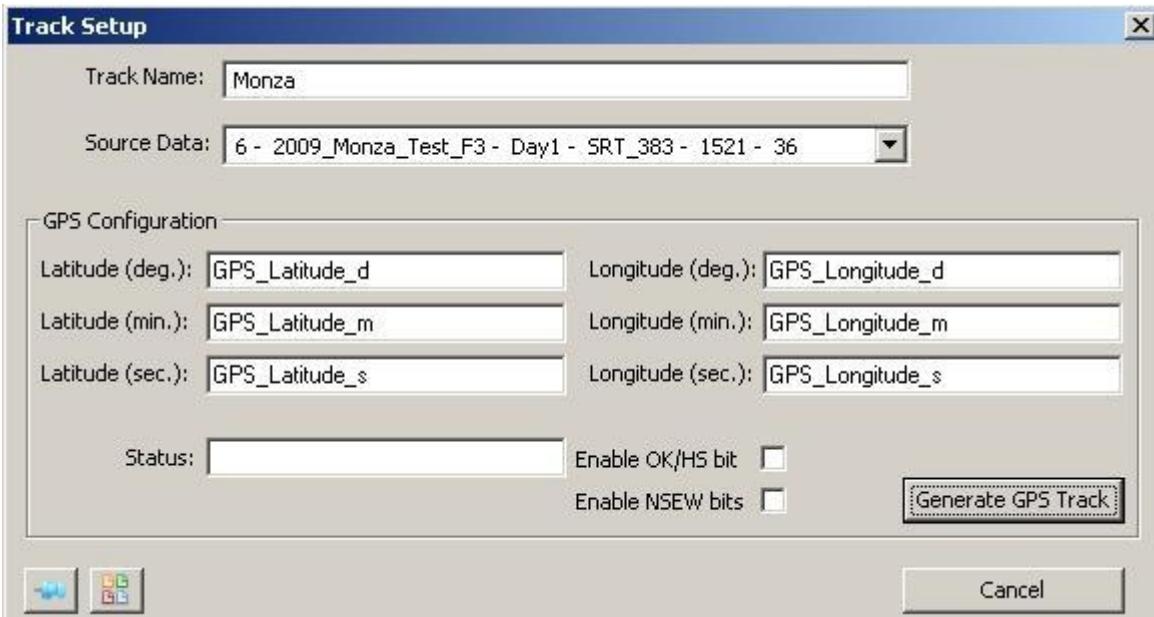
Uses speed channel and lateral acceleration channel.



- **Track Name:** Name of the track
- **Source Data:** Lap which contains the channels used for track calculation.
- **Speed (Km/h):** Speed channel expressed in Km/h.
- **Lateral Acceleration (g):** Lateral acceleration channel expressed in g unit.
- **Offsets:** Optional values to be added to the channel for any adjustments.
- **Auto Correction:** Correction necessary for calculations which not close properly the circuit.
- **Inversion:** Invert the calculated track.
- **Generate Track:** This is the button which perform calculation. The circuit obtained is displayed on the right side of the main Track Editor page.
- **Keep Visible:** Allows to keep displayed the window after performing calculations.
- **Open Channel Browser:** Displays the Channel Browser window if it is closed.
- **Cancel:** Exits from window without saving and without performing calculations.

GPS1

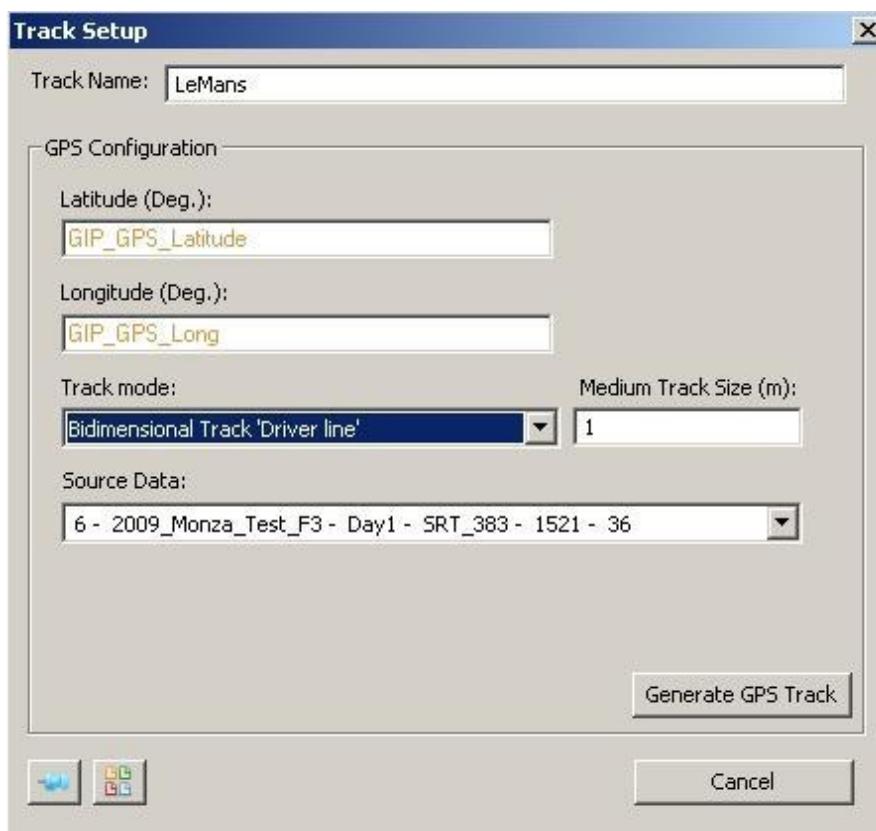
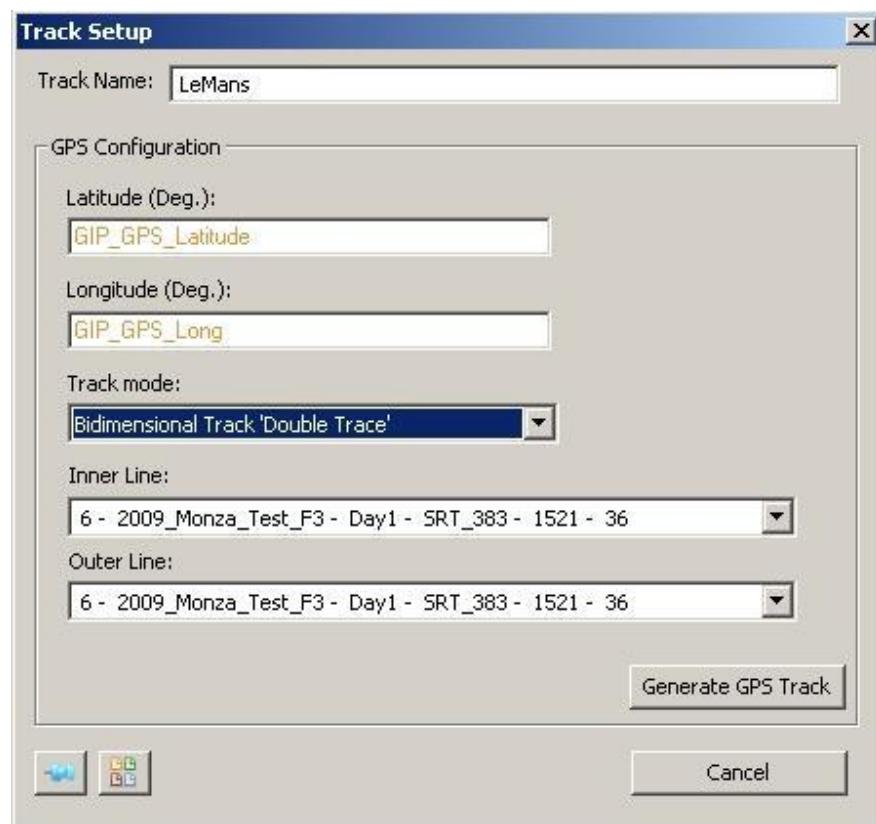
GPS1: uses latitude and longitude coordinates in degrees, minutes, seconds.



- **Track Name:** Name of the track
- **Source Data:** Lap which contains the channels used for track calculation.
- **Latitude (deg.):** Degrees latitude channel.
- **Latitude (min.):** Minutes latitude channel.
- **Latitude (sec.):** Seconds latitude channel.
- **Longitude (deg.):** Degrees longitude channel.
- **Longitude (min.):** Minutes longitude channel.
- **Longitude (sec.):** Seconds longitude channel.
- **Status:** Control channel that can be used to verify the quality of GPS channels. The channel also contains information about orientation (North, South, East, West).
- **Enable OK/HS bit:** Allows Status channel to use control information.
- **Enable NSEW bits:** Allows Status channel to use information orientation (North, South, East, West).
- **Generate GPS Track:** This is the button which perform calculation. The circuit obtained is displayed on the right side of the main Track Editor page.
- **Keep Visible:** Allows to keep displayed the window after performing calculations.
- **Open Channel Browser:** Displays the Channel Browser window if it is closed.
- **Cancel:** Exits from window without saving and without performing calculations.

GPS2

Uses latitude and longitude coordinates.



- **Track Name:** Name of the track
- **Latitude (Deg.):** Degrees latitude channel.
- **Longitude (Deg.):** Degrees longitude channel.
- **Track Mode:** sets the graphical mode to display circuit.

MODE	DESCRIPTION
Monodimensional Track ‘Single Trace’:	draws track with a single trace using <i>Source Data</i> selected.
Bidimensional Track ‘Double Trace’:	computes two traces, inner and outer, using two laps.
Bidimensional Track ‘Driver Line’:	draws track with driver line calculated from <i>Source Data</i> and medium track size.

- **Medium Track Size:** Defines the width of the track line if "Bidimensional Track Driver Line" is selected.
- **Inner Line:** Lap which contains the channels used for inner track calculation if "Bidimensional Track Double Trace" is selected.
- **Outer Line:** Lap which contains the channels used for outer track calculation if "Bidimensional Track Double Trace" is selected.
- **Source Data:** Lap which contains the channels used for track calculation.
- **Generate GPS Track:** This is the button which perform calculation. The circuit obtained is displayed on the right side of the main Track Editor page.
- **Keep Visible:** Allows to keep displayed the window after performing calculations.
- **Open Channel Browser:** Displays the Channel Browser window if it is closed.
- **Cancel:** Exits from window without saving and without performing calculations.

Generate Track Sections

The circuit *Track Sections* and its related functions are an essential feature of driver and vehicle performance analysis on a race track. The *Track Sections* consists of a series of datum points corresponding to the junctions between the straights and corners of the race track. These datum points may be found automatically using either one of the two simple algorithms or manually with the mouse or keyboard input. Once the *Track Sections* has been defined it forms the basis for section-by-section comparisons of data recorded in different laps which give a clear picture of precisely where and why time is lost or gained. Once defined for a given circuit, the map may be saved for future use allowing comparisons between different sessions. There are a few ways to generate track sections.

Track Sections Table

The Track Sections table permits to customize manually the sections of the track.

In the Sector table there are three main columns:

- **Sector:**

- **Show:** This check is enabled in "Show Custom" mode. In all the others mode the check is disabled and shows if the corresponding section is visible or hidden.
- **Name:** The custom name of the section, if configured. It is enabled in "Show Custom" mode.
- **Type:** The type of each sector can be straight or corner.
- **Distance (m):** the start and the end point, in meters, of each sectors. The end point is always editable and there are controls that prevent you to enter values that are not consistent.
- **Time (s):** Time, in seconds, taken to travel each sector.

The screenshot shows the 'Track Sections' dialog box. At the top is a table titled 'Sector' with columns: Show, Name, Type, Distance (m), and Time (s). The table contains six rows of data. Below the table is a control group for shifting all track sections by a distance of 0 meters, with an 'Apply...' button. The next section, 'Track Sections Numeration', contains radio buttons for 'Show All', 'Show Straight', 'Show Corner', and 'Show Custom', with 'Show All' selected. It also includes 'Numeration mode' and 'First sector type' dropdown menus. The final section, 'Track Orientation', features a horizontal slider for setting the orientation from 0° to 360°, currently set at 0°.

Sector		Distance (m)		Time
Show	Name	Type	(m)	(s)
<input checked="" type="checkbox"/>	-	Straight	0	921 00:15:084
<input checked="" type="checkbox"/>	-	Corner	921	1363 00:26:936
<input checked="" type="checkbox"/>	-	Straight	1363	2619 00:51:503
<input checked="" type="checkbox"/>	-	Corner	2619	3506 01:07:880
<input checked="" type="checkbox"/>	-	Straight	3506	4865 01:30:938
<input checked="" type="checkbox"/>	-	Corner	4865	5779 01:47:313

Shift All Track Section (m): Apply...

Track Sections Numeration

Show All Show Straight Show Corner Show Custom

Numeration mode:

First sector type:

Track Orientation

0° 180° 360°

- **Shift All Track Section** is a command that allows to increase the length of all sections, except the last, of a constant quantity. The total distance is the same because the increase in the length of the sections is absorbed from the last section.

The "Shift All Track Section" command is useful, for example, when moving beacon transmitter position.

- **Track Sections Numeration** WinTAX automatically names the sections defined either in manual or in auto mode generation.

The auto numeration is always intended as follow:

The *Type* of each sector is alternatively straight and corner. The *Name* of each sector is: 1, 2, 3, ..., N for corners, 1-2, 2-3, ..., N - 0 for straights. The color of the sectors is: red for corners, green for straights, black for not covered areas. Four predefined filters of display are available

- Show All: all sections are, by default, shown in each windows which supports the Track Sections object.
- Show Straight: filter on straights type.
- Show Corner: filter on straights type.
- Show custom: custom visualization. With this option, the User can change both the name of the sector and its type.

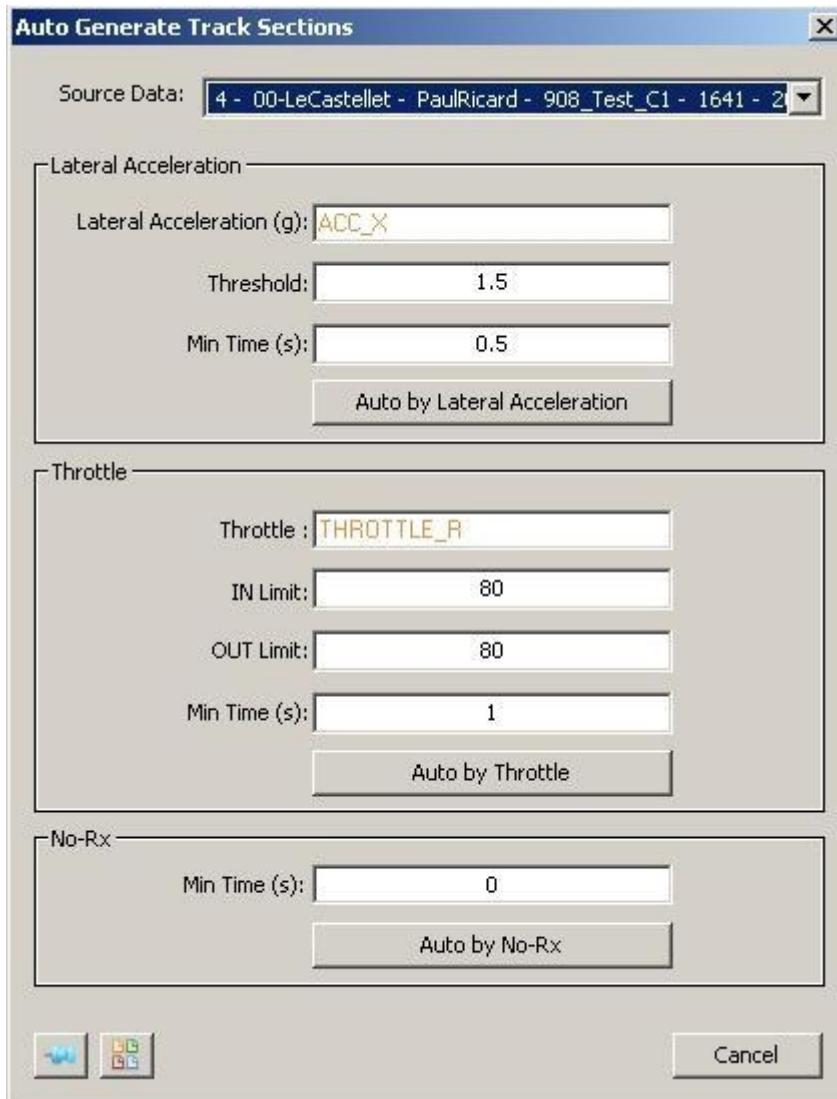
The chosen filter can be locally modified in each window.

- **Track Orientation** With this command it is possible to rotate in a different way the circuit, by setting a variable angle from 0 to 360 degrees.

Auto Generate

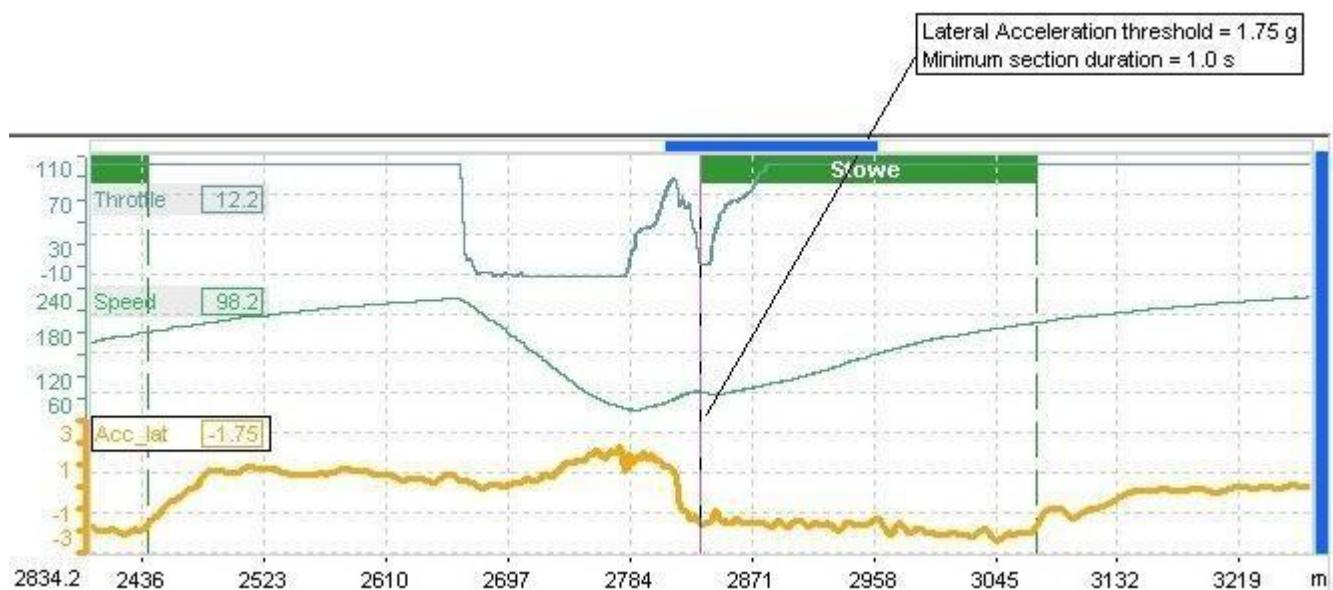
This window is used to specify the channels and their related thresholds which are used to define the *Track Sections* sections automatically based on either throttle position or lateral acceleration or No-Rx zones.

To save the trajectory, which is displayed on preview area, use the menu: *File/Save Track As*.



Auto Generate Track Sections by Lateral Acceleration

FIELD	DESCRIPTION
Lateral acceleration (g)	Lateral acceleration channel
Threshold	Acceleration threshold which defines the start and end of a corner.
Min Time (s)	Minimum allowed <i>Track Sections</i> section duration in seconds. This parameter is used to filter out spikes in the acceleration channel which would result in spurious <i>Track Sections</i> divisions.
Auto by Lateral Acceleration	Calculates the sections and closes the window.



Track Sections splits using lateral acceleration

Auto Generate Track Sections by Throttle

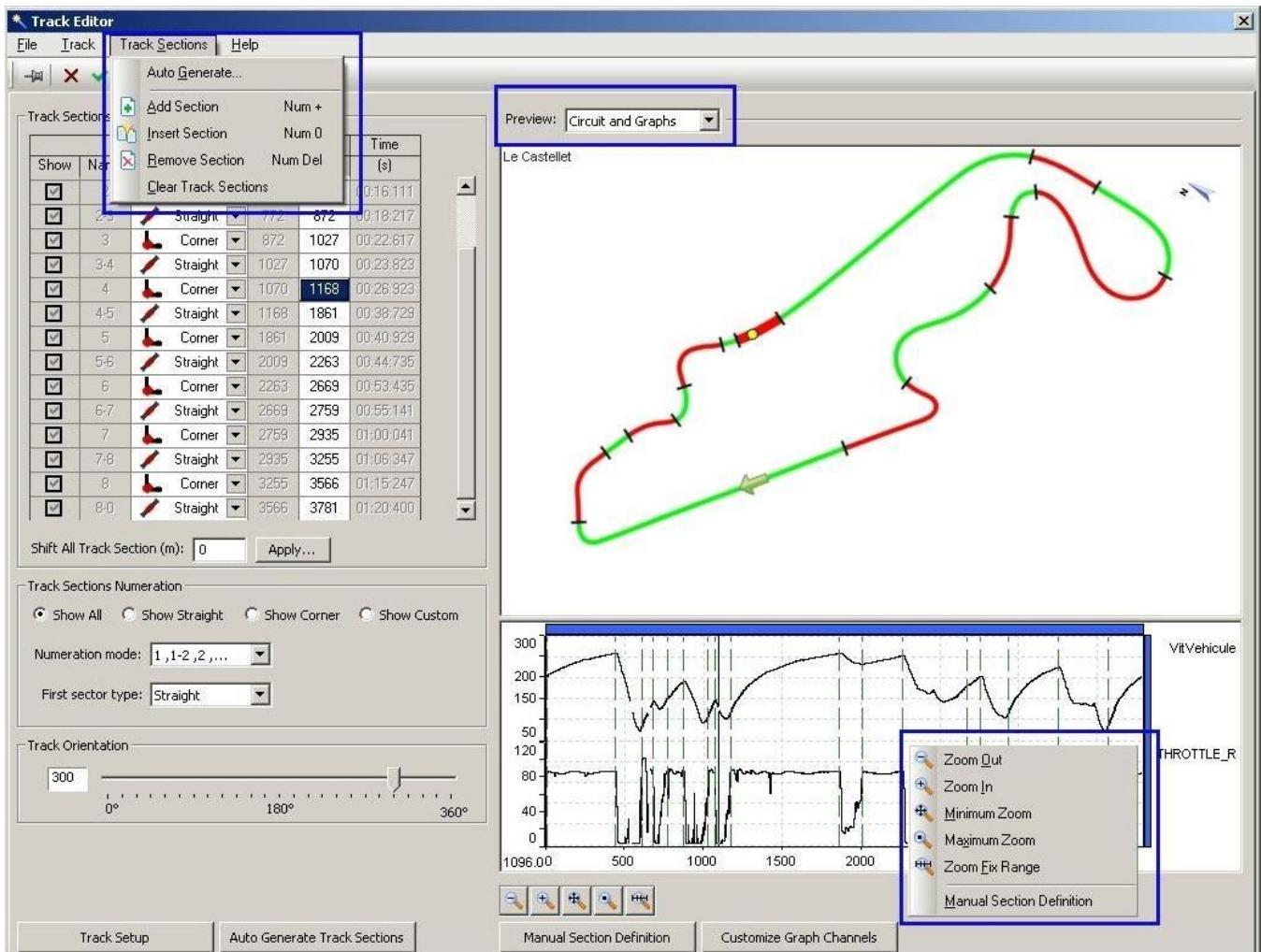
FIELD	DESCRIPTION
Throttle	Throttle channel
IN Limit	Throttle position used to define the start of a corner.
OUT Limit	Throttle position used to define the end of a corner.
Min Time (s)	Minimum allowed <i>Track Sections</i> section duration. This parameter is used to filter out spikes in the throttle channel which would result in spurious map divisions.
Auto by Throttle	Calculates the sections and closes the window.

Auto Generate *Track Sections* by No-Rx

FIELD	DESCRIPTION
Min Time (s)	Minimum allowed <i>Track Sections</i> section duration. This parameter is used to filter out spikes in the no-rx zones which would result in spurious <i>Track Sections</i> divisions.
Auto by No-Rx	Calculates the sections and closes the window.

Manual Generate Track Sections

Track Sections sections may also be manually defined at any time using the Manual *Track Sections* definition commands from the preview graph window or from the break points table with add/insert commands. In the preview graph window, use the mouse to insert a series of section splits at points on a distance plot. To confirm the manual splits press the END key. On the track window preview use the mouse to select sections, to move the borders of them or the finish line.



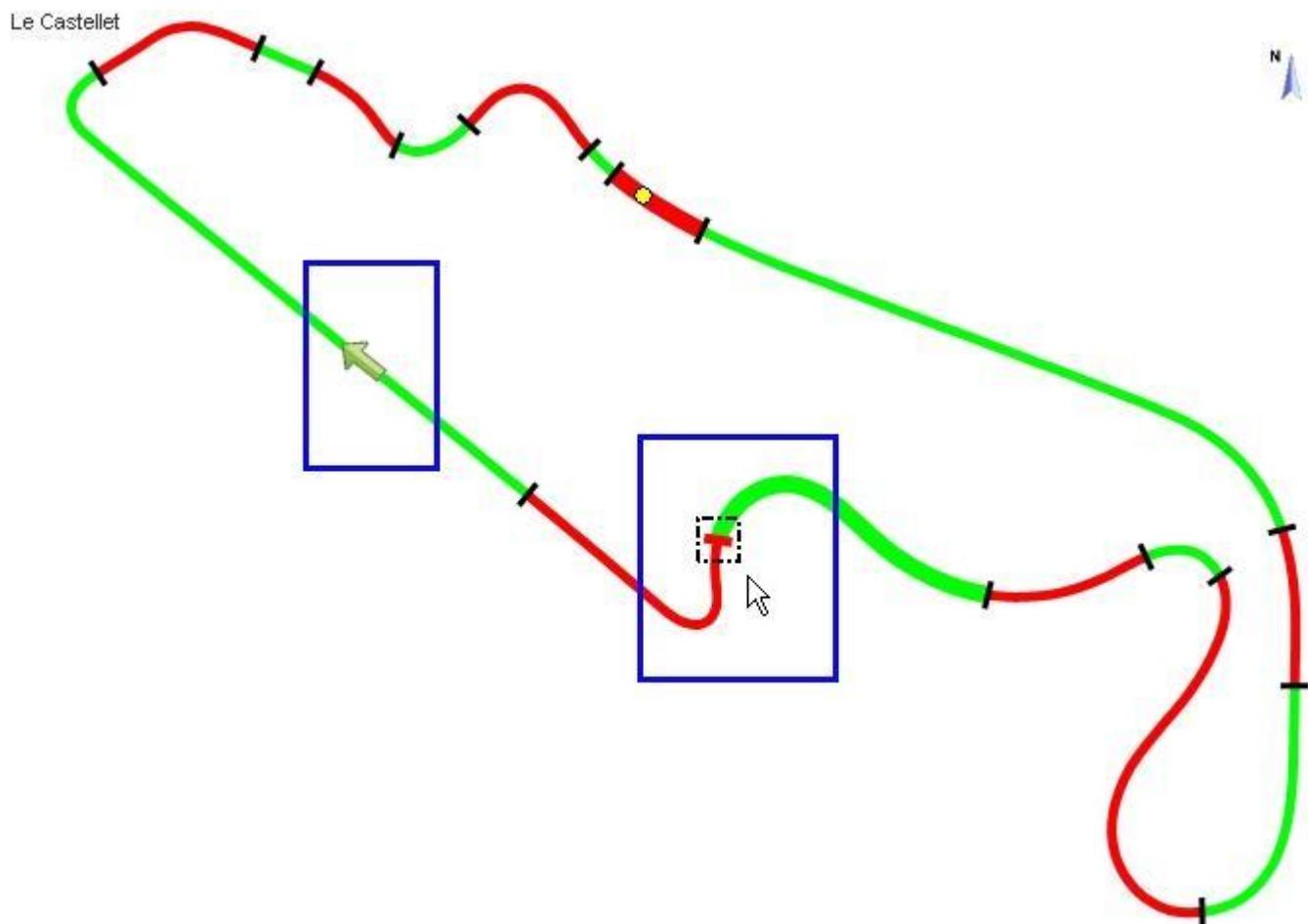
As shown in the previous figure, the manual *Track Sections* generation may be defined in two ways:

- using the mouse: through *Manual Section Definition* on the graph window (to open the preview graph window, use the combo at the top of the page)
- with the tabular editor on the left side of the dialog. The available commands are:
 - *Add*: add one section always in the last position
 - *Insert Section*: split in two parts the selected section

The "Shift All Track Section" command allows to add an offset (meters) to all sections, useful for example when moving beacon transmitter position.

The length of every field can be graphically modified working directly on the trajectory through the mouse (see picture below).

Moreover in the preview circuit window, it's possible to move the finish line by dragging the green arrow to the desired position (see picture below).



To save the Track Sections, use the menu: *File/Save Track Sections As..*

Google Earth

WinTAX is able to interface with Google Earth and download satellite maps of the areas of the tracks. The system is based on the use of some interfaces of Google Earth, which has to be installed on the PC in use; WinTAX is able to tell whether it is installed or otherwise; if it is not installed, the commands that launch Google Earth remain disabled. Simply install the free version of Google Earth from www.google.com. WinTAX requires GE 5.0 or higher and is certified for GE 6.xx version.

An active Internet line is obviously required to be able to use the satellite maps.

Internet must be connected when acquiring the images and when starting-up WinTAX if maps downloaded previously are used.

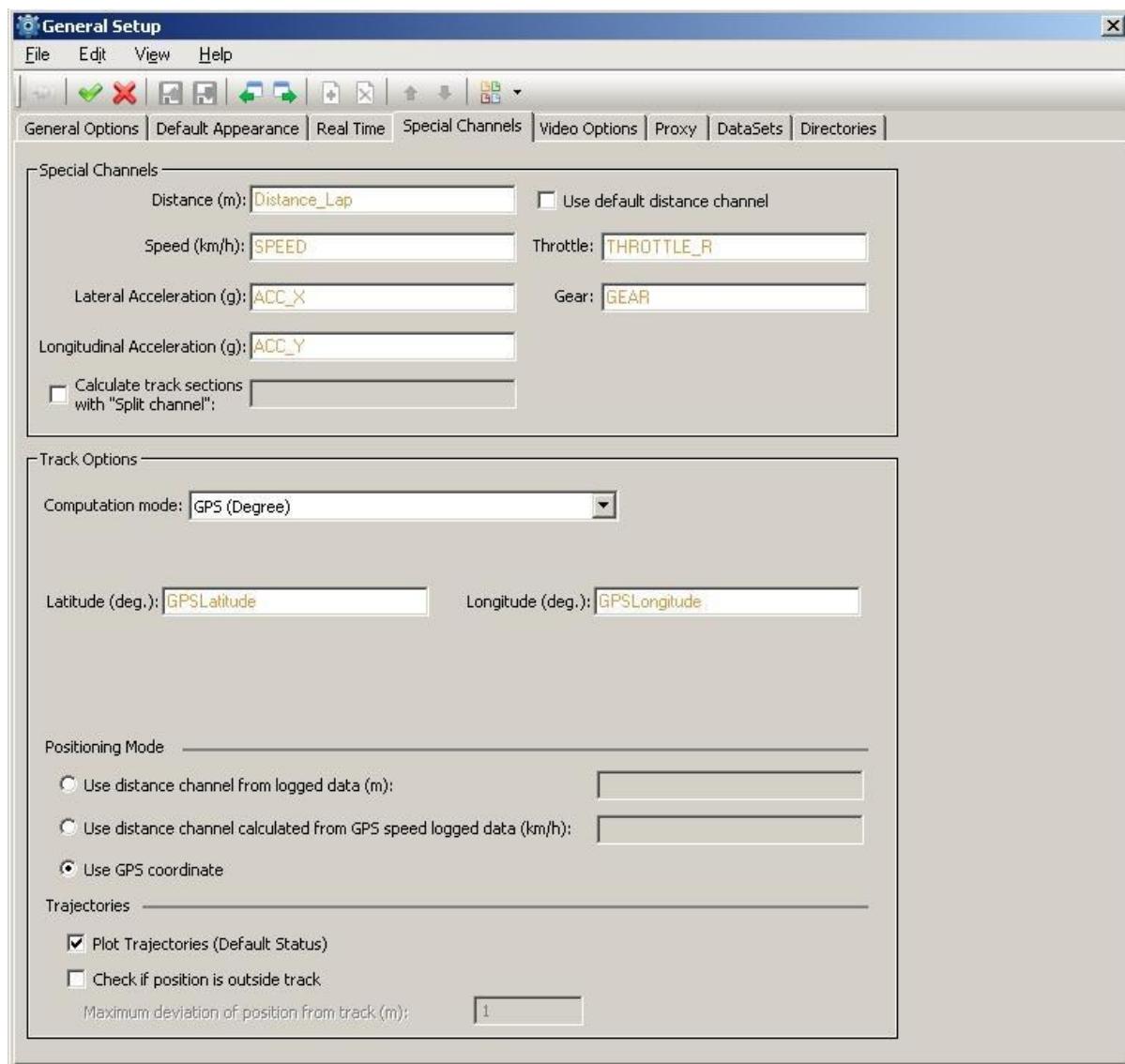
If a satellite map has been acquired previously from Google Earth, the next time you start-up WinTAX, the Internet connection is verified and therefore also the link to a GE server. If the connection is not valid, WinTAX highlights the condition with the following pop-up message:



This does not mean that WinTAX cannot be used; the track windows and their functions are still guaranteed, but you will simply not be able to display the satellite map as their background.

Configuration

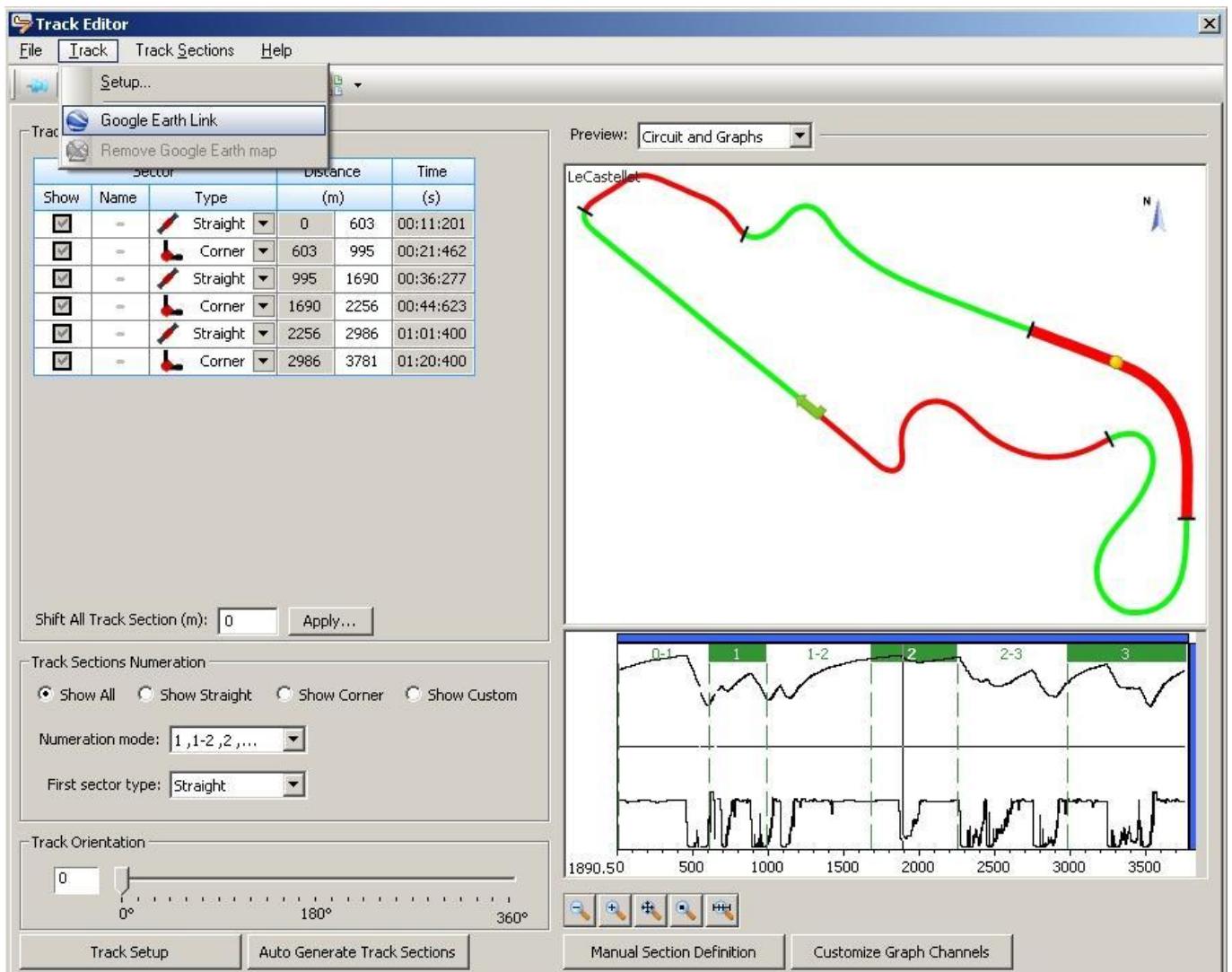
To use the functions of Google Earth (GE) correctly, the Setup – General – Special Channels page needs to be configured correctly. In the Track Options area you need to select, in the Computation Mode combo box, a GPS mode, either GPS (Deg. / Min. / Sec.) or GPS (Degree, recommended mode). Based on the mode selected, you will have to enter the channels required for configuration. Further configuration details are available in the Setup chapter.



Once the GPS channels have been configured correctly, you can open the Track Editor from the Tools menu and create the track based on the GPS coordinates set and on the values of the channels of the lap loaded. Once these operations are complete, you can launch the interface with which WinTAX connects to GE using the button on the toolbar or the command from the menu.

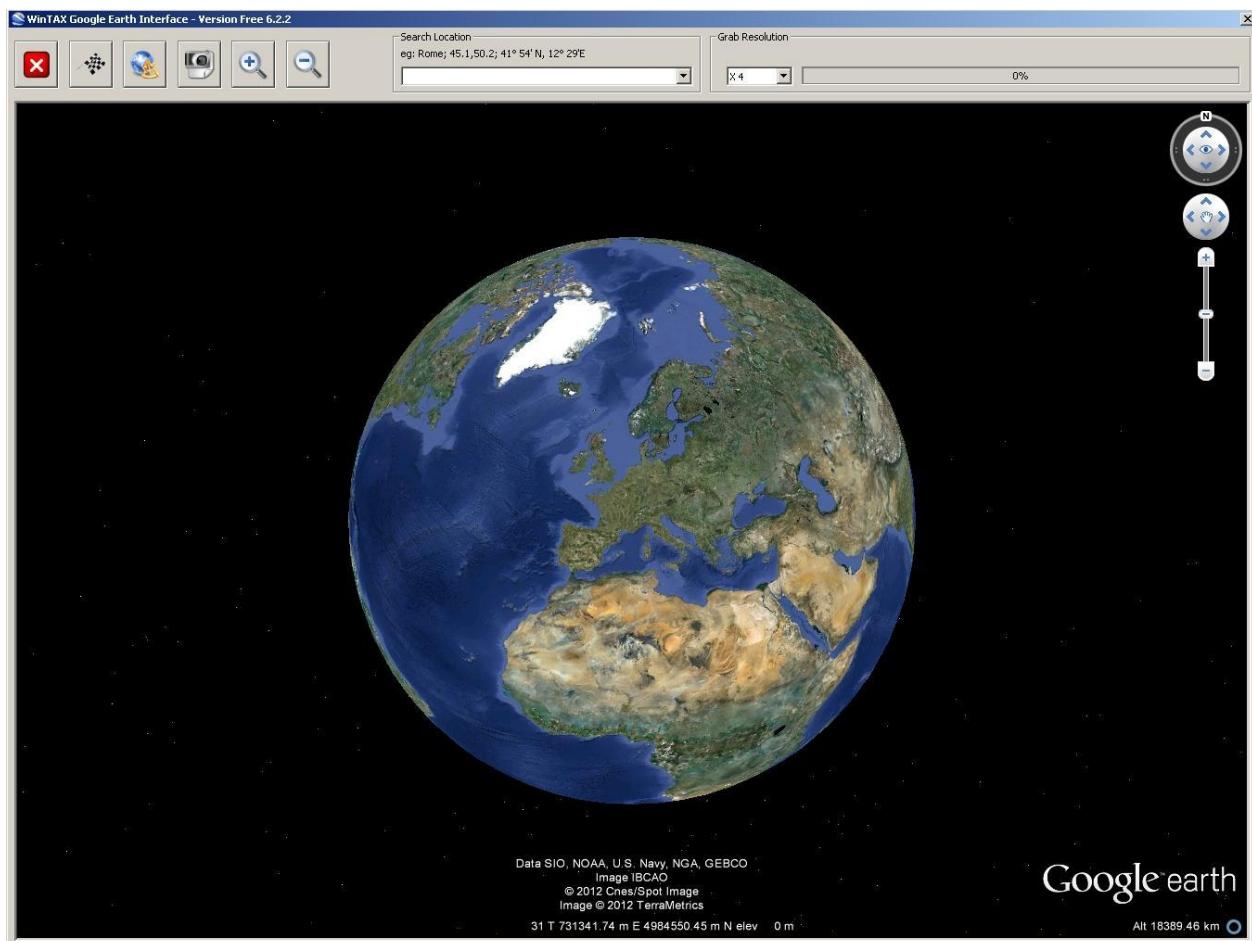
Two commands are associated with GE on the Track Editor. The first is **Google Earth Link**, which opens the GE interface. The second is **Remove Google Earth Map**, which eliminates the GE map from the track, if it has been loaded.

As mentioned, to access Google Earth you need an active Internet connection, otherwise, when you access the Track Editor environment and attempt to connect to Google Earth using the **Google Earth Link** command, a connection error pop-up will appear.



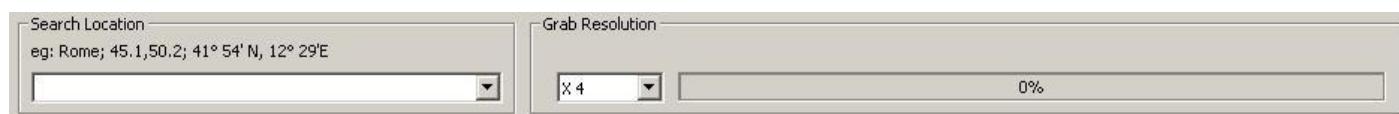
WinTAX Google Earth Interface

Once opened, the GE interface appears as follows.



The movement and search commands are the same as the GE application. Using the mouse, you can browse the maps, clicking and dragging the images. Using the central roller wheel, you can zoom in and out. Using ESC, you can interrupt the loading process if it takes too long; if all the buttons are grey, it means that GE is still processing something. To browse, there is a compass and zoom bar on the right-hand side of the window.

The toolbar offers the following commands.



Close Google Earth Interface

The first button closes the interface without loading or saving any image.

View Circuit Area

The second button with the checkered flag, activates the search engine of GE in the attempt to display the area in which the track configured on the Track Editor is present, adapting the screen dimensions in the best way possible to the size of the track.

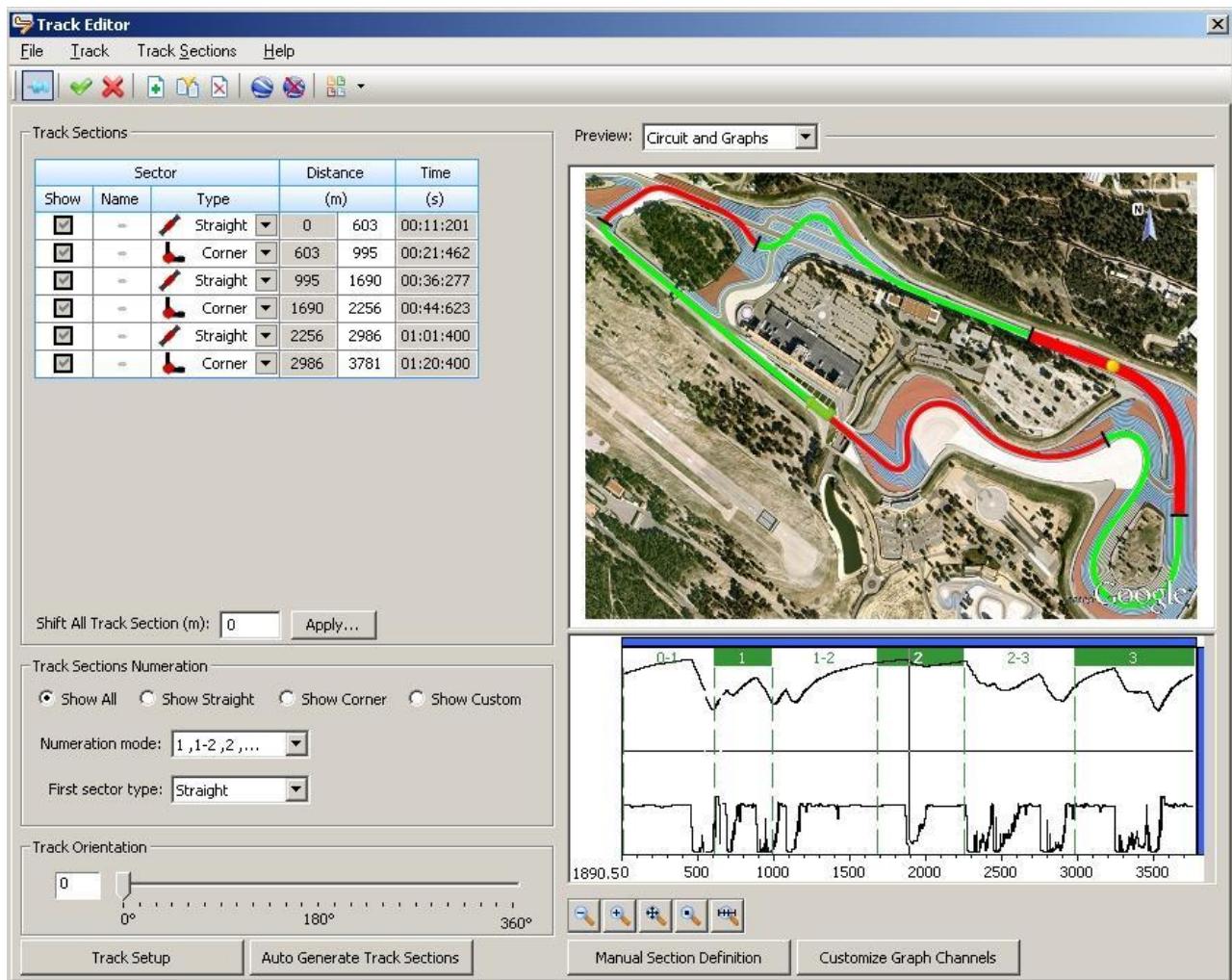


Reset North

The third button turns the image so that North is at the top.

Grab displayed map

This button starts the saving process of the map and consequently loads it in WinTAX. There are four levels of resolution of the image, which can be set from the Grab Resolution combo box, x1, x2, x3, x4. The loading function attempts to recover as much space possible; it first and foremost attempts to centre the map to utilize as much space possible, then, based on the resolution set, the images are saved. You can keep an eye on the saving progress on the bar at the side of the resolution setting or you can interrupt the operation using the ESC key. At the end of the saving process, the GE interface closes and the image is loaded in the Track Editor, overlapping the track, as you can see in the picture that follows. The image can also be saved turned around.



When you exit the Track Editor environment with the Apply command, WinTAX is enabled to display the map as a background on the track windows.

Save Track

Using the standard command: File / Save Track As... the user can save the track and relevant satellite map as is normally possible for the tracks.

Whilst saving, WinTAX will suggest the name of the file, path and type of file.

Files ending in *.CGE (default setting suggested by WinTAX) represent the coupled track and satellite map.

Files ending in *.CRG represent just the track files

Remember that when saving as CGE, the images can only be used if the Internet connection is active when launching WinTAX.



Zoom In

The display height is reduced, consequently enlarging the image.

Zoom Out

The display height increases, consequently making the image smaller.

Search Location

This function is the same as that available in the GE application and is used to search a location by its name or by its coordinates. It may prove useful if you wish to save maps for which no preloaded track is available with relevant GPS coordinates.

Report Manager

Report Manager is a tool allowing to export data in binary format for MPS4 or in **TXT**, **CSV**, **XLS** format for possible further use. The configuration environment can be opened from the main menu through *Tools/Report Manager*. The report manager is divided into three sections: **MPS4 Export**, **Auto-Export** and **Options**.

MPS4 Export

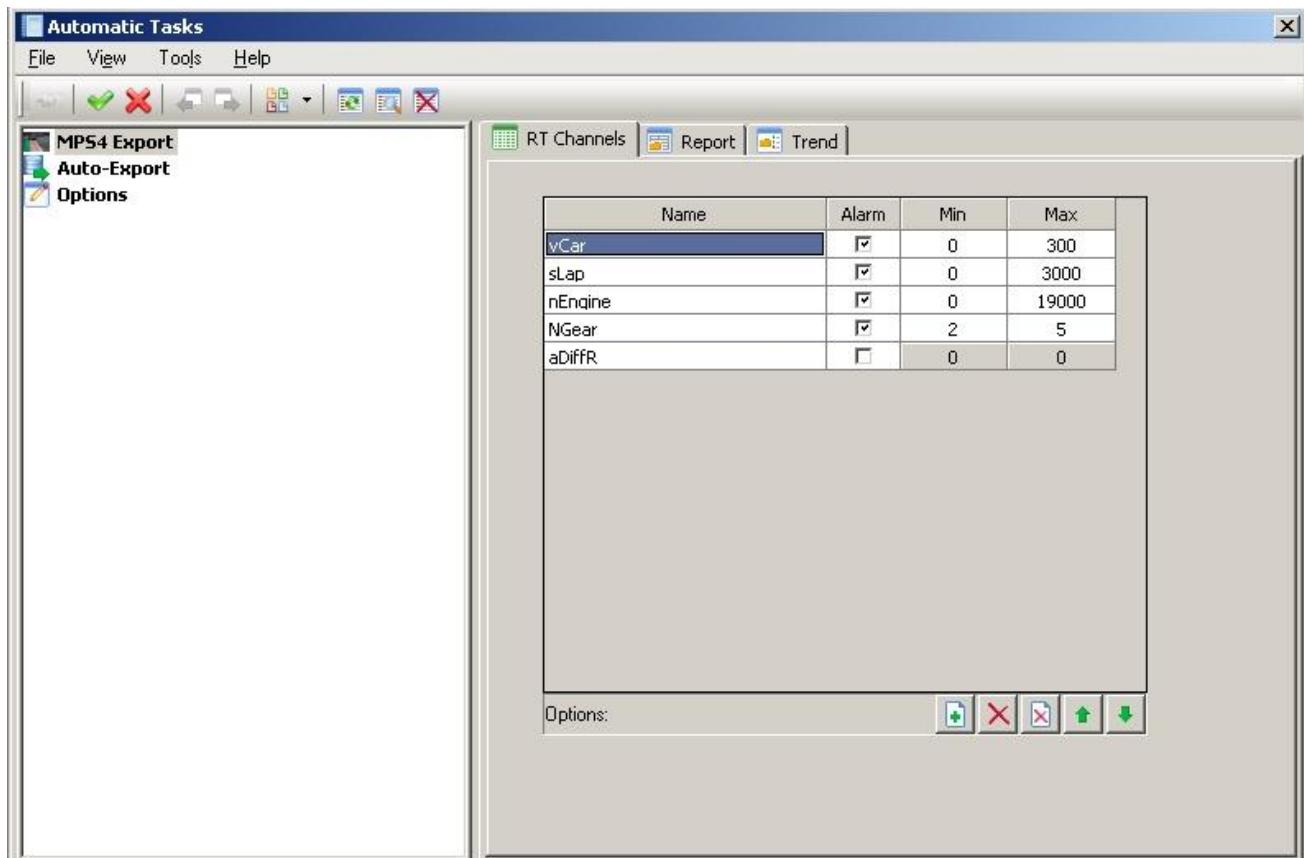
The exported data for MPS4 can be:

- **Real time**: The data are extracted from the real time stream during acquisition and exported
- **Post Processing**: When a lap is closed (real time acquisition) or when a new lap is acquired (cable acquisition) the data are read

MPS4 Export is in its turn divided into three tabs, **RT Channels**, **Report**, **Trend**.

RT Channels

This tab allows to configure the channels to be used in the real time exporting. For each channel furthermore an alarm field can be set.

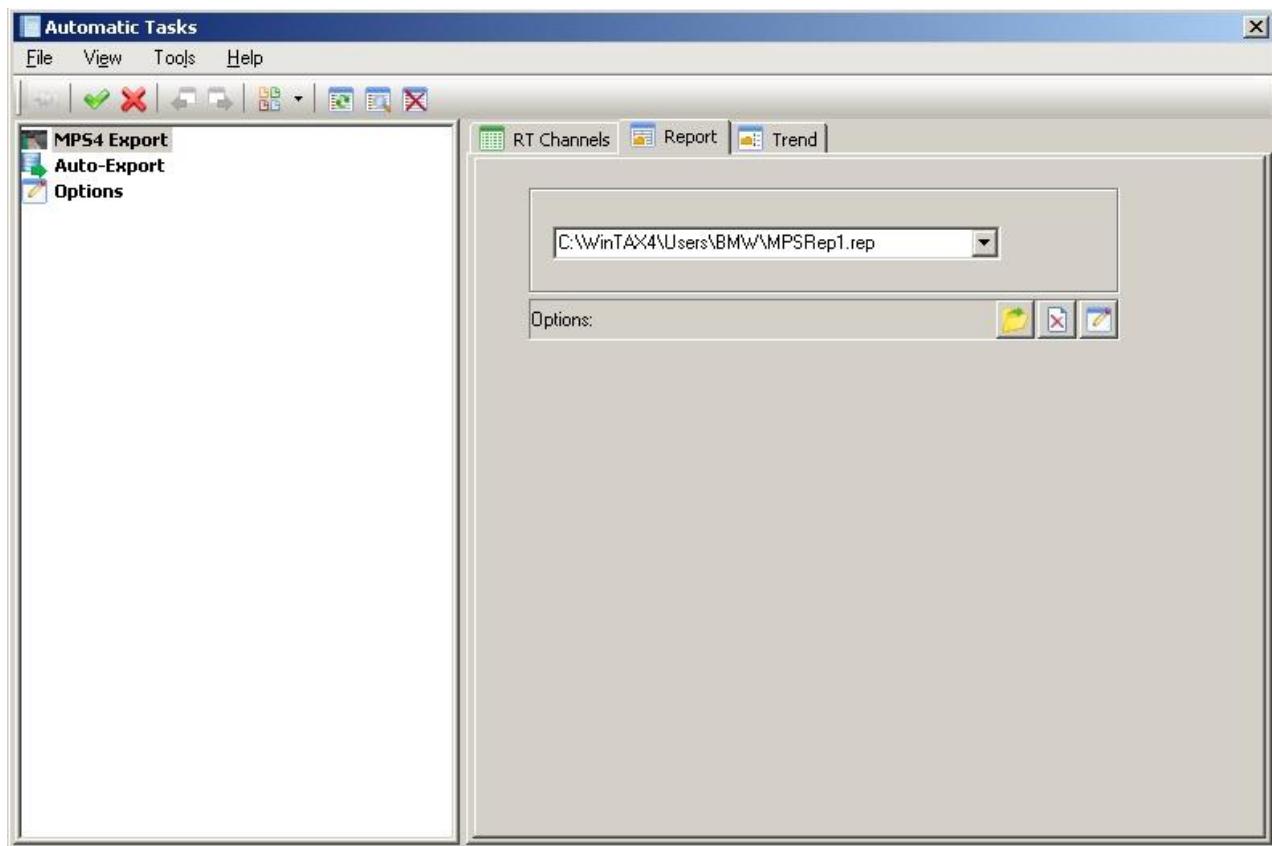


- **Name:** Name of the channel
- **Alarm:** Enables/disables the alarms management
- **Min/Max:** Limits of the alarm status

The channels can be added, cancelled or their position can be modified thanks to the Options toolbar buttons placed below the channels list. The channels configured in this page will be exported during the acquisition and read by the MPS4 system, if in the Options page the export is enabled.

Report

Page to select the *Lap Report tab* configuration to be exported; it is used with the post processing exporting.

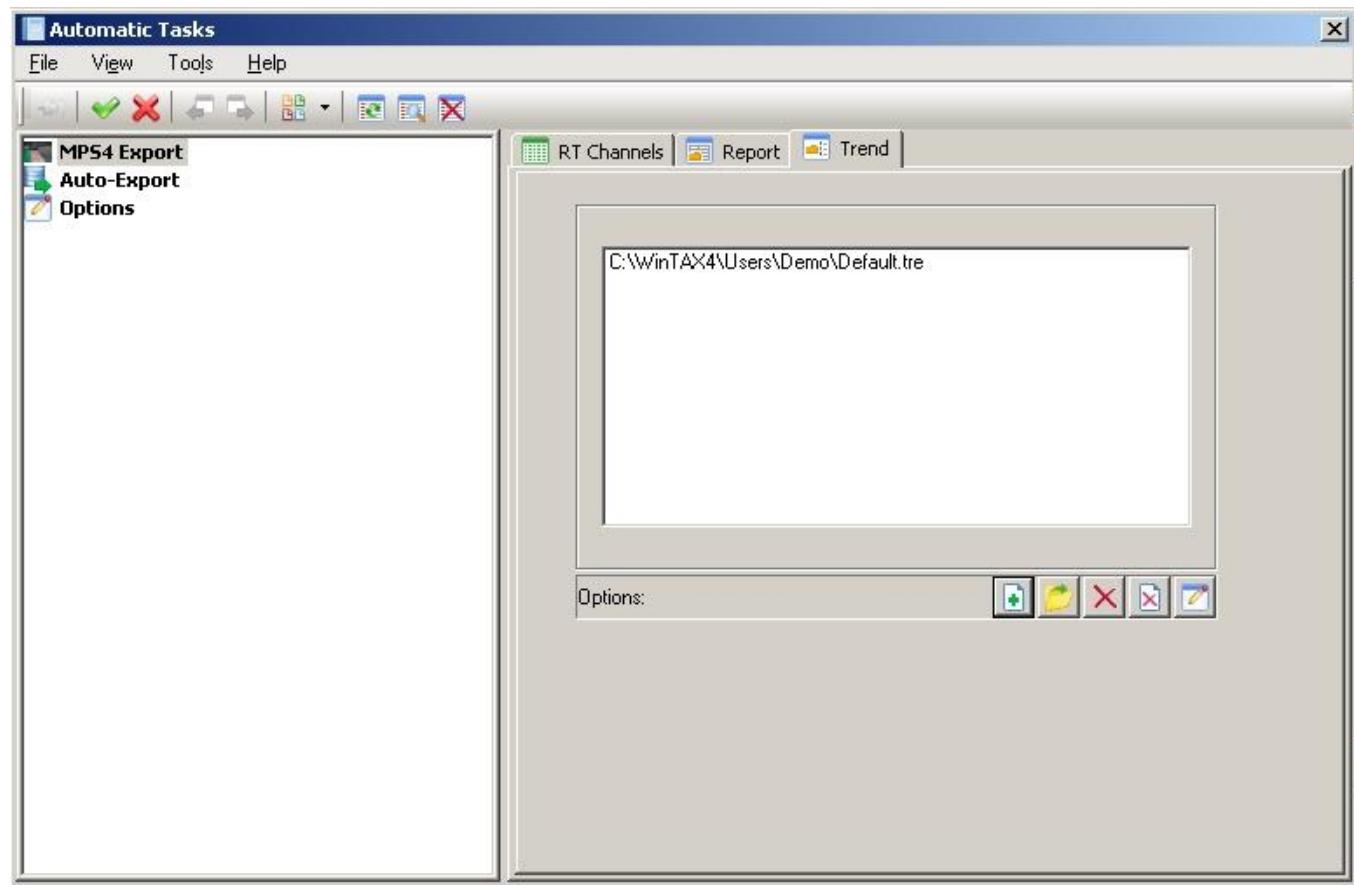


The Options toolbar includes three buttons: the first opens a browser to select the report; the second cancels the report, the third opens the configuration of the selected Lap Report..

The report configured in this page will be exported whenever the lap is closed (AutoRx) and read by the MPS4 system, if in the Options page the export is enabled.

Trend

Page to select the *Trend* configurations to be exported; it is used with the post processing.



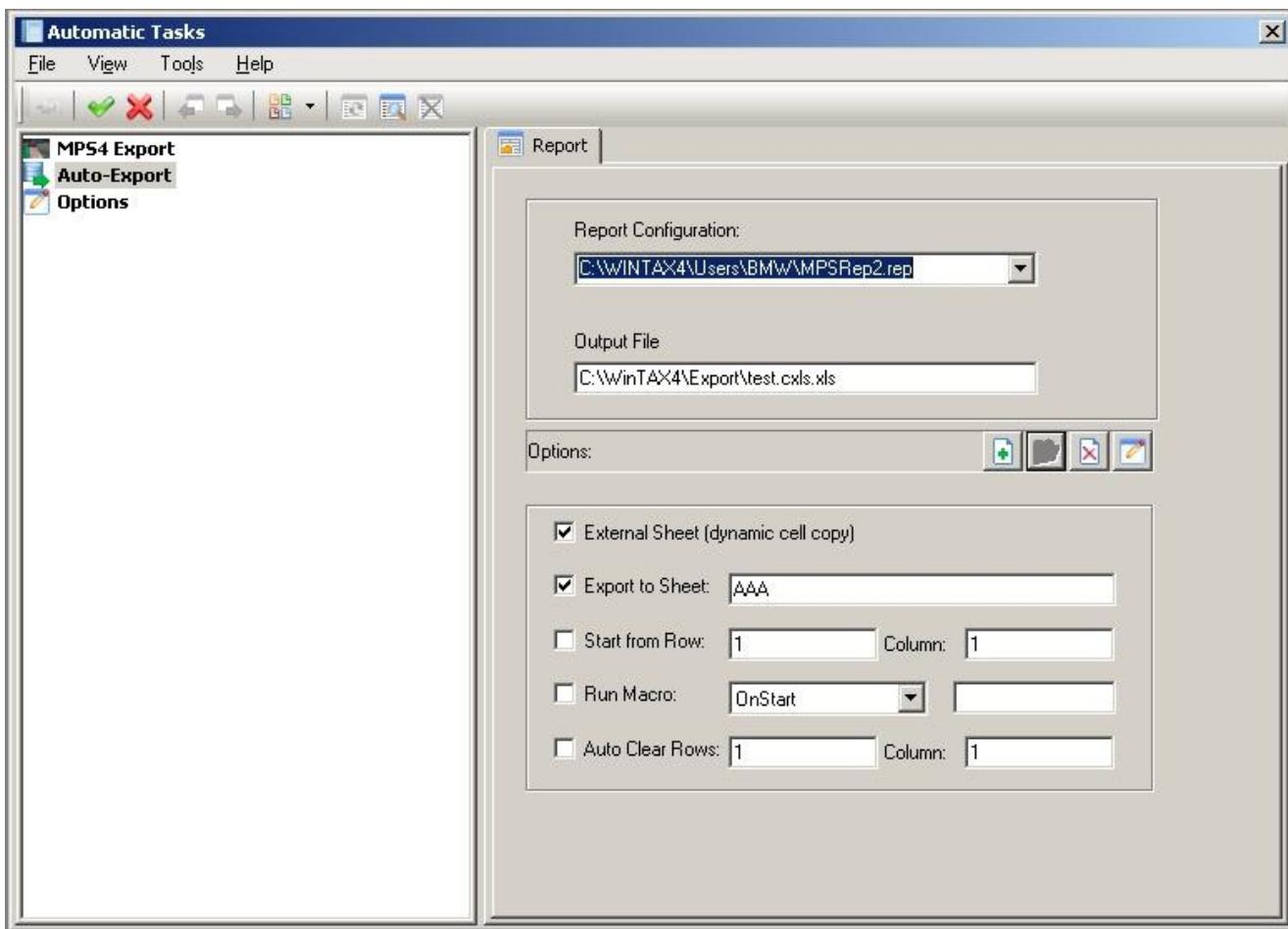
The Options toolbar includes five buttons: the first opens a browser to add a trend; the second allows to replace the selected report; the third cancels the report in the list; the fourth cancels them all; the fifth opens the configuration of the selected trend.

Up to 4 Trend configurations can be set.

The trends configured in this page will be exported whenever the lap is closed (AutoRx) and read by MPS4 system, if in the Options page the export is enabled.

Auto Export

In this page the report to be exported, the position of the output file and its format can be configured.



Report Configuration: Through the commands of the Options toolbar a report can be added, modified, cancelled and edited. The report available in the combo is the report that is exported when the lap is closed.

Output File: focusing on this text box only the selection file button is enabled allowing to select path and format of the output file TXT, CSV, XLS format. If the format is xls, a configuration form of the output Excel file is displayed, as in the previous window.

- **External Sheet (dynamic cell copy)** This option prevents WinTAX to reset the XLS file. If this option is set, WinTAX does not create a new XLS file when the report/session is reset, but it works always on an existing worksheet. Therefore, the export will fail if the XLS file is not found. In case of error, an error message is displayed in the History message window. The user must set this option when WinTAX is assumed to export information on an existing worksheet that already contains cell formatting or macros. In this case WinTAX will copy the single values to the corresponding cells by using Excel Automation. Only the cells corresponding to new report rows are overwritten.
- **Export to Sheet** This option is enabled only when the External Sheet (dynamic cell copy) checkbox is set. If enabled, WinTAX will export values to the WorkSheet whose name is entered in the text field. If the WorkSheet is not found, an error message is

displayed in the History message window and the export is aborted. If this option is not set, WinTAX will export values in the first WorkSheet.

- **Start from** This option is enabled only when the External Sheet (dynamic cell copy) checkbox is set. If enabled, WinTAX will export values starting from Row and Column entered in the numeric fields (0 based indexes).
- **Run Macro** This option is enabled only when the External Sheet (dynamic cell copy) checkbox is set. If enabled, WinTAX will call the indicated macros whose name are entered in the text field. Two macros can be set:

On Start This macro is run before any change in the WorkSheet.

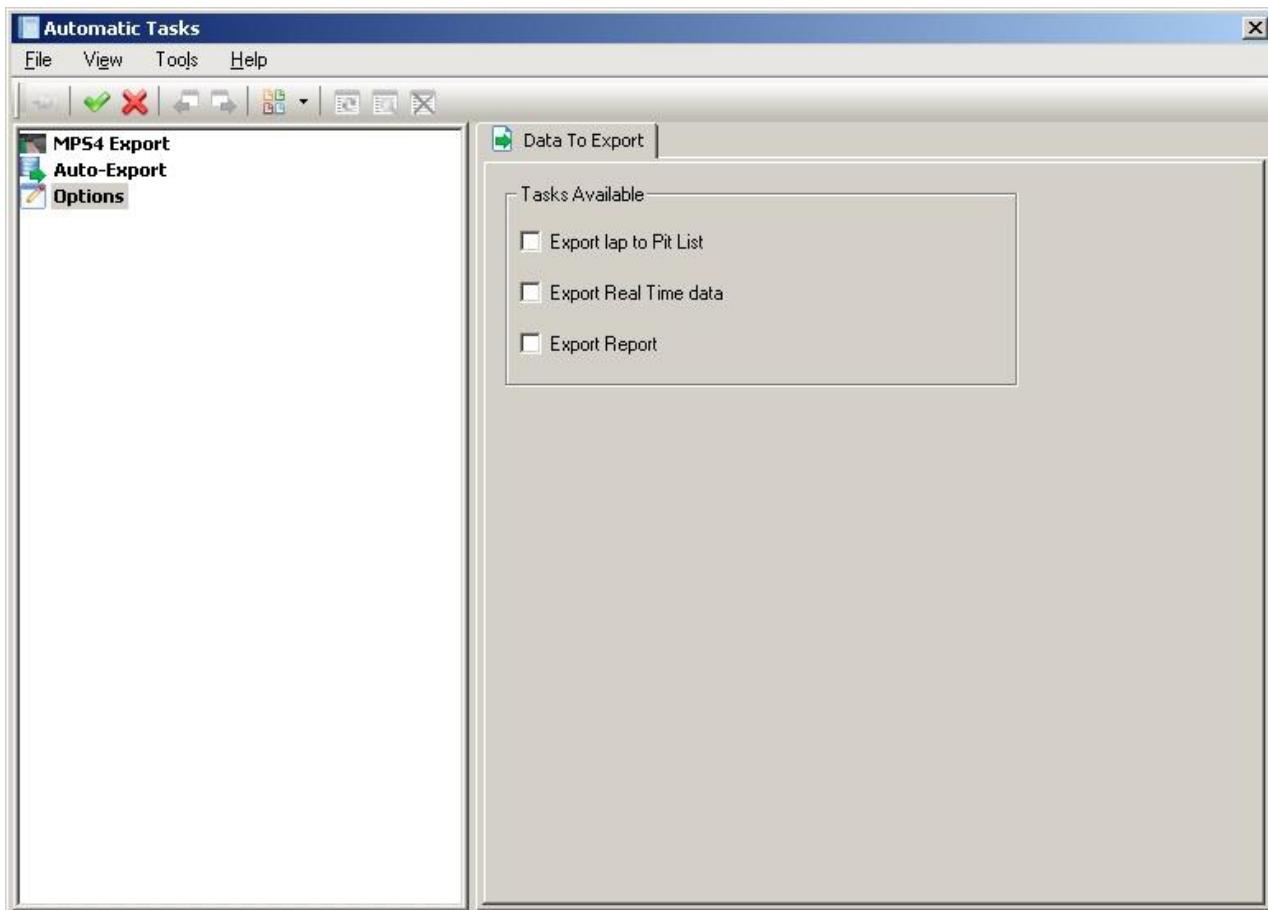
On Finish This macro is run after the WorkSheet has been updated.

The macros must be declared in a macro module of the XLS file. The macros are run after each lap export, or when the session is cleared. In case of error, an error message is displayed in the History message window.

- **Auto Clear** This option is enabled only when the External Sheet (dynamic cell copy) checkbox is set. If enabled, WinTAX will clear a number of Rows*Columns in the WorkSheet when a new session is started. Otherwise, a new session will simply start from the first row/column but old values are not cleared.

Options

In this page the configurations chosen in the other two pages can be enabled.



- **Export lap to Pit List:** enables/disables the post processing export (Report and Trend)
- **Export Real Time data:** enables/disables the real time export (RT Channels)
- **Export Report:** enables/disables the export of the reports in TXT, CSV, XLS.

Commands

Menu

The window menu allows the access to the following commands, divided in sub menus:

File Menu

COMMAND	DESCRIPTION
Apply	Applies the present settings of the window.
Cancel	Closes the window without applying the current settings.

View Menu

COMMAND	SHORTCUT	DESCRIPTION
Previous page	Ctrl + Shift + Tab	Enables the page of the window previous to the one currently in use.
Next page	Ctrl + Shift + Tab	Enables the page of the window next to the one currently in use.

Tools Menu

COMMAND	DESCRIPTION
Update	Recalculates the lap report and the trends to be exported with the last downloaded lap.
Scan	Recalculates the lap report and the trends to be exported for the whole present session.
Clear	Clears the exported data.

Help Menu

COMMAND	SHORTCUT	DESCRIPTION
Help	F1	Launch the WinTAX4 help, if available.

Toolbar

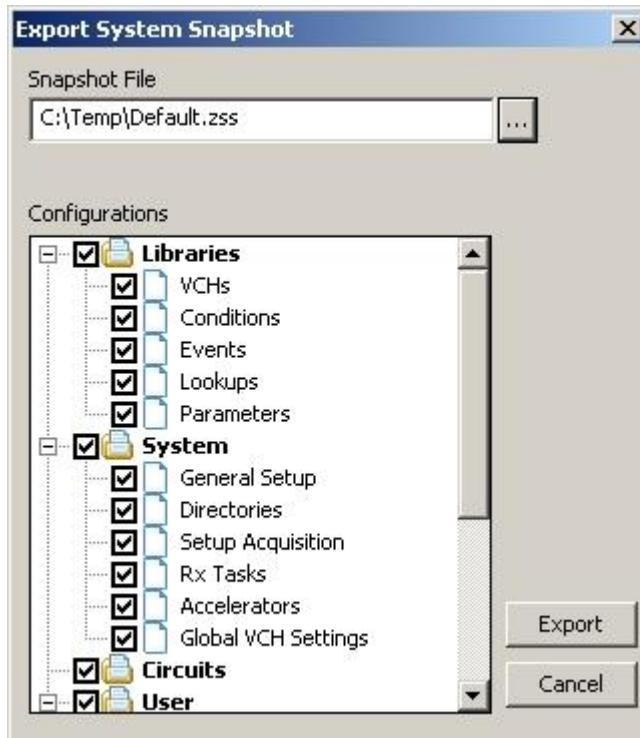
The toolbar of the **Automatic Tasks** window allows the access to the following commands:

COMMAND	DESCRIPTION
Keep Visible	Button not enabled in this window
Cancel	Similar to the Cancel command of the File menu
Apply	Similar to the Apply command of the File menu
Channel Browser	Visualizes the pop-up menu to select the page in the Channel Browser window 
Update	Similar to the Update command of the Tools menu
Scan	Similar to the Scan command of the Tools menu
Clear	Similar to the Clear command of the Tools menu

Snapshot

Export Snapshot

The dialog opens by selecting *Setup/User/Export User Snapshot*. This export user function can export the complete set (events, VCH libraries, layouts, windows, data) of user settings.



In the dialog you can choose the output file and which elements export. The extension of a snapshot export file is .zss. A .zss file is an archive which contains Libraries, System data, Circuits, User Information and Data Loaded.

In the dialog you can choose the exporting items from this check list.

- Libraries
 - VCH
 - Conditions
 - Events
 - Lookup
 - Parameters
- System

- General Setup
- Directories
- Setup Acquisition
- Rx Tasks
- Accelerators
- Global VCH Settings
- Circuits
- Users
 - Layout
 - Condition Settings
 - Data Header
 - Events Settings
 - Setup Users
 - Toolbars
 - Local VCH Settings
- Data

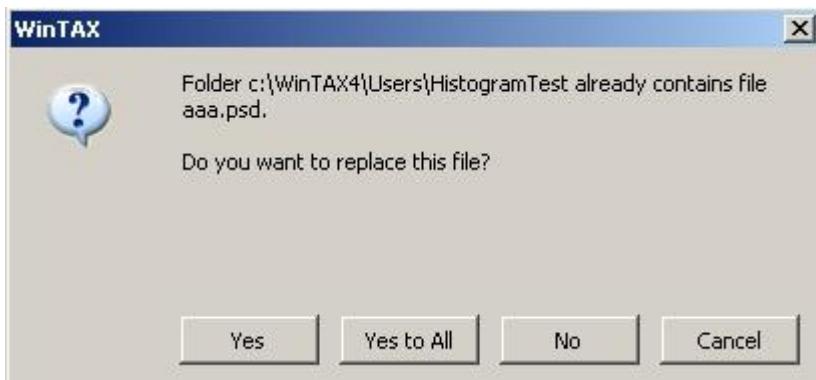
The operation can take several minutes. When the export is successful, the following message appears:



Import Snapshot

The command *Setup/User/Import User Snapshot* opens a window dialog for choosing a .zss file to import. After choosing the desired .zss file, WinTAX begins to extract directories and file from archive then copies its in his directory structures.

If there are any overlaps, WinTAX alerts with a message like the following.



You can choose to maintain or replace the old file with the same name.

The operation can take several minutes. When the export is successful, the following message could be appear:



Datasets

Datasets is an extension of the data management capabilities of WinTAX in which distinct sets of data can be managed simultaneously within the same workspace. The data from different laps/runs can be loaded and at any time it can be decided in which windows the sets of data should be viewed.

A Dataset can be any selection of laps, typically a single lap or a sequence of contiguous laps such as a run.

Up to 10 Datasets can be loaded at the same time.

Note: Datasets replace the previous WinTAX concept of Comparison Groups. The difference is that Datasets can be managed more flexibly in the windows of a layout and they are stored in memory until released.

DataSet configurations cannot be **saved between working sessions** and are **not included in the window of layout configurations**; only slot position can be saved for each window in layout configuration.

Managing DataSets

How to load Datasets

Interactive Data Header

Data Selection Bar

Dataset panel

Telemetry Dataset

Viewing Datasets

Loading Datasets

Loading Datasets from the Data Browser

The Data Browser allows to manage the group of Datasets which are available within the workspace.

Datasets remain in the workspace until released or replaced.

See also Selection methods

To load a single Dataset

Proceed as follows to look at just one single selection of data

Open the Data Browser

Click to select a session in the left hand panel

Select laps from the right hand panel using the standard multiple select key combinations

Note: or also simply left click and drag to select contiguous laps or press **R** to select a whole run

Press Return to load the selection in the first Dataset and return to the main workspace. Any previously loaded Dataset are *not* cleared

To load multiple Datasets

Proceed as follows to start from scratch and load in a group of Dataset.

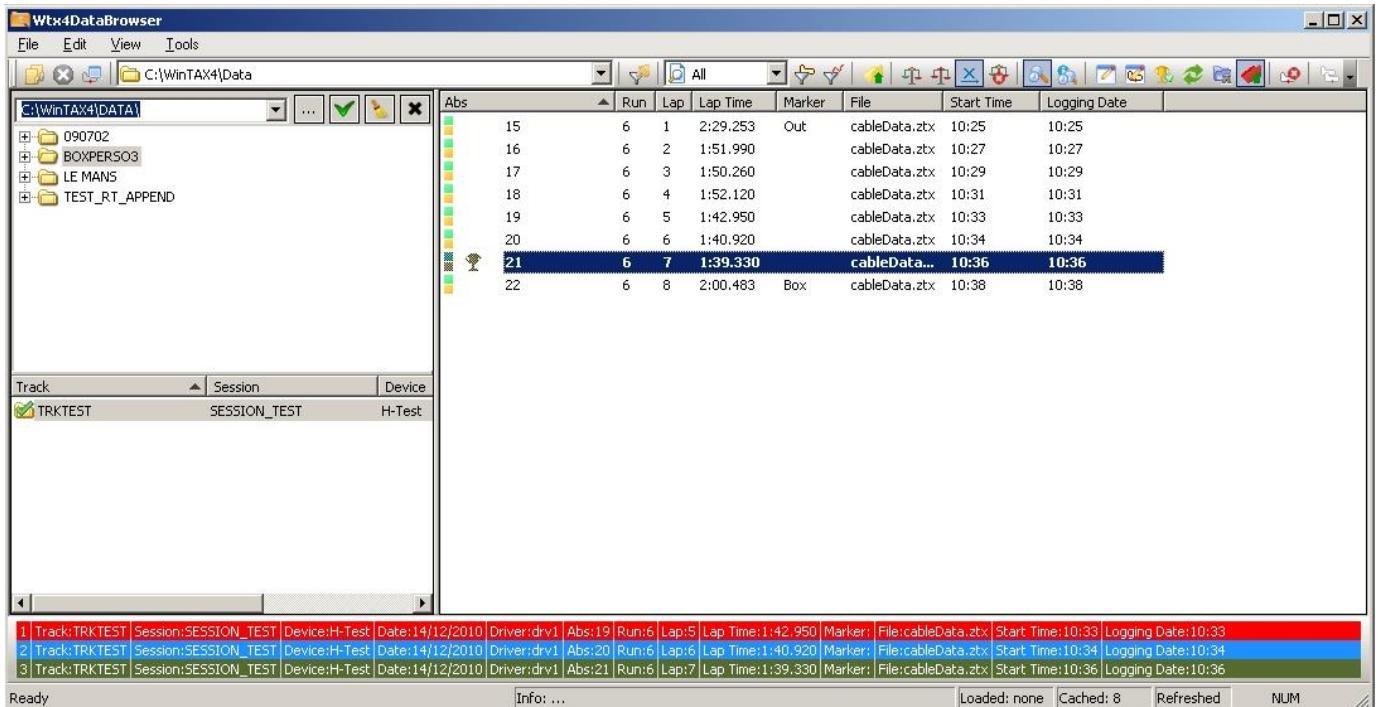
Open the Data Browser

Click to select a session in the left hand panel

Select laps from the right hand panel using the standard multiple select key combinations

Press Ctrl+Return (or right click Add to Comparison) to add the laps to the existing list of Dataset

Repeat steps 2, 3 & 4 until all the Dataset to be loaded have been selected. Each Dataset is loaded into the next available slot.



Press Return to go to the workspace

or

Right click Clear Comparison to clear the selection and start again

To load multiple Datasets to specific slots

Proceed as follows to load Datasets into a particular group of slots.

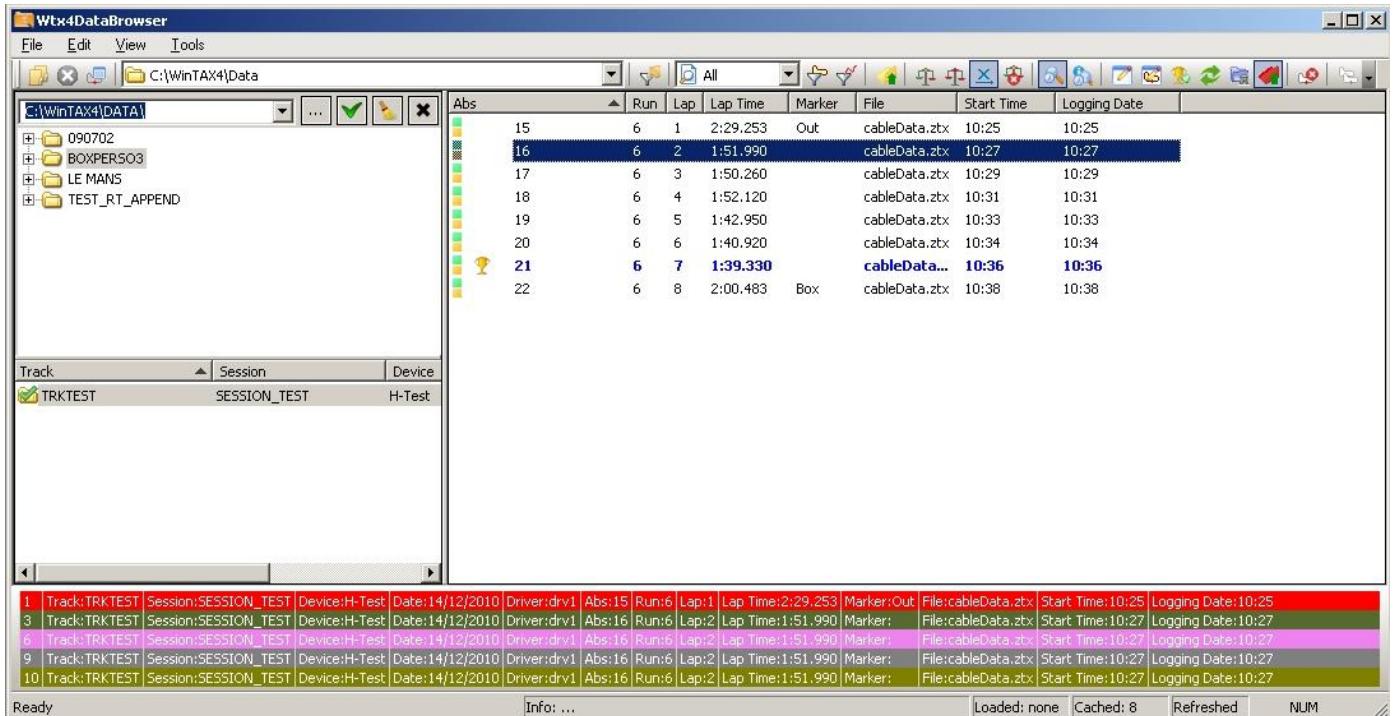
Open the Data Browser

Click to select a session in the left hand panel

Select laps from the right hand panel using the standard multiple select key combinations

Press $Ctrl + N$, where N is 1,2,3,...,0, (or right click Add to Dataset) to add the laps to the corresponding slot number

Repeat steps 2, 3 & 4 until all the Datasets to be loaded have been selected.



Press Return to go to the workspace

or

Right click on the laps and select Clear Comparison to clear the selection and start again.

To clear all Dataset slots

Open the Data Browser

Select *File/Clear comparison* or click on the toolbar button

Loading Datasets from Dataset panel

See DataSet panel

Loading Datasets from Data Header

See Data Header

Loading Datasets from Data Selection Bar

See Data Selection

Viewing Datasets

Windows not supporting comparison mode (e.g. lap reports, trend, circuit, channels) will show data only from the first Dataset in the list (the **Base Dataset**).

Lap report windows show entries for all laps of the part of the Base Dataset archive (i.e. anything for a car in a particular session).

All other windows can display data from any combination of Dataset.

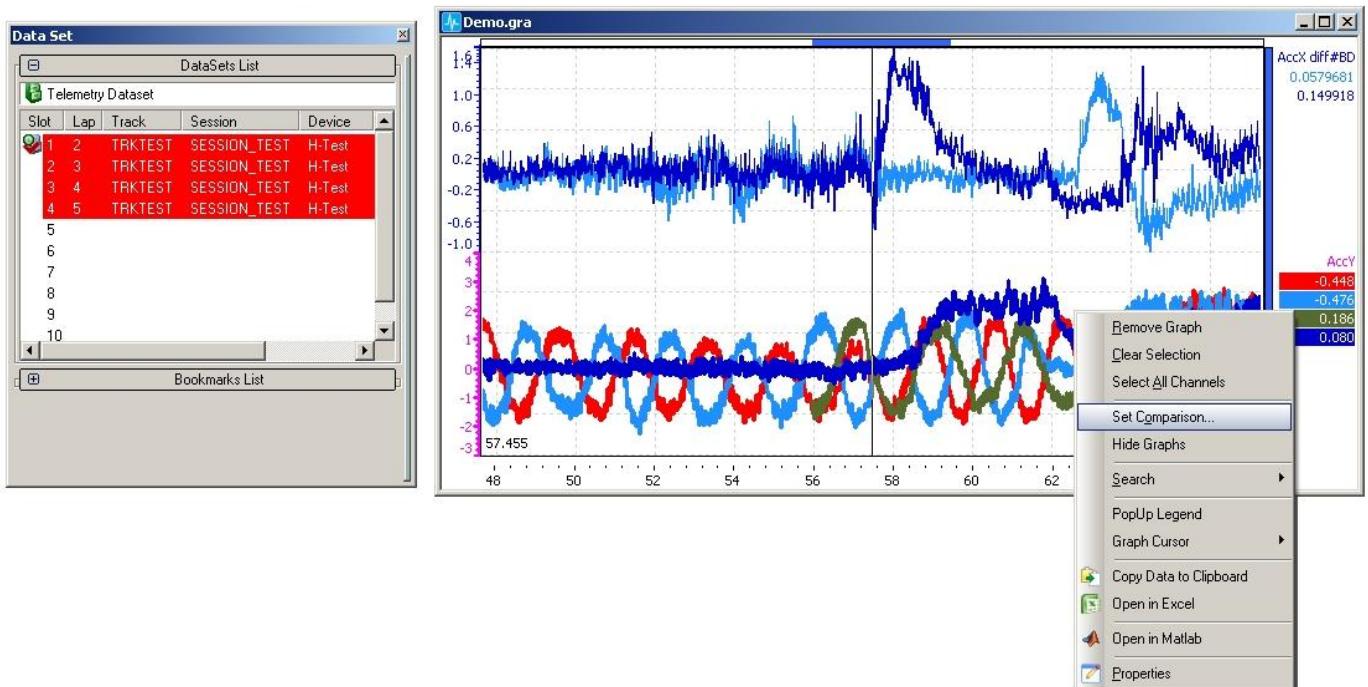
If a window is associated with multiple Dataset they will be displayed in comparison (overlay) mode and will take the color settings defined in the Comparison Groups setup (in effect each Dataset is equivalent to a comparison group).

The subset of laps from a displayed Dataset is selected via the Interactive Data Header. All windows displaying that Dataset will display the same subset of laps.

For individual channels within a Graph window it is possible to show/hide data from individual Dataset and to select the Auto Difference option.

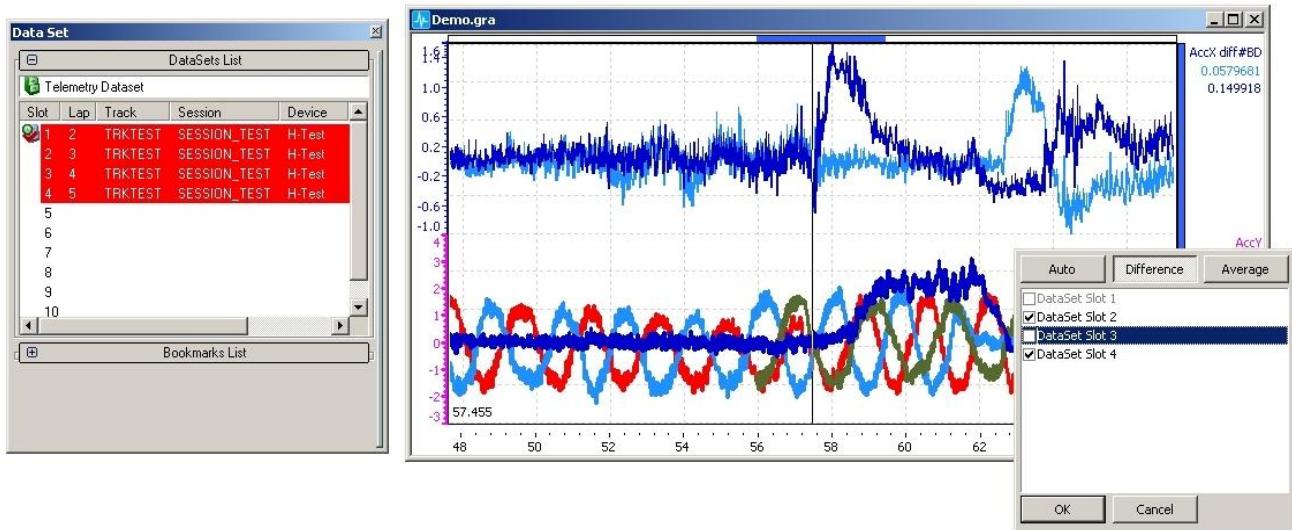
In Virtual Channels (VCH) configurations, it's possible to use the # operator; it is used to identify the Dataset on which the calculation of the channel will be made.

Right click on the channel values and select Set comparison



Enable the Dataset you want to draw

Select Difference to view the difference between data compared with the Base Dataset



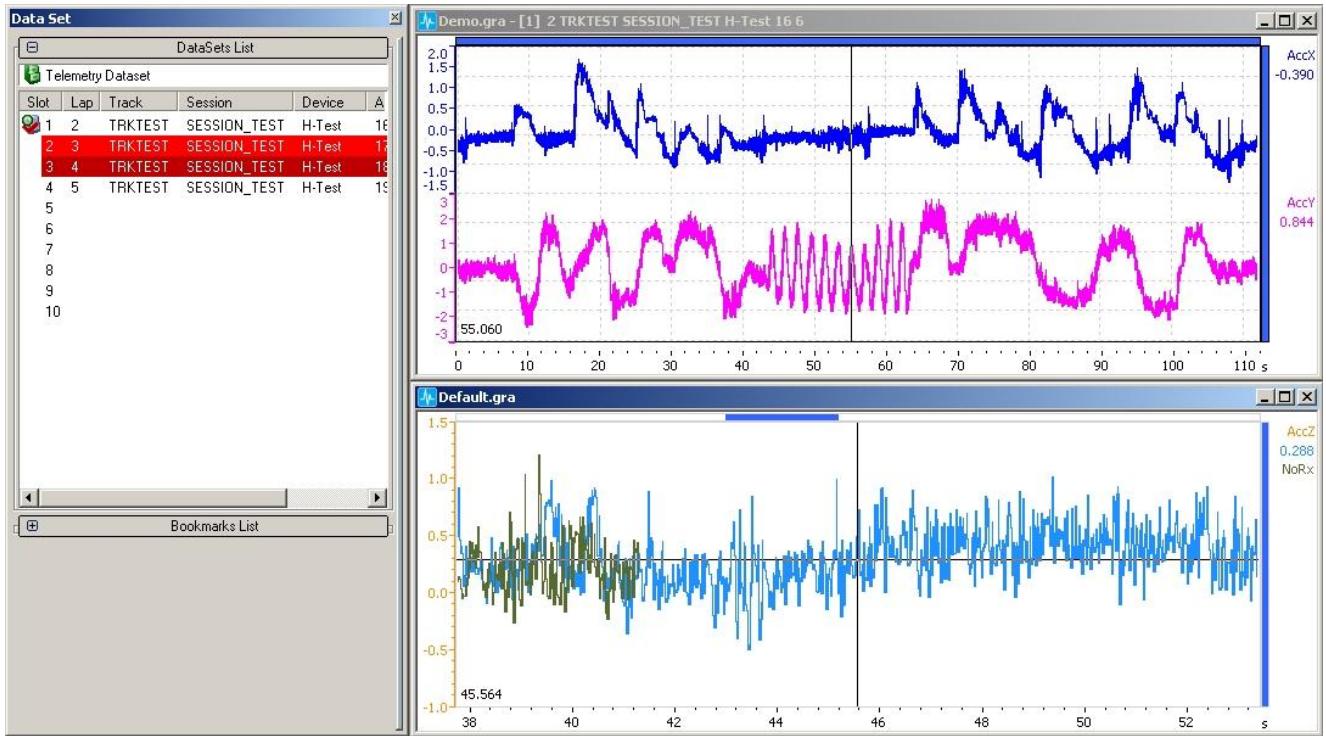
Auto connect (zoom, cursor, shift) functions apply to individual Datasets and any window that show them including comparisons.

Example:

Window_A shows Dataset #1

Window_B shows Datasets #2, #3.

Zoom in on window_B, window_A does not change.



Save slot in layout

In the layout the position of the slot for each window is saved, but not the DataSet loaded in the slot. This means that a configuration can be restored taking into account the number of DataSets and their active position on the window.

To restore this situation however the layout must be loaded after the data, otherwise the data loading is applied.

An example

A layout has four windows A, B, C and D where the DataSets on the slots 1,2,3,4 are active.

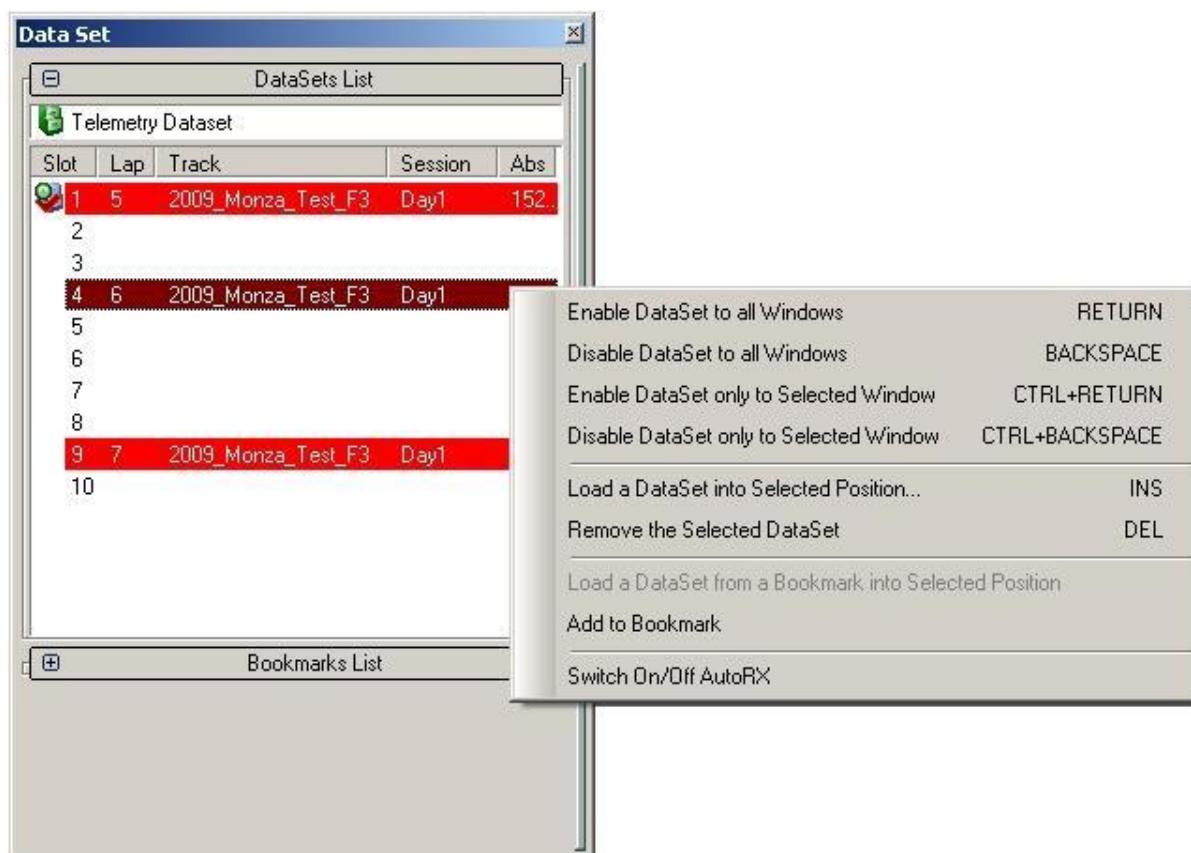
The layout is saved.

At the next session of WinTAX to restore the situation, first load the 4 DataSets on the slots 1,2,3,4 and then load the layout otherwise the data loading operations will overlay those written in the layout.

The information in layout can be modified only with the next saving of the layout itself.

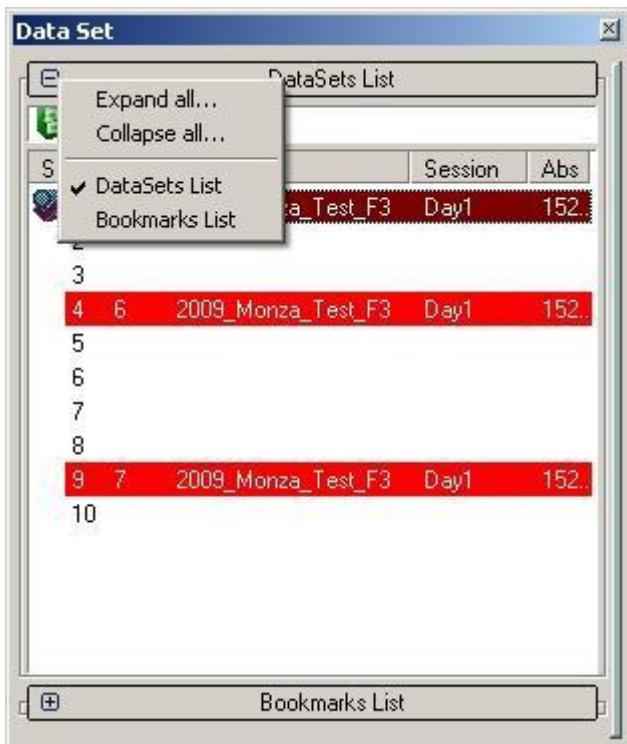
DataSet panel

The DataSet panel is used to control which DataSets are displayed within the various windows of a layout during a working session. It is an interactive control which is used both to see which DataSets are active in a particular window and to enable Datasets to one View/*DataSet Panel*.



The DataSet Panel is formed by the DataSet List section and by the Bookmark List section. The lists can be both expanded or compressed through the button of the corresponding headers.

Also the commands of the pop-up menu can be used.



Expand All Expands both lists

Collapse All Compresses both lists

DataSets List Expands the list if is selected

Bookmark List Expands the list if is selected

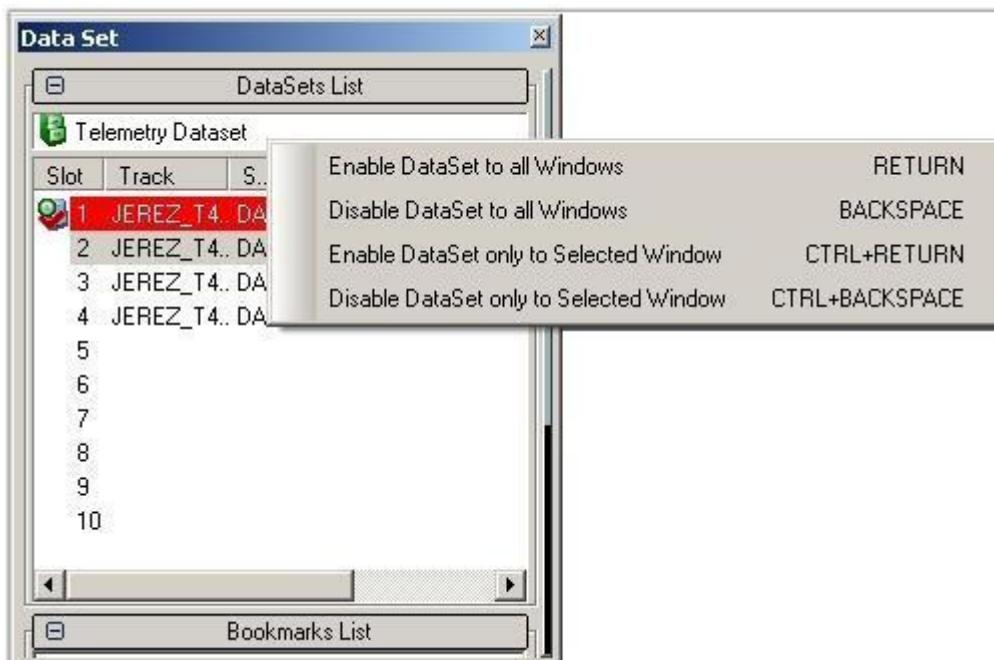
DataSets List

The DataSet List includes the Telemetry DataSet that dragged on a Graph window in Post Processing, changes it into a Real Time window. Below the Telemetry DataSet there is the list of the DataSets.

Telemetry DataSet

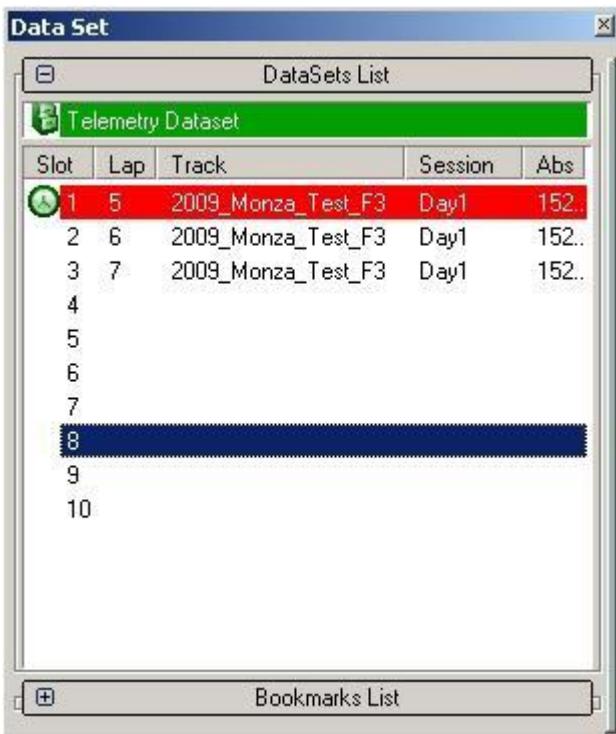
The Telemetry DataSet represents the Real Time stream coming from the Real time acquisition process

This special DataSet can be used to select which windows are set to display Real Time or Post Processing data (available for Graph windows). It's located at the top of the Dataset List in the workspace panel. The Telemetry Dataset is connected to standard enable/disable commands and drag&drop into windows. (See the description of available commands in DataSets List)



The RETURN command ('Enable dataset to all windows') can be used as a short-cut to change a post processing layout to real time layout

The background color of the Telemetry Dataset allows you to know when it's connected to a (or more) window



DataSets List

Below the Telemetry there is the header of the list, with headings that can be configured in the DataSet Header Setup.

Then there is the list of the 10 Slots where each line corresponds to a possible DataSet loaded.

The red check mark means that this is the working DataSet and that it is globally active on all windows.

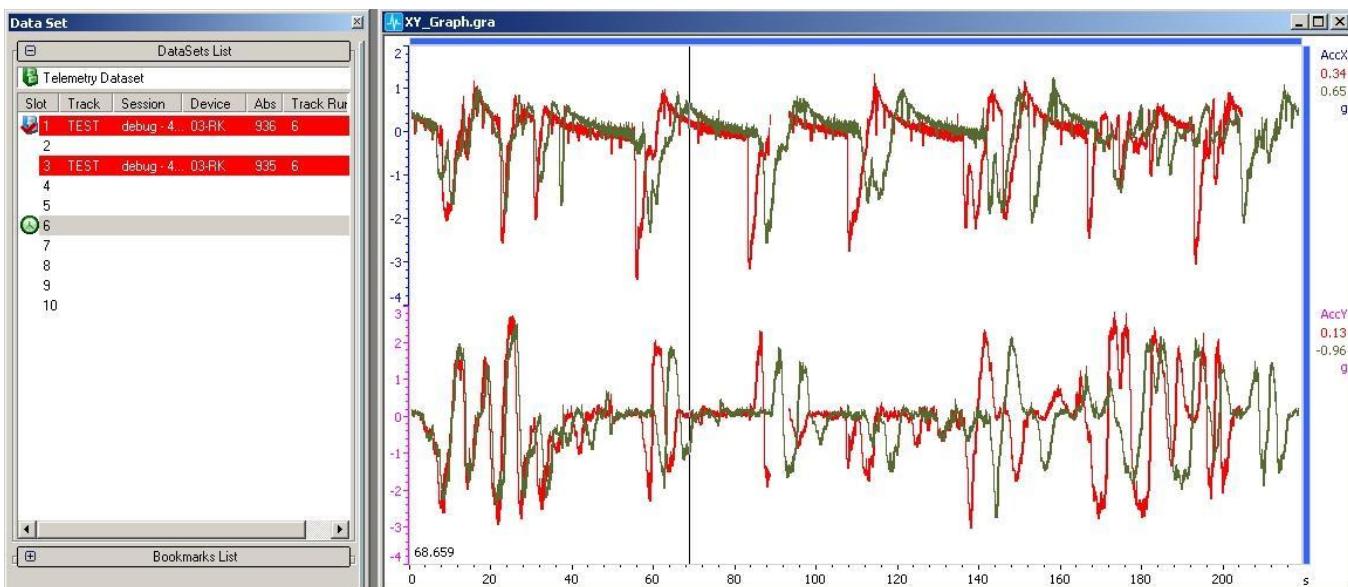
The clock icon means that in AutoRx the lap is loaded on that DataSet.

When the line of the DataSet is red (or brown if the line of the list is selected with the mouse), it means that the DataSet is active on the selected window.

When the line of the DataSet is white (or black if the line of the list is selected with the mouse), it means that the DataSet is not active on the selected window.

This means that the highlights on the list indicate which DataSets are active on the selected window.

In the following example on the Graph window the DataSets available on slot 1 and on slot 3 are displayed and compared. The DataSet on the slot 1 is also valid globally on all layout windows; in case of AutoRx Slot 6 would receive the new lap.



The DataSet can be dragged in drag & drop:

on the DataSets List to change their position

on the Bookmark List to save the references

on the Analysis windows to enable them to that DataSet

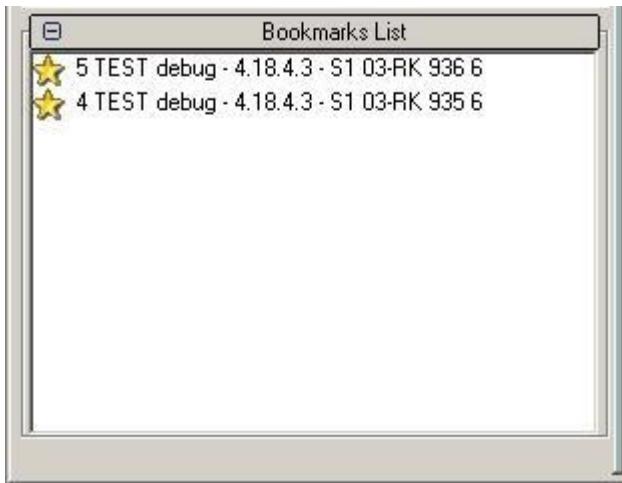
Commands

Click with the right button of the mouse in the Datasets List to see the options.

COMMAND	SHORTCUT	DESCRIPTION
Enable DataSet to all windows	Return	Displays the selected DataSet in all windows
Disable DataSet to all windows	Backspace	Hides the selected DataSet in all windows
Enable DataSet only to selected window	Ctrl + Return	Displays the selected DataSet in the window with the focus
Disable DataSet only to selected window	Ctrl + Backspace	Hides the selected DataSet in the window with the focus
Load a DataSet into selected position	Ins	Allows to return to the Data Browser and select some data to load into the selected DataSet slot
Remove the selected DataSet	Del	Clear the Dataset from memory
Load a DataSet from a Bookmark into Selected Position		Allows to select a DataSet from Bookmark list to be loaded into the selected Dataset slot
Add to Bookmark		Adds the selected DataSet to Bookmark List
Switch on/off AutoRx		Defines which DataSet will be refreshed with the AutoRx function.

Bookmark List

The Bookmarks are references to favorite DataSet that can be loaded by double clicking on the wished bookmark or dragging it with the mouse in a slot.



Bookmarks can be added as follows:

Through drag & drop from DataSets List

Through the **Add to Bookmark** command from the pop-up menu opened by clicking with the right button of the mouse on DataSets List

Through the **Add** command from the pop-up menu opened by clicking with the right button of the mouse on Bookmark List.

Other commands of the window (with pop-up menu) are:

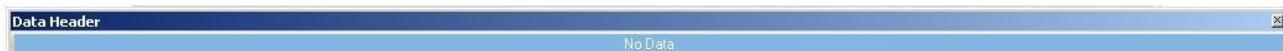
Remove removes the bookmark cancelling the reference to the dataset

Rename renames the bookmark.

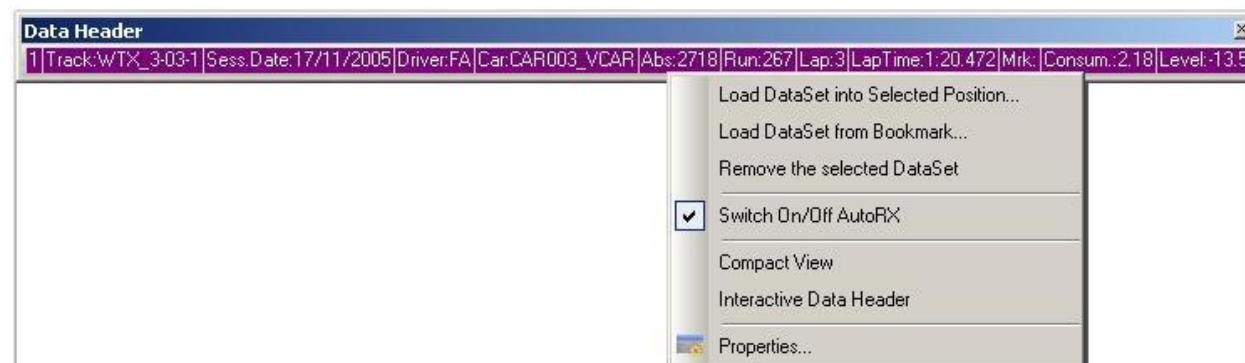
Data Header

The display of the Data Header Toolbar can be enabled/disabled through the **View/Toolbars/Data Header** command of the main menu or through the right click on the area of the toolbars. Data Header is a toolbar that can be configured but no commands can be added. The main function of the Data Header is to show information about the laps loaded; when the datasets are enabled, it becomes interactive as it works also as a control to manage the data on WinTAX.

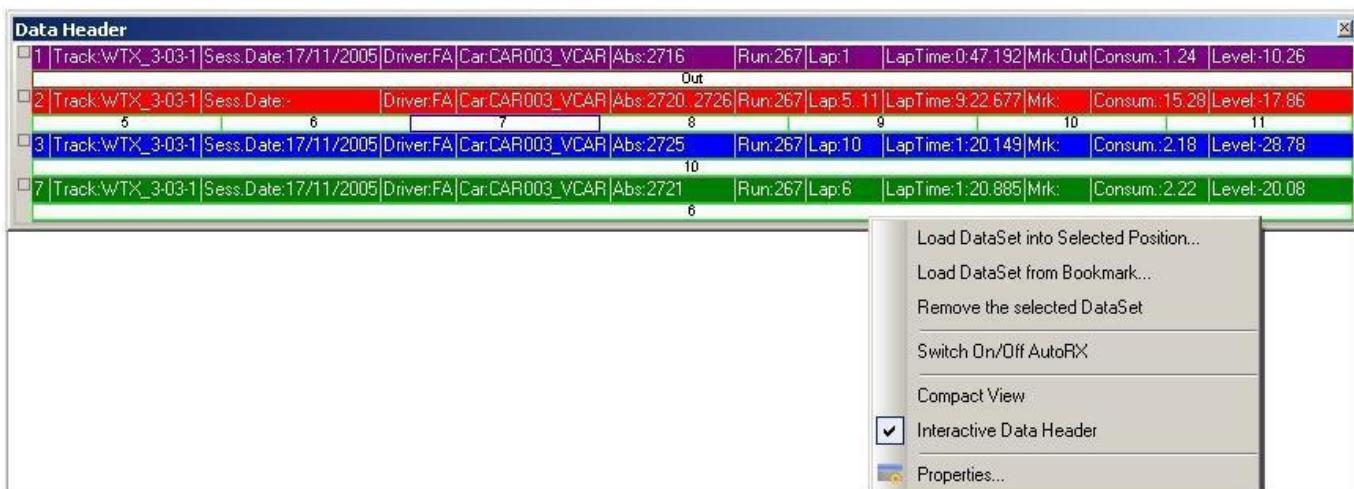
If no lap is loaded, the toolbar is displayed as shown in the figure.



When a lap is loaded, the toolbar shows the information about the lap and depending on its configuration, it can become similar to the one shown in the figure where the pop-up menu is highlighted and can be opened by clicking with the right button on the Data Header.



If an append of a lap is loaded, a single row is anyhow displayed showing the information that vary from lap to lap (for example Abs) and that are presented one after the other separated by a comma, if consecutive, or as a range separated by a colon, if not. The information LapTime, LapDistance, CronoTime and FuelConsumption are related to the currently displayed lap. If a comparison of laps is loaded, all lap information configured are displayed. In the following figure the interactive option is set.



Each lap is marked by a number identifying its position in the Dataset (slot).

The shortcuts ALT+N (N = [1,10]) allow switching the N Dataset in the first slot.

The commands of the menu are as follows:

Load DataSet into Selected Position Opens the Data Browser and allows to replace the lap in the slot identified by the position of the mouse with a new lap or with a lap append.

Load DataSet from Bookmark Opens the list of favourite laps available in the DataSet allowing a quick insert in the slot identified by the mouse.

Add DataSet... allows user to select a dataset from Data Browser and stores it in the first available slot.

Switch to Working DataSet: selected dataset replaces the working one.

Remove the selected DataSet Removes the DataSet selected by the system

Switch On/Off AutoRx Enables the slot of the DataSet where the lap of AutoRx must be loaded during the acquisition.

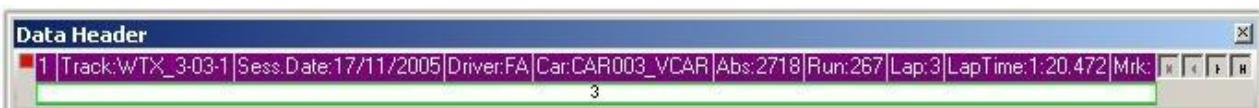
Compact View In case of a comparison of lap, the toolbar is zipped showing just one lap; there is however the possibility to show all laps through the arrow keys displayed on the left.



Interactive Data Header When this option is set, to each row a bar is added where the laps belonging to that DataSet are highlighted. Clicking with the mouse on one of these laps, the lap is loaded on WinTAX. Moreover a red square is added on the left allowing enable/disable the DataSet on the active window. It has the same functions of the commands CTRL+RETURN and CTRL+BACKSPACE on one slot of the DataSet. When the square is red, it means that the selected window has that DataSet active.

Properties Opens the configuration window of the Data Header.

If a toolbar requires more space than that allowed by the window, the exceeding length is cut and navigation buttons are added on the right to allow moving on all information of the Data Header, as shown in the next figure.



Data Selection Bar

It is a toolbar divided into two parts showing the information about the runs and laps of the current session. It is predefined and it cannot be configured. The display of the Layout Toolbar can be enabled/disabled through the **View/Toolbars/Data Selection bar** command of the main menu or by clicking with the right button on the area of the toolbars. It was introduced to simplify the loading of data and that can be seen as a compact representation of the Working DataSet. It is empty before the first loading of a DataSet.



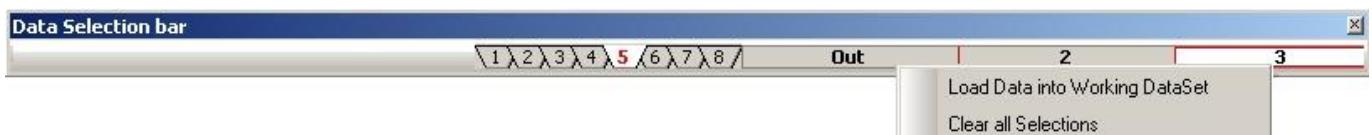
The toolbar has a series of tabs on the left representing the session loaded. Various sections correspond to each tab where the laps of the run are displayed through the marker, if available, or the number of the lap.

Clicking on a tab, the laps corresponding to the displayed Track Run are shown.

One or more tabs or one or more sections of a tab can be selected using the CTRL key. The border of the selected session becomes green with the exception of those corresponding to the laps loaded that become red.

By double clicking on one of the sections selected or using the **Load Data into Working DataSet** command, the laps selected in the Working Dataset are loaded. This command is available in the pop-up menu that can be opened with the right button on the lap area of the toolbar. The **Clear all Selections** command removes the selection to the laps of the toolbar.

By double clicking on a Run, the whole Run is loaded.



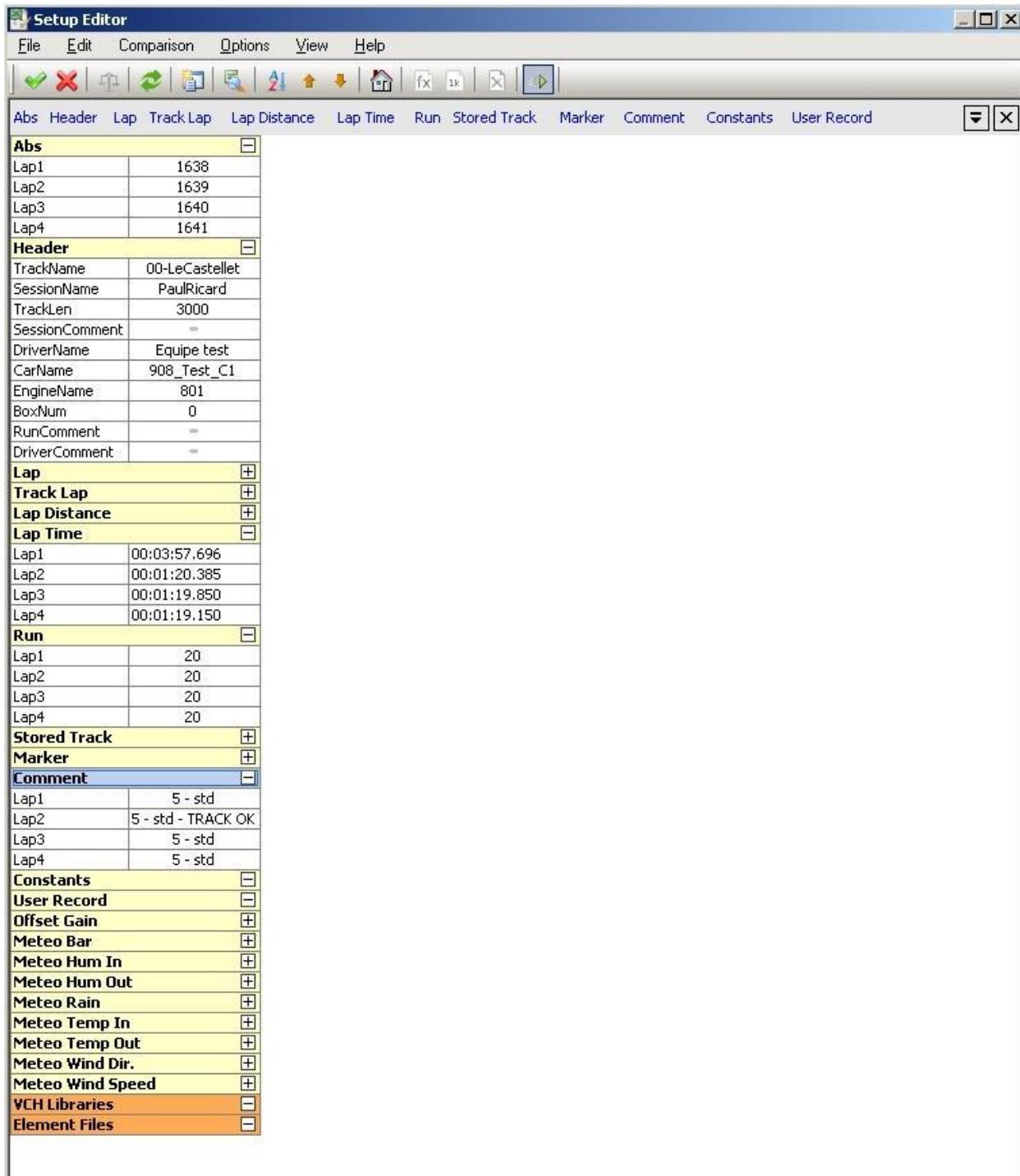
As displayed in the previous figure, when the space required by the run area exceeds a limit, some navigation buttons are added.



A Load operation made on the *Data Selection bar* means actually loading data from the archive (from the local disk or from the network), it is not the same as the operations made on *Interactive Data Header* where the data are already in memory

Setup Editor

Setup Editor is an application used to interface with the context information items of WinTAX data. Using this application it is possible to edit all information associated with the data, to add, edit or delete constants and user records, to perform computations using virtual channels and to import the content of files not present in the data archive. Using OLE Automation it is possible to access Setup Editor from external applications. Furthermore, the structure of Setup Editor allows for easy interaction with Excel.



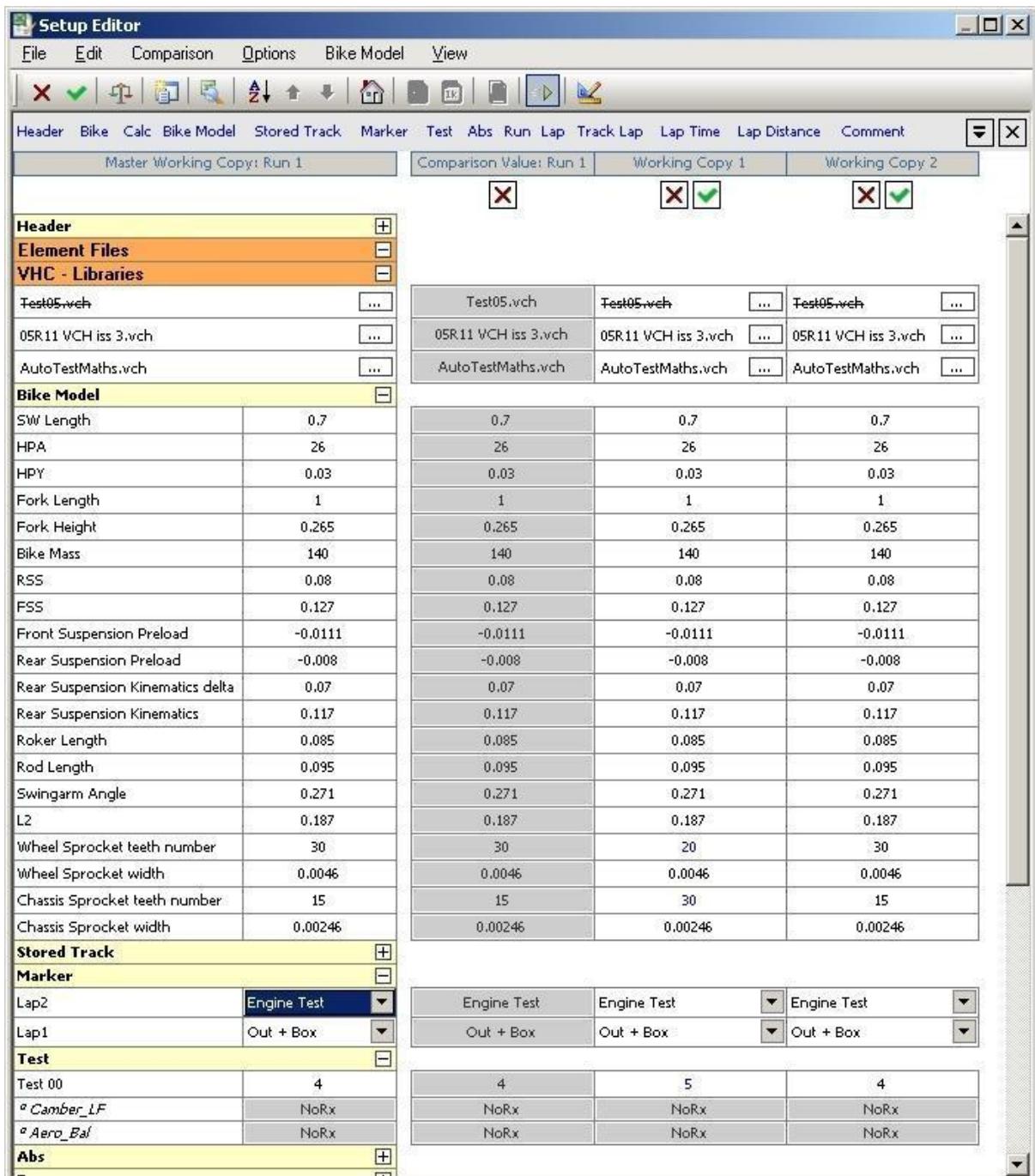
Setup Editor can be accessed in the following ways:

Data Browser, via the *Setup Editor* command in the right mouse button menu, via the *Edit -> Setup Editor* menu or via the shortcut CTRL+F10.

WinTAX, via the *Data -> Setup Editor* menu or via the shortcut CTRL+F10.

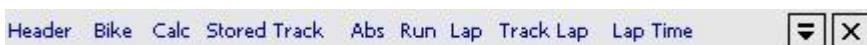
In addition, the configuration of constants, user records and offset gains on Acquisition Manager occurs in a structured environment with Setup Editor.

The context information items shown in the grid correspond to the first run selected: if opening from Data Browser, this means the first run corresponding to the selection in laps lists; if opening from WinTAX, this means the run corresponding to the first lap loaded, or more generally, the first run loaded in the Working Dataset. The interface shows the information in a table format that enables all of the information to be viewed on the same page, separated into groups and working copies.



Setup Editor in its standard layout consists of the main menu, a toolbar, the Groups Browser and the data grid.

Groups Browser is simply the following bar, which can be hidden from the user,



The bar indicates all of the group names, in the same order that they appear in the grid. Clicking once on the name sends the cursor to the start of the indicated group. The Groups Browser bar contains two buttons which have different functions. The first button displays the groups in an extended drop-down list, since it is difficult to show these groups in the horizontal bar, and is

therefore useful for selecting any group. The second button is used to hide the Groups Browser bar.

The grid page displays the various working copies aligned vertically in columns. The header of each working copy, which is coloured grey, shows the serial number entered at the time it was created, as well as the word Master in the case of the main working copy. This latter header also indicates the number of the run being edited. If only the Master working copy exists, no headers are displayed.

The commands Cancel and Apply, corresponding to the icons displayed under each working copy, enable the working copy to be deleted or saved as the Master. If it is saved as the Master, the working copy is automatically deleted.

Each working copy consists of groups with a yellow title header, except for the headers of special groups which are orange; in these latter groups, any links to files which no longer exist are displayed in strikethrough text.

At the right-hand side of each group header there is an icon consisting of the symbol + or the symbol -.

Click on the icon when the symbol is + to expand the group, all the elements are displayed and the icon becomes -.

Click on the icon when the symbol is - to collapse the group, all the elements remain hidden, only the group header is seen and the icon becomes +.

The information within the various groups is displayed one item per row. The Master working copy shows both the name and value of each context information item; the other working copies show only values, in order to maintain alignment between the various working copies. The VCHs are prefixed with ° and are in italic font. User-modified values are blue, whereas red values indicate differences computed by the system (differences in the Compare, differences in the computation of VCHs).

To edit a value, simply double-click on the desired cell or press the space bar to enter the cell value editing mode.

However in the case of "Element Files" groups and "VCH Libraries" groups, to edit the value of an element it is necessary to click the browse icon, which opens the file selection window.

Setup Editor elements

This section explains the terminology used to describe the various functions and gives an overview of how information is organized in Setup Editor.

Context Information

This term denotes all items of information which are saved along with data during acquisition of the laps. This information can relate to the individual lap (lap level) or to the entire run (run level). Using Setup Editor it is possible to read, edit and in some cases also to add or delete this information. Context information items which are added by Setup Editor are also called "fields". Note that the syntax of the elements must respect certain rules, e.g. they must not contain spaces, they must not contain the characters -/,+=#@*^ and furthermore they must not start with numeric values. When constants are used in VCH formulas, they must only be used with their name, without indications regarding the group to which they belong. Such indications must however be given in the case of Element Files. It is therefore not possible to have elements of the same type (e.g. constants) with the same name. Elements of different types (for example a constant element and a user record element) can however share the same name.

Virtual Channels (VCH)

Virtual channels are channels configured in the mathematical libraries of WinTAX. When a library is loaded into the VCH Libraries special group, all of the VCHs contained in it are available to be loaded into the Setup Editor of the custom groups and of the default Header group. The aim is to show the result of mathematical computations based on the context information numeric values.

VCH computations can also be based on Element File parameters, e.g. values read from text files whose corresponding links are stored in the Element Files group. These computations are performed using the values of information items stored in the memory at that time and a variation of the elements which constitute the VCH causes the VCH to be immediately recalculated. Setup Editor is also able to perform computations of VCHs which have logged channels in the formula.

Element Files

Element files are text files created by external applications which contain suitably encoded information that can be read by Setup Editor. These files must reside in the Libraries directory of WinTAX4. Element files can be used in two ways. The first way involves creating a link to the file and saving the link in the Element Files special group. The second way is by importing the text file. In both cases, Setup Editor is able to access the information contained in the files but with one fundamental difference. In the first case, Setup Editor does not display the loaded groups and values because it refers to them via the links to the file. In the second case however, the imported values reside directly in Setup Editor but the link with the source file is lost completely. The advantage of the first case is that the system is sensitive to changes in the elements within the files, while in the second case, obviously changes to the file are lost unless the file is subsequently

reloaded. On the other hand, the disadvantage of the first case is that information loaded from the file is not visible in Setup Editor. The user should select the most convenient method as required. In both cases, when it is necessary to retrieve one of these elements, for example in a VCH computation formula, the syntax to use is **Group.Value**.

The information contained in element files can consist of numeric values or string values. Only the presence of a non-numeric character differentiates the two types of information: numeric or alphanumeric, e.g. constants and user records.

The syntax of the individual elements must respect the syntax rules of VCHs, e.g. they must not contain spaces, they must not contain the characters -./,+=#@*^ and furthermore they must not start with numeric values.

The only accepted decimal separator character is the decimal point, irrespective of the regional settings configured on the PC. Vectors are not provided for.

File formatting must however conform to the following fixed rules.

FILE FORMAT	DESCRIPTION
[GROUP NAME]	group name, always delimited by the characters [and]
Element Name = Element Value	group elements, the sign = delimits the name of the element from its value // is the comment sign; the whole line after this symbol is ignored.

For example, the content of an element file may be as follows:

FILE FORMAT	COMMENT	DESCRIPTION
[GENERAL]	// group name	Element Value=VAL_T1.06 (string)
Event=VAL_T4.06	// Element: Event.	Element Value=VAL_T1.06 (string)
EventNum=Test	// Element: EventNum	Element Value=Test (string)
Session=Day1, 30/10/06	// Element: Session	Element Value=Day1, 30/10/06 (string)
Track Length=4005	// Element: Track Length	Element Value=4005 (numeric)

FILE FORMAT	COMMENT	DESCRIPTION
[ENGINE]	// group name	
Cyl head=1995	// Element <i>Cyl head</i>	Element Value=1995 (numeric)
Engine spec=BB4	// Element: <i>Engine spec.</i>	Element Value=BB4 (string)
Primary=48/88	// Element <i>Primary.</i>	Element Value=48/88(string)

Groups

Context information items and VCHs are sorted into groups. When a lap is opened for the first time, Setup Editor loads all of the context information items and sorts them into groups. After loading it is still possible to add new groups. Groups are identified by a name which must be unique. They can also be unlimited in number, just as there is no limit to the number of context information items and VCHs which may be present within a group. The group name must also respect the syntax rules, e.g. it must not contain spaces, it must not contain the characters - /.,+=#@*^\\ and furthermore it must not start with numeric values.

Groups can be divided into three categories: 1) Default Groups 2) Custom Groups 3) Special Groups.

Default Groups

Below is a summary of the groups which are created at startup of Setup Editor. The following groups cannot be deleted and contain elements which themselves cannot be deleted but only edited.

Abs, Comment, Lap, Lap Distance, Lap Time, Marker, Meteo Bar, Meteo Hum In, Meteo Hum Out, Meteo Rain, Meteo Temp In, Meteo Temp Out, Meteo Wind Dir, Wind Speed, Run, Stored Track, Track Lap contain lap-level information; within the group, unique information is displayed for every single lap in the run.

In addition there are four other default groups but with different characteristics.

Offset Gain contains the list of run-level parameters which can modify the value of the channel. Lap-level offset gains are simply ignored. It is not possible to add or delete channels because each element of the group is associated with a channel of the lap. The values can only be edited.

Header contains general information about the loaded run. This information can be edited but not deleted. In this group it is possible to add or delete VCH elements.

Constants is a group which contains all of the run-level constants, whereas the lap-level constants are completely ignored. Constants are numeric values associated with a name. This group is created the first time that a data archive is opened with Setup Editor in order to somehow group all of the existing constants, although in fact it is a fully custom group. Therefore, when the archive is opened on subsequent occasions, the group may not even be present because it can be deleted or renamed.

User Record is a group which contains all of the run-level user record values, whereas the lap-level user record values are completely ignored. User records are text values associated with a name. This group is created the first time that a data archive is opened with Setup Editor in order to somehow group all of the existing user records, although in fact it is a fully custom group. Therefore, when the archive is opened on subsequent occasions, the group may not even be present because it can be deleted or renamed.

Custom Groups

Custom groups are groups which are inserted by the user, they can be unlimited in number and can in turn contain an unlimited number of context information items or VCHs. In fact, the default groups "Constants" and "User Record" are also similar to custom groups, the only difference being that they are created the first time that a lap is opened in Setup Editor, to enable existing constants and user records to be placed. The elements present in the groups must be unique for the given type. In other words, in all groups there must be only one constant with a particular name; if multiple constants are inserted with the same name, including between different groups, the system does not allow them to be saved and only saves the first constant that it finds. However, it is possible for a constant and a user record with the same name to coexist.

Special Groups

There are two special groups which are called **Element Files** and **VCH Libraries**.

Element Files groups contain links to text files present in the library. These files contain further information which is not displayed in Setup Editor but which is however available for VCH computations. To add links to the group, use the command Add Element File Link.

The **VCH Libraries** group instead contains one or more links to the WinTAX virtual channel libraries; if the archive is being opened for the first time with Setup Editor, the group is still present but empty. To add links to the group, use the command Add VCH Library Link.

It is also possible to create groups of context information items from suitably formatted external files.

The WinTAX channel browser is able to manage groups. The individual group is not active and cannot be dragged and dropped to insert all of its constituent elements in the desired window, whereas drag & drop is permitted for individual elements or for a multiple selection of elements. It is possible to expand or collapse the list of constants by double-clicking on the group name.



Working Copy

The full set of groups is called the working copy. Up to 16 working copies can be displayed simultaneously on the main page. The main working copy, which is the one for which data can be saved in the archive, is called the Master. The other working copies are for tests and modifications; if a working copy must be saved, Setup Editor allows the existing Master to be replaced with the desired working copy. Working copies are always aligned in the sense that any added/deleted elements are also added/deleted on all the working copies present in Setup Editor. Computations executed by the VCHs are performed on the working copy to which it belongs. It is therefore

normal for the same VCH to produce different results in the various working copies, since the parameters which constitute the VCH may have been edited. The content of the working copies is also available via OLE/Automation, by means of appropriate addressing.

Run Comparison

Using Setup Editor it is possible to make comparisons between runs. The reference run is always the one loaded in the Master working copy. It is therefore not possible to edit this reference run without exiting Setup Editor and re-entering the program after having loaded the data from another run. Consequently the comparison is made between the run indicated by the current Master working copy and one or more of the other runs. In terms of the display, the appearance is similar to the status of the multiple working copies. In other words, a main column which displays the Master run, in addition to one column for each of the comparison runs. Each column is divided into groups of elements. The Master run determines which elements are displayed, in the sense that any elements present in at least one of the comparison runs but not in the Master run are not shown. Similarly, elements which are present in the Master run but not present in any of the comparison runs are still displayed and indicated with a dash symbol (-). Elements which are present in the comparison runs cannot be edited in any way. To highlight this fact, the cells of the values are shaded grey.

The comparison can be performed in two modes, Delta and Values.

In Delta mode, differences with the reference run are displayed; fields which remain unchanged are shown blank. In string fields, the message NoRx is displayed if the values are different. If the reference run contains an element which is not present in the comparison runs, a dash symbol is displayed in the comparison runs. If on the other hand the element is present in the comparison runs but not in the Master run, then the element is not shown.

In Values mode, the values of the reference run are displayed; these values are displayed in red when different from the values of the same elements in the comparison run, otherwise they are shown in black as normal.

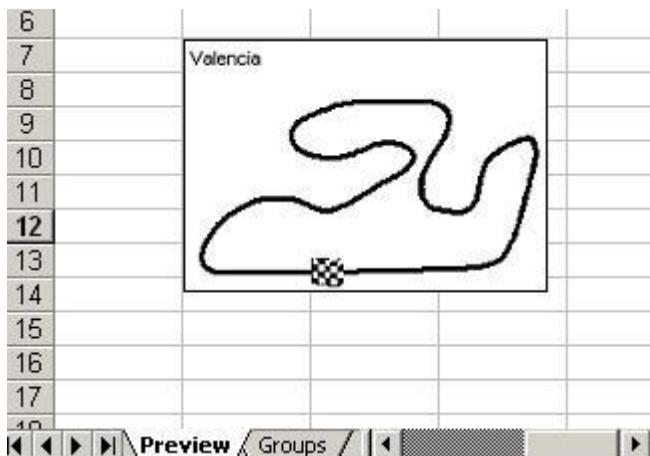
Excel Preview

Excel Preview mode used to display only the requested data on an Excel spreadsheet. In order to activate preview mode, it is necessary to create an Excel workbook with a well-defined, fixed structure.

In particular it is necessary to have created, within the Excel workbook, two worksheets called Preview and Groups, in the desired order.

The Preview sheet requires no further preparation, while the Groups sheet needs to be formatted to receive data.

The Preview sheet displays the bitmap of the track present in the Stored Track group currently saved to file. If the stored track of the Master working copy has been edited but not saved, the original track is still loaded. If there is no track associated with the stored track, the Preview sheet remains blank.



The **Groups** sheet instead displays the values of the desired group and working copy elements. In fact, this group must contain preset search keys so that only elements indexed by the keys (if any) are displayed. To index a group, the following syntax is used:

[GROUPNAME] if you want to associate a value to an element of the GROUPNAME group in the Master working copy.

[GROUPNAME].wc1 if you want to associate a value to an element of the GROUPNAME group in working copy number 1

[GROUPNAME].wcN if you want to associate a value to an element of the GROUPNAME group in working copy number N

The names of the elements to which you want to associate the value must be listed in the column under the group. Here it is no longer necessary to indicate which working copy is involved, since this information is in the group name. The element is indexed as follows: **[GROUPNAME].ElementName**.

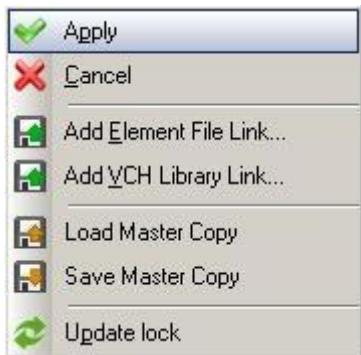
If the indicated working copy and the corresponding group contain an element with the same name as the requested element, then the value is written in the same row and in the column immediately to the right of the column having that name. The value is the one which is currently saved in the requested working copy. Therefore when preparing the Groups sheet, always ensure to keep an empty column to the right of each column containing the requests of groups to be displayed.

	A	B	C	D	E	F	G	H
1	[ENGINE]		[ENGINE].wc1		[ENGINE].wc2		[ENGINE].wc3	
2	ENGINE.Engine spec	BB4	ENGINE.Engine spec	BB5	ENGINE.Engine spec	BB6	ENGINE.Engine spec	BB7
3	ENGINE.Primary	48/88	ENGINE.Primary	47/89	ENGINE.Primary	51/43	ENGINE.Primary	43/90
4	ENGINE.Cyl head	1995						
5								
6	[CHASSIS]		[CHASSIS].wc1		[CHASSIS].wc2		[CHASSIS].wc3	
7	CHASSIS.sn	A1	CHASSIS.sn	A2	CHASSIS.sn	A3	CHASSIS.sn	A4
8	CHASSIS.test	35.7	CHASSIS.test	35.7	CHASSIS.test	33.6	CHASSIS.test	37.75
9	CHASSIS.testA	23	CHASSIS.testA	22	CHASSIS.testA	21	CHASSIS.testA	24
10								
11	[FRONT]		[FRONT].wc1		[FRONT].wc2		[FRONT].wc3	
12	FRONT.Camber	3.6	FRONT.Camber	3.56	FRONT.Camber	3.6	FRONT.Camber	4
13	FRONT.PreLoad	0	FRONT.PreLoad	0	FRONT.PreLoad	0	FRONT.PreLoad	0
14	FFRONT.Bump	24	FFRONT.Bump	24	FFRONT.Bump	23.5	FFRONT.Bump	27.8
15								
16								

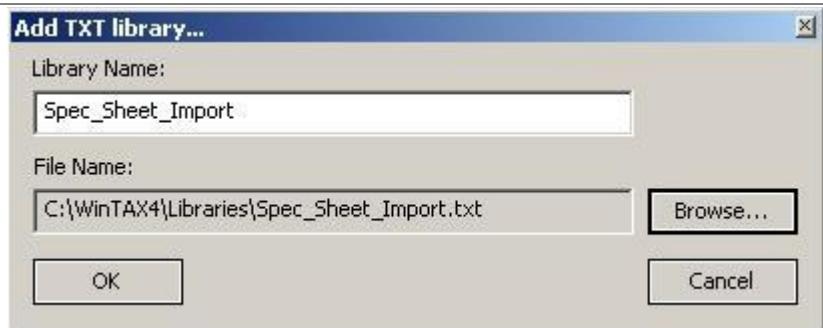
Commands

The menus contain all of the commands which can be executed in Setup Editor. There is also a non-configurable toolbar which displays the main commands. Finally, commands can also be executed by clicking the right-hand mouse button to open a popup menu, which shows all the possible commands for the selected element. The following section describes the commands with reference to the main menu.

Menu File



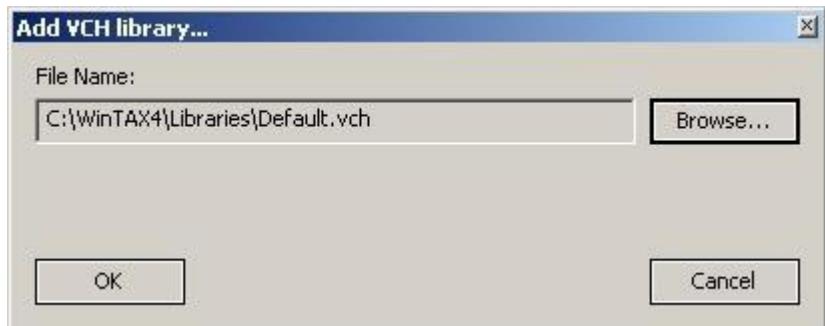
COMMAND	DESCRIPTION
Apply	Use this command to exit the Setup Editor environment, saving any modifications made. Modifications to context information items are saved to XML files; WinTAX automatically reloads the modifications on exiting Setup Editor.
Cancel	Use this command to exit the Setup Editor environment, cancelling any modifications made. The WinTAX status remains the same as before Setup Editor was opened.
Add Element File Link	To add a link to an external text file which must be located in the WinTAX4 Libraries directory; links to text files are the elements which constitute the Element Files group. The command opens the following input window.



Library Name refers to the file which will be displayed in Setup Editor, whereas File Name is the complete path of the file which can only be entered via the Browse button. Press OK to load the link.

Add VCH Library Link

Use this command to add a link to a virtual channel library which must be located in the WinTAX4 Libraries directory; links to virtual channel libraries automatically become elements of the VCH Libraries group.



File Name is the complete path of the file which can only be entered via the Browse button. Press OK to load the link.

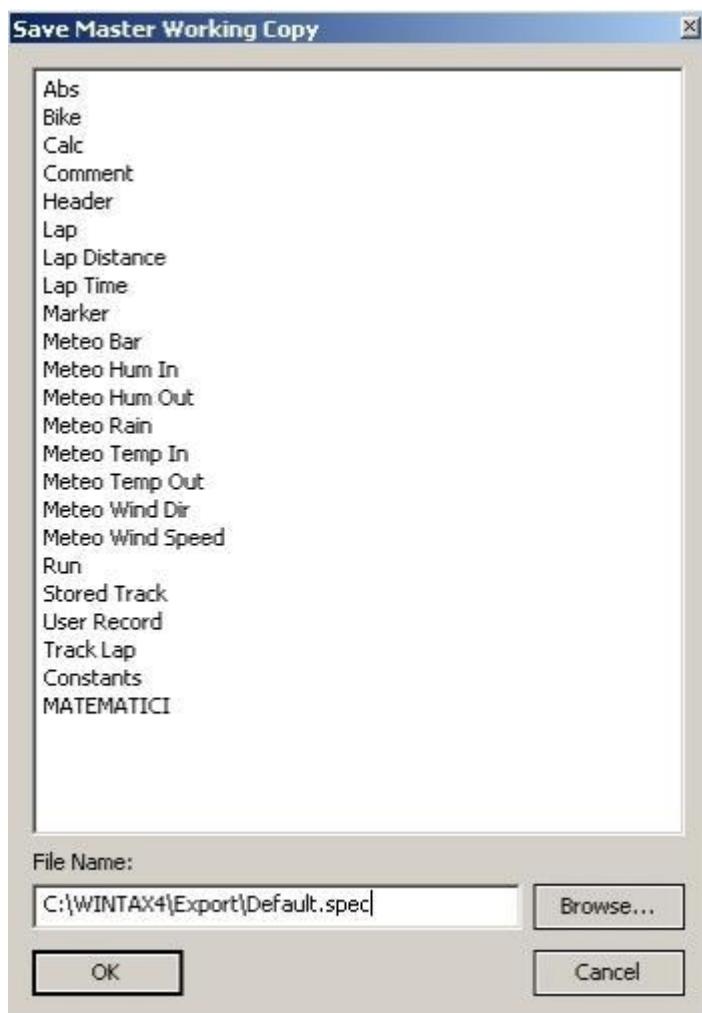
Load Master Copy

Use this command to load an XML file with the extension .spec created using the command Save Master Copy. However, in WinTAX4 only custom groups are loaded, whereas others are ignored. In other words, only constants and user records are loaded using this command. The load is performed not by overwriting the Master loaded from file with the existing Master, but by merging the two files, adding the new values and replacing the values which are identical.

One use for this command is to save a Master copy from the Acquisition Manager environment and then load it in WinTAX, so as to obtain the same constants or user records that you would have during acquisition.

Save Master Copy

To save all or part of the Master Copy in an XML file with the extension.spec, which can then be loaded using the command Load Master Copy. The Save Master Copy command opens the following window:



If no item is selected from the list or if all items are selected (using the standard Windows command Ctrl+Shift) all groups with all values are saved in the file indicated in the File Name box. Otherwise only the selected groups are saved. The file can be saved in any directory; by default the WinTAX4 Export directory is given.

Update lock

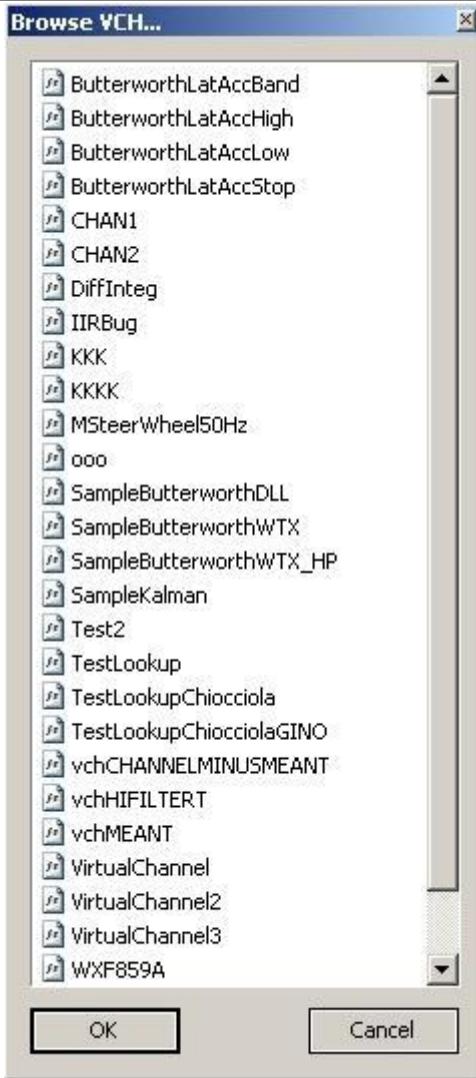
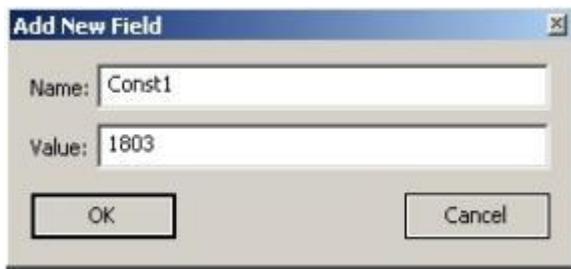
Manual Refresh of the lock state in case the editor opened in read-only mode due to simultaneous editing of the same information. When simultaneous editing is no longer available, the window is removed from the read-only mode.

Menu Edit



COMMAND	SHORTCUT	DESCRIPTION
Create New Working copy		<p>This command adds a working copy by copying it from the Master. The new working copy is positioned to the right of the Master or in any case to the right of the last copy created. Neither the group names nor channel names are indicated, since changes made to the structure of a working copy are also made to all other working copies in exactly the same way. Each new working copy is an image of the Master captured at that moment. During creation of the first working copy which is not the Master, the column header is also created.</p> <p>These new working copies can also be accessed via Automation, in order to create an Excel chart showing trends in the various context information items when one of the variables is changed.</p>
Sort Group A - Z		<p>This command sorts all of the groups into ascending alphabetical order, e.g. from A to Z.</p>
Move up		<p>This command, which applies both to groups and group elements, can be used to move the selected element up one position. Multiple elements can be selected within a group, allowing more than one element to be moved upward.</p>
Move down		<p>This command, which applies both to groups and to group elements, can be used to move the selected element down one position. Multiple elements can be selected within a group, allowing more than one element to be moved</p>

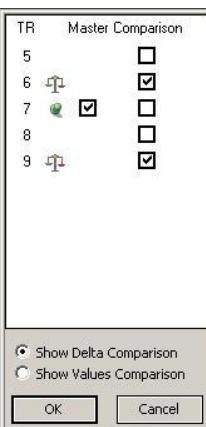
		downward.
Add New Group	Ctrl + G	<p>This command adds a group to the working copies. Since working copies are always aligned with each other, the group is added to all of the working copies present. When this command is selected the following window appears, in which a group name can be entered.</p>  <p>The created group is obviously a custom group. It is not possible to insert a group with a name which is already in use: in this case, the entry is blocked. The newly created group is obviously blank. The command can be invoked using the keyboard shortcut Ctrl+G.</p>
Rename Group		<p>This command changes the name of the selected group. The command opens the following window. Note that it is not possible to change a group name into an existing name.</p> 
Add VCH	Ctrl + H	<p>This command opens the following selection window, which contains all of the virtual channels present in the libraries which are linked in the VCH Libraries special group. The VCHs can be added to all custom groups and to the header special group. A VCH is computed in the working copy to which it belongs. If the formula used to construct it contains constants which have different values in the various working copies, the computed output result will show a different value for each working copy.</p>

		 <p>The screenshot shows a Windows-style dialog box titled "Browse VCH...". The main area contains a list of 27 items, each preceded by a small icon representing a file or folder. The items are:</p> <ul style="list-style-type: none"> ButterworthLatAccBand ButterworthLatAccHigh ButterworthLatAccLow ButterworthLatAccStop CHAN1 CHAN2 DiffInteg IIRBug KKK KKKK MSteerWheel50Hz ooo SampleButterworthDLL SampleButterworthWTX SampleButterworthWTX_HP SampleKalman Test2 TestLookup TestLookupChiocciola TestLookupChiocciolaGINO vchCHANNELMINUSMEANT vchHIFILTERT vchMEANT VirtualChannel VirtualChannel2 VirtualChannel3 WXF859A <p>At the bottom of the dialog are two buttons: "OK" and "Cancel".</p>
Add Fields	Ctrl + D	<p>This command opens the following window, in which a new element can be entered.</p>  <p>The screenshot shows a Windows-style dialog box titled "Add New Field". It has two input fields: "Name:" containing "Const1" and "Value:" containing "1803". At the bottom are two buttons: "OK" and "Cancel".</p> <p>These elements can be added to all custom groups. Both strings and numerical values can be added in the value field, without distinction.</p>

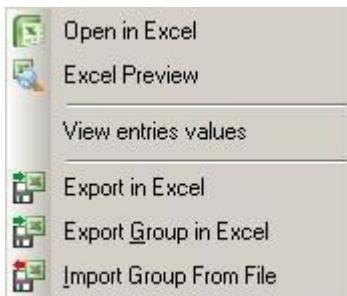
Delete	Delete	This command deletes a group from a working copy or an element from a group, depending on the object selected at the time. The command does not require confirmation. A group is deleted even if it contains elements. For groups, the command is only active for custom groups. Meanwhile in the case of individual elements, the command is active for all constants and user records, all VCHs and for elements contained in special groups. In default groups it is only possible to delete VCHs added to the Header group.
---------------	---------------	---

Menu Comparison

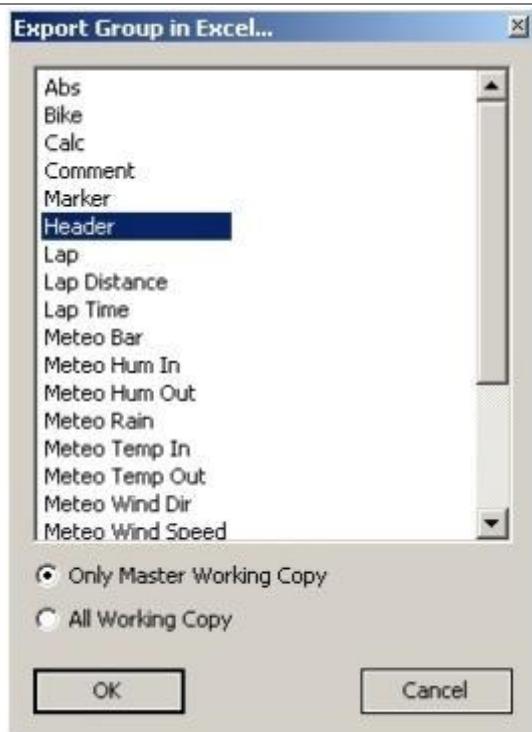


COMMAND	DESCRIPTION
Comparison Settings	<p>This command opens the interface for selecting run comparison operations.</p>  <p>The interface proposes a list comprising four columns. The first column, TR, indicates the Track Run, e.g. the number which identifies the various runs present in the data session. The second column shows a green icon, indicating the Master, and scales icons, indicating the comparison runs. The third column, Master, shows a check mark to indicate the run currently loaded in memory (reference run for the comparison). The fourth column, Comparison, is used to select one or more runs, including the Master itself, for comparison with the Master. The interface also enables the user to select the comparison mode (Delta or Values).</p>
Mode	Mode brings up a submenu which allows the user to select between two different comparison modes, Delta and Value. The same modes can also be configured in the comparison settings interface.

Options Menu



COMMAND	DESCRIPTION
Open in Excel	This command opens an Excel workbook in which the entire content of Setup Editor is displayed. The values are loaded into Excel with a similar layout to the original one. Each column header is also saved and, in contrast to Setup Editor, all of the names of each group and each element are repeated, not only for the Master but also for each working copy. Furthermore, any groups which may have been collapsed and hidden for space-saving purposes are expanded and displayed on the Excel workbook.
Excel Preview	<p>This command opens the standard Windows selection window, which shows the directory Wintax4\Utilities\ and all of the Excel workbooks contained in it. For this command to function correctly, the Excel workbooks that you wish to preview must have already been appropriately configured according to a well-defined, fixed structure. You can also open Excel files located in directories other than Wintax4\Utilities\, even though this is the default directory.</p> <p>When the general Excel workbook is selected, it is opened and any matches between groups and elements present at that time in Setup Editor are checked against a fixed search key; finally, the associated fields in the Excel workbook are updated.</p>
View entries values	If checked, show the groups loaded from Element Files. The color of the header of these groups is cyan.
Export in Excel	This command opens the standard Windows "Save As" window and shows the directory Wintax4\Export\, although it is possible to save the file in any other directory. An Excel workbook is created with the same characteristics as the file obtained using the Open command in Excel, but with a simplified layout.
Export Group in Excel	This command opens the group selection window.



In this window you can select one or more groups. Selecting OK opens an Excel workbook formatted according to the Excel Preview rules. Each group will be identified by a header **[GROUPNAME]** with all the group elements listed underneath in the style **[GROUPNAME].ElementName** and with their corresponding values in the next column. If the option Only Master Working Copy is selected, then only the values for the elements of selected groups belonging to the Master are exported to the Excel file. If, on the other hand, the option All Working Copies is selected, then the selected groups of all working copies are exported.

Import Group From File

This command imports into Setup Editor text files formatted according to the Element File rules. During the import operation, new elements are added and existing elements are updated. If the loaded file contains a group which is not present in the Master working copy, a new group is created to which all of the elements present in the file are added. If however the group exists, new elements are added while existing values are only updated.

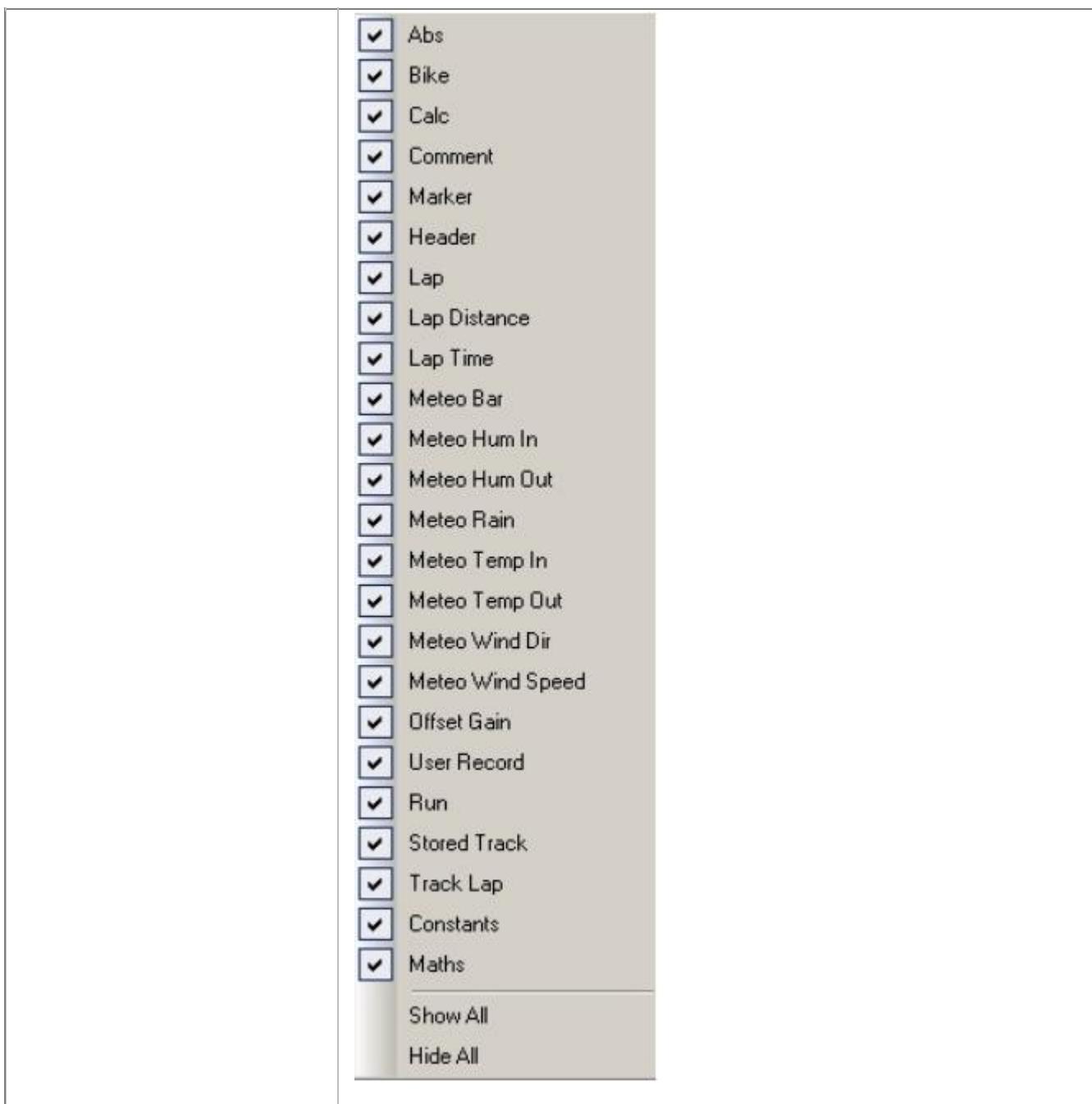
In short, elements belonging to identical groups are combined, while identical elements are discarded. This applies to all groups, not just custom groups.

If the Master copy already contains a constant with the same name as a new constant or a user record with the same name as a new user record, and provided they are located in different groups, the insertion of this new value is permitted. However, it is not permitted to save two constants or two user records with the same name, therefore during the save operation only the first one is kept and all others with the same name are deleted.

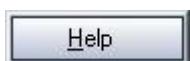
Menu View



COMMAND	DESCRIPTION
Groups Browser	This command displays or hides the Groups Browser bar.
Hide Group	Hides the selected group. The group is understood to be selected even when the selection is active on an element in the group. Multiple selections are not possible.
Expand/Collapse Group	Expands or collapses the selected group. The group is understood to be selected even when the selection is active on an individual element in the group. Multiple selections are not possible. The status of the individual groups is maintained whenever Setup Editor is reopened.
Show/Hide Group	This command opens the following popup menu, which lists all of the groups present in Setup Editor. Each group can be hidden or displayed by clicking the corresponding name. A ticked box indicates a displayed group, while an empty box indicates a hidden group. The status of the individual groups is maintained whenever Setup Editor is reopened.



Menu Help



COMMAND	SHORTCUT	DESCRIPTION
Help	F1	Launch the WinTAX4 help, if available.

Setup Device

A simplified version of Setup Editor is present in the Setup of Acquisition Manager, for the purpose of editing constants, user records and offset & gain values. Note that by default the following 5 groups are given:

VCH Libraries

The **VCH Libraries** group has the same characteristics as the VCH Libraries special group on WinTAX. The only difference is that in this simplified environment, it is not possible to use virtual channels. The obvious reason being that this is a pre-acquisition setup, therefore the channels are not available. To add links to the group, use the Add Element File Link command. This group cannot be deleted.

Element Files

Just as in WinTAX4, the **Element Files** group contains links to text files present in the library. This group cannot be deleted.

Constants

The Constants group is a custom group and can therefore be freely edited or deleted. It is proposed the first time that data is read using Setup Car, so as to give the user an indication of where to save the constants.

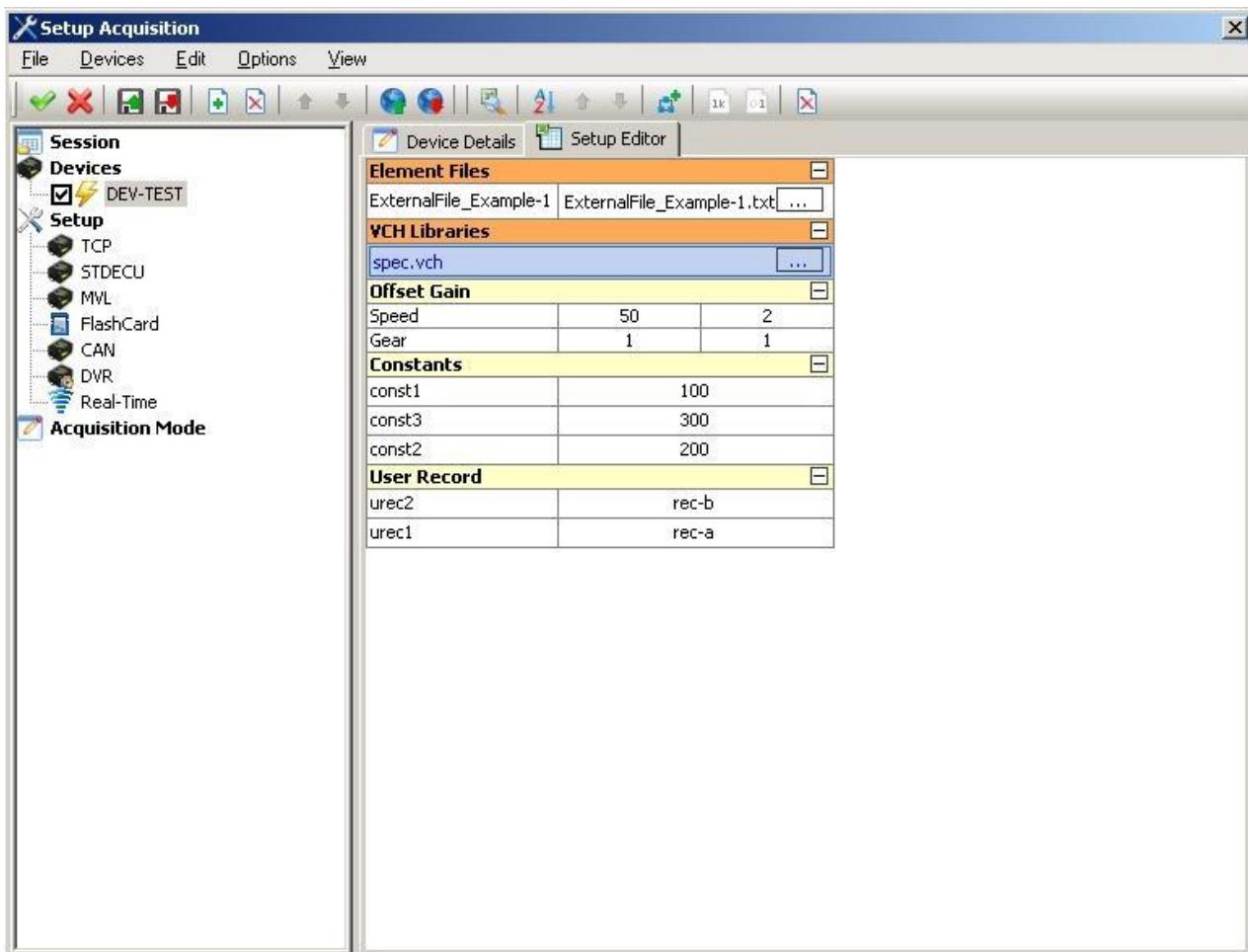
User Record

The User Record group is a custom group and can therefore be freely edited or deleted. It is proposed the first time that data is read using Setup Car, so as to give the user an indication of where to save the user records.

Offset Gain

By contrast, the Offset Gain group is a fixed group which cannot be deleted, and which must contain the indications of the channels with addition or multiplication constants to be applied to the channel itself.

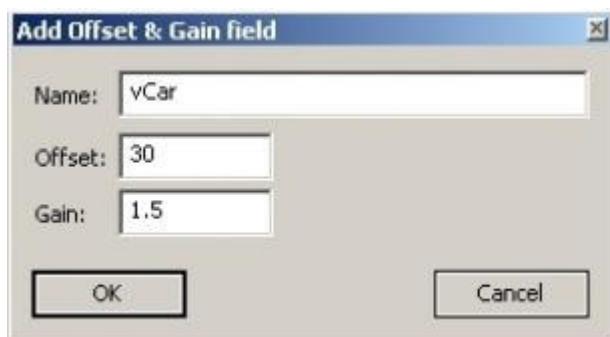
The interface appears as shown in the following screenshot; in the case of configuration via wizard, the Setup Car interface is not used.



The Setup Car commands are essentially the same as those found in the extended version on WinTAX, with a few exceptions.

Add Offset & Gain field

This command is active when the Offset Gain fixed field is selected. The command does not exist in Setup Editor which is opened from WinTAX or from Data Browser. Selecting it opens the following window, in which it is possible to configure the offset and gain values to be associated with the name of a channel.



Load & Save Master Copy

These commands function in the same way as the equivalent commands on WinTAX; the only difference is that they are located in the Options menu instead of in the File menu. The Load and Save commands relate to the selected car.

Add VCH

It is not possible to add VCH in Setup Car. Since it is not possible to load data in this phase, it is not possible to obtain results on the virtual channels: however, it is possible to select links to external files (VCH and TXT) which will subsequently be saved in the archives.

OLE Automation

Setup Editor - or more precisely the working copies, groups and individual elements - are accessible from external applications via Automation. In fact, the WinTAX interfaces are extended to provide direct read and write access to context information and to the various working copies.

Context information can be read or edited via Automation only by means of the COM interfaces of the WinTAX4 component. The following example demonstrates how to access this information.

```
Dim oWintax As Object
```

```
Set oWintax = CreateObject("wintax4.Application")
```

```
Dim spec As WTXSpecSheet
```

```
Set spec = oWintax.specsheet
```

```
Dim nWorking As Long
```

```
nWorking = spec.Count
```

```
Dim working As WTXSpecWorkingCopy
```

```
If (nWorking >= 1) Then Set working = oWintax.specsheet.WorkingCopy(0)
```

```
Dim nGroup As Long
```

```
nGroup = working.Count
```

```
Dim group As WTXSpecGroup
```

```
If (nGroup >= 1) Then Set group = working.group(0)
```

```
Dim item As WTXSpecItem
```

```
Set item = group.AddlItem("test")
```

```
item.Value = 47
```

```
Set item = group.DataItem(0)
```

```
group.RemoveItem ("test")
```

```
group.RemoveItem (0)
```

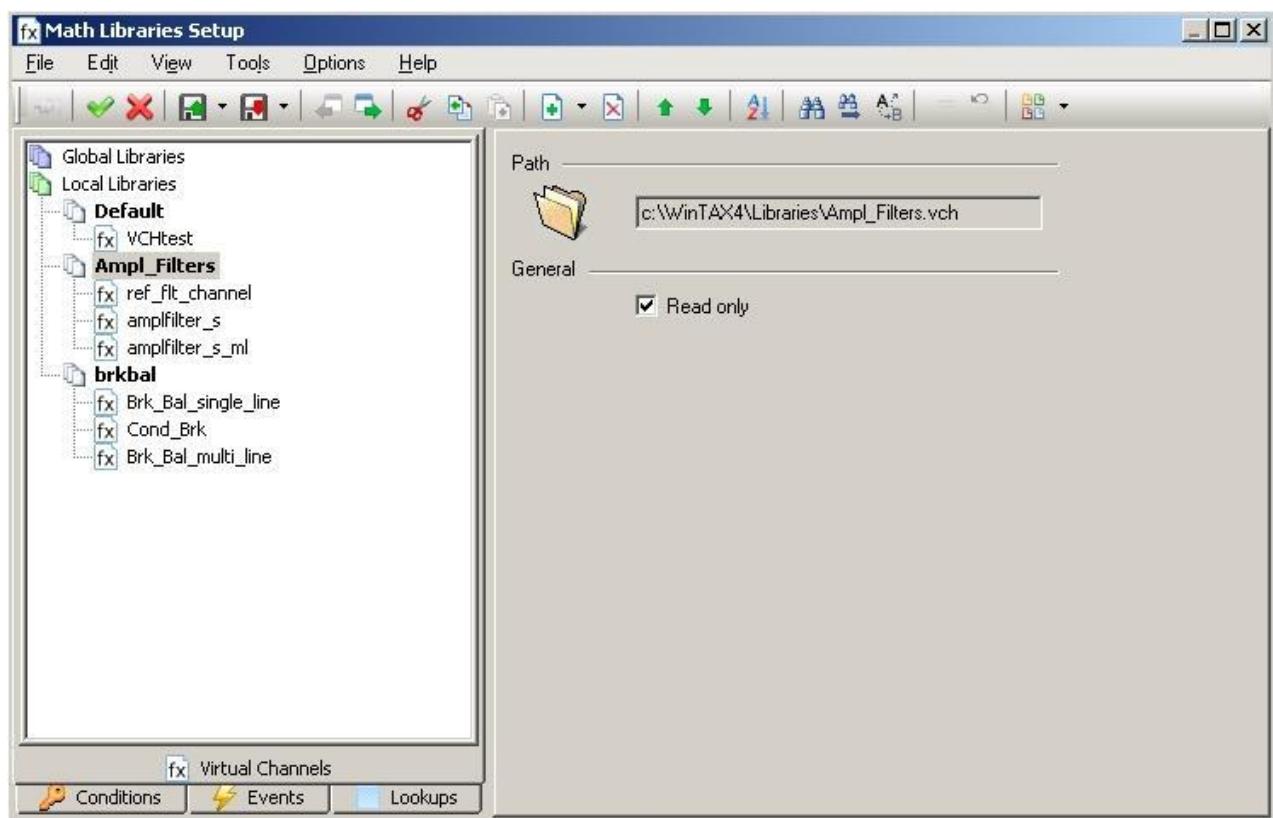
Runtime analysis

Virtual Channels (Vch)

Setup Vch

Loading VCH libraries

1. Select *Tools/Virtual channels* to open the editor
 2. Select *File/Load* from the editor menu and load or create one or more VCH files. The libraries which are currently loaded are listed on the left of the editor window. The path for the highlighted library is shown on the right
- By default, VCH libraries are local to the User
3. Use the *read only* flag to prevent entries in the library from being modified. Read only libraries are shown as a closed book. Libraries which are not saved in the local *Libraries* directory are always read only. They are generally shared between users.

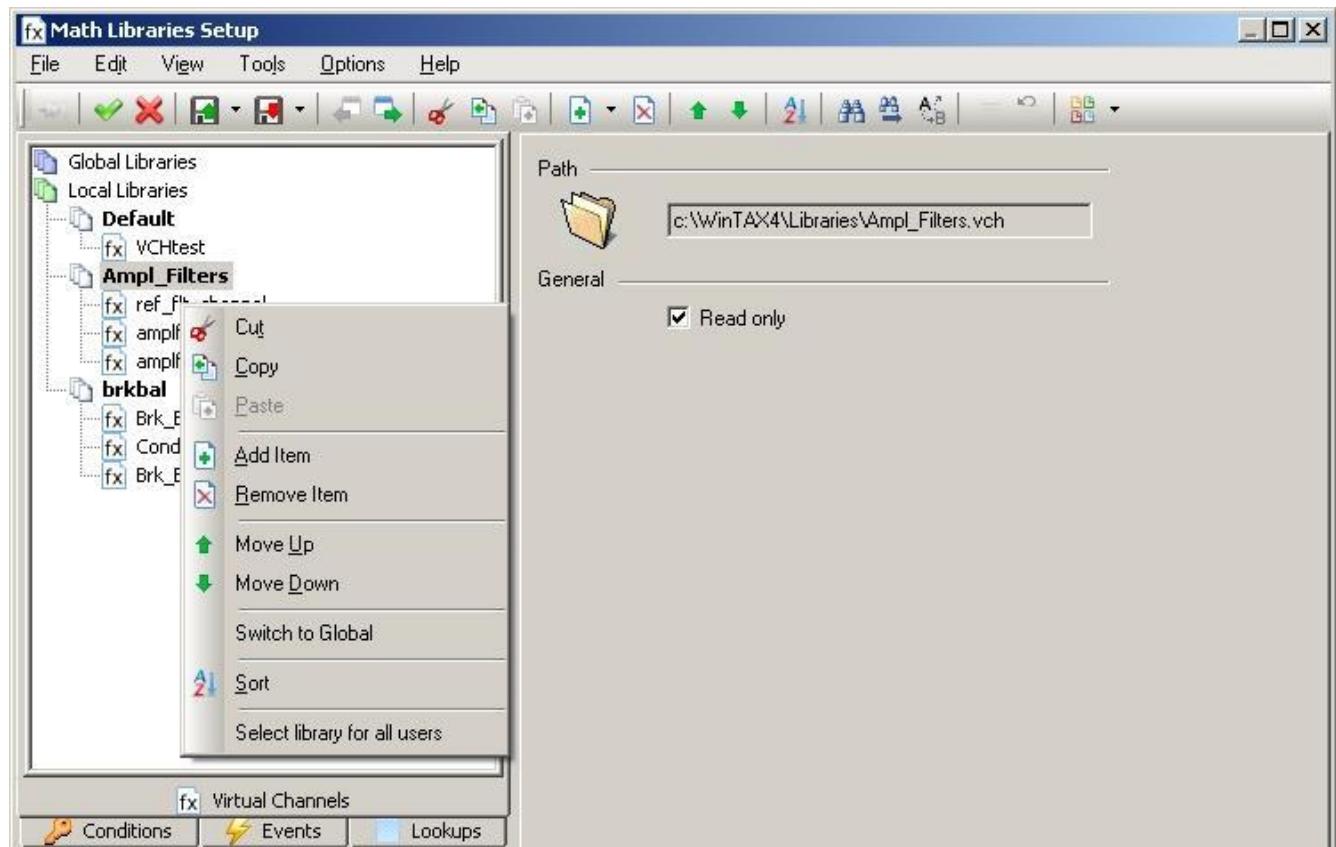


Applying a VCH library to all users

1. Select the library
2. Right click and select *Switch to Global* or select *Options/Switch to Global/Local*
3. Click OK to confirm at the prompt
4. The selected library will now be visible within all user environments

Loading a VCH library to all users

1. Select *File/Load* to load the library, by default it is loaded as Local
2. Click on the library then right click and select *Switch to Global*
3. The selected library will now be visible within all user environments



Restore user default VCH libraries

1. From the main WinTAX menu bar select *Setup/Users/Configure user*
2. Choose the user to be restored
3. Select *Edit/Restore default user libraries*

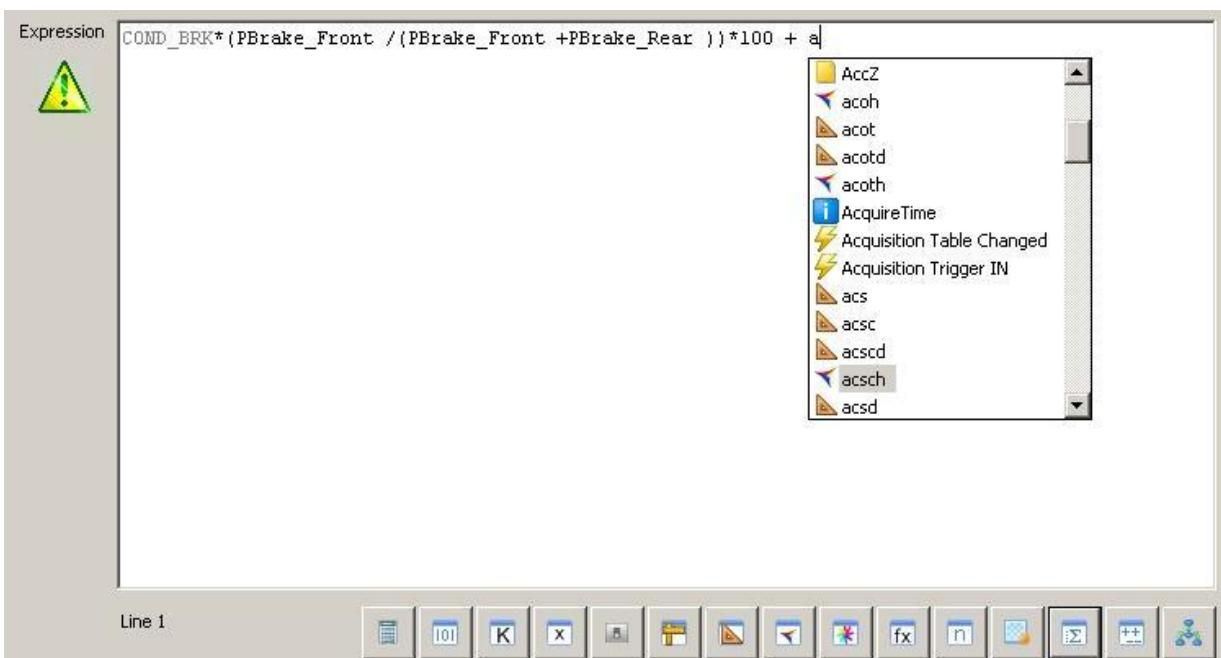
Removing VCH libraries

1. To remove a library from the list simply right click on it and select Cut (CTRL+X) or type delete

Note: removing a VCH from the list will not delete it from the disk

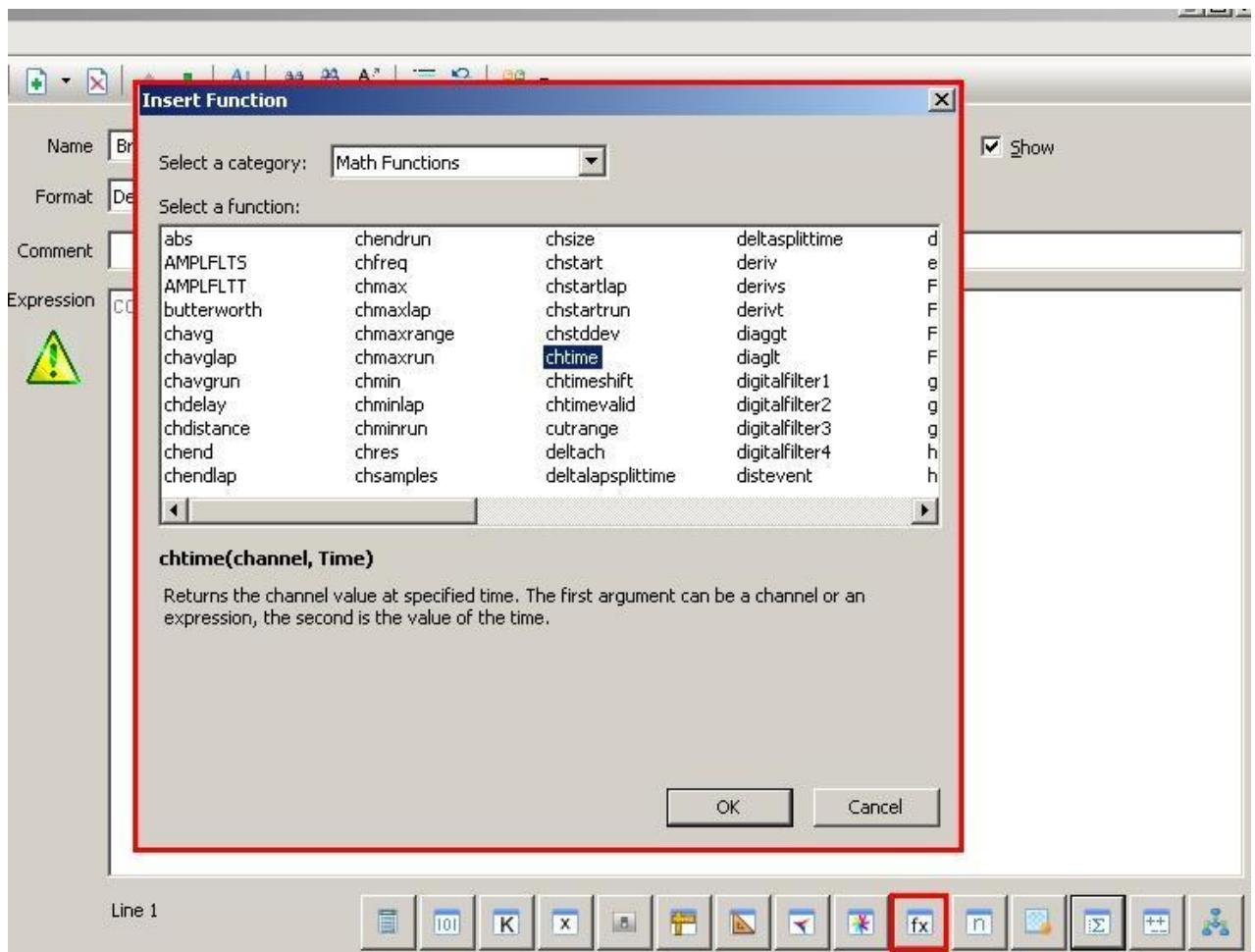
Create a mathematical channel

1. To create virtual channels select *Edit/Add item*
 2. A new entry with a default name will be created and the editor will show the fields needed to define the expression. Edit the default name
 3. Click inside the *Expression* pane and begin typing
- Note:** no equals sign needs to be typed at the beginning of the expression.
4. While typing an expression the editor will offer auto-complete suggestions for function and channel names.



Function arguments are shown in a tooltip when the open bracket after a function name is typed.

6. To see a list of available functions and operators click on the functions type buttons on bottom of the window. A list of functions is shown within an help description



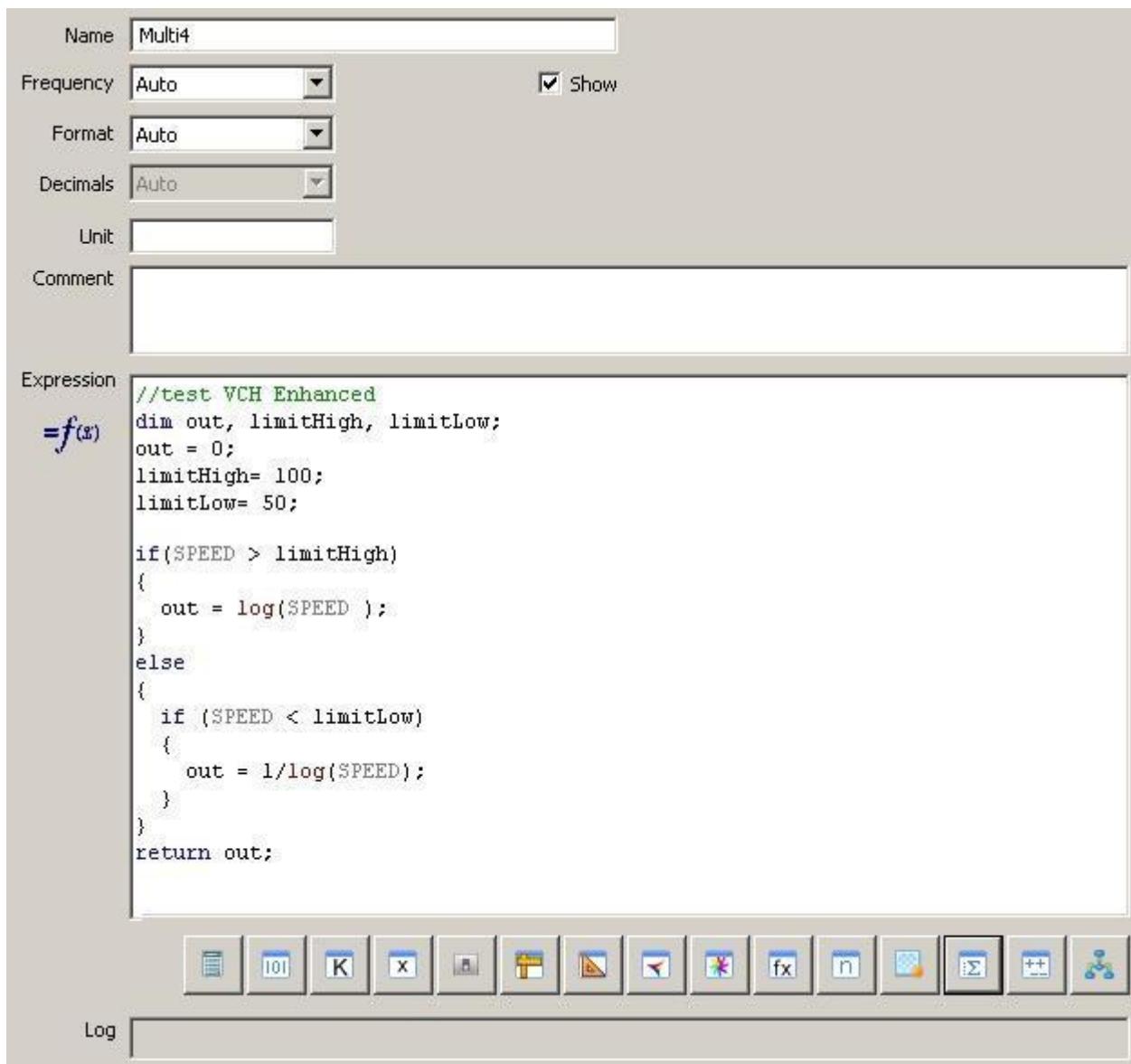
6. Use the *Show* flag to define whether an expression is to be displayed in the channel browser (you may want to hide intermediate expressions).
7. Set the frequency to *Auto* to generate the channel at the highest frequency of the constituent channels.

Writing an expression

In addition to standard mathematical rules, a mathematical expression could be write using the VCH Programming Language.

The expression can be written on multiple lines and each line must be terminated with a semicolon. It's possible to use variable for saving partial results and reusing them in the same expression or in another one.

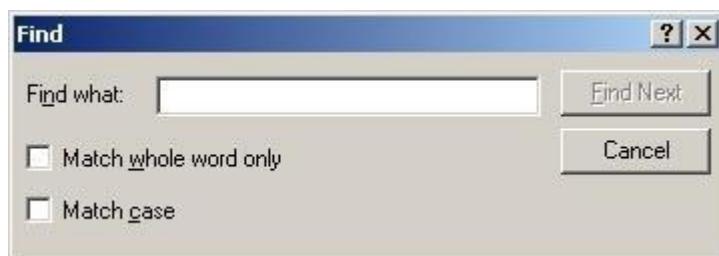
Comment line start with // tag.

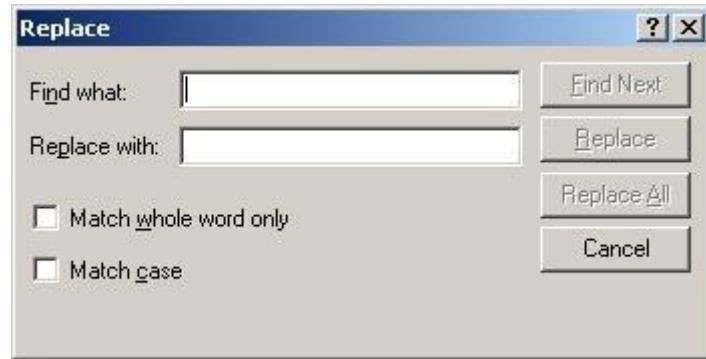


Search, Find and Replace

Search, Find & Replace commands are available by clicking with mouse on respective tool bar buttons and via menu Edit.

Following windows will appear, in order to set searching filter conditions:





- **Find what:** insert here the target string to search for.
- **Match whole word only:** enable this check in order to restrict search to strings that match exactly target string.
- **Match case:** enable this check, in order to find strings that match case with target string.
- **Replace with:** insert here the string that replace target string.
- **Find Next:** click to find next occurrence.
- **Replace:** click to replace current string found.
- **Replace All:** click to replace all occurrences of target string.

Find & Replace functionality works on:

- All libraries currently loaded, both “Global” and “Local”.
- VCH Description and Expression.

Example: User Records in math expression

Example of how to use the User Records in math expression In principle the content of the User Records can be used in Virtual Channels by means of @ operator

For example the User can define a virtual channel as following

myVCH = RPM + @demo

demo is a “User Records” where you can define a number or a formula

demo = 1000 → myVCH = RPM + 1000

demo = Integ(Speed)/3.14 → myVCH = RPM + Integ(Speed)/3.14

Importing & Exporting VCH libraries

Export in New Library

This option allows to create a new VCH library consisting of a subset of channels from an existing

1. Select *Tools/Virtual channels* or select the *Virtual channels* tab from the Channel Browser
2. Select a subset of channels from one of the existing libraries
3. Select *File/Export in a new library*
4. Define the name for the new library. It will be created in *WinTAX4\Libraries*

CSV format files

VCH libraries can be imported from and exported to .CSV format files

Import

1. Select *Tools/Virtual channels* or select the *Virtual channels* tab from the Channel Browser
2. Load and select or create the destination library where the math channels must be imported to.
3. Select *Options/Import CSV*
4. Browse and select the CSV file from which to import

Export

1. Select *Tools/Virtual channels* or select the *Virtual channels* tab from the Channel Browser
2. Load and select the source library from where the math channels must be exported.
3. Select *Options/Export CSV*
4. Browse to the destination path and define the CSV output file name

VCH Functions

Separators

=

Assignment

,

Separator

()

Brackets

[]

Square brackets

{ }

Braces

Arithmetic operators

- (expression1 - expression2)

Subtraction

The result of the subtraction (-) operator is the difference between the operands.

% (expression1 % expression2)

Modulus

The result of the modulus operator (%) is the remainder of division of one number by another.

*** (expression1 * expression2)**

Multiplication

The result of the (*) operator is the multiplication between the factor.

/ (expression1 / expression2)

Division

The result of the (/) operator is the division between the factor.

^ (number ^ expression2)

Exponent

Raises a number to the power of an exponent.

+ (expression1 + expression2)

Addition

The result of the addition (+) operator is the sum of the operands.

Assignments

Prefix or postfix decrement operator.

The effect of applying the prefix decrement operator is that the operand's value is decreased by one unit of the appropriate type prior to be used in expression. The effect of applying the postfix decrement operator is that the operand's value is decreased by one unit of the appropriate type after to be used in expression.

Syntax:

--prefix-expression
postfix-expression--

++

Prefix or postfix increment operator.

The effect of applying the prefix increment operator is that the operand's value is increased by one unit of the appropriate type prior to be used in expression. The effect of applying the postfix increment operator is that the operand's value is increased by one unit of the appropriate type after to be used in expression.

Syntax:

++prefix-expression
postfix-expression++

%=

Modulus compound assignment.

Take modulus of the first operand specified by the value of the second operand; store the result in the object specified by the first operand.

Syntax:

result %= expression

&=

Obtain the bitwise AND of the first and second operands; store the result in the object specified by the first operand.

Syntax:

result &= expression

***=**

Multiplication compound assignment.

Multiply the value of the first operand by the value of the second operand; store the result in the object specified by the first operand.

Syntax:

*result *= expression*

/=

Division compound assignment.

Divide the value of the first operand by the value of the second operand; store the result in the object specified by the first operand.

Syntax:

result /= expression

^=

Obtain the bitwise exclusive OR of the first and second operands; store the result in the object specified by the first operand.

Syntax:

result ^= expression

|=

Obtain the bitwise inclusive OR of the first and second operands; store the result in the object specified by the first operand.

Syntax:

result |= expression

+=

Plus compound assignment.

Add the value of the second operand to the value of the first operand; store the result in the object specified by the first operand.

Syntax:

result += expression

=

Equal simple assignment.

Store the value of the second operand in the object specified by the first operand.

Syntax:

result = expression

-=

Minus compound assignment.

Subtract the value of the second operand from the value of the first operand; store the result in the object specified by the first operand.

Syntax:

result -= expression

Bitwise operators

Bit-wise operators can be used to analyze the status of individual bits in diagnostic channels by using the AND operator to mask the values of other bits.

The bitwise logical operators available are AND, OR, XOR, bitwiseNOT, << (left shift) and >> (right shift) as shown below. The operators can also be written in C format: & (AND), | (OR), ~ (NOT).

AND (expression1 AND expression2)

The bitwise AND looks at the binary representation of the values of two expressions and performs the logical AND operation on each pair of corresponding bits. In each pair, the result is 1 if both bits are 1. Otherwise, the result is 0.

		expression1	
		AND	
		0	1
expression1	0	0	0
	1	0	1

& (expression1 & expression2)

The bitwise & looks at the binary representation of the values of two expressions and performs the logical AND operation on each pair of corresponding bits. In each pair, the result is 1 if both bits are 1. Otherwise, the result is 0. This operator is the same of bitwise AND written in C Format.

OR (expression1 OR expression2)

The bitwise OR looks at the binary representation of the values of two expressions and performs the logical OR inclusive operation on each pair of corresponding bits. In each pair, the result is 0 if both bits are 0. Otherwise, the result is 1.

		expression1	
		OR	
		0	1
expression1	0	0	1
	1	1	1

| (expression1 | expression2)

The bitwise | looks at the binary representation of the values of two expressions and performs the logical OR inclusive operation on each pair of corresponding bits. In each pair, the result is 0 if both bits are 0. Otherwise, the result is 1. This operator is the same of bitwise OR written in C Format.

XOR (expression1 XOR expression2)

The bitwise XOR looks at the binary representation of the values of two expressions and performs the logical OR exclusive operation on each pair of corresponding bits. In each pair, the result is 1 if the two bits are different and 0 if they are the same.

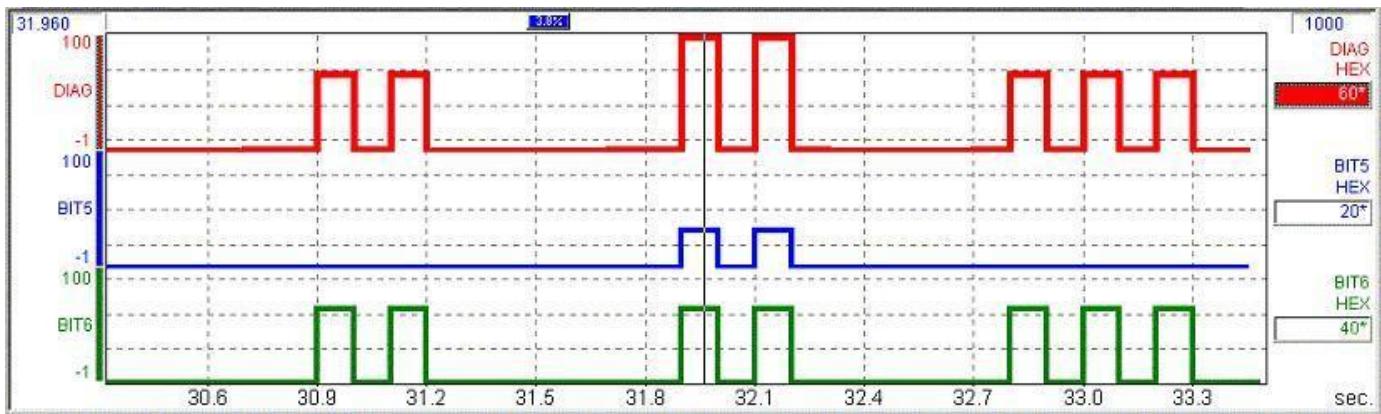
		expression1	
		XOR	
		0	1
expression1	0	0	1
	1	1	0

bitwiseNOT(expression)

The bitwise NOT looks at the binary representation of the value and performs the logical NOT on each bit, forming the one's complement of the given binary value. Digits which were 0 become 1, and vice versa.

		expression	
		0	1
bitwiseNOT (expression)		1	0

Example: Using bitwise logic to check individual bits



As an example application, the graph above shows a diagnostic channel, *DIAG*, where each one of the 16 bits represents the status of a particular device or process (0=OK; 1=NOK). The combination of all the status bits results in a number (shown in hexadecimal in this case) which is not easy to be interpreted.

The two math channels, *BIT5* and *BIT6* use the AND operator to isolate the values of bits 5 and 6 as shown below.

~ (expression)

The bitwise `~` looks at the binary representation of the value and performs the logical NOT on each bit, forming the one's complement of the given binary value. Digits which were 0 become 1, and vice versa. This operator is the same of `bitwiseNOT` written in C Format.

<< (expression1 << expression2)

The left shift operator causes the bit pattern in the first operand (`expression1`) to be shifted left the number of bits specified by the second operand (`expression2`). Bits vacated by the shift operation are zero-filled. This operator is the same of `shiftl` written in C Format.

>> (expression1 << expression2)

The right shift operator causes the bit pattern in the first operand (`expression1`) to be shifted right the number of bits specified by the second operand (`expression2`). Bits vacated by the shift operation are zero-filled for unsigned quantities. For signed quantities, the sign bit is propagated into the vacated bit positions. This operator is the same of `shiftr` written in C Format.

Constants

ecost

e constant is Napier's (or Euler's) number

Returns the value of base of the natural logarithm; $e = 2.718281828$.

gcost

gravitational acceleration

Returns the medium Earth's gravitational acceleration at sea level; $g = 9,80665 \text{ m/s}^2$.

intmax

Returns the maximum integer value; INTMAX = 2147483647

intmin

Returns the minimum integer value; INTMIN = -2147483648

norx

Invalid data

Returns the value used in math expressions to identify invalid data. Data marked as invalid will not be considered during computation.

null

Invalid data, the same of norx.

Returns the value used in math expressions to identify invalid data. Data marked as invalid will not be considered during computation.

pi

π

Returns the value of the ratio of any circle's circumference to its diameter in Euclidean space; $\pi = 3.1415926536$.

realmax

Returns the maximum positive value; REALMAX = $1.7976931348623158e+308$

realmin

Returns the minimum positive value; REALMIN = $2.2250738585072014e-308$

Special operators

operator (channel#[ABCDEFHIJLRT])

The # operator is used to identify the Dataset on which the calculation of the channel will be made.

- **Channel** can be any simple channels (logged, vch, condition, etc.); an expression can not precede # operator.
- **A, B, C, D, E, F, G, H, I, J** are the Dataset identifiers. Letter A corresponds at Dataset number 1, letter B corresponds at Dataset 2 and so on up to letter J which corresponds at Dataset number 10.
- **L** corresponds at Real Time Lap Comparison.
- **R** corresponds at Reference lap, if enabled in licence.
- **T** corresponds at Telemetry Dataset.

operator allows to create VCH which can be calculated on different Dataset in post processing or in real time.

The standard syntax of WinTAX VCH is the name of the channel, than the # operator followed by the index of Dataset.

- The expression $VCH1 = RPM \#T - RPM \#L$ returns the difference of RPM channel between real-time live data and reference lap used for “real-time comparison”.
- The expression $VCH2 = RPM\#A - RPM\#B$ returns the difference of RPM channel in data A and B, where usually A and B are two laps compare.
- The expression $VCH3 = RPM\#T - RPM\#A$ returns the difference of RPM channel using samples of telemetry data and samples of lap loaded in Dataset A.
- The expression $VCH4 = RPM\#T - RPM\#R$ returns the difference of RPM channel using samples of telemetry data and samples of reference lap automatically loaded by WinTAX.
- In post processing window, if only one lap is loaded, RPM and $RPM\#A$ returns the same values; in real time window RPM and $RPM\#T$ returns the same values.

System Variables

\$ABSTIME

Returns the absolute time of the lap expressed in seconds from 01/01/1970.

\$DELTATIME

Returns the difference between current time on a lap and the time in the lap of the #A comparison at the same distance.

\$DISTANCE

Current space since start of lap. The value is expressed in meters.

\$FUELCONS

Returns the fuel consumption in the lap.

\$FUELLEVEL

Returns the fuel level in the lap.

\$METEOBAR

Meteo: weather station internal barometric pressure sensor. The value is expressed in bar.

\$METEOHUMIN

Meteo: weather station internal humidity sensor. The value is expressed in relative humidity percent.

\$METEOHUMOUT

Meteo: weather station external humidity sensor. The value is expressed in relative humidity percent.

\$METEORAIN

Meteo: weather station rainfall sensor. The value is expressed in mm.

\$METEOTEMPIN

Meteo: weather station internal temperature. The value is expressed in degree Celsius.

\$METEOTEMPOUT

Meteo: weather station external temperature sensor. The value is expressed in degree Celsius.

\$METEOWINDDIR

Meteo: weather station wind direction. The value is expressed in degree from 180E to 180W.

\$METEOWINDSP

Meteo: weather station wind speed. The value is expressed in Km/h.

\$TIME

Current time since start of lap. The value is expressed in seconds.

\$TRACKLEN

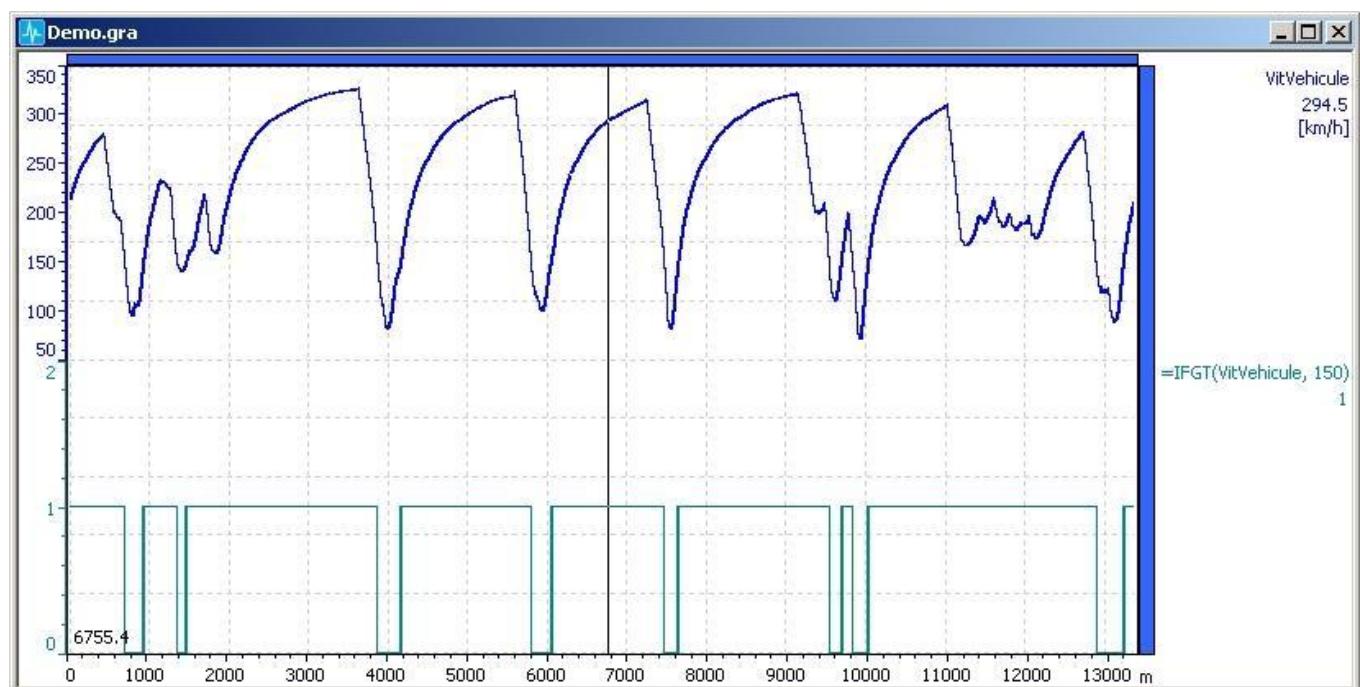
Returns the length of circuit (maximum value of distance channel). The value is expressed in distance channel unit.

Logical functions

Boolean operators can be used to filter and condition mathematical expressions. See also Bitwise operators

The functions shown below return value 1 if the condition is **True**, 0 if the condition is **False**

Example: IFGT(VitVehicule,150)



IFBETWEEN(expression, rangeMin, rangeMax)

Returns 1 (TRUE) if the values of expression are included between the rangeMin and rangeMax. Returns 0 (FALSE) if values are external.

RangeMin and rangeMax can be single values or expression.

IFEQ(expression1, expression2, range)

Check whether an expression is equal to another; the second expression can be evaluated in a range.

Returns 1 (TRUE) if expressions are equal, 0 (FALSE) if the expressions are different.

Within range, returns true if (expression2-range) <= expression1 <= (expression2+range)

`== (expression1 == expression2)`

Check whether an expression is equal to another. Returns 1 (TRUE) if expressions are equal, 0 (FALSE) if the expressions are different. This operator is the same of IFEQ written in C Format.

`IFGE(expression1, expression2)`

Returns 1 (TRUE) if expression1 is greater or equal than expression2; 0 (FALSE) if expression2 is greater than expression1.

Greater than or equal to, returns true if $\text{expression1} \geq \text{expression2}$

`>= (expression1 >= expression2)`

Returns 1 (TRUE) if expression1 is greater or equal than expression2; 0 (FALSE) if expression2 is greater than expression1. This operator is the same of IFGE written in C Format.

`IFGT(expression1, expression2)`

Returns 1 (TRUE) if expression1 is greater than expression2; 0 (FALSE) if expression2 is greater than expression1.

Greater than or equal to, returns true if $\text{expression1} >= \text{expression2}$

`> (expression1 > expression2)`

Returns 1 (TRUE) if expression1 is greater than expression2; 0 (FALSE) if expression2 is greater than expression1. This operator is the same of IFGT written in C Format.

`IFLE(expression1, expression2)`

Returns 1 (TRUE) if expression2 is greater or equal than expression1; 0 (FALSE) if expression1 is greater than expression2.

Less than or equal to, returns true if $\text{expression1} \leq \text{expression2}$

`<= (expression1 <= expression2)`

Returns 1 (TRUE) if expression2 is greater or equal than expression1; 0 (FALSE) if expression1 is greater than expression2. This operator is the same of IFLE written in C Format.

IFLT(expression1, expression2)

Returns 1 (TRUE) if expression2 is greater than expression1; 0 (FALSE) if expression1 is greater than expression2.

Less than, returns true if expression1 <= expression2

< (expression1 < expression2)

Returns 1 (TRUE) if expression2 is greater than expression1; 0 (FALSE) if expression1 is greater than expression2. This operator is the same of IFLT written in C Format.

IFNE(expression1, expression2, range)

Check whether an expression is different from another; the second expression can be evaluated in a range. Returns 1 (TRUE) if expressions are different, 0 (FALSE) if the expressions are equal.

Out of range, returns true if expression1 < (expression2-range); expression1 > (expression2+range)

!= (expression1 != expression2)

Check whether an expression is different from another. Returns 1 (TRUE) if expressions are different, 0 (FALSE) if the expressions are equal. This operator is the same of IFNE written in C Format.

NOT

The logical negation operator NOT returns the value 0 if its operand is nonzero and the value 1 if its operand is zero.

! expression

The logical negation operator ! returns the value 0 if its operand is nonzero and the value 1 if its operand is zero. This operator is the same of NOT operator written in C Format.

&& (expression1 && expression2)

Logical AND. Returns 1 (TRUE) if both expressions are TRUE, otherwise return FALSE.

|| (expression1 || expression2)

Logical OR. Returns 1 (TRUE) if at least one of the two expressions is TRUE, otherwise return FALSE.

choose (condition, expression1, expression2)

Select between two different results based on a logical expression. The arguments can be a channel or an expression.

flipflop(set, reset)

Returns true when the first expression sets to true and false when the second expression sets to true. The arguments can be a channel or an expression.

Conversion Functions

Acceleration

feet2toinchs2(Val[feet/s2])

Converts values from Feet per Square Second to Inches per Square Second: returns the value in Inches per Square Second of an acceleration expressed in Feet per Square Second. $1 \text{ feet/s}^2 = 12 \text{ inch/s}^2$.

feet2toms2(Val[feet/s2])

Converts values from Feet per Square Second to Meters per Square Second: returns the value in Meters per Square Second of an acceleration expressed in Feet per Square Second. $1 \text{ m/s}^2 = 3.280833 \text{ feet/s}^2$.

inchs2tofeets2(Val[inch/s2])

Converts values from Inches per Square Second to Feet per Square Second: returns the value in Feet per Square Second of an acceleration expressed in Inches per Square Second. $1 \text{ feet/s}^2 = 12 \text{ inch/s}^2$.

inchs2toms2(Val[inch/s2])

Converts values from Inches per Square Second to Meters per Square Second: returns the value in Meters per Square Second of an acceleration expressed in Inches per Square Second. $1 \text{ m/s}^2 = 39.37 \text{ inch/s}^2$.

ms2tofeets2(Val[m/s2])

Converts values from Meters per Square Second to Feet per Square Second: returns the value in Feet per Square Second of an acceleration expressed in Meters per Square Second. $1 \text{ m/s}^2 = 3.280833 \text{ feet/s}^2$.

ms2toinchs2(Val[m/s2])

Converts values from Meters per Square Second to Inches per Square Second: returns the value in Inches per Square Second of an acceleration expressed in Meters per Square Second. $1 \text{ m/s}^2 = 39.37 \text{ inch/s}^2$.

Angle

radtodeg(Val[rad])

Converts values from Radians to Degrees: returns the value in Degrees of an angle expressed in Radians. 1 radian is equal to 57.30 degrees.

degtorad(Val[deg])

Converts values from Degrees to Radians: returns the value in Radians of an angle expressed in Degrees. 1 degree is equal to 0.017 radians.

Distance

cmtofeet(Val[cm])

Converts values from Centimeters to Feet: returns the value in Feet of a length expressed in Centimeters. 1 foot = 30.48 centimeters.

cmtoinch(Val[cm])

Converts values from Centimeters to Inch: returns the value in Inches of a length expressed in Centimeters. 1 centimeter is equal to 0.39 inches.

feettocm(Val[feet])

Converts values from Feet to Centimeters: returns the value in Centimeters of a length expressed in Feet. 1 foot = 30.48 centimeters.

feettoinch(Val[feet])

Converts values from Feet to Inches: returns the value in Inches of a length expressed in Feet. 1 foot = 12 inches.

feettoyard(Val[feet])

Converts values from Feet to Yards: returns the value in Yards of a length expressed in Feet. 1 yard = 3 feet.

inchtohm(Val[inch])

Converts values from Inches to Centimeters: returns the value in Centimeters of a length expressed in Inches. 1 inch is equal to 2.54 centimeters.

inchtofeet(Val[inch])

Converts values from Inches to Feet: returns the value in Feet of a length expressed in Inches. 1 foot = 12 inches.

inchtomile(Val[inch])

Converts values from Inches to Miles: returns the value in Miles of a length expressed in Inches. 1 mile = 63360 inches.

inchtoyard(Val[inch])

Converts values from Inches to Yards: returns the value in Yards of a length expressed in Inches. 1 yard = 36 inches.

metertoyard(Val[meter])

Converts values from Meters to Yards: returns the value in Yards of a length expressed in Meters. 1 yard = 0.9144 meters.

miletoinch(Val[mile])

Converts values from Miles to Inches: returns the value in Inches of a length expressed in Miles. 1 mile = 63360 inches

miletoyard(Val[miles])

Converts values from Miles to Yards: returns the value in Yards of a length expressed in Miles. 1 mile = 1760 yards.

yardtofeet(Val[yard])

Converts values from Yards to Feet: returns the value in Feet of a length expressed in Yards. 1 yard = 3 feet.

yardtoinch(Val[yard])

Converts values from Yards to Inches: returns the value in Inches of a length expressed in Yards. 1 yard = 36 inches.

yardtometer(Val[yard])

Converts values from Yards to Meters: returns the value in Meters of a length expressed in Yards. 1 yard = 0.9144 meters.

yardtomile(Val[yard])

Converts values from Yards to Miles: returns the value in Miles of a length expressed in Yards. 1 mile = 1760 yards.

Miscellaneous

intelmotorola(val)

Converts val from Intel to Motorola format

motorolaintel(val)

Converts val from Motorola to Intel format

Power

hptokw(Val[Hp])

Converts values from Horse Power to Kilowatt: returns the value in Kilowatt of a power expressed in Horse Power. 1 kw = 1.341022 hp.

kwtohp(Val[Kw])

Converts values from Kilowatt to Horse Power: returns the value in Horse Power of a power expressed in Kilowatt. 1 kw = 1.341022 hp.

Pressure

atmtobar(Val[bar])

Converts values from Atmosphere to Bar: returns the value in bar of a pressure expressed in Atmosphere. 1 bar = 1.01 atm.

bartoatm(Val[bar])

Converts values from Bar to Atmosphere: returns the value in Atmosphere of a pressure expressed in Bar. 1 bar = 1.01 atm.

bartommhg(Val[bar])

Converts values from Bar to Millimeters of Mercury: returns the value in Millimeters of Mercury of a pressure expressed in Bar. 1 bar = 750 mmHg.

bartopas(Val[bar])

Converts values from Bar to Pascal: returns the value in Pascal of a pressure expressed in Bar. 1 bar = 100000 Pascal.

bartopsi(Val[bar])

Converts values from Bar to Psi: returns the value in Pounds per Square Inch of a pressure expressed in Bar. 1 bar = 14.5 psi.

mmhgtoobar(Val[mmHg])

Converts values from Millimeters of Mercury to Bar: returns the value in Bar of a pressure expressed in Millimeters of Mercury. 1 bar = 750 mmHg.

mmhgtopas(Val[mmHg])

Converts values from Millimeters of Mercury to Pascal: returns the value in Pascal of a pressure expressed in Millimeters of Mercury. 1 pascal = 133.322 mmHg.

mmhgtopsi(Val[mmHg])

Converts values from Millimeters of Mercury to Psi: returns the value in Pounds per Square Inch of a pressure expressed in Millimeters of Mercury. 1 mmHg = 51.68 psi.

pastobar(Val[pascal])

Converts values from Pascal to Bar: returns the value in Bar of a pressure expressed in Pascal. 1 bar = 100000 Pascal.

pastommhg(Val[mmHg])

Converts values from Pascal to Millimeters of Mercury: returns the value in Millimeters of Mercury of a pressure expressed in Pascal. 1 pascal = 133.322 mmHg.

pastopsi(Val[pas])

Converts values from Bar to Pascal: returns the value in Pascal of a pressure expressed in Bar. 1 bar = 100000 Pascal.

psitobar(Val[psi])

Converts values from Psi to Bar: returns the value in Bar of a pressure expressed in Pounds per Square Inch. 1 bar = 14.5 psi.

psitommhg(Val[psi])

Converts values from Psi to Millimeters of Mercury: returns the value in Millimeters of Mercury of a pressure expressed in Pounds per Square Inch. 1 mmHg = 51.68 psi.

psitopas(Val[psi])

Converts values from Psi to Bar: returns the value in Bar of a pressure expressed in Pounds per Square Inch. 1 bar = 6890.0 psi.

Speed

feetstokmh(Val[Km/h])

Converts values from Feet per Second to Kilometers per Hour: returns the value in Kilometers per Hour of a speed expressed in Feet per Seconds. 1 ft/s = 1.09728 km/h.

feetstoms(Val[feet/s])

Converts values from Feet per Second to Meter per Second: returns the value in Meter per Second of a speed expressed in Feet per Second. 1 ft/s = 0.30480 m/s.

kmhto(feets(Val[km/h]))

Converts values from Kilometers per Hour to Feet per Second: returns the value in Feet per Second of a speed expressed in Kilometers per Hour. 1 ft/s = 1.09728 km/h.

kmhtoknot(Val[km/h])

Converts values from Kilometers per Hour to Knot: returns the value in Nautical Miles per Hour (knot) of a speed expressed in Kilometers per Hour. 1 knot = 1.85199 km/h.

kmhtomph(Val[km/h])

Converts values from Kilometers per Hour to Miles per Hour: returns the value in Miles per Hour of a speed expressed in Kilometers per Hour. 1 mph = 1.60934 km/h.

kmhtoms(Val[Km/h])

Converts values from Kilometers per Hour to Meters per Second: returns the value in Meters per Second of a speed expressed in Kilometers per Hour. 1 km/h is equal to 0.28 m/s.

knottokmh(Val[Knot])

Converts values from Knot to Kilometers per Hour: returns the value in Kilometers per Hour of a speed expressed in Nautical Miles per Hour (knot). 1 knot = 1.85199 km/h.

knottomph(Val[Knot])

Converts values from Knot to Miles per Hour: returns the value in Miles per Hour of a speed expressed in Nautical Miles per Hour (knot). 1 knot = 1.150779 mph.

mphtokmh(Val[mph])

Converts values from Miles per Hour to Kilometers per Hour: returns the value in Kilometers per Hour of a speed expressed in Miles per Hour. 1 mph = 1.60934 km/h.

mphtoknot(Val[mph])

Converts values from Miles per Hour to Knot: returns the value in Nautical Miles per Hour (knot) of a speed expressed in Miles per Hour. 1 knot = 1.150779 mph.

mstofeet(Val[m/s])

Converts values from Meter per Second to Feet per Second: returns the value in Feet per Second of a speed expressed in Meter per Second. 1 ft/s = 0.30480 m/s.

mstokmh(Val[m/s])

Converts values from meters per Second to Kilometers per Hour: returns the value in Kilometers per Hour of a speed expressed in Meters per Second. 1 km/h is equal to 0.28 m/s.

Temperature

ctofahr(Val[°C])

Converts values from Centigrade to Fahrenheit: returns the value in Degree Fahrenheit of a temperature expressed in Degree Celsius. $^{\circ}\text{F} = 9/5 * ^{\circ}\text{C} + 32$.

ctok(Val[°C])

Converts values from Centigrade to Kelvin: returns the value in Kelvin of a temperature expressed in Degree Celsius. $^{\circ}\text{K} = ^{\circ}\text{C} + 237.15$.

fahrtoc(Val[°F])

Converts values from Fahrenheit to Centigrade: returns the value in Degree Celsius of a temperature expressed in Degree Fahrenheit. $^{\circ}\text{C} = (\text{°F} - 32) * 5/9$.

fahrtok(Val[°F])

Converts values from Fahrenheit to Kelvin: returns the value in Kelvin of a temperature expressed in Degree Fahrenheit. $^{\circ}\text{K} = (\text{°F} - 32) * 5/9 + 273.15$.

ktoctc(Val[°K])

Converts values from Kelvin to Centigrade: returns the value in Degree Celsius of a temperature expressed in Kelvin. 0 Kelvin is equal to 273.15 degree Celsius. $^{\circ}\text{C} = ^{\circ}\text{K} - 273.15$.

ktofahr(Val[°K])

Converts values from Kelvin to Fahrenheit: returns the value in Degree Fahrenheit of a temperature expressed in Kelvin. $^{\circ}\text{F} = 9/5 * (^{\circ}\text{K} - 273.15) + 32$.

Torque

kgmtonm(Val[Kgm])

Converts values from Kilogram-force Meters to Newton Meters: returns the value in Newton Meters of a torque expressed in Kilogram-force Meters. 1 Nwm = 9.80665 Kgm (9.80665 is 'g', acceleration of gravity).

ftlbstonm(Val[Ftlbs])

Converts values from Pound-force Feet to Newton Meters: returns the value in Newton Meters of a torque expressed in Pound-force Feet. 1 Nwm = 0.7375

nmtoftlbs(Val[Nm])

Converts values from Newton Meters to Pound-force Feet: returns the value in Pound-force Feet of a torque expressed in Newton Meters. 1 Nwm = 0.7375621 Ftlbs.

nmtokgm(Val[Nm])

Converts values from Newton Meters to Kilogram-force Meters: returns the value in Kilogram-force Meters of a torque expressed in Newton Meters. 1 Nwm = 9.80665 Kgm (9.80665 is 'g', acceleration of gravity).

Volume

cm3togaluk(Val[cm3])

Converts values from Cubic Centimeters to Gallon UK: returns the value in Imperial Gallons of a volume expressed in Cubic Centimeters. 1 UK Gallon = 4546.1 cm3.

cm3togalus(Val[cm3])

Converts values from Cubic Centimeters to Gallon US: returns the value in American Liquid Gallons of a volume expressed in Cubic Centimeters. 1 US Gallon = 3785.41 cm3.

cm3toinch3(Val[cm3])

Converts values from Cubic Centimeters to Cubic Inches: returns the value in Cubic Inches of a volume expressed in Cubic Centimeters. 1 inch3 = 16.387064 cm3.

galuktocm3(Val[gallon U.K.])

Converts values from Gallon UK to Cubic Centimeters: returns the value in Cubic Centimeters of a volume expressed in Imperial Gallons. 1 UK Gallon = 4546.1 cm3.

galuktogalus(Val[gallon U.K.])

Converts values from Gallon UK to Gallon US: returns the value in American Liquid Gallons of a volume expressed in Imperial Gallons. 1 UK Gallon = 1.2 US Gallon.

galuktoliter(Val[gallon U.K.])

Converts values from Gallon UK to Liter: returns the value in Liters of a volume expressed in Imperial Gallons. 1 UK Gallon = 4.5461 liters.

galuktom3(Val[gallon U.K.])

Converts values from Gallon UK to Cubic Meters: returns the value in Cubic Meters of a volume expressed in Imperial Gallons. 1 UK Gallon = 0.0045461 m3.

galustocm3(Val[gallon U.S.])

Converts values from Gallon US to Cubic Centimeters: returns the value in Cubic Centimeters of a volume expressed in American Liquid Gallons. 1 US Gallon = 3785.41 cm3.

galustogaluk(Val[gallon U.S.])

Converts values from Gallon US to Gallon UK: returns the value in Imperial Gallons of a volume expressed in American Liquid Gallons. 1 UK Gallon = 1.2 US Gallon.

galustoliter(Val[gallon U.S.])

Converts values from Gallon US to Liter: returns the value in Liters of a volume expressed in American Liquid Gallons. 1 US Gallon = 3.78541 liters.

galustom3(Val[gallon U.S.])

Converts values from Gallon US to Cubic Meters: returns the value in Cubic Meters of a volume expressed in American Liquid Gallons. 1 US Gallon = 0.00378541 m³.

inch3tocm3(Val[inch3])

Converts values from Cubic Inches to Cubic Centimeters: returns the value in Cubic Centimeters of a volume expressed in Cubic Inches. 1 inch³ = 16.387064 cm³.

littergaluk(Val[liter])

Converts values from Liter to Gallon UK: returns the value in Imperial Gallons of a volume expressed in Liters. 1 UK Gallon = 4.5461 liters.

littergalus(Val[liter])

Converts values from Liter to Gallon US: returns the value in American Liquid Gallons of a volume expressed in Liters. 1 US Gallon = 3.78541 liters.

m3togaluk(Val[m3])

Converts values from Cubic Meters to Gallon UK: returns the value in Imperial Gallons of a volume expressed in Cubic Meters. 1 UK Gallon = 0.0045461 m³.

m3tocalus(Val[m3])

Converts values from Cubic Meters to Gallon US: returns the value in American Liquid Gallons of a volume expressed in Cubic Meters. 1 US Gallon = 0.00378541 m³.

Weight

gramtoounce(Val[gr])

Converts values from Grams to Ounces: returns the value in Ounces of a weight expressed in Grams. 1 Ounce = 2.834954 Grams.

kgtopound(Val[kg])

Converts values from Kilograms to Pounds: returns the value in Pounds of a weight expressed in Kilograms. 1 Pounds = 2.204621 Kilograms.

ouncetogram(Val[ounce])

Converts values from Ounces to Grams: returns the value in Grams of a weight expressed in Ounces. 1 Ounce = 2.834954 Grams.

ouncetopound(Val[ounce])

Converts values from Ounces to Pounds: returns the value in Pounds of a weight expressed in Ounces. 1 Pounds = 16 Ounces.

poundtokg(Val[pound])

Converts values from Pounds to Kilograms: returns the value in Kilograms of a weight expressed in Pounds. 1 Pounds = 2.204621 Kilograms.

poundtoounce(Val[pound])

Converts values from Pounds to Ounces: returns the value in Ounces of a weight expressed in Pounds. 1 Pounds = 16 Ounces.

Numerical functions

ceil(expression)

Ceiling. Returns the value of expression rounded to the nearest higher integer.

ceileven(expression)

Ceiling. Returns the value of expression rounded to the nearest higher even integer.

ceilodd(expression)

Ceiling. Returns the value of expression rounded to the nearest higher odd integer.

div(expression1, expression2)

The result is the integer quotient of expression1 divided by expression2. The integer quotient discards any remainder and retains only the integer portion.

fact(expression)

Returns the factorial of a number. The factorial of a number is equal to $1*2*3*...* \text{number}$. If number is not an integer, it is truncated; if the number is negative, returns NoRx.

factdouble(expression)

Returns the double factorial of a number. The double factorial of an odd number is equal to $1*3*5*7*...*\text{number}$; the double factorial of an even number is equal to $(2*4*6*8*...*\text{number})$. If number is not an integer, it is truncated; if the number is negative, returns NoRx.

floor(expression)

Returns the value of expression rounded to the nearest lower integer.

flooreven(expression)

Returns the value of expression rounded to the nearest lower even integer.

floorodd(expression)

Returns the value of expression rounded to the nearest lower odd integer.

fmod(expression)

Returns the floating-point remainder of numerator/denominator. Numerator and denominator can be values or expressions.

frac(expression)

Returns the fractional part of a number. The argument can be a value or an expression.

gcd(N0, N1, N2, N3, N4, N5, N6, N7, N8, N9, N10, N11, N12, N13, N14, N15)

Returns the greatest common divisor of two or more integers. The greatest common divisor is the largest integer that divides the numbers without a remainder. The function accepts 16 optionally input values. If you need more, you can call recursively the function gcd as a parameter of the same function.

iseven(expression)

Returns 1 if the number is even, and 0 otherwise.

isnan(expression)

Returns TRUE (1) if expression is a NaN (Not a Number) or NoRx.

isnum(expression)

Returns TRUE (1) if expression gets a valid number.

isodd(expression)

Returns 1 if the number is odd, and 0 otherwise.

isprime(expression)

Returns 1 if the number is prime, and 0 otherwise.

lcm(N0, N1, N2, N3, N4, N5, N6, N7, N8, N9, N10, N11, N12, N13, N14, N15)

Returns the least common multiple of numbers. The least common multiple is the smallest positive integer that is a multiple of all integer arguments number1, number2, and so on. If

number is not an integer, it is truncated. The function accepts 16 optionally input values. If you need more, you can call recursively the function lcm as a parameter of the same function.

mod(numerator, denominator)

Remainder or modulo

Returns the integer remainder of numerator/denominator. Numerator and denominator can be values or expressions.

Example:

to get minutes and seconds from a time counter minutes -> *time* /60 seconds -> MOD(*time*,60)

nk(n, k)

Returns the binomial coefficient $n!/(n-k)!k!$ where n and k are non negative integers. This is the number of combinations of n things taken k at a time.

rand()

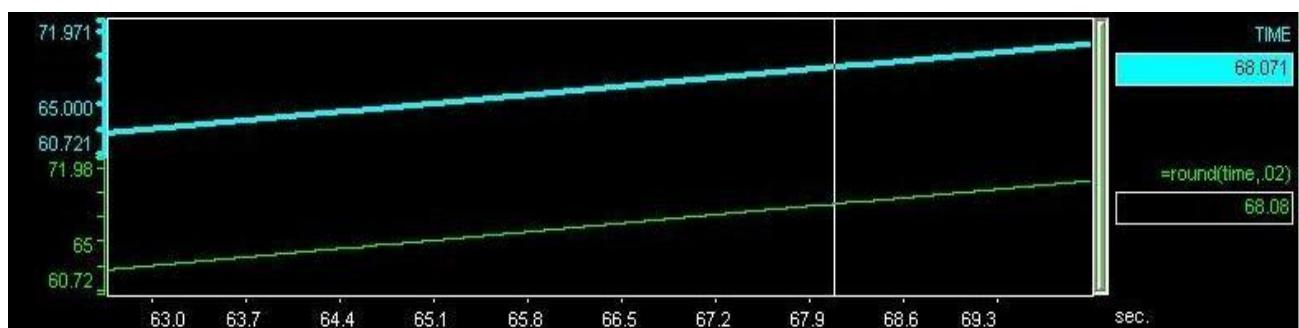
Returns a random number between 0 and 1.

randbetween()

Returns a random number between the numbers you specify.

round(expression, n)

Rounds expression to a precision given by n.



roundn(expression)

Rounds expression to the nearest integer value.

sign(expression)

Determines the sign of a number. Returns 1 if the number is positive, zero (0) if the number is 0, and -1 if the number is negative.

Exponential functions

cbrt(expression)

Cubic root. Returns the cubic root of an expression.

exp(expression)

Returns the exponential $e^{\text{expression}}$. The argument can be a value or expression.

exp10(expression)

Raises 10 to the power of an exponent. The argument can be a value or an expression.

exp2(expression)

Raises 2 to the power of an exponent. The argument can be a value or an expression.

expm1(expression)

Computes $\exp(x)-1$, compensating for the roundoff in $\exp(x)$. For small x , $\expm1(x)$ is approximately x , whereas $\exp(x)-1$ can be zero.

ln(expression)

Natural logarithm. Returns the natural logarithm (base e) of expression.

ln1p1(expression)

Computes $\ln(1+x)$, compensating for the roundoff in $1+x$. $\ln1p(x)$ is more accurate than $\ln(1+x)$ for small values of x . For small x , $\ln1p(x)$ is approximately x , whereas $\ln(1+x)$ can be zero.

log(expression)

Logarithm base 10. Returns the base 10 logarithm base of expression.

logn(base, expression)

Logarithm base N. Returns the base N logarithm of expression.

nextpow2(x, y)

Returns the smallest power of two that is greater than or equal to the absolute value of A. (That is, p that satisfies $2^p \geq \text{abs}(A)$).

nthroot(expression, rootindex)

Nth root. Returns the real nth root of an expression. Both expression and n must be real. If x is negative, n must be an odd integer.

pow(x, y)

Calculates x raised to the power of y. The arguments can be expressions.

sqrt(expression)

Square root. Returns the square root of expression. Argument expression must be greater than or equal to 0.

sqrt(pi)(expression)

Returns the square root of an expression multiplied by pi. Argument expression must be greater than or equal to 0.

square(expression)

Returns the square of a number. The argument can be a value or an expression.

Trigonometric Functions

sin(expression)

Returns the sine of an angle expressed in radians. The result will be within range -1 and +1. The argument can be a value or an expression.

sind(expression)

Returns the sine of an angle expressed in degrees. The result will be within range -1 and +1. The argument can be a value or an expression.

cos(expression)

Returns the cosine of an angle expressed in radians. The result will be within range -1 and +1. The argument can be a value or an expression.

cosd(expression)

Returns the cosine of an angle expressed degrees. The result will be within range -1 and +1. The argument can be a value or an expression.

tan(expression)

Returns the tangent of an angle expressed in radians. The argument can be a value or expression.

tand(expression)

Returns the tangent of an angle expressed in degrees. The argument can be a value or expression.

sec(expression)

Returns the secant of an angle expressed in radians. The result will be within range $X \leq -1$ and $X \geq 1$. The argument can be a value or an expression.

secd(expression)

Returns the secant of an angle expressed in degrees. The result will be within range $X \leq -1$ and $X \geq 1$. The argument can be a value or an expression.

csc(expression)

Returns the cosecant of an angle expressed in radians. The result will be within range $X \leq -1$ and $X \geq 1$. The argument can be a value or an expression.

cscd(expression)

Returns the cosecant of an angle expressed in degrees. The result will be within range $X \leq -1$ and $X \geq 1$. The argument can be a value or an expression.

cot(expression)

Returns the cotangent of an angle expressed in radians. The argument can be a value or an expression.

cotd(expression)

Returns the cotangent of an angle expressed in degrees. The argument can be a value or an expression.

asn(expression)

The arcsine is an inverse trigonometric functions. Returns the angle expressed in radians from a sine trigonometric value. The result will be within the range $-\pi/2$ and $\pi/2$; the argument value or expression must lie between -1 and +1.

asnd(expression)

The arcsine is an inverse trigonometric functions. Returns the angle expressed in degrees from a sine trigonometric value. The result will be within the range -90 and 90; the argument value or expression must lie between -1 and +1.

acs(expression)

The arccosine is an inverse trigonometric functions. Returns the angle expressed in radians from a cosine trigonometric value. The result will be within the range 0 and π ; the argument value or expression must lie between -1 and +1.

acsd(expression)

The arccosine is an inverse trigonometric functions. Returns the angle expressed in degrees from a cosine trigonometric value. The result will be within the range 0 and 180; the argument value or expression must lie between -1 and +1.

atn(expression)

The arctangent is an inverse trigonometric functions. Returns the angle expressed in radians from a tangent trigonometric value. The result will be within the range $-\pi/2$ and $\pi/2$; the argument value or expression can take any real value.

atnd(expression)

The arctangent is an inverse trigonometric functions. Returns the angle expressed in degrees from a tangent trigonometric value. The result will be within the range -90 and 90; the argument value or expression can take any real value.

asec(expression)

The arcsecant is an inverse trigonometric functions. Returns the angle expressed in radians from a secant trigonometric value. The result will be within the range 0 and pi with the exclusion of $\pi/2$; the argument value or expression must be less or equal than -1 or greater or equal than +1.

asecd(expression)

The arcsecant is an inverse trigonometric functions. Returns the angle expressed in degrees from a secant trigonometric value. The result will be within the range 0 and 180 with the exclusion of 90; the argument value or expression must be less or equal than -1 or greater or equal than +1.

acsc(expression)

The arccosecant is an inverse trigonometric functions. Returns the angle expressed in radians from a cosecant trigonometric value. The result will be within the range -pi/2 and pi/2 with the exclusion of 0; the argument value or expression must be less or equal than -1 or greater or equal than +1.

acscd(expression)

The arccosecant is an inverse trigonometric functions. Returns the angle expressed in degrees from a cosecant trigonometric value. The result will be within the range -90 and 90 with the exclusion of 0; the argument value or expression must be less or equal than -1 or greater or equal than +1.

acot(expression)

The arcocotangent is an inverse trigonometric functions. Returns the angle expressed in radians from a cosecant trigonometric value. The result will be within the range 0 and pi; the argument value or expression must be any real value.

acotd(expression)

The arcocotangent is an inverse trigonometric functions. Returns the angle expressed in degrees from a cosecant trigonometric value. The result will be within the range 0 and 180; the argument value or expression must be any real value.

polartox(radius, angle)

Converts values from polar coordinates to Cartesian X. The first argument is the radius, the second argument is the angle expressed in radians.

polartoy(radius, angle)

Converts values from polar coordinates to Cartesian Y. The first argument is the radius, the second argument is the angle expressed in radians.

at2(expression1,expression1)

The arctangent2 is an inverse trigonometric functions. Returns the angle expressed in radians from a tangent trigonometric value. The result will be within the range -pi/2 and pi/2; the argument value or expression is the ratio of expression1 to expression2; both expression can take any nonzero real value.

hypo(expression1, expression2)

Returns the length of the hypotenuse of a right-angled triangle with sides expression1 and expression2. The function is equivalent to: SQRT(expression1² + expression2²).

Hyperbolic Functions

sih(expression)

Returns the hyperbolic sine of a value or expression.

coh(expression)

Returns the hyperbolic cosine of a value or expression.

tanh(expression)

Returns the hyperbolic tangent of a value or expression.

sech(expression)

Returns the hyperbolic secant of a value or expression.

csch(expression)

Returns the hyperbolic cosecant of a value or expression.

coth(expression)

Returns the hyperbolic cotangent of a value or expression.

asih(expression)

Returns the inverse hyperbolic sine. The argument can be a value or an expression.

acoh(expression)

Returns the inverse hyperbolic cosine. The argument can be a value or an expression.

atanh(expression)

Returns the inverse hyperbolic tangent. The argument can be a value or an expression.

asech(expression)

Returns the inverse hyperbolic secant. The argument can be a value or an expression.

acsch(expression)

Returns the inverse hyperbolic cosecant. The argument can be a value or an expression.

acoth(expression)

Returns the inverse hyperbolic cotangent. The argument can be a value or an expression.

Math functions

abs(expression)

Absolute

Absolute value (or modulus) of expression. The result is the input expression without regard to its sign.

chavg(expression)

Average channel value.

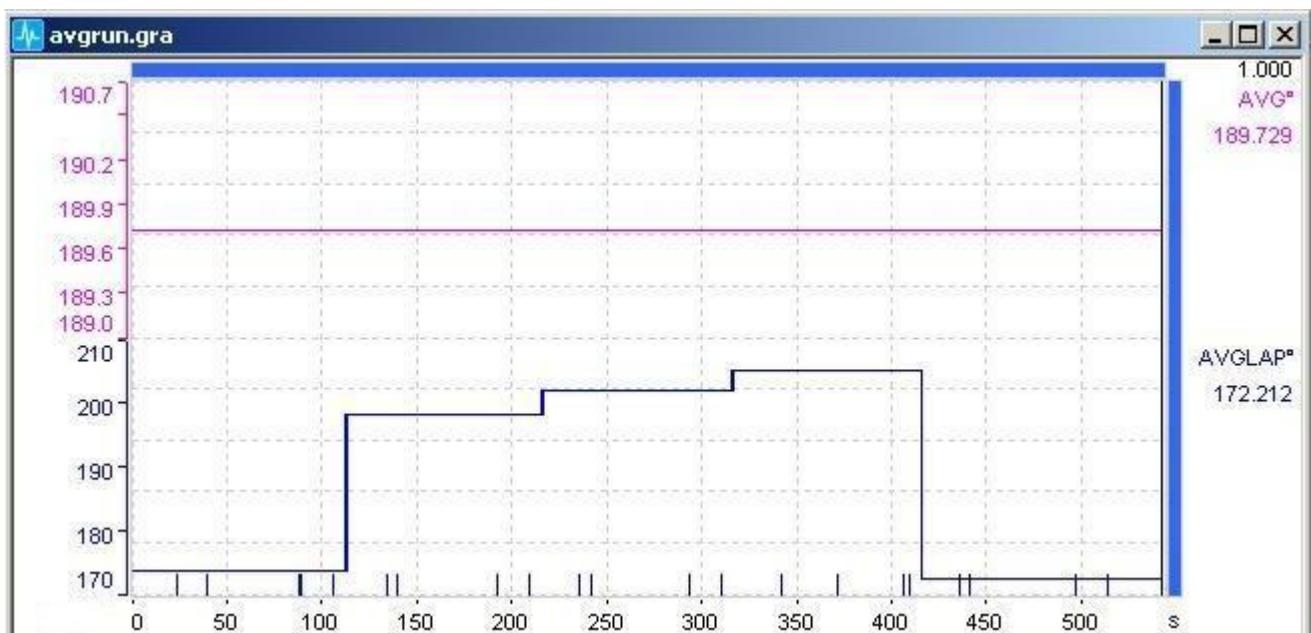
Returns the mean of expression over the current data set. The argument can be a channel or an expression.

chavglap(expression)

Average channel value.

Returns the average channel value in the current lap. The argument can be a channel or an expression.

If an append of laps is loaded, chavg differs from chavglap because the first one calculate the average on the entire group of laps, while the second one calculate the average of each lap as in picture below where 5 laps are loaded. If only one lap is loaded, chavg and chavglap assume the same value.



chavgrun(expression)

Average channel value.

Returns the average channel value in the current run. The argument can be a channel or an expression.

If an append of laps of more runs is loaded, chavg differs from chavgrun because of the first one calculate the average on the entire group of laps, while the second one calculate the average of each run. If laps of the same run are loaded, chavg and chavgrun assume the same value.

chdelay(expression, time)

Channel delay

Returns true when expression is true but with a delay of time. The first argument can be a channel or an expression. The second is a time value (seconds).

chdistance(channel, distance)

Channel distance.

Returns the value of a channel at specified position, *distance*, in the lap. Both arguments can be a channel or an expression.

chend(channel)

End channel value.

Return the end value of the argument in input. The argument can be a channel or an expression.

chendlap(channel)

End channel value.

Returns the end channel value in current lap. The argument can be a channel or an expression.

chendrun(channel)

End channel value.

Returns the end channel value in current run. The argument can be a channel or an expression.

chfreq(channel)

Channel frequency.

Returns sampling frequency (Hz) of channel. The argument can be a channel or an expression.

chmax(channel)

Maximum channel value.

Return the maximum value of the argument in input. The argument can be a channel or an expression.

chmaxlap(channel)

Maximum channel value.

Returns the maximum channel value in current lap. The argument can be a channel or an expression.

chmaxrange(channel, min, max)

Maximum channel value with range

Returns the maximum channel value in specified time range. The first argument can be a channel or an expression; min and max arguments are only values.

chmaxrun(channel)

Maximum channel value.

Returns the maximum channel value in current run. The argument can be a channel or an expression.

chmin(channel)

Minimum channel value

Return the minimum value of the argument in input. The argument can be a channel or an expression.

chminlap(channel)

Minimum channel value.

Returns the minimum channel value in current lap. The argument can be a channel or an expression.

chminrun(channel)

Minimum channel value.

Returns the minimum channel value in current run. The argument can be a channel or an expression.

chres(channel)

Channel resolution

Returns the channel resolution. The argument can be a channel or an expression.

chsamples(channel)

Channel samples

Returns the number of samples in the channel. The argument can be a channel or an expression

chsize(channel)

Channel size

Returns the channel size. The argument can be only a channel.

chstart(channel)

Start channel value

Return the start value of the argument in input. The argument can be a channel or an expression.

chstartlap(channel)

Start channel value

Returns the start channel value in current lap. The argument can be a channel or an expression.

chstartrun(channel)

Start channel value

Returns the start channel value in current run. The argument can be a channel or an expression.

chstdev(channel)

Standard deviation.

Returns the channel standard deviation. The argument can be a channel or an expression.

chttime(channel, time)

Value of channel at time.

Returns the channel value at specified time. The first argument can be a channel or an expression, the second is the value of the time.

chtimeshift(channel, time)

Channel time shift.

Returns the value of the channel in input shifted of time. The first argument can be a channel or an expression. The second is a time value (seconds).

chtimevalid(expression, time)

Channel time valid

Returns the value of the channel in input shifted of time. The first argument can be a channel or an expression. The second is a time value (seconds).

cutrange(channel, mintime, maxtime)

Cut channel range.

Returns the values of channels between the time range MinTime and MaxTime (MinTime<time<MaxTime); otherwise returns NoRx.

MinTime and MaxTime must be explicit numbers to ensure that the range is properly defined by parameters, variable names will not be accepted.

deltach(channel)

Returns the difference between first and last sample of lap. The argument can be a channel or an expression.

deriv(channel)

Derivative of channel

Returns the derivative of the channel in input at the current time point. The derivative is calculated by deducting the value of the channel at the preceding time point: DERIV(Ch) = (Ch_i - Ch_{i-1})/Dtime, where Dtime is the sampling interval expressed in seconds, defined by the configured frequency of the mathematical channel.

The argument can be a channel or an expression.

derivs(channel, sample)

Derivative of channel

Returns the derivative of the channel in input at the current time point. The derivative is calculated by deducting the value of the channel at the preceding time point: DERIV(Ch) = (Ch_i - Ch_{i-1})/Dtime, where Dtime is the input sampling interval expressed in seconds calculated by the number of samples in input. The first argument can be a channel or an expression. The second is a number of samples.

derivt(channel, time)

Derivative of channel

Returns the derivative of the channel in input at the current time point. The derivative is calculated by deducting the value of the channel at the preceding time point: DERIV(Ch) = (Ch_i - Ch_{i-1})/Dtime, where Dtime is the input sampling interval expressed in seconds in input. The first argument can be a channel or an expression. The second is a time value (seconds).

diaggt(channel, value, time)

Diagnostic greater than

Return 1 (TRUE) if *channel* is greater than *value*; otherwise returns 0 (FALSE). Holdoff *time* allows detection of transients, the function will remain TRUE for *time*, expressed in seconds, after which it will return the default value FALSE. The first argument can be a channel or an expression; the second and the third arguments only values.

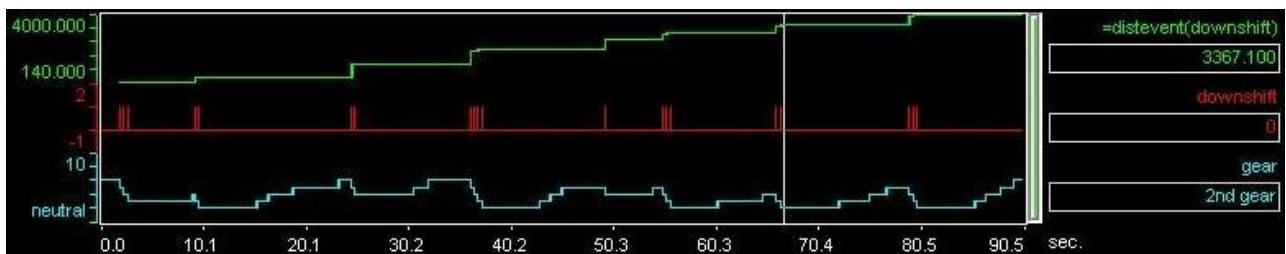
diaglt(channel, value, time)

Diagnostic Less Than

Return 1 (TRUE) if *channel* is smaller than *value*; otherwise returns 0 (FALSE). Holdoff *time* allows detection of transients, the function will remain TRUE for *time*, expressed in seconds, after which it will return the default value FALSE. The first argument can be a channel or an expression; the second and the third arguments only values.

distevent(event)

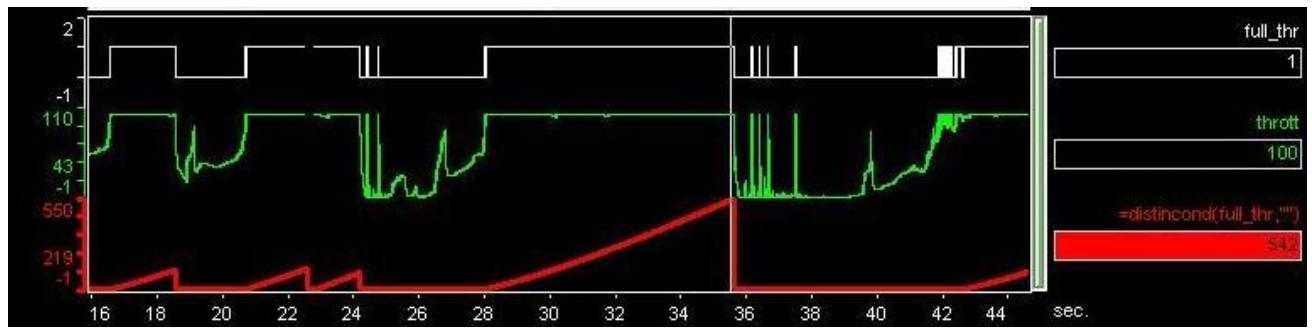
Returns the distance when an event is detected. At any given point within the data this expression will return the position of the previous occurrence of the event. The argument can be an event or an expression.



distincond(condition, "chdistance")

Distance travelled while a condition is true. Returns a piecewise distance counter calculated when the condition is true. It resets to zero when the condition is false. It does not reset at end of lap. This can be used to return the distance covered each time a given condition is true. The first argument can be a condition or an expression. The second argument must be the name of distance channel.

ChDistance must be enclosed in quotation marks. Write "" to use the default distance channel defined in General/Setup/Miscellaneous/Distance.



enum(channel, "text")

Function to find a text string value in an enumerated channel. Returns the numerical value of the Enum channel associated with the label *text*. This function can be combined with other logical functions (e.g. IFEQ) to create conditions and events based on a text string input. If the same label is associated with more values, the Enum function returns only the first value. The argument can be only a channel.

getbit(expression, start, n)

Get Bit

Returns *n* bits of expression starting form bit *start*, where *start* is in the range 0 to 31 and 0 identifies the least significant bit. The value returned is shifted according to the position *start*. The arguments can be values or expressions.

getnibble(expression, n)

Get Nibble

Returns the *n*th nibble of expression; *n* can take values from 0 to 7 where 0 returns the least significant nibble. The returned value is shifted according to the position *n*. The arguments can be values or expressions.

Example: GETNIBBLE(0x1CF5,1) = 15 (0xF)

glitch(condition, time)

Glitch filter.

Returns TRUE (1) only when the condition is true for a given time. Condition can be an expression, time is a value.



hiword(expression)

Hiword

Returns most significant word of expression and shifts the result 16 bits to the right.

integ(channel)

Integral of channel

Returns integral of a channel from the start to the end of the data set. The argument can be also an expression.

integt(channel, time)

Integral of channel from time

Returns integral of channel from time. Time is expressed in units of 0.01s. The argument can be also an expression.

interp(channel, frequency)

Interpolation

Linearly interpolates *channel* at the specified *frequency*.

LapConstMath(LapNumber, expression)

Returns the value of the expression calculated in the selected lap. The first argument is the index of a lap in the run. The second argument can be a channel or an expression. If channel or expression returns a constant value in the lap selected, LapConstMath returns the same value; otherwise, if channel or expression is not constant, LapConstMath returns a not valid value.

lapsplittime(section)

Returns the time elapsed from the beginning of the lap to *section*. The argument is the index of the section and can be a value or an expression.

lookup1(file,x)

One dimensional lookup

One-dimensional lookup in file with input value x. File is a *.DAT file in the Wintax4-Libraries directory and must be enclosed in speech marks (filename) without the DAT extension.

Lookup tables can be selected from a browse list and may be edited within WinTAX via Configure/Lookups

Intermediate points are linearly interpolated.

Example

OUT = LOOKUP1 ("TAB", CH) where TAB is the name (without extension) of the file containing the table (e.g. TAB.DAT) and CH is the name of the input channel.

```
#      (#      =      comment      character)
#      1-D      look-up      table
#      columns      separated      TABs
#      rows      end      with      CR+LF
#
```

0	0
1000	1
2000	4
3000	9
4000	16
5000	25
6000	36
7000	49
8000	64
9000	81
10000	100

CH = 1000 -> OUT = 1.0
CH = 2500 -> OUT = 6.5

lookup2(file, column, row)

Lookup two dimensional

Two-dimensional lookup in file with input value column and rows. File is a *.DAT file in the Wintax4-Libraries directory and must be enclosed in speech marks (filename) without the DAT extension. Lookup tables can be selected from a browse list and may be edited within WinTAX via Configure/Lookups. Intermediate points are linearly interpolated.

Example

OUT = LOOKUP2 ("TAB", CH1, CH2) where TAB is the name of the table (TAB.DAT) without extension and CH1 and CH2 are the names of the input channels

```
#          2-D      look-up      table
#          first      row
#          columns    separated   by
# rows end with CR+LF      TABs
```

	0	30	60	90	120
1000	1.0	31	61	91	121
3000	9.0	39	69	99	129
5000	25.0	55	85	115	145
7000	49.0	79	109	139	169
9000	81.0	81.0	111	141	201
10000	100.0	130	160	190	220

CH1 = 1000; CH2 = 30 -> OUT = 31

CH1 = 7000; CH2 = 90 -> OUT = 139

loword(expression)

Low Word

Returns least significant word of expression.

LR_OFFSET(channel1, channel2)

Linear Regression Offset, correspond to the "B0" value. It gives the same results than plotting channel1 vs channel2 in an XY plot with a 1st degree "Best Fit"

LR_R2(channel1, channel2)

Returns the R2 coefficient (fraction between 0.0 and 1.0), a measure of goodness -of- fit of Linear Regression. An R2 value of 0.0 means that knowing X does not help you predict Y. There is no linear relationship between X and Y, and the Best Fit line is a horizontal line going through the mean of all Y values. When R2 equals 1.0, all point lie exactly on a straight line with no scatter.

LR_SLOPE(channel1, channel2)

Linear Regression Slope, correspond to the "B1" value. It gives the same results than plotting channel2 vs channel1 in an XY plot with a 1st degree "Best Fit"

mask(channel, threshold, logic, tolerance, holdtime)

It's used to generate events, includes a time-dependent hysteresis.

If the value of *logic* is 1, "Max", (0, "Min") the function returns

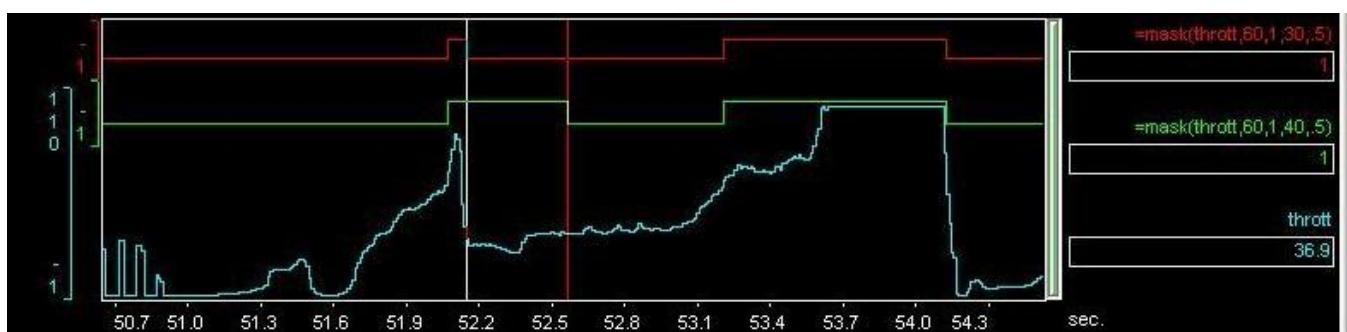
- 0 if the channel is lower (higher) than *Threshold*
- 1 if the channel is greater (less) than or equal to *Threshold*,

When the result is true (i.e. has exceeded the threshold) all variations within the range: [*Threshold* - *Tolerance*] ([*Threshold* + *Tolerance*]) will not be considered for a time = *hold_time*, counted from when the condition became true.

Thus the function results in hysteresis which is applied for a specified time.

If *hold_time* is set to -1 then the hysteresis time is infinite and the channel values must be below (above) the tolerance in order for the result to reset to 0.

Example



= mask(thrott, 60, 1 30, 0.5)

resets when *thrott* goes below *threshold-tolerance* (= 30) even if the mask time has not expired

= mask(thrott, 60, 1 40, 0.5)

resets when the mask time (=0.5s) expires because *thrott* is below *threshold-tolerance* (= 20)

max(expression1, expression2)

Maximum value

Returns the maximum value between expression1 and expression2 at current time.

means(channel, n)

Mean value (sample)

Returns the mean value of channel over n samples.

meant(channel, time)

Mean value (time)

Returns the mean value of channel over time (milliseconds).

mileage(condition, "chdistance")

Similar to TimeTotal but returns the piecewise counter (i.e. integral in distance) of the channel defined as ChDistance

ChDistance must be enclosed in quotation marks. Write "" to use the default distance channel defined in General/Setup/Miscellaneous/Distance.

min(expression1, expression2)

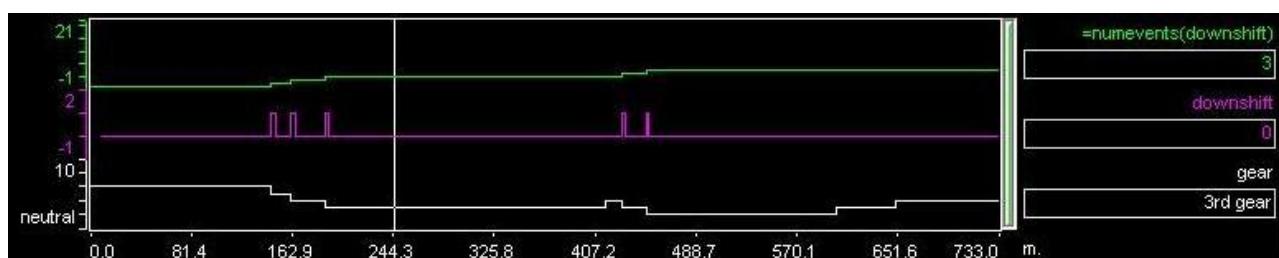
Minimum value

Returns the minimum value between expression1 and expression2 at current time.

numevents(event)

Returns the progressive number of occurrences of an event within the loaded data.

Returns 0 up to first event, returns N between Nth and the N+1st



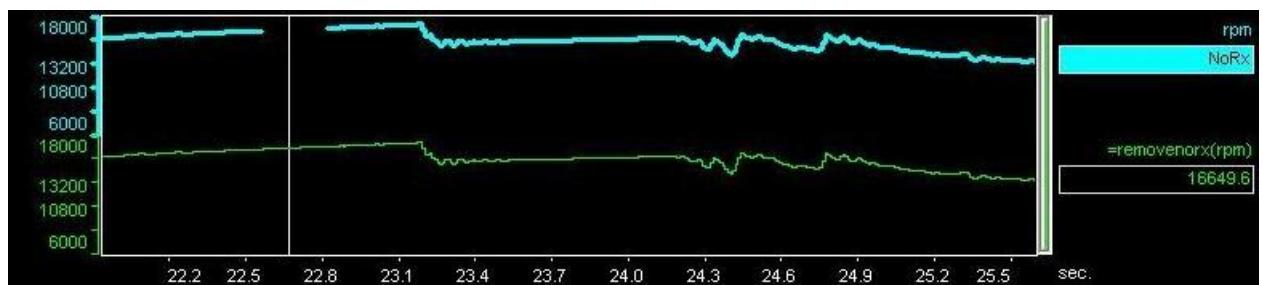
poly(x, b0, b1, b2, b3, b4, b5, b6)

Returns a polynomial up to 6th degree calculated on the input value X.

X apart, the other arguments are optional.

removenorx(channel)

Removes NoRx values from channel and replaces them with interpolated values. The argument can be also an expression.



replace(channel, x, y)

Replaces x with y in channel. The arguments can be also expressions.

rotl(expression, n)

Rotate expression to left by n bits.

rotr(expression, n)

Rotate expression to right by n bits

samplemax(channel, n)

Returns maximum channel value n samples behind/above.

samplemin(channel, n)

Returns minimum channel value n samples behind/above.

SAMPLES(channel)

Returns the number of samples (values <> NoRx) included in channel.

SAMPLET(channel, range)

Returns the number of samples up to a certain time "range" [msec] of the lap (values <> NoRx) included in channel.

shiftl(expression, n)

Shift left.

Shift left by n bits of expression.

shiftr(expression, n)

Shift right.

Shift right by n bits of expression.

timeatcond(condition)

Returns the total time in the current selection of laps for which condition is true. Condition can be also an expression.

timeatmax(channel)

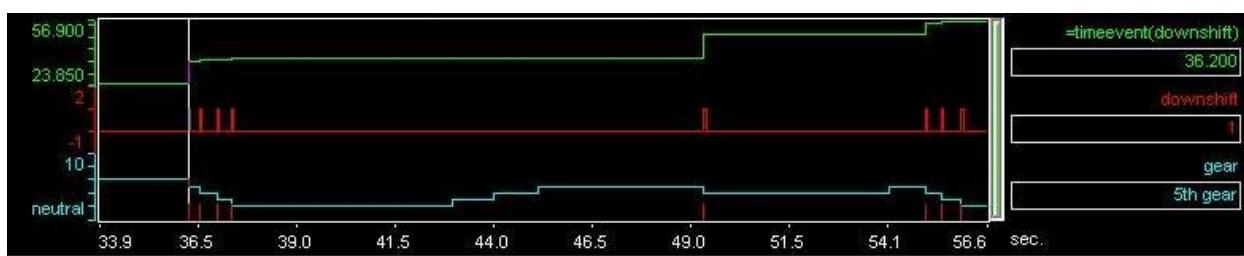
Returns the total time in seconds where channel had its maximum value. Channel can be also an expression.

timeatmin(channel)

Returns the total time in seconds where channel had its minimum value. Channel can be also an expression.

timeevent(event)

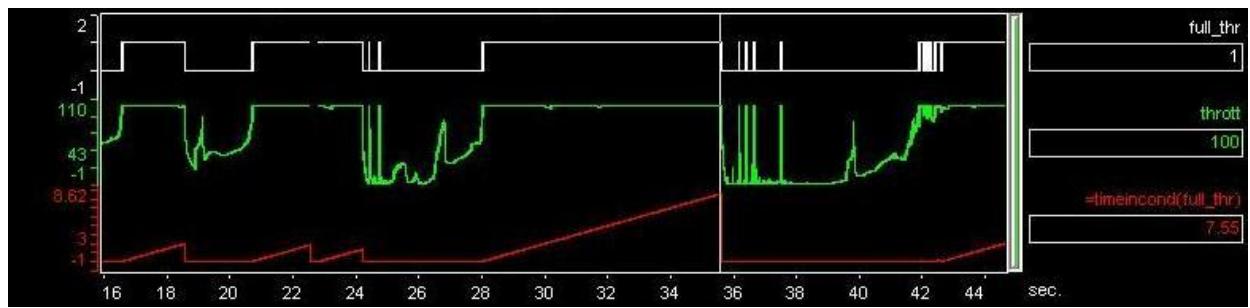
Returns the time at which an event is detected. At any given point within the data this expression will return the time of the previous occurrence of the event. The argument can be an event or an expression.



timeincond(condition)

Time spent in Condition.

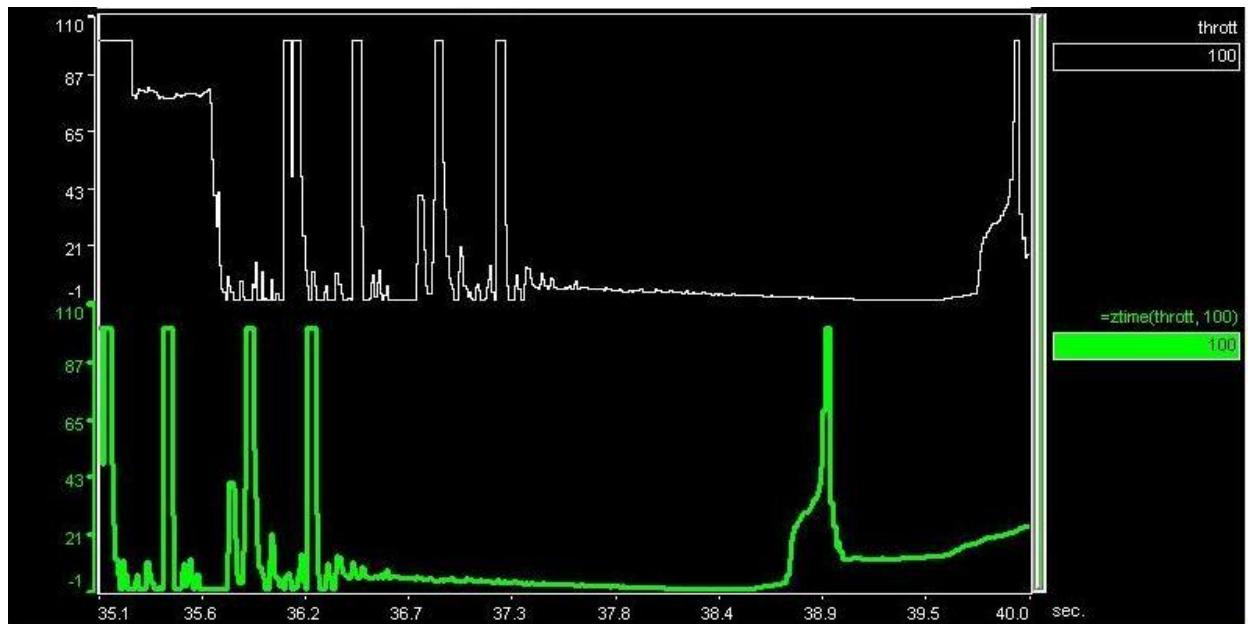
Returns a piecewise time counter calculated when the condition is TRUE. Resets to zero when the condition is FALSE. This can be used to return the elapsed time each time a given condition is true.



ztime(channel, v)

Value of channel at v samples away

Returns value of channel at a distance of v samples (positive for later, negative for earlier), consequently it shifts the channel by v samples.



Filters

butterworth(channel, type, freqlow, freqhigh, order)

Butterworth filter is characterized by a magnitude response that is maximally flat in the pass band and monotonic overall.

The first argument can be a channel or an expression.

Type (string) may take the following values: "low", "high", "bandpass", "bandstop".

FreqLow and FreqHigh are the cutoff frequencies.

Order is the order of the filter, in other words the number of recursive inputs used to calculate the current output; the minimum order is 1, the maximum is 99.

FFT_BP(channel, freqlow, freqhigh)

FFT band pass filter

Returns the data channel band pass filtered between freqlow (Hz) and freqhigh (Hz). The first argument can be a channel or an expression.

FFT_BS(channel, freqlow, freqhigh)

FFT band stop filter

Returns the data channel filtered above and below freqlow (Hz) and freqhigh (Hz). The first argument can be a channel or an expression.

FFT_HP(channel, freq)

FFT high pass filter

Returns the data channel high pass filtered at freq (Hz). The first argument can be a channel or an expression.

FFT_LP(channel, freq)

FFT low pass filter

Returns the data channel low pass filtered at freq (Hz). The first argument can be a channel or an expression.

hifiltert (channel, time)

Define a period for which to filter out the dc part of a signal for a specified channel; time is given in ms. The argument channel can be also an expression; time is a value.

Digital Filters

The WinTAX's digital filters are described by the recursion equation:

$$Y(n) = A0 * X(n) + A1 * X(n-1) + A2 * X(n-2) + A3 * X(n-3) + A4 * X(n-4) + \dots + B1 * Y(n-1) + B2 * Y(n-2) + B3 * Y(n-3)$$

For example, the first order filter is described by the difference equation:

$$Y(n) = A0 * X(n) + A1 * X(n-1) + B1 * Y(n-1)$$

The correspondent WinTAX's formulae are: DigitalFilter1 (channel, A0, A1, B1)

DigitalFilter1 (channel, A0, A1, B1)

Returns the 1st order Digital filter using the equation $y(n) = A0 * x(n) + A1 * x(n-1) - B1 * y(n-1)$

DigitalFilter2 (channel, A0, A1, A2, B1, B2)

Returns the 2nd order Digital filter using the equation $y(n) = A0 * x(n) + A1 * x(n-1) + A2 * x(n-2) + B1 * y(n-1) + B2 * y(n-2)$

DigitalFilter3 (channel, A0, A1, A2, A3, B1, B2, B3)

Returns the 3rd order Digital filter using the equation $y(n) = A0 * x(n) + A1 * x(n-1) + A2 * x(n-2) + A3 * x(n-3) + B1 * y(n-1) + B2 * y(n-2) + B3 * y(n-3)$

DigitalFilter4 (channel, A0, A1, A2, A3, A4, B1, B2, B3, B4)

Returns the 4th order Digital filter using the equation $y(n) = A0 * x(n) + A1 * x(n-1) + A2 * x(n-2) + A3 * x(n-3) + A4 * x(n-5) + B1 * y(n-1) + B2 * y(n-2) + B3 * y(n-3) + B4 * y(n-4)$

For all 4types of digital filter, it is your responsibility to ensure the function is evaluated at the appropriate frequency for the filter coefficients. The 'Fixed Frequency' calculation mode is recommended to ensure that changes to the parameters sampling rates do not affect filter results.

The initial condition for Low and High Pass filters is calculated as followings:

$$Y(n) = A_0 \cdot X(n) + A_1 \cdot X(n-1) + A_2 \cdot X(n-2) + B_1 \cdot Y(n-1) + B_2 \cdot Y(n-2)$$

$$Y(0) = A_0 \cdot X(0) + 0 + 0 + 0 + 0$$

$$Y(1) = A_0 \cdot X(1) + A_1 \cdot X(0) + 0 + B_1 \cdot Y(0) + 0$$

$$Y(2) = A_0 \cdot X(2) + A_1 \cdot X(1) + A_2 \cdot X(0) + B_1 \cdot Y(1) + B_2 \cdot Y(0)$$

.....

The coefficients of the recursion equation can be calculated for example in Matlab, where you can design the filter.

For example:

Cebicev LOW PASS filter defined in Matlab:

```
[a,b] = cheby1(4, 0.5, 0.1, 'low')
a = 0.0002  0.0007  0.0011  0.0007  0.0002
b = 1.0000  -3.5328  4.7819  -2.9328  0.6868
```

The correspondent filter in WinTAX is:

```
digitalfilter4(X, 0.0002, 0.0007, 0.0011, 0.0007, 0.0002, 3.5328, -4.7819, 2.9328, -0.6868)
```

Cebyshev High PASS filter defined in Matlab:

```
[a,b] = cheby1(4, 0.5, 0.1, 'high')
a = 0.6066  -2.4264  3.6396  -2.4264  0.6066
b = 1.0000  -3.1004  3.7156  -2.0314  0.4332
```

The correspondent filter in WinTAX is:

```
digitalfilter4(X, 0.6066, -2.4264, 3.6396, -2.4264, 0.6066, 3.1004, -3.7156, 2.0314, -0.4332)
```

IIR Filters

IIR(channel, cutfreq)

Infinite Impulsive Response filter of the channel, where cutfreq is the cut-off frequency.

IIR_LP(channel, cutfreq)

This type of filter (Infinite Impulse Response) has time output n0 depending not only on the various input values for $n \leq n_0$, but also on the output values for $n \leq n_0$. It is therefore a recursive type of filter. Infinite Impulsive Response Low Pass filter is a recursive filter that maintains frequency content below the cut-off freq; it is described by the following characteristic equation:

$$Y(n) = a_0 * X(n) + b_1 * Y(n-1)$$

Where

Y = Out, filtered signal

X = In, source signal

The coefficients of the filter are calculated as follows:

$$a_0 = 1 - X;$$

$$b_1 = X;$$

$$\text{with } X = 1/(1 + 2 * \pi * \text{cutfreq} / f)$$

$$\pi = \prod$$

f is the signal frequency

IIR_HP(channel, cutfreq)

This type of filter (Infinite Impulse Response) has time output n0 depending not only on the various input values for $n \leq n_0$, but also on the output values for $n \leq n_0$. It is therefore a recursive type of filter.

Infinite Impulsive Response High Pass filter is a recursive filter that maintains frequency content above the cut-off freq; it is described by the following characteristic equation:

$$Y(n) = a_0 * X(n) + a_1 * X(n-1) + b_1 * Y(n-1)$$

Where

Y = Out, filtered signal;

X = In, source signal.

The coefficients of the filter are calculated as follows:

$$a_0 = (1 + X)/2;$$

$$a_1 = -(1 + X)/2;$$

$$b_1 = X$$

$$\text{with } X = 1/(1 + 2 * \pi * \text{cutfreq} / f);$$

f is the signal frequency

Saturation Amplitude Filters

SATAMPS(channel, positivedelta, negatedelta)

Limits the maximum change of a value (positive or negative) from one sample to the next to a certain value; *positivedelta* is the maximum change per sample in positive direction and *negatedelta* the maximum change per sample in negative direction. If the virtual channel is:

ch_fil = SATAMPS(ch, pos, neg)

where *pos* is the maximum change per sample in positive direction, *neg* the maximum change per sample in negative direction, the formula for SATAMPS is:

ch_fil_i = IFGE(ch_i, ch_{i-1}) * MIN(ch_i, (ch_fil_{i-1} + pos)) + IFLT(ch_i, ch_{i-1}) * MAX(ch_i, (ch_fil_{i-1} - neg))

There is the possibility to switch off either the positive or the negative part individually to use only one of both, for example by a negative value for 'pos' or 'neg':

ch_fil = SATAMPS(ch, -1, 5)

lead to a channel that has got a maximum negative slew rate of 5 / sample, without limiting the slew rate in positive direction.

SATAMPT(channel, positivedelta, negatedelta)

Limits the maximum allowed change per second to a value (positive or negative); *positivedelta* is the maximum change per second in positive direction and *negatedelta* the maximum change per second in negative direction. The virtual channel:

ch_fil = SATAMPT(ch, pos, neg)

would accordingly filter 'channel' with a maximum delta / second. In virtual channel *pos* is the maximum change per second in positive direction, *neg* the maximum change per second in negative direction; SATAMPT introduces the sample frequency *f_{sample}* of the channel. The internal formula is:

ch_fil_i = IFGE(ch_i, ch_{i-1}) * MIN(ch_i, (ch_fil_{i-1} + (pos/f_{sample}))) + IFLT(ch_i, ch_{i-1}) * MAX(ch_i, (ch_fil_{i-1} - (neg/f_{sample})))

There is the possibility to switch off either the positive or the negative part individually to use only one of both, for example by a negative value for 'pos' or 'neg':

ch_fil = SATAMPT(ch, 10, -1)

limit the positive slew rate to 10 / second without affecting negative behavior.

Amplitude Filters

AMPLFLTT(channel, PositiveDelta, NegativeDelta)

Limits the maximum allowed change per second to a value (positive or negative) using previous filtered value; *positivedelta* is the maximum change per second in positive direction and *negativedelta* the maximum change per second in negative direction.

AMPLFLTS(channel, PositiveDelta, NegativeDelta)

Limits the maximum change to a value (positive or negative) from one sample to the next to a certain value using previous filtered value; *positivedelta* is the maximum change per sample in positive direction and *negativedelta* the maximum change per sample in negative direction.

Track Section Function

Note: The section indices in the functions of map management are '0 based'.

deltasplittime(section)

Delta section split time

Returns the difference in the time used to run the section in input, between the current comparison and the base comparison. The argument is the index of the section and can be a value or an expression.

deltalapsplittime(section)

Delta lap split time

Returns the difference in the time elapsed from the beginning of the lap to the section in input, between the current comparison and the base comparison group. The argument is the index of the section and can be a value or an expression.

splittime(section)

Section split time

Returns time used to run the section in input. The argument is the index of the section and can be a value or an expression.

tracksection(time)

Returns the index of the map section corresponding to time.

tracksectionend(section)

Returns the distance corresponding to the end of section.

tracksectionendtime(section)

Returns the time corresponding to the end of section.

tracksectionstart(section)

Returns the distance corresponding to the beginning of section.

tracksectionstarttime(section)

Returns the time corresponding to the beginning of section.

VCH Programming Language

In same licences the VCH channel expression can be improved using some programming language statements.

The **VCH programming language statements** are categorized into this following types:

- **Declaration Statements:** dim, static.
- **Conditional Statement:** if, else.
- **Iteration Statements:** for, while.
- **Jump Statements:** break, continue, return.

If an expression uses statements, the expression can be written and expanded on more than one line of the editor. The line must be terminated with ";". It's possible to insert comments using "//".

- **Statements**

Statements

dim

Declares variables, allocates storage space and optionally initializes it with a specified value; if not specified the variable is initialized by default as NoRx.

Syntax:

dim variable [=number];

A variable declared as local is available only inside the virtual channel and has its scope resolution inside the code block where it is declared.

The last value is maintained for each sample calculated.

Local variables declared with a **dim** statement has higher precedence than the global variable with the same name declared with **static** statement.

static

Declares variables, allocates storage space and optionally initializes it with a specified value; if not specified the variable is initialized by default as NoRx..

Syntax:

static variable [=number];

A variable declared static retains its state between all the virtual channels in the loaded libraries.

Local variables declared with a **dim** statement has higher precedence than the global variable with the same name declared with **static** statement.

if, else

Controls conditional branching. If the value of expression is nonzero, statement1 is executed. If the optional else is present, statement2 is executed if the value of expression is zero.

Syntax:

```
if (expression)
{
    statement1;
}
else
{
    statement2;
}
```

for

Use the for statement to construct loops that must execute a specified number of times. A for loop terminates when a break or return within statement is executed. A continue statement in a for loop terminates only the current iteration.

Syntax:

```
for (init-expression; conditional-expression; loop-expression)
{
    statement;
}
```

while

Executes statement repeatedly until expression evaluates to zero. A while loop can also terminate when a break or return within the statement body is executed. Use continue to terminate the current iteration without exiting the while loop; continue passes control to the next iteration of the while loop.

Syntax:

```
while (expression)
{
    statement;
}
```

break

The break statement terminates the execution of the nearest enclosing loop or conditional statement in which it appears. Control passes to the statement that follows the terminated statement, if any; break is used with the for and while loop statements.

Syntax:

break;

continue

Forces transfer of control to the controlling expression of the smallest enclosing for or while loop. Any remaining statements in the current iteration are not executed. The next iteration of the loop is determined as follows: 1)In a while loop the next iteration starts by reevaluating the controlling expression of the while statement. 2) In a for loop continue causes loop-expression to be executed.

Syntax:

continue;

return

Exits from the current function and returns a value from that function. The value of expression is returned to the calling function.

Syntax:

return expression;

External maths channels

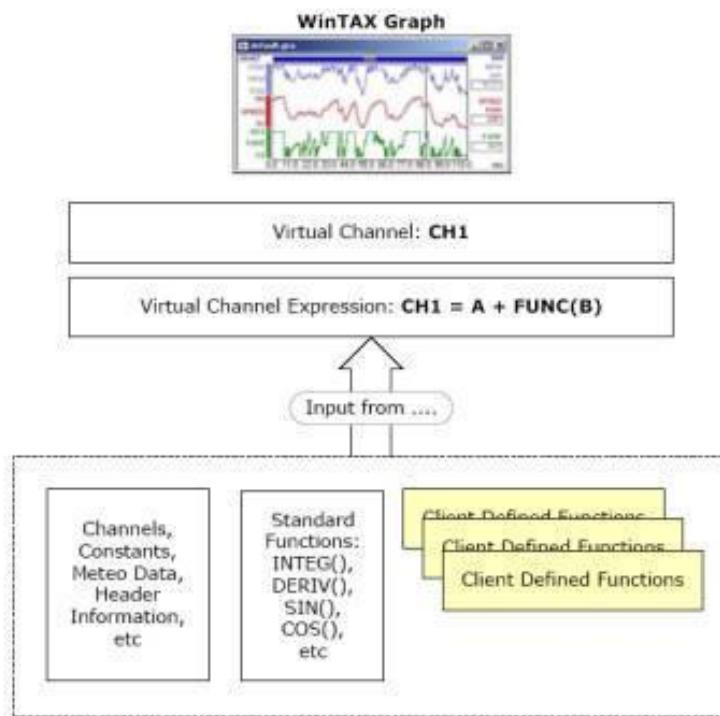
In addition to native internal Math functions, it's possible to create Math channel in other two ways:

- Math Channels can be created externally via Scripting
- Math Channels can be created externally via user-generated Math DLLs (an example DLL project is installed in **Wintax4\Samples\MathDII.zip**)

DLL Maths

Within the math channels environment of WinTAX / TelDataX it will be possible to select a series of parametric *Math Client Functions* in addition to the standard math functions (SIN, COS, INTEG, etc).

These functions will be available in the Virtual Channels expression of WinTAX. In this way a maths channel may directly return the result of a Client Function or it may include it within another function. Several math channels may call the same Client Function passing different parameters in order to obtain different results. Via the Virtual Channels, the user may include his own function in every point where WinTAX uses a channel (virtual and logged).



DLL Registration

At startup, WinTAX checks for math DLLs in a specific folder (`\Wintax\PluginIns\Math\` where `\Wintax\` is the working folder which contains WinTAX4.exe and `\PluginIns\` is the folder configured in *Setup/General/Directories* as folder type *Plugin*). For each DLL found, WinTAX carries out a LoadLibrary and analyses if all the functions required have been implemented. This is done via calls to GetProcAddress: if any call fails (that is, if the function name is not found in the DLL),

WinTAX will log an error message in the *Log Window*, with a description of the failed operation, the DLL file name and the function name.

Not all the functions need to be implemented in the DLL, but if a DLL does not implement the minimum number of functions required, it will not be validated and therefore it will be ignored.

Here is a list of the required functions:

- **QueryMathComponentNumFunctions**
- **QueryMathComponentName**
- **QueryMathFunctionName**
- **QueryMathFunctionDataTransferType**
- **QueryMathFunctionNumParameters**

Both successful and failed DLL registration results are logged in WinTAX Log Window.

During the registration phase, WinTAX calls some query functions to determine what user functions are implemented and how many parameters are needed. It calls QueryMathComponentNumFunctions, QueryMathComponentName, QueryMathFunctionName, QueryMathFunctionNumParameters, QueryMathFunctionDataTransferType, and QueryMathParameterName. Every error is logged in the log window.

During the session, WinTAX and TelDataX will not make further calls to GetProcAddress: functions pointers of the validated DLLs are stored during start up. Therefore, a DLL cannot be replaced during a WinTAX session: close WinTAX, change the DLL file and then restart WinTAX.

TelDataX registration sequence is similar to WinTAX, but it is done only when the user tool calls ITelRun::SetPropertyData with the special property PROPERTYTEXT_MathDLLEnabled set to 1. In this case TelDataX proceeds with the same registration sequence of WinTAX. In case of conflicts, the registration stops at the first conflict found. It is possible to get the last error message via a call to ITelRun::GetPropertyData with the special property PROPERTYTEXT_MathDLError.

When closed, WinTAX releases the registered DLLs. TelDataX releases the DLLs when the last ITelRun object is released.

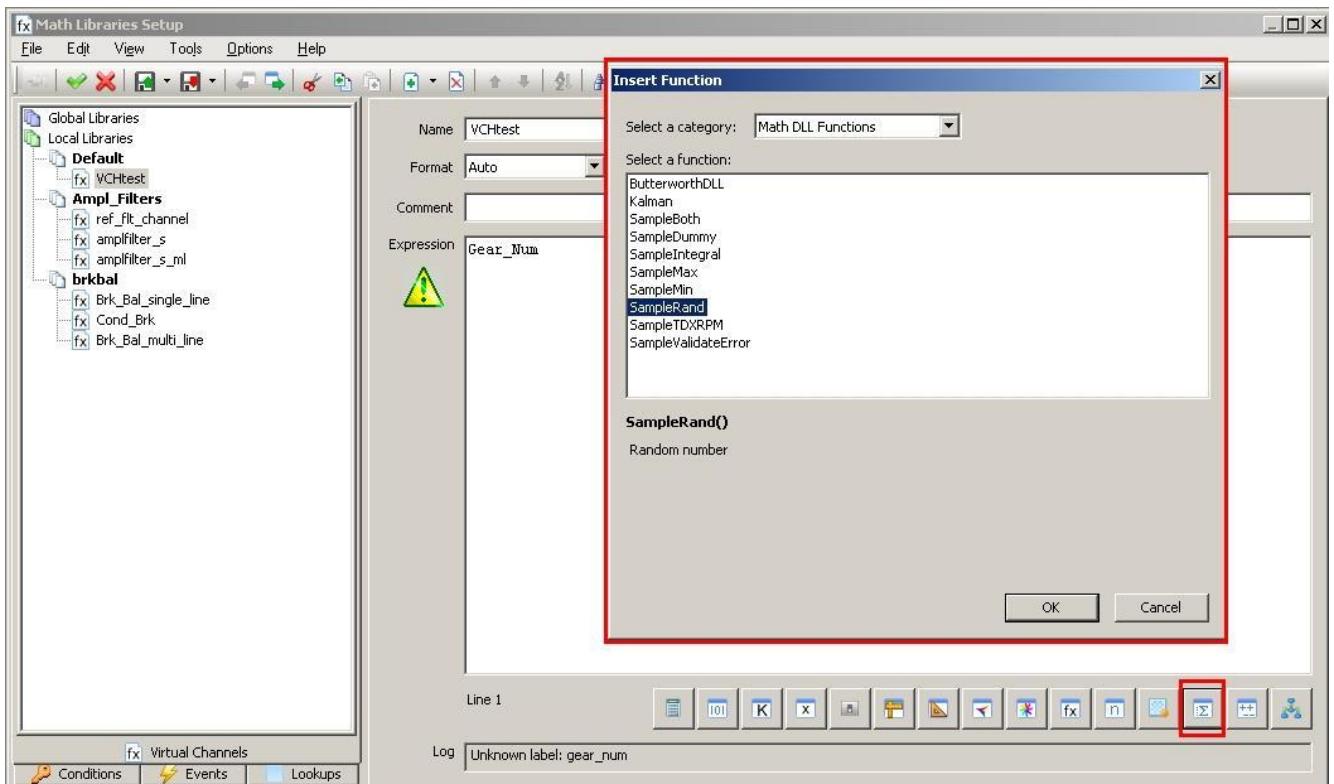
Both WinTAX and TelDataX run the DLL registration loop in alphabetical order, case insensitive (eg Alpha.dll is always registered before Zone.dll).

Editing math channels

When the user needs to configure a math channel, WinTAX displays in pop-up menus and tooltips the names and descriptions of the Component, the Math Functions and the Parameters which were found during the start up phase in the DLLs.

The information displayed in the GUI is the same returned by the DLLs via the functions QueryMathComponentName, QueryMathComponentDescription, QueryMathFunctionName, QueryMathFunctionDescription, QueryMathParameterName, QueryMathParameterDescription.

In order to view the list of client functions click on *Show Math DLL Functions* button (highlighted in the following figure). This button will be activated only if at least one client function is available.



TelDataX4 exceptions

The following math functions use configurations within WinTAX and cannot be calculated by TelDataX4

Map- & Distance-related functions

\$Deltatime
\$Tracklen
Chdistance
Deltalapsplittime
Deltasplittime
Lapsplittime
Splittime
Tracksection
Tracksectionend
Tracksectionendtime
Tracksectionstart
Tracksectionstarttime

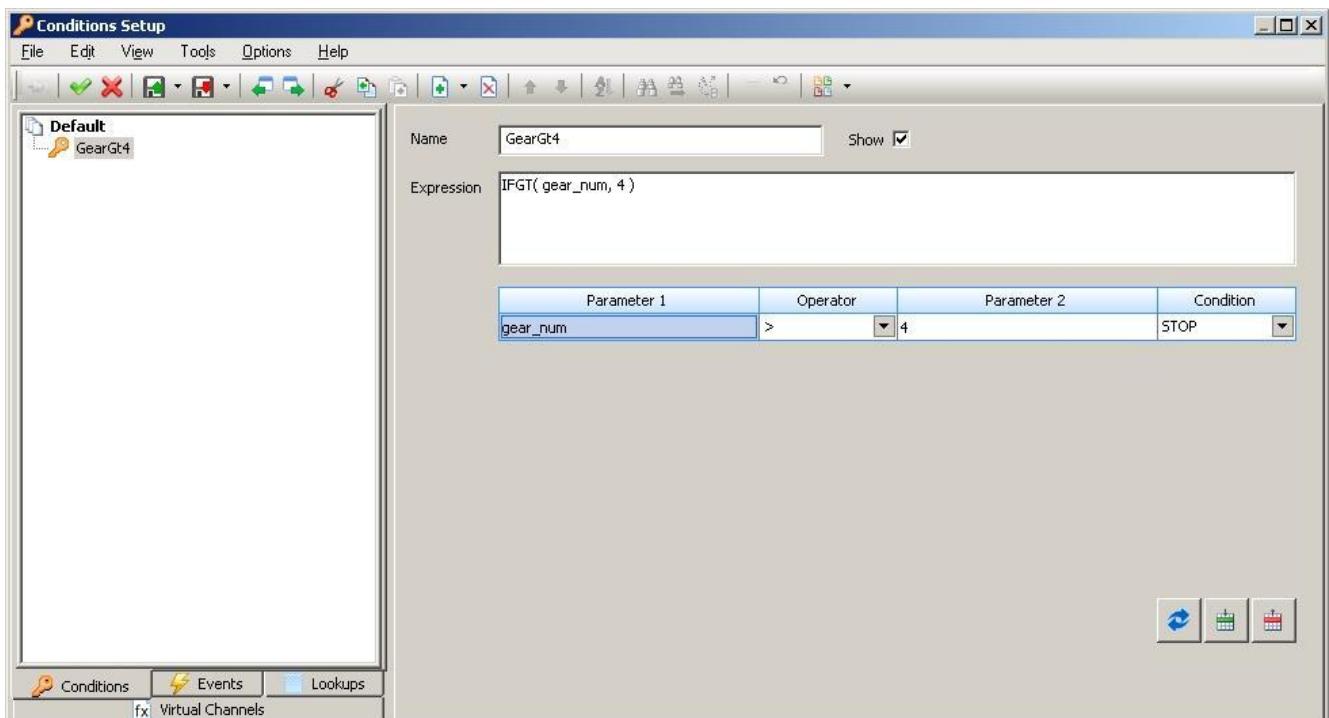
Event- & condition-related functions

DistanceEvent
DistanceInCondition
Enum
Mileage
NumEvents
TimeEvent
TimeInCondition

Conditions

Conditions are combinations of Boolean logic expressions (based on VCH functions) which return a value of 0 or 1. They can be used as a basis for generating events and also for filtering the data displayed in analysis windows.

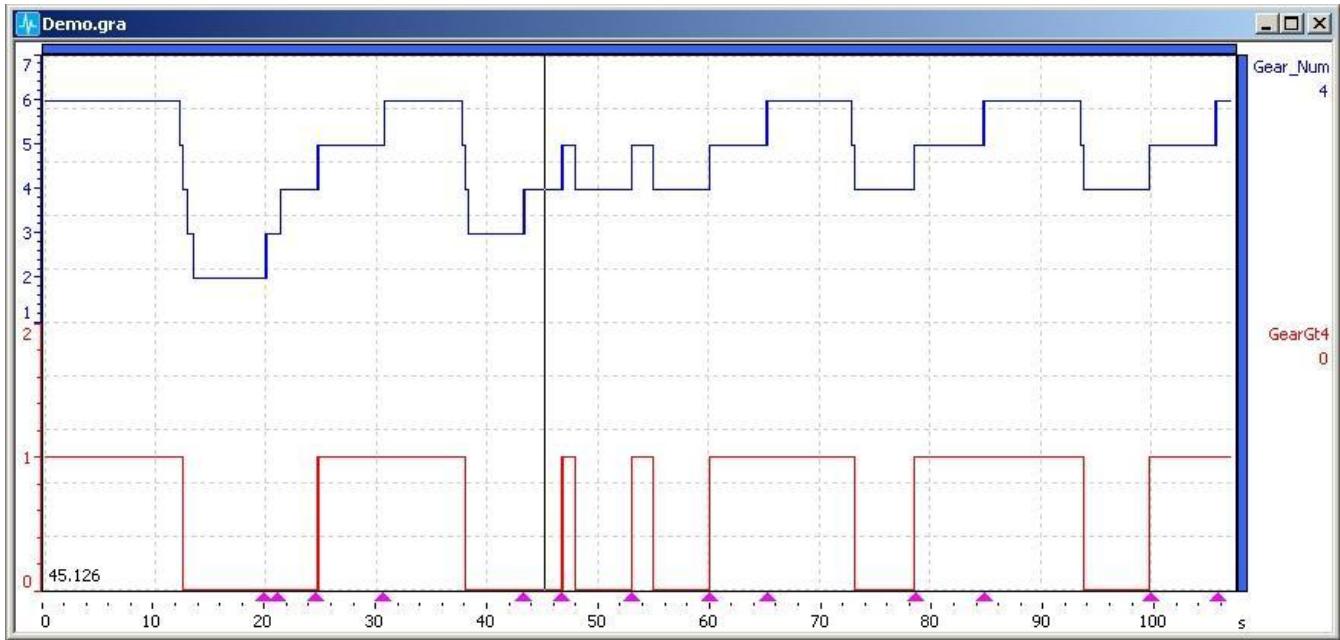
To setup conditions select *Tools/Conditions*.



Each Condition is defined by:

- **Name:** Name of the condition
- **Show:** Enables/disables the visualization in the *Channel Browser*.
- **Expression:** Boolean expression to calculate the condition; it is formed by one or more relations connected among them by a logic operator (And, Or, Xor and STOP, Condition column); each relation is formed by two parameters (usually a channel and a threshold value) connected by a Boolean operator. In the field *Expression* the condition formula is shown as a *Virtual Channel* and can be manually modify. Use Reload Condition button after edit expression filed to refresh the conditions list. If the Expression fields is wrong, an error message appears instead of the condition list.

Conditions can be added to graphic windows just like VCH channels



Commands of the window

Menu

The menu of the **Conditions Setup** window allows the access to the following commands, divided into sub menus:

File Menu

COMMAND	DESCRIPTION
Apply	Applies the current settings of the window.
Cancel	Closes the window without applying the current settings.
Load	Opens a dialog window to select a Conditions library (.cnd) to be loaded.
Save As	Opens a dialog window to select a Conditions library (.cnd) to save the current settings.
Import	Not used
Export in a new library	Exports the selected Conditions in a new library.

Edit Menu

COMMAND	SHORTCUT	DESCRIPTION
Cut	Ctrl + X	Copies to clipboard the configurations of the selected channels and it removes them from the list.
Copy	Ctrl + C	Copies to clipboard the configurations of the selected channels in the list.
Paste	Ctrl + V	Pastes the configurations of the channels available in clipboard, adding them to the list.
Add Item		Adds a new item to the selected library.
Remove Item		Removes the selected items.
Move Up		Moves up by one position the selected items in the list.
Move Down		Moves down by one position the selected items in the list.
Find...	Ctrl + F	Not used.
Fin Next	F3	Not used.
Replace...	Ctrl + R	Not used.
Comment selected lines	Ctrl + K	Not used.
Uncomment selected lines	Ctrl + U	Not used.

View Menu

COMMAND	SHORTCUT	DESCRIPTION
Previous page	Ctrl + Shift + Tab	Enables the page of the window previous to the one currently in use.
Next page	Ctrl + Shift + Tab	Enables the page of the window next to the one currently in use.

Tools Menu

COMMAND	DESCRIPTION
Sort	Sorts by name the libraries, if a library is selected, or the channels of the library to which the selected channel belongs.

Options Menu

COMMAND	DESCRIPTION
Add Row	Adds a line to the list of the formula of the Condition.
Remove Row	Removes the line selected in the list of the formula of the Condition.
Reload Condition	Refreshes the conditions list after manual edit of the Condition.

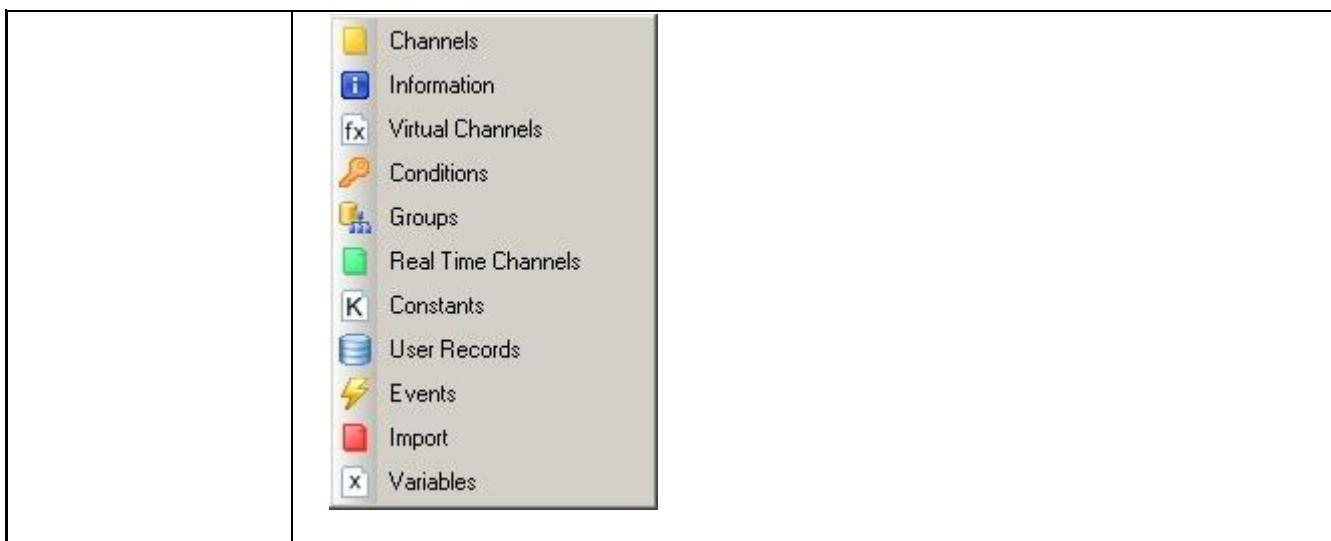
Help Menu

COMMAND	SHORTCUT	DESCRIPTION
Help	F1	Launch the WinTAX4 help, if available.

Toolbar

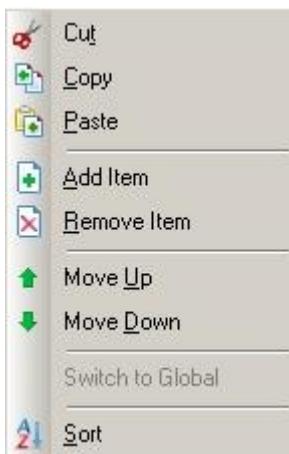
The toolbar allows the access to the following commands:

COMMAND	DESCRIPTION
Keep Visible	Not enabled in this window.
Cancel	Similar to the Cancel command of the File menu
Apply	Similar to the Apply command of the File menu
Load	Similar to the Load command of the File menu
Save As	Similar to the Save As command of the File menu
Previous Page	Similar to the Previous page command of the View menu
Next Page	Similar to the Next page command of the View menu
Cut	Similar to the Cut command of the Edit menu
Copy	Similar to the Copy command of the Edit menu
Paste	Similar to the Paste command of the Edit menu
Add Item	Similar to the Add Item command of the Edit menu
Remove Item	Similar to the Remove Item command of the Edit menu
Move Up	Similar to the Move Up command of the Edit menu
Move Down	Similar to the Move Down command of the Edit menu
Sort	Similar to the Sort command of the Tools menu
Channel Browser	Shows the pop-up menu to select the page in the Channel Browser window



Pop-up Menu

The pop-up menu of the **Conditions Setup** window can be displayed by clicking with the right button of the mouse



The pop-up menu of the **Conditions Setup** allows the access to the following commands:

COMMAND	DESCRIPTION
Cut	Similar to the Cut command of the Edit menu
Copy	Similar to the Copy command of the Edit menu

Paste	Similar to the Paste command of the Edit menu
Add Item	Similar to the Add Item command of the Edit menu
Remove Item	Similar to the Remove Item command of the Edit menu
Move Up	Similar to the Move Up command of the Edit menu
Move Down	Similar to the Move Down command of the Edit menu
Switch to Global	Not used.
Sort	Similar to the Sort command of the Tools menu

Events

Definition of an event

An event is defined as the change of status of a variable from False (=0) to True (<>0) or vice versa. The variable can be a logged channel, such as a diagnostic or an error flag, or some derived channel which has two meaningful status (e.g. a Boolean condition). When the variable changes status an event is generated.

Examples

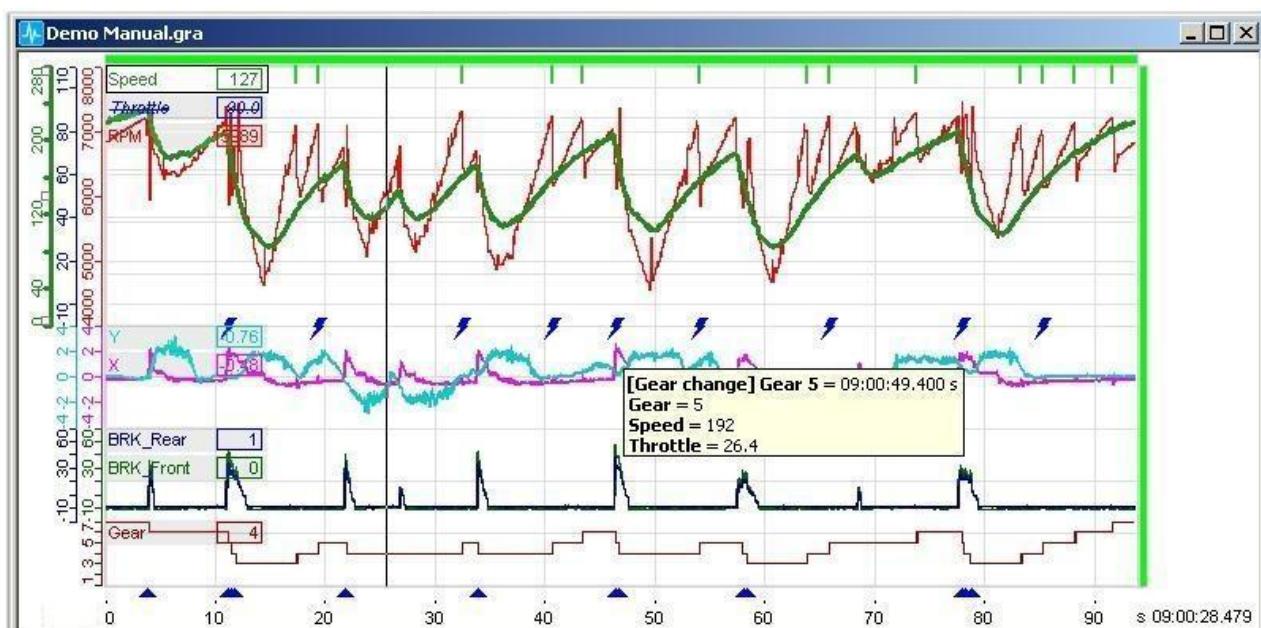
- **Gear shifts** are events which are generated by the change of status of the logged gear number channel.
- **Alarm** events can be generated by error flags changing from false to true
- **Corner entry/exit** is an event generated when lateral acceleration exceeds a certain value

Events can be displayed as **markers** in **Graph**, **XY**, **XYZ**, **Track** windows, as statistics in **lap reports** and in **event reports**.

[Click here](#) to find out about setting up events.

Graphic windows

- Events are displayed within or below graphic windows with **markers**, **icons** or **lines**. A variety of styles and options can be configured for individual event types. Default styles are setup in Tools/Events/Default Settings.
- **Tooltips** on each event marker show the type and the value of event and can show the value of associated channels at the event time.



- Individual events can be displayed in graphic windows by dragging them from the channel browser. When an event is hidden in graphs, it will still be calculated and listed in the event reports and can be searched via the Event Search function.
- Global events are defined as an event displayed in every window. Their symbol is  . This *global* graphic property means an automatic drag in all windows (it's true even in all new windows). A Global event can be set via mouse right click command in the *Channel Browser* panel or via flag in edit event page



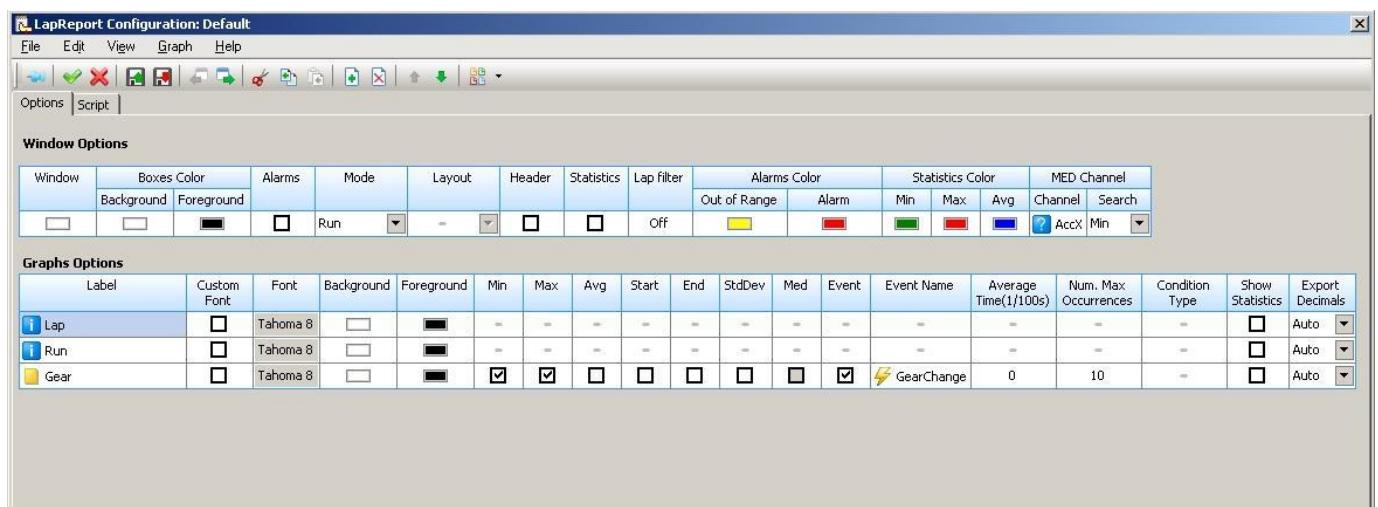
- Events which are active in a window are shown with a green icon in the channel browser. A yellow icon indicates that the event is not associated with the dataset displayed.
- Use Ctrl+drag from the *Channel Browser* to graph the event as a virtual channel
- All events can be hidden or displayed in individual windows by clicking on the Show Events button
- The **Search Event** function allows to step through occurrences of one or more types of event within the data.
- Event markers can be displayed in the following window types:
 - **Graph** window
 - **XY** and **XYZ** windows
 - **Track** window

Lap reports

Events can be used in **lap reports** to show the value of any channel at the various occurrences of the event. The example below shows the values of the channel called *Gear* at the first five occurrences of the event called *GearChange*.



The configuration is as follows:



Automation

Automation interfaces is extended to add OLE events which are triggered when events are found. These events can be caught with external applications or internal scripts. See OnEvent in Applications scripts.

Make Event Logs

There is an option in the Data Browser to create processed Event Logs based on a selection of data which are saved in the ZTX archive at the car level (allowing to create a report for the whole session for each car).

Event reports files are saved with EVL file extension inside the data archive. The file format is XML.

The EVL files are stored in the archive in a folder with the structure [Car]\Events\[EventName]\ where [Car] is the Car folder, and [EventName] is the name of the single event.

Each Event Log will contain the names of the groups/events within the libraries that it was created from. They will not include the full event definitions as these are basically subsets of VCH libraries.

The Event Comment field, if present, will be used to identify the Event in WinTAX environment as explained below

An associated Auto Rx task will allow the Event Log to be created during the acquisition session (real time and cable download). For each following run the entries will be appended to the existing report (at car level).

System events

The following pre-defined system events are available

- **Tn events**

A Tn event is a pre-configured event defined as the last point of maximum speed within a certain time (or distance) range when the throttle is fully open; it represents a condition of peak engine stress and within a lap and typically occurs at the end of the main straight. When searching for a Tn event WinTAX searches the conditions in the following order: first it applies time/distance window, then it searches for maximum speed within the selected window. Tn exists if max speed sample point corresponds to a full throttle condition, otherwise no Tn is found.

These event requires a speed channel configuration. Speed Channel is configured in Setup/General/Special Channels

- **End of lap**

End of Lap occurs when a lap is completed.

- **Acquisition trigger IN**

Acquisition trigger IN occurs when Trigger Channel goes in range

- **Acquisition trigger OUT**

Acquisition trigger OUT occurs when Trigger Channel goes out of range

- **Acquisition table changed**

This system event shows the changes of Acquisition Table

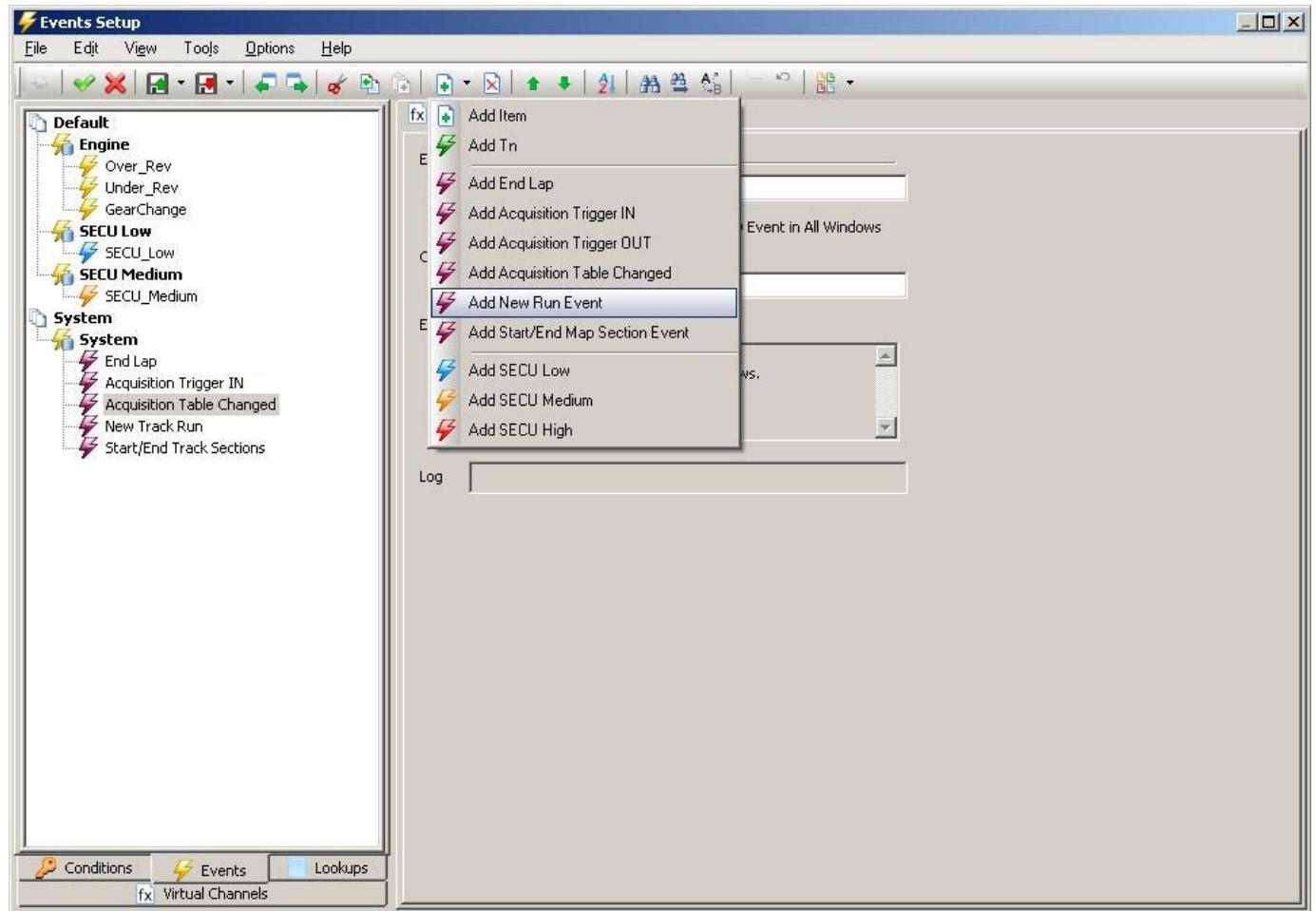
- **New Track run**

Occurs when a new track run starts

- **Start and end of a circuit map section**

This system event shows start and end of a track section

These events can be added to a library with the *Options/Add...* command. Although the algorithm of these events can not be changed by the user, it is possible to set up the Graph Options. System Events can not be displayed as traces in Graphs, but only with event markers.



SECU Events

SECU event means an event coming from TAG310 system. Event definition is configured in MES layout and it cannot be changed in WinTAX world.

Basically SECU events are sets of events externally computed and then transmitted to WinTAX. They are organized in three logical groups, distinguished by priority levels: low, medium, high.

Each group could contains several events, as usual for all other type of events.

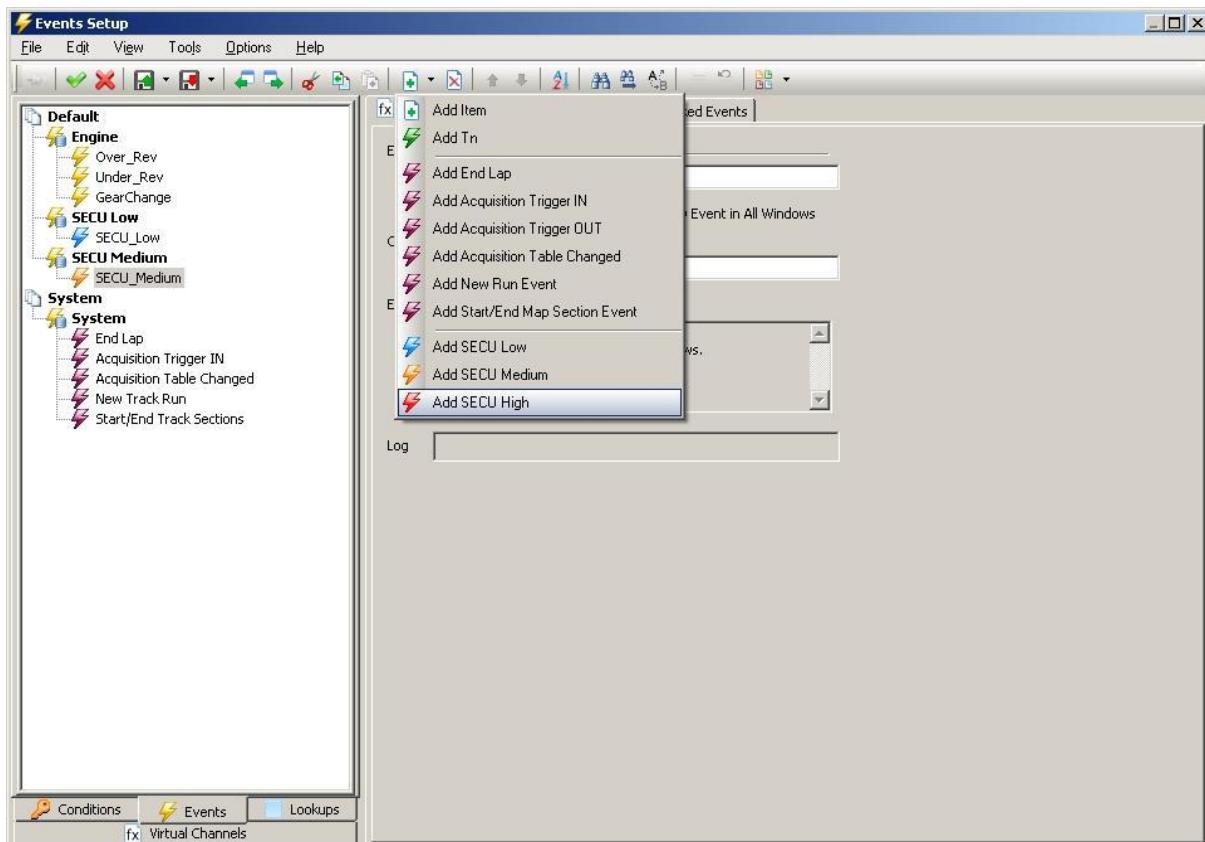
These events can be added to a library with *Options/Add...* command. As explained above, the algorithm of these events cannot be changed by the WinTAX user, but it is possible to set up the graphical Options. SECU Events cannot be displayed as traces into graphical windows, but only with event markers.

Events can be masked so that they are not displayed:

- in Events Report windows, by right clicking onto a row and then by choosing *Mask Secu Event* command from popup menu.
- In Graph windows, by right clicking on a marker event, when the tooltip appears; a dialog which contains the list of all occurred events at this time, will be displayed. User can choose the event that should be hidden.

Masked event are not visible in all waveforms.

In order to unmask the events user has to unselect the entry from the list of masked events. This list is available in events setup dialog, one for each groups



During the analysis work, events of the same group can be hidden singly:

- with Events Report windows, right clicking on a row where an occurrence of the event to hide is recorded, and then choosing *Mask Secu Event* command from popup menu.
- with Graph windows, right clicking on a marker event when tooltip appears; a dialog with all events occurred at the same time will be displayed and user can check events to hide and then click *Mask Selected* button.

All occurrences of the masked events will be hidden on all windows.

Whole list of masked events is displayed in *Masked Events* page of the related group in the events setup dialog. Masked events can be restored removing event from the list.

Setting up events

- The event setup environment allows to create and edit expressions (like Virtual Channels) and save them in libraries (.evn files). Event definitions can be also created from existing diagnostic window configurations.
- Events are organized in groups (e.g. gearbox events, diagnostic events etc.) inside the libraries. The group name appears beside the event name when it is displayed.
- Events are typically defined via Boolean expressions such as those used for Conditions. Complex conditions can be built up using math channels. To avoid duplicating expressions, the event trigger (status transition) can also be defined allowing a single Condition expression to be used to define an event and its negation.
- WinTAX also provides some pre-defined system events.
- Any filtering or time-masking of multiple transitions ("debounce") must be handled within the definition of the status variable itself, not within the event configuration. Some specific math channel functions (e.g. mask) be introduced to simplify the definition of conditions to be used to generate events.

Defining and displaying events

Default event marker style

In Tools/Events/Default Settings the style for event tick marks and the associated channel values shown in tooltips can be configured.

The automatic zoom and cursor offset are used when using the event search function.

To create an event

1. Select Tools/Events/Configure

2. Create a new event library: select File/Load and type the name of the library to be created (e.g. myLibrary). This will create a library with the given name which contains a group called Default
3. Change the name of the group from Default into any other name, then highlight the group
4. Select Edit/Add item or click on the item toolbar button to add either an empty event or a system event
5. Edit the event configuration by assigning a name, the logic of the event transition and the expression on which it is based. Note that events are generated when the value of the expression changes from zero (false) to any other value (true), or vice versa depending on the logic defined.
6. Click on Graph Option to set any specific display options for the particular event. If Graph Options are not enabled, the event will be displayed using the default options which are defined in Tools/Events/Default Settings.
7. Ensure that the *Show* flag is checked. This makes ensures that the event is enabled and will be visible in the channel browser. Any events not to be used from within the library can be disabled by un-checking the *Show* flag.

To display an event

1. Select the *Events* tab in the *Channel Browser*
2. The list shows all the event groups of the current libraries and the events which are enabled by the *Show* option the event graph options
3. To display an event just drag it from the *Channel Browser* into the window. The event icon will change to green.
4. Select any graph window then the *Show events* toolbar button or Tools /Events/*Show events*. This option switches all events on/off in the current window.

Note: if event display is switched off in all or any graph windows, it does not disable event calculation, it will still be possible to use the *Search event* and *Event report* functions.

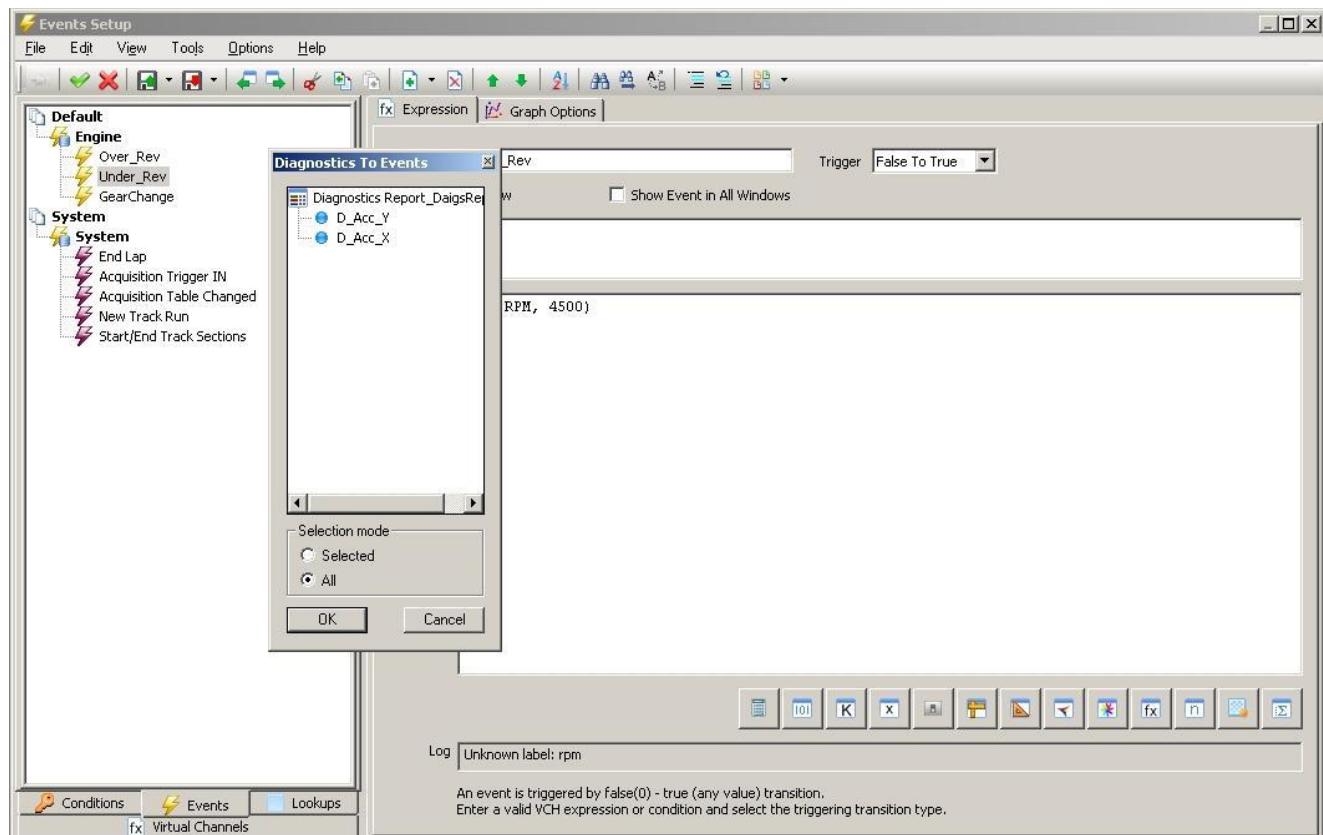
To switch off events

- **All events** - Press Ctrl+E or right click in the channel browser and toggle off *Global show events* or *Tools/Events>Show events*.
- **Single events** - Right click in the window and select *Events/Remove Events*
- Events can be enabled and disabled via the *show* flag in the setup dialog. When they are disabled they are not calculated and cannot be searched.

Diagnostics

Diagnostic window configurations may be converted into event configurations. The events correspond to the changes of state of the constituent bits of the diagnostic.

Select *File/Import* from the *Events Setup* dialog.

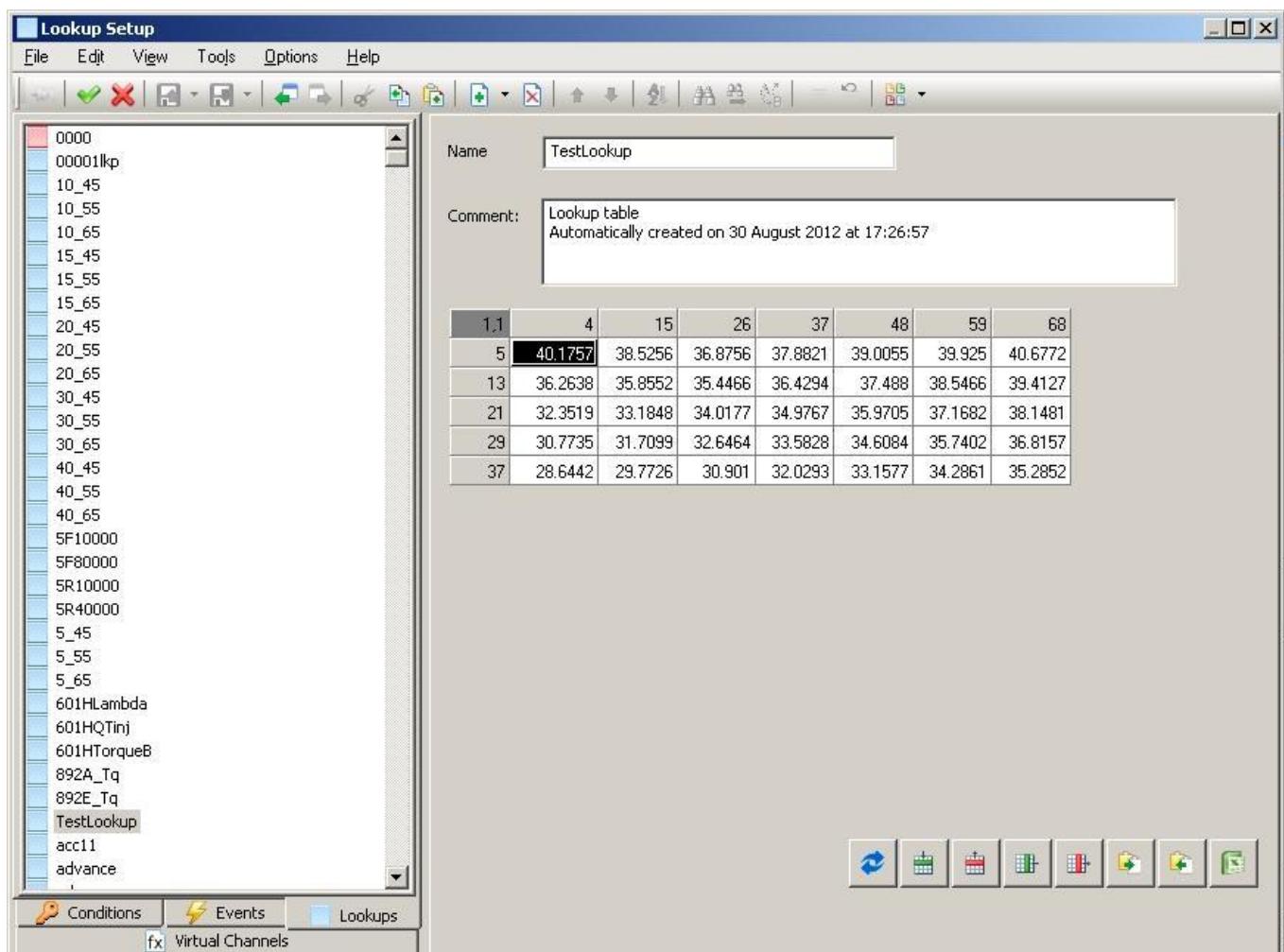


Lookups Editor

The lookups are 1-dimensional or 2-dimensional tables that can be used in the VCH expressions to associate some determined values to pre-determined values of one or more channels.

A lookup is identified by a file named as the lookup followed by the .dat extension. These files must be added in the WinTAX4\Libraries directory.

Through WinTAX already existing lookups can be modified or new ones can be created, both 1-dimensional and 2-dimensional. To launch the editor of the lookup, use the Tools/Lookups command or the corresponding button on the toolbars.



The editor in the figure shows a 2-dimensional lookup.

The editor is formed by a list on the left to select the lookup to be displayed or modified, and by the editor page where the changes can be carried out.

The editor area is formed by two text boxes where the name of the lookup and an optional comment can be written, by a table and by buttons that performs operations on the table. The table

is formed by rows and columns where the first row and the first column are highlighted as they contain the reference values of the channels and have a grey background. (if there is a 1-dimensional lookup with one column, no reference values are displayed in the first row), all others cells contain the output values. The cell with 0,0 index simply contains the reference to the index of the row and column selected.

To create a new lookup, use the Add Item command. The command creates in the memory a new lookup structure formed by a row and a column that can be named and a comment can be added to it. The file is saved only when the Apply command is used or when another lookup of the list is selected or when a new lookup is created. The saving always requires a confirmation.

When a lookup is edited and the rows and columns are added, the addition is carried out as follows: the row is always added after the currently selected row and the same applies to the column. The values of the first column and of the first row are automatically added using the following rule: if the row or the column selected are the last ones, then in the new row or column a value corresponding to the previous one increased by one is added, if the row or column are in any other position, the value added corresponds to the average value obtained between the previous and the next ones.

All values, included those of the reference row and column, can be anyhow edited and modified. The reference row and column must however respect the rule according to which each added value must be higher than the previous one and lower than the next one, otherwise the addition is not allowed. In all other rows there are no limits to the values that can be added.

The distinction between 1-dimensional and 2-dimensional is done on the basis of the number of columns available. When only one column is available together with the reference one, the lookup is 1-dimensional.

The editor can recognize also the lookup manually created if the rules of comment and sorting for rows and columns are respected.

Examples: User Record In Lookups

Commands of the window

Menu

The menu of the window allows the access to the following commands, divided into sub menus

File Menu

COMMAND	SHORTCUT	DESCRIPTION
Apply		Applies the current settings to the window.
Cancel		Closes the window without applying the current settings.

There are also grey commands, not used in lookup editor.

Edit Menu

COMMAND	SHORTCUT	DESCRIPTION
Copy	CTRL + C	Copy in clipboard the selected cells
Paste	CTRL + V	Remove all the previous cells and paste the cells saved in the selected lookup
Add Item		Adds a new lookup; the .dat file is created after the confirmation.
Remove Item		Removes the selected lookup; it does not handle multiple cancellation. The file is removed also from the disk and moved in the bin.

View Menu

COMMAND	SHORTCUT	DESCRIPTION
Previous page	CTRL + SHIFT + TAB	Enables the page of the window previous to the one currently in use.
Next page	CTRL + TAB	Enables the page of the window next to the one currently in use.

Options Menu

COMMAND	DESCRIPTION
Add Row	Adds a row to the lookup displayed in the position indicated by the selection.
Remove Row	Removes the selected row.
Add Column	Adds a column to the lookup displayed in the position indicated by the selection.
Remove Column	Removes the selected column.
Reload	Cancels the modifications reloading the lookup displayed by the file.
Copy Data to	Copies to clipboard the rows and columns selected.

Clipboard	
Paste Data to Clipboard	Copies the contents of clipboard into table.
Open in Excel	Opens a file in Excel with the rows and columns selected.

Toolbar

The toolbar of the **Channels Parameters Setup** window allows the access to the following commands:

Keep Visible	Not enabled in this window.
Cancel	Similar to the Cancel command of the File menu
Apply	Similar to the Apply command of the File menu
Previous Page	Similar to the Previous page command of the View menu
Next Page	Similar to the Next page command of the View menu
Copy	Similar to Copy Data to Clipboard of the Options menu
Paste	Similar to Paste Data to Clipboard of the Options menu
Add Item	Similar to the Add Item command of the Edit menu
Remove Item	Similar to the Remove Item command of the Edit menu

The grayed commands on toolbar are not enabled for Lookup editor.

Keyboard Shortcuts

Keyboard shortcuts are a combination of keystrokes that provides easier access to WinTAX commands.

WinTAX divides the shortcuts in two categories

- General keyboard shortcuts: these are the keyboard shortcuts related to the WinTAX menu.
- Analysis windows keyboard shortcuts: these are the keyboard shortcuts related to the analysis windows.
- Data Browser keyboard shortcuts: these are the keyboard shortcuts related to Data Browser.

COMMAND	DESCRIPTION	SHORTCUT	CUSTOMIZABLE
Help	Display WinTAX Help	F1	NO
Keyboard shortcuts	Display WinTAX keyboard shortcuts	Shift + F1	NO
Show/Hide Dataset 1	Show/Hide the selected Dataset	Ctrl + 1	YES
Show/Hide Dataset 2	Show/Hide the selected Dataset	Ctrl + 2	YES
Show/Hide Dataset 3	Show/Hide the selected Dataset	Ctrl + 3	YES
Show/Hide Dataset 4	Show/Hide the selected Dataset	Ctrl + 4	YES
Show/Hide Dataset 5	Show/Hide the selected Dataset	Ctrl + 5	YES
Show/Hide Dataset 6	Show/Hide the selected Dataset	Ctrl + 6	YES
Show/Hide Dataset 7	Show/Hide the selected Dataset	Ctrl + 7	YES
Show/Hide Dataset 8	Show/Hide the selected Dataset	Ctrl + 8	YES
Show/Hide Dataset 9	Show/Hide the selected Dataset	Ctrl + 9	YES
Show/Hide Dataset 10	Show/Hide the selected Dataset	Ctrl + 0	YES
Show/Hide Reference Dataset	Show/Hide the reference Dataset	Ctrl + R	YES
Switch to Working Dataset 1	Set the selected Dataset as "Working Dataset"	Alt + 1	YES
Switch to Working Dataset 2	Set the selected Dataset as "Working Dataset"	Alt + 2	YES
Switch to Working Dataset 3	Set the selected Dataset as "Working Dataset"	Alt + 3	YES

Switch to Working Dataset 4	Set the selected Dataset as "Working Dataset"	Alt + 4	YES
Switch to Working Dataset 5	Set the selected Dataset as "Working Dataset"	Alt + 5	YES
Switch to Working Dataset 6	Set the selected Dataset as "Working Dataset"	Alt + 6	YES
Switch to Working Dataset 7	Set the selected Dataset as "Working Dataset"	Alt + 7	YES
Switch to Working Dataset 8	Set the selected Dataset as "Working Dataset"	Alt + 8	YES
Switch to Working Dataset 9	Set the selected Dataset as "Working Dataset"	Alt + 9	YES
Switch to Working Dataset 10	Set the selected Dataset as "Working Dataset"	Alt + 0	YES
Toggle Captions	Show/Hide windows caption	Alt + C	YES
Small/Standard Caption	Change the caption size of all the windows open.	K	YES
View Alarms	View current alarms	Ctrl + W	YES
Calculator	Launches the system calculator	Shift + A	
Notepad	Launches Notepad	Shift + O	
Excel	Launches Microsoft Excel	Shift + E	
Generic application	Opens a window for choosing an application to execute.	Shift + G	
Update RX	Update RX	Alt + Ctrl + X	YES
Visual Basic editor	Opens Visual Basic editor	Alt + F11	YES
Next Gear Change	Connect cursor at next occurrence of gear change	Alt + Ctrl + Right	YES
Last Gear Change	Connect cursor at last occurrence of gear change	Alt + Ctrl + Down	YES
Previous Gear Change	Connect cursor at previous occurrence of gear change	Alt + Ctrl + Left	YES
First Gear Change	Connect cursor at first occurrence of gear change	Alt + Ctrl + Up	YES
Next Occurrence	Search next occurrence of events	Alt + N	YES
Last Occurrence	Search last occurrence of events	Alt + Down	YES
Previous Occurrence	Search previous occurrence of events	Alt + P	YES
First Occurrence	Search first occurrence of events	Alt + Up	YES
Jump to Auto Event	Jump to Auto Event	Alt + J	YES

Print Layout	Print current layout	Shift + P	YES
Split Time	Show / Hide split time	S	YES
Track Sections	Show / Hide track sections	N	YES
Track Editor	Open track editor environment	Alt + T	YES
Variance	Show / Hide Variance channel in selected graph window	Alt + V	YES
Load Layout	Load multiple window layout	Alt + Y	YES
Channels Parameters	Channels Parameters Configuration	C	YES
Logging Table	View Logging Table	Ctrl + B	YES
Global Show Events	Global Show/Hide events	Ctrl + E	YES
Fit Window	Fit current window	Ctrl + F	YES
Log Window	Show / Hide output window	Ctrl + F1	YES
Dataset Panel	Show / Hide Dataset Panel	Ctrl + F4	YES
Search Event	Search Event	Ctrl + F8	YES
Real-Time Toolbar	Open or Close Real-Time Toolbar	Ctrl + F9	YES
Edit Lap Properties	Edit properties of current laps	Ctrl + F10	YES
Start Play	Start play in playback mode	F6	YES
Next Hot Event	Next Hot Event	Ctrl + N	YES
Calculate Track	Calculate track with current lap data	Ctrl + O	YES
Previous Hot Event	Previous Hot Event	Ctrl + P	YES
Run Preview	Run Preview	Ctrl + Q	YES
Save All Windows	Save all configurations	Ctrl + Shift + S	YES
Select User	Select User	Ctrl + U	YES
Select Fastest Lap	Select Fastest Lap	F	YES
Channel Browser	Show / Hide channel browser	F2	YES
Open Data	Open Data Browser window	F3	YES
PopUp Track	Show / Hide popup track	F5	YES
PopUp Legend	Show / Hide popup legend	L	YES
Next	Load next lap	Page Down	YES
Previous	Load previous lap	Page Up	YES
Select Reference Lap	Select Reference Lap	R	YES

Enable/Disable Telemetry	Dataset	Enable/Disable Telemetry to all Windows	T	YES
Switch PP / RT		Switch post processing to real time and vice versa	Ctrl + T	NO
Select Next Layout		Select Next Layout	Ctrl + Tab	YES
Select Previous Layout		Select Previous Layout	Shift + Tab	YES
Virtual Channels...		Edit Virtual Channels	V	YES
Properties		Edit current window configuration	E	NO
Open in Excel		Open in a temporary Excel file	Shift + X	NO
Save Layout		Save multiple window layout	Y	YES
Select All Channels		Select all channels	Ctrl + A	NO
Save Window		Save configuration for current window	Ctrl + S	YES
Copy Data to Clipboard		Copy Data to Clipboard	Ctrl + Shift + C	YES
Copy		Copy from current window	Ctrl + C	YES
Paste		Paste to current window	Ctrl + V	YES
Cut		Cut from current window	Ctrl + X	YES
Redo		Repeat the last undo operation	Ctrl + Y	YES
Undo		Cancel last operation	Ctrl + Z	YES

ANALYSIS WINDOWS SHORTCUTS

GRAPHS KEYBOARD SHORTCUTS			
COMMAND	DESCRIPTION	SHORTCUT	CUSTOMIZABLE
Zoom In	Zoom In	+	YES
Zoom Out	Zoom Out	-	YES
Minimum Zoom	Minimum Zoom	Ctrl + -	YES
Maximum Zoom	Maximum Zoom	Ctrl + +	YES
Increase cursor step	Increase cursor step	Up	NO
Decrease cursor step	Decrease cursor step	Down	NO
Move the cursor left by one step	Move the cursor left by one step	Left	NO

Move the cursor right by one step	Move the cursor right by one step	Right	NO	
Move the cursor left by step x 10	Move the cursor left by step x 10	Ctrl + Left	NO	
Move the cursor right by step x 10	Move the cursor right by step x 10	Ctrl + Right	NO	
Show / Hide Area	Show or hide the graph areas.	A	YES	
Set Datum	Set Datum Cursor	D	NO	
Close Datum	Close Datum Cursor	Ctrl + D	NO	
Shift Dataset 1	Shift the selected Dataset 1	1	NO	
Shift Dataset 2	Shift the selected Dataset 2	2	NO	
Shift Dataset 3	Shift the selected Dataset 3	3	NO	
Shift Dataset 4	Shift the selected Dataset 4	4	NO	
Shift Dataset 5	Shift the selected Dataset 5	5	NO	
Shift Dataset 6	Shift the selected Dataset 6	6	NO	
Shift Dataset 7	Shift the selected Dataset 7	7	NO	
Shift Dataset 8	Shift the selected Dataset 8	8	NO	
Shift Dataset 9	Shift the selected Dataset 9	9	NO	
Shift Dataset 10	Shift the selected Dataset 10	0	NO	
Shift Reference Dataset	Shift the Reference Dataset	Shift + R	NO	
Active Shift	Active Shift	Alt + S	NO	
Confirm Shift	Confirm shift operation	Enter	NO	
Reset All Shift	Reset All Shift	Alt + X	NO	
Cancel Shift	Cancel shift operation	Esc	NO	
Select next channel	Select next channel in current window	Tab	NO	
Hide Graphs	Hide selected graphs	Alt + Ctrl + H	NO	
Show Graphs	Show selected graphs	Alt + Ctrl + S	NO	
Manual	Show graphs in manual mode	M	NO	
Overlay	Show graphs in overlay mode	O	NO	
Parallel	Show graphs in parallel mode	P	NO	
X Axis	Select the X axis mode (time or distance)	X	NO	
Confirm Manual Definition	Manual Lap	Confirm manual lap definition operation	End	NO
Confirm Manual Definition	Manual Map	Confirm manual map definition operation	End	NO

Move current zoom left	Move current zoom left	Ctrl + Left	NO
Move current zoom right	Move current zoom right	Ctrl + Right	NO
Zoom Box selection left	Zoom Box selection left	Shift + Left	NO
Zoom Box selection right	Zoom Box selection right	Shift + Right	NO
Move Y Zoom Up	Move Y Zoom up	Ctrl + Up	NO
Move Y Zoom Down	Move Y Zoom down	Ctrl + Down	NO
Move Previous	Move to the previous homologous point	Alt + Left	NO
Move Next	Move to the next homologous point	Alt + Right	NO
Manual Section Definition	Define manually sections	Alt + M	NO
Set cursor position	Set cursor position	INSERT	NO
Show / Hide Y scale	Show / Hide Y scale	Ctrl + End	NO
Show Events	Show / Hide events on current window	Alt + Ctrl + E	YES
Move Right to Next	Place cursor on next event occurrence	Alt + Ctrl + N	YES
Move Left to Previous	Place cursor on previous event occurrence	Alt + Ctrl + P	YES
Minimum	Search minimum value	Shift + -	NO
Maximum	Search maximum value	Shift + +	NO
Max & Min	Open/Close Max & Min Window	Ctrl + M	NO
Show absolute Max & Min on Graph	Show / Hide absolute minimum and maximum values	Shift + M	NO
Remove Graphs	Remove selected graphs	Delete	NO
Cancel Zoom operation	Cancel Zoom operation	Esc	NO
Cancel "Manual Lap Definition" operation	Cancel Manual Lap Definition operation	Esc	NO
Cancel "Manual Section Definition" operation	Cancel Manual Section Definition operation	Esc	NO

GRAPH REAL TIME KEYBOARD SHORTCUTS

COMMAND	DESCRIPTION	SHORTCUT	CUSTOMIZABLE
Zoom In	Zoom In	+	YES
Zoom Out	Zoom Out	-	YES
Minimum Zoom	Minimum Zoom	Ctrl + -	YES
Maximum Zoom	Maximum Zoom	Ctrl + +	YES

Select next channel	Select next channel in current window	Tab	NO
Hide Graphs	Hide selected graphs	Alt + Ctrl + H	NO
Show Graphs	Show selected graphs	Alt + Ctrl + S	NO
Manual	Show graphs in manual mode	M	NO
Overlay	Show graphs in overlay mode	O	NO
Parallel	Show graphs in parallel mode	P	NO
X Axis...	Select the X axis mode (time or distance)	X	NO
Set Datum	Set datum cursor	D	NO
Show Events	Show/Hide events on current window	Alt + Ctrl + E	YES
Post Processing View	View real time data in a post processing window	Q	NO
Minimum	Search minimum value	Shift + -	NO
Maximum	Search maximum value	Shift + +	NO
Max & Min	Open/Close Max & Min Window	Ctrl + M	NO
Cancel Zoom Operation	Cancel Zoom operation	Esc	NO
Remove Graphs	Remove selected graphs	Delete	NO

XY KEYBOARD SHORTCUTS

COMMAND	DESCRIPTION	SHORTCUT	CUSTOMIZABLE
Zoom In	Zoom In	+	YES
Zoom Out	Zoom Out	-	YES
Minimum Zoom	Minimum Zoom	Ctrl + -	YES
Maximum Zoom	Maximum Zoom	Ctrl + +	YES
Cancel Zoom operation	Cancel Zoom operation	Esc	NO
Select next channel	Select next channel in current window	Tab	NO
Hide Graphs	Hide Selected Graphs	Alt + Ctrl + H	NO
Show Graphs	Show Selected Graphs	Alt + Ctrl + S	NO
Manual	Show graphs in "manual mode"	M	NO
Overlay	Show graphs in "Overlay"	O	NO
View next channel in single mode	View next channel in single mode	Left	NO
View previous channel in	View previous channel in single	Right	NO

single mode	mode		
Show Events	Show/Hide events on current window	Alt + Ctrl + E	YES
Move Right to Next	Place cursor on next event occurrence	Alt + Ctrl + N	YES
Move Left to Previous	Place cursor on previous event occurrence	Alt + Ctrl + P	YES
Remove Graphs	Remove selected graphs	Delete	NO

XY REAL TIME KEYBOARD SHORTCUTS

COMMAND	DESCRIPTION	SHORTCUT	CUSTOMIZABLE
Zoom In	Zoom In	+	YES
Zoom Out	Zoom Out	-	YES
Minimum Zoom	Minimum Zoom	Ctrl + -	YES
Cancel Zoom operation	Cancel Zoom operation	Esc	NO
Select next channel	Select next channel in current window	Tab	NO
Hide Graphs	Hide selected graphs	Alt + Ctrl + H	NO
Show Graphs	Show selected graphs	Alt + Ctrl + S	NO
Manual	Show graphs in manual mode	M	NO
Overlay	Show graphs in overlay mode	O	NO
View next channel in single mode	View next channel in single mode	Left	NO
View previous channel in single mode	View previous channel in single mode	Right	NO
Show Events	Show/Hide events on current window	Alt + Ctrl + E	YES
Remove Graphs	Remove selected graphs	Delete	NO

XYZ KEYBOARD SHORTCUTS

COMMAND	DESCRIPTION	SHORTCUT	CUSTOMIZABLE
Select next channel	Select next channel in current window	Tab	NO
Remove Graphs	Remove selected graphs	Delete	NO
Cancel Zoom operation	Cancel Zoom operation	Esc	NO

GG KEYBOARD SHORTCUTS			
COMMAND	DESCRIPTION	SHORTCUT	CUSTOMIZABLE
Zoom In	Zoom In	+	YES
Zoom Out	Zoom Out	-	YES
HISTOGRAM KEYBOARD SHORTCUTS			
COMMAND	DESCRIPTION	SHORTCUT	CUSTOMIZABLE
X Axis...	Select the X axis mode (time or distance)	X	NO
TRACK KEYBOARD SHORTCUTS			
COMMAND	DESCRIPTION	SHORTCUT	CUSTOMIZABLE
Move current car position forward	Move car position forward	Left	NO
Move current car position back	Move car position back	Right	NO
Minimum Zoom	Minimum Zoom	Ctrl + -	YES
Show Events	Show / Hide events on current window	Alt + Ctrl + E	YES
Cancel "Custom Circuit" operation	Cancel Custom Circuit operation	Esc	NO
LAP REPORT KEYBOARD SHORTCUTS			
COMMAND	DESCRIPTION	SHORTCUT	CUSTOMIZABLE
Stop Operations	Cancel report calculation	Esc	NO
Remove Graphs	Remove selected graphs	Delete	NO
TREND KEYBOARD SHORTCUTS			
COMMAND	DESCRIPTION	SHORTCUT	CUSTOMIZABLE
Stop Operations	Cancel Trend calculation	Esc	NO

Select next channel	Select next channel in current window	Tab	NO
Remove Graphs	Remove selected graphs	Delete	NO

SECTION TIME REPORT KEYBOARD SHORTCUTS

COMMAND	DESCRIPTION	SHORTCUT	CUSTOMIZABLE
Stop Operations	Cancel report calculation	Esc	NO

FFT KEYBOARD SHORTCUTS

COMMAND	DESCRIPTION	SHORTCUT	CUSTOMIZABLE
Select next channel	Select next channel in current window	Tab	NO
Remove Graphs	Remove selected graphs	Delete	NO

DEBUG VCH KEYBOARD SHORTCUTS

COMMAND	DESCRIPTION	SHORTCUT	CUSTOMIZABLE
Remove Graphs	Remove selected graphs	Delete	NO

RUN PREVIEW KEYBOARD SHORTCUTS

COMMAND	DESCRIPTION	SHORTCUT	CUSTOMIZABLE
Move the cursor left by one step	Move the cursor left by one step	Left	NO
Move the cursor right by one step	Move the cursor right by one step	Right	NO
Increase cursor step	Increase cursor step	Up	NO
Decrease cursor step	Decrease cursor step	Down	NO

DATABROWSER SHORTCUTS

COMMAND	DESCRIPTION	SHORTCUT	CUSTOMIZABLE
Help	Display DataBrowser Help	F1	NO
Add to Comparison	Add the selected lap to the current comparison	Ctrl+Enter	YES

Add to Average Comparison	Add the selected lap to the current average comparison	Alt+Enter	YES
Open	Load in WinTAX the current comparison	Enter	YES
Add to Dataset 1	Add the selected Dataset	Ctrl+1	YES
Add to Dataset 2	Add the selected Dataset	Ctrl+2	YES
Add to Dataset 3	Add the selected Dataset	Ctrl+3	YES
Add to Dataset 4	Add the selected Dataset	Ctrl+4	YES
Add to Dataset 5	Add the selected Dataset	Ctrl+5	YES
Add to Dataset 6	Add the selected Dataset	Ctrl+6	YES
Add to Dataset 7	Add the selected Dataset	Ctrl+7	YES
Add to Dataset 8	Add the selected Dataset	Ctrl+8	YES
Add to Dataset 9	Add the selected Dataset	Ctrl+9	YES
Add to Dataset 10	Add the selected Dataset	Ctrl+0	YES
Load Comparison average Dataset 1	Load the selected Dataset to average Comparison	Alt+1	YES
Load Comparison average Dataset 2	Load the selected Dataset to average Comparison	Alt+2	YES
Load Comparison average Dataset 3	Load the selected Dataset to average Comparison	Alt+3	YES
Load Comparison average Dataset 4	Load the selected Dataset to average Comparison	Alt+4	YES
Load Comparison average Dataset 5	Load the selected Dataset to average Comparison	Alt+5	YES
Load Comparison average Dataset 6	Load the selected Dataset to average Comparison	Alt+6	YES
Load Comparison average Dataset 7	Load the selected Dataset to average Comparison	Alt+7	YES
Load Comparison average Dataset 8	Load the selected Dataset to average Comparison	Alt+8	YES
Load Comparison average Dataset 9	Load the selected Dataset to average Comparison	Alt+9	YES
Load Comparison average Dataset 10	Load the selected Dataset to average Comparison	Alt+0	YES
Load Best Lap	Add the lap marked as best to the current Comparison.	Ctrl + B	YES
Setup Editor	Edit properties of laps	Ctrl + F10	YES
Select Run	Select all the laps of a run	R	NO
Run Selection Mode	If enabled, command Open loads in WinTAX the whole run	Ctrl + R	YES
Refresh	Reload all laps of the selected sessions	F5	YES

Stop Scanning	Interrupts the reloading of laps.	Esc	NO
Directory Tree	Shows the directory tree for lap selection.	Ctrl + T	YES
Track Preview	Show a preview of track stored at current run	Ctrl + Q	YES
Delete Lap	Delete the selected laps.	Del	YES
Remove Run	Delete all the laps in the selected run.	Ctrl + Del	YES

Scripting

Introduction

Interfaces for WinTAX4 Automation

WinTAX4 provides powerful possibilities for interfacing with external applications using the Automation Server technology (formerly OLE Automation Server). Automation is a protocol which allows an application to make its own objects available for use in other applications, programming tools or via scripting languages.

In this way WinTAX4 can be run and controlled by any program which has the characteristics of Automation controller. Some examples of applications which make great use of Automation are Microsoft Excel, Access, Project and many others written in Visual Basic or Visual C++.

It is possible, for example, to open a WinTAX4 window from an Excel spreadsheet, analyze information via Matlab or run print or copy commands directly from an application written in Visual Basic.

Active Scripting inside WinTAX4

WinTAX4 contains an engine to run scripts written in standard interpreted languages (VBScript and JScript).

Select the script language to be used from General/Setup/Miscellaneous/Application

Scripts are custom applications (macro functions) that can be manually launched from the toolbars or can be enabled as a result of system events (acquisition of a new lap, loading of data, alarm or condition found in the data).

The scripts written by the customer can be used to search for data or conditions, to launch WinTAX environment commands, to enter additional information automatically calculated into the archives or to transfer information from external applications to WinTAX and vice versa.

All WinTAX objects exposed through OLE Automation can be viewed and managed through scripting. Moreover, through scripting, external applications can be called to obtain information, analyze data and, in general, use other functions that are not present in WinTAX.

Wintax4 contains a compiler for two different languages:

- **VBScript**
- **JScripts**

The flag to modify the language supported is: "General setup->Miscellaneous->Application"

The default is VBScript

Script Environment

WinTAX4 provides two distinct environments where to write a script

In Menu: Tools/Script

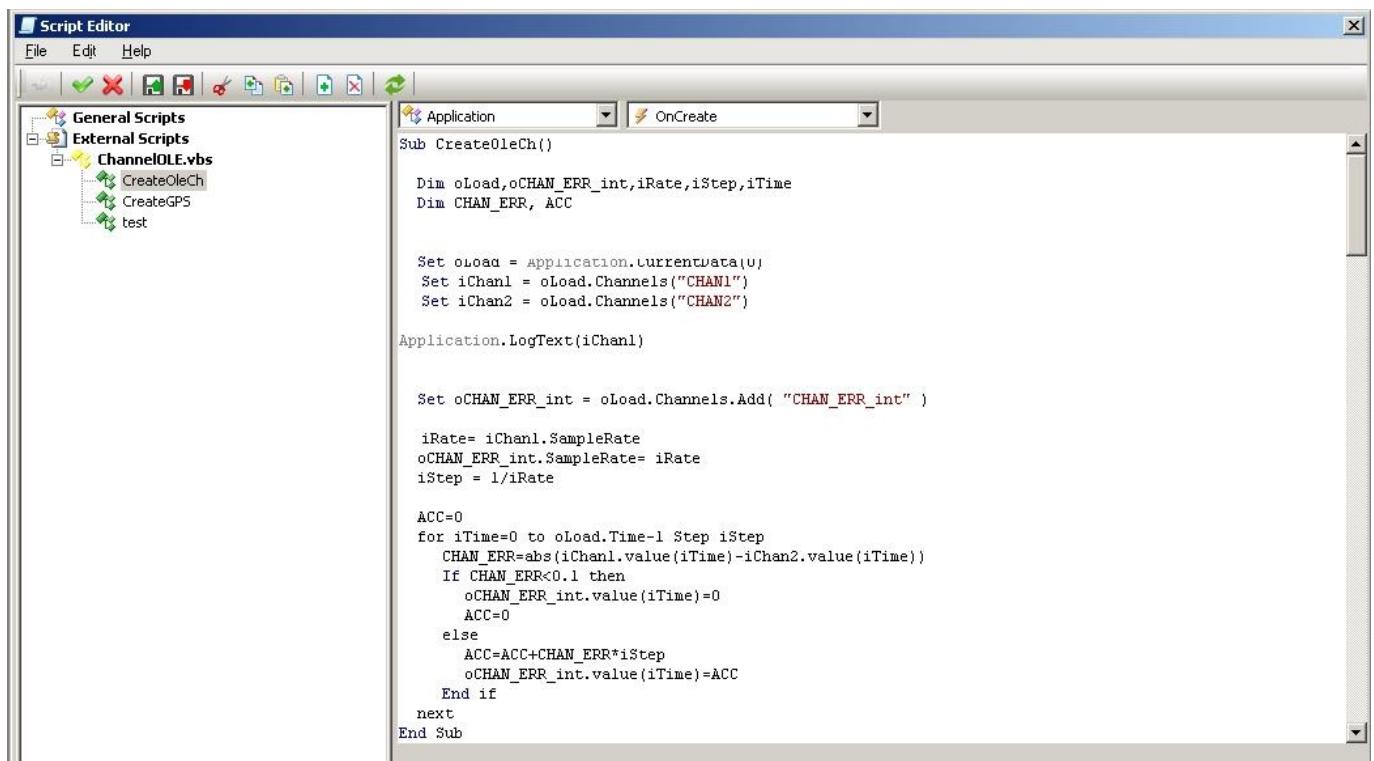
Into All graph window (graph, report, xy, etc) in menu: Graph/Configuration/Script

The Scripts written in Tools/Script can be used as a Macro and Event based

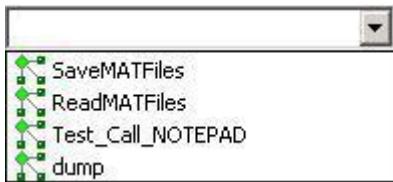
The Macro scripts are the Subroutines that can be only manually run.

The scripts Event Based are automatically run by WinTAX4 whenever an event happens (i.e. new lap loaded).

In Tools/Script it is possible not only to edit a single script saved in Setup.xml file, but also to manage a set of script files (with extension vbs or js) with a system of Load/Save similar to vch libraries. On the left of the script editor, the tree shows a General Scripts node, under which all the scripts stored in the Setup.xml configuration are listed. Every node inside General Scripts allows to move the script editor to the beginning of a single routine. Other vbs/js libraries are displayed with the same structure under the External Scripts node. On the right, the script editor shows the file selected, focusing on the routine selected in the tree. Two drop-down lists (module + event) allow to add predefined events to the script page: the user can select the component in the left drop-down list, and the event in the right drop-down list. After the event selection, the scripting code is added in the editor page.



The Select Macro combo shows the list of scripts now available



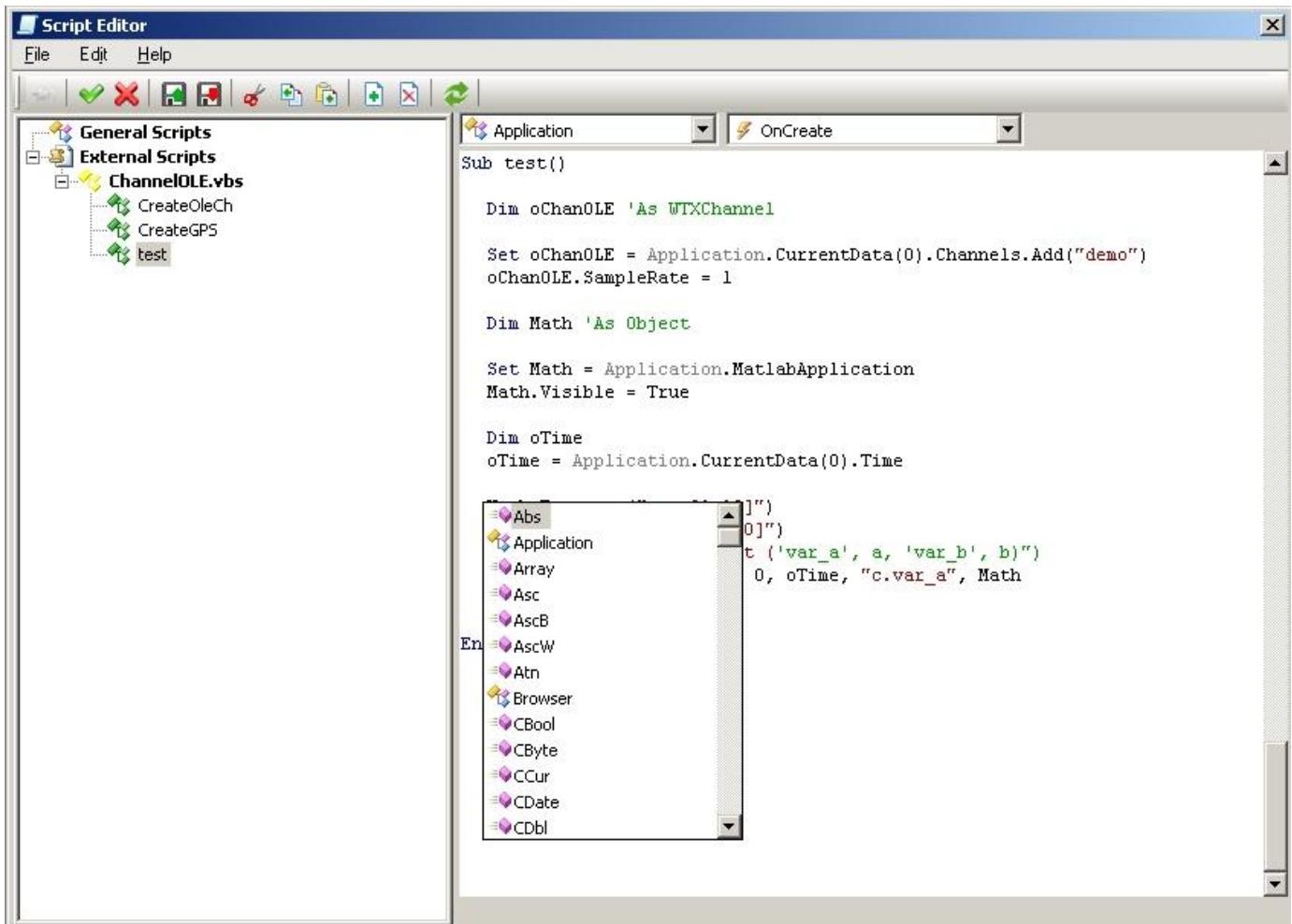
The scripts are carried out when the user name in the combo is selected

All scripts included into the single graph configuration can be only automatically run

All scripts functions are available for the two types of scripts.

Scripts Editor

The script editor is a simple text editor when the client can write the source code. The editor recognizes automatically if one label is a keyword by changing the color of text.



i.e.: `Set oData = Application .CurrentData(0)`

In the editor the standard *cut/paste* functions are available

The list of standard VBScript functions are available with the shortcut:

ctrl + space (also for JScript language, see previous image)

Error Handling

The errors that can occur during the implementation are written in the History Log Messages window (WinTAX4 menu: View/Log Window)

The History Log Messages window shows the number of wrong lines and the error code

Use of Log Messages

The Log Messages window is also available for the users.

It is in fact possible to write (and erase) a personal string (i.e. for source code debugging)

VBScript Fundamentals

VB Script Data Types

VBScript has only one data type called **Variant**. A Variant is a special kind of data type that can contain different kinds of information, depending on how it is used. Because Variant is the only data type in VBScript, it is also the data type returned by all functions in VBScript.

VB Script Variables

Variables are explicitly indicated in the script using the *Dim* statement:

```
Dim myVariable
```

Multiple variables are indicated by separating each variable name with a comma:

```
Dim MyVar1, MyVar2, MyVar3
```

Assigning Values to Variables

Values are assigned to variables creating an expression as follows: the variable is on the left side of the expression and the value to be assigned to the variable is on the right. For example:

```
MyVar1 = 100
```

Array Variables

Array variables and scalar variables are declared in the same way, except that the declaration of an array variable uses parentheses () after the variable name. In the following example, a single-dimension array containing 11 elements is declared:

```
MyVar1(10)
```

Arrays aren't limited to a single dimension

MyTable variable is a two-dimensional array consisting of 6 rows and 5 columns:

```
MyTable(5,6)
```

Conditional & Looping Statement

The flow of the script can be controlled with conditional statements and looping statements

- *If...Then...Else* statement
- *Do...Loop*: Loops while or until a condition is True.
- *While...Wend*: Loops while a condition is True.
- *For...Next*: Uses a counter to run statements for a specified number of times.

- *For Each...Next*: Repeats a group of statements for each item in a collection or each element of an array.

VBScript Procedures

In VBScript, there are two kinds of procedures; the Sub procedure and the Function procedure.

Sub Procedures

A Sub procedure is a series of VBScript statements (enclosed by Sub and End Sub statements) that perform actions but don't return a value. A Sub procedure can accept topics (constants, variables, or expressions that are passed by a calling procedure).

If a Sub procedure has no topics, its Sub statement must include an empty set of parentheses () .

My First Script

The following Sub procedure uses two intrinsic VBScript functions, *MsgBox* and *InputBox* to prompt a user for information. It then displays the results of a calculation based on that information.

```
Sub MyFirstScript()
    Dim A
    A = InputBox( "Please enter a Number" )
    MsgBox "Your Number is " & A
End Sub
```

VBScript Comments

The comments are indicated by the character: '

```
Sub MyTest()
    Dim A                      'declaration of my variable
    A = InputBox( "Please enter a Number" )   'prompt to users
    MsgBox "Your Number is " & A           'print the result
End Sub
```

Function Procedures

A Function procedure is a series of VBScript statements enclosed by the Function and End Function statements. A Function procedure is similar to a Sub procedure, but it can also return a value. A Function procedure can take topics (constants, variables, or expressions that are passed to it by a calling procedure). If a Function procedure has no topics, its Function statement must include an empty set of parentheses. A Function returns a value by assigning a value to its name in one or more statements of the procedure. The return type of a Function is always a Variant.

In the following example, the Celsius function calculates degrees Celsius from degrees Fahrenheit. When the function is called from the ConvertTemp Sub procedure, a variable containing the topic value is passed to the function. The result of the calculation is returned to the calling procedure and displayed in a message box.

```

Sub ConvertTemp()
    Dim temp
    temp = InputBox( "Please enter the temperature in degrees F.", 1)
    MsgBox "The temperature is " & Celsius(temp) & " degrees C."
End Sub

```

```
Function Celsius(fDegrees)
```

```
    Celsius = (fDegrees - 32) * 5 / 9
```

```
End Function
```

Getting Data into and out of Procedures

Each piece of data is passed into the user's procedures using an argument. Arguments serve as placeholders for the data to be passed into the user's procedure. Name topics with any valid variable name. When a procedure is created using either the Sub statement or the Function statement, parentheses must be included after the name of the procedure. Any topic placed inside these parentheses, separated by commas. For example, in the following example, fDegrees is a placeholder for the value being passed into the Celsius function for conversion.

```
Function Celsius(fDegrees)
```

```
    Celsius = (fDegrees - 32) * 5 / 9
```

```
End Function
```

To get data out of a procedure, use a Function. Remember, a Function procedure can return a value; a Sub procedure can't.

Using Sub and Function Procedures in Code:

A Function in the code must always be used on the right side of a variable assignment or in an expression. For example:

Temp = Celsius(fDegrees)

-or-

MsgBox "The Celsius temperature is " & Celsius(fDegrees) & " degrees."

To call a Sub procedure from another procedure, type the name of the procedure along with values for any required arguments, each separated by a comma. The Call statement is not required, but used, enclose any topic in parentheses.

The following example shows two calls to the MyProc procedure. One uses the Call statement in the code; the other doesn't. Both do exactly the same thing.

```
Call MyProc(firstarg, secondarg)
```

```
MyProc firstarg, secondarg
```

Notice that the parentheses are omitted in the call when the Call statement isn't used.

Set Statement

Assign an object reference to a variable

```
Set objectvar = { objectexpression | New classname }
```

Parameters

objectvar

Required. Name of the variable or property; follows standard variable naming conventions.

objectexpression

Optional. Expression consisting of the name of an object, another declared variable of the same object type, or a function or method that returns an object of the same object type.

New

Keyword used to create a new instance of a class. If *objectvar* contains a reference to an object, that reference is released when the new one is assigned. The New keyword can only be used to create an instance of a class.

classname

Optional. Name of the class being created. A class and its members are defined using the Class statement.

Examples:

```
Dim oExcel  
Set oExcel = CreateObject( "Excel.Application" )
```

CreateObject Function

Creates and returns a reference to a COM object. **CreateObject** cannot be used to create instances of classes in VBscript unless those classes are explicitly exposed as COM components.

Parameters

ProgId

Required, String. The program ID of the object to create.

In order to know the program ID, use a Object Browser tools

For example OLE/COM Object Viewer of C++ tools or the VBA environment into Microsoft Excel

```
Sub Test_Call ()
```

```
    Dim WshShell, oExec  
    Set WshShell = CreateObject( "WScript.Shell" )  
    Set oExec = WshShell.Exec(calc)
```

```
End Sub
```

```
Dim oMatlab  
Set oMatlab = CreateObject( "Matlab.Application" )
```

JScript Fundamentals

All WinTAX4 functions available in VBScript mode are also available in JScript. There are no differences of performance between the two languages, the customers can therefore select the language based on his preferences.

Many examples described have been resumed from the official documentation Microsoft that is available to the address:

VBScript language:

<http://msdn.microsoft.com/library/default.asp?url=/library/en-us/script56/html/vbscripttoc.asp>

Jscript language:

<http://msdn.microsoft.com/library/default.asp?url=/library/en-us/script56/html/js56jslrfjscriptlanguagereference.asp>

WinTAX4 Automation Interfaces

The complete documentation is available with the WinTAX4 pack. The installer copies into the directory .\WinTAX4\Docs the file WinTAX4 Automation Interfaces.chm. The documentation is updated with the new version. Then the main classes (and their member functions), used for the Data (and their properties) are listed in access. Every description will be provided with a working example. For further details read the documentation

Active Scripting inside WinTAX4

IApplication Interface Reference

The IApplication interface describes methods and properties of the WinTAX4 Application Object. The Application Object represents the entire WinTAX4 application.

The Application object contains:

- Application-wide settings, options and methods.
- Properties that return top-level objects, such as Windows, configurations, directories, and so on.

Note: For internal scripts use, the IApplication interface is accessible via the **Application** named object.

Member Functions

The following examples show how to use some basic member functions

LogText

CurrentData

RealTime

Windows

ConfVCHLibraries

ConfParameters

HRESULT LogText ([in] BSTR sLog)

Adds a text to the LOG window.

```
Sub Test_Log()
    Application .LogText( "Hello" )
End Sub
```

HRESULT CurrentData ([out, retval] IWTXDataLoads ** pVal)

Member of IApplication that returns one array of IWTXDataLoads, collection that represents the current data loaded in the application. [Read]

```
Sub Test_Cdata()
    Dim oData, oTime
    Set oData = Application.CurrentData(0)
        oTime = Application.CurrentData(0).Time
    MsgBox oTime
End Sub
```

Note:

each item represents a comparison. A single lap selection is referenced by the first item.

in order to run this script, load a Data

In case of single lap loaded CurrentData(0) represents the Lap

In case of append lap loaded, CurrentData(0) represents the Append

In case of comparison of two lap, CurrentData(0) represents the first item (Lap or Append), CurrentData(1) represents the second item (Lap or Append)

How to obtain the Time object?

The ITelDataLoad (Inherited by IWTXDataLoad Class) interface describes methods and properties of a Data Load (Lap) object. A Data Load object represents a closed set of acquired data. It consists of a set of channels and properties. The items are:

- *HRESULT Time ([out, retval] double *pVal)*
- *HRESULT Channels ([out, retval] ITelChannels **pVal)*
- *HRESULT Properties ([out, retval] ITelProperties **pVal)*

The **Time** represents the logging time of lap (or append), in seconds

Channels, Properties are a collection (array) of ITelChannels and ItelProperties

How to obtain the samples of lap?

ITELChannels and ItelProperties are inherited by IWTXChannel (as for ItelDataLoad by IWTXDataLoad)

The Items of ITelChannel are:

- *HRESULT Name ([out, retval] BSTR *pVal)*
- *HRESULT Value ([in] double Time,[out, retval] double *pVal)*
- *HRESULT Values ([in] double TimeStart,[in] double TimeEnd,[out, retval] VARIANT *pVal)*

- HRESULT Properties ([out, retval] ITelProperties **pVal)
- HRESULT Offset ([out, retval] double *pVal)
- HRESULT Gain ([out, retval] double *pVal)
- HRESULT SampleRate ([out, retval] long *pVal)
- HRESULT Type ([out, retval] long *pVal)

Therefore, in order to get the samples the lap, the logical structure is the following:

Obtain the object CurrentData from Application, obtain the object Channels from CurrentData, obtain the object Channel from Channels array and finally obtain the Value from Channel

```
Sub GetData()
Dim oData, oChan
Set oData = Application .CurrentData(0)
Set oChan = oData.Channels( "N" )
oValue = oChan.Value(10)
MsgBox "N Value at time 10 sec= " & oValue
EndSub
```

How to obtain the properties of CurrentData

In the same way of the access to the sample it is also possible to extract the property of CurrentData

```
Sub ExportHeader()
Dim fso, f
Const ForWriting = 2
oFileName = InputBox ( "Select The File Name with path and extension" )
Set fso = CreateObject( "Scripting.FileSystemObject" )
Set f = fso.OpenTextFile(oFileName, ForWriting, True)
Dim oData
Set oData = Application .CurrentData(0)
Dim oLevel, oCons, oAbs, oTR, oMarker
Set oLevel = oData.Properties( "FuelLevel" )
Set oCons = oData.Properties( "FuelConsumption" )

Set oAbs = oData.Properties( "Abs" )
Set oTR = oData.Properties( "Run" )
Set oMarker = oData.Properties( "LapMarker" )

f.WriteLine( "HEADER INFO:" )
f.WriteLine( "_____" )
f.WriteLine( "Marker =" & oMarker.Data & " " & "Abs = " & oAbs.Data & " " &
"TrackRun = " & oTR.Data)
f.WriteLine
```

```

f.WriteLine
f.WriteLine( "LapLevel = " & Round(oLevel.Data, 2))
f.WriteLine
f.WriteLine( "LapConsumption = " & Round(oCons.Data, 2))
f.Close
MsgBox( "Export Finished" )
End Sub

```

The previous example introduces the access to an external export of the values. The properties returned by automation are saved on a txt file indicated by user

HRESULT RealTime ([out, retval] IWTXDataLoad ** pVal)

IWTXDataLoad current real time data loaded in the application. [Read]

The logical structure to give a sample of current RealTime Data is the same one of CurrentData

```

Sub Application _OnNewDataRealTime()
Dim oData, oChan, iValue, iValueOld
    Set oChan = oData.Channels(Time)
    Set oData = Application .CurrentDataRealTime
    Set oChan = oData.Channels( " Time" )
    iValue = oChan.Value(oData.Time)
    iValueOld = oChan.Value(oData.Time - 0.05)

    If iValueOld > iValue Then
        If iValueOld <> "-1,#QNAN" Then
            If iValue <> "-1,#QNAN" Then
                MsgBox "Real-Time CloseLap" & " LapTime=" &iValueOld
            EndIf
        EndIf
    EndIf
Next
End Sub

```

In order to run this script:

1. Copy the subroutine into the configuration menu of one Real Time window.
2. Start the Real Time acquisition process

The script read the value at the current instant and the value at the (current instant 0.05 sec), it checks if the running value is diminished. If so, it marks the closing of the Lap and its LapTime

HRESULT Windows ([out, retval] CollectWindows ** pVal)

IWindows collection represents the opened windows in the application. [Read]

All configuration files (windows, settings, user etc.) of WinTAX4 are in XML format

The customer can approach the configuration directly to carry out the modifications.

The following example shows the entering in XML configuration of one window in order to modify a parameter:

```
Function Window _OnCursorPosChange(TimePos)
Dim strMsg 'As String
Dim strInput 'As String

    ' Initialize string.
    strMsg = "Weight outside range. Enter a number that is lower than 0 Or greater than 10.Press OK To enter the number again. Press Cancel To Exit"
    ' Prompt user for input.
    strInput = InputBox( "Enter The Desired Weight." )
    ' Determine if user chose "Cancel".
    If strInput <> "" Then
        ' Test value of user input.
        DoWhile strInput < 0 Or strInput > 10
            If MsgBox(strMsg, vbOKCancel, "Error!") = vbOK Then
                strInput = InputBox( "Enter a number between 0 and 10." )
            Else
                ExitFunction
            EndIf
        Loop
        ' Display user's correct input.
        MsgBox "The Weight Selected is " & strInput & "."
    EndIf
    Dim oDoc
    Set oDoc = CreateObject( "MSXML.DOMDocument" )
    oDoc.async = False
    oDoc.loadXML Window .XML
    ' I try the elements <Label> in document ...
    Set oLabels = oDoc.getElementsByTagName( "Weight" )
    ForEach Label In oLabels
        If Label.Text <> "0" Then
            Application .Logtext "Change the Weight " & Label.Text & strInput
            Label.Text = strInput
        EndIf
    Next
    ' applies the modification to the window
    Window .XML = oDoc.XML
End Function
```

In order to run this script:

1. Copy the subroutine into the configuration menu of one Post Processing window (*.gra).
2. Load a Data
3. Move a cursor into the graph.

The Script is carried out by CursorPosChange event, reads the XML configuration of Window, changes the configuration and finally saves the window

HRESULT ConfVCHLibraries([out, retval]ITelConfiguration pVal)**

Returns current WinTAX4 VCH configuration

```
Sub Load_VCH()
    Dim oLibraries
    Dim oLib
    Set oLibraries = Application .ConfVCHLibraries
    ForEach oLib In oLibraries
        MsgBox oLib.Name
    Next
End Sub
```

HRESULT ConfParameters([out, retval]ITelConfiguration pVal)**

Returns current WinTAX4 Parameters configuration

```
Sub Test_Parameters_WRITE()
    Dim oCnf
    Set oCnf = Application .ConfParameters
    Dim oParameters
    Set oParameters = oCnf.Objects
    Dim oDocXml
    Set oDocXml = CreateObject( "MSXML2.DOMDocument" )
    oDocXml.async = False
    Dim oParameter
    ForEach oParameter In oParameters
        oDocXml.loadXML oParameter.XML
        Dim oLabels
        Dim oRangeMin
        Dim oRangeMax
        oRangeMin= InputBox ( "Range Min =" )
        oRangeMax= InputBox ( "Range Max =" )
        Set oLabels = oDocXml.getElementsByTagName( "Name" )
        Set oLabelsRangeMin = oDocXml.getElementsByTagName( "RangeMin" )
        Set oLabelsRangeMax = oDocXml.getElementsByTagName( "RangeMax" )
        Dim oLabel
        ForEach oLabel In oLabels
            oLabel.Text = "N"
        Next
        Dim oLabelRangeMin
        ForEach oLabelRangeMin In oLabelsRangeMin
            oLabelRangeMin.Text = oRangeMin
        Next
        Dim oLabelRangeMax
        ForEach oLabelRangeMax In oLabelsRangeMax
            oLabelRangeMax.Text = oRangeMax
        Next
        oParameter.XML = oDocXml.XML
    Next
End Sub
```

In order to run this script:

1. Copy into menu: General/setup/scripts
2. Select the script into the toolbar Select Macro

The first example (Load_VCH) reads the VCH libraries currently loaded into WinTAX4.

The second example reads the XMI configuration of Parameters settings (menu WinTAX4: Setup/Channels Parameters..), changes for all channels the Name and RangeMin, RangeMax for manual scale settings

JScript Sample

```
function Window::OnCursorPosChange(TimePos)
{
    var oData;
    var oChan;
    var iValues;
    oData = Application .CurrentData(0);
    oChan = oData.Channels( "N" );
    iValues = oChan.Value( TimePos );
    Application .LogText( iValues );
}
```

In order to run this script:

1. Modify the Script Language setting in WinTAX4 menu: Setup/General/Miscellaneous/Application/script language
2. Restart WinTAX4
3. Copy the subroutine into the configuration menu of one Post Processing window (*.gra).
4. Load some Data
5. Move a cursor into the graph.

Example Scripts

Automatic change of channel label

```
Function Window_OnZoomChange (vStart, vEnd)
Dim oDoc
Set oDoc = CreateObject("MSXML.DOMDocument")

oDoc.async = False
oDoc.loadXML Window.XML

'cycle all elements <Label> in the document..

Set oLabels = oDoc.getElementsByTagName("Label")
For Each Label In oLabels
    If Label.Text <> "LAP" Then
        Application.Logtext " Change the channel " & Label.Text & " in LAP"
        Label.Text = "LAP"
    End If
Next

' Apply the modification to the window..

Window.XML = oDoc.XML

End Function
```

Automatic change of line weight

```
Function Window_OnZoomChange(vStart, vEnd)
Dim strMsg 'As String
Dim strInput 'As String

' Initialize string
strMsg = "Weight outside range. A number lower than 0 Or greater than 10 was entered. Press OK To enter the number again. Press Cancel To Exit"

'Prompt user for input
strInput = InputBox("Enter The Desired Weight")
'Determine if user selects"Cancel"
```

```

If strInput <> "" Then
    'Check value of user input.

Do While strInput < 0 Or strInput > 10
    If MsgBox(strMsg, vbOKCancel, "Error!") = vbOK Then
        strInput = InputBox("Enter a number between 0 and 10")
    Else
        Exit Function
    End If

Loop
'Display user's correct input.
MsgBox("The Weight Selected is " & strInput & ".")
```

EndIf

```

Dim oDoc
Set oDoc = CreateObject("MSXML.Document")
oDoc.async = False
oDoc.loadXML Window.XML

'Loop the elements <Label> in document ...
Set oLabels = oDoc.getElementsByTagName("Weight")

ForEach Label In oLabels

    If Label.Text <> "0" Then
        Application.Logtext "Change the Weight" & Label.Text & strInput

```

```
Label.Text = strInput
```

```
End If
```

```
Next
```

```
'Apply the modification to the window
```

```
Window.XML = oDoc.XML
```

```
End Function
```

Automatic cursor connect for all windows

```
Function Window_OnCursorPosChange(TimePos)
```

```
Dim oCursor
```

```
For Each oCursor In Application.Windows
```

```
oCursor.cursor = TimePos
```

```
Application.LogText(oCursor.cursor)
```

```
Next
```

```
End Function
```

Automatic cursor snap

```
Function Window_OnCursorPosChange(TimePos)
```

```
Dim strMsg 'As String
```

```
Dim strInput 'As String
```

```
'Initialise the string
```

```
strMsg = "Number outside range. A number lower than 0 Or greater than 3 was entered. Press OK To enter the number again. Press Cancel To Exit"
```

```

'Prompt user for input..
strInput = InputBox("Enter The Round Desired.")

'check if the user selects "Cancel"

If strInput <> "" Then

    'Test value of input
    Do While strInput < 0 Or strInput > 3

        If MsgBox(strMsg, vbOKCancel, "Error!") = vbOK Then

            strInput = InputBox("Enter a number between 0 and 3.")

        Else

            Exit Function

        End If

    Loop

    'Display user input
    MsgBox "The Round Selected is " & strInput & "."

End If

Window.Cursor = Round (TimePos, strInput)

End Function

```

Automating reading of user data

The following function allows to automatically read a channel from a user-generated file (called "clientData.txt") if found in the WinTAX archive. The name of the OLE Channel and its frequency are loaded from the header of the file. This file is structured as follows:

EXTERNAL_GENERATED	//OLE Channel Name
100	//OLE Channel Frequency
284.30	//Sample
285.72	//Sample
284.63	
285.13	
...	

...

```
Function Application_OnLoadData(bsFileName)

Dim oData
Set oData = Application.CurrentData(0)

Dim oFilePath
Set oFilePath = oData.Properties( "FilePath" )

Dim sFilePath
sFilePath = oFilePath.Data
sFilePath = sFilePath & "clientData.txt"

Create_OLE_Channel_From_External_File( sFilePath )

End Function
```

```
Function Create_OLE_Channel_From_External_File( FileName ) 

On Error Resume Next
Err.Clear

Dim objFSO, objTextFile
Dim sRead, sReadLine, sReadAll
Const ForReading = 1, ForWriting = 2, ForAppending = 8

Set objFSO = CreateObject("Scripting.FileSystemObject")
Set objTextFile = objFSO.OpenTextFile( FileName, ForReading )

sReadLine = objTextFile.ReadLine
If Len(sReadLine) = 0 Then
    Exit Function
End If

Dim oChanOLE
Dim oLoad
Set oLoad = Application.CurrentData(0)
Set oChanOLE = oLoad.Channels.Add( sReadLine )

sReadLine = objTextFile.ReadLine
iRate = CInt(sReadLine)
oChanOLE.SampleRate = iRate

Dim iTime
iTime = 0

Do

sReadLine = objTextFile.ReadLine
```

```

If Len(sReadLine) > 0 Then

    If (iTime < oLoad.Time) Then

        oChanOLE.Value( iTime ) = CDbl( sReadLine )
        iTime = iTime + (1 / iRate)

    End If

End If

Loop Until (Len(sReadLine) = 0)

objTextFile.Close

End Function

```

Generate an Excel report

This example creates an Excel report triggered by the loading data event

```
Function Application_OnLoadData(bsFileName)
```

```
    Report_Excel(bsFileName)
```

```
End Function
```

```
Sub Report_Excel(bsFileName)
```

```
    Set oExcel = CreateObject("Excel.Application")
    oExcel.Visible = True
```

```
    Set oBooks = oExcel.WorkBooks
```

```
    oBooks.create("C:\Test.xls")
```

```
    Set oWorksheets = oExcel.Worksheets
```

```
    Set oWorksheet = oExcel.Sheets
```

```

Set FirstSheet = oWorksheet(1)
FirstSheet.Name = "Report From WTX4"

Set oCells = oExcel.Cells

Dim oChanA, oChanB, oChanC
Set oData = Application.CurrentData(0)

Set oChanA = oData.Channels("ABS")
Set oChanB = oData.Channels("LAP")
Set oChanC = oData.Channels("RPM")

oCells(2,1).value = oChanA.Value(0)
oCells(2,2).value = oChanB.Value(0)
oCells(2,3).value = oChanC.Value(0)

Set oExcel = Nothing

End Sub

```

Read and Write data from Excel

```

Sub Excel()

Dim oBooks, oBook, oExcel
Dim oWorksheet
Dim oWorksheets
Dim FirstSheet
Dim oCells, FirstCell, FirstCellMath

```

```
Dim i
```

```
i = InputBox ("Insert Number")
```

```
'create excel object
```

```
Set oExcel = CreateObject("Excel.Application")
```

```
oExcel.Visible = True
```

```
Set oBooks = oExcel.WorkBooks
```

```
oBooks.create("C:\TestRW.xls")
```

```
Set oWorksheets = oExcel.Worksheets
```

```
Set oWorksheet = oExcel.Sheets
```

```
Set FirstSheet = oWorksheet(1)
```

```
FirstSheet.Name = "Test Read_Write"
```

```
Set oCells = oExcel.Cells
```

```
Set FirstCell = oCells(1,1)
```

```
FirstCell.Value = i
```

```
Set FirstCellMath = oCells(1,2)
```

```
Dim myMsgBox
```

```
myMsgBox = MsgBox (FirstCellMath.Value, 48)
```

```
Set oExcel = Nothing
```

```
End Sub
```

Export a list of channels to ASCII file

In order to run this script

1. Create a file called Channel.Export containing the following lines:

2
rpm
Time

2. Copy the contents of the script into menu: General/setup/scripts
3. Copy the file "Channel.Export" in C:\WinTAX4\ or modify the script with the path desired
4. Modify the configuration file "Channel.Export" according to the own requirements:

The first row represents the number of channel exported

In the successive rows enter the name of the exported channels

4. Load some Data
5. Select this script in the toolbar "Select Macro"

```
Sub Export_Ascii()
Dim fso, f, r, rs, oNumChannels, oLen, oSpace, oSpaceSamples, oTime, oFreq, oRow,
oRowName, oLenValue, oLenSamples, oFileName, oMaxLen

Const ForReading = 1
Const ForWriting = 2

oFreq = InputBox ("Select the export frequency (Hz)")
oFileName = InputBox ("Select the export file name")

Set oData = Application.CurrentData(0)
oTime = Application.CurrentData(0).Time
Set fso = CreateObject("Scripting.FileSystemObject")
Set r = fso.OpenTextFile("Channels.Export", ForReading, True)
Set f = fso.OpenTextFile(oFileName & ".txt", ForWriting, True)

oNumChannels = r.readLine

#####
Dim oLabel(75)
oMaxLen = 1
For i = 1 To oNumChannels
    oLabel(i) = r.ReadLine
    oLen = Len(oLabel(i))
    If Len(oLabel(i)) > oMaxLen Then
        oMaxLen = Len(oLabel(i))
    End If
Next i
f.WriteLine(oNumChannels)
For i = 1 To oNumChannels
    f.WriteLine(oLabel(i))
Next i
f.Close()
```

```
    Next
    If oMaxLen < 7 Then
        oMaxLen = 10
    End If
```

```
    r.close
```

```
    oSpace = ""
    For ioLen = 0 To oMaxLen
        oSpace = oSpace + " "
    Next
```

```
    oRowName = ""
    For h = 1 To oNumChannels
        oRowName = oRowName & oLabel(h) & oSpace
    Next
```

```
    f.WriteLine(oRowName)
    f.WriteLine
```

```
For j = 0 To oTime Step (1/oFreq)
    oRow = ""
    For k = 1 To oNumChannels
        Set oChan = oData.Channels(oLabel(k))
        iValue = oChan.Value(j)

        If iValue = "-1,#QNAN" Then
            iValue = "NoRx"
        Else If oChan.Value(j) = "-1,#IND" Then
            iValue = "NoRx"
        End If
```

```
    oLenValue = Len(iValue)
    oLen = Len(oChan.Name)
    oLenSamples = oLen + oMaxLen - oLenValue
    oSpaceSamples = ""

    For ioLen = 0 to oLenSamples
        oSpaceSamples = oSpaceSamples + " "
    Next
```

```
    oRow = oRow & Replace(iValue, ",", ".") & oSpaceSamples
    Next
```

```
f.Writeline oRow  
Next  
  
MsgBox "Export Finished"  
End Sub
```

Export channels to ASCII file

This script is intended for the Graph windows. It automatically exports all the channels contained in the waveform to an ASCII files (extension *.m) whenever a lap ends.

```
Function Application_OnNewLap(sFile)  
  
Dim oData, oTime, oFileName, fso, oDoc, oLabels, Label, oChan, oFreq, f, iValue  
Const ForWriting = 2  
Set fso = CreateObject("Scripting.FileSystemObject")  
  
Set oData = Application.CurrentData(0)  
oTime = Application.CurrentData(0).Time  
  
Set oDoc = CreateObject("MSXML.DOMDocument")  
oDoc.async = False  
oDoc.loadXML Window.XML  
  
Set oLabels = oDoc.getElementsByTagName("Label")  
  
For Each Label In oLabels  
  
If Label.Text <> "" Then  
Set oChan = oData.Channels(Label.Text)  
oFreq = oChan.SampleRate  
  
oFileName = "\Export\" & oChan.Name & ".m"
```

```
Set f = fso.OpenTextFile(oFileName, ForWriting, True)
```

```
For j = 0 To oTime Step (1/oFreq)
```

```
iValue = oChan.Value(j)
```

```
If iValue = "-1,#QNAN" Then
```

```
iValue = "Nan"
```

```
Else If oChan.Value(j) = "-1,#IND" Then
```

```
iValue = "Nan"
```

```
End If
```

```
f.WriteLine (Replace(iValue, ",", "."))
```

```
Next
```

```
End If
```

```
Next
```

```
MsgBox "Export Finished"
```

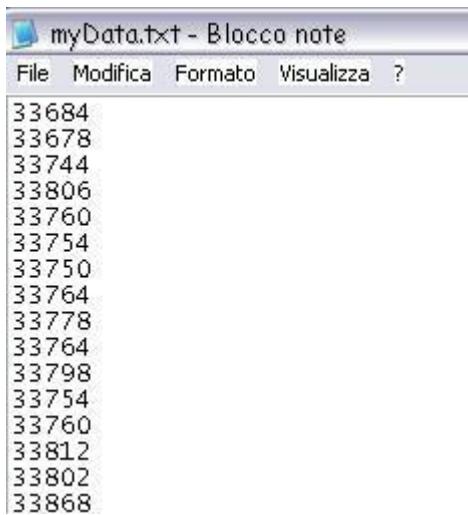
```
End Function
```

Calculate the Power Spectral Density in Matlab

This example calculates a PSD spectrum using MATLAB

In order to run this script

1. Copy the script into menu: General/setup/scripts
2. Create a text file called "myData.txt" in c:\ containing one column of values, e.g.



myData.txt - Blocco note
File Modifica Formato Visualizza ?
33684
33678
33744
33806
33760
33754
33750
33764
33778
33764
33798
33754
33760
33812
33802
33868

3. Load some Data
4. Select the script desired into the toolbar “Select Macro”

```
Sub Matlab_PSD()
```

```
Dim Math
```

```
Set Math = CreateObject("matlab.application")
```

```
Math.Visible = True
```

```
Math.Execute("clear all")
```

```
Math.Execute("in_file='C:\myData.txt'")
```

```
Math.Execute("in_file_p=fopen(in_file,'r')")
```

```
Math.Execute("y=fscanf(in_file_p,'%f')")
```

```
Math.Execute("fclose(in_file_p)")
```

```
Math.Execute("Subplot(2,1,1)")
```

```
Math.Execute("plot(y)")
```

```
Math.Execute("xlabel('Time [Sec]')")
```

```
Math.Execute("ylabel('Amplitude [m/sec^2]')")
```

```
Math.Execute("a = fft(y,512)/100")
```

```
Math.Execute("Pyy =(a.* conj(a))/512")
```

```

Math.Execute("Subplot(2,1,2)")

Math.Execute("plot(10*log10(Pyy))")

Math.Execute(" xlabel('Frequency [Hz]')")

Math.Execute(" ylabel('Power Spectral Density [dB/Hz]')")

MsgBox "Exit From Matlab"

End Sub

```

Reading Matlab file (*.mat) in WinTAX

This script reads the content of an example of a Matlab binary file (MAT), called "RPM.mat". It is a mono dimensional array of samples.

The content of "RPM.mat" is read by WinTAX and imported as an OLE Channel, called "Read_From_MatFile"

```

Sub ReadMATFiles()

Dim oData, oTime, oChannel, myVar, Math, oChanOLE

Set oData = Application.CurrentData(0)
oTime = Application.CurrentData(0).Time
oFreq = 200

Set oChanOLE = oData.Channels.Add("Read_From_MatFile")
oChanOLE.SampleRate = oFreq

Set Math = CreateObject("matlab.application")

Math.Visible = False

'read MAT file from disk...
Math.Execute("load('C:\RPM.mat')")

'extract the content of MAT files...
Math.GetWorkspaceData "WTXArray", "base", myVar

oChanOLE.Values(0, oTime) = myVar

End Sub

```

Saving WinTAX Channels in Matlab file (*.mat)

This script saves the "RPM" channel into the mat file "WinTAX4_RPM.mat" in C:\ drive

```
Sub SaveMATFiles()
    Dim oData, oTime, oChannel, myVar, Math
    Set oData = Application.CurrentData(0)
    oTime = Application.CurrentData(0).Time
    Set oChannel = oData.Channels("RPM")
    myVar = oChannel.Values(0, oTime)
    Set Math = CreateObject("matlab.application")
    Math.Visible = False
    Math.PutWorkspaceData "WTXArray", "base", myVar
    Math.Execute("save('c:\WinTAX4_RPM.mat', 'WTXArray')")
End Sub
```

Read and Write data from ASCII file

```
Sub TXT()
    Const ForReading = 1
    Const ForWriting = 2
    Dim fso, f, ra
    Set fso = CreateObject("Scripting.FileSystemObject")
    'create an ASCII file...
    Set f = fso.CreateTextFile("c:\testfile.txt", ForWriting, True)
    f.Write "OK!!" & vbCrLf & "WINTAX4!" & vbCrLf
    'read the content of the ASCII file
```

```

Set f = fso.OpenTextFile("c:\testfile.txt", ForReading)
ra = f.ReadAll
GetLine = f.Line

MsgBox ra

End Sub

```

Using the Windows Shell

```

Sub Test_Call_NOTEPADE
    Dim WshShell, oExec
    Set WshShell = CreateObject("WScript.Shell")
    Set oExec = WshShell.Exec("notepad")

End Sub

```

VCH by Scripts

Using `IWTXChannel::SetValuesMath` method to put into WinTAX OLE Channels the math expressions.

```

Sub TestSetValuesMath()
    Dim oChanScript, oLoad, sExpression

    Set oLoad = Application.CurrentData(0)
    Set oChanScript = oLoad.Channels.Add( "MyChanScript" )
    oChanScript.SampleRate = 100

    ' Set initial values in oChanScript from a VCH expression:
    sExpression = "=IFGT(DERIV(Gear),0)"
    oChanScript.SetValuesMath( sExpression )

    ' Change initial values In oChanScript via VBScript language...

```

```
oChanScript.Value(0) = -2  
oChanScript.Value(0.01) = -1  
oChanScript.Value(0.02) = 0
```

End Sub

JAVA Script Example

This example returns the position of the cursor using Java as language for scripting

In order to run this script:

1. Set the Script Language as Java Script in Wintax4 menu: *General Setup/General Option/Script language*
2. Restart WinTAX4
3. Copy the script for example in a Graph window
4. Load Data
5. Move the cursor
- 6.

```
function Window::OnCursorPosChange(TimePos)  
{  
    var oData;  
    var oChan;  
    var iValues;  
  
    oData = Application.CurrentData(0);  
  
    oChan = oData.Channels("rpm");  
  
    iValues = oChan.Value( TimePos );  
  
    Application.LogText( iValues );  
}
```

OLE Automation Examples

Full documentation is provided in the Automation Interfaces technical reference installed in the WinTAX4/docs directory.

Automation examples

Add WinTAX channels from Excel

Read WinTAX channels from Excel

Add WinTAX channels from Matlab

Read WinTAX channels from Matlab

Add WinTAX channels from Excel

The following Excel routine allows to put data in WinTAX via OLE Channels

```
Sub AddChannels()
    Dim oWintax As Object
    Dim oStartTime, oTime, oFileName

    Set oWintax = CreateObject("wintax4.Application")
    oWintax.Visible = True
    'Open a WinTAX4 lap...
    oStartTime = "C:\WinTAX4\Data\Track\Session\Car\Run\Lap\cableData.ztx"
    oWintax.Open (oStartTime)

    Set oData = oWintax.CurrentData(0)
    oTime = oData.Time
    Dim oChanOLE As WTXChannel
    Dim oFreq, oLBuffer As Integer
    oFreq = 100
    oLBuffer = oFreq * oTime
```

```

Dim buffer(oLBuffer)

Set oChanOLE = oData.Channels.Add("ExcelTest")
oChanOLE.SampleRate = oFreq

For i = 0 To Round(oLBuffer, 0)
    buffer(i) = i
Next
oChanOLE.Values(0, oTime) = buffer
End Sub

```

Add WinTAX channels from MATLAB

The following MATLAB routine allows to put data in WinTAX via OLE Channels

```

%%%%%%%
%%%Matlab Example used to put Data to WinTAX4 from Matlab%%%%%
%%%%%%%
%%%%%%%
%%%%%This example needs to have WinTAX open with a loaded lap %%%%
%%%%%%%
clear;
%%%%%Create WinTAX4 Server Object..
oWTX4 = actxserver('WinTax4.Application');
oWTX4.visible = 'TRUE';

%%%%% get the current DataSet Loaded in WinTAX4..
myData = oWTX4.CurrentData;
myDataLoad = invoke(myData, 'Item', 0);

```

```

%%%%% LapTime is..
myDataLoadTime = get(myDataLoad, 'Time' );

MyChannels = get(myDataLoad, 'Channels');

%%%%% My OLE Channel Name is..
MyChannelMatlab = invoke(MyChannels, 'Add', 'OleChannelTest');
MyChannel = invoke(MyChannels, 'Item', 'OleChannelTest');

%%%%% My OLE Channel SampleRate = 1 HZ
set(MyChannel, 'SampleRate', 1);

start = 0;
finish = myDataLoadTime;

%%%%% create a ramp vector with length = LapTime
for i = 1: myDataLoadTime
    vector(i) = i;
end

%%%%% Put the vector in WinTAX4
set(MyChannel, 'Values', 0, finish, vector);

```

Read WinTAX channels from Excel

The following Excel routine allows to read WinTAX data

Sub ReadChannels()

```

Dim oWintax As Object
Dim oStartData, oTime, oFileName

```

```
Set oWintax = CreateObject("wintax4.Application")
oWintax.Visible = True
'Open a WinTAX4 lap...
oStartData = "C:\WinTAX4\Data\Track\Session\Car\Run\Lap\cableData.ztx"
oWintax.Open (oStartData)
```

```
Set oData = oWintax.CurrentData(0)
```

```
Dim myChannel As WTXChannel
'only for demonstration purpose, get the channel "RPM" ..
Set myChannel = oData.Channels("RPM")
'only for demonstration purpose, the first value of RPM" is..
FirstValue = myChannel.Value(0)
MsgBox FirstValue
```

```
End Sub
```

Read WinTAX channels from Matlab

The following Matlab routine allows to read WinTAX data

```
%%%%%%%
%%%%%%Matlab Example used to read Data from WinTAX4%%%%%
%%%%%%%
%%%%%%%
%%%%%This example needs to have WinTAX4 open with a loaded lap %%%%%%
%%%%%%%
clear;
%%%%%Create WinTAX4 Server Object..
oWTX4 = actxserver('WinTax4.Application');
```

```

oWTX4.visible = 'TRUE';

%%%%%%%%%%%%%%%
%%%%%%Get the Data From WinTAX4.....



%%%%%% get the current DataSet Loaded in WinTAX4..
myData = oWTX4.CurrentData;
myDataLoad = invoke(myData, 'Item', 0);

%%%%% LapTime is..
myDataLoadTime = get(myDataLoad, 'Time' );
MyChannels = get(myDataLoad, 'Channels');

%%%%% only for demonstration purpose, get the channel "RPM"..
MyChannel = invoke(MyChannels, 'Item', 'RPM')

%%%%% "RPM" SampleRate is..
MyChannelFreq = get(MyChannel, 'SampleRate')

%%%%% extract the buffer of samples by "RPM"..
MyChannelValues = invoke(MyChannel, 'Values', 0, myDataLoadTime);

%%%%% only for demonstration purpose, the first value of "RPM" is..
FirstSample = MyChannelValues{1};

```

Export Formats

WinTAX .BIN file format

File structure

The WinTAX binary export file uses the extension *.bin. Each file represents one ‘lap’ of data. The file is structured in three parts:

File header

It contains general information about the lap.

Channel header

Describes sampling and representation information for each individual channel in a sequence of 32-byte records.

A maximum of 1024+1 channels may be contained in the file. The additional channel is a status channel as described below.

Data are represented as **integer** variables. The value of the decimal field of the channel header is used to represent floating point values up to a maximum of 3 decimal places (i.e. if decimal=3 then the integer data value must be divided by 1000 to obtain the real value).

Data

The data are written as a series of samples from each time point. The time interval is determined by the channel with the highest sampling rate. Time points are not written explicitly and the time interval must be derived from the channel header. At each time point, channel samples are written according to the order in which they appear in the channel header.

At any given time point, only those channels which are sampled are written (i.e. there is no filling in at intermediate time points). If all channels are sampled at the same rate, then each time point contains one sample from each channel.

examples: equal sampling rates; different sampling rates

File contents

The contents of the file are described in the table below and two cases are shown in the following examples.

LABEL	BYTES	DESCRIPTION
File header		
File comment	32	Fill with NULL chars
N_chan	2	Number of channels
Lap_length	4	Lap length [milliseconds]
Reserved	10	Reserved
Channel header		
Freq	2	[1,2,5,10,20,50,100,200,500,1000,2000,5000,10000] Hz
Decimals	1	0 £ dec £ 7
Output format	1	0=Hex 1=Hex leading zeroes 2=Dec 3=Dec leading zeroes 4=ASCII 5=Binary
Type	1	0x0=Byte (unsigned 1 byte) 0x1=Char (signed 1 byte) 0x2=Word (unsigned 2 bytes) 0x3=Short (signed 2 bytes) 0x4=Dword (unsigned 4 bytes) 0x5=Long (signed 4 bytes) 0xFF=Status channel (unsigned 1 byte)
Reserved	11	Reserved
Label	16	Channel name
Data		

Status channel

One of the options in the *Type* field is shown as *Status channel* (1 byte). This feature is used by WinTAX to provide additional information about all of the other channels at any particular sample point, in particular it is used to flag invalid data points such as radio drop-out in telemetry data. The value of *Status* determines how all other data points in the current sample should be interpreted.

The *Status* channel is optional and may be given any valid name. If not present in the table, all data points will be interpreted as being good. This channel may be used by external applications which use the export file to identify sample points which should be ignored.

The Status channel may assume the following values

VALUE	MEANING
0	Valid data points
1	No-Rx – radio drop out
2	Err – invalid data points

WinTAX will typically generate the *Status channel* at the maximum sampling rate found in the table so that the shortest duration *No-Rx* will be equivalent to one sample of the fastest channel. If a *.bin file is created where *Status* is generated at a different, lower sampling rate then the shortest *No-Rx* drop-out may include several good samples of faster channels. This situation is unlikely to occur since data created by an external application (e.g. a simulation program) is unlikely to simulate radio drop-out or error conditions.

Example: different sampling rates

Ch1 = 1 Hz (byte)

Ch2 = 10 Hz (word)

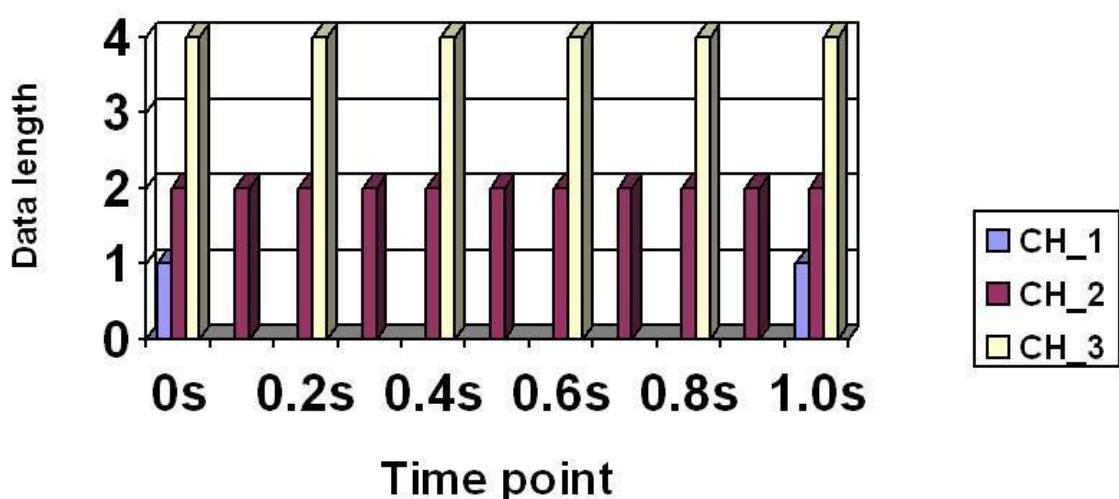
Ch3 = 5 Hz (long)

Samples are ordered by channel and sampling rate.

Min sampling interval = 0.1 s

The example shows samples from one second of data.

Independent sampling rates



Data		
Time point [s]	Data sample	Length
0.0	Ch1_sample1	1
	Ch2_sample1	2
	Ch3_sample1	4
0.1	Ch2_sample2	2
0.2	Ch2_sample3	2
	Ch3_sample2	4
0.3	Ch2_sample4	2
0.4	Ch2_sample5	2
	Ch3_sample3	4
0.5	Ch2_sample6	2
0.6	Ch2_sample7	2
	Ch3_sample4	4
0.7	Ch2_sample8	2
0.8	Ch2_sample9	2
	Ch3_sample5	4
0.9	Ch2_sample10	2
1.0	Ch1_sample2	1
	Ch2_sample11	2
	Ch2_sample6	4

Example: equal sampling rates

Ch1 = 5 Hz (byte)

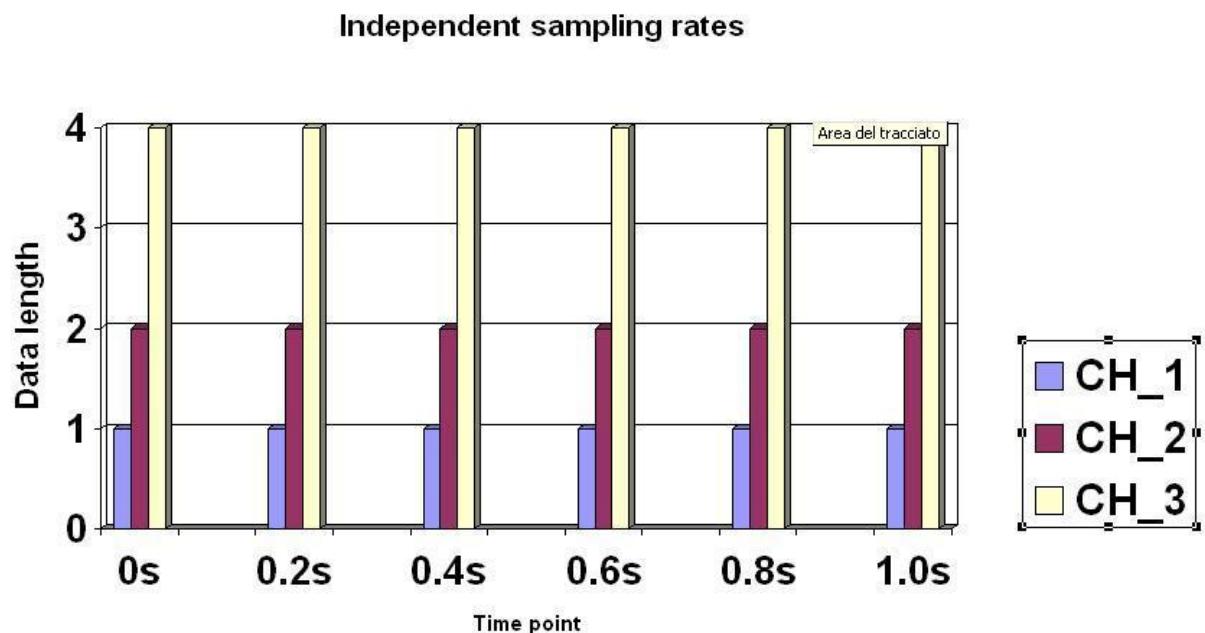
Ch2 = 5 Hz (word)

Ch3 = 5 Hz (long)

Samples are ordered by channel and sampling rate.

Min sampling interval = 0.2 s

The example shows samples from one second of data.



Data		
Time point [s]	Data sample	Length
0.0	Ch1_sample1	1
	Ch2_sample1	2
	Ch3_sample1	4
0.2	Ch1_sample2	1
	Ch2_sample2	2
	Ch3_sample2	4
0.4	Ch1_sample3	1
	Ch2_sample3	2
	Ch3_sample3	4
0.6	Ch1_sample4	1
	Ch2_sample4	2
	Ch3_sample4	4
0.8	Ch1_sample5	1
	Ch2_sample5	2
	Ch3_sample5	4
1.0	Ch1_sample6	1
	Ch2_sample6	2
	Ch3_sample6	4

EXP Import Export

To transfer parts of a WinTAX archive from one PC to another use the EXP file format containing ZTX files together with context information.

Exporting

Two export commands are available from the *Data Browser*

Export all channels to a single EXP file for each run.

1. Open the Data Browser
2. Select the laps to be exported
3. Select *Tools/Export/Export to EXP:*
4. Select the destination folder and file name.

Export selected channels to a single EXP file for each run.

1. Open the Data Browser
2. Select the laps you want to export
3. Select *Tools/Export/Export Channels to EXP:*
4. Select the destination folder and filename.

Importing

Export selected channels to a single EXP file for each run.

From DataBrowser: *Tools/Import/Import from EXP:* imports one or more EXP files. The import operation expands xml and ztx files in a complete folder structure with Track / Session / Car / Run / Lap. The user is asked to select the destination root folder.

In the Acquisition Manager tool, two new RX-Tasks allow to automate the export of EXP files.

\$AbsTime in Excel

Copying data to clipboard when the Absolute (Date/Time) option is selected in a Graph window will give a timestamp expressed in seconds from 1/1/1970, e.g.

Time		 rpm
1102063392.436	16742	
1102063392.446	16793	
1102063392.456	16799	
1102063392.466	16762	
1102063392.476	16772	

When using an Excel sheet, convert the time vector before it can be formatted as a date/time.

To do this:

1. convert from seconds to days (i.e. divide by $24 \times 60 \times 60 = 86,400$)
2. add the date value of 1/1/1970 = DATE(1970,1,1) = 25569
3. format as required, e.g. d/m/y h:mm:ss.000
4. thus 1102063392.456 becomes 3/12/04 8:43:12.456

External components

MPS

The main function of the MPS (*Marelli Pit System*) application is to show the telemetry data acquired and exported by WinTAX through *Pit System*.

To start a working session with MPS, first of all set at least one reference directory that will be used by the application to import the telemetry data. The environment to carry out this operation can be reached from the *Setup/Directory Setup menu*.

MPS offers to the user four analysis windows:

- **Pit List:** is similar to the WinTAX Lap Report and shows the data exported with this kind of configuration
- **Alphanumeric:** shows the data of the real time channels exported by WinTAX and the possible alarm
- **Circuit:** circuit window; the position of the cars is up-dated only with the real time data
- **Trend:** shows the data exported with the Trend configuration

When a display window is open, the user can select the data source to be associated with the window.

The selection can be done through a pop-up menu that displays the reference directories configured by the user. To ease to the user the selection of the right directory, each line can contain additional information about the content of the directory.

The Circuit window is a special case because it can show at the same time the position of three cars, so three different directories can be configured from those the window will read the data.

Each MPS window, once opened, automatically shows the up-dated information with no need of intervention by the user.

TelDataX

TelDataX is a COM component which allows to read WinTAX data archives (ZTX and DTX) from your own custom built applications. If WinTAX is installed also the math channel libraries can be used.

The TelDataX Programmer's Reference can be found in the WinTAX4\docs directory

Example code and applications are found in the WinTAX4\samples directory

TelDataX is an optional component and is supplied as a **separate licence** from WinTAX4.

TelDataZTX

TelDataZTX is a WIN32 DLL which allows to write WinTAX data archives (ZTX) from your own custom built applications.

The TelDataZTX Programmer's Reference can be found in the WinTAX4\docs directory

Example code and applications are found in the WinTAX4\samples directory

TelDataZTX is an optional component and is supplied as a **separate licence** from WinTAX4.

TelDSTClient

TelDSTClient is a COM component which allows the access to real time data directly from the user's own application.

The TelDSTClient Programmer's Reference can be found in the WinTAX4\docs directory

Example code and applications are found in the WinTAX4\samples directory

TelDSTClient is an optional component and is supplied as a **separate licence** from WinTAX4.

TelRTCClient

TelRTCClient is a COM component which allows to push real-time data in WinTAX from your own custom built applications. Data could be in addition to the real time telemetry coming from the Car.

The TelRTCClient Programmer's Reference can be found in the WinTAX4\docs directory

Example code and applications are found in the WinTAX4\samples directory

TelRTCClient is an optional component and is supplied as a **separate licence** from WinTAX4.

VBA Engine

This chapter describes the Microsoft Visual Basic for Applications (VBA) included in WinTAX4 project. Unlike VBScript, which is a standard and free scripting technology designed for generic scripting, VBA offers the power of the Visual Basic language inside the context of the containing application, and is especially designed to be run inside Windows desktop applications. The same VBA engine is used in Microsoft Office applications (Access, Excel, FrontPage, PowerPoint, Outlook and Word) and can offer further functions such as a dedicated IDE, debugging and forms.

VBA Registration

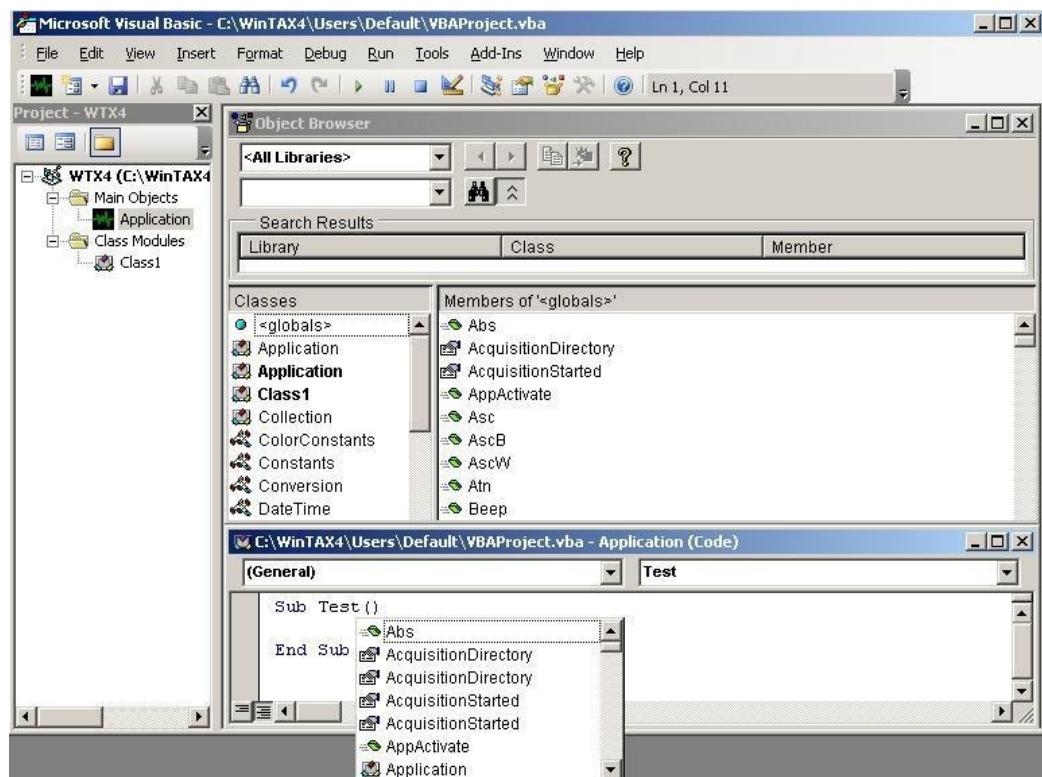
To use the VBA Engine, WinTAX license must include VBA. VBA must be registered before use. The registering might be effected either when registering WinTAX and or at any time afterwards by selecting the **Register VBA** command from the *Help* menu.

Hosting VBA Scripts

WinTAX4 is enabled to include VBA support, so it will be able to edit and run applications written in VBA.

The WinTAX4 release hosting VBA will be enabled to:

- Manage a VBA project with standard VBA editor. (menu *Tools/Macro/Visual Basic Editor...* (*CTRL+F11*)). The editor contains standard VBA features such as syntax checking, Object Browser, color-coded syntax and suggestions.



- Run VBA projects connected to WinTAX4 Automation object model. Scripts can be carried out via event notifications connected to the main application or directly by calling subroutines written in VBA.

In order to simplify the VBA project management, WinTAX will manage a single VBA project for each user. The VBA project will contain a single VBA application capable of receiving windows and application notifications, with subroutines that can be manually called via drop down list or configurable keyboard shortcuts. A single project can also implement its own forms for custom data entry.

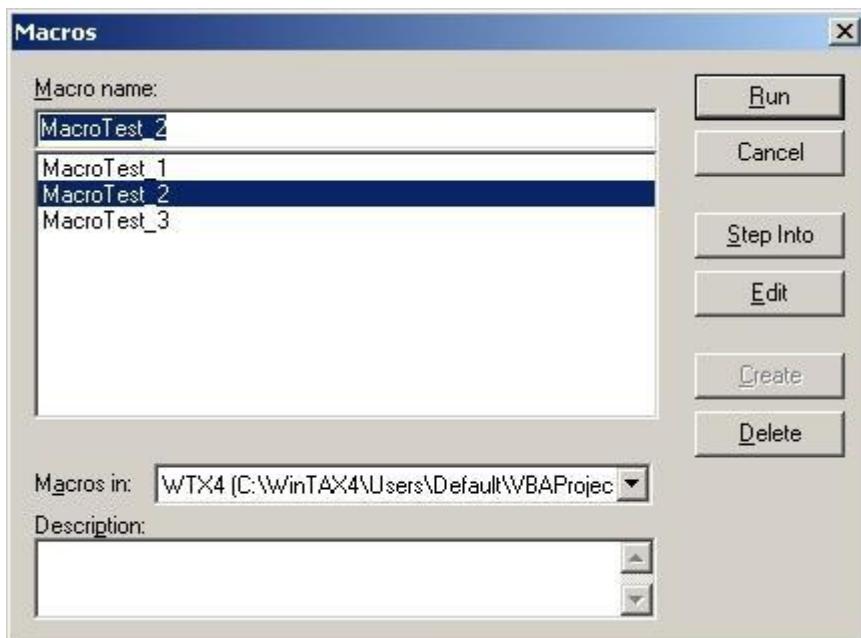
Every VBA project is saved on a single binary file inside the User folder. The project file format is not 'open', and the only tool allowed to modify contents is the VBA IDE.

Current scripting engine will still be available, and will coexist with VBA projects. It is not necessary to port scripts to VBA unless required. However, these engines are completely separated and can refer to the same WinTAX objects exposed via Automation: although WinTAX can easily manage any conflict, it may be useful to choose only a single engine for user customizations.

- Install VBA binaries together with WinTAX release. Installation features such as repair / uninstall are provided.

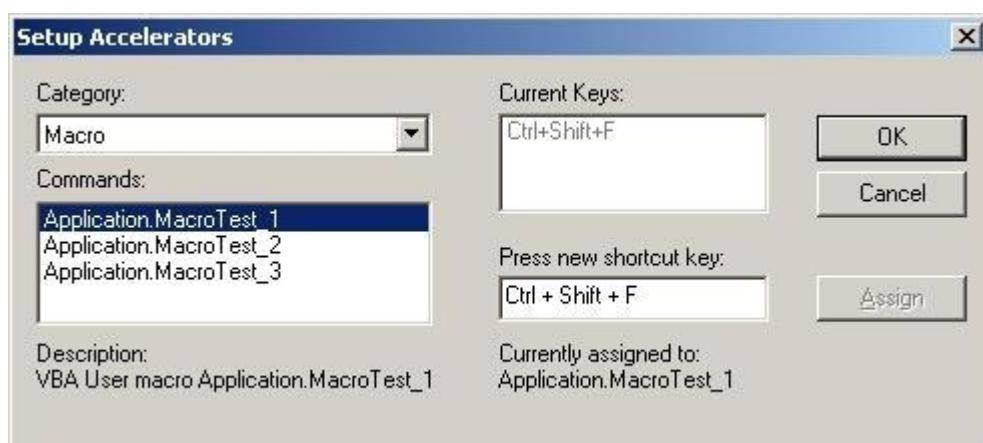
Using MACROS

Open the WinTAX menu: *Tools/Macro/Visual Basic Macro*. The list of the available macros is displayed and it's possible to *Run*, *Step Into* (debug mode), *Edit*, and *Delete* them



Link MACROS to shortcut keys

Open the menu: *Tools/Macro/Configure Accelerators*. Select a macro and configure a keyboard shortcut



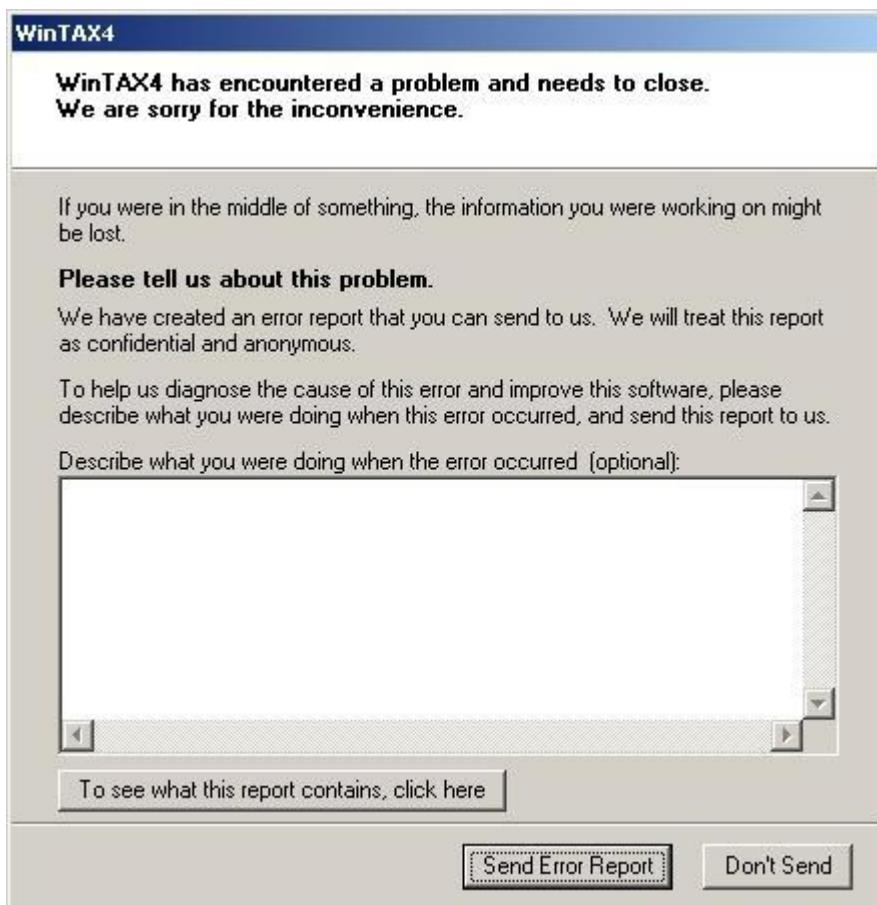
Command line

Parameter	Description	Example
<file.dtx>	Load the specified data file (ZTX or DTX, other file formats are ignored).	WinTAXx4 c:\WinTAX4\data\track\session\car\run_003\lap_00001234_00023\cabledata.ztx
<cabledata.ztx>	Specify full path to ZTX file.	WinTAX4 c:\WinTAX4\data\track\session\car\2405201T.DTX
<file.wly>	To open the specified .WLY layout file, just specify the file name to load a layout from the current user directory. To load a layout from another user specify the full path	WinTAX4 myLayout.wly WinTAX4 c:\WinTAX4\users\another\hisLayout.wly
-curtime<F>	To place the analysis window cursor in the specified position (value expressed in seconds)	WinTAX4 -curtime10.5
-starttime<F>	To zoom in the current analysis windows to the specified limits (values expressed in seconds)	WinTAX4 -curtime10.5 -starttime0 -endtime 20
-endtime<F>		
-password	To open the Select Password window	Wintax4 -password
-FreezeDST	Creates a (user-defined) data file in the WinTAX4\work directory containing the DST data from last track marker beacon to	C:\WinTAX4\WinTAX4 c:\WinTAX4\data\dstData.ztx -FreezeDST Saves dstData.ztx in c:\WinTAX4\data\ and loads the file to memory.

	current instant. The file is automatically loaded and displayed by WinTAX.	
-Filter[all cable dst]	Sets data type filter (all/cable/dst) for WinTAX4. It is used to ensure that when you load a data file of a certain type, any operation such as lap +/-, lap reports does not include other ztx file types.	WinTAX4 -filter [dst] WinTAX4 -filter [dst]
-LoadLastLayout	Opens the last layout of current user.	WinTAX4 c:\WinTAX4\data\track\session\car\run_003\lap_00001234_00023\cabledata.ztx -LoadLastLayout
-QuitApp	Closes WinTAX application.	WinTAX4 -QuitApp
-setlanguage	Opens the window for selecting languages.	WinTAX4 -setlanguage

System Dump

In the shipped version, WinTAX4 may have some crashes that are not visible during the development. To fix the problems, the development team needs to know where the program is crashing. WinTAX4 requires to catch every exception after a crash in the main routine of its executable modules, and needs to create a record of information through the use of an API called MiniDumpWriteDump contained in a Microsoft module called dbghelp.dll. This information can help to quickly fix the problem. The information dump are automatically saved in the \WinTAX4\Dump directory, where \WinTAX4\ is the working folder which contains WinTAX4.exe. When a crash situation is captured, the WinTAX4 crash manager tool can also send an e-mail (after a confirmation) to the support team with all the information needed. To configure e-mail for system dump see central_configuration.xml.



The default filename format for minidump files will be:

[COMPUTER]_[COMPONENT]_[VERSION]_YYMMDD_HHMMSS.dmp

Where [COMPUTER] is the computer name in which WinTAX is run, and [COMPONENT] is a three letter word that identifies the WinTAX component that crashed. An example of dump file will be: PC1_WTX_4.0.3.1_061221_153956.dmp.

Examples

Equal sampling rates

Ch1 = 5 Hz (byte)

Ch2 = 5 Hz (word)

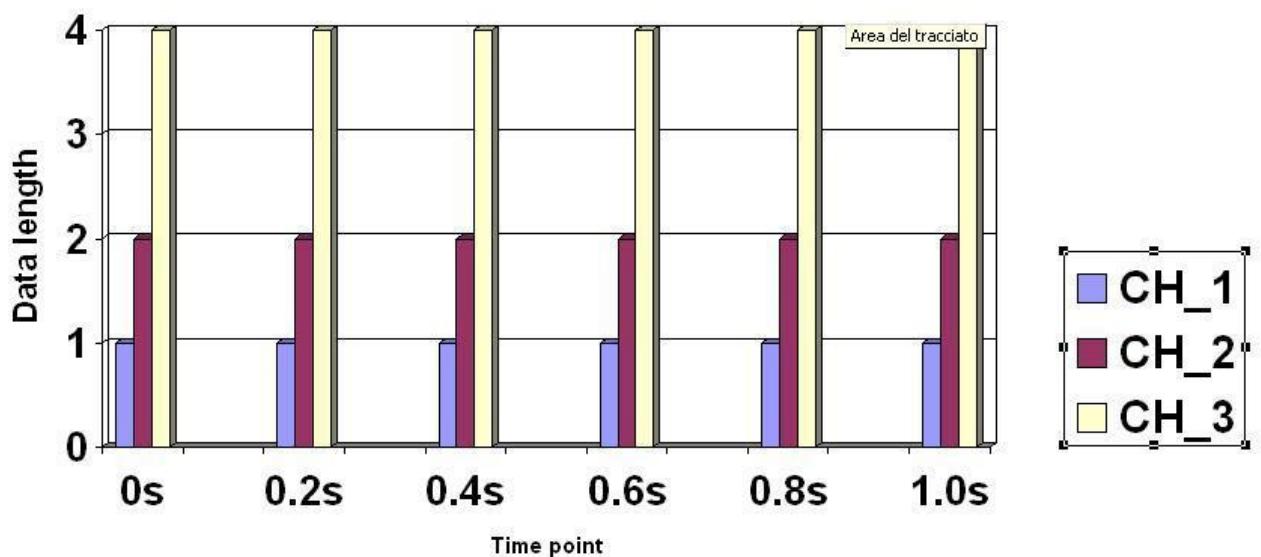
Ch3 = 5 Hz (long)

Samples are ordered by channel and sampling rate.

Min sampling interval = 0.2 s

The example shows samples from one second of data.

Independent sampling rates



Data		
Time point [s]	Data sample	Length
0.0	Ch1_sample1	1
	Ch2_sample1	2
	Ch3_sample1	4
0.2	Ch1_sample2	1
	Ch2_sample2	2
	Ch3_sample2	4
0.4	Ch1_sample3	1
	Ch2_sample3	2
	Ch3_sample3	4
0.6	Ch1_sample4	1
	Ch2_sample4	2
	Ch3_sample4	4
0.8	Ch1_sample5	1
	Ch2_sample5	2
	Ch3_sample5	4
1.0	Ch1_sample6	1
	Ch2_sample6	2
	Ch3_sample6	4

Different sampling rates

back

Ch1 = 1 Hz (byte)

Ch2 = 10 Hz (word)

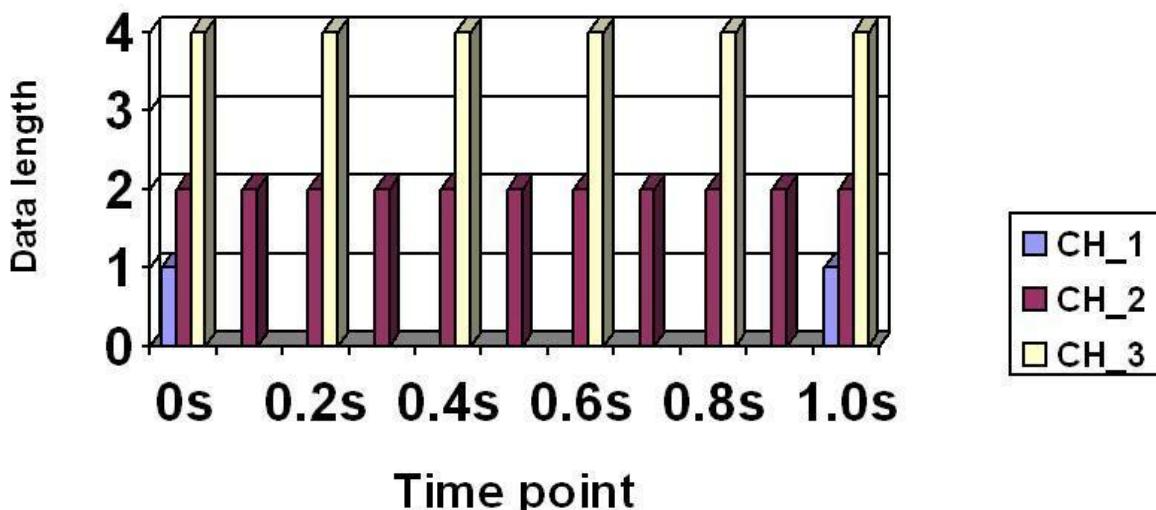
Ch3 = 5 Hz (long)

Samples are ordered by channel and sampling rate.

Min sampling interval = 0.1 s

The example shows samples from one second of data.

Independent sampling rates



Data		
Time point [s]	Data sample	Length
0.0	Ch1_sample1	1
	Ch2_sample1	2
	Ch3_sample1	4
0.1	Ch2_sample2	2
0.2	Ch2_sample3	2
	Ch3_sample2	4
0.3	Ch2_sample4	2
0.4	Ch2_sample5	2
	Ch3_sample3	4
0.5	Ch2_sample6	2
0.6	Ch2_sample7	2
	Ch3_sample4	4
0.7	Ch2_sample8	2
0.8	Ch2_sample9	2
	Ch3_sample5	4
0.9	Ch2_sample10	2
1.0	Ch1_sample2	1
	Ch2_sample11	2
	Ch2_sample6	4

User Records in math expression

Example of how to use the User Records in math expression In principle the content of the User Records can be used in Virtual Channels by means of @ operator

For example the User can define a virtual channel as following

myVCH = RPM + @demo

demo is a "User Records" where you can define a number or a formula

$$\text{demo} = 1000 \quad \rightarrow \text{myVCH} = \text{RPM} + 1000$$

demo = Integ(Speed)/3.14 -> myVCH = RPM + Integ(Speed)/3.14

User Records in lookups

The User Records can be also used in combination with lookups files. In this case, there are two ways of work:

- ## 1. WinTAX Virtual Channel: **myVirtual = @Test**

WinTAX User Records:

Test = Lookup1("file1", RPM)

The channel “myVirtual” extracts the content of the User Records “Test” and calculates the formula described by the string returned from the User Records (in this example 1 dimensional Lookup table, called “file1”). In this approach the User can change each run the expression of the User Records, forcing WinTAX to use different sets of lookup tables. For Example in the next run the formula should be

Test = Lookup1(“file2”, PRM)

Test = Lookup1("file2", RPM)

Win

2. WinTAX Virtual Channel
myVirtual = Lookup1(@Test, RPM)

WinTAX User Records

Test = “file1”

Also in this approach the User can change each run the expression of the User Record: "file1", "file2", "file3" ... forcing WinTAX to use run by run different lookup files

Recursive infinite response filter (IIR Ip, first order)

Example of how to use the VCH programming language

```
// Example of recursive infinite response filter (IIR low pass, first order)
```

```
// Variable Declaration
```

```
dim val_filt;  
dim pre_val_filt;  
dim val_raw;
```

```
// "cut_freq" is the Cutoff frequency of filter
```

```
dim cut_freq;  
cut_freq = 0.1;
```

```
// Filter coefficients declaration
```

```
dim a0;  
dim b1;  
dim X;
```

```
// Filter coefficients calculation
```

```
val_raw = val_filt = Laterl_Acceleration;  
X = 1 / (1 + 2 * pi * cut_freq/chfreq(Laterl_Acceleration));  
a0 = 1-X;  
b1 = X;  
if( !isnan(val_raw) && !isnan(pre_val_filt) )  
{ val_filt = a0* val_raw + b1 * pre_val_filt; }  
pre_val_filt = val_filt;  
return val_filt;
```